Base Load Power Hub (BLPH)

EQUIPMENT MANUFACTURER RECORD BOOK
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-QC-LIS-00025

Document Class: 2

00	26/05/2025	Issue for Review (IFR)	JCD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Table of contents

1. DESIGN DOSSIER				Page Number	
				From	To
Sub Sub-Section No.	Document No.	Document Title (Section Description)	Rev. No.		
1.1. LIST				**6**	**6**
1.1.1	1724000936-MD-LIS-00001	Supplier Master index Register (SMIR)	01	07	11
1.1.2	-	Sub-supplier list & Unpriced PO	00	12	25
1.1.3	1724000936-MAC-LIS-00017	Electrical Load List	03	26	29
1.1.4	1724000936-MAC-LIS-00030	Special Tools List (Pump and Motor)	00	30	39
1.1.5	1724000936-MAC-LIS-00026	Vendor Asset Register	02	40	42
1.2. DRAWINGS				**43**	**43**
1.2.1	1724000936-MAC-DA-00004	General Arrangement and Dimensional Outline Drawings	03	44	48
1.2.2	1724000936-MAC-DD-00006	Pump Cross Sectional Drawing and Bill of Material (Including Speed Reducer)	01	49	53
1.2.3	1724000936-MAC-DG-00005	Motor Outline Drawing and Wiring Diagram	02	54	58
1.2.4	1724000936-MAC-DD-00007	Shaft Seal Drawing and Bills of Material (Including Flushing Plan 51)	03	59	62
1.2.5	1724000936-MAC-DD-00009	Speed Reducer Assembly Drawing and Bill of Materials	01	63	67
1.2.6	1724000936-MAC-DD-00008	Shaft Coupling Assembly Drawing and Bill of Materials	01	68	75
1.2.7	1724000936-MAC-DD-00011	Heating Jacket System Detailed Drawing (Including Electrical Connections)	01	76	88
1.3. DATA SHEET				**89**	**89**
1.3.1	1724000936-MAC-DS-00012	Pump Data Sheets Including Weight Data Sheet	02	90	96
1.3.2	1724000936-MAC-DS-00013	Pump and Motor Noise Data Sheet	03	97	99
1.3.3	1724000936-MAC-DS-00014	Electric Motor Data Sheet	03	100	103
1.3.4	1724000936-MAC-DS-00034	PSV Data Sheet	01	104	107
1.4. EQUIPMENT PERFORMANCE DATA				**108**	**108**
1.4.1	1724000936-MAC-DS-00015	Pump Performance Curves	03	109	111
1.4.2	1724000936-MAC-DS-00016	Electric Motor Performance Data	01	112	115
1.5. CALCULATION NOTE				**116**	**116**
1.5.1	1724000936-MAC-RE-00003	Vibration Analysis Data-Lateral Analysis	01	117	132

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

2. CERTIFICATION DOSSIER				Page Number	
				From	To
Sub Sub-Section No.	Document No.	Document Title (Section Description)	Rev. No.		
2.1. ENGINEERING				**133**	**133**
2.1.1	1724000936-QC-ITP-00002	Inspection And Test Plan (ITP)	02	134	137
2.2. MANUFACTURING PROCEDURE				**138**	**138**
2.2.1	1724000936-WEL-PRO-00020	Weld Procedure Specification (WPS), Weld Location Plan (WLP) and Qualifications (PQR)Records	03	139	208
2.2.2	1724000936-NDT-PRO-00021	Non-Destructive Examinations Procedures (NDE) NDE Operators List and Qualifications	03	209	241
2.2.3	1724000936-QC-PRO-00022	Hydrostatic and or Pneumatic Test Procedure	02	242	247
2.2.4	1724000936-MAT-PRO-00018	Coating Procedure- According To Crosswind Project Specification	03	248	274
2.2.5	1724000936-QC-PRO-00023	FAT (Final Acceptance Test) Procedures	02	275	286
2.2.6	1724000936-COM-PRO-00024	Pre-Commissioning -Commissioning Procedures	01	287	294
2.2.7	1724000936-QC-PRO-00032	Packing Procedure	01	295	335
2.2.8	1724000936-QC-PRO-00033	Preservation Procedure	02	336	342
2.3. MANUFACTURING TEST REPORTS				**343**	**343**
2.3.1	-	Material Certificate 3.1 / 2.2	-	344	1030
2.3.2	-	NDE Records	-	1031	1083
2.3.3	-	Hydrostatic Test Report	-	1084	1109
2.3.4	-	Motor Test Report	-	1110	1113
2.3.5	-	PSV Test Report	-	1114	1116
2.3.6	-	Painting Report	-	1117	1120
2.3.7	-	FAT Report	-	1121	1155
2.3.8	-	Packing List & Preservation Record	-	1156	1158
2.4. CERTIFICATES				**1159**	**1159**
2.4.1.	1724000936-MAC-LIS-00027	ATEX Register	04	1160	1173
2.4.2	-	EC Declaration of Conformity	-	1174	1182
2.4.3	RN-0936-PCM-03	IRN	00	1183	1183

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

3. MAINTENANCE DOSSIER				Page Number	
				From	To
Sub Sub-Section No.	Document No.	Document Title (Section Description)	Rev. No.		
3.1. SPARE PARTS				**1184**	**1184**
3.1.1.	1724000936-COM-LIS-00029	Spare Part Index Register (Commissioning, 2 Year Operation)	01	1185	1187
3.2. LUBRICANT				**1188**	**1188**
3.2.1	1724000936-MAC-LIS-00035	Utilities And Lubricant List	02	1189	1191
3.3. MANUALS				**1192**	**1192**
3.3.1.	1724000936-MAC-MAN-00031	Installation, Operating and Maintenance Manual (Pump and Motor, Including Site Erection Instructions and Procedures)	01	1193	1543

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

1 DESIGN DOSSIER

1.1 LIST

1.1.1 SUPPLIER MASTER INDEX REGISTER (SMIR)

1.1.2 SUB-SUPPLIER LIST & UNPRICED PO

1.1.3 ELECTRICAL LOAD LIST

1.1.4 SPECIAL TOOLS LIST (PUMP AND MOTOR)

1.1.5 VENDOR ASSET REGISTER

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	30-01-2025

Base Load Power Hub (BLPH)

PROGRESSIVE CAVITY PUMPS

SUPPLIER MASTER INFORMATION REGISTER (SMIR)

For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MD-LIS-00001

Document Class: 3

Rev.	Date	Description	Prepared	Reviewed	Approved
01	29/01/2025	Issue for Information (IFI)	GLL	APD	AHN
00	10/06/2024	Issue for Information (IFI)	GLL	APD	AHN

PCM | keep it moving

This document undergoes an issuance cycle within EDMS "Fusionlive".
Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Table of Contents

SH.	DESCRIPTION	REVISIONS							
		00	01						
1	Cover	X	X						
2	Table of Contents	X	X						
3	Revision / Change Log / Hold List	X	X						
4	References	X	X						
5	SMIR	X	X						

This document undergoes an issuance cycle within EDMS "Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as “NOT CONTROLLED” copy

Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)
01	Issue for Information (IFI)

HOLDS LIST

No.	Description
1.	
2.	
3.	
4.	

This document undergoes an issuance cycle within EDMS "Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as “NOT CONTROLLED” copy

This document undergoes an issuance cycle within EDMS "Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as “NOT CONTROLLED” copy

SMIR - REGISTRO DOCUMENTI / *SMIR - SUPPLIER MASTER INFORMATION REGISTER* - ATT2of 123A90-DDL-MAC-SP-50013

Ordine n°/*order nr.*	**1724000936**	**Fornitore/*Supplier*:**	**PCM GROUP ITALIA SRL**	
data / *dated:*	**10/06/2024**	**Codice F./ *S. Code:***		
Commessa / *Job:*	**123A90A - Base Load Power Hub Platform**	**Indirizzo/ *address* :**	**Via Venti Settembre 14/7, 16121 GENOVA GE, ITALY**	
Descrizione / *Description*	**PROGRESSIVE CAVITY PUMPS SEA WATER LIFT PUMPS (P-50001 A/B)**	**Persona di riferim./ *contact person:***	gboellisi@pcm.eu	
Macrofase / *Phase*				

Pos.	Document nr. Client (1)	Doc Client Rev. (1)	Document no. Internal	Document no. Internal Rev. (2)	Document nr. Supplier (3)	Doc Supplier Rev. (3)	SMIR -SUPPLIER MASTER INFORMATION REGISTER VERTICAL VOLUMETRIC PUMP	Disciplina / *Discipline* (5)	Blocco Classe / *Class Block* (6)	Docum. Format (7)	first issue date Proposed by RM (8)	KEY Document Ingegneria	Documents subject to liquidated damages	Document Approval (I/A)
CONTROL DOCUMENTS														
1	1724000936-MD-LIS-00001	01	1724000936-MD-LIS-00001	01	PCM000	01	SUPPLIER MASTER INDEX REGISTER (SMIR)-PROGRESSIVE CAVITY PUMPS	MEC			10/06/2024			I
QUALITY DOCUMENTS														
2	1724000936-QC-ITP-00002	02	1724000936-QC-ITP-00002	02	PCM001	02	INSPECTION AND TEST PLAN-PROGRESSIVE CAVITY PUMPS	QUA			10/06/2024			A
ENGINEERING DOCUMENTS														
3	1724000936-MAC-RE-00003	01	1724000936-MAC-RE-00003	01	PCM090	01	VIBRATION ANALYSIS DATA-LATERAL ANALISYS-PROGRESSIVE CAVITY PUMPS	MEC			24/06/2024			I
4	1724000936-MAC-DA-00004	03	1724000936-MAC-DA-00004	03	PCM020	03	GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, SEAL SYSTEMS, FOUNDATION LOADS, NOZZLES LOADS, BATTERY LIMITS, LIFTING DETAILS)	MEC			10/06/2024	X	X	A
5	1724000936-MAC-DG-00005	02	1724000936-MAC-DG-00005	02	PCM042	02	MOTOR OUTLINE DRAWING AND WIRING DIAGRAM-PROGRESSIVE CAVITY PUMPS	MEC			24/06/2024			A
6	1724000936-MAC-DD-00006	01	1724000936-MAC-DD-00006	01	PCM025	01	PUMP CROSS SECTIONAL DRAWING AND BILL OF MATERIAL (INCLUDING SPEED REDUCER)	MEC			22/07/2024			I
7	1724000936-MAC-DD-00007	03	1724000936-MAC-DD-00007	03	PCM051	03	SHAFT SEAL DRAWING AND BILLS OF MATERIAL (INCLUDING FLUSHING PLAN 51)	MEC			22/07/2024			I
8	1724000936-MAC-DD-00008	01	1724000936-MAC-DD-00008	01	PCM071	01	SHAFT COUPLING ASSEMBLY DRAWING AND BILL OF MATERIALS	MEC			22/07/2024			I
9	1724000936-MAC-DD-00009	01	1724000936-MAC-DD-00009	01	PCM070	01	SPEED REDUCER ASSEMBLY DRAWING AND BILL OF MATERIALS	MEC			22/07/2024			I
~~10~~	~~1724000936-MAC-DD-00010~~	~~00~~	~~1724000936-MAC-DD-00010~~	~~00~~	~~PCM052~~	~~00~~	~~PRIMARY AND AUXILIARY FLUSH PIPING SCHEMATICS AND BILL OF MATERIALS~~	~~MEC~~			~~22/07/2024~~	~~X~~		~~A~~
11	1724000936-MAC-DD-00011	01	1724000936-MAC-DD-00011	01	PCM072	01	HEATING JACKET SYSTEM DETAILED DRAWING (INCLUDING ELECTRICAL CONNECTIONS)	MEC			22/07/2024	X	X	A
12	1724000936-MAC-DS-00012	02	1724000936-MAC-DS-00012	02	PCM010	02	PUMP DATA SHEETS INCLUDING WEIGHT DATA SHEET-PROGRESSIVE CAVITY PUMPS	MEC			24/06/2024	X	X	A
13	1724000936-MAC-DS-00013	03	1724000936-MAC-DS-00013	03	PCM012	03	PUMP AND MOTOR NOISE DATA SHEET - PROGRESSIVE CAVITY PUMPS	MEC			24/06/2024	X	X	A
14	1724000936-MAC-DS-00014	03	1724000936-MAC-DS-00014	03	PCM040	03	ELECTRIC MOTOR DATA SHEET - PROGRESSIVE CAVITY PUMPS	MEC			24/06/2024	X	X	A
15	1724000936-MAC-DS-00015	03	1724000936-MAC-DS-00015	03	PCM011	03	PUMP PERFORMANCE CURVES - PROGRESSIVE CAVITY PUMPS	MEC			24/06/2024	X	X	A
16	1724000936-MAC-DS-00016	01	1724000936-MAC-DS-00016	01	PCM041	01	ELECTRIC MOTOR PERFORMANCE DATA -PROGRESSIVE CAVITY PUMPS	MEC			24/06/2024	X	X	A
17	1724000936-MAC-LIS-00017	03	1724000936-MAC-LIS-00017	03	PCM031	03	ELECTRICAL LOAD LIST - PROGRESSIVE CAVITY PUMPS	MEC			24/06/2024	X	X	A
	1724000936-MAC-LIS-00035	01	1724000936-MAC-LIS-00035	01	PCM032	01	UTILITIES & LUBRICANT LIST - PROGRESSIVE CAVITY PUMPS	MEC						
18	1724000936-MAT-PRO-00018	03	1724000936-MAT-PRO-00018	03	PCM120	03	COATING PROCEDURE- ACCORDING TO CROSSWIND PROJECT SPECIFICATION	MEC			22/07/2024	X		A
~~19~~	~~1724000936-WEL-PL-00019~~	~~00~~	~~1724000936-WEL-PL-00019~~	~~00~~	~~TBD~~	~~00~~	~~WELD LOCATION PLAN - PROGRESSIVE CAVITY PUMPS~~	~~QUA~~			~~15/07/2024~~			~~I~~
20	1724000936-WEL-PRO-00020	03	1724000936-WEL-PRO-00020	03	PCM110	03	WELD PROCEDURE SPECIFICATION (WPS), WELD LOCATION PLAN (WLP) AND QUALIFICATIONS (PQR) RECORDS	WEL			15/07/2024			A
21	1724000936-NDT-PRO-00021	02	1724000936-NDT-PRO-00021	02	PCM111	02	NON-DESTRUCTIVE EXAMINATIONS PROCEDURES (NDE) NDE OPERATORS LIST and QUALIFICATIONS	QUA			15/07/2024			A
22	1724000936-QC-PRO-00022	02	1724000936-QC-PRO-00022	02	PCM113	02	HYDROSTATIC AND OR PNEUMATIC TEST PROCEDURE -PROGRESSIVE CAVITY PUMPS	MEC			15/07/2024			I
23	1724000936-QC-PRO-00023	02	1724000936-QC-PRO-00023	02	PCM150	02	FAT (FINAL ACCEPTANCE TEST) PROCEDURES - PROGRESSIVE CAVITY PUMPS	MEC			15/07/2024			A
24	1724000936-COM-PRO-00024	01	1724000936-COM-PRO-00024	01	PCM151	01	PRE-COMMISSIONING -COMMISSIONING PROCEDURES - PROGRESSIVE CAVITY PUMPS	COM			23/09/2024			A
25	1724000936-QC-LIS-00025	01	1724000936-QC-LIS-00025	01	PCM511	01	EQUIPMENT MANUFACTURER RECORD BOOK INDEX - PROGRESSIVE CAVITY PUMPS	QUA			23/09/2024	X		A
26	1724000936-MAC-LIS-00026	02	1724000936-MAC-LIS-00026	02	PCM512	02	VENDOR ASSET REGISTER (REF DOC N 123A90-DDL-MAC-SP-50013 - PARA 9 DIGITAL DOCUMENT REQUIREMENTS)	MEC			15/07/2024			A
CERTIFICATES (ref. to notes in the RDDS)														
27	1724000936-MAC-LIS-00027	04	1724000936-MAC-LIS-00027	04	PCM310	04	ATEX REGISTER - PROGRESSIVE CAVITY PUMPS	MEC			15/07/2024			A
28	1724000936-QC-DB-00028	00	1724000936-QC-DB-00028	00	PCM510	00	EQUIPMENT MANUFACTURERS RECORD BOOK – COMPLETE (A4 bound volume(s) to Purchaser specifications)	CERT			30/01/2025	X	X	A
SPARES & MAINTENANCE DATA														
29	1724000936-COM-LIS-00029	00	1724000936-COM-LIS-00029	00	PCM400	00	SPARE PART INDEX REGISTER (COMMISSIONING, 2 YEAR OPERATION) - PROGRESSIVE CAVITY PUMPS	COM			30/09/2024			I
30	1724000936-MAC-LIS-00030	00	1724000936-MAC-LIS-00030	00	PCM080	00	SPECIAL TOOLS LIST (PUMP AND MOTOR) - PROGRESSIVE CAVITY PUMPS	MEC			18/11/2024			I
31	1724000936-MAC-MAN-00031	01	1724000936-MAC-MAN-00031	01	PCM500	01	INSTALLATION, OPERATING AND MAINTENANCE MANUAL (PUMP AND MOTOR, INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)	Eng-Mechanical			18/11/2024		X	I
HANDLING, SHIPPING & SITE INSTALLATION														
32	1724000936-QC-PRO-00032	01	1724000936-QC-PRO-00032	01	PCM160	01	PREPARATION FOR SHIPPING PROCEDURES (A4 procedure) INCLUDING BELOW DOCUMENT	LOG			30/09/2024			I
33	1724000936-QC-PRO-00033	02	1724000936-QC-PRO-00033	02	PCM161	02	PREPARATION FOR HANDLING AND STORAGE PROCEDURES (A4 procedure) - PROGRESSIVE CAVITY PUMPS	COSTR			30/09/2024			I

Notes:

(1) Numero documento Cliente
Document number assigned by final Client

(2) Numero documento interno
Document number internal

(3) Numero documento Fornitore (assegnato dal Fornitore)
Document number assigned by Supplier

(4) Assegnare il Titolo del documento (assegnato dal Fornitore)
Fill in the document title (to be assigned by Vendor)

(5) Specific are la disciplina (compilato da Rosetti)
Quality dep., Expediting. Dep., Commissioning dep., Engineering dep.

(6) Blocco Classe: Specifica, Disegno, Report, Data Sheet, etc. (compilato da Rosetti)
Procedure, list, drawing, data sheet, etc. (to be filled by Rosetti)

(7) A4, A3, A1 (compilato dal Fornitore)
A4, A3, A1 (Supplier)

(8) Data prevista per l'emissione del documento (compilato dal Fornitore)
Foreseen date for the first issue (Supplier)

Base Load Power Hub (BLPH)

SUB-SUPPLIER LIST & UNPRICED PO
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: PCM004

Document Class: 3

00	28/06/2024	Issue for Information (IFI)	GLL	APD	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)

HOLDS LIST

No.	Description
1	
2	
3	
4	

Table of contents

1 List of sub-SUPPLIERS 4

2 UNPRICED PO (Casing / SEAL / MOTOR / PSV) 5

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

1 LIST OF SUB-SUPPLIERS

PUMP ITEM	SUPPLER NAME	Manufacturing location	Order status
Shaft line / Rotor / Stator	PCM Manufacturing S.A.S.	France	N/A
Casing parts	S.R.C.I.	France	Order placed
Mechanical seal	FLOWSERVE	Netherlands	Order placed
API Plan 51	FLOWSERVE	Netherlands	Order placed
Gear Box	NORD	Germany	To be ordered
Motor	ABB	FINLAND	Order placed
Coupling	John Crane Flender	Czech Republic Germany	To be ordered
Heating Jackets	To be advised	To be advised	To be ordered
PSV	TAI (Ordered via Enolia)	Italy	Order placed

APPENDICES > UNPRICED PO (CASING / SEAL / MOTOR / PSV)

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

keep it moving

BON DE COMMANDE
PCM Manufacturing France S.A.S.

PCM Manufacturing France S.A.S.

Référence PCM : PO070-24-07599
N° avenant : 0
Date cde : 21/06/2024
Code fournisseur : 11100157
Référence fournisseur :

CONTACT PCM

Nom : Coralie PRODHOMME
Fonction : Procurement Technician
Email : cprodhomme@pcm.eu
Téléphone (+33)241225928

Fournisseur

SRCI

4 allées des Bruyères
ZA Harfleur
71200 LE CREUSOT
France

CONTACT FOURNISSEUR

Nom : ADV ADV ENVOI COMMANDE
Fonction : MAIL ENVOI CDE
Email : srci@srci-france.com
Téléphone (+33)385770780

Destination finale

PCM MANUFACTURING FRANCE SAS
62 rue de la gare
49123 CHAMPTOCE SUR LOIRE - France

ADRESSE DE FACTURATION

PCM MANUFACTURING FRANCE SAS
service comptabilité
62 rue de la gare
49123 CHAMPTOCE SUR LOIRE - France

La réception fournisseur sera fermée du 05/08/24 au 16/08/24

Réception fournisseurs (chauffeurs) : ouverture de la réception de 7h30 à 12h00.

Ligne	Article	Désignation	Date Demandée	Qté Commandée	Prix net	Total Net
1	W-004942300257WP	**RALLONGE CORPS 6IN AV7** Origine FR Plan : W-004942 - Révision n° : B Matière (NF / Nombre) : X2CrNiMoCuWN25-7-4 (ZERON100® Spécifications #1 : Traçabilité / Traceability Cahier des charges : 1.006 - Chaudronneries pour le marché pétrolier / Welded part for Oil & Gas applications	18/10/2024	18,00 UN		
		L = 3000 MM - MATERIAUX SCHEDULE 40 - CERTIFICATS MATIERE EN 10204 : 3.1 - DMOS ET QMOS : EN 15614-1 - QUALIFICATIONS SOUDEURS : ASME IX 1 - HYDROTEST A 30 BARS - RAPPORT DE TEST A LIVRER AVEC LES PIECES - CERTIFICATS ET RAPPORT D'HYDROTEST - SABLAGE NON REQUIS SAUF PIECES PROTEGEES PAR RESINE Fournir le certificat 3.1 selon EN 10204:2004 Transmettre tous les certificats et rapports à l' adresse : certificats(at)pcm.eu + QSTRXX0014 : DOSSIER CONSTRUCTEUR POUR 1 POMPE, INCLUANT CERTIFICATS MATIERES, PLANS DE PRODUCTION, QUALIFICATION DES SOUDEURS, DMOS, QMOS, DESCRIPTION METAL D'APPORT, CONTROLES DESOUDURE,RAPPORT D' HYDROTEST ET CERTIFICAT DE CONFORMITE A LA COMMANDE - + QSTRXX0015 : PT - RESSUAGE SUR SOUDURES (100%) PAR INSPECTEUR CERTIFIE COFREND 2. INTEPRETATION DES RESULTATS SUIVANT LE CODE ASME Contrôle dimensionnel avec rapport. *ROSETTI MARINO*				
2	W-008202257WP	**CORPS 6IN AV7** Origine FR	18/10/2024	2,00 UN		

keep it moving

BON DE COMMANDE
PCM Manufacturing France S.A.S.

		Plan : W-008202 - Révision n° : A Matière (NF / Nombre) : X2CrNiMoCuWN25-7-4 (ZERON100® Spécifications #1 : Traçabilité / Traceability Cahier des charges : 1.006 - Chaudronneries pour le marché pétrolier / Welded part for Oil & Gas applications				
	MATERIAUX SCHEDULE 40 - CERTIFICATS MATIERE EN 10204 : 3.1 - DMOS ET QMOS : EN 15614-1 - QUALIFICATIONS SOUDEURS : ASME IX 1 - HYDROTEST A 30 BARS - RAPPORT DE TEST A LIVRER AVEC LES PIECES - CERTIFICATS ET RAPPORT D'HYDROTEST - SABLAGE NON REQUIS SAUF PIECES PROTEGEES PAR RESINE Fournir le certificat 3.1 selon EN 10204:2004 Transmettre tous les certificats et rapports à l' adresse : certificats(at)pcm.eu QSTRXX0014 : DOSSIER CONSTRUCTEUR , INCLUANT CERTIFICATS MATIERES, CAHIER DE SOUDAGE, PLANS DE PRODUCTION, QUALIFICATION DES SOUDEURS, DMOS, QMOS, DESCRIPTION METAL D'APPORT, CONTROLES DE SOUDURE, RAPPORT D'HYDROTEST ET CERTIFICAT DE CONFORMITE A LA COMMANDE - EN ACCORD AVEC ASME + QSTRXX0015 : PT -RESSUAGE SUR SOUDURES (100%) PAR INSPECTEUR CERTIFIE COFREND2. INTEPRETATION DES RESULTATS SUIVANT LES ASME V ET VIII Contrôle Dimensionnel avec rapport.					
		ROSETTI MARINO				
3	**W-004942120257WP**	**RALLONGE CORPS 6IN AV7** Origine FR Plan : W-004942 - Révision n° : B Matière (NF / Nombre) : X2CrNiMoCuWN25-7-4 (ZERON100® Spécifications #1 : Traçabilité / Traceability Cahier des charges : 1.006 - Chaudronneries pour le marché pétrolier / Welded part for Oil & Gas applications	**18/10/2024**	2,00 UN		
	L = 1200 MM - MATERIAUX SCHEDULE 40 - CERTIFICATS MATIERE EN 10204 : 3.1 - DMOS ET QMOS : EN 15614-1 - QUALIFICATIONS SOUDEURS : ASME IX 1 - HYDROTEST A 30 BARS - RAPPORT DE TEST A LIVRER AVEC LES PIECES - CERTIFICATS ET RAPPORT D'HYDROTEST - SABLAGE NON REQUIS SAUF PIECES PROTEGEES PAR RESINE Fournir le certificat 3.1 selon EN 10204:2004 Transmettre tous les certificats et rapports à l' adresse : certificats(at)pcm.eu + QSTRXX0014 : DOSSIER CONSTRUCTEUR POUR 1 POMPE, INCLUANT CERTIFICATS MATIERES, PLANS DE PRODUCTION, QUALIFICATION DES SOUDEURS, DMOS, QMOS, DESCRIPTION METAL D'APPORT, CONTROLES DESOUDURE,RAPPORT D' HYDROTEST ET CERTIFICAT DE CONFORMITE A LA COMMANDE - + QSTRXX0015 : PT - RESSUAGE SUR SOUDURES (100%) PAR INSPECTEUR CERTIFIE COFREND 2. INTEPRETATION DES RESULTATS SUIVANT LE CODE ASME Contrôle dimensionnel avec rapport.					
		ROSETTI MARINO				
4	**W-008199257WP**	**EMBOUT STATOR 25AV24** Origine FR Plan : W-008199 - Révision n° : A Matière (NF / Nombre) : X2CrNiMoCuWN25-7-4 (ZERON100® Spécifications #1 : Traçabilité / Traceability Cahier des charges : 1.006 - Chaudronneries pour le marché pétrolier / Welded part for Oil & Gas applications	**18/10/2024**	2,00 UN		

keep it moving

BON DE COMMANDE
PCM Manufacturing France S.A.S.

		MATERIAUX SCHEDULE 40 - CERTIFICATS MATIERE EN 10204 : 3.1 - DMOS ET QMOS : EN 15614-1 - QUALIFICATIONS SOUDEURS : ASME IX 1 - HYDROTEST A 30 BARS - RAPPORT DE TEST A LIVRER AVEC LES PIECES - CERTIFICATS ET RAPPORT D'HYDROTEST - SABLAGE NON REQUIS SAUF PIECES PROTEGEES PAR RESINE Fournir le certificat 3.1 selon EN 10204:2004 Transmettre tous les certificats et rapports à l' adresse : certificats(at)pcm.eu QSTRXX0014 : DOSSIER CONSTRUCTEUR , INCLUANT CERTIFICATS MATIERES, CAHIER DE SOUDAGE, PLANS DE PRODUCTION, QUALIFICATION DES SOUDEURS, DMOS, QMOS, DESCRIPTION METAL D'APPORT, CONTROLES DE SOUDURE, RAPPORT D'HYDROTEST ET CERTIFICAT DE CONFORMITE A LA COMMANDE - EN ACCORD AVEC ASME + QSTRXX0015 : PT -RESSUAGE SUR SOUDURES (100%) PAR INSPECTEUR CERTIFIE COFREND2. INTEPRETATION DES RESULTATS SUIVANT LES ASME V ET VIII Contrôle Dimensionnel avec rapport. *ROSETTI MARINO*				
5	**W-008200257**	**ENVELOPP STATOR 25AV24** Origine FR Plan : W-008200 - Révision n° : A Matière (NF / Nombre) : X2CrNiMoCuWN25-7-4 (ZERON100® Spécifications #1 : Traçabilité / Traceability CERTIFICATS MATIERE EN 10204 : 3.1 AVEC CERTIFICAT NACE MR0103-0175 Fournir le certificat 3.1 selon EN 10204:2004 Transmettre tous les certificats et rapports à l' adresse : certificats(at)pcm.eu *ROSETTI MARINO*	**18/10/2024**	2,00 UN		

Devise	EUR
Incoterm	DDP CHAMPTOCE SUR LOIRE
Mode de livraison	
Condition paiement	Vir SEPA 45 jours FM
Type d'emballage	

Total ligne
TOTAL HT
TOTAL TAXE
TOTAL TTC

COMMANDE SELON LES CONDITIONS GENERALES D'ACHATS :http://pcm.eu/fr/groupe-pcm/bienvenue-dans-l-espace-fournisseurs-pcm

ACCUSE DE RECEPTION DE COMMANDE A COMMUNIQUER A PCM SOUS 48 HEURES (ARTICLE 4)

PAYS D'ORIGINE DES PRODUITS A MENTIONNER SUR ARC (ARTICLE 9)

AUCUNE LIVRAISON EN PORT DÛ ACCEPTEE

keep it moving

PURCHASE ORDER
PCM Manufacturing France S.A.S.

PCM Manufacturing France S.A.S.

PCM ref: **PO070-24-07869**
Revision #: 0
Order date 27/06/2024
Supplier code : 12200017
Supplier reference :

PCM CONTACT

Name : Coralie PRODHOMME
Position : Procurement Technician
Email : cprodhomme@pcm.eu
Tel. (+33)241225928

Supplier

FLOWSERVE BV

PO BOX 25
4870 AH ETTEN-LEUR
Netherlands

SUPPLIER CONTACT

Name : Farid KADRI
Position : COMMERCIAL
Email : fkadri@flowserve.com
Tel. (+33)610797178

Final Destination

PCM MANUFACTURING FRANCE SAS
62 rue de la gare
49123 CHAMPTOCE SUR LOIRE - France

INVOICING ADRESSS

PCM MANUFACTURING FRANCE SAS
service comptabilité
62 rue de la gare
49123 CHAMPTOCE SUR LOIRE - France

Suppliers deliveries will be closed from August 05th to 16th

suppliers deliveries (drivers): reception opens from 7.30 a.m. to 12 p.m.

Line	Product	Description	Requested Date	Order Qty	Net price	Net Total
1	**DI317873-02**	**PLAN 51 API** origin NL Specifications #1 : Traçabilité / Traceability	**16/09/2024**	2,00 UN		

keep it moving

PURCHASE ORDER
PCM Manufacturing France S.A.S.

API PLAN 51 API 682 4TH EDITION:

According to OP-24-432567

Material : 316/316L SS
Piping/Tubing/Fittings : 316/316L SS
Welding as per ASME Section IX
Operating Temperature : Ambient
Operating Pressure : Atmospheric
Design Code : ASME Section VIII Division 1
Testing of welded connections: 100% visual examination, 10% liquid penetrant
Buffer fluid : Water

Connections : NPT

1 x Level Gauge
3 x Block Valve (Fill, Quench, Vent) - 316L SS
1 x Orifice

SS remains unpainted.

Documentation:
GAD
PID
3D Model
IOM
3.1 certificate for pressure containing parts & 2.2 for non-pressure parts.
Reports (NDE, hydrotest)
Manufacturing Databook including WPS, PQR, WPQ and weldmap

ROSETTI MARINO

2	**DIGIAN-392481-01**	**GARNITURE MECANIQUE** origin NL	**16/09/2024**	4,00 UN		

Specifications #1 : Traçabilité / Traceability

As per OP-24-432567-R1

Old description: SINGLE CART. MS D60 CB
Typology: Single packing trimmed cartridge
Material in contact with the fluid: Duplex Stainless Steel
Flexible Element Materials: FKM
Grain mount: Massif
Element spring: Single spring
Spring system: -
Friction face fluid side: Carbon-SIC: Graphite Carbon-Silicium Carbide
Friction face atmosphere side: Carbon-SIC: Graphite Carbon-Silicium Carbide
Standard: NF EN 12756
Direction of rotation from atmosphere: 2 directions
Minimum pressure(bar): -
Maximum pressure(bar): 21
Shaft dimension (mm): 60
Drawing Supplier: -
Good Dual Use: No

Seal type : ISC2-PX provided with lip Seal

Certificate of compliance : 2.1
Material Certificate 3.1 for sleeve and gland.

ROSETTI MARINO

keep it moving

PURCHASE ORDER
PCM Manufacturing France S.A.S.

Currency	EUR
Incoterm	DDP CHAMPTOCE SUR LOIRE
Delivery mode	
Payment term	SEPA bank transfert 60 D end month
Packing type	

Line total

TOTAL TAX EXCL

TOTAL TAX INC

ORDER IN ACCORDANCE WITH GENERAL PURCHASING CONDITIONS:http://pcm.eu/en/pcm-group/welcome-to-pcm-suppliers-portal

ACKNOWLEDGMENT OF RECEIPT IS COMMUNICATED WITHIN 48 HOURS TO PCM (ARTICLE 4)

COUNTRY OF ORIGIN OF PRODUCTS TO BE MENTIONED ON ACKNOWLEDGMENT OF RECEIPT (ARTICLE 9)

NO DELIVERY FREIGHT COLLECT ACCEPTED

keep it moving

BON DE COMMANDE
PCM Manufacturing France S.A.S.

PCM Manufacturing France S.A.S.

Référence PCM : **PO070-24-07792**
N° avenant : 0
Date cde : 26/06/2024
Code fournisseur : S22000054
Référence fournisseur :

CONTACT PCM

Nom : Marion Imperas
Fonction : Procurement Technician
Email : mimperas@pcm.eu
Téléphone (+33)

Fournisseur

ABB France

7 bd d'Osny
95800 CERGY
France

CONTACT FOURNISSEUR

Nom : ADV
Fonction :
Email : FR-order-DRMG@abb.com
Téléphone (+33)240382501

Destination finale

PCM MANUFACTURING FRANCE SAS
62 rue de la gare
49123 CHAMPTOCE SUR LOIRE - France

ADRESSE DE FACTURATION

PCM MANUFACTURING FRANCE SAS
service comptabilité
62 rue de la gare
49123 CHAMPTOCE SUR LOIRE - France

La réception fournisseur sera fermée du 05/08/24 au 16/08/24

Réception fournisseurs (chauffeurs) : ouverture de la réception de 7h30 à 12h00.

Ligne	Article	Désignation	Date Demandée	Qté Commandée	Prix net	Total Net
1	DI317873-01	**MOTOR 5.5KW** offre CQ813220v.D Origine à confirmer sur AR et/ou BL	**27/09/2024**	2,00 UN		

keep it moving

BON DE COMMANDE
PCM Manufacturing France S.A.S.

Type moteur : 132M - Dimension: IEC - Electrique: IEC

DETAIL MOTEUR :
Nombre de pôles : 4
Puissance : 5.5KW - 7.5HP
Type tension : TRIPHASE
Tension : 230/400V +-- 5%
Type de couplage : TRIANGLE - ETOILE
Fréquence (Hz) : 50 +-- 2%
Type de protection moteur : IP56
Classe d'isolation : F
Position boîte à borne : N:2-L:HAUT
Position Entrée de cable : I
Classe d'efficacité : IE3-PREMIUM
Type de peinture : C5-Medium - Standard Fournisseur
Carcasse : CARCASSE FONTE STANDARD

Position de montage : IMV1 VERTICAL
Type de boitier : BRIDE TROU LISSE
Dimension de la bride : F265(D300)
Type et dimensions d'arbre : arbre claveté taraudé DIN332-2 type D M12 - D38 L80

Options::
Boîte à bornes 4x90oC rotatable.
corrosion protected stator and rotor core
PTC thermistors - 150°C in stator winding.
Protective Roof
Corrosion protected stator and rotor core
JIP-33 standard design
Type test

Documentation:
-Motor TB drawing
-Motor 2D Drawing
-Type test report

Devise	EUR
Incoterm	FCA Champtocé sur Loire
Mode de livraison	
Condition paiement	Vir SEPA 45 jours FM
Type d'emballage	

Total ligne

TOTAL HT
TOTAL TAXE
TOTAL TTC

COMMANDE SELON LES CONDITIONS GENERALES D'ACHATS :http://pcm.eu/fr/groupe-pcm/bienvenue-dans-l-espace-fournisseurs-pcm
ACCUSE DE RECEPTION DE COMMANDE A COMMUNIQUER A PCM SOUS 48 HEURES (ARTICLE 4)
PAYS D'ORIGINE DES PRODUITS A MENTIONNER SUR ARC (ARTICLE 9)

AUCUNE LIVRAISON EN PORT DÛ ACCEPTEE

keep it moving

BON DE COMMANDE
PCM Manufacturing France S.A.S.

PCM Manufacturing France S.A.S.

Référence PCM : **PO070-24-07627**
N° avenant : 0
Date cde : 24/06/2024
Code fournisseur : S13001157
Référence fournisseur :

CONTACT PCM

Nom : Marion Imperas
Fonction : Procurement Technician
Email : mimperas@pcm.eu
Téléphone (+33)

Fournisseur

ENOLIA

12 B rue Ledru Rollin
44200 NANTES
France

CONTACT FOURNISSEUR

Nom : Alienor MEMETEAU
Fonction : Commercial - ADV
Email : sales@enolia.fr
Téléphone (+33)695945658

Destination finale

PCM MANUFACTURING FRANCE SAS
62 rue de la gare
49123 CHAMPTOCE SUR LOIRE - France

ADRESSE DE FACTURATION

PCM MANUFACTURING FRANCE SAS
service comptabilité
62 rue de la gare
49123 CHAMPTOCE SUR LOIRE - France

La réception fournisseur sera fermée du 05/08/24 au 16/08/24

Réception fournisseurs (chauffeurs) : ouverture de la réception de 7h30 à 12h00.

Ligne	Article	Désignation	Date Demandée	Qté Commandée	Prix net	Total Net
2	**DIGIAN-392481-05**	**SOUPAPE 1IN 150 X 2IN 150** Origine à confirmer sur AR et/ou BL SOUPAPE DE SECURITE, CONNEXION PAR BRIDES ANSI-ASME B16.5 ADMISSION 1in CLASS 150 FACE RF REFOULEMENT 2in CLASS 150 FACE RF CALCULS SELON API 520. CONSTRUCTION SUIVANT API 526. TESTS SUIVANT API 527 Fluide : Eau de Mer DENSITE FLUIDE : 1030 kg/m3 VISCOSITE : 0.9cP PRESSION DE TARAGE : 7.6barg DEBIT MAX : 2.5 m3/h CORPS EN ACIER CARBONE AVEC PIECES INTERNES EN INOX 316L Nez & Disque en Inox Super Duplex (25% Cr) Marquage ATEX: II 2G IIB	**14/10/2024**	2,00 UN		

keep it moving

BON DE COMMANDE
PCM Manufacturing France S.A.S.

Devise	EUR
Incoterm	DDP CHAMPTOCE SUR LOIRE
Mode de livraison	
Condition paiement	Vir SEPA 45 jours FM
Type d'emballage	

Total ligne

TOTAL HT

TOTAL TAXE

TOTAL TTC

COMMANDE SELON LES CONDITIONS GENERALES D'ACHATS :http://pcm.eu/fr/groupe-pcm/bienvenue-dans-l-espace-fournisseurs-pcm

ACCUSE DE RECEPTION DE COMMANDE A COMMUNIQUER A PCM SOUS 48 HEURES (ARTICLE 4)

PAYS D'ORIGINE DES PRODUITS A MENTIONNER SUR ARC (ARTICLE 9)

AUCUNE LIVRAISON EN PORT DÛ ACCEPTEE

PCM Manufacturing France S.A.S.

SASau capital de25 000 000,00 EUR RCS Nanterre 803933399 SIRET: 80393339900013 - APE 2813Z - TVA FR66803933399

6 Boulevard Bineau, 92300 LEVALLOIS PERRET, France - T: (+33)177683129

www.pcm.eu - E-mail: contact@pcm.eu

Base Load Power Hub (BLPH)

ELECTRICAL LOAD LIST
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-LIS-00017

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	18-10-2024

Document Class: 2

NOTE
FINAL ACCEPTANCE IS ACHIEVED WITH A CRS CLOSE OUT FROM CROSSWIND

03	16/10/2024	Accepted for Construction (AFC)	APD	GLL	AHN
02	17/09/2024	Accepted for Construction (AFC)	APD	GLL	AHN
01	23/08/2024	Accepted for Construction (AFC)	APD	GLL	AHN
00	24/06/2024	Issue for Review (IFR)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)
03	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Pump Tag: P-50001 A

Motor Consumption List:

Motor tag	Description	Volt	Phase	Frequency	Rated power	Efficiency	Power factor	Rated current
PM-50001 A	Squirrel cage induction motor	400 +/- 5% V	3 Ph	50 +/- 2% Hz	5.5 kW	89.6%	0.74	11.9 A

Heating Jacket Consumption List:

Power Supply Line	Description	Supply voltage	Operating Current	Starting Current	Operating Power	Starting Power
ETB-200N1-20-L1-01A	JB with included thermostat	230 Vac	2.3 A	2.9 A	526 W	667 W
H-ETE-200N1-20-L1-01A	Heat Tracing Cables	230 Vac	2.3 A	2.9 A	526 W	667 W

Heat Tracing Power Cable Consumption List:

Cable tag	Description	Voltage	Operating Current	Starting current	Cable Formation	Cable Outer Diameter	Cable Gland
P-ETB-200N1-20-L1-01A	Heat Tracing Power Cable	230 V	2.3 A	2.9 A	3G6 unarmored	16.2 mm	M25

Pump Tag: P-50001 B

Motor Consumption List:

Motor tag	Description	Volt	Phase	Frequency	Rated power	Efficiency	Power factor	Rated current
PM-50001 B	Squirrel cage induction motor	400 +/- 5% V	3 Ph	50 +/- 2% Hz	5.5 kW	89.6%	0.74	11.9 A

Heating Jacket Consumption List:

Power Supply Line	Description	Supply voltage	Operating Current	Starting Current	Operating Power	Starting Power
ETB-200N1-20-L1-01B	JB with included thermostat	230 Vac	2.3 A	2.9 A	526 W	667 W
H-ETE-200N1-20-L1-01B	Heat- Tracing Cables	230 Vac	2.3 A	2.9 A	526 W	667 W

Heat Tracing Power Cable Consumption List:

Cable tag	Description	Voltage	Operating Current	Starting current	Cable Formation	Cable Outer Diameter	Cable Gland
P-ETB-200N1-20-L1-01B	Heat Tracing Power Cable	230 V	2.3 A	2.9 A	3G6 unarmored	16.2 mm	M25

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	16-12-2024

Base Load Power Hub (BLPH)

SPECIAL TOOLS LIST (PUMP AND MOTOR)
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-LIS-00030

Document Class: 3

00	25/11/2024	Issue for Information (IFI)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)

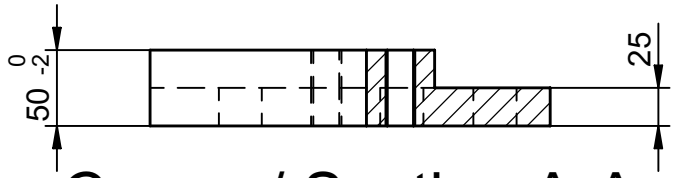
HOLDS LIST

No.	Description
1	
2	
3	
4	

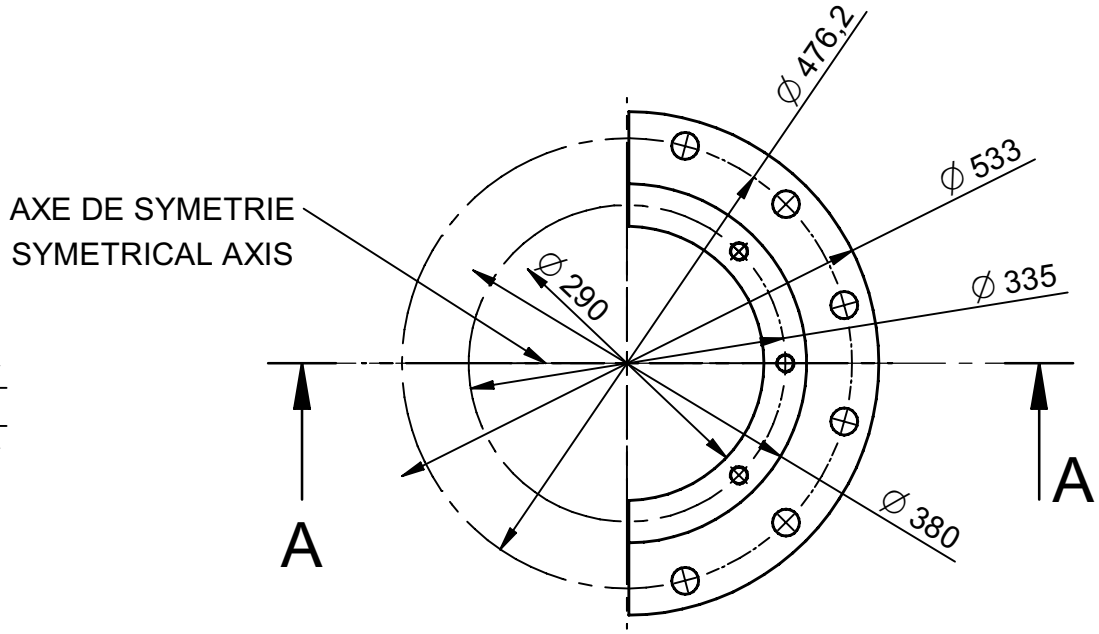
This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

1) Flange for Caisson Lifting – T1
2) Flange Support – T2
3) Body Extension Lifting Plate - T4
4) Body Lifting Plate - T5
5) Shaft Extension Clamp - T7
6) Shaft extension clamp (plate) - T7
7) SHAFT Lifting - T8

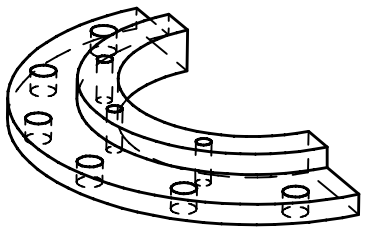
This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy



Coupe / Section A-A



- CASSER LES ANGLES VIFS
- NO SHARP ANGLES



Rev.	Par / *By*	Objet / *Subject*	FNC / *NCR*	Vérifié par / *Checked by*	Le / *On*
A	A.POUPLARD	Première révision / First issue	XXXXX	APD	05/08/2024

PCM
keep it moving

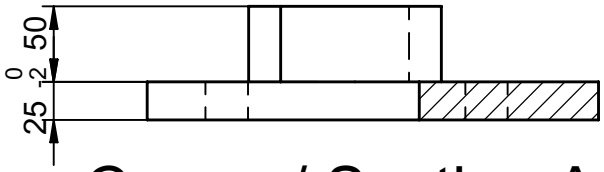
Rue René Moineau
49 123 Champtocé/Loire
FRANCE
Phone : +33 (0)1.77.68.31.00
www.pcm.eu

Bride pour levage de Caisson

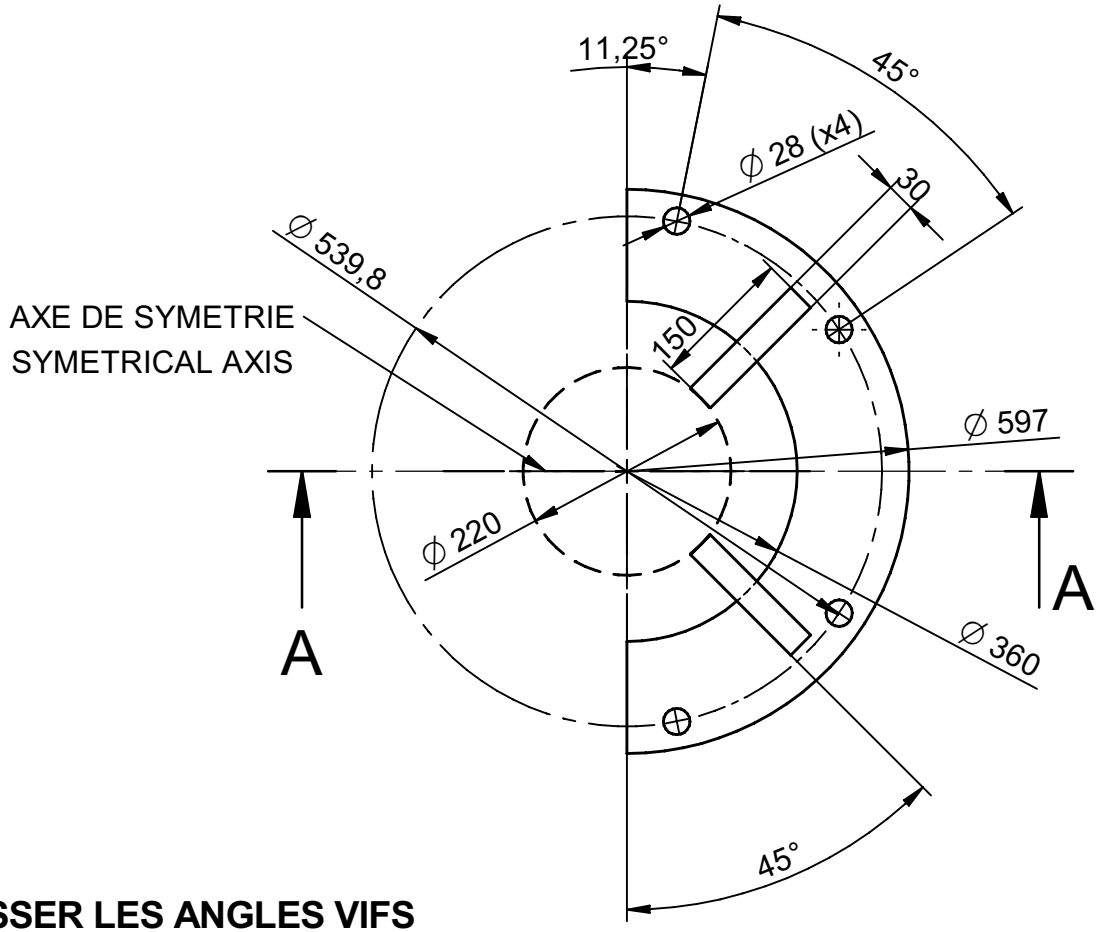
Flange for Caisson Lifting

Type	**AV7**								
Masse / *Weight*	**18.94 kg / 41.7 lbs**		Tol.	**ISO 2768-mH**	√	**Ra 3.2**	Mat.	**Voir Ordre Fabrication / Achat** *See Manufacturing / Purchasing Order*	
Par / *By*	**A.POUPLARD**	Le / *On* **05/08/2024**		Feuille *Sheet*	Format	N°	**W-008278**		Rev. **A**
				1 / 1	**A4**				

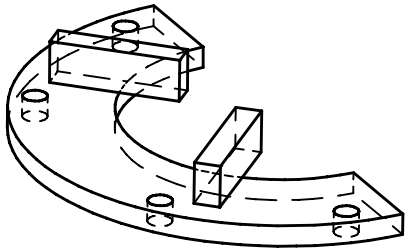
Tous droits réservés, diffusion ou reproduction interdite sans autorisation écrite de PCM.
All rights reserved, reproduction or distribution prohibited without written permission from PCM.



Coupe / Section A-A



- CASSER LES ANGLES VIFS
- MEULER LES SOUDURES
- SOUDURES CONTINUES ETANCHES



Rev.	Par / *By*	Objet / *Subject*	FNC / *NCR*	Vérifié par / *Checked by*	Le / *On*
A	A.POUPLARD	Première révision / First issue	XXXXX	APD	11/07/2024

PCM
keep it moving

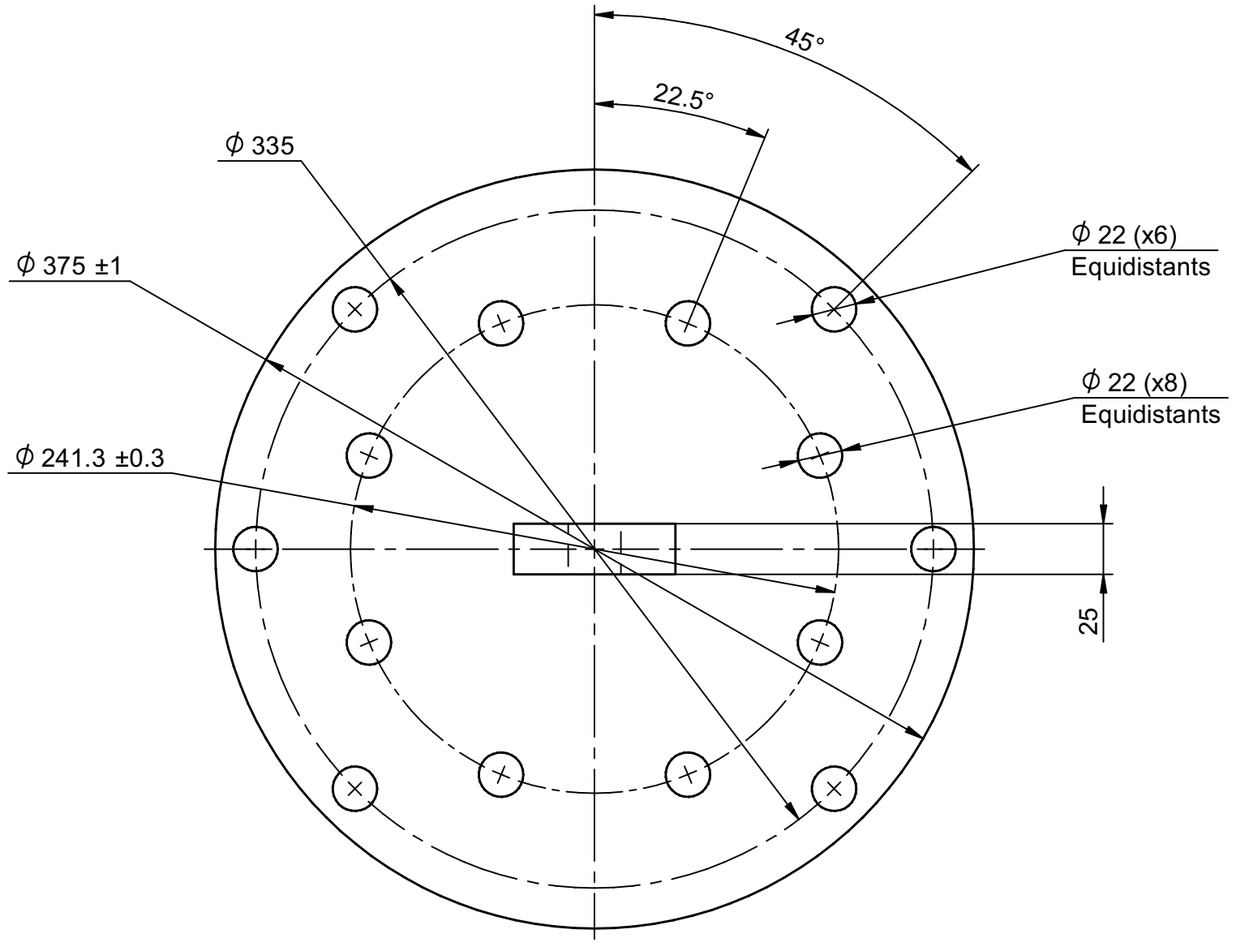
Rue René Moineau
49 123 Champtocé/Loire
FRANCE
Phone : +33 (0)1.77.68.31.00
www.pcm.eu

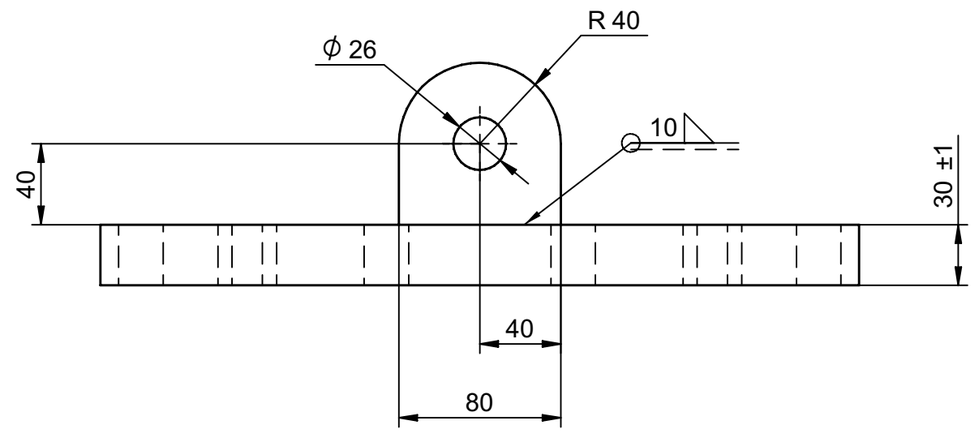
SUPPORT MONTAGE BRIDE 6" - POSE 16"

FLANGE SUPPORT

Type	**AV7**							
Masse / *Weight*	**20.57 kg / 45.2 lbs**	Tol.	**ISO 2768-mH**	√	**Ra 3.2**	Mat.	**Voir Ordre Fabrication / Achat** *See Manufacturing / Purchasing Order*	
Par / *By*	**A.POUPLARD**	Le / *On*	**11/07/2024**	Feuille *Sheet*	Format	N°	**W-008251**	Rev. **A**
				1 / 1	**A4**			

Tous droits réservés, diffusion ou reproduction interdite sans autorisation écrite de PCM.
All rights reserved, reproduction or distribution prohibited without written permission from PCM.





SWL : 4T

Rev.	Par / *By*	Objet / *Subject*	ICR/NCR	Vérifié par / *Checked by*	Le / *On*
A	A.POUPLARD	Première révision / First revision	-	APD	19/09/2024

PCM keep it moving

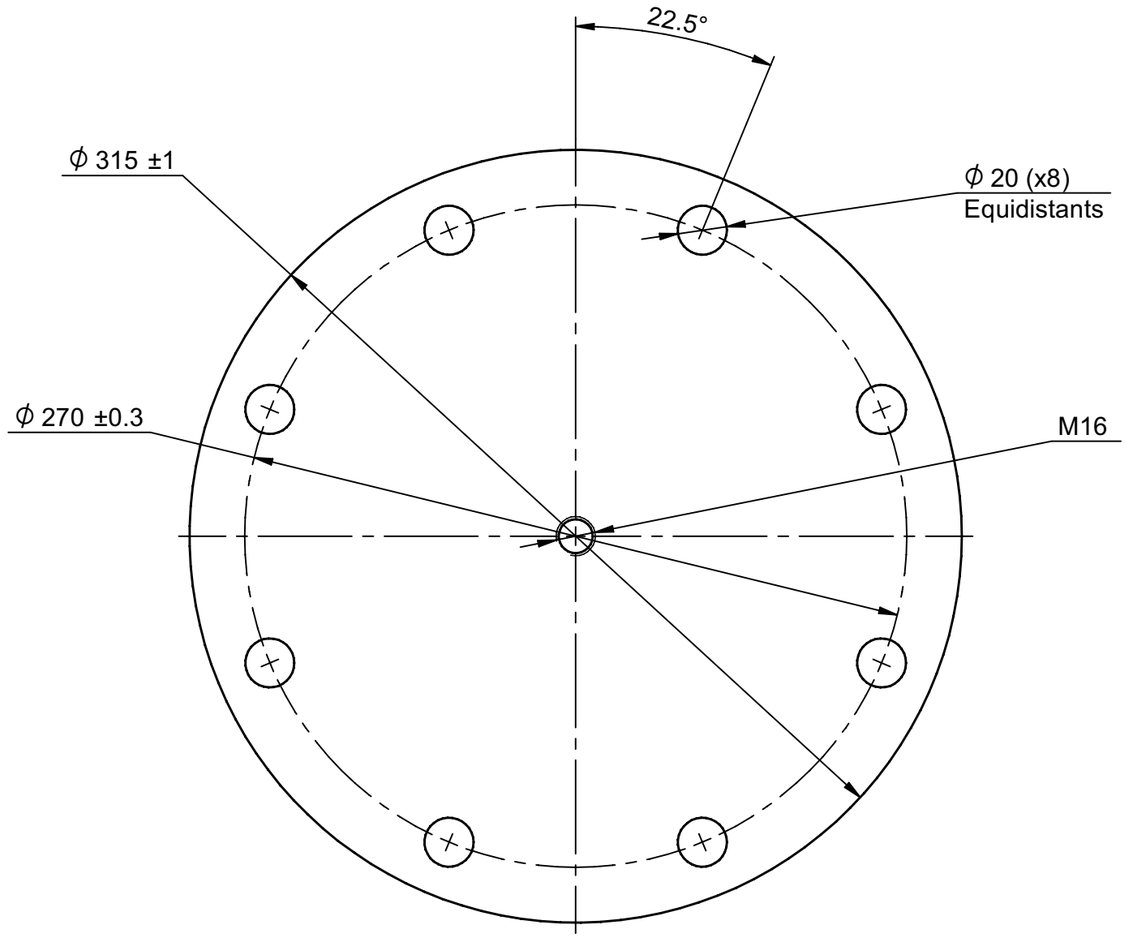
276 Rue René Moineau
49 123 Champtocé/Loire
FRANCE
Phone : +33 (0)1.77.68.31.00
www.pcm.eu

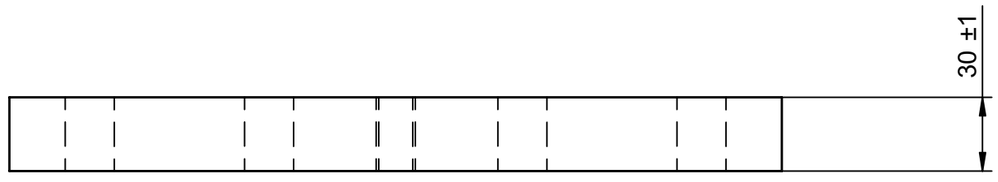
Plateau Levage CAISSON + PUMP

PUMP + CAISSON Lifting Plate

Type : **AV7**				ISO 13715 Arêtes / *Edges* : 1 +0 -0.2 -0.5
Masse / *Weight* : **25.82 kg**	Mat. : **Voir Ordre Fabrication / Achat** *See Manufacturing / Purchasing Order*	**Ra 3.2**	Tol. : **ISO 2768-mH**	
Par / *By* : **A.POUPLARD**	Le / *On* : **19/09/2024**	Feuille *Sheet* **1 / 1**	Format **A3**	N° : **W-008279** — Rev. **A**

Tous droits réservés, diffusion ou reproduction interdite sans autorisation écrite de PCM.
All rights reserved, reproduction or distribution prohibited without written permission from PCM.





SWL : 1.5T

Rev.	Par / *By*	Objet / *Subject*	ICR/NCR	Vérifié par / *Checked by*	Le / *On*
A	A.POUPLARD	Première révision / First revision	-	-	03/11/2023

PCM keep it moving
276 Rue René Moineau
49 123 Champtocé/Loire
FRANCE
Phone : +33 (0)1.77.68.31.00
www.pcm.eu

Plateau de Levage du Corps

Body Lifting Plate

Type : **AV7**

ISO 13715 Arêtes / *Edges* : 1 (0) -0.2 (-0.5)

Masse / *Weight* : **17.76 kg**

Mat. : **Voir Ordre Fabrication / Achat** *See Manufacturing / Purchasing Order*

Ra 3.2

Tol. : **ISO 2768-mH**

Par / *By* : **A.POUPLARD**

Le / *On* : **02/11/2023**

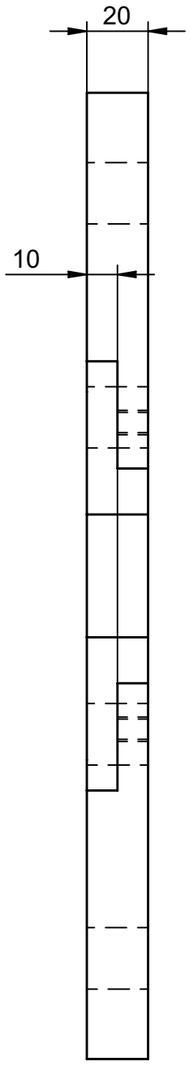
Feuille *Sheet* **1 / 1**

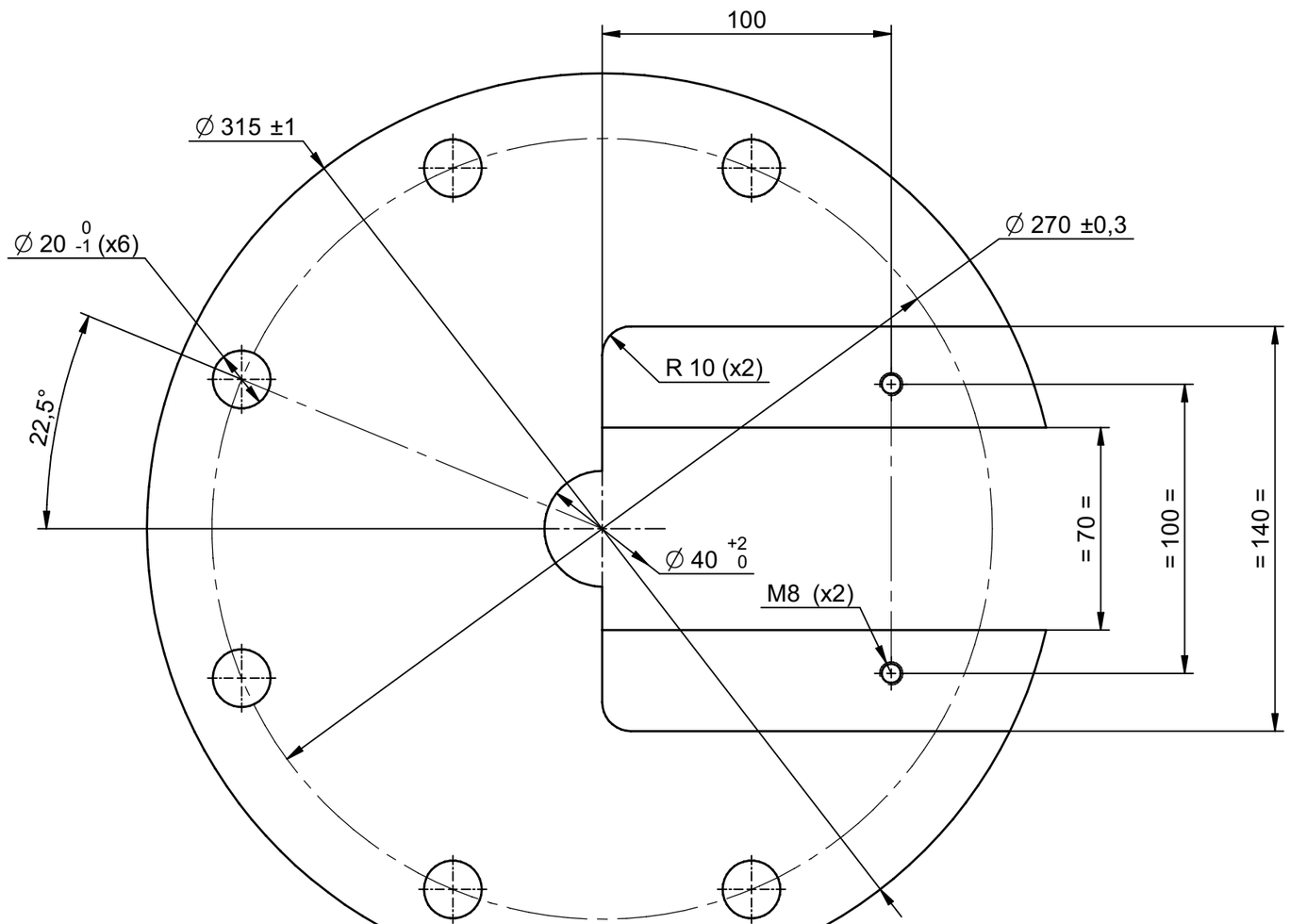
Format **A3**

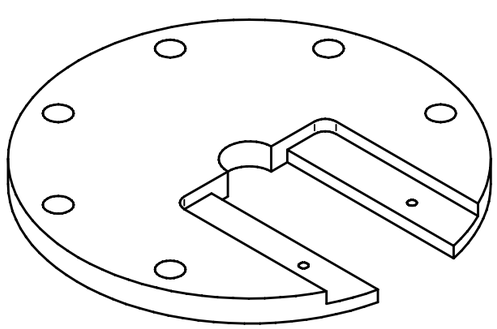
N° : **W-007801**

Rev. **A**

Tous droits réservés, diffusion ou reproduction interdite sans autorisation écrite de PCM.
All rights reserved, reproduction or distribution prohibited without written permission from PCM.







Casser les arêtes vives / *Smooth sharp angles*

A	A.POUPLARD	**Première révision / First revision**	XXXX	G.PIETTE	21/11/2023
Rev.	Par / *By*	Objet / *Subject*	ICR/NCR	Vérifié par / *Checked by*	Le / *On*

PCM keep it moving

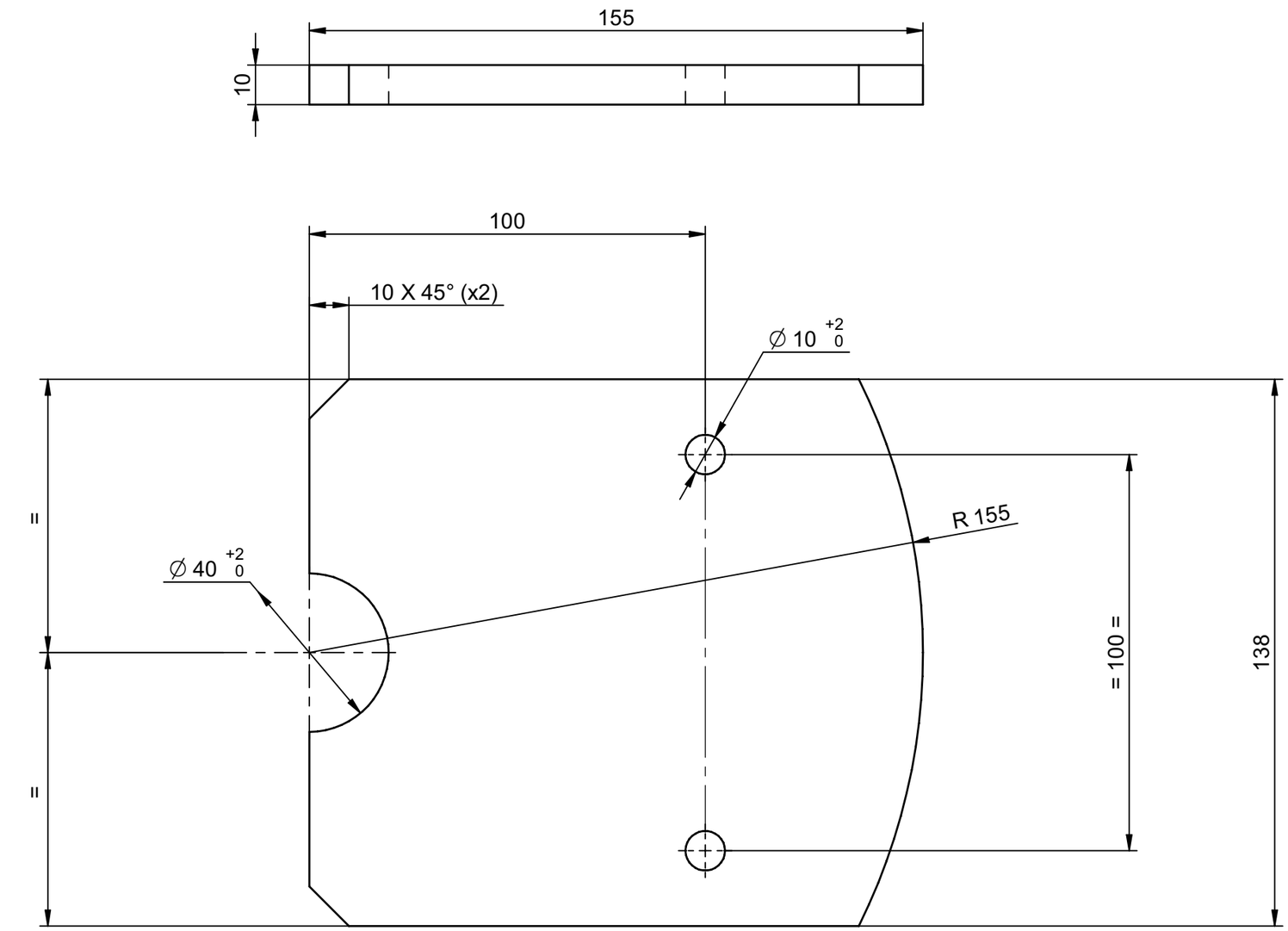
Rue René Moineau
49 123 Champtocé/Loire
FRANCE
Phone : +33 (0)1.77.68.31.00
www.pcm.eu

CLAMP MAINTIEN RALLONGE

EXTENSION CLAMP

Type	**AV7**							
Masse / *Weight*	**9.33 kg / 20.5 lbs**	Tol.	**ISO 2768-mH**	✓	**Ra 3.2**	Mat.	**Voir Ordre Fabrication / Achat** *See Manufacturing / Purchasing Order*	
Par / *By*	**A.POUPLARD**	Le / *On*	**21/11/2023**	Feuille *Sheet*	Format	N°	**W-007834**	Rev. **A**
				1 / 1	**A3**			

Tous droits réservés, diffusion ou reproduction interdite sans autorisation écrite de PCM.
All rights reserved, reproduction or distribution prohibited without written permission from PCM.



Casser les arêtes vives / *Smooth sharp angles*

A	A.POUPLARD	**Première révision / First revision**		**XXXX**	**G.PIETTE**		**21/11/2023**
Rev.	Par / *By*	Objet / *Subject*		ICR/NCR	Vérifié par / *Checked by*		Le / *On*

PCM keep it moving

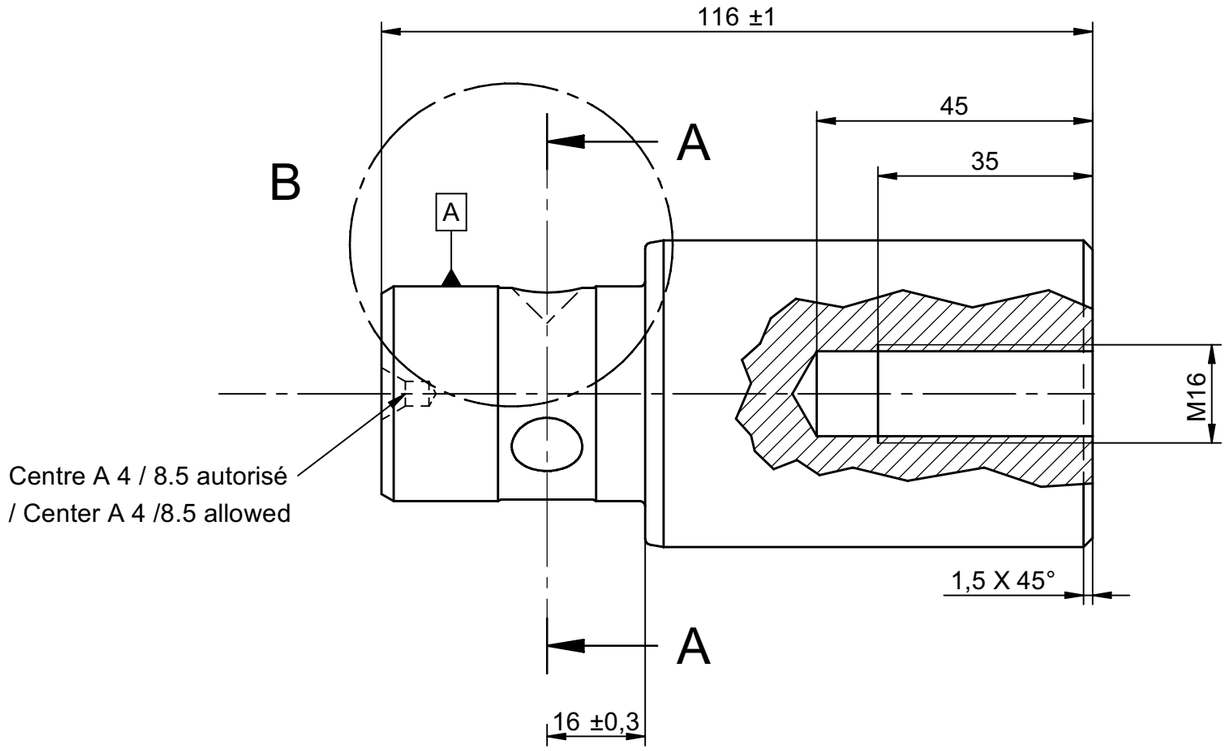
Rue René Moineau
49 123 Champtocé/Loire
FRANCE
Phone : +33 (0)1.77.68.31.00
www.pcm.eu

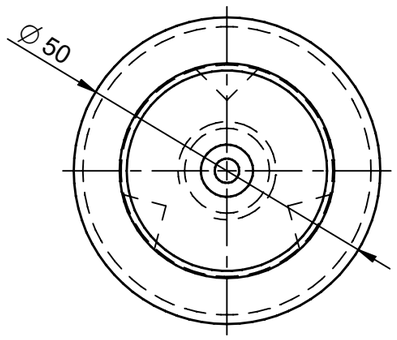
PLAQUE FERMETURE CLAMP

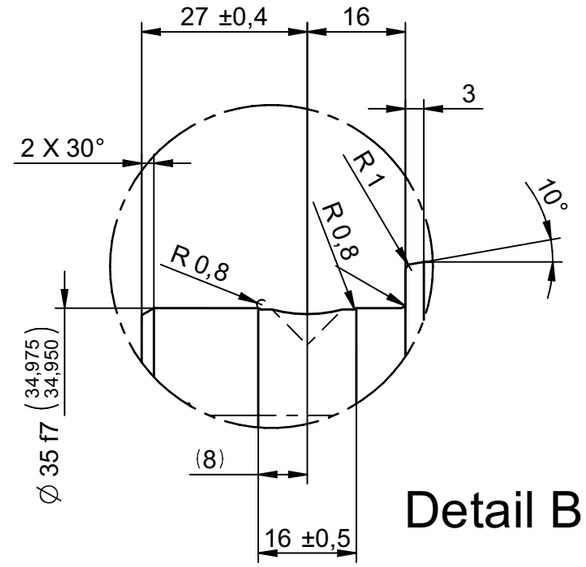
CLAMP CLOSE PLATE

Type	**AV7**								
Masse / *Weight*	**1.56 kg / 3.43 lbs**		Tol.	**ISO 2768-mH**	✓	**Ra 3.2**	Mat.	**Voir Ordre Fabrication / Achat** *See Manufacturing / Purchasing Order*	
Par / *By*	**A.POUPLARD**	Le / *On* **21/11/2023**		Feuille *Sheet* **1 / 1**	Format **A3**	N°	**W-007835**	Rev. **A**	

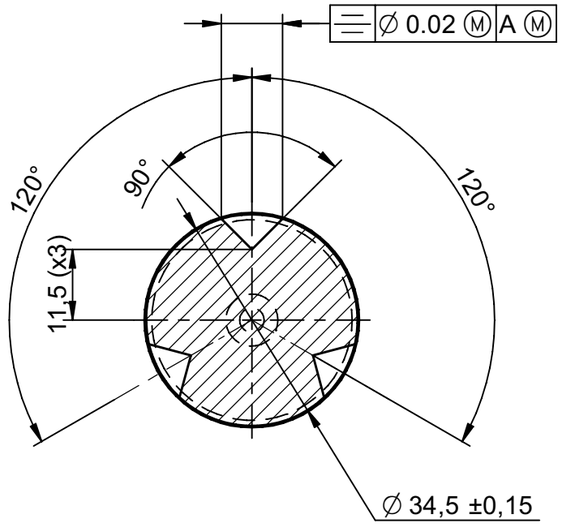
Tous droits réservés, diffusion ou reproduction interdite sans autorisation écrite de PCM.
All rights reserved, reproduction or distribution prohibited without written permission from PCM.







Detail B



Coupe / Section A-A

A	A.POUPLARD	Première révision / First issue			XXXX	G.PIETTE	21/11/2023	
Rev.	Par / *By*	Objet / *Subject*			ICR/NCR	Vérifié par / *Checked by*	Le / *On*	

PCM keep it moving

Rue René Moineau
49 123 Champtocé/Loire
FRANCE
Phone : +33 (0)1.77.68.31.00
www.pcm.eu

OUTIL LEVAGE LIGNE D'ARBRE

SHAFT LINE LIFTING TOOL

Type	AV7								
Masse / *Weight*	1.37 kg / 3.02 lbs			Tol.	ISO 2768-mH	✓	1.6	Mat.	Voir Ordre Fabrication / Achat *See Manufacturing / Purchasing Order*
Par / *By*	A.POUPLARD	Le / *On*	21/11/2023		Feuille *Sheet*	Format	N°	W-007828	Rev. A
					1 / 1	A3			

Tous droits réservés, diffusion ou reproduction interdite sans autorisation écrite de PCM.
All rights reserved, reproduction or distribution prohibited without written permission from PCM.

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	27-01-2025

Base Load Power Hub (BLPH)

VENDOR ASSET REGISTER (REF DOC N 123A90-DDL-MAC-SP-50013 - PARA 9 DIGITAL DOCUMENT REQUIREMENTS)
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-LIS-00026

Document Class: 2

02	17/01/2025	Accepted for Construction (AFC)	GLL	APD	AHN
01	18/09/2024	Accepted for Construction (AFC)	GLL	APD	AHN
00	31/07/2024	Issue for Review (IFR)	GLL	APD	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

Tag Number	Tag Description	Physical Class Name	Location	System/SubSystem Code	Purchase Order Number	Vendor Company Name	Manufacturer Company Name	Model Number	Equipment Manufacturer Serial Number	Model Part No	Hazardous Area Equip Relevant	Hazardous Area Certificate Standard	Hazardous Area Certifying Authority	Hazardous Area Certificate Number	Atex Classification	Explosion Protection Examination Certificate Document Number	Layout Drawing	Datasheet	Assembly/Dimensional Drawing	General Arrangement	Operating & Maintenance Manual	Wiring Diagram	Spare Parts List	Lubricant Document Reference	Criticality	Remarks
P-50001A	Sea Water Lift Progressive Cavity Pump				1724000936	PCM GROUP ITALIA SRL	PCM MANUFACTURING SAS	25AV24	070P140016399	317873	SAFE	N/A	N/A	N/A	N/A	N/A	1724000936-MAC-DA-00004	1724000936-MAC-DS-00012	1724000936-MAC-DA-00004	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
P-50001B	Sea Water Lift Progressive Cavity Pump				1724000936	PCM GROUP ITALIA SRL	PCM MANUFACTURING SAS	25AV24	070P140016400	317873	SAFE	N/A	N/A	N/A	N/A	N/A	1724000936-MAC-DA-00004	1724000936-MAC-DS-00012	1724000936-MAC-DA-00004	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
PM-50001A	Sea Water Lift Progressive Cavity Pump Motor				1724000936	PCM GROUP ITALIA SRL	ABB	M3BP 132SMF 4	3G1F2433998068	DI317873-01	SAFE	N/A	N/A	N/A	N/A	N/A	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
PM-50001B	Sea Water Lift Progressive Cavity Pump Motor				1724000936	PCM GROUP ITALIA SRL	ABB	M3BP 132SMF 4	3G1F2433998069	DI317873-01	SAFE	N/A	N/A	N/A	N/A	N/A	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
50-LG-001	Sea Water Lift Progressive Cavity Pump Seal Level Gauge				1724000936	PCM GROUP ITALIA SRL	FLOWSERVE	N/A	N/A	C0560271ZZ	SAFE	N/A	N/A	N/A	N/A	N/A	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
50-RO-003	Sea Water Lift Progressive Cavity Pump Sea Restriction orifice				1724000936	PCM GROUP ITALIA SRL	PCM MANUFACTURING SAS	N/A	N/A	C0095396ZZ	SAFE	N/A	N/A	N/A	N/A	N/A	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
50-LG-002	Sea Water Lift Progressive Cavity Pump Seal Level Gauge				1724000936	PCM GROUP ITALIA SRL	FLOWSERVE	N/A	N/A	C0560271ZZ	SAFE	N/A	N/A	N/A	N/A	N/A	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
50-RO-004	Sea Water Lift Progressive Cavity Pump Seal Restriction orifice				1724000936	PCM GROUP ITALIA SRL	PCM MANUFACTURING SAS	N/A	N/A	C0095396ZZ	SAFE	N/A	N/A	N/A	N/A	N/A	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
V-50000 A	Sea Water Lift Progressive Cavity Pump Seal pot				1724000936	PCM GROUP ITALIA SRL	FLOWSERVE	N/A	400370175-000200-001	C0172048X951 C0489371X947	SAFE	N/A	N/A	N/A	N/A	N/A	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
V-50000 B	Sea Water Lift Progressive Cavity Pump Seal pot				1724000936	PCM GROUP ITALIA SRL	FLOWSERVE	N/A	400370175-000200-002	C0172048X951 C0489371X947	SAFE	N/A	N/A	N/A	N/A	N/A	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
H-ETE-200N1-20-L1-01A	Sea Water Lift Progressive Cavity Pump Self-regulating heat cable				1724000936	PCM GROUP ITALIA SRL	Thermon	N/A	N/A	HTSX 15-2-OJ	YES	Directive 2014/34/EU	FM Approvals Ltd.	FM 12ATEX0014	Zone 1 IIB T3	FM 12ATEX0014	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
H-ETE-200N1-20-L1-01B	Sea Water Lift Progressive Cavity Pump Self-regulating heat cable				1724000936	PCM GROUP ITALIA SRL	Thermon	N/A	N/A	HTSX 15-2-OJ	YES	Directive 2014/34/EU	FM Approvals Ltd.	FM 12ATEX0014	Zone 1 IIB T3	FM 12ATEX0014	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
ETB-200N1-20-L1-01A	Sea Water Lift Progressive Cavity Pump Junction box				1724000936	PCM GROUP ITALIA SRL	Thermon	ZP-XP	N/A	27652	YES	Directive 2014/34/EU	FM Approvals Ltd.	FM 10ATEX0058X	Zone 1 IIB T3	FM 10ATEX0058X	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
ETB-200N1-20-L1-01B	Sea Water Lift Progressive Cavity Pump Junction box				1724000936	PCM GROUP ITALIA SRL	Thermon	ZP-XP	N/A	27652	YES	Directive 2014/34/EU	FM Approvals Ltd.	FM 10ATEX0058X	Zone 1 IIB T3	FM 10ATEX0058X	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
50-PSV-006	Sea Water Lift Progressive Cavity Pump Pressure Safety Valve				1724000936	PCM GROUP ITALIA SRL	TAI	3111W-1D2-S	200145	DIGIAN-392481-05	YES	Directive 2014/34/EU	Bureau Veritas	BVI/ATEX/ITA/23/055	Zone 1 IIB T3	BVI/ATEX/ITA/23/055	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A
50-PSV-007	Sea Water Lift Progressive Cavity Pump Pressure Safety Valve				1724000936	PCM GROUP ITALIA SRL	TAI	3111W-1D2-S	200146	DIGIAN-392481-05	YES	Directive 2014/34/EU	Bureau Veritas	BVI/ATEX/ITA/23/055	Zone 1 IIB T3	BVI/ATEX/ITA/23/055	1724000936-MAC-DA-00004	1724000936-MAC-DS-00014	1724000936-MAC-DG-00005	1724000936-MAC-DA-00004	1724000936-MAC-MAN-00031	1724000936-MAC-DG-00005	1724000936-COM-LIS-00029	N/A	2	N/A

1.2 DRAWING

1.2.1 GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS

1.2.2 PUMP CROSS SECTIONAL DRAWING AND BILL OF MATERIAL (INCLUDING SPEED REDUCER)

1.2.3 MOTOR OUTLINE DRAWING AND WIRING DIAGRAM

1.2.4 SHAFT SEAL DRAWING AND BILLS OF MATERIAL (INCLUDING FLUSHING PLAN 51)

1.2.5 SPEED REDUCER ASSEMBLY DRAWING AND BILL OF MATERIALS

1.2.6 SHAFT COUPLING ASSEMBLY DRAWING AND BILL OF MATERIALS

1.2.7 HEATING JACKET SYSTEM DETAILED DRAWING (INCLUDING ELECTRICAL CONNECTIONS)

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

CROSSWIND	HOLLANDSE KUST NOORD WIND PARK Project Contract No. CW-I-WP4-2023-05	ROSETTI MARINO
Document Title:	GENERAL ARRANGEMENT DRAWING	Sheet 1 of 5 Date: 17/10/2024 Rev: 03

Base Load Power Hub (BLPH)

GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, SEAL SYSTEMS, FOUNDATION LOADS, NOZZLES LOADS, BATTERY LIMITS, LIFTING DETAILS) For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-DA-00004

Document Class: 2

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	04-11-2024

03	17/10/2024	Accepted for Construction (AFC)	APD	GLL	AHN
02	06/08/2024	Issue for Review (IFR)	APD	GLL	AHN
01	15/07/2024	Issue for Review (IFR)	APD	GLL	AHN
00	10/06/2024	Issue for Review (IFR)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Issue for Review (IFR)
02	Issue for Review (IFR)
03	Accepted for Construction (AFC)

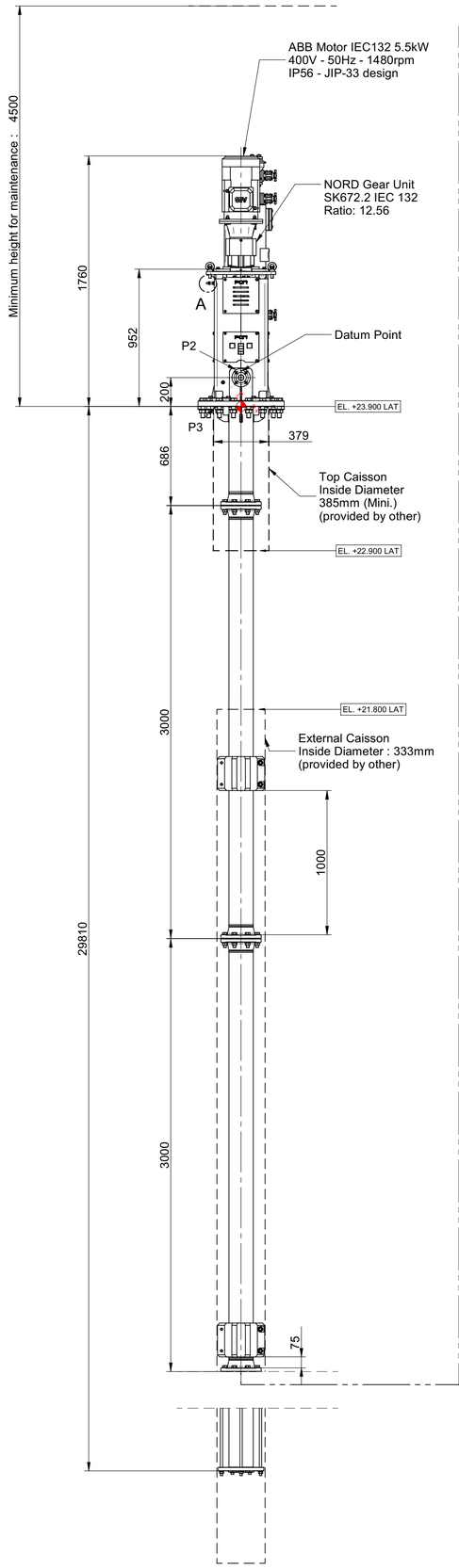
HOLDS LIST

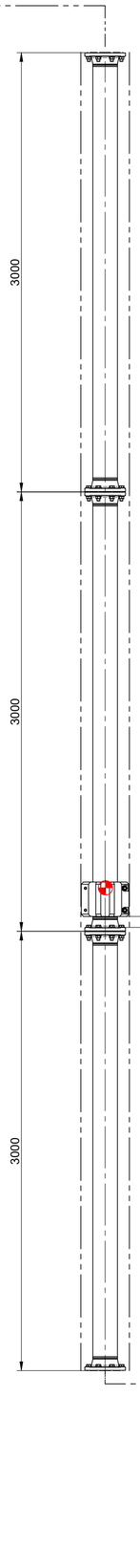
No.	Description
1	
2	
3	
4	

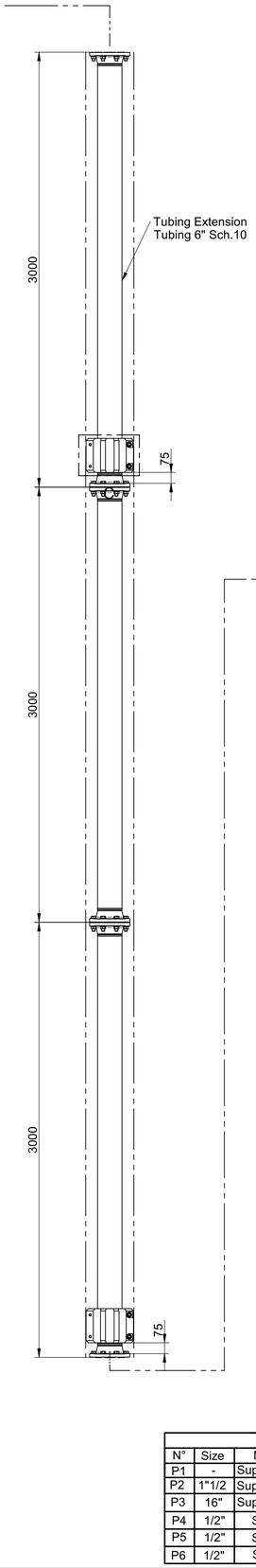
This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

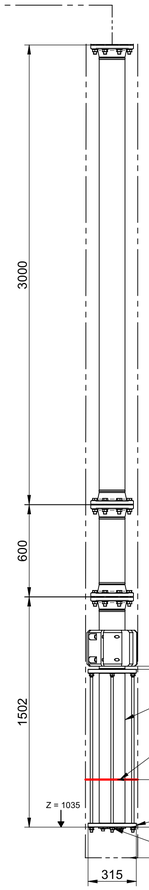
DRAWING NO. 1724000936-MAC-DA-00004

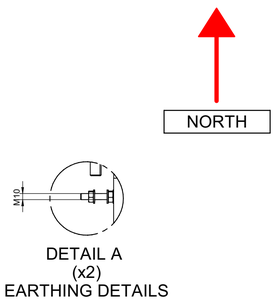
REV. 03

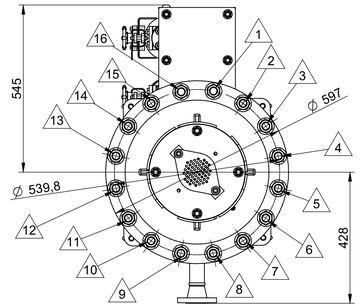






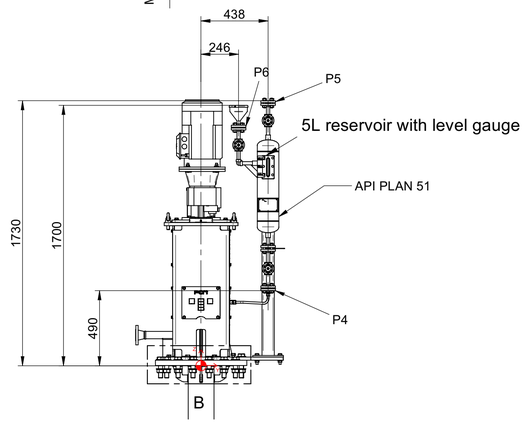




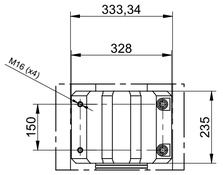


BOTTOM VIEW

	Foundation Loads (N)
1	2510 (Compression)
2	2510 (Compression)
3	2510 (Compression)
4	2510 (Compression)
5	2510 (Compression)
6	2510 (Compression)
7	2510 (Compression)
8	2510 (Compression)
9	2510 (Compression)
10	2510 (Compression)
11	2510 (Compression)
12	2510 (Compression)
13	2510 (Compression)
14	2510 (Compression)
15	2510 (Compression)
16	2510 (Compression)



SEAL SYSTEM API PLAN 51



Note :
Grooves to allow byocide entry.

	C.O.G
X	7
Y	-1
Z	-12398

WEIGHT	
Total dry	1967 kg
Operating	4072 kg
Details for maintenance	
Pump Casing	230 kg
Pump Trunk	242 kg
Pump Extensions (x9)	130 kg
Pump Shaft Line	30 kg
Motor	81 kg
Gearbox	26 kg
Stator	33 kg
Rotor	16 kg
Coupling	25 kg
Seal System + Stand	54 kg
Centralizers (x6)	10 kg

Nozzle list					Allowable Nozzle Load (API 676)					
					Forces (kN)			Moments (N.m)		
N°	Size	Material	Rating	Service	Fx	Fy	Fz	Mx	My	Mz
P1	-	Super Duplex	strainer	Suction	-	-	-	-	-	-
P2	1"1/2	Super Duplex	150# RF	Discharge	0.65	0.65	0.65	350	350	350
P3	16"	Super Duplex	150# RF	Mounting	5.20	5.20	5.20	2800	2800	2800
P4	1/2"	SS 316L	300# RF	To Quench	-	-	-	-	-	-
P5	1/2"	SS 316L	300# RF	P51 Fill	-	-	-	-	-	-
P6	1/2"	SS 316L	300# RF	P51 Vent	-	-	-	-	-	-

PCM | keep it moving

N° [Manufacturing Unique Serial Number]

Made in France

Item 317873

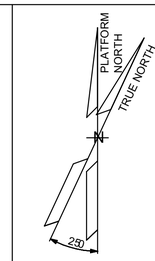
Cyl 462 cm3 Rpm 118 Bar 5.9

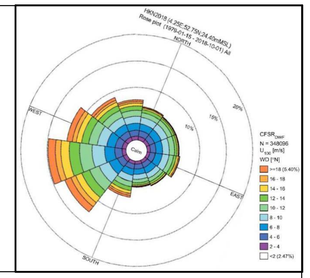
Mod 25A24 2024

Ref P-5001A/B

8 boulevard Bineau - 92300 Levallois-Perret - FRANCE www.pcm.eu

Manufacturer: PCM EUROPE SAS





NOTES

Dimensions tolerances as per ISO2768 vK.

API Plan 13 is provided to vent the mechanical seal of vertical pumps. Tubing made in Stainless Steel 316L.

LEGEND

Z = Minimum distance for stator dismantling.

HOLDS

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
03	17/10/24	APD	GLL	AHN	ACCEPTED FOR CONSTRUCTION (AFC)
02	06/08/24	APD	GLL	AHN	ISSUE FOR CLIENT REVIEW (ICR)
01	15/07/24	APD	GLL	AHN	ISSUE FOR CLIENT REVIEW (ICR)
00	10/06/24	APD	GLL	AHN	ISSUE FOR CLIENT REVIEW (ICR)

PCM keep it moving

CROSSWIND

ROSETTI MARINO

TITLE :

BASE LOAD POWER HUB (BLPH)

GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS

(INCLUDING : NAMEPLATE, BASEFRAME, SEAL SYSTEMS, FOUNDATION LOADS, NOZZLES LOADS, BATTERY LIMITS, LIFTING DETAILS)

CONTRACT NO./TITLE : CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK

SCALE 1:20

DRAWN APD | CHECKED GLL | APPROVED AHN | DATE 17/10/24

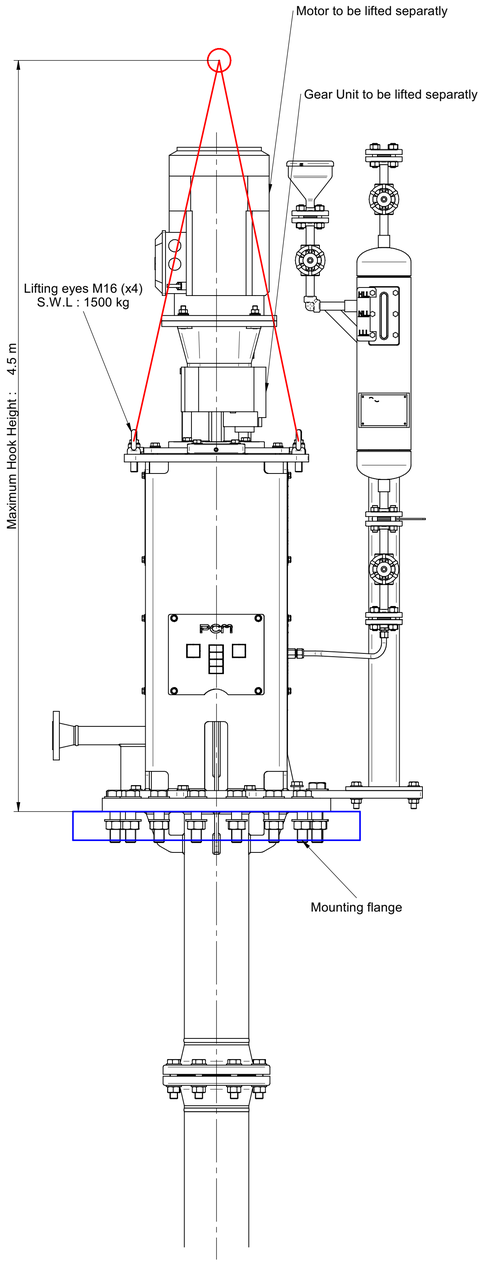
A1 | DRAWING NO. 1724000936-MAC-DA-00004 | SHEET 03 | REV. 03

File Name : 1724000936-MAC-DA-00004

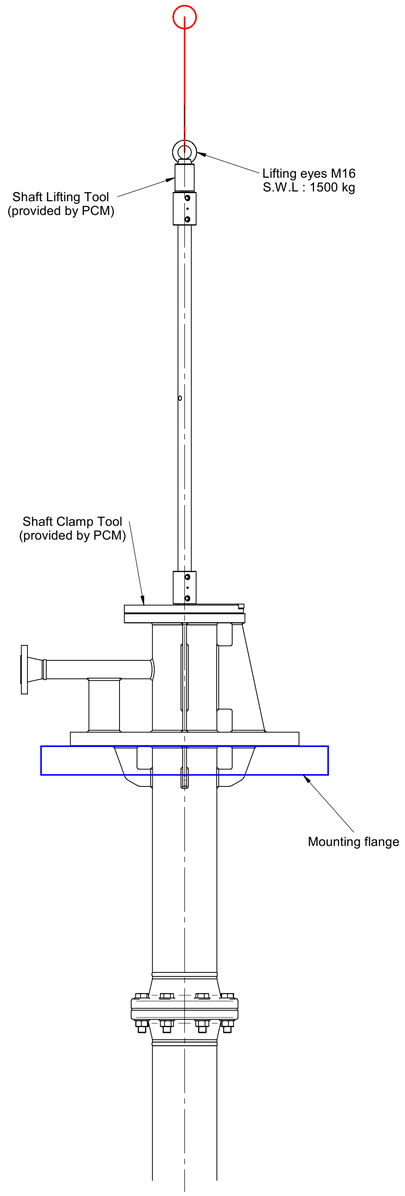
DRAWING NO. 1724000936-MAC-DA-00004

REV. 03

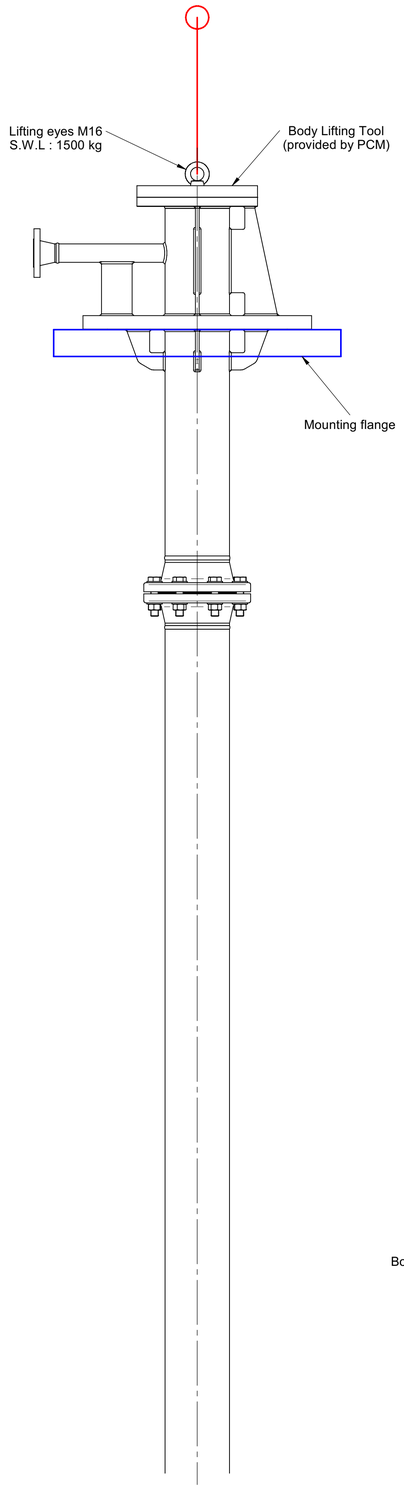
LIFTING DETAILS : TRUNK

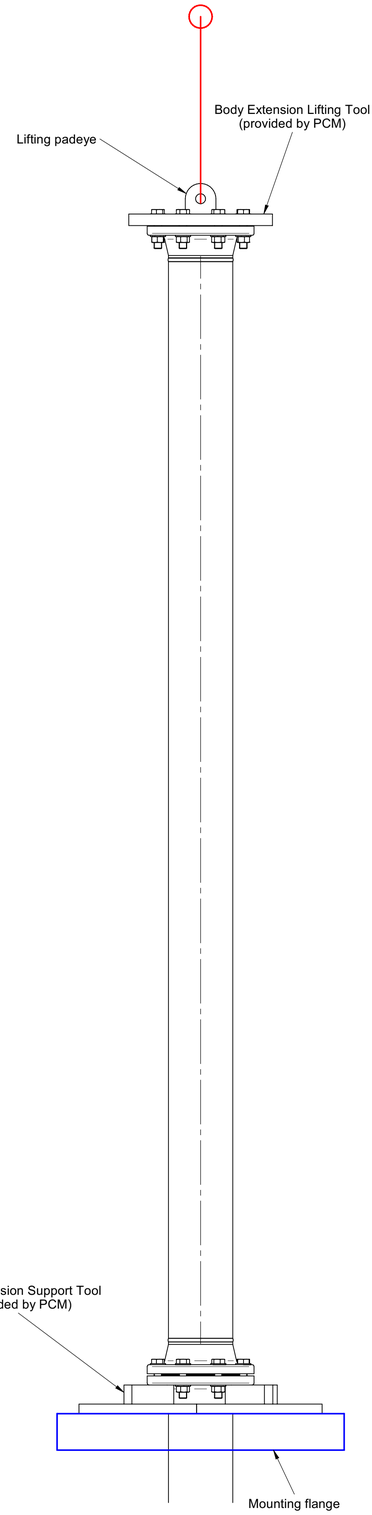


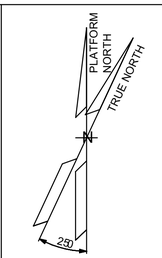
LIFTING DETAILS : SHAFT EXTENSION

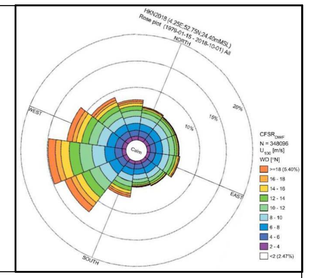


LIFTING DETAILS : BODY & BODY EXTENSION









NOTES

Document Reference:
INSTALLATION, OPERATING AND MAINTENANCE MANUAL (PUMP AND MOTOR, INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)

Document number: 1724000936-MAC-MAN-00031

LEGEND

HOLDS

PCM keep it moving

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
03	17/10/24	APD	GLL	AHN	ACCEPTED FOR CONSTRUCTION (AFC)
02	06/08/24	APD	GLL	AHN	ISSUE FOR CLIENT REVIEW (ICR)
01	15/07/24	APD	GLL	AHN	ISSUE FOR CLIENT REVIEW (ICR)
00	10/06/24	APD	GLL	AHN	ISSUE FOR CLIENT REVIEW (ICR)

CROSSWIND

ROSETTI MARINO

TITLE :
BASE LOAD POWER HUB (BLPH)
GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS
(INCLUDING : NAMEPLATE, BASEFRAME, SEAL SYSTEMS, FOUNDATION LOADS, NOZZLES LOADS, BATTERY LIMITS, LIFTING DETAILS)

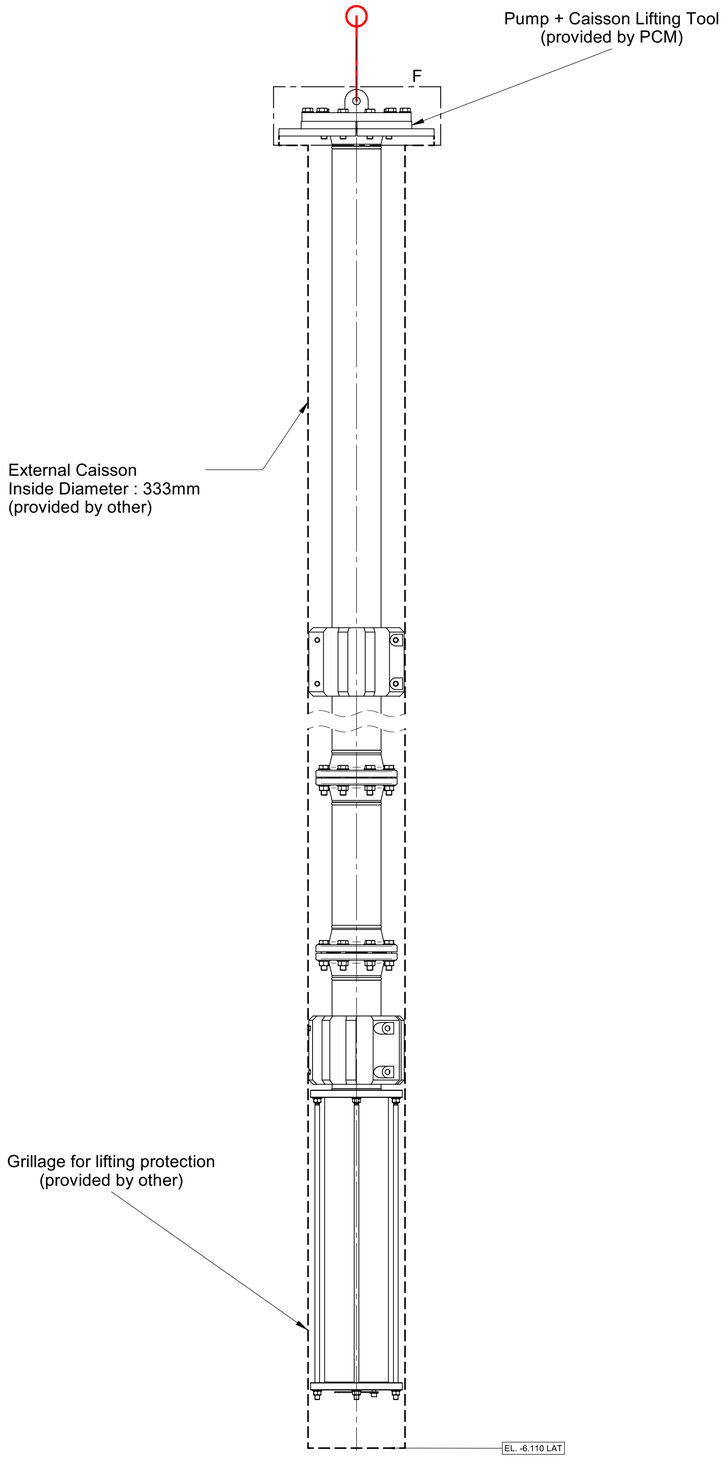
CONTRACT NO./TITLE : CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE 1:8
DRAWN APD	CHECKED GLL	APPROVED AHN	DATE 17/10/24
A1	DRAWING NO.: 1724000936-MAC-DA-00004	SHEET 04	REV. 03

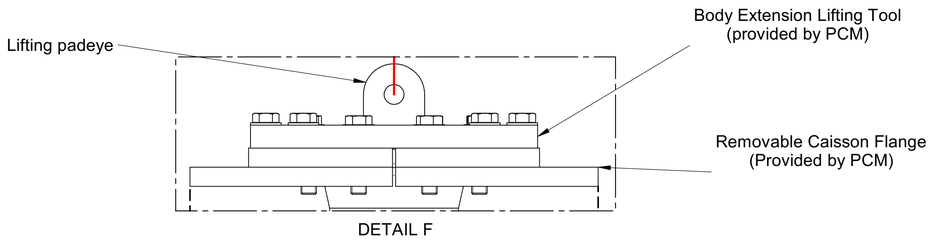
File Name : 1724000936-MAC-DA-00004

DRAWING NO. 1724000936-MAC-DA-00004

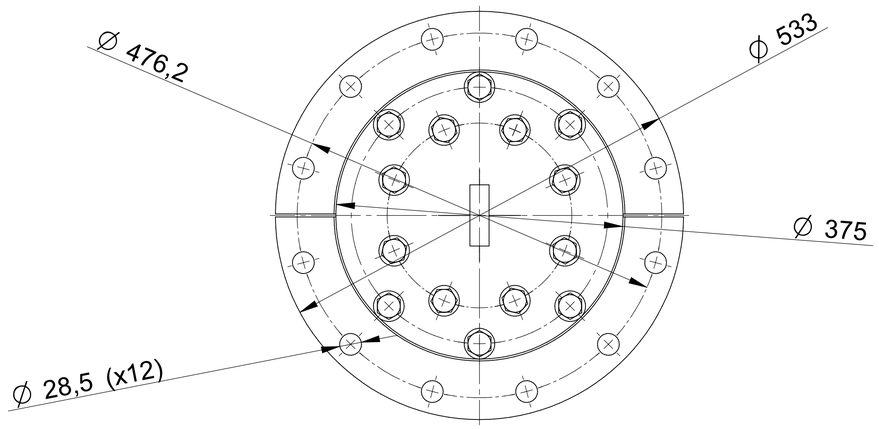
REV. 03

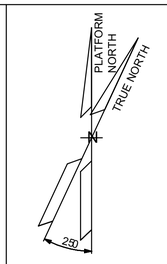
LIFTING DETAILS :
PUMP + CAISSON

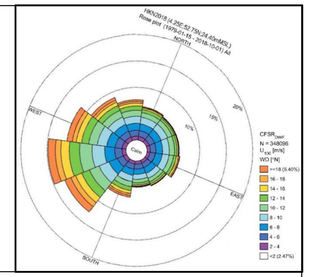




DETAIL F







NOTES

Document Reference:
INSTALLATION, OPERATING AND MAINTENANCE MANUAL (PUMP AND MOTOR, INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)

Document number: 1724000936-MAC-MAN-00031

LEGEND

HOLDS

PCM keep it moving

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
03	17/10/24	APD	GLL	AHN	ACCEPTED FOR CONSTRUCTION (AFC)
02	06/08/24	APD	GLL	AHN	ISSUE FOR CLIENT REVIEW (ICR)
01	15/07/24	APD	GLL	AHN	ISSUE FOR CLIENT REVIEW (ICR)
00	10/06/24	APD	GLL	AHN	ISSUE FOR CLIENT REVIEW (ICR)

CROSSWIND

ROSETTI MARINO

TITLE :
BASE LOAD POWER HUB (BLPH)
GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS
(INCLUDING : NAMEPLATE, BASEFRAME, SEAL SYSTEMS, FOUNDATION LOADS, NOZZLES LOADS, BATTERY LIMITS, LIFTING DETAILS)

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE
DRAWN APD	CHECKED GLL	APPROVED AHN	DATE 17/10/24
A1	DRAWING NO. 1724000936-MAC-DA-00004	SHEET 05	REV. 03

File Name : 1724000936-MAC-DA-00004

CROSSWIND	HOLLANDSE KUST NOORD WIND PARK Project Contract No. CW-I-WP4-2023-05	ROSETTI MARINO
Document Title:	CROSS SECTIONAL DRAWING	Sheet 1 of 5 Date: 23/08/2024 Rev: 00

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	02-09-2024

Base Load Power Hub (BLPH)

PUMP CROSS SECTIONAL DRAWING AND BILL OF MATERIAL
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-DD-00006

Document Class: 2

01	23/08/2024	Issue for Information (IFI)	APD	GLL	AHN
00	24/07/2024	Issue for Information (IFI)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)
01	Issue for Information (IFI)

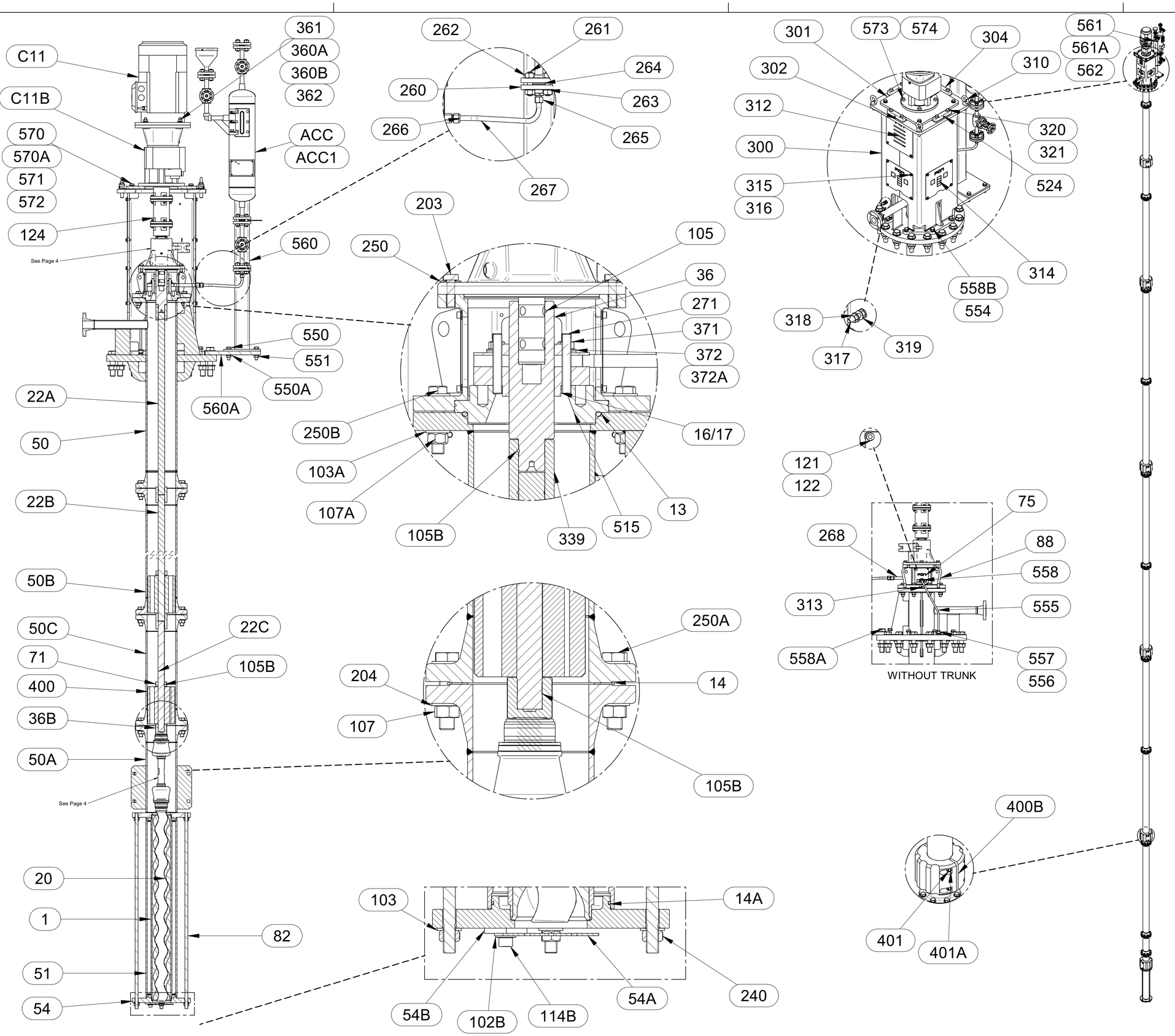
HOLDS LIST

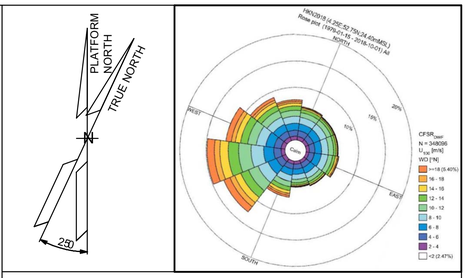
No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

DRAWING NO. 1724000936-MAC-DD-0000

REV. 01





NOTES

LEGEND

HOLDS

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	23/08/24	APD	GLL	AHN	ISSUE FOR INFORMATION (IFI)
00	24/07/24	APD	GLL	AHN	ISSUE FOR CLIENT REVIEW (ICR)

CROSSWIND

ROSETTI MARINO

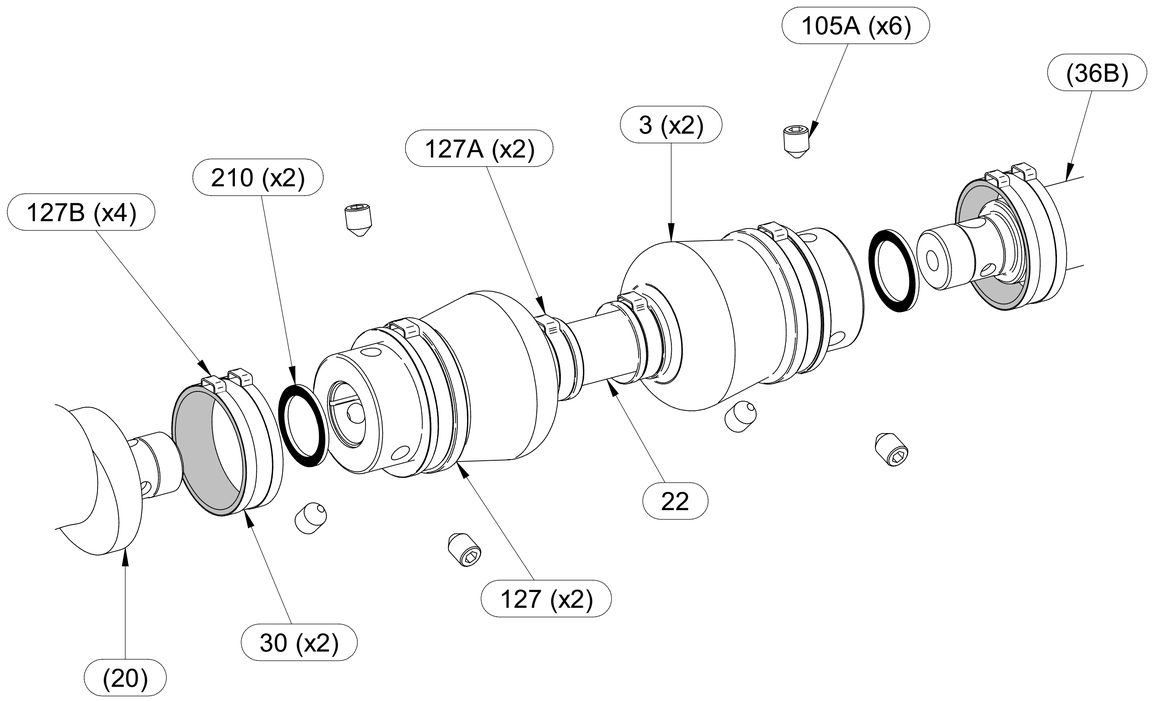
TITLE :
BASE LOAD POWER HUB (BLPH)
PUMP CROSS SECTIONAL DRAWING AND BILL OF MATERIAL
(INCLUDING SPEED REDUCER)

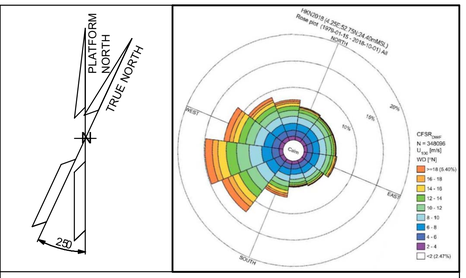
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE
DRAWN APD	CHECKED GLL	APPROVED AHN	DATE 23/08/24
A1	DRAWING NO. 1724000936-MAC-DD-00006	SHEET	REV. 01

File Name : 1724000936-MAC-DD-00006

DRAWING NO. 1724000936-MAC-DD-0000

REV. 01

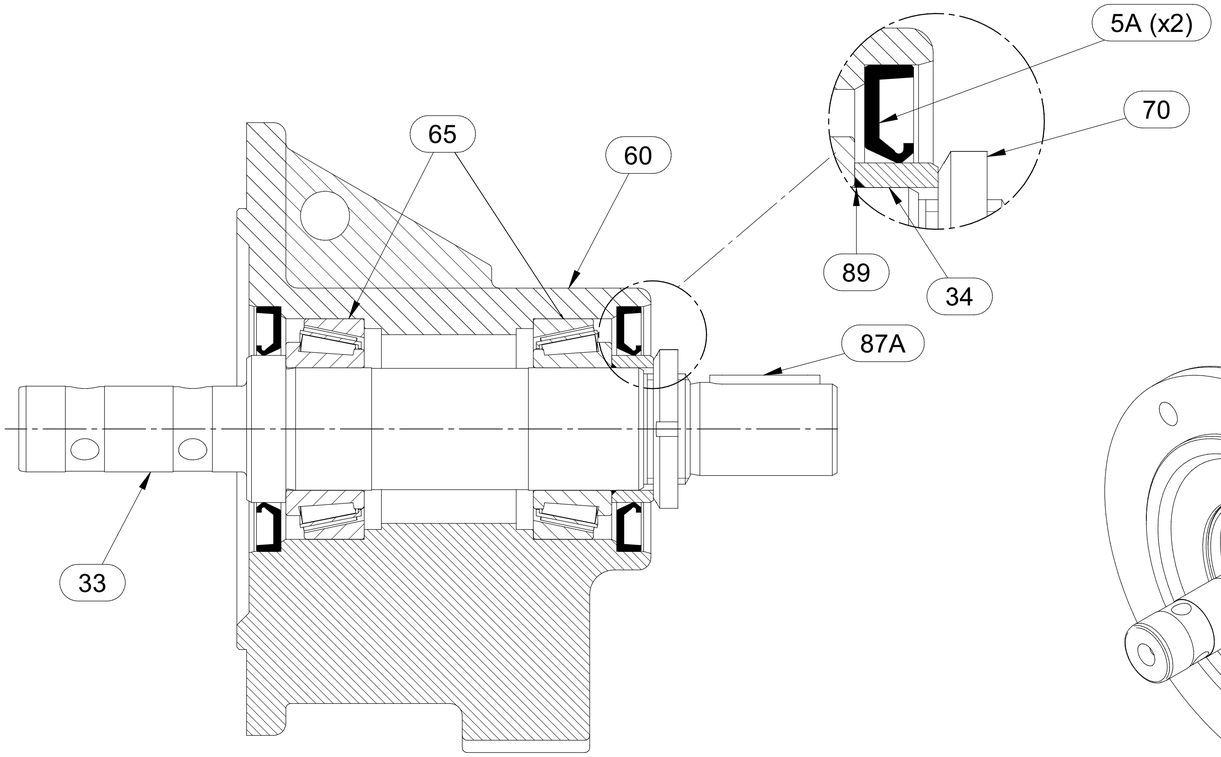


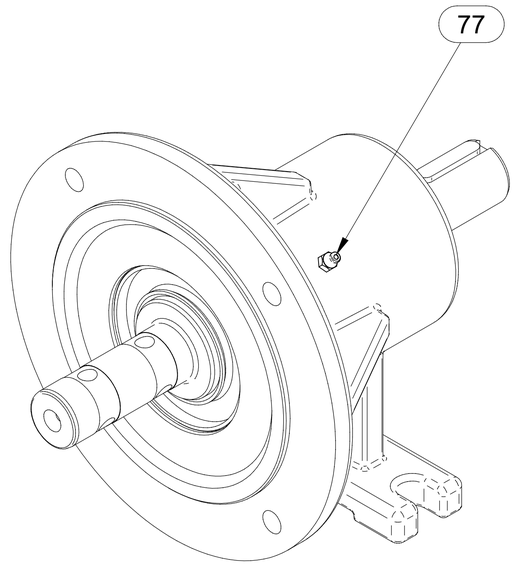


NOTES

LEGEND

HOLDS





REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	23/08/24	APD	GLL	AHN	ISSUE FOR INFORMATION (IFI)
00	24/07/24	APD	GLL	AHN	ISSUE FOR CLIENT REVIEW (ICR)

PCM keep it moving

CROSSWIND

ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)

PUMP CROSS SECTIONAL DRAWING AND BILL OF MATERIAL

(INCLUDING SPEED REDUCER)

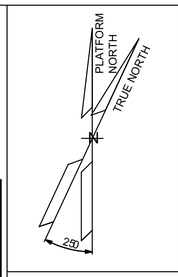
CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE
DRAWN APD	CHECKED GLL	APPROVED AHN	DATE 23/08/24
A1	DRAWING NO. 1724000936-MAC-DD-00006	SHEET	REV. 01

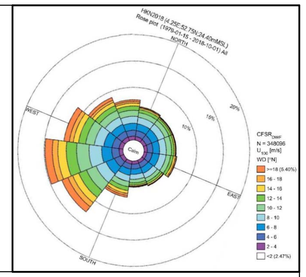
File Name : 1724000936-MAC-DD-00006

DRAWING NO. 1724000936-MAC-DD-0000

REV. 01

N°	Reference	Designation	Material	Qty	Spare parts code
1	77418-1646	STATOR 20I16 25700	NBR	1	STA00071
3	T030004160	SHEATH C6 C7 M6 M7 160	NBR	2	NM-1374-PR
5A	C09070P160	ROTARY SEAL A 60X100X10	NBR	2	-
13	40687-160	O-RING 170.82X6.99	NBR	1	NM-2893-PR
14	C09002T118	FLANGE GASKET 6 CL150	Synthetic Fiber + NBR	11	-
14A	45892-160	O RING 152X3.53	NBR	2	NM-4290-PR
16/17	DIGIAN-392481-01	MECHANICAL SEAL	DSS S31803 - NBR	1	DIGIAN-392481-01
20	M-001931A257TS	ROTOR 25-4P-E10 R1 C M	SDSS - UNS S32760	1	M-001931A257
22	NM-1363	N006LA C7M E-CTFE NBR	NBR / Halar	1	NM-1363-PR
22A	W-008209257	EXTENSION FIX D35 988 AV7	SDSS - UNS S32760	1	-
22B	W-004958300257	EXTENSION SHAFT D35 AV7	SDSS - UNS S32760	9	-
22C	W-004958060257	EXTENSION SHAFT D35 AV7	SDSS - UNS S32760	1	-
30	M-002023209	SHEATH OF PROTECTION C6C7	NBR	2	NM-3384-PR
33	M-001300018	BEARING SHAFT C6C7 D35D38	SS431	1	-
34	28093-043	SHAFT RING D50	Steel C35E	1	-
36	W-004571020	DRIVING SHAFT D60 AV6-7	DSS - S31803	1	-
36B	W-004946257	REDUCED DRIVING SHAFT AV7	SDSS - UNS S32760	1	-
50	W-008202257WP	BODY 6IN AV7	SDSS - UNS S32760	1	-
50A	W-008199257WP	STATOR PIPING 25AV24	SDSS - UNS S32760	1	-
50B	W-004942300257WP	EXTENSION BODY 6IN AV7	SDSS - UNS S32760	9	-
50C	W-004942060257WP	EXTENSION BODY 6IN AV7	SDSS - UNS S32760	1	-
51	W-008200257	STATOR CASING 25AV24	SDSS - UNS S32760	1	-
54	W-008198257	PIPE STATOR 25AV24	SDSS - UNS S32760	1	-
54A	W-008189257T	FLAT STRAINER 25AV AV7	SDSS - UNS S32760	1	-
54B	N-108928257T	PLAT PERCE 7MM	SDSS - UNS S32760	2	-
60	T600004051	BEARING HOUSING F215 M6M7	Cast iron	1	-
65	40121-000	BEARING 33210A	-	2	-
70	40102-043	NUT KM M45	Steel C35E	1	-
71	W-004947257	CENTERING END STOP D35	SDSS - UNS S32760	11	-
75	W-007587014	GUARD AV7	SS316L	4	-
77	C10002C000	GREASE ZERK M8X1.25	-	1	-
82	C06177W257T	STUD M16 BM40-1023	SDSS - UNS S32550	4	-
87A	40751-046	KEY A SHAPE 10X8X45	Steel C45E	1	-
88	W-007527274	STRONG SPACER AV7	CS A570 gr. 50	1	-
89	C09035C160	O-RING 50X2.5	NBR	1	-
102B	C06029G257T	WASHER CS12 M	SDSS - UNS S32550	2	-
103	C06001I257T	WASHER M16 200HV	SDSS - UNS S32550	8	-
103A	C06001I014	WASHER M16 200HV	SS316L (A4-70 fatsener)	16	-
105	C06125C020	SCREW HC M12-16 TR	DSS - S31803	3	-
105A	C06125C014	SCREW HC M12-16 TR	SS316L (A4-70 fatsener)	6	NM-1374-PR
105B	C06125C257T	SCREW HC M12-16 TR	SDSS - UNS S32550	81	-
107	C06002J257	HEX NUT H M20	SDSS - UNS S32550	88	-
107A	C06002I014	HEX NUT H M16	SS316L (A4-70 fatsener)	8	-
114B	C06016D257TS	SCREW CHC M12-30	SDSS - UNS S32550	2	-
114C	C06240E257	SCREW HC M12-25 CU	SDSS - UNS S32550	2	-
121	C06162C087	CAPTIVE WASHER M5	PETP	16	-
122	C06004F010	SCREW CHC M5-10	SS304 (A2-70 fatsener)	16	-
124	C15099J000	CPG. API610 38X60 35X70	-	1	-
127	C01042Z014	EAR CLAMP D78.3-81.5	SS316L	2	NM-1374-PR
127A	C01042P014	EAR CLAMP D42.3-45.5	SS316L	2	NM-1374-PR
127B	C01042U014	EAR CLAMP D66.3-69.5	SS316L	4	NM-3384-PR
203	C06015E014	SCREW H M12-35	SS316L (A4-70 fatsener)	4	-
204	C06001J257	WASHER M20 200HV	SDSS - UNS S32550	176	-
210	M-002022NBR	GASKET D36XD46X2	NBR	2	NM-3384-PR
240	C06002I257T	HEX NUT H M16	SDSS - UNS S32550	8	-
250	C06029G014	WASHER CS12 M	SS316L (A4-70 fatsener)	4	-
250A	C06203J257TS	SCREW H M20-90	SDSS - UNS S32550	88	-
250B	40371-014	SCREW H M16-80	SS316L (A4-70 fatsener)	8	-
260	N-104597014	FLANGE 1-2 300 3-8 NPT	SS316L	1	-
261	W-007229014	THREADED STUD M12 X 80	SS316L (A4-70 fatsener)	4	-
262	C06002G014	HEX NUT H M12	SS316L (A4-70 fatsener)	8	-
263	C06001G014	WASHER M12 200HV	SS316L (A4-70 fatsener)	8	-
264	C09131A014	SPIRAL WOUND GASKET 1-2IN	SS316L	1	-
265	C14259S014T	UNION MALE 3-8NPT - 1-2IN	SS316L	1	-
266	C14260S014T	UNION FEM. 3-8NPT - 1-2IN	SS316L	1	-
267	F-000335014T	TUBE 1-2IN OD 316L	SS316L	-	-
268	W-003825014	NIPPLE 3-8 NPT	SS316L	1	-
271	W-007229014	THREADED STUD M12 X 80	SS316L (A4-70 fatsener)	4	-
300	W-008268046	TRUNK AV6/7 SHAFT 16IN	CS C15	1	-
301	W-008089014	GEARBOX PLATE AV6/7 D250	SS316L	1	-
302	W-007034014T	SETTING SHIMS AV5	SS316L	4	-
304	W-007035014T	STOP SETTING AV5	SS316L	4	-
310	C02004K014	LIFTING EYE BOLT M16-L46	SS316L	4	-
312	W-008091073	SUP TRUNK COVER AV7	Brass	2	-
313	C06176E014	SCREW HC M5-12 TR	SS316L (A4-70 fatsener)	2	-
314	W-008092073	MS TRUNK COVER AV7	Brass	4	-
315	C06029E014	WASHER CS8 M	SS316L (A4-70 fatsener)	24	-
316	C06032A014	SCREW H M8-20	SS316L (A4-70 fatsener)	24	-
317	W-003790014	THREADED STUD M10 X 55	SS316L (A4-70 fatsener)	2	-
318	C06002F014	HEX NUT H M10	SS316L (A4-70 fatsener)	4	-
319	C06001F014	WASHER M10 200HV	SS316L (A4-70 fatsener)	6	-
320	C06001G014	WASHER M12 200HV	SS316L (A4-70 fatsener)	8	-
321	C06015G014	SCREW H M12-45-30	SS316L (A4-70 fatsener)	8	-
339	W-004945257	EXTENSION JUNCTIOND35 AV7	SDSS - UNS S32760	11	-
360A	C06001G014	WASHER M12 200HV	SS316L (A4-70 fatsener)	4	-
360B	C06029G014	WASHER CS12 M	SS316L (A4-70 fatsener)	4	-
361	W-005833014	THREADED STUD M12 X 60	SS316L (A4-70 fatsener)	4	-
362	C06002G014	HEX NUT H M12	SS316L (A4-70 fatsener)	4	-
371	C06002G014	HEX NUT H M12	SS316L (A4-70 fatsener)	4	-
372	C06001G014	WASHER M12 200HV	SS316L (A4-70 fatsener)	4	-
372A	C06029G014	WASHER CS12 M	SS316L (A4-70 fatsener)	4	-
400	W-004957078	CENTRALIZER D35 AV7	POM H	11	-
400B	N-108969099	EXTERNAL CENTRALIZER AV7	PA 66	12	-
401	C06034P257T	SCREW CHC M16-90-44	SDSS - UNS S32760	24	-
401A	C06001I257T	WASHER M16 200HV	SDSS - UNS S32550	24	-
515	W-008207257	MS SUPORT D90 AV7	SDSS - UNS S32760	1	-
524	C06106H014	SCREW HC M12-40	SS316L (A4-70 fatsener)	4	-
550	C06095C014	SCREW H M14-60-34	SS316L (A4-70 fatsener)	4	-
550A	C06001H014T	WASHER M14 200HV	SS316L (A4-70 fatsener)	8	-
551	C06002H014T	HEX NUT H M14	SS316L (A4-70 fatsener)	4	-
554	C06001I014	WASHER M16 200HV	SS316L (A4-70 fatsener)	8	-
555	45868-014T	TUBE D10 EP.1	SS316L (A4-70 fatsener)	-	-
556	W-004064014	FLOW RESTRICTION 2MM	SS316L (A4-70 fatsener)	1	-
557	C14259B014	UNION MALE 3-8NPT - D10	SS316L (A4-70 fatsener)	1	-
558	C14260B014	UNION FEM. 3-8NPT - D10	SS316L (A4-70 fatsener)	1	-
558A	C06131K014	SCREW H M16-60	SS316L (A4-70 fatsener)	2	-
558B	C06131H014	SCREW H M16-50	SS316L (A4-70 fatsener)	6	-
560	W-008269014	API PLAN 51 SUPPORT	SS316L	1	-
560A	W-008270014	API PLAN 51 FOOT SUPPORT	SS316L	1	-
561	W-007229014	THREADED STUD M12 X 80	SS316L (A4-70 fatsener)	2	-
561A	C06001G014	WASHER M12 200HV	SS316L (A4-70 fatsener)	4	-
562	C06002G014	HEX NUT H M12	SS316L (A4-70 fatsener)	4	-
570	C06001G014	WASHER M12 200HV	SS316L (A4-70 fatsener)	8	-
570A	C06029G014	WASHER CS12 M	SS316L (A4-70 fatsener)	4	-
571	C06002G014	HEX NUT H M12	SS316L (A4-70 fatsener)	4	-
572	C06015K014	SCREW H M12-65-30	SS316L (A4-70 fatsener)	4	-
573	C06001G014	WASHER M12 200HV	SS316L (A4-70 fatsener)	4	-
574	C06015F014	SCREW H M12-40	SS316L (A4-70 fatsener)	4	-
ACC	DI317873-02	API PLAN 51	SS316L (A4-70 fatsener)	1	-
ACC1	DI317873-03	HEATING JACKET P51	-	1	-
C11B	FGAHXCG1256CEAA	RED SK672.1F 132	Cast Aluminum	1	-
C11	DI317873-01	MOTOR 5.5KW	Cast iron	1	-





NOTES

LEGEND

HOLDS

PCM keep it moving

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
01	23/08/24	APD	GLL	AHN	ISSUE FOR INFORMATION (IFI)
00	24/07/24	APD	GLL	AHN	ISSUE FOR CLIENT REVIEW (ICR)

CROSSWIND

ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)

PUMP CROSS SECTIONAL DRAWING AND BILL OF MATERIAL

(INCLUDING SPEED REDUCER)

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK | SCALE

DRAWN APD | CHECKED GLL | APPROVED AHN | DATE 23/08/24

A1 | DRAWING NO. 1724000936-MAC-DD-00006 | SHEET | REV. 01

File Name : 1724000936-MAC-DD-00006

Base Load Power Hub (BLPH)

MOTOR OUTLINE DRAWING AND WIRING DIAGRAM
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-DG-00005

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	20-08-2024

Document Class: 2

02	06/08/2024	Accepted for Construction (AFC)	APD	GLL	AHN
01	15/07/2024	Accepted for Construction (AFC)	APD	GLL	AHN
00	24/06/2024	Issue for Review (IFR)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

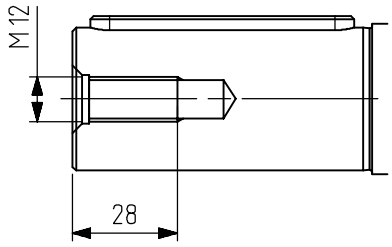
Revision / Change Log

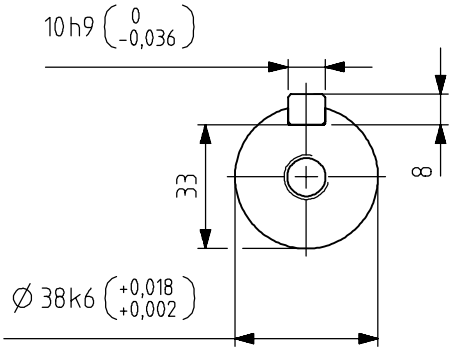
Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)

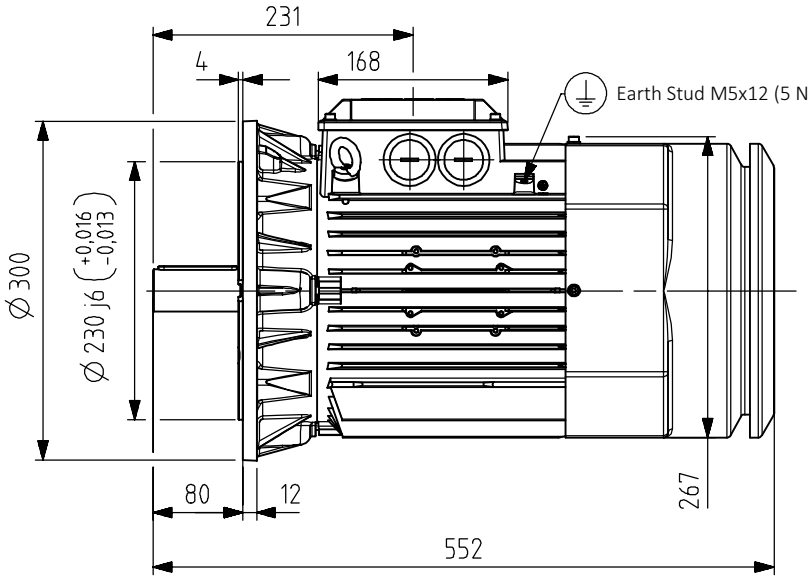
HOLDS LIST

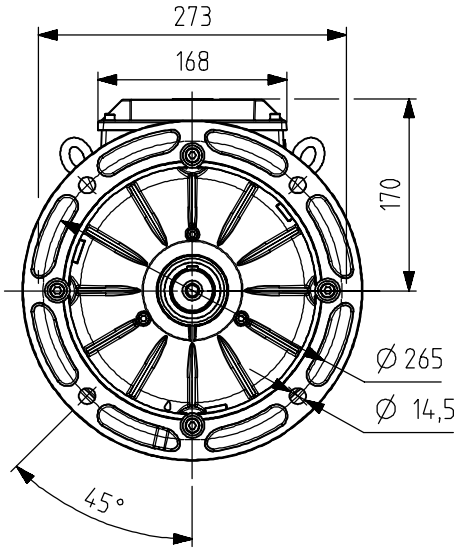
No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy









Additional information:

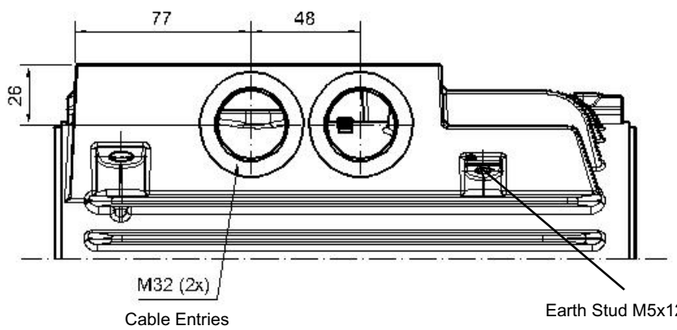
Dimension Print	Motor Type: M3BP/GP (B,K,L) 132SM_2-8; B5, V1 FF265	Document No: 3GZF500013-44 E

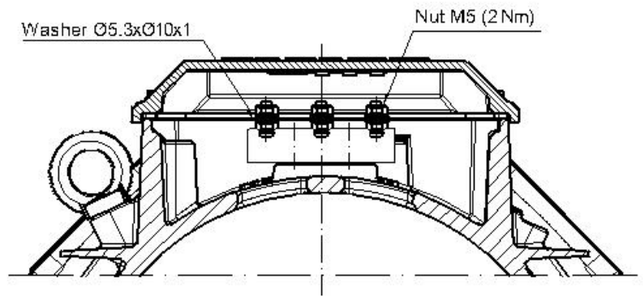
Description: SQUIRREL CAGE MOTOR WITH PROTECTIVE ROOF

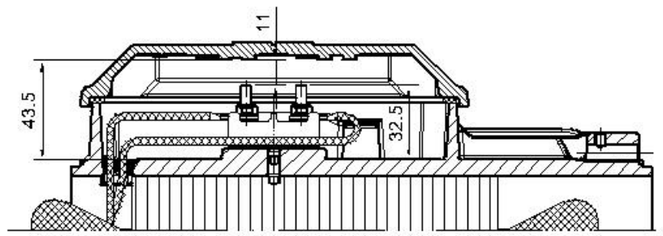
Unit:	IEC LV Motors	Issued by:	J. Hautala	Replaces:	
Date:	06.Nov.2021	Approved by:	A. Härmänmaa	Replaced by:	

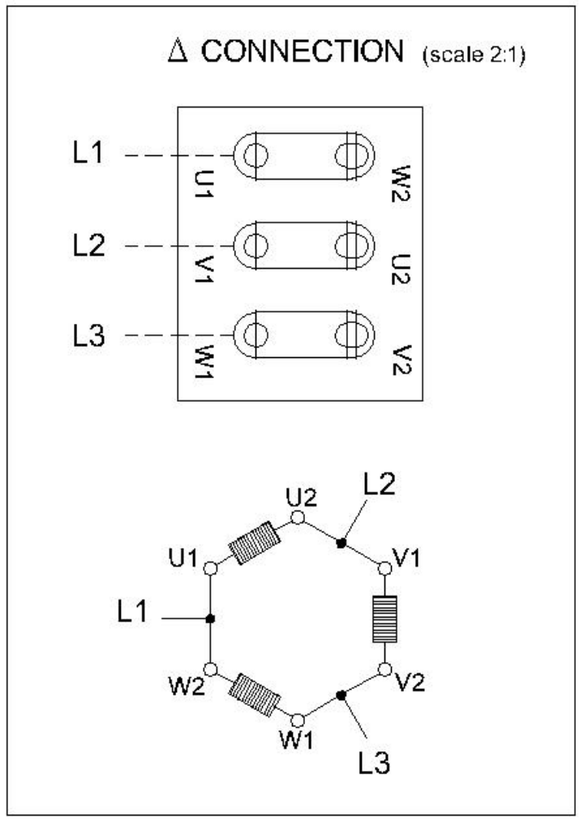
ABB

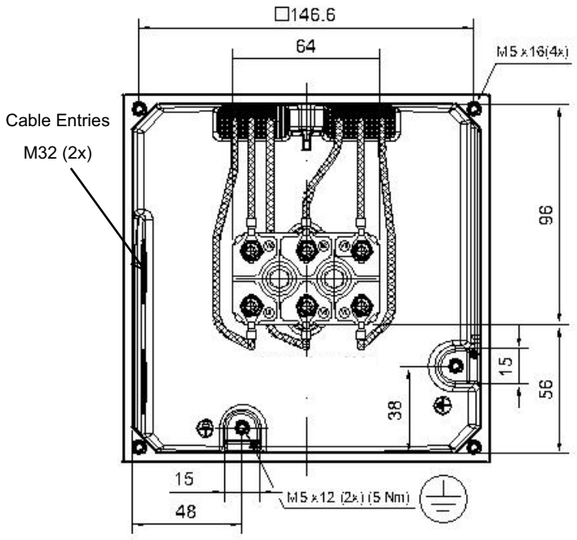
Customer Reference:

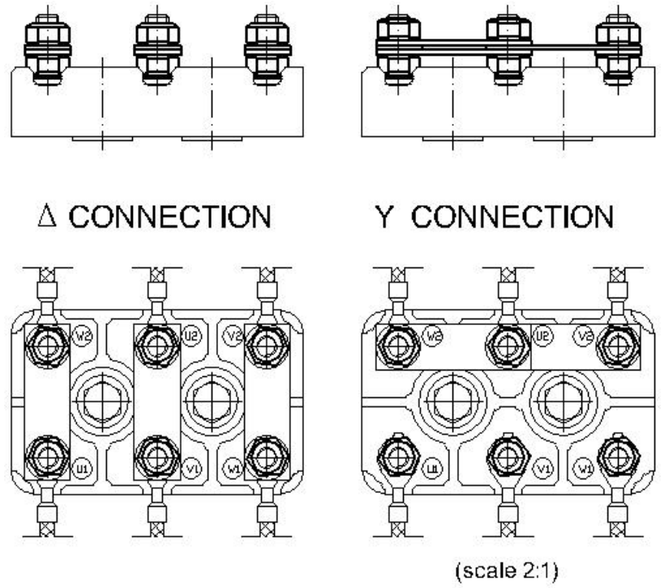










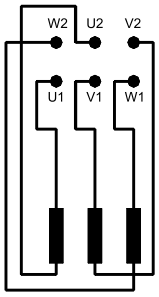


Comment:

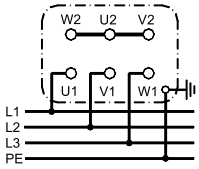
- All unused threaded holes of the terminal box are plugged.

Dimension Print	Motor Type: M3BP/GP (K/L) 112 M3BP/GP (B/K/L) 132	Document No: 3GZF500711-15 B
Description: TERMINAL BOX WITH EARTHINGS SHOWN		
Unit: IEC LV Motors Date: 05.Jul.2021	Issued by: J. Helin Approved by: A. Härmänmaa	Replaces: Replaced by:
ABB	Customer Reference:	

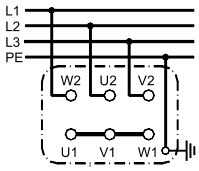
Diagram of connection
Anschluss-Schema
Schema de branchement

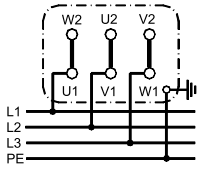


Connection of terminals
Anschluss des Motors
Branchement des bornes

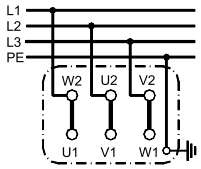


Y-connection
Y-Schaltung
Connection etoile





D-connection
D-Schaltung
Connection triangle





Direction of rotation with phase sequence shown in picture
Drehrichtung nach Schaltbild
Direction de rotation avec branchement ci-dessus



Direction of rotation with reversed phase sequence
Drehrichtung mit umgekehrter Phasenfolge
Direction de rotation avec sequence de phase reversée

Motor No Maschine Nr No du moteur	
ABB Oy, Motors	3GZF321100-1 E

Connection Diagram

Document No: 3GZF321100-1 E

Description: 3-PHASE SQUIRREL-CAGE MOTOR

Unit:	Motors	Issued by:	M Prusi	Replaces:
Date:	21.09.2005	Approved by:	Jari Raittila	Replaced by:

ABB Oy

Customer Reference:

Base Load Power Hub (BLPH)

SHAFT SEAL DRAWING AND BILLS OF MATERIAL
(INCLUDING FLUSHING PLAN 51)
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-DD-00007

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	18-10-2024

Document Class: 3

Rev.	Date	Description	Prepared	Reviewed	Approved
03	17/10/2024	Issue for Information (IFI)	APD	GLL	AHN
02	05/09/2024	Issue for Information (IFI)	APD	GLL	AHN
01	06/08/2024	Issue for Information (IFI)	APD	GLL	AHN
00	18/07/2024	Issue for Information (IFI)	APD	GLL	AHN

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

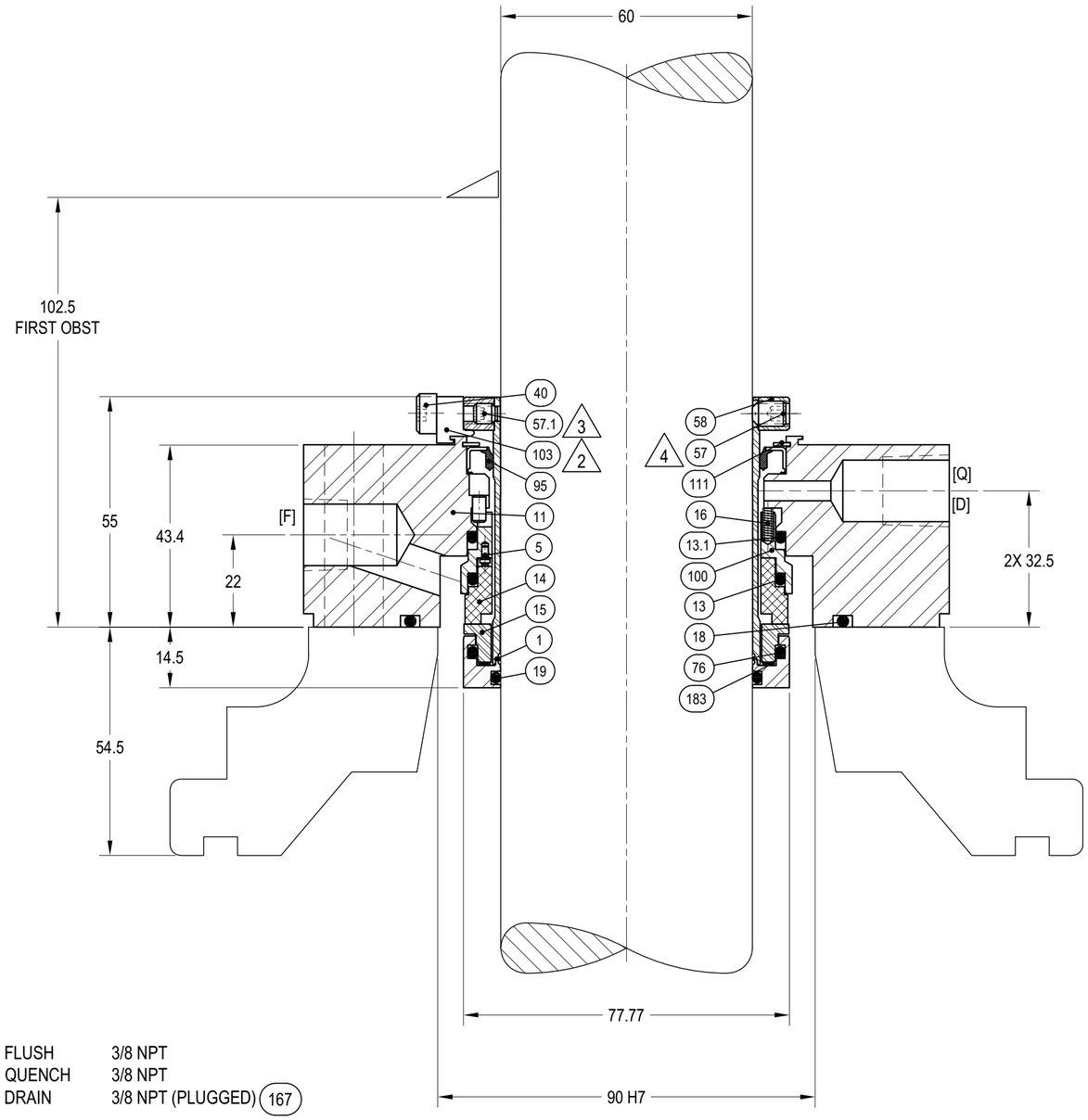
Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)
01	Issue for Information (IFI)
02	Issue for Information (IFI)
03	Issue for Information (IFI)

HOLDS LIST

No.	Description
1	
2	
3	
4	

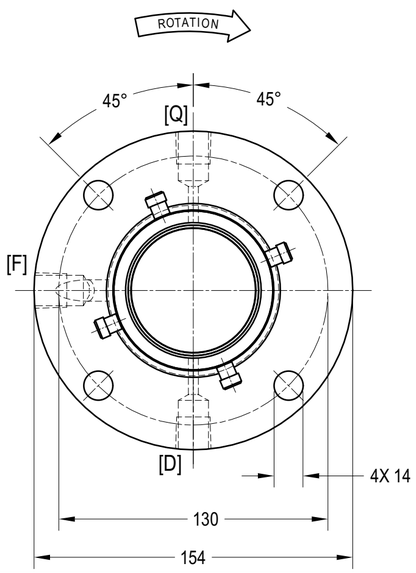
This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy



[F] FLUSH 3/8 NPT
[Q] QUENCH 3/8 NPT
[D] DRAIN 3/8 NPT (PLUGGED) (167)

NOTES:

1. FOR INSTALLATION AND OPERATING INSTRUCTIONS SEE APPROPRIATE FLOWSERVE INSTALLATION SHEET (FIS).
2. REMOVE SETTING DEVICES (#103) BEFORE START-UP.
3. DO NOT TORQUE DOG POINT SET SCREWS (#10-24).
4. TIGHTEN(M6) SETSCREWS EQUALLY, CROSSWISE, IN 4 STEPS. FINAL TORQUE: 8.5 Nm.
5. PARTS #1 & #11 MUST BE SUPPLIED WITH 3.1 CERTS.



BILL OF MATERIAL NO: C100033781

SPARE PARTS: [1] STARTUP [2] 2 YEAR [3] CAPITAL/CRITICAL

NO	PART CODE	QTY	DESCRIPTION	MATERIAL	
1	C100036102	1	SLEEVE, SEAL	DUPLEX 255	
5	C0012107NL	3	PIN, BUTTON-HEAD	ALLOY C-276	1
11	C100036104	1	GLAND, SEAL	DUPLEX 255	
13	568149GU	1	O-RING, OTHER	FLUOROELASTOMER (FKM)	1
13.1	568149GU	1	O-RING, OTHER	FLUOROELASTOMER (FKM)	1
14	C0011933KR3	1	FACE, SEAL	CARBON-GRAPHITE, RESIN IMPREGNATED	1
15	K23C2375C33	1	FACE, SEAL	DIRECT SINTERED SILICON CARBIDE	1
16	MIAX88403CM	18	SPRING, COIL	ALLOY C-276	1
18	568242GU	1	O-RING, OTHER	FLUOROELASTOMER (FKM)	1
19	568142GU	1	O-RING, OTHER	FLUOROELASTOMER (FKM)	1
40	C0032674CK	4	SCREW, CAP	18-8	1
57	4N01857X902	4	SCREW, SET	17-4 PH COND H900	1
57.1	MLA36788233	2	SCREW, SET	ALLOY C-276	1
58	C100036236	1	DRIVE COLLAR, STYLE 2	DUPLEX 2205	
76	568149GU	1	O-RING, OTHER	FLUOROELASTOMER (FKM)	1
95	MNAX9078470	1	SEAL, LIP	MULTIPLE MATERIAL	1
100	C0011995ZB	1	SUPPORT, FACE	DUPLEX 255	1
103	C0012106CK	4	SETTING DEVICE, NOTCH	18-8	1
111	UR300CK	1	RING, SNAP	18-8	1
167	4R3000X953	1	END FITTING, PIPE	ASME SA-479 TYPE 316/316L	
183	C0012057QF	1	GASKET, FLAT	FLEXIBLE GRAPHITE	1

API PLAN 13

RECIRCULATION FROM SEAL THROUGH FLOW CONTROL ORIFICE TO PUMP SUCTION.

1. MAINTAIN VAPOR PRESSURE MARGIN NOT LESS THAN 3.5 BAR [50 PSI]. IF NOT POSSIBLE, MAINTAIN SEAL CHAMBER PRESSURE NOT LESS THAN 30% ABOVE VAPOR PRESSURE AT PUMPING TEMPERATURE.
2. ORIFICE DIAMETER Ø 3.0 MM [.118 INCH].

FLUSH RATE: 9 LPM [3.4 GPM]

PIPING REQUIREMENTS

API PLAN 51

EXTERNAL RESERVOIR PROVIDING DEAD-ENDED BLANKET TO QUENCH CONNECTION OF GLAND.

PIPING REQUIREMENTS

OPERATING DATA	
PRODUCT: SEA WATER, FEW PARTICLES	RPM (MIN): 118
TEMP: 25.0 °C Max	SUCTION PRES: 0 barG Max
SEAL CHAMBER PRES: 5.9 barG Max	DISCHARGE PRES: 5.9 barG Max
VISCOSITY: 0.9 cP Max	API PLAN: 13/51
CUSTOMER DATA	ULTIMATE USER: CROSSWIND (JV SHELL + ENECO)
CUSTOMER: PCM MANUFACTURING FRANCE SAS	ADDRESS: THE NETHERLANDS
ADDRESS: CHAMPTOCE-SUR-LOIRE FRANCE	CUSTOMER P.O.: PO070-24-07869
SEAL DATA	EQUIP MODEL: 60
MATL CODE: DZ4T	EQUIP DRAWING: W-004921 REVB
EQUIP MFG: PCM MANUFACTURING FRANCE SAS	INSTR: FIS 190
GENERAL DATA	REF DWG: D0110893

JOB NUMBER 400370175-000100

DRWN: AjSr
DATE: 03-Sep-2024
CHKD: MuMa
DATE: 04-Sep-2024
APVD: MuMa
DATE: 04-Sep-2024

FLOWSERVE AMSS Seals & Systems

DRAWING TITLE

MECHANICAL SEAL - ASSEMBLY

ISC2-PX - 60MM

ALL DIMENSIONS ARE REFERENCE UNLESS OTHERWISE SPECIFIED

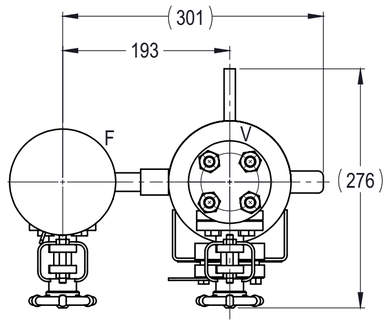
3rd ANGLE

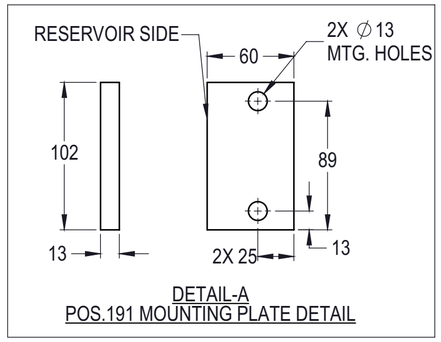
SIZE	DRAWING NUMBER	REV.
A2	F001604380	0

SCALE: TO SCALE UNITS: mm SHEET: 1 OF: 1

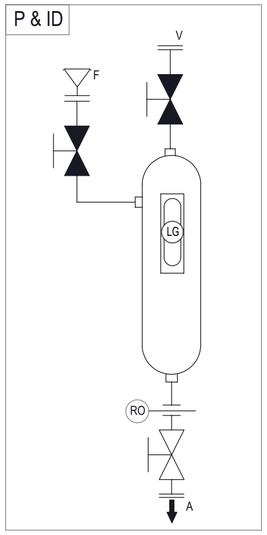
REV.	CHG NO.	DATE	REVD	CHKD	APVD
----	----	----	----	----	----
	DESC: ----				

THIS PROPRIETARY AND/OR CONFIDENTIAL MATERIAL IS THE PROPERTY OF FLOWSERVE CORPORATION AND IS FURNISHED ONLY FOR THE PURPOSE INDICATED. FLOWSERVE RESERVES ALL RIGHTS IN THE MATERIAL, AND DOES NOT CONVEY PERMISSION TO MANUFACTURE OR USE THE CONFIDENTIAL OR PROPRIETARY INFORMATION CONTAINED HEREIN.





DETAIL-A
POS.191 MOUNTING PLATE DETAIL



DESIGN CONDITIONS

		UNIT
QUENCH FLUID	WATER	
DESIGN PRESSURE	12	BARG
DESIGN TEMPERATURE	-10 TO 93	°C
OPERATING PRESSURE	ATMOSPHERIC	BARG
OPERATING TEMPERATURE	MAX.80	°C
DESIGN CODE (VESSEL)	ASME VIII DIV 1	
DESIGN CODE (PIPING)	ASME B31.3	
EC DIRECTIVE	PED 2014/68/EU	
PED CATEGORY	SEP	
TOTAL VOLUME	7	LITER
VOLUME AT NLL	5	LITER
WEIGHT EMPTY	~40	KG

N.D. TESTING / INSPECTION

HYDROTEST PRESSURE	18	BARG
RADIOGRAPHY	NONE	
DYE-PENETRANT	100%	
MATERIAL CERTIFICATES	REFER NOTE 3	
INSPECTION	FLOWSERVE	

WELDING

WPS & PQR IN ACCORDANCE WITH ASME IX.

REMARKS

STAINLESS STEEL SURFACES SHALL NOT BE PAINTED.
CLEANING IN ACCORDANCE WITH RSD-SP-ENG-089E.
BOLTHOLES STRADDLE TO CENTERLINE.
STAINLESS STEEL WELDS TO BE PICKLED & PASSIVATED OR GLASS-PEARL CLEANED.
DO NOT USE TEFLON TAPE, BUT USE LOCTITE 577.

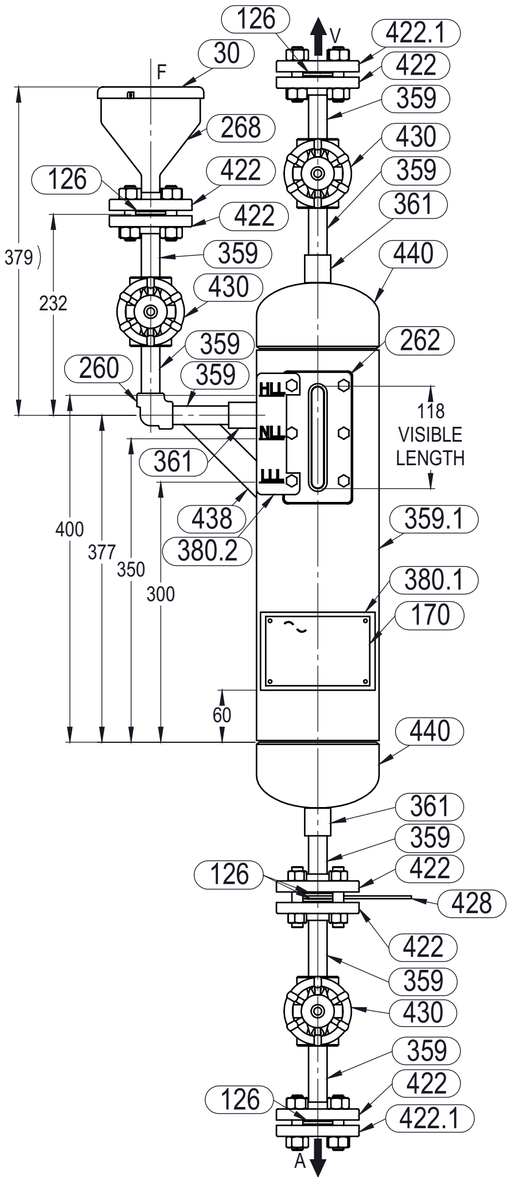
CONNECTIONS

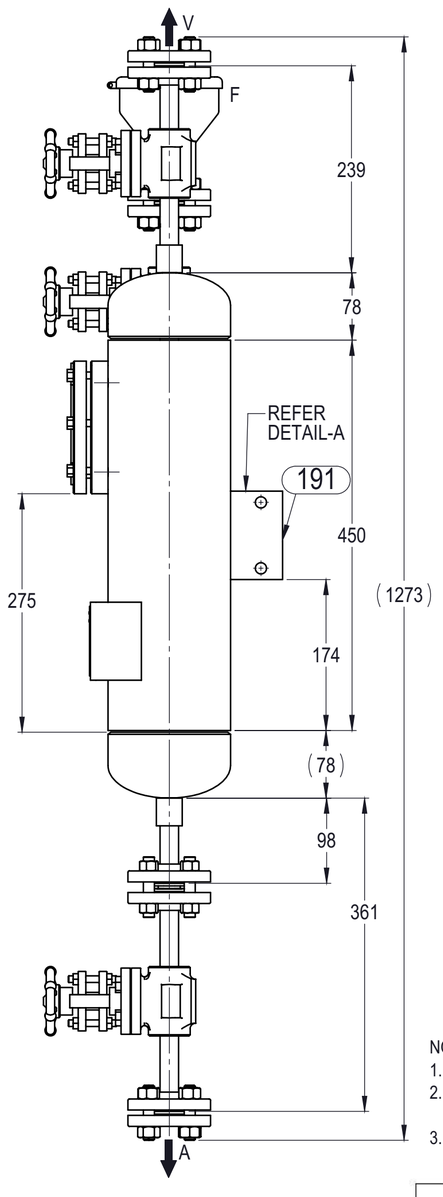
NO.	NAME	SIZE
A	TO SEAL	1/2 IN 300# RF + BLIND
F	FILLING	4 IN FUNNEL
V	VENT	1/2 IN 300# RF + BLIND

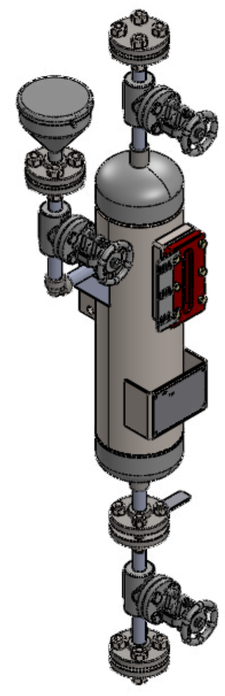
BILL OF MATERIAL NO: C100033782

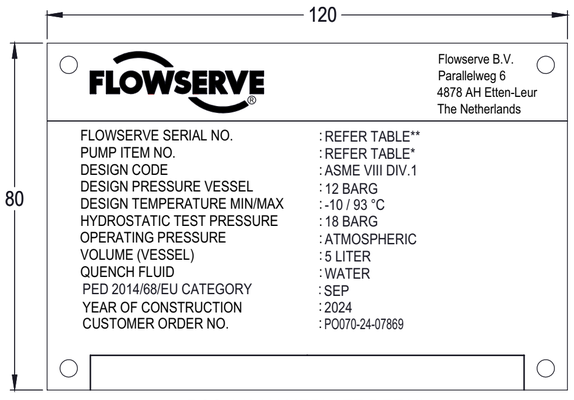
SPARE PARTS: [1] STARTUP [2] 2 YEAR [3] CAPITAL/CRITICAL

NO	PART CODE	QTY	DESCRIPTION	MATERIAL
30	C0538533ZZ-Q2	1	CAP, OTHER - DUST, 4 IN WITH CHAIN	GRADE 316/316L
126	C0111934ZZ	5	GASKET, SPIRAL WOUND -CL 300, 1/2 IN, SPIRAL WOUND	STAINLESS STEEL 316 + GRAPHITE
170	C100032896	1	PLATE, NAME - FOR AUXILIARY PLAN 51	316
191	C0243841ZZ-Q1	1	PLATE, MOUNTING - 102 X 60X 13 MM THK.	316
260	C0216202X941	1	ELBOW FITTING, PIPE - 1/2 IN, SOCKET WELD, CL 3000, 90 DEG	ASME SA-182 GRADE F316/F316L
262	C0560271ZZ	1	INDICATOR, LEVEL - GAUGE, WELD ON TYPE, VISIBLE LENGTH : 118 MM, BOROSILICATE GLASS	GRADE 316/316L
268	C0405667X941	1	STRAIGHT FITTING, PIPE - SWAGE, 4 IN X 1/2 IN, SCH 40, PBE, SMLS	ASME SA-182 GRADE F316/F316L
359	C0063392X951	1	PIPE, OTHER - SCH.80, 1/2 IN, SEAMLESS, PLAIN BOTH END	ASME SA-312 GRADE TP316/316L
359.1	C0172048X951	1	PIPE, OTHER - 5 IN X 450 MM LG, SCH 40, SMLS, BBE	ASME SA-312 GRADE TP316/316L
361	C0215993X941	3	STRAIGHT FITTING, PIPE - HALF COUPLING, 1/2 IN SW, CL. 3000	ASME SA-182 GRADE F316/F316L
380	4R124140ZZ-Q1	2	PLATE, NAME - FOR INSTRUMENT	ASME SA-240 GRADE 316/316L
380.1	C0234657ZZ-Q1	1	PLATE, NAME - BRACKET FOR NAMEPLATE	316
380.2	C0538973ZZ-Q2	1	PLATE, NAME - FOR LEVEL INDICATION, SIZE 2	316
422	C0362295X941	6	FLANGE, PIPE - 1/2 IN, CL 300, RFSW	ASME SA-182 GRADE F316/F316L
422.1	C0363170X941	2	FLANGE, PIPE - BLIND 1/2 IN CL 300	ASME SA-182 GRADE F316/F316L
428	C0095396ZZ	1	PLATE, ORIFICE - 1/2 IN, CL 300, 3.2 MM ORIFICE	316
430	C0369816ZZ	3	VALVE, GATE CL 800,1/2 IN SOCKET WELD,SCH 80,BOLTED BONNET,REDUCED BORE	316
438	C0493357X944-Q2	1	GUSSET, OTHER - 6 MM THK X 30 MM WIDE	ASME SA-240 GRADE 316/316L
440	C0489371X947	2	HEAD, RESERVOIR - CAP, 5 IN BUTT WELD, SCH 40	ASME SA-403 GRADE WP316/316L

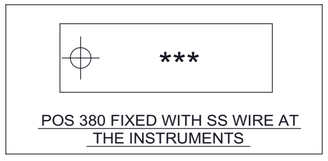








POS.170 NAMEPLATE DETAIL
(SCALE: NTS)



POS 380 FIXED WITH SS WIRE AT THE INSTRUMENTS

NOTES:
1. ALL VALUES IN () ARE REFERENCE DIMENSIONS.
2. CARBON STEEL STUDS(ASME SA-193 GR B7) & NUTS(ASME SA 194 GR 2H) WITH HOT-DIP GALVANIZED. ALL MISCELLANEOUS FASTENERS MUST BE 316 SS.
3. MATERIAL CERTIFICATE OF ALL PRESSURE CONTAINING PARTS (PIPES/FLANGES/PIPE FITTINGS) REQUIRES EN 10204 3.1. EN 10204 2.2 FOR NON-PRESSURE CONTAINING PARTS.

* PUMP ITEM NO.	** FLOSERVE SERIAL NO.	*** INSTRUMENT TAG NUMBER					
		LG	RO	FUNNEL VALVE	VENT VALVE	OUTLET VALVE	SEAL POT
50001 A	400370175-000200-001	50-LG-001	50-RO-003	BLPH-MV-503	BLPH-MV-503	BLPH-MV-503	V-50000 A
50001B	400370175-000200-002	50-LG-002	50-RO-004	BLPH-MV-503	BLPH-MV-503	BLPH-MV-503	V-50000 B

DIM TOLERANCES (UNLESS SPECIFIED)
X. = ± 5 ANGLE = ± 0.5°
X.X = ± 2.5

ALL DIMENSIONS ARE REFERENCES UNLESS OTHERWISE SPECIFIED

OPERATING DATA
PRODUCT: SEA WATER
SEAL CHAMBER PRES: 5.9 barG Max
BARRIER FLUID: WATER
DISCHARGE PRES: 5.9 barG Max
API PLAN: 13/51

CUSTOMER DATA
CUSTOMER: PCM MANUFACTURING FRANCE SAS
ADDRESS: CHAMPTOCE-SUR-LOIRE FRANCE
ULTIMATE USER: CROSSWIND (JV SHELL + ENECO)
ADDRESS: THE NETHERLANDS
CUSTOMER P.O.: PO070-24-07869

SEAL DATA
MATL CODE: ----

0	00210008	21-Aug-2024	HaMa	LoSh	HaSc
	DESC: RELEASE TO MANUFACTURE				
REV.	CHG NO.	DATE	REVD	CHKD	APVD

THIS PROPRIETARY AND/OR CONFIDENTIAL MATERIAL IS THE PROPERTY OF FLOWSERVE CORP. AND IS FURNISHED ONLY FOR THE PURPOSE INDICATED. FLOWSERVE RESERVES ALL RIGHTS IN THE MATERIAL, AND DOES NOT CONVEY PERMISSION TO MANUFACTURE OR USE THE CONFIDENTIAL OR PROPRIETARY INFORMATION CONTAINED HEREIN.

JOB NUMBER	400370175-000200
DRWN	LoSh
DATE	23-Jul-2024
CHKD	LoSh
DATE	23-Jul-2024
APVD	HaSc
DATE	24-Jul-2024
3D MODEL NO. / REV.	F001614989 / 0
≈ WEIGHT ( )	64.95 lb (29 kg)

FLOWSERVE AMSS Seals & Systems

DRAWING TITLE
SEAL SYSTEM - GENERAL ARRANGEMENT
PLAN 51 -

SIZE	DRAWING NUMBER	REV.
A2	F001615657	0

3rd ANGLE

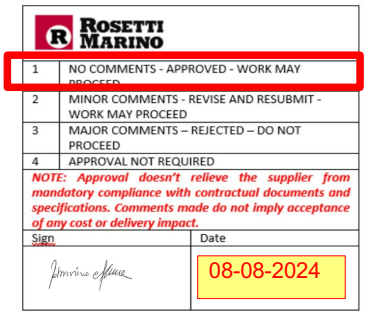
SCALE: 1:1 | DIM. UNITS: mm | SHEET: 1 OF: 1

Part of 1

Base Load Power Hub (BLPH)

SPEED REDUCER ASSEMBLY DRAWING AND BILL OF MATERIALS
PROGRESSIVE CAVITY PUMPS
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-DD-00009


ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	08-08-2024

Document Class: 3

01	06/08/2024	Issue for Information (IFI)	APD	GLL	AHN
00	08/07/2024	Issue for Information (IFI)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

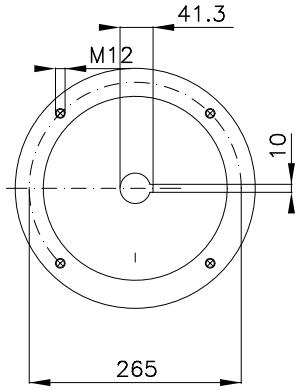
Revision / Change Log

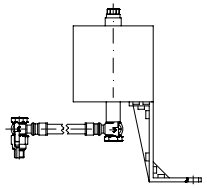
Rev.	Description
00	Issue for Information (IFI)
01	Issue for Information (IFI)

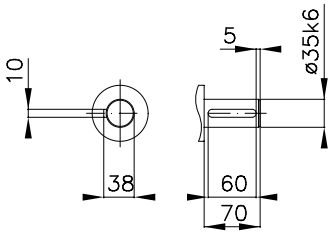
HOLDS LIST

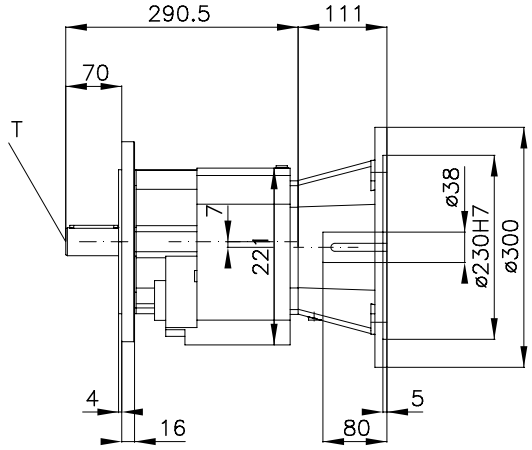
No.	Description
1	
2	
3	
4	

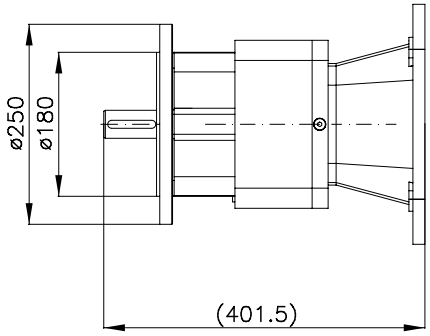
This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

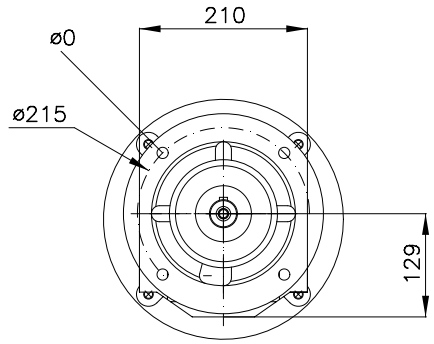


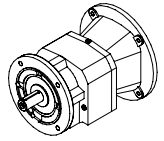










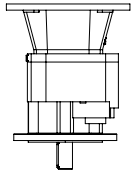


Center Hole acc. to DIN 332 part 2 form D

General tolerances DIN ISO 8062–3 – DCTG 9–12

This drawing is created with NORDCAD 9.3.1.1 SAP – Technical changes reserved!

Document number : 1724000936-MAC-DD-00009 page 3 of 5

Einbaulage/Mounting Pos.: M4	Angewandte Normen	Applied Standards
	Vollwellen bis ø50 nach ISO k6 Vollwellen ?ber ø50 nach ISO m6 Hohlwellen nach ISO H7 Passfedern nach DIN6885 Zentriergewinde nach DIN 332/2 Flanschzentrierung bis ø230 nach ISO j6 Flanschzentrierung ?ber ø230 nach ISO h6	Shafts up to ø50 according to ISO k6 Shafts above ø50 according to ISO m6 Hollow shafts according to ISO H7 Keyways according to DIN 6885 Center Hole Thread according to DIN 332/2 Flange centering up to ø230 according to ISO j6 Flange centering above ø230 according to ISO h6
	Motor:	Skizze / Outline:

Getriebebau NORD
GmbH & Co. KG
Getriebebau-Nord-Straße 1
D-22941 Bargteheide
Tel. 04532/289-0 – Fax. 04532/289-2253 – www.nord.com

DRIVESYSTEMS

Observe protection note according to ISO 16016

Rev.	Change	Date	Name

	Date	Name
Creat.	08.07.2024	SYSTEM
Check.		

Unmachined-No./Pre-fab-No.:

Scale: 1:1 | Format: A3 | Page 1 of 1

Status:

SK 672.1F – IEC132K – B5 A300

Documentnumber: NC240708112851VV_D

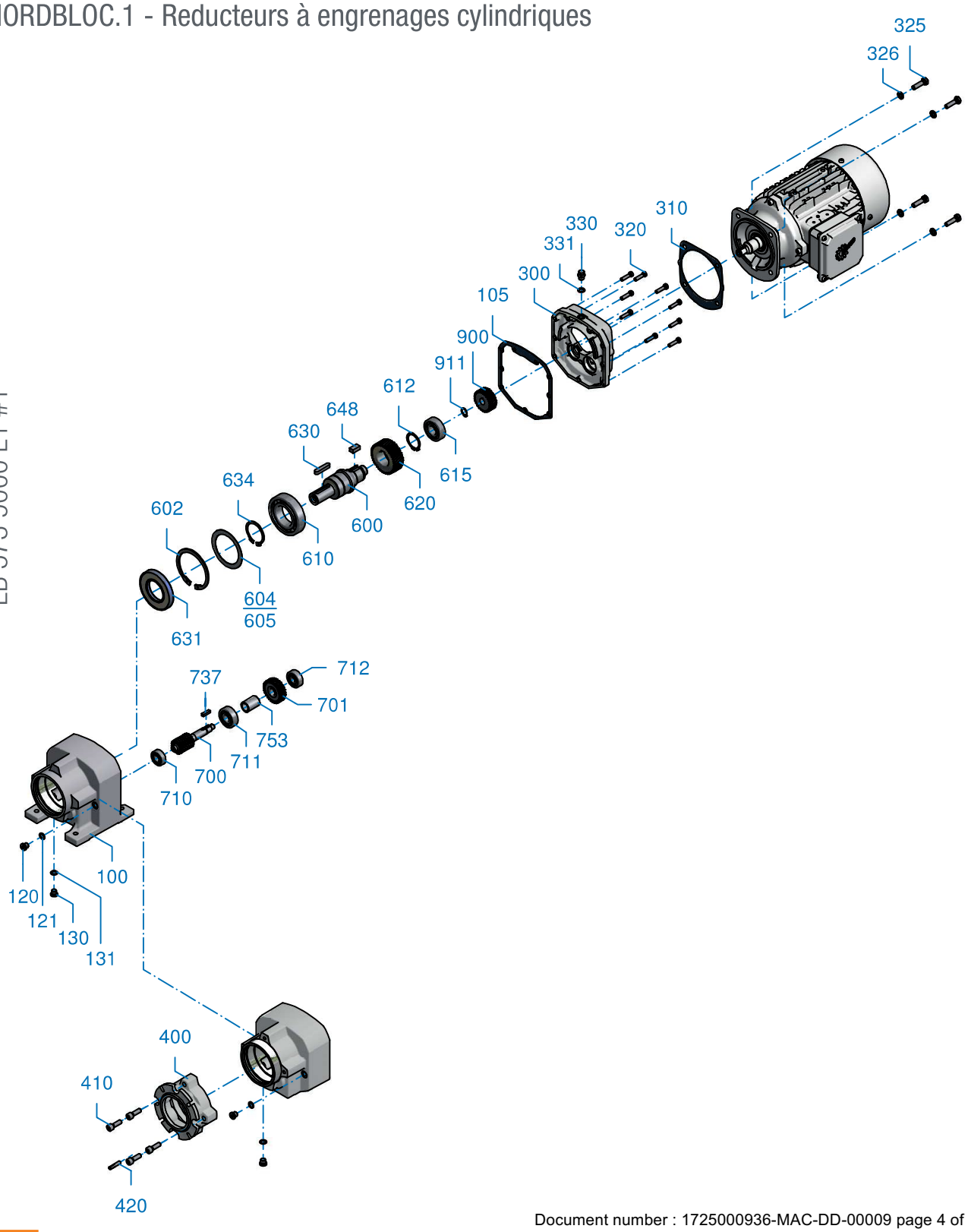
Revision

T-Task:



NORDBLOC.1 - Stirnradgetriebe
NORDBLOC.1 - Helical Gear Unit
NORDBLOC.1 - Reducteurs à engrenages cylindriques

EB 573 9000 E1 #1





SK 072.1 - SK 672.1

DE		EN		FR	
100	Gehäuse	100	Housing	100	Boîtier
105	Dichtung	105	Seal	105	Bague d‘étanchéité
120	Schraube	120	Screw	120	Vis
121	Dichtung	121	Seal	121	Bague d‘étanchéité
130	Schraube	130	Screw	130	Vis
131	Dichtung	131	Seal	131	Bague d‘étanchéité
300	Getriebedeckel	300	Gear unit cover	300	Couvercle du réducteur
310	Dichtung	310	Seal	310	Bague d‘étanchéité
320	Schraube	320	Screw	320	Vis
325	Schraube	325	Screw	325	Vis
326	Federring	326	Lock washer	326	Rondelle élastique
330	Schraube	330	Screw	330	Vis
331	Dichtung	331	Seal	331	Bague d‘étanchéité
400	Flansch	400	Flange	400	Bride
410	Schraube	410	Screw	410	Vis
420	Stift	420	Pin	420	Goupille
600	Abtriebswelle	600	Output shaft	600	Arbre de sortie
602	Sicherungsring	602	Circlip	602	Circlip
604	Passscheibe	604	Shim	604	Rondelles d‘ajustage
605	Passscheibe	605	Shim	605	Rondelles d‘ajustage
610	Wälzlager	610	Roller bearing	610	Palier
612	Sicherungsring	612	Circlip	612	Circlip
615	Wälzlager	615	Roller bearing	615	Palier
620	Abtriebsrad	620	Output gear	620	Roue de sortie
630	Passfeder	630	Key	630	Clavette
631	Wellendichtring	631	Radial shaft seal	631	Bague d‘étanchéité de l‘arbre
634	Sicherungsring	634	Circlip	634	Circlip
648	Passfeder	648	Key	648	Clavette
700	Ritzelwelle	700	Pinion shaft	700	Arbre de pignon
701	Antreibsrad	701	Drive gear	701	Roue d‘entrée
710	Wälzlager	710	Roller bearing	710	Palier
711	Wälzlager	711	Roller bearing	711	Palier
712	Wälzlager	712	Roller bearing	712	Palier
737	Passfeder	737	Key	737	Clavette
753	Buchse	753	Socket	753	Douille
900	Antriebsritzel	900	Driving pinion	900	Pignon d‘entrée
911	Sicherungsring	911	Circlip	911	Circlip

Base Load Power Hub (BLPH)

SI _Y DRAWING AND BILL OF MATERIALS

SIVE CAVITY PUMPS

essive Cavity Pumps (P-50001 A/B)

: 1724000936-MAC-DD-00008

ument Class: 3

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	08-08-2024

Rev.	Date	Description	Prepared	Reviewed	Approved
01	06/08/2024	Issue for Information (IFI)	APD	GLL	AHN
00	08/07/2024	Issue for Information (IFI)	APD	GLL	AHN

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)
01	Issue for Information (IFI)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

PCM
keep it moving

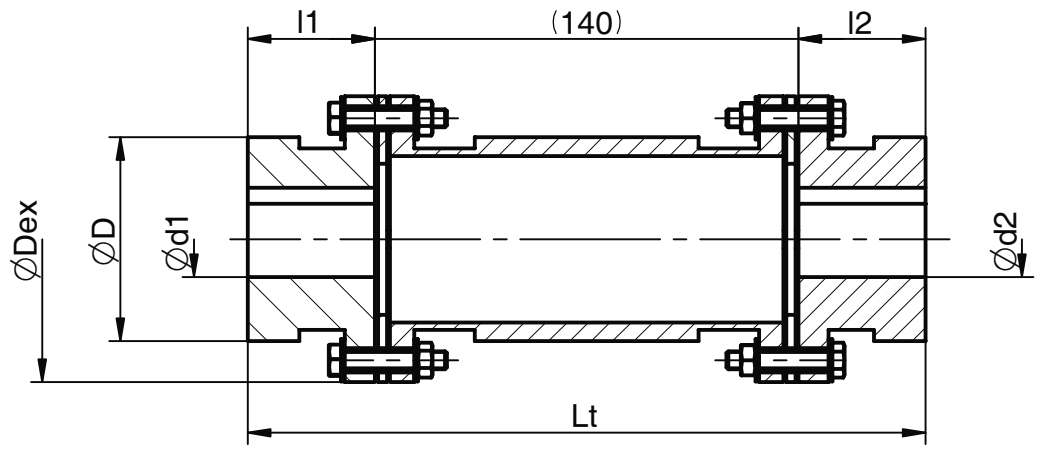
Rue René Moineau
49 123 Champtocé/Loire
FRANCE
Phone : +33 (0)1.77.68.31.00
www.pcm.eu

STANDARD TECHNIQUE REFERENCE

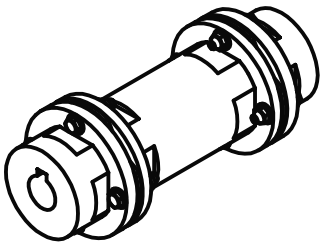
C15099X

ACCOUPLEMENT API 610

COUPLING API 610



Code X	Ød1	l1	Øarbre palier / Ø bearing shaft	Ød2	l2	Øarbre moteur / Ø drive shaft	ØD	ØDex	Lt
A	20	33	20x40	20	33	20x40	41.4	63	206
B	20	38	20x40	20	38	20x40	49.4	74	216
C	20	38	20x40	25	38	25x50	49.4	74	216
D	20	38	20x40	35	38	35x70	49.4	74	216
E	28	42	28x50	25	42	25x50	67.4	94.5	224
F	28	42	28x50	35	42	35x70	67.4	94.5	224
G	28	42	28x50	40	42	40x80	67.4	94.5	224
H	28	42	28x50	50	42	50x100	67.4	94.5	224
J	38	62	38x60	35	62	35x70	86.4	120	264
K	38	62	38x60	40	62	40x80	86.4	120	264
L	38	62	38x60	50	62	50x100	86.4	120	264
M	38	62	38x60	60	62	60x120	86.4	120	264
N	55	75	55x105	50	75	50x100	103	145	290
P	55	75	55x105	60	75	60x120	103	145	290
Q	55	75	55x105	65	75	65x130	103	145	290
R	55	75	55x105	75	75	75x140	103	145	290
S	55	90	55x105	50	90	50x100	125	172	320
T	55	90	55x105	60	90	60x120	125	172	320
U	55	90	55x105	65	90	65x130	125	172	320
V	55	90	55x105	75	90	75x140	125	172	320
W	55	75	55x105	45	90	45x90	103	145	290
Y	55	75	55x105	40	80	40x80	103	145	290
Z	55	75	55x105	55	110	55x110	103	145	290



Specifications

serie L

Fournisseur / *Supplier* :	Par / *By* : **THOMAS**	Le / *On* : **24/08/2015**
Exemple / *Example* : **John Crane**	Indice / *Revision* : **F**	Par / *By* : **GPE**
Mat : **Voir Ordre Achat / *See Purchasing Order***	Vérifié par / *Checked by* : **GPE**	Le / *On* : **10/11/2023**

L SERIES

METAL MEMBRANE COUPLING L SERIES

Technical Specification

A – Stainless steel flexible membranes

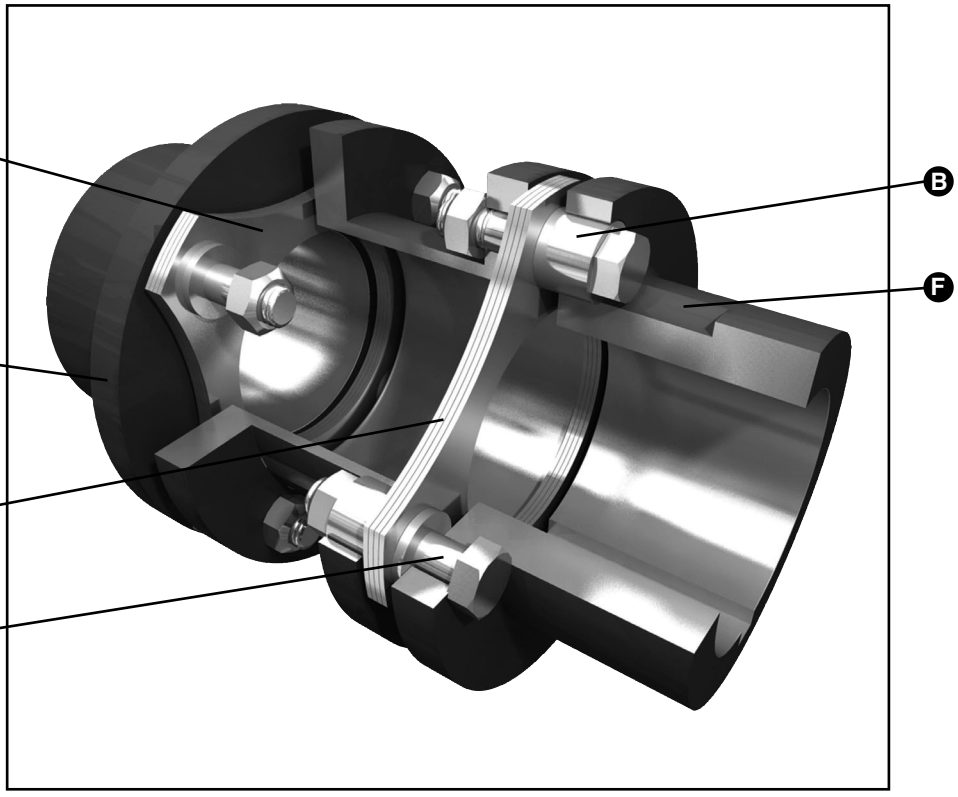
B – Overload and anti-fly protection collars

C – Anti-corrosion treatment

D – Membrane unit assembly for ease of fitting

E – Fitted bolts for balance integrity

F – Scalloped hubs to maximize bore



Product Description

John Crane's Metastream L Series range of membrane couplings has been specifically designed to provide a cost-effective solution for demanding industrial applications. The couplings are selected by their torque capacity, with the scalloped hub providing the right size for the shaft.

- Easy to install
- Operates in either direction
- A hubs supplied either finish machined or solid
- Coated carbon steel hardware for corrosion protection
- Choice of hub configuration to suit the shaft diameter
- ATEX compliant

Design Features

- **Fit and forget** – Designed for infinite life and, with correct machinery alignment, will often outlast the machines it connects
- **Overload protection** — Fitted with overload collars to protect the membranes in the event of severe torsional overload
- **Low imposed loads** — Designed to optimize torque capability while minimizing reaction forces due to misalignment, maximizing the life of the machines connected
- **Zero maintenance** — Requires no lubrication or routine maintenance
- **No backlash** — Torsionally stiff design ensures there is zero backlash, making coupling ideal for drives where constant speed is crucial

L SERIES

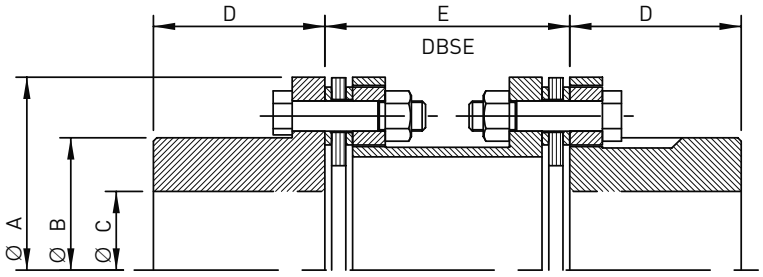
METAL MEMBRANE COUPLING L SERIES

Technical Specification

L Series Technical Data (Imperial)

Coupling Size	Rating	Max. Continuous Torque	Peak Overload Torque	Max. Unbalanced Speed	Max. Balanced Speed	Weight Coupling		Weight Unbored Hub
	HP/100 rpm	lb.in.	lb.in.	rpm	rpm	Min.Std DBSE lb.	Extra DBSE lb./in.	lb.
LDES-0007	0.9	620	1,239	7,000	22,000	4.01	0.11	0.93
LDES-0014	1.9	1,150	2,301	6,500	20,000	4.41	0.13	1.45
LDES-0028	3.7	2,390	4,868	6,000	18,000	8.6	0.27	2.98
LSES-0045	6	3,806	7,965	6,000	18,000	9.7	0.27	3.48
LSES-0090	12	7,611	15,045	5,200	15,000	18.9	0.39	6.99
LSES-0175	23	14,602	29,205	4,800	12,300	33.1	0.63	12.1
LSES-0265	35	22,125	44,250	4,400	10,800	55.6	0.79	21.2
LSES-0525	70	44,250	88,500	4,200	9,000	87.5	1.4	32.4
LSES-0810	109	68,145	137,175	4,000	7,800	123	1.9	45.4
LSES-1150	154	97,350	194,700	3,800	7,000	170	2.5	63.9
LSES-1560	209	132,750	265,500	3,700	6,000	234	3	86
LLES-1850	248	155,760	309,750	2,500	5,500	229	2.5	79.4
LLES-3000	402	253,110	504,450	2,250	5,200	364	3.5	132
LLES-4200	563	354,000	708,000	2,100	4,700	518	4	192
LLES-6000	805	504,450	1,017,750	2,000	4,200	754	5.3	267
LLES-9009	1,207	761,100	1,504,550	1,750	3,600	1,135	8.3	412
LLES-9012	1,609	1,017,750	2,035,500	1,600	3,200	1,488	10.2	540
LLES-9015	2,012	1,239,000	2,478,000	1,500	3,000	1,852	12.6	701
LLES-9025	3,353	2,079,750	4,159,500	1,400	2,600	3,153	12.9	1,224

L Series Typical Arrangement



L Series Imperial Dimensional Data (Inches)

Coupling Size	A in	B in	(1) C Max Bore in	D in	E - DBSE (3)						
					Absolute Min (in)	Preferred Min ((in)	3.5 in	4.38 in	5 in	7 in	9 in
LDES-0007	2.48	1.63	1.18	1.3	1.57	1.57	x	x	x		
LDES-0014	2.91	1.94	1.38	1.5	1.57	1.57	x	x	x		
LDES-0028	3.72	2.65	1.89	1.65	1.69	1.69	x	x	x	x	
LSES-0045	3.72	2.61	1.85	2.05	1.69	1.69	x	x	x	x	
LSES-0090	4.72	3.4	2.44	2.44	2.13	2.13	x	x	x	x	
LSES-0175	5.71	4.07	2.95	2.95	2.52	2.52			x	x	
LSES-0265	6.77	4.94	3.54	3.54	2.91	2.91			x	x	
LSES-0525	7.76	5.65	4.06	4.13	3.35	3.35				x	x
LSES-0810	8.74	6.36	4.53	4.57	3.82	3.82				x	X
LSES-1150	9.72	7.12	5.08	5.12	4.21	4.21				x	x
LSES-1560	10.71	7.83	5.59	5.71	4.76	4.76					x
LLES-1850	11.5	7.56	5.39	5.39	5.47	7.09					x
LLES-3000	13.43	9.02	6.42	6.42	6.1	7.09					x
LLES-4200	15.12	10.24	7.28	7.32	6.69	7.09					
LLES-6000	16.89	11.38	8.11	8.11	7.76	9.84					
LLES-9009	19.13	13.23	9.41	9.45	8.58	9.84					
LLES-9012	21.06	14.45	10.31	10.31	9.37	9.84					
LLES-9015	22.48	15.87	11.3	11.34	9.76	9.84					
LLES-9025	26.89	19.13	13.62	13.66	10.87	11.81					

Notes:

1 Maximum bores shown are based on standard ANSI/AGMA square key dimensions for sizes 0007 through 3000 and rectangular key dimensions for sizes 4200 through 9025.

2 Dimensions should not be used for construction. Certified dimensions furnished upon request.

3 **X** These distance between shaft end (DBSE) sizes are more readily available. Other lengths to suit specific shaft separations are available.

L SERIES

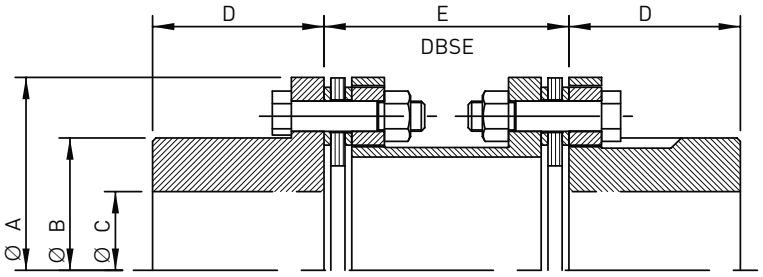
METAL MEMBRANE COUPLING L SERIES

Technical Specification

L Series Technical Data (Metric)

Coupling Size	Rating	Max. Continuous Torque	Peak Overload Torque	Max. Unbalanced Speed	Max. Balanced Speed	Weight Coupling		Weight Unbored Hub
	kW/1000 rpm	kNm	kNm	rpm	rpm	Min.Std DBSE Kg.	Extra DBSE Kg/m.	Kg.
LDES-0007	7	0.07	0.14	7,000	22,000	1.82	7.14	0.42
LDES-0014	14	0.13	0.26	6,500	20,000	2	2.31	0.66
LDES-0028	28	0.27	0.54	6,000	18,000	3.9	4.8	1.35
LSES-0045	45	0.43	0.86	6,000	18,000	4.4	4.8	1.58
LSES-0090	90	0.86	1.7	5,200	15,000	8.6	7	3.17
LSES-0175	175	1.65	3.3	4,800	12,300	15	11.3	5.5
LSES-0265	265	2.5	5	4,400	10,800	25.2	14.2	9.6
LSES-0525	525	5	10	4,200	9,000	39.7	24.8	14.7
LSES-0810	810	7.7	15.5	4,000	7,800	55.8	34.3	20.6
LSES-1150	1,150	11	22	3,800	7,000	77	44	29
LSES-1560	1,560	15	30	3,700	6,000	106	54	39
LLES-1850	1,850	17.6	35	2,500	5,500	104	45	36
LLES-3000	3,000	28.6	57	2,250	5,200	165	62	60
LLES-4200	4,200	40.1	80	2,100	4,700	235	71	87
LLES-6000	6,000	57.3	115	2,000	4,200	342	95	121
LLES-9009	9,000	86	172	1,750	3,600	515	149	187
LLES-9012	12,000	115	230	1,600	3,200	675	183	245
LLES-9015	15,000	143	286	1,500	3,000	840	225	318
LLES-9025	25,000	238	476	1,400	2,600	1,430	230	555

L Series Typical Arrangement



L Series Dimensional Data (mm)

Coupling Size	A mm	B mm	(1) C Max Bore mm	D mm	E - DBSE (3)					
					Absolute Min (mm)	Preferred Min (mm)	(Min.) mm	100 mm	140 mm	180 mm
LDES-0007	63	41	30	33	40	100	x	x	x	
LDES-0014	74	49	35	38	40	100	x	x	x	x
LDES-0028	95	67	48	42	43	100	x	x	x	x
LSES-0045	95	66	47	52	43	100	x	x	x	x
LSES-0090	120	86	62	62	54	100	x	x	x	x
LSES-0175	145	103	75	75	64	100	x	x	x	x
LSES-0265	172	125	90	90	74	100		x	x	x
LSES-0525	197	144	103	105	85	140			x	x
LSES-0810	222	162	115	116	97	140			x	x
LSES-1150	247	181	129	130	107	140			x	x
LSES-1560	272	199	142	145	121	180				x
LLES-1850	292	192	137	137	139	180				
LLES-3000	341	229	163	163	155	180				
LLES-4200	384	260	185	186	170	180				
LLES-6000	429	289	206	206	197	250				
LLES-9009	486	336	239	240	218	250				
LLES-9012	535	367	262	262	238	250				
LLES-9015	571	403	287	288	248	250				
LLES-9025	683	486	346	347	276	300				

Notes:

1 Maximum bores shown are based on standard DIN/BS rectangular keys.

2 Dimensions should not be used for construction. Certified dimensions furnished upon request.

3 **X** These distance between shaft end (DBSE) sizes are more readily available. Other lengths to suit specific shaft separations are available.

L SERIES

METAL MEMBRANE COUPLING L SERIES

Technical Specification

Selection Procedure (Metric)

1. Select appropriate service factor (SF)
2. Calculate the coupling rating R from:

$$R = \frac{kW \times 1000 \times SF}{N} \quad (kW/1{,}000\ rpm)$$

Where:

kW = rated power for driven equipment (kW)

N = speed (rpm)

3. Select a coupling with the same or higher rating.
4. Check distance between shaft ends (DBSE).
5. Check the hub bore capacity is suitable. If not, select a larger size coupling.
6. Check peak torque capability is suitable for application.
7. Check speed capability is suitable.
8. Specify DBSE as appropriate.

Selection Procedure (Imperial)

1. Select appropriate service factor (SF)
2. Calculate the coupling rating R from:

$$R = \frac{HP \times 100 \times SF}{N} \quad (HP/100\ rpm)$$

Where:

HP = rated power for driven equipment (HP)

N = speed (rpm)

3. Select a coupling with the same or higher rating.
4. Check distance between shaft ends (DBSE).
5. Check the hub bore capacity is suitable. If not, select a larger size coupling.
6. Check peak torque capability is suitable for application.
7. Check speed capability is suitable.
8. Specify DBSE as appropriate.

Service Factor (SF)

Suggested service factors for electric motor, steam turbine and gas turbine drivers are given below.

Torque Variation	Typical Application	Service Factor
Constant torque	Centrifugal pump Centrifugal compressor Axial compressor Centrifugal blower	1.0*
Slight torque fluctuation	Screw compressor gear lobe and vane pumps Forced draft fan Medium duty mixer Lobe blower	1.5
Substantial torque fluctuations	Reciprocating pumps Heavy duty mixers Induced draft fans	2.0

*Use a minimum service factor of 1.25 on electric motor drives through a gearbox.

*Use a minimum service factor of 1.75 on electric motor drives with VFD coupled to high inertia driven machines.

The examples given are for typical machines and are empirically based guidelines. Knowledge of actual torque characteristics may indicate a different service factor. Consult John Crane for advice.

KSelect is an internet based selection program for L Series. This selection program provides all necessary technical data, including inertias and torsional stiffness.

Visit www.johncrane.com

Available Options

- Spark-resistant couplings for hazardous zone operation.
- Special materials for low-temperature applications and/or higher corrosion resistance
- Electrical insulation

Consult John Crane for any other special requirements. John Crane couplings can be adapted to suit virtually all power transmission coupling needs.

Coupling Alignment

Correct installation and alignment of shafts are essential for reliable machinery performance.

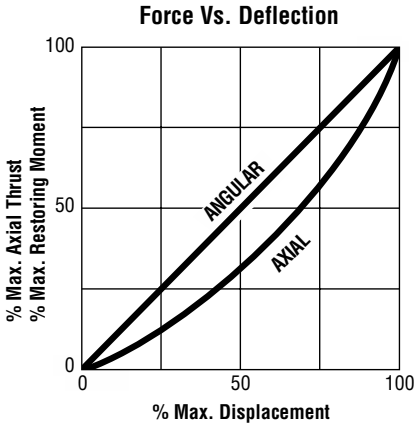
The angular and axial restoring forces in the table below are given at maximum deflections. The chart can be used to determine forces across the full deflection range. The nonlinear characteristics of axial stiffness can dampen a system to prevent high-amplitude axial vibration.

L Series – Metric Misalignment Capabilities

Coupling Size	Max. Axial ± mm Equivalent Thrust	Equivalent Thrust kN	(2) Max. Angular Degrees	Restoring Moment at Max. Angle Nm	(3) Max. Parallel mm
0007	1.5	0.14	1	0.55	0.5
0014	1.5	0.15	1	0.65	0.7
0028	1.8	0.15	1	1.22	0.9
0045	1.2	0.28	0.8	3.64	0.7
0090	1.5	0.39	0.8	6.96	0.9
0175	2	0.77	0.8	14.6	1.2
0265	2.5	1.43	0.8	26.4	1.2
0525	2.7	1.74	0.8	48	1.6
0810	3.2	2.43	0.8	84	1.6
1150	3.7	3.04	0.8	112	1.6
1560	4.2	4.25	0.8	136	2
1850	3	2	0.5	77.5	1.4
3000	4	3.85	0.5	110	1.4
4200	4.4	4.5	0.5	160	1.3
6000	5	5.6	0.5	208	1.9
9009	6	7.5	0.5	300	1.9
9012	6.8	8.6	0.5	390	1.9
9015	7.5	9.8	0.5	435	1.9
9025	8.8	11.3	0.5	510	2.3

L Series – Imperial Misalignment Capabilities

Coupling Size	Max. Axial ± in	Equivalent Thrust lbf	(2) Max. Angular Degrees	Restoring Moment at Max. Angle lb.in	(3) Max. Parallel in
0007	0.06	31.5	1	4.87	0.02
0014	0.06	34.2	1	5.75	0.027
0028	0.07	33.3	1	10.8	0.035
0045	0.05	62.9	0.8	32.2	0.027
0090	0.06	87.9	0.8	61.6	0.035
0175	0.08	172	0.8	130	0.047
0265	0.1	322	0.8	234	0.047
0525	0.11	390	0.8	425	0.063
0810	0.13	547	0.8	743	0.063
1150	0.15	683	0.8	991	0.063
1560	0.17	955	0.8	1204	0.078
1850	0.12	450	0.5	686	0.055
3000	0.16	866	0.5	974	0.055
4200	0.17	1012	0.5	1416	0.055
6000	0.2	1259	0.5	1837	0.059
9009	0.24	1686	0.5	2655	0.059
9012	0.27	1933	0.5	3452	0.075
9015	0.3	2203	0.5	3850	0.075
9025	0.35	2540	0.5	4514	0.09

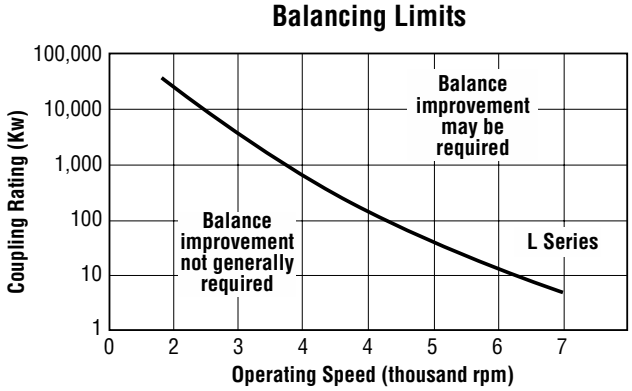


(1) These values are maximums for each type of misalignment. It is recommended that the coupling is initially aligned to 10% of these values to allow for inevitable movement during the life of the machines

(2) The values given are for each membrane bank.

(3) These values are based on the standard minimum distance between shaft ends. (Min).

Balance Condition



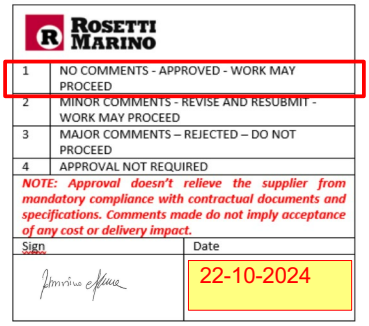
These couplings are designed with a high inherent balance, due to the precision of the manufacturing process. It is important that all parts are carefully stored and fitted to maintain this integrity.

The inherent balance of the L Series meets AGMA standard 9000-C90 class 8. The maximum operating speeds listed in the tables are on the basis of this AGMA class 8 characteristic to provide a general guide to maximum permissible speed. If higher speeds are required, contact John Crane for an alternative coupling selection.

Base Load Power Hub (BLPH)

HEATING JACKET SYSTEM DETAILED DRAWING
(INCLUDING ELECTRICAL CONNECTIONS)
PROGRESSIVE CAVITY PUMPS
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-DD-00011



Document Class: 2

NOTE
FINAL ACCEPTANCE IS ACHIEVED WITH THE RELEASE OF CRS CLOSE OUT FROM CROSSWIND

01	17/10/2024	Approved for Construction (AFC)	APD	GLL	AHN
00	17/09/2024	Issue for Review (IFR)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Approved for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Electric Heat Tracing Design Data Chart

CIRCUIT REFERENCE	LINE REFERENCE	PIPE SIZE (mm)	PIPE LENGTH (M)	MAINT. TEMP. °C	OPER. TEMP. °C	AMB. TEMP. °C	INSULATION		HEATING CABLE			HEAT LOSS (W/M)	CABLE OUTPUT (W/M)	TOTAL LOAD (W)	CURRENT (A)		WATTAGE (W)	
							TYPE	THK. (mm)	TYPE	APP. RATIO	LENGTH (M)				OPER.	COLD	OPER.	COLD
01	SEAL SYSTEM	N/A	N/A	15	N/A	−8	MINERAL WOOL	10	HTSX 15−2−OJ	N/A	10	38.9	46.1	526	2.3	2.9	526	667

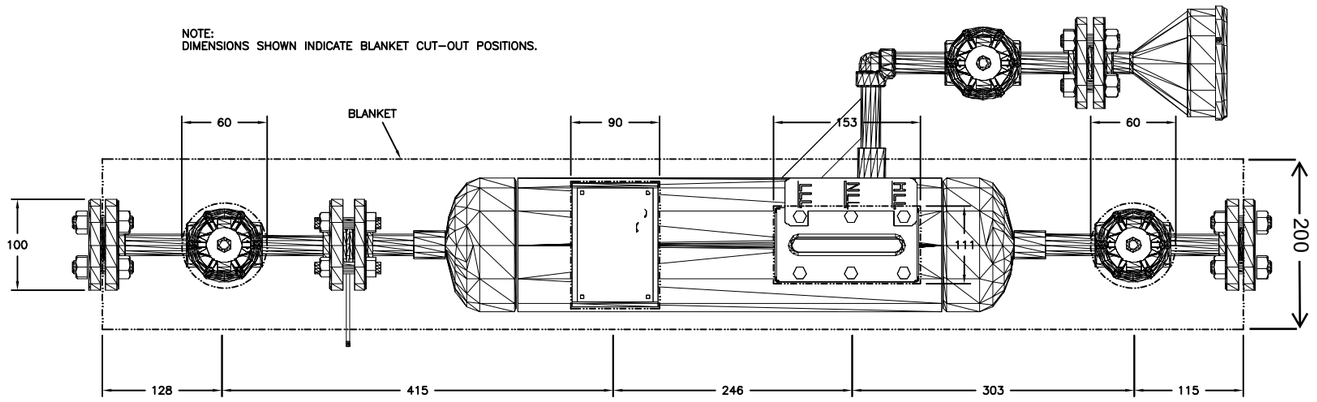
Electrical Class

VOLTAGE:	230V
ZONE:	1
GAS GROUP:	IIB
'T' CLASS:	T3

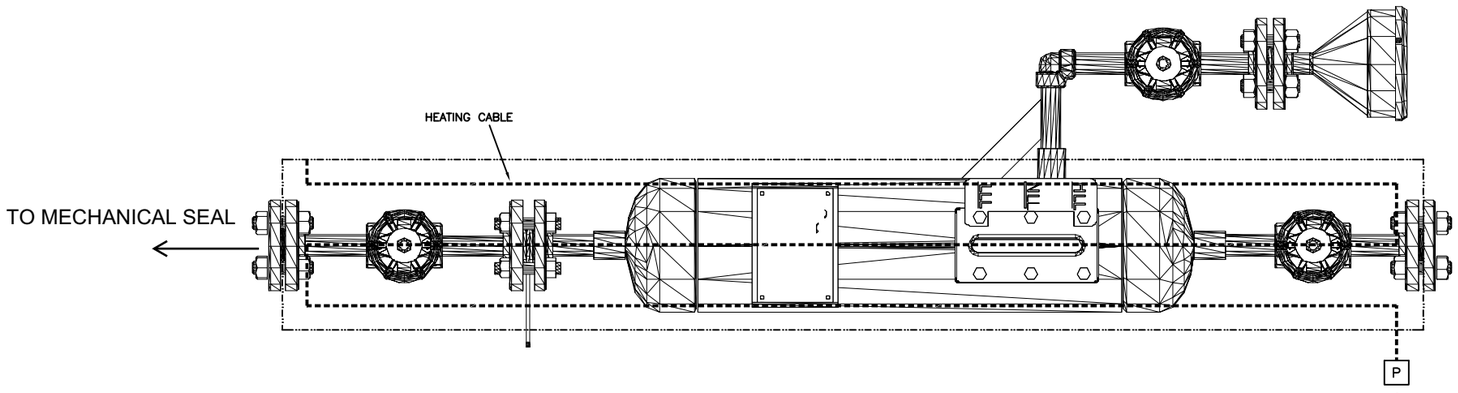
Notes

.....

NOTE:
DIMENSIONS SHOWN INDICATE BLANKET CUT−OUT POSITIONS.



ELECTRICAL HEAT TRACING BLANKET OUTLINE COVERING SEAL SYSTEM



HEATING CABLE REPRESENTATION WITHIN BLANKET COVERING SEAL SYSTEM

ON SITE POWER CABLES

PUMP ITEM NO.	EQUIPMENT TAG NUMBER		
	JB with included thermostat	Heat- Tracing Cables	Heat Tracing Power Cable
P-50001 A	ETB-200N1-20-L1-01A	H-ETE-200N1-20-L1-01A	P-ETB-200N1-20-L1-01A
P-50001 B	ETB-200N1-20-L1-01B	H-ETE-200N1-20-L1-01B	P-ETB-200N1-20-L1-01B

Bill Of Materials

Item	Quantity	Catalog No.	Description
①	10m	24952	HTSX 15−2−OJ SELF REGULATING HEATING CABLE
②	1	23379	TERMINATOR ZP−XP JUNCTION BOX
③	1	23420	PETK−2 TERMINATION KIT
④	1 ROLL	40000	FT−1H POLYESTER FIBRE FIXING TAPE
⑤	3	27208	CL−E−FR CAUTION LABEL
⑥			
⑦			
⑧			
⑨			
⑩			
⑪			
⑫			
⑬			
⑭			

Unit Cable Allowance (M)

Size	Valve	Support	Flange	Pump
3"	1.07	0.60	0.69	2.14
2"	0.76	0.50	0.61	1.22
1½"	0.76	0.50	0.61	0.92
1"	0.61	0.40	0.46	0.60
¾"	0.46	0.40	0.46	0.46

Reference Drawings

.
.
.

REV.	DESCRIPTION	DRWN.	DSGD.	REVD.	APPR.	DATE
0	ISSUED FOR COMMENTS/APPROVAL.	C.M	S.F	C.L	C.L	12.9.24

Legend

P	POWER JUNCTION BOX
---	HEATING CABLE
⊃	CABLE END SEAL

THERMON FRANCE
5 Rue Charles de Gaulle Alfortville, 94140, France

"This drawing is prepared solely for the use of the contractual customer of Thermon Heat Tracing Services ("Thermon") and Thermon assumes no liability to any other party for any representations contained in this drawing."

ENOLIA
ELECTRICAL HEAT TRACING BLANKET
SEAL SYSTEM

DWG. DESCRIPTION ELECTRIC HEAT TRACING GENERAL ARRANGEMENT

DRAWING No. 41J000213−7−1

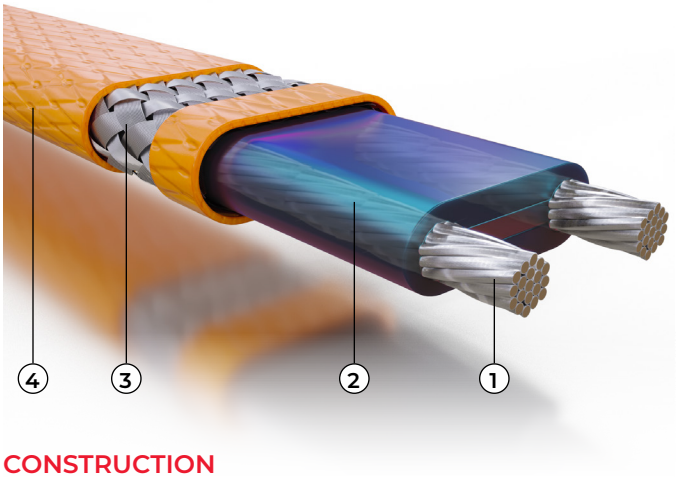
CUSTOMER PO. CF2408−4677

PROJECT NUMBER 41J000213

SCALE NONE | **SHEET** 1 of 1 | **REV** 0

TUK HT ISO v1.00

PRODUCT DATASHEET
HTSX™
SELF-REGULATING HEAT TRACING



APPLICATION

HTSX self-regulating trace heaters are designed specifically for process temperature maintenance or freeze protection where high temperature exposure capability is required. HTSX withstands the temperature exposures associated with steam purging. Constructed using Thermon's unique and proven monolithic co-extrusion process, HTSX is the market leading self-regulating heat tracing technology.

The heat output of HTSX varies in response to the surrounding temperature. Variations in the ambient temperature or heat lost through the thermal insulation are compensated for automatically along the entire length of a heat-traced pipe.

HTSX trace heaters are approved for use in ordinary (nonclassified) areas and hazardous (classified) areas.

RATINGS

Available power densities ..... 10, 20, 30, 33 [3], 39, 49, 66 W/m @ 10°C (3, 6, 9, 10 [3], 12, 15, 20 W/ft @ 50°F)
Supply voltages ..... 110-120, 208-277, or 380-480 Vac
Max. maintenance temperature
- (110-277 Vac) ..... 150°C (302°F)
- (380-480 Vac) ..... 121°C (250°F)

Max. exposure temperature
- Intermittent power-on or off
  - (110-277 Vac) ..... 250°C (482°F)
  - (380-480 Vac) ..... 204°C (400°F)
- Continuous power-off ..... 204°C (400°F)

Minimum installation temperature ..... -60°C (-76°F)
Minimum bend radius
- @ 5°F (-15°C) ..... 10 mm (0.38")
- @ -76°F (-60°C) ..... 32 mm (1.25")

T-rating [1]
- 3-1, 3-2, 6-1, 6-2, 9-1, 9-2, 10-4, 12-1, 12-2, 15-2, 15-4 ..... T3 200°C (392°F)
- 15-1 and 20-1 ..... T2D 215°C (419°F)
- 20-2, 20-4 ..... T2C 230°C (446°F)
- Based on stabilized design [2] ..... T3 to T6

Notes

1. T-rating per the National Electrical Code and Canadian Electrical Code.
2. Thermon trace heaters are approved for the listed T-ratings using the stabilized design method. This enables the trace heaters to operate in hazardous areas without limiting thermostats. The T-rating may be determined using CompuTrace® Electric Heat Tracing Design Software or contact Thermon for design assistance.
3. 33 W/m (10 W/ft) available only with 480 Vac nominal voltage.

CONSTRUCTION

1. Nickel-plated copper bus wires 1.3 mm² (16 AWG)
2. Semiconductive heating matrix and fluoropolymer dielectric insulation
3. Nickel-plated copper braid
4. Fluoropolymer overjacket provides additional protection to core, insulation, and braid where exposure to chemicals or corrosives is expected.

BASIC ACCESSORIES

Thermon offers system accessories designed specifically for rapid, trouble-free installation of Thermon heat tracing.

All trace heaters require a suitably certified connection kit to comply with approval requirements.

Hot end terminations > 230°C (446°F) must be completed using the Terminator DS/DE, ZS/ZE, DE-B, ZE-B kits.

NOTE:

"D" Kits Division 2 and Zone 2 Areas
"Z" Kits Zone 1 Areas

CERTIFICATIONS/APPROVALS

Canadian Standards Association
Ordinary Locations
Hazardous (Classified) Locations

Canada:
Class I, Division 1, Groups A, B, C and D
Class II, Division 1, Groups E, F and G
Class III
Ex 60079-30-1 IIC Gb
Ex 60079-30-1 IIIC Db

US:
Class I, Division 2, Groups A, B, C and D
Class II, Division 2, Groups E, F and G
Class III
Class I Zone 1 AEx 60079-30-1 IIC Gb
Class II Zone 21 AEx 60079-30-1 IIIC Db

FM Approvals (120 VAC and 240 VAC only)
Ordinary Locations
Hazardous (Classified) Locations

US Only:
Class I, Division 2, Groups B, C and D
Class II, Division 2, Groups E, F and G
Class III

Specific Conditions of Use:

1. Heat tracing systems must be installed using the manufacturer's suitably rated accessory kits in accordance with the applicable instructions.
2. For insulated externally heated surfaces, lower T-class systems may be obtained by utilizing stabilized design of a trace heating system using methods described in IEC 60079-30-2, using CompuTrace® Electric Heat Tracing Design Software or by Thermon Engineering. The system design parameters, including the resulting T-class, shall be retained as a record of system documentation for each stabilized system design for as long as the system is in use. The parameters in the system documentation shall be checked during commissioning of the system.

Thermon · 100 Thermon Dr · PO Box 609 San Marcos, TX 78667-0609 · Phone: 512-396-5801 · 1-800-820-4328
For the Thermon office nearest you visit us at www.thermon.com

Form TEP0074-0221 © Thermon, Inc. · Printed in U.S.A. · Information subject to change.

PRODUCT DATASHEET

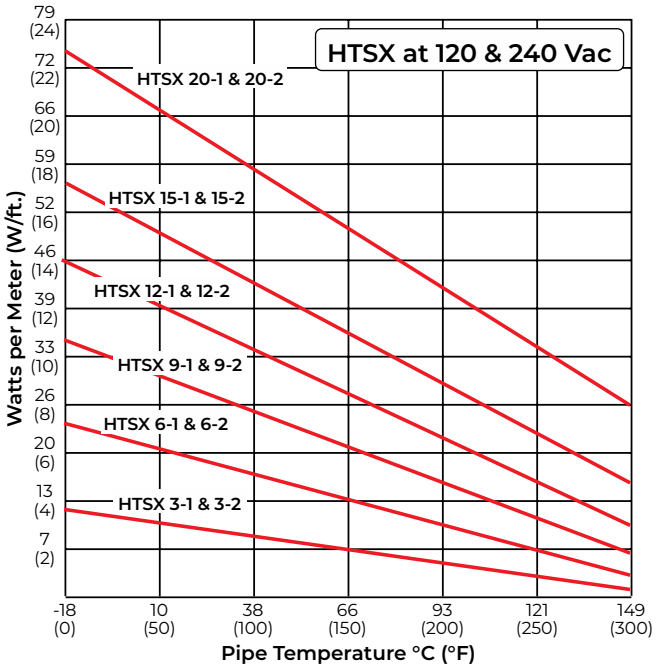
HTSX™

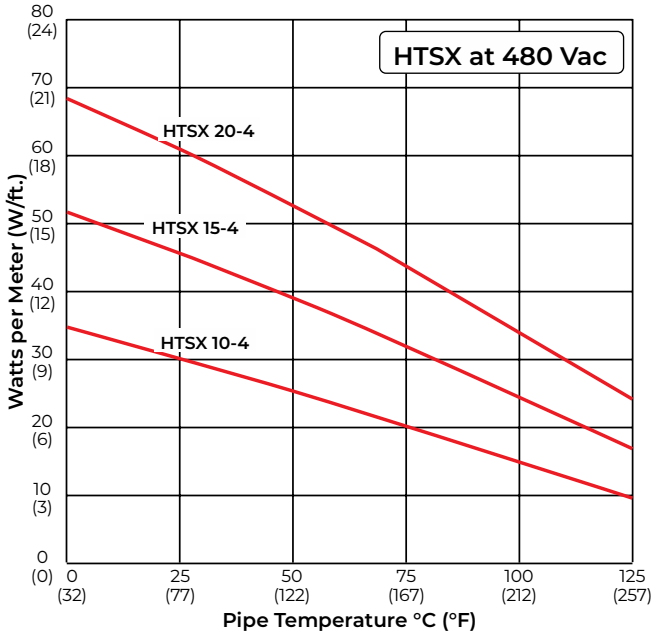
SELF-REGULATING HEAT TRACING

POWER OUTPUT CURVES [1]

The power outputs shown apply to trace heater installed on insulated metallic pipe (using the procedures outlined in IEC/IEEE 60079-30-1) at the service voltages stated below. For use on other service voltages, contact Thermon.

Catalog Number 120 Vac Nominal	Catalog Number 240 Vac Nominal	Catalog Number 480 Vac Nominal	Power Output at 10°C (50°F) W/m (W/ft)
HTSX 3-1	HTSX 3-2		10 (3)
HTSX 6-1	HTSX 6-2		20 (6)
HTSX 9-1	HTSX 9-2		30 (9)
		HTSX 10-4	33 (10)
HTSX 12-1	HTSX 12-2		39 (12)
HTSX 15-1	HTSX 15-2	HTSX 15-4	49 (15)
HTSX 20-1	HTSX 20-2	HTSX 20-4	66 (20)





CIRCUIT BREAKER SIZING [2]

120 Vac Service Voltage		Max. Circuit Length [3] vs. Breaker Size - m (ft)		
Catalog Number	Start-Up Temp °C (°F)	20 A	30 A	40 A
HTSX 3-1	10 (50)	109 (360)	109 (360)	109 (360)
	-18 (0)	109 (360)	109 (360)	109 (360)
	-29 (-20)	109 (360)	109 (360)	109 (360)
	-40 (-40)	109 (360)	109 (360)	109 (360)
HTSX 6-1	10 (50)	71 (235)	77 (250)	77 (250)
	-18 (0)	71 (235)	77 (250)	77 (250)
	-29 (-20)	71 (235)	77 (250)	77 (250)
	-40 (-40)	71 (235)	77 (250)	77 (250)
HTSX 9-1	10 (50)	52 (170)	62 (205)	62 (205)
	-18 (0)	52 (170)	62 (205)	62 (205)
	-29 (-20)	52 (170)	62 (205)	62 (205)
	-40 (-40)	50 (165)	62 (205)	62 (205)
HTSX 12-1	10 (50)	41 (135)	54 (175)	54 (175)
	-18 (0)	41 (135)	54 (175)	54 (175)
	-29 (-20)	41 (135)	54 (175)	54 (175)
	-40 (-40)	38 (125)	54 (175)	54 (175)
HTSX 15-1	10 (50)	30 (100)	48 (160)	49 (160)
	-18 (0)	29 (95)	46 (150)	49 (160)
	-29 (-20)	27 (90)	44 (145)	49 (160)
	-40 (-40)	26 (85)	41 (135)	49 (160)
HTSX 20-1	10 (50)	26 (85)	40 (130)	42 (140)
	-18 (0)	24 (80)	37 (120)	42 (140)
	-29 (-20)	23 (75)	35 (115)	42 (140)
	-40 (-40)	21 (70)	33 (110)	42 (140)

240 Vac Service Voltage		Max. Circuit Length [3] vs. Breaker Size - m (ft)		
Catalog Number	Start-Up Temp °C (°F)	20 A	30 A	40 A
HTSX 3-2	10 (50)	217 (710)	217 (710)	217 (710)
	-18 (0)	214 (700)	217 (710)	217 (710)
	-29 (-20)	187 (615)	217 (710)	217 (710)
	-40 (-40)	162 (530)	217 (710)	217 (710)
HTSX 6-2	10 (50)	143 (470)	154 (505)	154 (505)
	-18 (0)	132 (435)	154 (505)	154 (505)
	-29 (-20)	120 (390)	154 (505)	154 (505)
	-40 (-40)	108 (355)	154 (505)	154 (505)
HTSX 9-2	10 (50)	104 (340)	125 (410)	125 (410)
	-18 (0)	95 (310)	125 (410)	125 (410)
	-29 (-20)	88 (290)	125 (410)	125 (410)
	-40 (-40)	81 (265)	125 (410)	125 (410)
HTSX 12-2	10 (50)	82 (270)	109 (355)	109 (355)
	-18 (0)	74 (245)	109 (355)	109 (355)
	-29 (-20)	70 (230)	109 (355)	109 (355)
	-40 (-40)	65 (215)	104 (340)	109 (355)
HTSX 15-2	10 (50)	61 (200)	96 (315)	96 (315)
	-18 (0)	53 (175)	84 (275)	96 (315)
	-29 (-20)	51 (165)	79 (260)	96 (315)
	-40 (-40)	48 (155)	74 (245)	96 (315)
HTSX 20-2	10 (50)	48 (155)	75 (245)	84 (275)
	-18 (0)	42 (140)	65 (215)	84 (275)
	-29 (-20)	40 (130)	62 (205)	84 (275)
	-40 (-40)	38 (125)	59 (190)	80 (265)

480 Vac Service Voltage		Max. Circuit Length [3] vs. Breaker Size - m (ft)		
Catalog Number	Start-Up Temp °C (°F)	20 A	30 A	40 A
HTSX 10-4	10 (50)	166 (545)	203 (665)	203 (665)
	-18 (0)	148 (485)	203 (665)	203 (665)
	-29 (-20)	142 (465)	203 (665)	203 (665)
	-40 (-40)	139 (455)	203 (665)	203 (665)
HTSX 15-4	10 (50)	105 (345)	160 (525)	160 (525)
	-18 (0)	94 (310)	151 (495)	160 (525)
	-29 (-20)	91 (300)	145 (475)	160 (525)
	-40 (-40)	88 (290)	140 (460)	160 (525)
HTSX 20-4	10 (50)	88 (290)	136 (445)	136 (445)
	-18 (0)	79 (260)	126 (415)	136 (445)
	-29 (-20)	78 (255)	122 (400)	136 (445)
	-40 (-40)	75 (245)	119 (390)	134 (440)

Notes:

1. For more precise power output values as a function of pipe temperature, refer to CompuTrace®.
2. Breaker sizing should be based on the National Electrical Code, Canadian Electrical Code or any other applicable code. The National Electrical Code and Canadian Electrical Code require ground-fault protection of equipment for each branch circuit supplying electric heating equipment. Check local codes for ground-fault protection requirements.
3. The maximum circuit length is for one continuous length of trace heater, not the sum of segments of trace heater. Refer to CompuTrace® design software or contact Thermon for current loading of segments.

PRODUCT SPECIFICATIONS

Terminator™

HEATING CABLE TERMINATION KITS

APPLICATION

Power Connection, In-Line/T-Splice, End Termination Lighted Power Connection/End Termination. Terminator nonmetallic termination kits are designed specifically for rapid, trouble-free installation of Thermon self-regulating, power-limiting, and series polymer insulated heating cables. The integral design of these nonmetallic kits combines the pipe-mounted fitting, heating cable grommet and cable strain relief into a single assembly. Screws for securing the covers of the kits have been eliminated to simplify cover installation while providing additional security (a tool is required to remove the cover after installation).

Terminator kits are approved for use in ordinary (nonclassified) areas and hazardous (classified) areas.

PETK Circuit fabrication kits are required for use with all Thermon Parallel Heating Cables Connection Kits. Kits for termination of SX cables include a power connection boot, end cap, RTV adhesive and a caution label. Kits for termination of HPT and FP cables also include tape strip and a distinct grommet.

SCTK Splice connection termination kits are required when preparing outside-the-insulation splices with all Thermon Parallel Heating Cables Connection Kits. Kits for terminations of SX cables include 2 splice connection boots, assorted wire nuts and RTV adhesive. Kits for termination of HPT and FP cables also include a distinct grommet.

RATINGS

Enclosure rating .....NEMA 4X, IP66
Maximum pipe exposure temperature .....250°C (482°F)
Minimum installation temperature ..... -60°C (-76°F)
Oper. ambient temp.2..... -60°C (-76°F) to +55°C (+131°F)
Maximum voltage rating..... 600 Vac

Notes

1. Electrostatic charge resistant glass reinforced polymer standard on ZP, ZL, ZS/ZE kits.
2. DE-B and ZE-B operating ambient temperature is-60°C (-76°F) to 45°C (+113°F) with T6 T-rating. Higher ambients are possible, contact Thermon for corresponding T-rating.

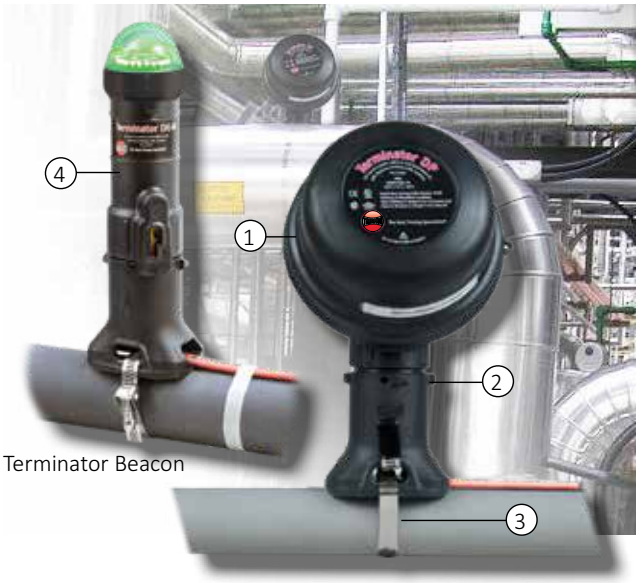
PRODUCT REFERENCE LEGEND

"D" Kits Division 2 and Zone 2 Areas
"Z" Kits Zone 1 Areas

Kits for BSX, RSX, HTSX, KSX, VSX-HT, USX, HPT & FP Cables
DP or ZP = Power Connection Kit
DL or ZL = Lighted Power Connection/End Termination Kit
DS/DE or ZS/ZE = In-Line Splice or End Termination Kit
DE-B or ZE-B = LED End of Circuit Light Kit

Kits for TEK and HTEK Cables
DP-M or ZP-M = Power Connection Kit

Kits for MIQ Cables
ZP-MI = Power Connection Kit



Terminator Beacon

Terminator DP

CONSTRUCTION

1 Junction box, glass-reinforced polymer [1] with DIN rail mounted terminal blocks
2 Pipe-mount expediter, glass-reinforced polymer [1]
3 Stainless steel pipe attachment band
4 Splice cap, glass-reinforced polymer [1]

CERTIFICATIONS/APPROVALS

Terminator kits have the following approvals when used in conjunction with Thermon heating cables:

FM Approvals
Ordinary Locations
Hazardous (Classified) Locations
Class I, Division 2, Groups A, B, C and D
Class II, Division 2, Groups F and G
Class III, Divisions 1 and 2
Class I, Zone 2, Group IIC
Class I, Zone 1, AEx e II (ZP, ZL, ZS/ZE, ZE-B only)

Underwriters Laboratories Inc.
Ordinary Locations
Hazardous (Classified) Locations
Class I, Division 2, Groups A, B, C and D
Class II, Division 2, Groups F and G
Class III, Divisions 1 and 2
Class I, Zone 2, Group IIC
Class I, Zone 1, AEx e II (ZP, ZL, ZS/ZE, ZE-B only)

Canadian Standards Association
Ordinary Locations
Hazardous (Classified) Locations
Class I, Division 2, Groups A, B, C and D
Class II, Division 2, Groups F and G
Ex e II (ZP, ZL, ZS/ZE, ZE-B only)

Thermon • 100 Thermon Dr • PO Box 609 San Marcos, TX 78667-0609 • Phone: 512-396-5801 • 1-800-820-4328
For the Thermon office nearest you visit us at . . . www.thermon.com

Form TEP0088-0720 © Thermon, Inc. • Printed in U.S.A. • Information subject to change.

PRODUCT SPECIFICATIONS

Terminator™

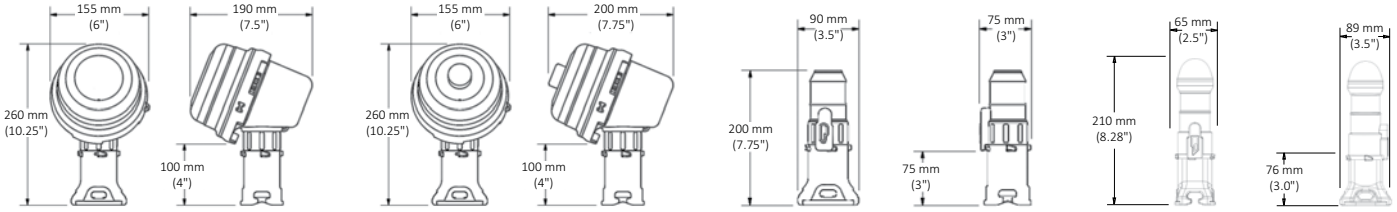
HEATING CABLE TERMINATION KITS

Terminator DP and ZP are designed to fabricate power connections, in-line/T-splice connections or for making end terminations. Electrical connections are made in terminal blocks utilizing nickel-plated copper terminals to ensure corrosion-free electrical integrity.

Terminator DL and ZL are designed to provide visual indication of an energized heating circuit. The kit may be utilized as a power connection or an end termination kit. Electrical connections are made in terminal blocks utilizing nickel-plated copper terminals to ensure corrosion-free electrical integrity.

Terminator DS/DE and ZS/ZE are designed to fabricate accessible outside-the-insulation in line splices or end terminations of Thermon Heating Cables. Electrical connections are made using wire fasteners. (For applications requiring terminations to be made with terminal block connections, the Terminator DP or ZP kit may be used.)

Terminator DE-B and ZE-B are designed to provide visual indication of an energized heating circuit. The DE-B and ZE-B utilize a high intensity green LED assembly for superior day or night visibility. Electrical connections are made using wire fasteners. (For applications requiring terminations to be made with terminal block connections, the Terminator DL or ZL kit may be used.)



	DP, ZP, ZP-MI	DP-M ZP-M	DL, ZL	DS/DE ZS/ZE	DE-B, ZE-B
Enclosure Ratings	NEMA 4X, IP66	NEMA 4X, IP66	NEMA 4X, IP66	NEMA 4X, IP66	NEMA 4X, IP66
Max. Pipe Exposure Temperature	250°C (482°F)	250°C (482°F)	250°C (482°F)	250°C (482°F)	250°C (482°F)
Min. Installation Temperature	-60°C (-76°F)	-60°C (-76°F)	-60°C (-76°F)	-60°C (-76°F)	-60°C (-76°F)
Operating Ambient Temperature	-60°C to +55°C (-76°F to +131°F)	-60°C to +55°C (-76°F to +131°F)	-60°C to +55°C (-76°F to +131°F)	-60°C to +55°C (-76°F to +131°F)	-60°C to +55°C [2] (-76°F to +131°F) [2]
Electrical Connection	Terminal Blocks[3]	Terminal Blocks[4]	Terminal Blocks[6]	Wire Fasteners	Wire Fasteners
Number of Power Connections	1 to 3 Cables	1 Cable	1 Cable[7]	n/a	n/a
Number of In-Line/T-Splices	2 to 3 Cables	2 Cables	n/a	2 Cables	n/a
Number of End Terminations	1 Cable (DP) 1 to 2 Cables (ZP) ZP-MI (NA)	1 Cable	1 Cable	1 to 2 Cables	1 Cable
Maximum Conductor Size [1]	16 mm^2 (6 AWG)	25 mm^2 (4 AWG)	16 mm^2 (6 AWG)	n/a	n/a
Maximum Voltage Rating	600 Vac	600 Vac	n/a	600 Vac	n/a
Maximum Rated Current [1]	50 Amps	85 Amps	50 Amps	n/a	n/a
T-rating, Ta^2 = 40°C (104°F)	T4 @ 46 Amps T6 @ 22 Amps	T4 @ 11.5 W/ft [5] T6 @ 5.2 W/ft [5]	T4 @ 46 Amps T6 @ 22 Amps	T4 @ 46 Amps T6 @ 22 Amps	T6
Indicating Lamp Service Life Rating	n/a	n/a	100,000 Hours	n/a	100,000 Hours
Indicating Lamp Operating Voltage Range	n/a	n/a	Up to 264 Vac	n/a	100 to 277 Vac

Notes

1. Alternate terminal block configurations are available, contact factory.
2. Higher ambient temperatures are possible. Consult Thermon for corresponding T-rating.
3. Terminator DP kit includes three terminal blocks (L1, L2 and G). Terminator ZP kit includes four line terminal blocks (two jumpered pairs, L1 and L2) and two ground terminal blocks (G).
4. Terminator DP-M kit includes four terminal blocks (L1, L2, L3 and G). Terminator ZP-M kit includes three line terminal blocks (L1, L2 and L3) and one ground terminal block (G).
5. T-Rating based on individual cable power output.
6. Terminator DL kit includes three terminal blocks (L1, L2 and G). Terminator ZL kit includes four line terminal blocks (two jumpered pairs, L1 and L2) and one ground terminal block (G).
7. Terminator DL kit allows up to 2 cables to be connected to power; additional TBX boots may be ordered separately.

Terminator™ ZP

Power Connection Kit

INSTALLATION PROCEDURES

For Power Connection, In-Line Splice Connection,
T-Splice Connection, or End Termination Applications



Terminator™ ZP

INSTALLATION PROCEDURES

Receiving, Storing and Handling

1. Inspect materials for damage incurred during shipping.
2. Report damages to the carrier for settlement.
3. Identify parts against the packing list to ensure the proper type and quantity has been received.

4. Store in a dry location.

Kit Contents



Item	Quantity	Description
1	1	Expediter Assembly Support Cap with O-Ring Threaded Grommet Compressor Grommet Support Base with O-Ring
2	1	Junction Box Lid
3	1	Junction Box Base with O-Ring
4	1	Nut
5	1	Banding
6	1	Banding Guide
7	1	Terminal Blocks with DIN Rail (Refer to terminal specifications for maximum allowable wire size)
8	1	Junction Box Cord

Order Separately

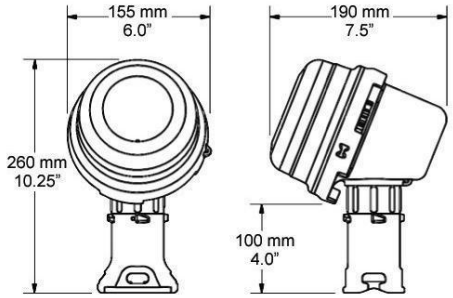
PETK Power and End Termination Kits (per cable)

PETK-1	for BSX, RSX, VSX-HT
PETK-2	for KSX, HTSX, USX
PETK-3	for HPT, FP



Item	Quantity	Description
1	1	RTV Tube
2	1	Power Connection Boot
3	1	End Cap
4	1	Tape Strip 6" (PETK-3 only)
5	1	End Termination Caution Label
6	1	GRW-G Grommet (PETK-3 only)
7	1	Ground Sleeve

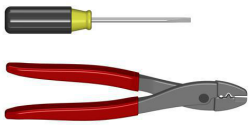
Dimensions



Installation Precautions

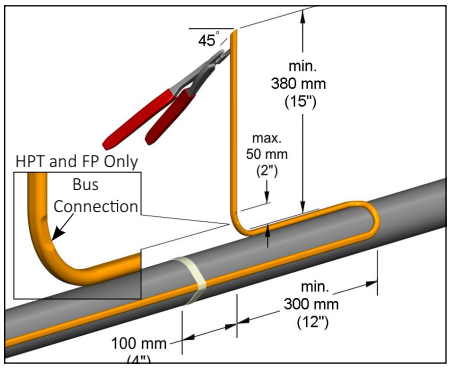
- To minimize the potential for arcing and fire caused by product damage or improper installation use ground-fault protection. The National Electrical Code (NEC) and Canadian Electrical Code (CEC) require ground-fault protection of equipment for each branch circuit supplying electric heat tracing.
- Installation must comply with Thermon requirements and be installed in accordance with the NEC, CEC, or any other applicable national and local codes.
- Component approvals and performance ratings are based on the use of Thermon specified parts only. User supplied power connection fittings must be listed or certified for intended use.
- Avoid electrostatic charge. Clean only with a damp cloth.
- De-energize all power sources before opening enclosure.
- Keep ends of heating cable and kit components dry before and during installation.
- Individuals installing these products are responsible for complying with all applicable safety and health guidelines. Proper personal protective equipment, or PPE, should be utilized during installation. Contact Thermon if you have any additional questions.

Tools Required

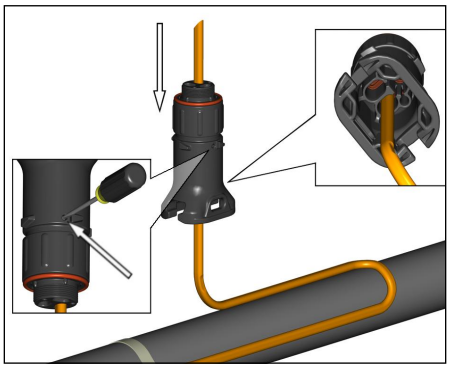


Certifications/Approvals

IP66/Type 4X -60°C ≤ Ta ≤ +55°C
Ordinary & Hazardous Locations
Class I, Division 2, Groups A, B, C, & D
Class II, Division 2, Groups F & G, Class III
Class I, Zone 1, AEx eb IIC T4-T6

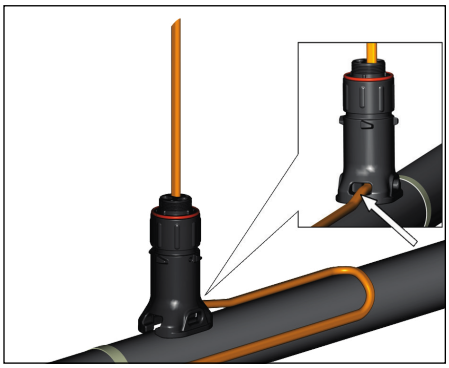


1. Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop. See page 5 for multiple cable installation tips.



2. Insert cable into expediter. If mounted on bottom or side of pipe, punch out weep hole

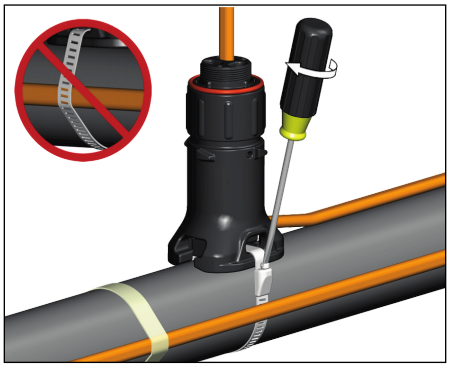
Note: For HPT and FP cable, exchange grommet in Terminator with GRW-G provided in PETK-3.



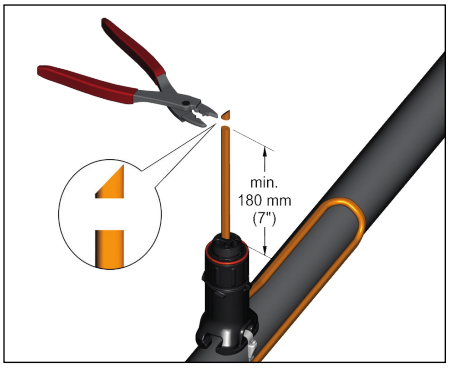
3. Slide expediter toward pipe and route cable through support base entry.



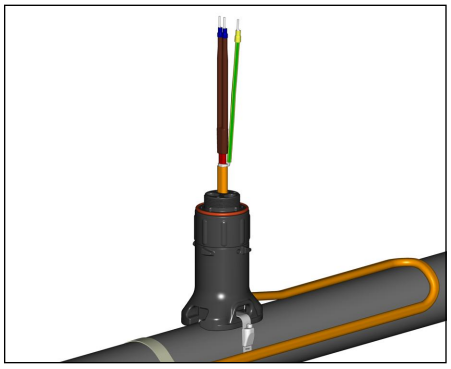
4. Insert banding guide into expediter and snap into place.



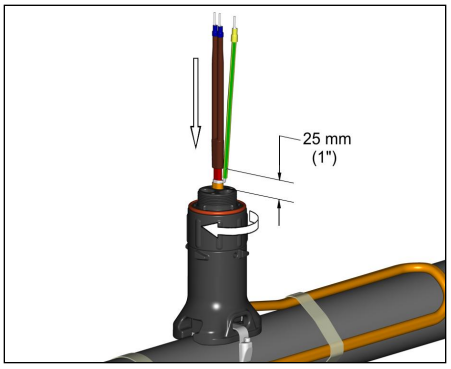
5. Mount expediter to pipe using pipe band. Do not band over cable.



6. Cut off end of cable.



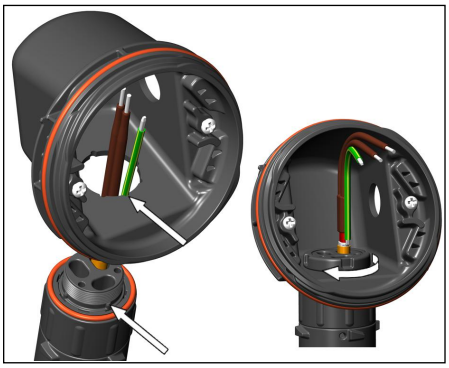
7. Terminate cable with appropriate PETK termination kit. Refer to PETK installation instructions.



8. Push excess cable back through expediter. Tighten cap securely. Tape cable expansion loop to pipe.



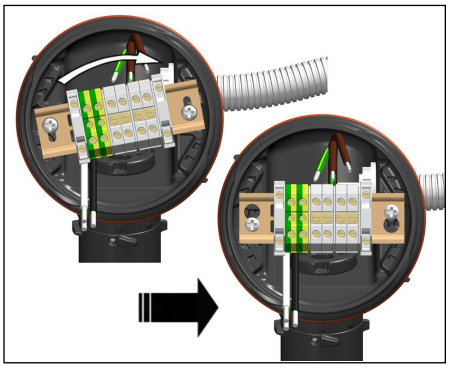
9. For power connection applications: Use dimple molded into side of junction box base to locate center of hole, drill for user supplied power connection fittings per manufacturer's recommendations.



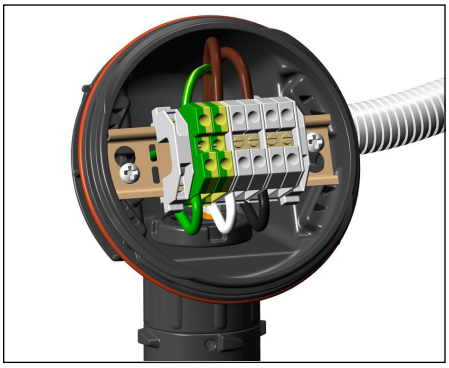
10. Mount junction box base on expediter. Make sure to align slots to properly orient junction box base. Tighten nut securely.



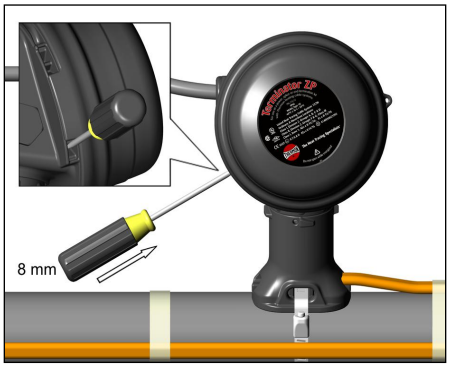
11. For power connection applications: Install power connection fittings (user supplied) and pull in power and ground wires.



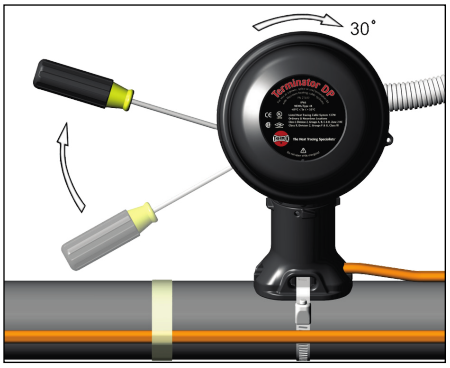
12. Install quick mount terminal blocks.



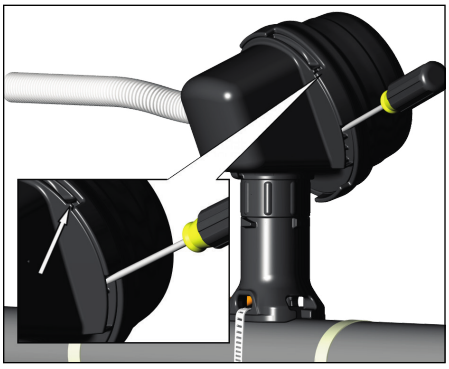
13. Complete system wiring. Refer to typical wiring details on page 5. Tightening torque 1.5 Nm–1.8 Nm (1.1 ft-lb–1.3 ft-lb).



14. Install junction box lid and twist hand tight. Insert screwdriver into ratchet slots located on side of junction box base.

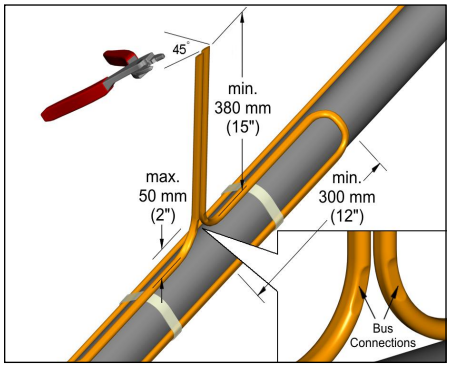


15. Use screwdriver to ratchet on junction box lid. Lid will rotate 30 degrees.

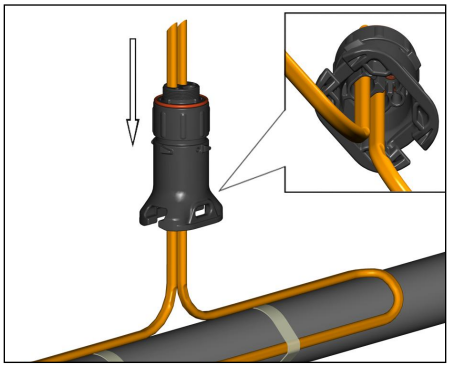


16. Lid latch mechanism fully engaged. To remove lid, repeat steps 14 and 15 but in the opposite direction.

Two Cable Layout Tips



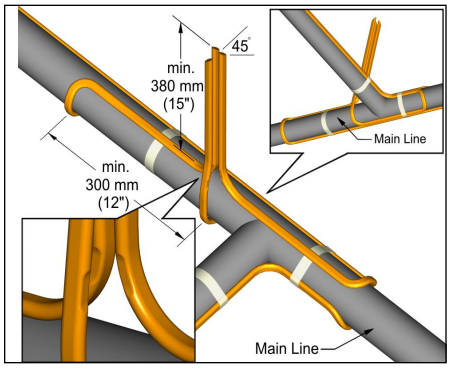
Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop.



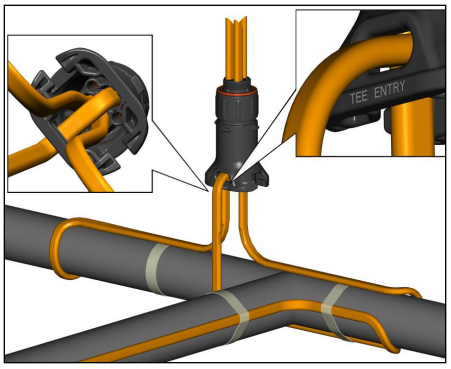
Insert two cables into expediter.

Note: For HPT and FP cable, exchange grommet in Terminator with GRW-G provided in PETK-3.

Three Cable Layout Tips

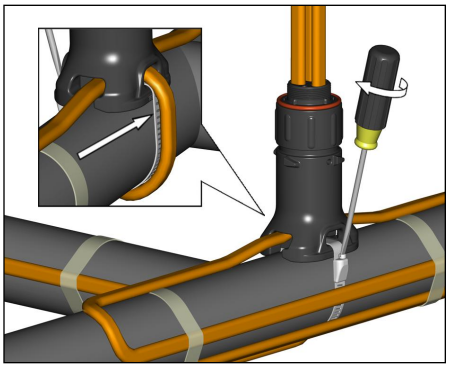


Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop.



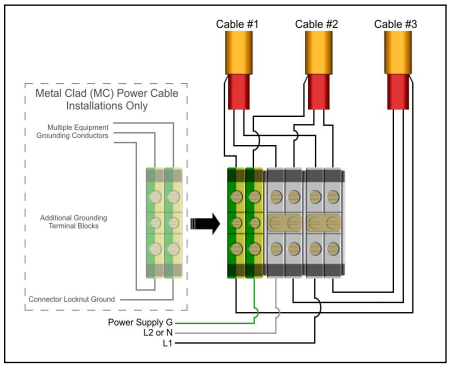
Insert three cables into expediter.

Note: For HPT and FP cable, exchange grommet in Terminator with GRW-G provided in PETK-3.

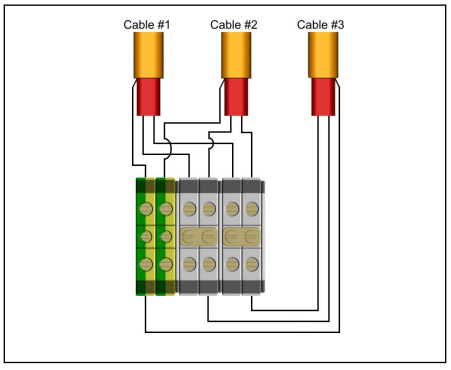


Mount expediter with three cables. Do not band over cable.

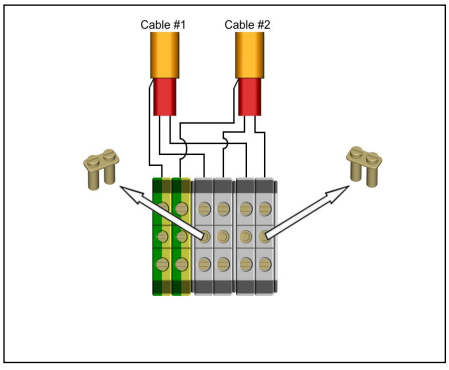
Typical Wiring Details



Power Connection (1 to 3 Cables). For 3 cable power connections, additional terminal blocks will be required when using 10mm² (#8 AWG) power supply wiring.



In-Line Splice and T-Splice



End Termination (1 to 2 Heating Cables) Remove jumpers for 2 cable terminations.



Corporate Headquarters: 100 Thermon Dr • PO Box 609 San Marcos, TX 78667-0609 • Phone: 512-396-5801 • 1-800-820-4328
For the Thermon office nearest you visit us at . . . www.thermon.com

Form No. PN50845-0320 © Thermon, Inc. • Printed in U.S.A. • Information subject to change.

1.3 DATA SHEET

1.3.1 PUMP DATA SHEETS INCLUDING WEIGHT DATA SHEET

1.3.2 PUMP AND MOTOR NOISE DATA SHEET

1.3.3 ELECTRIC MOTOR DATA SHEET

1.3.4 PSV DATA SHEET

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

PUMP DA
For Sea W

Docu

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

n	Date

in any case PCM shall wait for CRS Close Out from Crosswing for final acceptance

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	08-10-2024

Rev.	Date	Description	Prepared	Reviewed	Approved
02	01/10/2024	Accepted for Construction (AFC)	APD	GLL	AHN
01	18/07/2024	Accepted for Construction (AFC)	APD	GLL	AHN
00	24/06/2024	Issue for Review (IFR)	APD	GLL	AHN

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

CROSSWIND	HOLLANDSE KUST NOORD WIND PARK Project Contract No. CW-I-WP4-2023-05	ROSETTI MARINO
Document Title:	PUMP DATA SHEETS	Sh. 3 of 7 Date : 01/10/2024 Rev. 02

NOTE: ○ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER

GENERAL

NO. MOTORS DRIVEN	2 (TWO)	OTHER DRIVER TYPE			
PUMP ITEM NO'S	P-5001A/B	PUMP ITEM NO'S			
MOTOR ITEM NO'S	PM-5001A/B	DRIVER ITEM NO'S		GEAR ITEM NO'S	
MOTOR PROVIDED BY	ABB	DRIVER PROVIDED BY	N/A	GEAR PROVIDED BY	NORD
MOTOR MOUNTED BY	PUMP VENDOR	DRIVER MOUNTED BY	N/A	GEAR MOUNTED BY	PUMP VENDOR
MOTOR DATA SHEET NO.	1724000936-MAC-DS-00014	DRIVER DATA SHEET NO.		GEAR DATA SHEET NO.	

OPERATING CONDITIONS

- ● CAPACITY @ PT (m³/h):
  - @ MAXIMUM VISCOSITY — @ MIN. VISCOSITY **2,5**
- ● DISCHARGE PRESSURE (kPa)(BARG):
  - MAXIMUM **5.3 (note 3)** MINIMUM
- ● SUCTION PRESSURE (kPa)(BARG):
  - MAXIMUM — MINIMUM **Flooded (note 1)**
- ● DIFFERENTIAL PRESSURE (kPa)(BARG)
  - MAXIMUM — MINIMUM **(note 3)**
- ● NPSH AVAILABLE (m) **>7 @ level +0,00 (note 1)**
- ○ HYDRAULIC kW
- PSV Set Value : 7.6 barg

LIQUID

- ● TYPE OR NAME OF LIQUID **SEA WATER**
- ● PUMPING TEMPERATURE (°C):
  - NORMAL **20** MAX — MIN **1,3**
- ● SPECIFIC GRAVITY **1,03** MAXIMUM **1,02** MINIMUM
- ○ SPECIFIC HEAT — Cp (kJ/kg °C)
- ● VISCOSITY (Cp) **0,9** MINIMUM — MAXIMUM
- ● CORROSIVE/EROSIVE AGENTS **SAND/SALT PARTICLES**
- ● CHLORIDE CONCENTRATION (PPM) max 35,000 ppm
- ○ H_2S CONCENTRATION (PPM)

LIQUID ○ TOXIC ○ FLAMMABLE ○ OTHER

Fluid considered with no H2S / C02 / BTEX and TSS < 5%

PERFORMANCE

RATED CAPACITY (m³/h)	**2,5**
NPSH REQUIRED (m)	**0.56 mH2O**
RATED SPEED (RPM)	**118**
DISPLACEMENT (m³/h)	**3,3**
VOLUMETRIC EFFICIENCY (%)	**81,6**
MECHANICAL EFFICIENCY (%)	**56,7**
kW @ MAXIMUM VISCOSITY	**1,45**
kW @ RELIEF VALVE SETTING	**1,55**
MAXIMUM ALLOWABLE SPEED (RPM)	**450**
MINIMUM ALLOWABLE SPEED (RPM)	**100**

CONSTRUCTION

	SIZE	ANSI RATING	FACING	POSITION
CONNECTIONS				
SUCTION				**BOTTOM**
DISCHARGE	**1" 1/2**	**150#**	**RF**	**SIDE**
MOUNTING	**16"**	**150#**	**RF**	
DRAINS				
VENTS				
JACKET				

PUMP TYPE:

- ☐ INTRN'L GEAR ☐ TWIN-SCREW ☐ VANE
- ☐ EXTRN'L GEAR ☐ 3-SCREW ■ PROGRESSING CAVITY

GEAR TYPE

- ☐ SPUR ■ HELICAL
- ☐ OTHER

SITE AND UTILITY DATA

LOCATION ○ INDOOR ● OUTDOOR

○ HEATED ● UNHEATED ○ UNDER ROOF

○ ELECTRICAL AREA CLASS SAFE GROUP DIV

○ WINTERIZATION REQD ○ TROPICALIZATION REQD

SITE DATA

○ RANGE OF AMBIENT TEMPS:MIN/MAX -8 / 25 °C

UNUSUAL CONDITIONS

○ DUST ○ FUMES ● SALT ATMOSPHERE

○ OTHER

○ UTILITY CONDITIONS

ELECTRICITY	DRIVERS	HEATING	CONTROL	SHUTDOWN
VOLTAGE	**400**			
HERTZ	**5**			
PHASE	**50**			

COOLING WATER	INLET	RETURN	DESIGN	MAX Δ
TEMP °C		MAX		
PRESS. (BARG)		MIN		
SOURCE				

INSTRUMENT AIR MAX MIN

PRESSURE (kPa)(BARG)

APPLICABLE SPECIFICATIONS:

API 676 POSITIVE DISPLACEMENT PUMPS - ROTARY

○ GOVERNING SPECIFICATION (IF DIFFERENT) **(5)**

REMARKS:

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once 1724000936-MAC-DS-00012 printed shall be considered as "NOT CONTROLLED" copy

CROSSWIND	HOLLANDSE KUST NOORD WIND PARK Project Contract No. CW-I-WP4-2023-05	ROSETTI MARINO
Document Title:	PUMP DATA SHEETS	Sh. 4 of 7 Date : 01/10/2024 Rev. 02

CONSTRUCTION (CONTINUED)

CASING

- ■ MAXIMUM ALLOWABLE PRESSURE: 20 (BARG) 20 °C
- ■ HYDROSTATIC TEST PRESSURE: 30 (BARG)
- □ STEAM JACKET PRESSURE: (BARG) °C
- ROTOR MOUNT □ BTWN. BEARINGS ■ OVERHUNG
- TIMING GEARS □ YES □ NO
- BEARING TYPE: ■ RADIAL TIMKEN (1) □ THRUST
- LUBRICATION TYPE: ○ CONSTANT LEVEL OILERS
- □ PUMPED FLUID □ RING OIL □ OIL MIST
- □ EXTERNAL □ OIL FLOOD ■ GREASE
- ■ LUBRICANT TYPE Fuchs Renolin CLP 220
- ● MECHANICAL SEALS
- ■ MANUFACTURER AND MODEL Flowserve / ISC2-PX
- ■ MANUFACTURER CODE 1CW-FX
- ● API 610 SEAL FLUSH PLAN API PLAN 51
- ■ API 610 SEAL CODE 21A-FFQ-060-13/51
- ○ PACKING: ○ LANTERN RING
- □ MFR. AND TYPE □ NO. OF RINGS

DRIVE MECHANISM

- ○ DIRECT-COUPLED ○ V-BELT ■ GEAR
- ■ COUPLING MANUFACTURER John Crane

DRIVERS

- ● MOTOR:
- ■ MANUFACTURER ABB
- ■ TYPE 4 poles, safe area induction motor
- ■ FRAME NO. IEC 132
- ● CONSTANT SPEED
- ○ VARIABLE SPEED
- ■ kW 5,5 RPM 1463
- ● VOLTS 400 PHASE 3
- ● HERTZ 50 SERVICE FACTOR S1
- ● ENCLOSURE TEFC
- ○
- ○ STEAM TURBINE
- ○ OTHER (SEE SEPARATE DATA SHEETS)

OTHER PURCHASER REQUIREMENTS

NAMEPLATE UNITS ○ U.S. CUSTOMARY ● SI

- ● RELIEF VALVES BY PUMP MFRG ● INTERNAL ○ EXTRNL.

PIPING FOR SEAL FLUSH FURNISHED BY:

- ● PUMP VENDOR (2) ○ OTHERS

PIPING FOR COOLING/HEATING FURNISHED BY:

- ○ PUMP VENDOR ○ OTHERS
- ● PROVIDE TECHNICAL DATA MANUAL (3)

MATERIALS

- ■ CASING Super Duplex SS (25%Cr)
- ■ STATOR NBR
- ■ END PLATES N/A
- ■ ROTOR (S) Super Duplex SS (25%Cr)
- ■ VANES N/A
- ■ SHAFT Super Duplex SS (25%Cr)
- ■ SLEEVE (S) Super Duplex SS (25%Cr)
- ■ GLAND (S) Super Duplex SS (25%Cr)
- ■ BEARING HOUSING Cast Iron
- ■ MOTOR Cast Iron
- ○ SPECIAL MATERIAL TESTS
- ○ LOW AMBIENT TEMP. MATERIALS TESTS

QA INSPECTION AND TEST

- ● COMPLIANCE WITH INSPECTORS CHECK LIST
- ● CERTIFICATION OF MATERIALS (Material certificate 3.1)
- ● FINAL ASSEMBLY CLEARANCES
- ● SURFACE AND SUBSURFACE EXAMINATIONS
- ○ RADIOGRAPHY
- ○ ULTRASONIC
- ○ MAGNETIC PARTICLE
- ● LIQUID PENETRANT 100 % of welds
- ● CLEANLINESS PRIOR TO FINAL ASSEMBLY
- ○ HARDNESS OF PARTS, WELDS & HEAT AFFECTED ZONES
- ○ FURNISH PROCEDURES FOR OPTIONAL TESTS

TESTS	REQ'D	WIT	OBS
HYDROSTATIC	○	●	○
MEHANICAL RUN	○	●	○
PERFORMANCE	○	●	○
NPSH	○	○	○

PREPARATION FOR SHIPMENT

- ● DOMESTIC ○ EXPORT ○ EXPORT BOXING REQ'D
- ○ OUTDOOR STORAGE MORE THAN 6 MONTHS

WEIGHTS (kg)

■ PUMP 1836 □ BASE 0 ■ GEAR 26 ■ MOTOR 81

BASEPLATE

- ● BY PUMP MANUFACTURER ○ SUITABLE FOR EPOXY GROUT
- ○ EXTENDED FOR
- ● SUBSOLE PLATES BY PUMP MANUFACTURER
- ○ DRAIN-RIM ○ DRAIN-PAN

REMARKS

(1) Shaft sleeves hardnedned in correspondence of plain bearings

(2) Plan 51 will be mounted on the pump assembly and connected to the seal with SS316L tubing and fitting.
Plan 51 is to be filled with clean fresh water. I t needs to be maintained at positive temperature.

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as “NOT CONTROLLED” copy

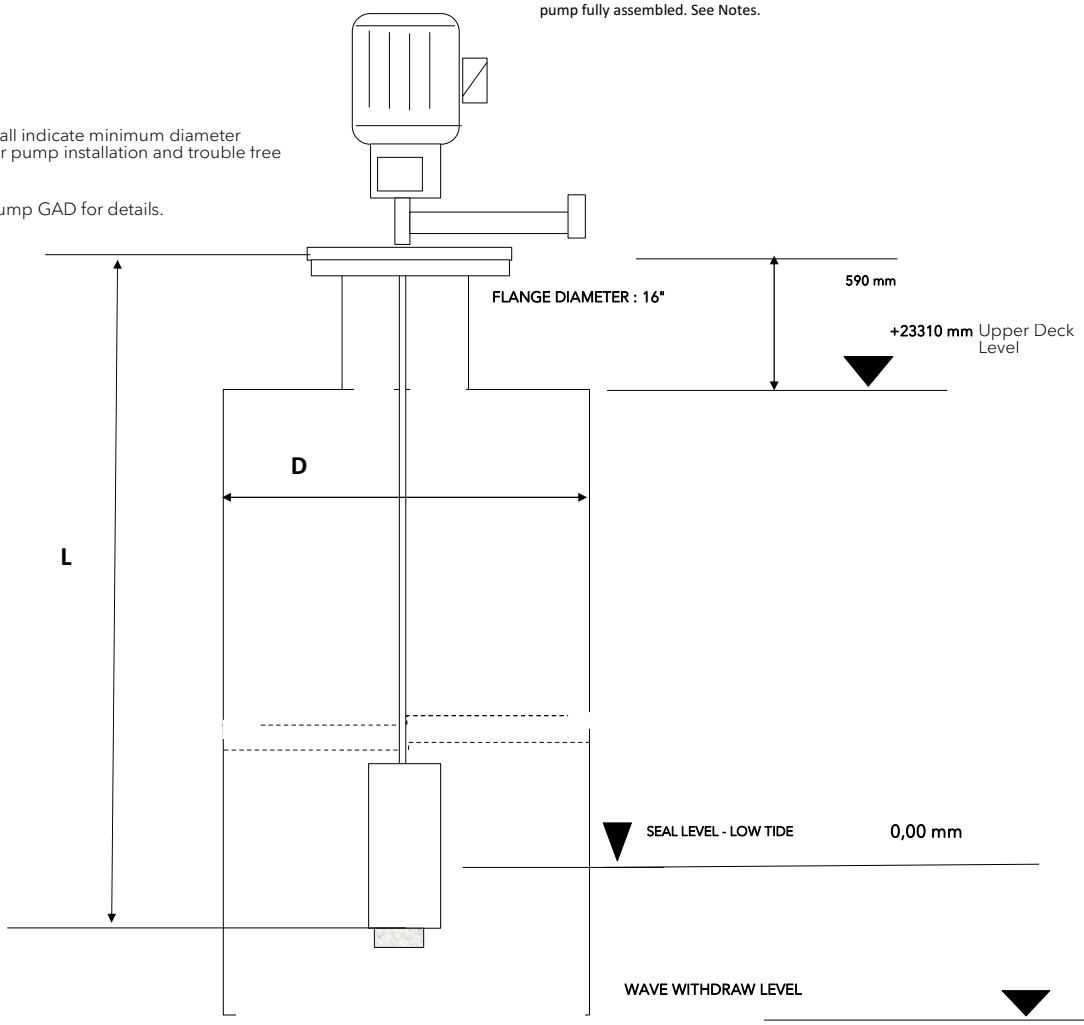
L 29.81 m

D 333.34 mm

NOTE:
Vendor shall indicate minimum diameter suitable for pump installation and trouble free operation

Refer to pump GAD for details.

Vendor to declare the mounting/dismountig clearance considering the pump fully assembled. See Notes.



OPEN CAISSON

Expected wave withdraw is 5.4 meters below low tide level (-5,40 m)
Pump lenght shall be defined to consider the above

1724000937HMAC-DS-00012 undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

NOTES

1) For NPSHA vendor to consider 1bara at minimum seawater level (+ 0,00 mm)

2) Pump lenght to be calculated by vendor according to a reliable margin (VTA) between NPSHA vs NPSHR and minimum submergence
Vendor to advise the suction nozzle depth, according to the above sentence

3) Discharge pressure / head is referred to pump battery limit (i.e. dicharge nozzle)

4) Suction strainer to be provided by vendor.
Mesh size is 7mm diameter as per PCM standard design for the selected pumps.
Mesh size shall be minimized without jeopardizing suction condition.

5) Full compliance to API Std 676 is not strictly mandatory. Vendor to submit a list of deviation supported by reference list
Please refer to attached list of technical clarifications & deviations, including API 676.

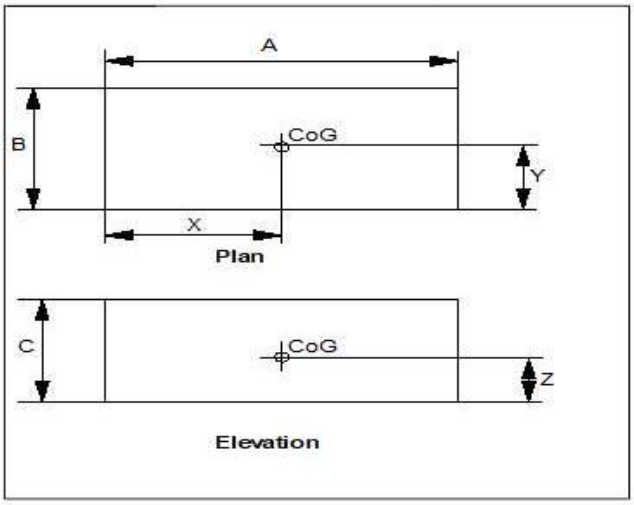
6) Vendor to declare mounting/dismantling clearance considerinf full assmbled pump
For full assembled pump mounting/ dismantling, the required minimum vertical clearance will be the total length of the equipment (including motor & all casing extensions : approx 35 m estimated), plus the required length for slings, depending on the lifting equipment to be used.
This clearance will be required above the supporting flange elevation.

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as “NOT CONTROLLED” copy

WEIGHT DATA (kg)

		Areas for input by Supplier
Dry Weight	(I)	1943 kg
Content	(II)	2150 kg
Operating Weight	(I+II)	4093 kg
Auxiliaries' weight, included in I (specify under Notes)		kg
Test weight, i.e. filled with water		kg
Transport weight		1943 kg

CENTRE OF GRAVITY (CoG) DATA FOR INSTALLED DRY CONDITION



Overall dimensions	
A =	971 mm
B =	597 mm
C =	32170 mm

CoG location (mm)	
X =	7 mm
Y =	-1 mm
Z =	-12398 mm

NOTES

Datum point considered to locate the C.O.G of the pump is the center of the mounting flange.

WEIGHT AND CoG STATUS (TICK OFF AS APPROPRIATE)

☐ Estimated ☐ Calculated

☐ Catalogue data ☐ Weighed

Base Load Power Hub (BLPH)

PUMP AND MOTOR NOISE DATA SHEET
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-DS-00013

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	18-10-2024

Document Class: 2

NOTE
FINAL ACCEPTANCE IS ACHIEVED WITH RECEIVING OF CLOSE OUT CRS FROM CROSSWIND

Rev.	Date	Description	Prepared	Reviewed	Approved
03	16/10/2024	Accepted for Construction (AFC)	APD	GLL	AHN
02	17/09/2024	Accepted for Construction (AFC)	APD	GLL	AHN
01	03/07/2024	Accepted for Construction (AFC)	APD	GLL	AHN
00	24/06/2024	Issue for Review (IFR)	APD	GLL	AHN

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)
03	Accepted for Construction (AFC)

HOLDS LIST

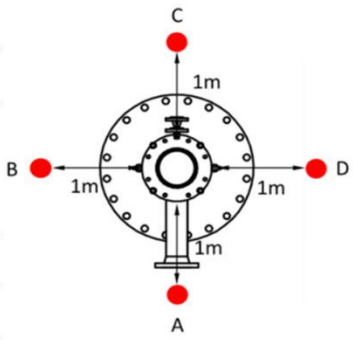
No.	Description
1	
2	
3	
4	

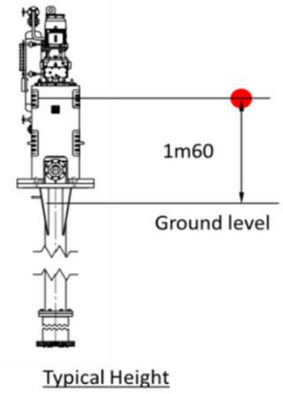
This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

CROSSWIND	HOLLANDSE KUST NOORD WIND PARK Project Contract No. CW-I-WP4-2023-05	ROSETTI MARINO
Document Title:	PUMP AND MOTOR NOISE DATA SHEET	Sh. 3 of 3 Date : 16/10/2024 Rev. 03

PUMP AND MOTOR NOISE DATA SHEET
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Identified points	Sound pressure level dB(lin) in octave or 1/3 octave band (Hz)								Global level
Location	63	125	250	500	1000	2000	4000	8000	dBA
A	60	58	58	60	70	63	61	55	85
B	60	58	58	60	70	63	61	55	85
C	60	58	58	60	70	63	61	55	85
D	60	58	58	60	70	63	61	55	85
Mean									





Typical Height

Notes

VENDOR shall fill the above table with the calculated sound pressure levels.
Pressure levels shall be indicated at identified points distributed all along a perimeter located 1m away from the edge of the pump and at 1.6 m above the top of the main beams of the motor
These points shall be regularly spaced on the perimeter.
There shall be a sufficient number of points to obtain a meaningful calculation result.
The above table shall indicate noise levels without any enclosure (partial or total) on the package.

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as “NOT CONTROLLED” copy

Base Load Power Hub (BLPH)

ELECTRICAL MOTOR DATA SHEET
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-DS-00014

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	18-10-2024

Document Class: 2

NOTE
FINAL ACCEPTANCE IS ACHIEVED WITH RECEIPT OF CRS CLOSE OUT FROM CROSSWIND

03	16/10/2024	Accepted for Construction (AFC)	APD	GLL	AHN
02	06/08/2024	Accepted for Construction (AFC)	APD	GLL	AHN
01	18/07/2024	Accepted for Construction (AFC)	APD	GLL	AHN
00	24/06/2024	Issue for Review (IFR)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)
03	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

IEC LV Motors	Technical Data Sheet - DOL			
	HOLLANDSE KUST NOORD WIND PARK Project		Location: Netherlands	
Department/Author: Rakesh Purushohama	Customer name: PCM		Customer ref: GIAN-392481	Item name: PM-50001 A/B
Our ref.: CQ813220	Rev/Changed by: C	Date of issue: 07/06/2024	Saving ident: cq813220.xlsm	Pages: 3(4)

No.	Definition	Data	Unit	Remarks	
1	Product	***TEFC, 3-phase, squirrel cage induction motor***			
2	Product code	***3GBP 132 260-BDK***		Calc. ref.	3GZF021013-1094
3	Type/Frame	***M3BP 132SMF 4***			
4	Mounting	***IM3011, V1(flange)***			
5	Rated output P_N	***5,5***	kW		
6	Service factor	***1***			
7	Type of duty	***S1(IEC) 100%***			
8	Rated voltage U_N	***400***	VD	± 5 % (IEC 60034-1)	
9	Rated frequency f_N	***50***	Hz	± 2 % (IEC 60034-1)	
10	Rated speed n_N	***1463***	r/min		
11	Rated current I_N	***11,9***	A		
12	No-load current	***5,8***	A		
13	Starting current I_s/I_N	***7,6***		Meet IEC 60034-12, N,(H at 60 Hz)	
14	Nominal torque T_N	***36***	Nm		
15	Locked rotor torque T_S/T_N	***2,8***			
16	Maximum torque T_{max}/T_N	***3,5***			
17	Minimum torque T_{min}/T_N	***2,5***			
18	Speed at minimum torque	***255***	r/min		
	Load characteristics (IEC 60034-2-1:2014)	Load %	Current A	Efficiency %	Power factor
19	PLL determined from residual loss	*100*	**11,9**	**89.6 / IE3**	**0,74**
20		*75*	**9,8**	**89,8**	**0,68**
21		*50*	**8**	**88,7**	**0,56**
22		*Start*	**90**		**0,43**
23	Maximum starting time from hot	***12***	s		
24	Maximum starting time from cold	***21***	s		
25	Insulation class / Temperature class	***F / B***			
26	Ambient temperature	***40***	°C		
27	Altitude	***1000***	m.a.s.l.		
28	Enclosure	***IP56***			
29	Cooling system	***IC411 self ventilated***			
30	Bearing DE/NDE	***6208-2Z/C3 - 6208-2Z/C3***			
31	Type of Grease				
32	Sound pressure level (LP dB(A) 1m)	***70***	dB(A)	at load	
33	Moment of inertia J = ¼ GD2	***0,0295***	kg-m2		
34	Balancing				
35	Vibration class				
36	Position of terminal box	***Top***			
37	Terminal box entries; no, dimens.	***2 x M25***			
38	Number of power terminals	***6 x M5***			
39	Direction of rotation	***CW or CCW***			
40	Weight of rotor	***21***	kg		
41	Total weight of motor	***81***	kg		
42	Dimension drawing no.				
43					
44					
45					
Ex-motors (N/A)					
46					
47					
48					

Option Variant Codes / Definition

49	+066 Modified for non-standard mounting position
50	+403 Degree of protection IP56. Applicable to Motor and Terminal Box
51	
52	

Remarks:

Data based on situation 3/7/2024
All data subject to tolerances in accordance with IEC
Guaranteed values on request

CROSSWIND	9 E AA% C 0 Q2 #@T QS#C E E P0 #Z £C 0 #M% P@#Mf£{nj‡ . £ ¡ #ñaj#C £ ‡#. Z ÐÆZ M ¸Ð ˜ " ° Ð ´	ROSETTI MARINO
0 £ j · ~ n ¡ #Ɛv‡}hø	2A2 . SP :. #B E SE P#Ð % S% #Ð9 22S	Qu#, #E s#, Date : 16/10/2024 Rev. 03

Applicable to : Proposal Purchase As Built | PAGE ____ OF ____ REQ'N NO. NA

DESIGN, MANUFACTURE & TESTING SHALL CONFORM TO SPECIFICATION : 123A90-DDL-EL-SP-20084 - Technical Specification for LV Motors

FOR CROSSWIND UNIT

SITE BLPH - Hollandse Kust Noord (HKN)

SERVICE SEA WATER LIFT | DRIVEN EQUIPMENT TYPE PUMP | DRIVEN EQUIP. ITEM NO.: P-50001 A/B | QUANTITY: 2

MANUFACTURER ABB | MODEL: 3GBP 132 260-BDK | SERIAL NO. TBC | FRAME NO: IEC 132

NOTE: INFORMATION TO BE COMPLETED BY: PURCHASER MANUFACTURER PURCHASER OR MANUFACTURER

OPERATING CONDITIONS (1)

Site Data: HOLLANDSE KUST NOORD WIND PARK

Altitude: Less than 1000 Other ____ (m)

Ambient Temperature: Min/Max -8 / 25 (°C)

Electrical Characteristics:

Volts 400 Phase 3 Hertz 50

Starting Voltage: Full Reduced ____ %

Volt Dip +10/-20' % Loaded Unloaded

Installation: Indoor Outdoor YES

Operating Mode Continuous Standby Intermittent YES Alter.

Electrical Area Classification ____ Unclassified YES

Class ____ Group ____ Division ____

Unusual Conditions Dust Fumes

Gasses/Vapours ____

Ignition Temp ____ (°C) Temperature Code ____

PERFORMANCE

Nameplate Power 5,5 (kW) 1463 (rpm)

Load	Current (AMPS)	Efficiency	Power Factor
Full	11,9	89,6	0,74
75%	9,8	89,8	0,68
50%	8	88,7	0,56
Locked Rotor	90		0,43

No Load Current: 5,8 (A)

Starts per Hour: 2 Hot 2 Cold

Full Load Torque: 36 (N-m)

L. R. Torque: 280 %FLT

Breakdown Torque: 350 %FLT

Acceleration Time: 0,1 (sec)

CONSTRUCTION FEATURES

Enclosure TEFC YES WP1 WP2

Explosion Proof Other SAFE AREA

Insulation Class B YES F YES Other

Non-Hygroscopic Tropicalized

Temperature Rise: ____ (°C) Above ____ (°C)

By: ____ @ ____ S.F.

NEMA Torque Design A B C D

Locked rotor kVA Code ____

Mounting

Horizontal Foot Mounted Flange Mounted YES

Vertical YES Shaft Up Shaft Down YES With Canopy YES

Coupling

Supplied By John Crane Mounted By PCM

Suitable for Belt Drive N/A

Bearing type Ball YES Roller Sleeve

Bearing Lubrication Grease YES Ring Oil Oil Mist

Grease Fitting Plugged Alemite Other YES

Bearing Shielding Single Double Sealed for Life

Motor Rotation (facing end opposite shaft extension) YES

CW CCW Bidirectional YES

Fan Reversible Unidirectional

Non-Sparking YES Aluminium Non-Metallic YES

Main Terminal Box Location TOP F-1 F-2

Space Heater (2) N/A (kW)

Volts 230 Phase 1P+N+PE Hertz 50

Max. Sheath Temperature ____ (°C)

Winding Temperature Detectors (not mandatory but provided as standard)

No. per Phase ____ Type: ____

Bearing temperature Detectors

Location N/A Type: N/A

Separate JB for Space Heaters, Winding/Bearing Detectors

Adjustable Frequency Drive

Speed range: From N/A (rpm) to: N/A (rpm)

Materials of Construction

Frame Cast Iron

Junction Box Cast Iron

Copper Bar Rotor

Stainless Steel Filters

Differential Pressure Switch for Inlet Filters

Vertical Jackscrews

Ground Connection

Drilled and tapped Hole in Conduit Box

Ground Lug Size M6 (mm)

Motor Thrust Load None N/A (N)

Thrust Direction Toward Away

Motor Thrust Rating

Nameplate Material 316 SS YES Other

TESTING & MISCELLANEOUS

Testing	Required	Witness
Routine Test		
Complete Test	YES	
Noise Test		
Certified Results		

Weight Net ____ (kg) Shipping ____ (kg)

Painting Mfr. Std. Other IEEE 841

Noise Design

Max sound Pressure Level @ ____ (m) ____ dBA

Expected Sound Pressure Level @ ____ (m) ____ dBA

Notes:

(1) Refer to pump DS - Document Number : 1724000936-MAC-DS-00012

(2) space heater NOT necessary according to enviromental conditions (Ref. IOGP S-703 par. 11.3.6.1)

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	18-10-2024

PSV DATA SHEET

For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-DS-00034

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
01	16/10/2024	Approved for Construction (AFC)	APD	GLL	AHN
00	24/07/2024	Issue for Review (IFR)	APD	GLL	AHN

PCM keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Approved for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Serie: 3000W

TAI MILANO S.P.A.
Via Petrella, 21 - 20124 MILANO (ITALY)
Tel.: +39 02 29525941 - Fax: +39 02 29404417
email: tai@taimilano.it - web: www.taimilano.it

PRESSURE RELIEF VALVE CALCULATION SHEET

LIQUIDS IN ABSENCE OF CAVITATION OR FLASHING
(According to EN ISO 4126-1)

$$A = \frac{Q_v}{B_9 F_{dr} K F_V} \sqrt{\frac{G}{P_1 - P_2}}$$

$$Re = B_{14} \frac{Q_m}{\mu \sqrt{A'}}$$

TAI Ref.	Item Ref.
24/8637	50-PSV-006/007
Customer	**Sheet No.**
PCM EUROPE	3 of 4
Order No.	**dated**
Customer Ref.	**dated**
GIAN-392481	29/03/2024

Tag
01
02
03
04
05
06
07
08
09
10

DIMENSION

01	MEDIUM	Sea Water			15	SPECIFIC VOLUME		**v**	0.00097 [m³/kg]
02	COEFFICIENT B7		**B_7**	---	16	SPECIFIC GRAVITY (H20=1)		**G**	1.03
03	COEFFICIENT B8		**B_8**	---	17	KINEMATIC VISCOSITY		ν	[ctsk]
04	COEFFICIENT B9		**B_9**	0.05091	18	DYNAMIC VISCOSITY		μ	0.9 [cpoise]
05	COEFFICIENT B13		**B_{13}**	---	19	REQUIRED	MASS FLOW RATE	**Q_m**	2575 [kg/h]
06	COEFFICIENT B14		**B_{14}**	313.4			VOL. FLOW RATE	**Q_v**	2.5 [m³/h]
07	DISCHARGE COEFFICIENT		**K**	0.87	20	CALCULATED AREA(1)		**A**	22.014 [mm²]
08	DE-RATING FACTOR		**F_{dr}**	0.9	21	QTY. OF VALVES		**n**	1
09	OPERATING PRESSURE			[bar g]	22	SELECTED AREA		**A'**	78.5 [mm²]
10	SET PRESSURE			7.6 [bar g]	23	REYNOLDS NUMBER		**Re**	101204
11	OVERPRESSURE			10 [%]	24	LOW TURB. CORR. FACTOR		**Fv'**	1
12	RELIEVING PRESSURE		**P_1**	8.36 [bar g]	25	Fv' * n * A'/A (OK if >= 1)			3.566
13	BACK PRESSURE		**P_2**	0 [bar g]	26	ORIFICE			D
14	TEMPERATURE AT P1		**T_1**	293.2 [K]	27	CAPACITY			8.915 [m³/h]
			t_1	20.2 [°C]	28				

NOTES

(1) Fv assumed as equal to 1

REV.	DATE	COM / BY	DESCRIPTION
10			
09			
08			
07			
06			
05			
04			
03	06/06/2024	LV	
02	17/04/2024	LV	
01	03/04/2024	LV	First issue

TAI MILANO S.P.A.
Via Petrella, 21 - 20124 MILANO (ITALY)
Tel.: +39 02 29525941 - Fax: +39 02 29404417
email: tai@taimilano.it - web: www.taimilano.it

DIMENSIONAL OUTLINE DRAWING WITH MATERIAL LIST AND VALVE DATA

TAI Ref.	Item Ref.	Quantity
24/8637	50-PSV-006/007	2
Customer		**Sheet No.**
PCM EUROPE		4 of 4
Order No.		**dated**
Customer Ref.		**dated**
GIAN-392481		29/03/2024

VALVE DATA

Series	Valve	Size	Spring	Accessories
3000W	3111W	1" X 2"	S	

Orifice	Area [mm²]	Cold differential test pressure [bar g]	Set pressure [bar g]	Overpressure [%]	Total backpressure [bar g]
D	78.5	7.6	7.6	10	0

Superimposed backpressure [bar g]	Relieving temperature [°C]	Minimum temperature [°C]	Maximum temperature [°C]	Service G	L	S	M
0	20.2	-29	100		X		

Inlet connection

Code	Size	Class/PN	Facing	Finish
ASME	1"	150	RF	125 AARH

Outlet connection

Code	Size	Class/PN	Facing	Finish
ASME	2"	150	RF	125 AARH

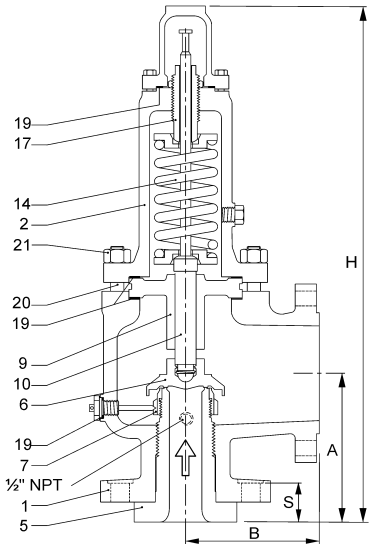
Tag	
01	
02	
03	
04	
05	
06	
07	
08	
09	
10	

PARTS AND MATERIAL LIST

Our material class: L1 /11 /30 /X3 /X7 /X9 /X13

001	Body	A352-LCC		020	Body studs	A320-L7 HDG	
002	Bonnet	A352-LCC		021	Body nuts	A194-7 HDG	
005	Nozzle	UNS S32760	/X3		Cap	A352-LCC	/X13
006	Disc	UNS N07718					
007	Blowdown adjusting ring	A351-CF8M					
009	Guide bushing	A351-CF8M					
010	Spindle	UNS N07718	/X7				
014	Spring	AISI 316					
017	Spring adj. screw	UNS N07718	/X9				
019	Set of gaskets	PTFE					

DRAWING



NOTES

Preliminary dimensions [mm] A	B	S	H	Mass [kg]
105	114	33	465	22

REV.	DATE	COM / BY	DESCRIPTION
05			
04			
03	06/06/2024	LV	
02	17/04/2024	LV	
01	03/04/2024	LV	First issue

Printed by: LVarisco
Print date: 06/06/2024 08:46:45
Document: 24/8637-001-DAA R02

1.4 CURVES

1.4.1 PUMP PERFORMANCE CURVES

1.4.2 ELECTRIC MOTOR PERFORMANCE DATA

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Base Load Power Hub (BLPH)

PUMP PERFORMANCE CURVES
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-DS-00015

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	08-10-2024

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
03	01/10/2024	Accepted for Construction (AFC)	APD	GLL	AHN
02	06/08/2024	Accepted for Construction (AFC)	APD	GLL	AHN
01	08/07/2024	Accepted for Construction (AFC)	APD	GLL	AHN
00	10/06/2024	Issue for Review (IFR)	APD	GLL	AHN

PCM keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)
03	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

pump selector

25AV24

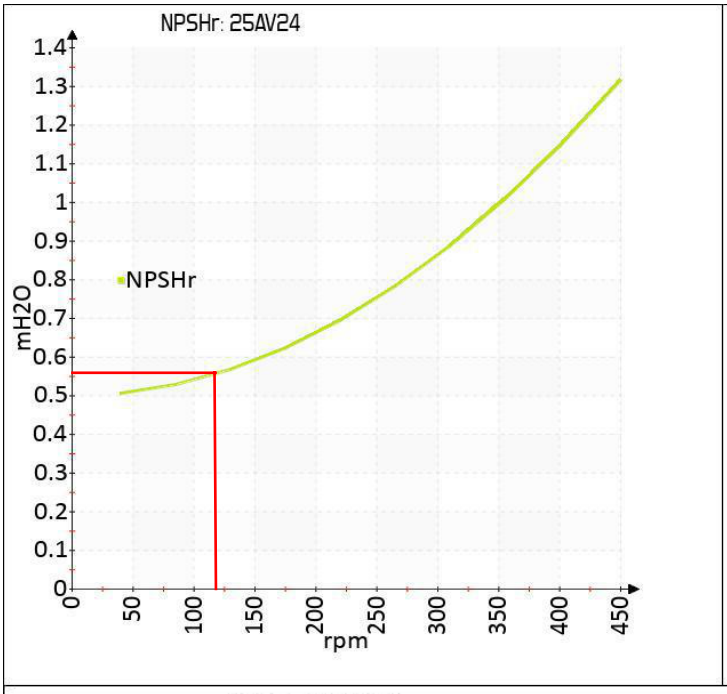
Date: 10/06/2024
PCM pump selector V3.11.7

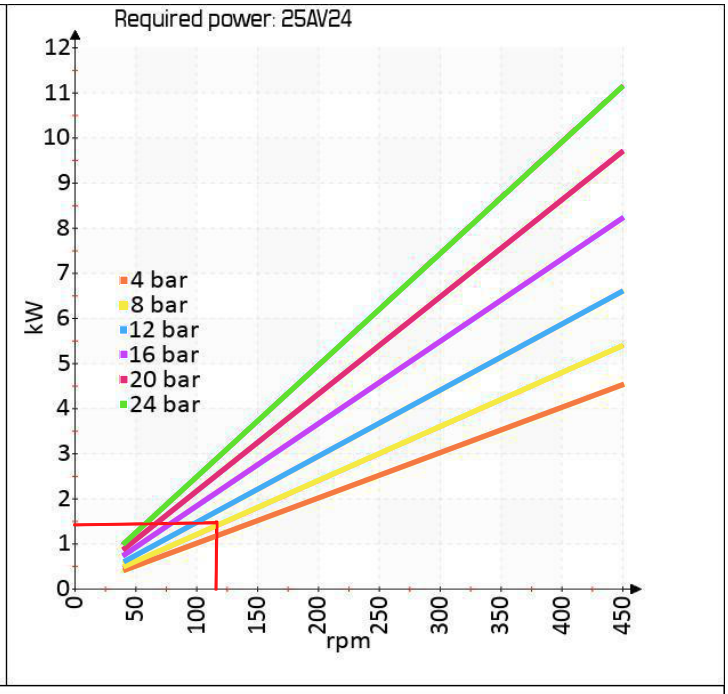
Information

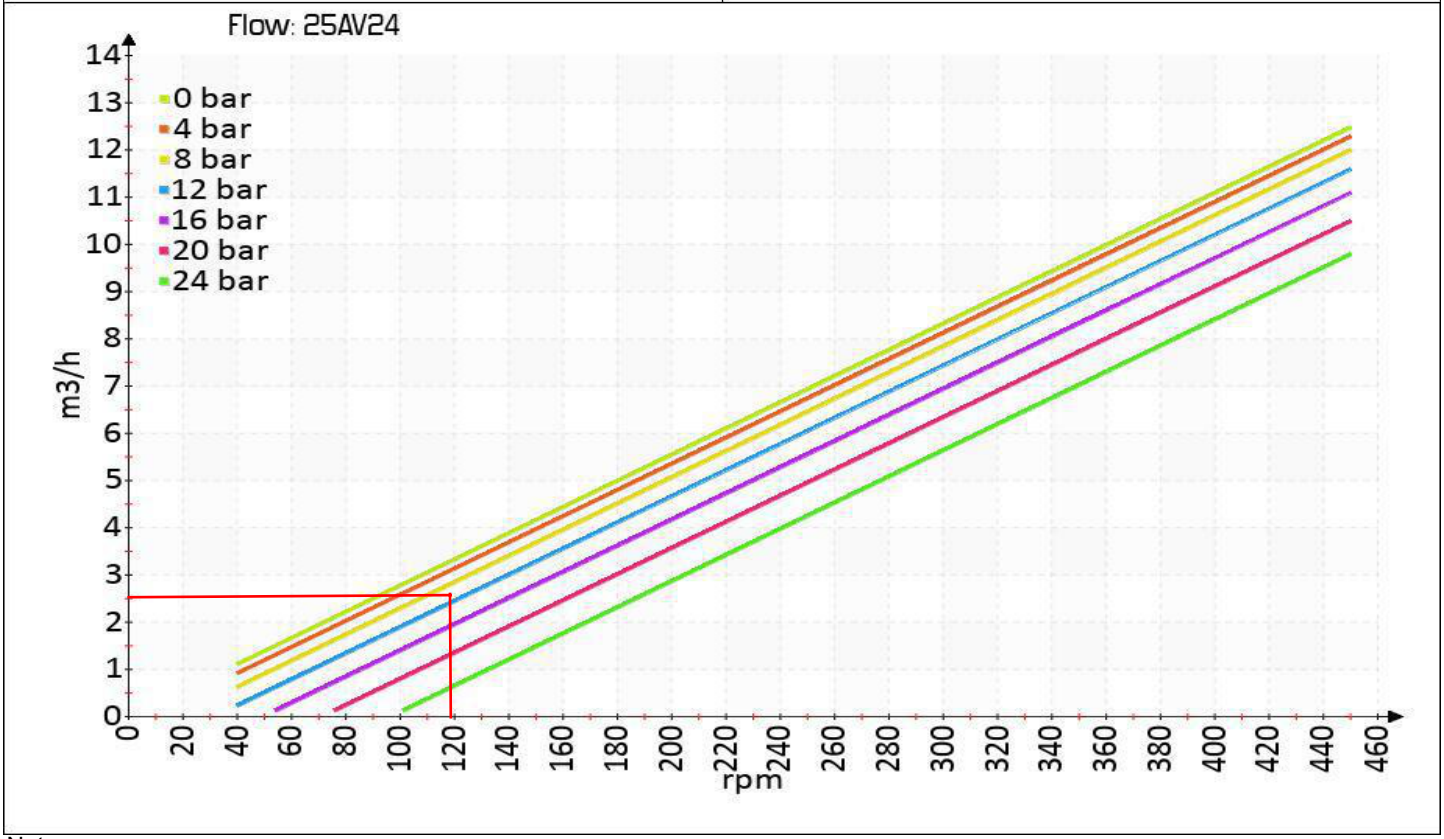
Max rpm (rpm): 450
Pump rpm (rpm): 118
Viscosity (cPo): 0.9

Starting torque (N.m): 250
Max pressure (bar): 24
Pump Discharge Pressure: 5.3barg
Pump Hydraulic Differential Pressure: 8.28bar

Fluid: Sea Water
PSV Set : 7.6 barg
Absorbed Power @ PSV Set : 1.55 kW







Note :
To obtain 5.3 barg at the pump discharge nozzle, the pump hydraulic must be dimensioned for 8.28bar differential pressure considering the hydrostatic pressure produced by the height of the pump.
Same reasoning apply to the PSV set pressure. The pump hydraulic must be dimensioned for a differential pressure equal to 10.58 bar.

Ce document est la propriété de PCM. Il ne peut être reproduit ou diffusé sans autorisation préalable.
This document is the property of PCM. Permission to copy or to disclose os subject to prior approval.
Este documento es la propiedad de PCM. Se prohibe su reproducción o difusión sin autorización previa.

keep it moving

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	19-07-2024

Base Load Power Hub (BLPH)

ELECTRIC MOTOR PERFORMANCE DATA
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-DS-00016

Document Class: 2

01	18/07/2024	Ap Accepted for Construction (AFC))	APD	GLL	AHN
00	24/06/2024	Issue for Review (IFR)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	App Accepted for Construction (AFC)

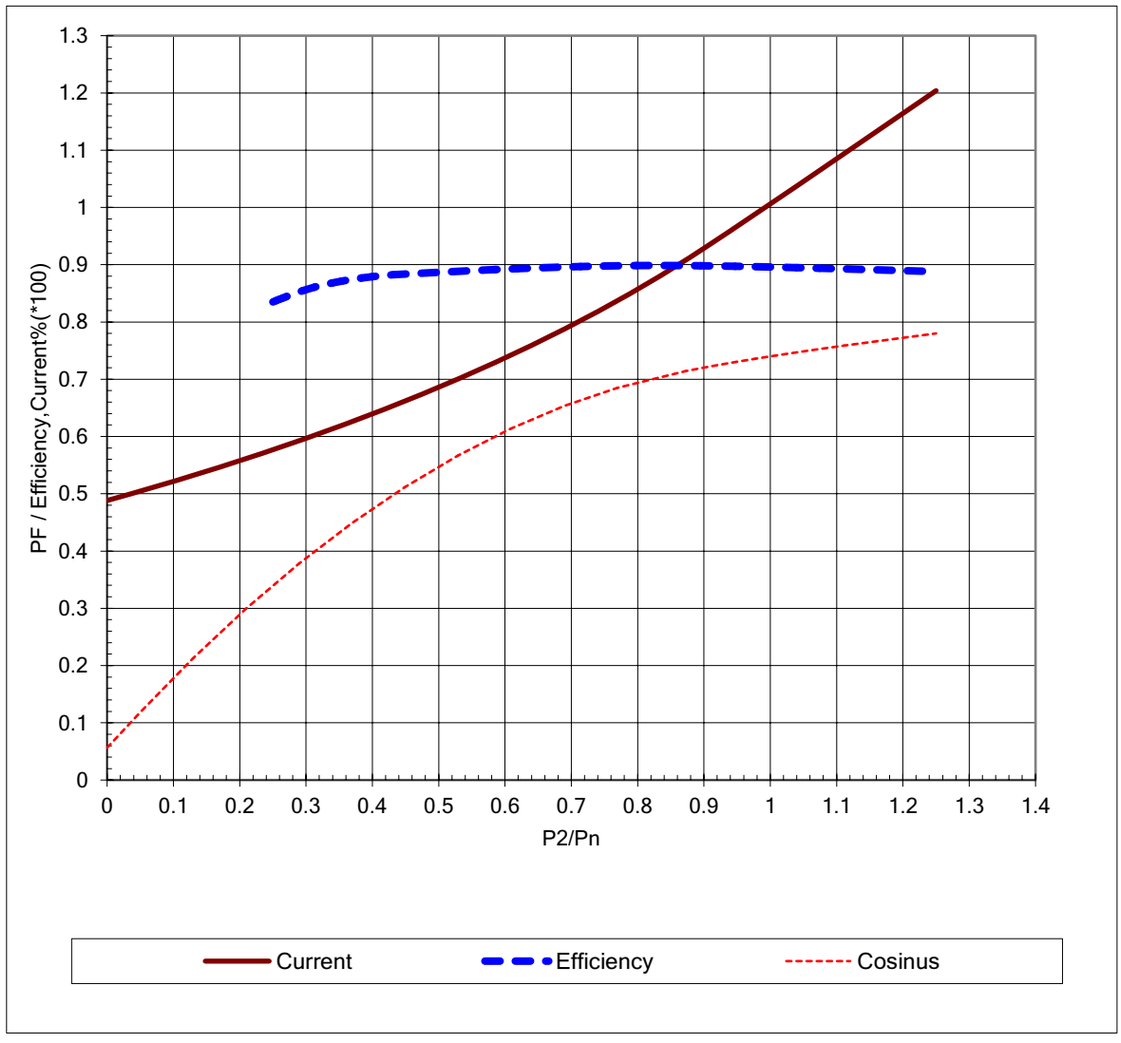
HOLDS LIST

No.	Description
1	
2	
3	
4	

IEC LV Motors	Load Curves			
	Project		Location	
	HOLLANDSE KUST NOORD WIND PARK Project		Netherlands	
Department/Author	Customer name		Customer ref	Item name
Rakesh Purushohama	PCM		GIAN-392481	PM-5001A/B
Our ref.	Rev/Changed by	Date of issue	Saving ident	Pages
CQ813220	C	07/06/2024	cq813220.xlsm	3(4)

Product	TEFC, 3-phase, squirrel cage induction motor		
Type/Frame	M3BP 132SMF 4	Calc. ref.	3GZF021013-1094
Product code	3GBP 132 260-BDK		
Rated output P_N	5.5 kW		
Type of duty	S1(IEC) 100%		

Voltage (V)	400	Current I_N (A)	11.9	Power factor at P_N	0.74
Frequency (Hz)	50	Speed (r/min)	1463	Efficiency (%) at P_N	89.6



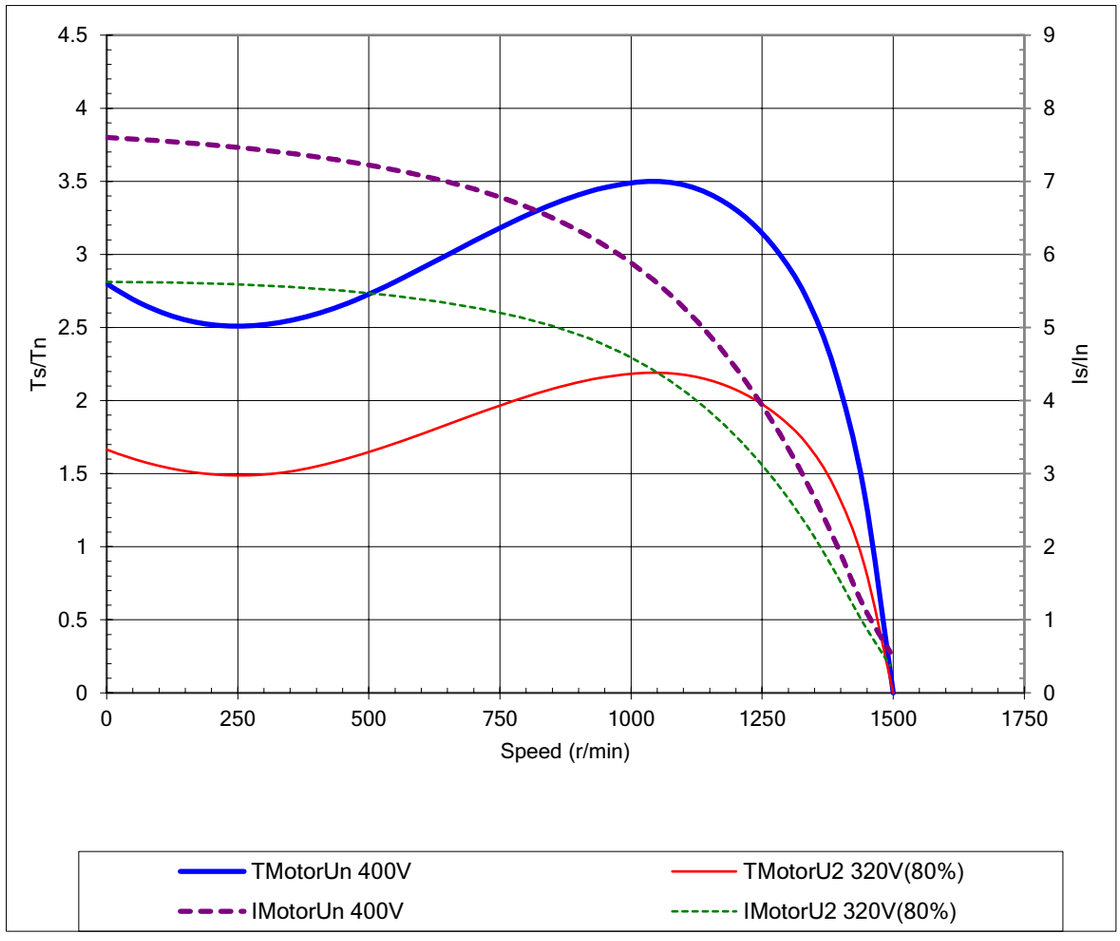
Load characteristics (IEC 60034-2-1:2014)
Data based on situation 3/7/2024

All data subject to tolerances in accordance with IEC

IEC LV Motors	Starting Curves			
	Project		Location	
	HOLLANDSE KUST NOORD WIND PARK Project		**Netherlands**	
Department/Author	Customer name		Customer ref	Item name
Rakesh Purushohama	**PCM**		**GIAN-392481**	**PM-5001A/B**
Our ref.	Rev/Changed b	Date of issue	Saving ident	Pages
CQ813220	**C**	**07/06/2024**	**cq813220.xlsm**	**4(4)**

Type of product	**TEFC, 3-phase, squirrel cage induction motor**			
Type/Frame	**M3BP 132SMF 4**	Calc. ref.	3GZF021013-1094	
Product code	**3GBP 132 260-BDK**	Frequency (Hz)	**50**	
Rated output P_N	**5.5** kW	Rated current I_N	**11.9**	A
Type of duty	**S1(IEC) 100%**			

J_{motor} (kgm2)	**0.0295**	Voltage (V) 100%	***400***	Voltage (V)	***320V(80%)***
J_{load} (kgm2)		T_{start}/T_N	***2.8***	T_{start}/T_N	***1.7***
Speed (r/min)	**1463**	Starting time (s)		Starting time (s)	
T_N (Nm)	**36**	Speed (r/min)		Speed (r/min)	
T_{load} (Nm)		I_s/I_n	***7.6***	I_s/I_n	***5.6***
		T_{max}/T_n	***3.5***	T_{max}/T_n	***2.2***



Load characteristics (IEC 60034-2-1:2014)
Data based on situation 3/7/2024

All data subject to tolerances in accordance with IEC

1.5 CALCULATION NOTE

1.5.1 VIBRATION ANALYSIS DATA-LATERAL ANALYSIS

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	08-08-2024

Base Load Power Hub (BLPH)

VIBRATION ANALYSIS DATA-LATERAL ANALYSIS
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-RE-00003

Document Class: 3

01	06/08/2024	Issue for Information (IFI)	APD	GLL	AHN
00	08/07/2024	Issue for Information (IFI)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)
01	Issue for Information (IFI)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

STUDY REPORT

Vibration Analysis of pump shaft and casing

Project: Hollandse Kust Noord Wind Park – CrossWind / Rosetti Marino

PROGRESSIVE CAVITY PUMP - P-50001 A/B.

Abstract: *Modal analysis of the pump shaft and the pump casing were made to ensure the proper frequency of the pump is out of the operating range of the pump.*

By	Checked	Approved
APD	HDT	GPE

Table of contents

1. Introduction 5
2. Calculation 5
2.1. Shaft line only 5
2.2. Casing Only 7
3. Results 9
3.1. Shaft line only 9
3.2. Pump Casing only 11
4. Conclusion 14
5. Appendices 15

1. Introduction

Both pump casing and shaft modal analysis are performed separately. The structure is modelled according to the locations of the centralizers indicated on the document 1724000936-MAC-DA-00004 (GAD of P-50001A/B). See attachment for the centralizer's locations.

Number of PCM pumps: 2

Tag: P-50001 A/B.

The operating speed of the pumps being 118 rotation/minute= 1.97 hertz, the first eigen frequencies must be superior to this value. The modal analysis has been performed multiple times with decreasing mesh sizes until there is no significant change in the 1st mode shape frequency value.

2. Calculation

2.1. Shaft line only

The calculation is performed on the below part:

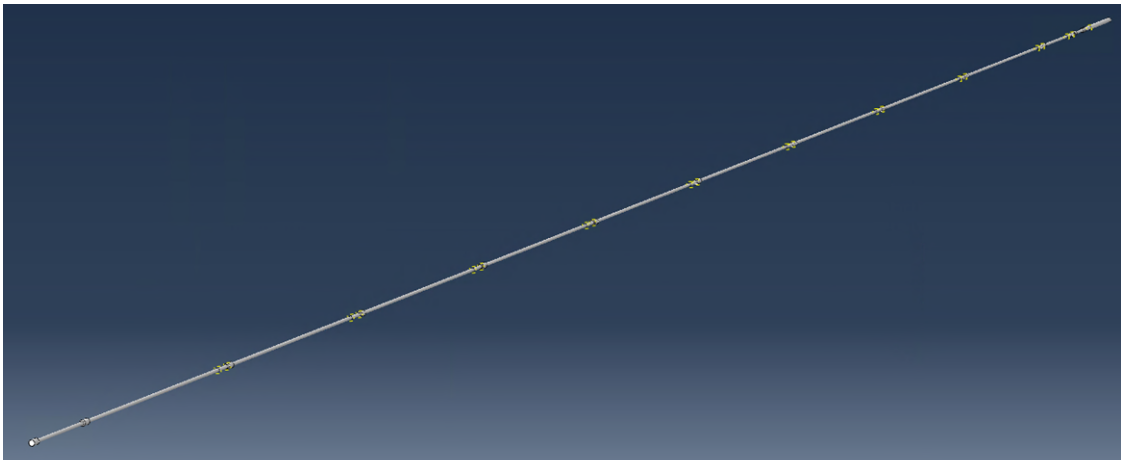


Figure 1: Shaft Line Model

- Meshing

The meshing characteristics are listed in Table 1 below:

	Elements Number	Nodes Number	Type
SHAFT 25AV24	80599	147814	Tetrahedral quadratic elements (C3D10)

Table 1: Meshing characteristics

- Material

The material and its properties are defined in the below Table 2. These values are considered at ambient temperature.

Material	Young Modulus E [GPa]	Poisson ratio ν [-]	Density ρ [Ton/mm3]
Super Duplex Stainless Steel	200	0.3	7.8 E-09

Table 2: Material Properties

- Boundary Conditions

The top of the shaft is fixed in all directions to simulate the impact of the mechanical seal on the shaft.

We highlighted the surfaces in contact with the internal centralizers and the stator. These surfaces are fixed in both lateral directions to simulate the operating conditions. For our calculation, we do not consider the stiffness of the centralizers because, as per experience, the centralizers are stiff enough to be considered as fixed points.

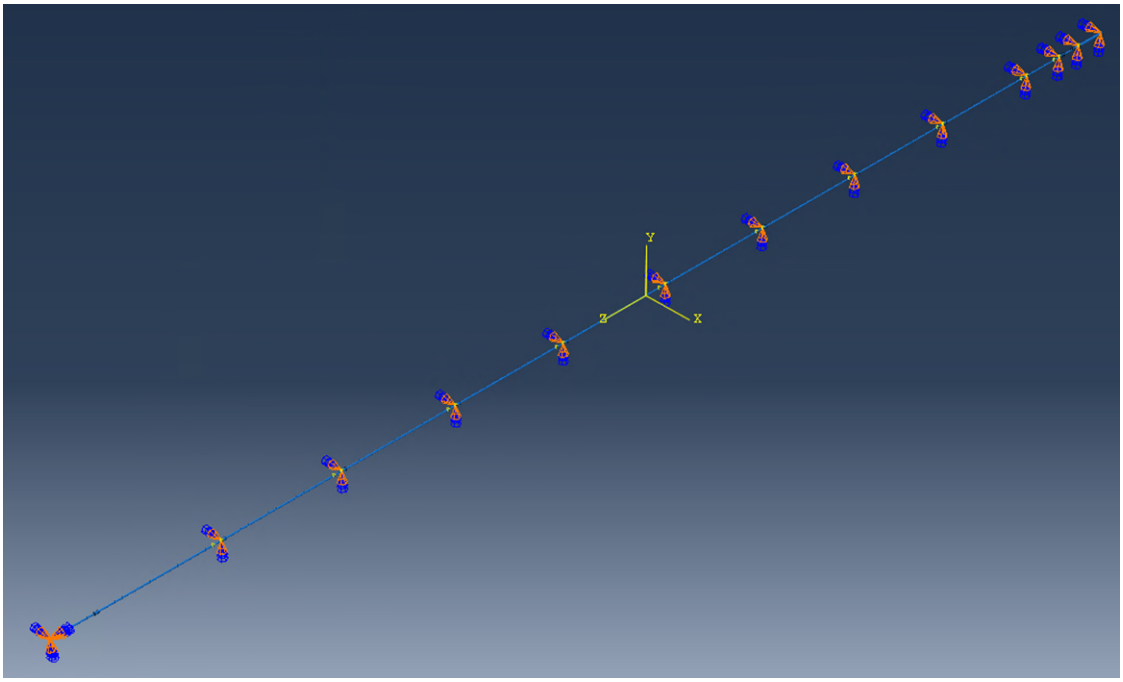


Figure 2: Shaft line boundary conditions modeling

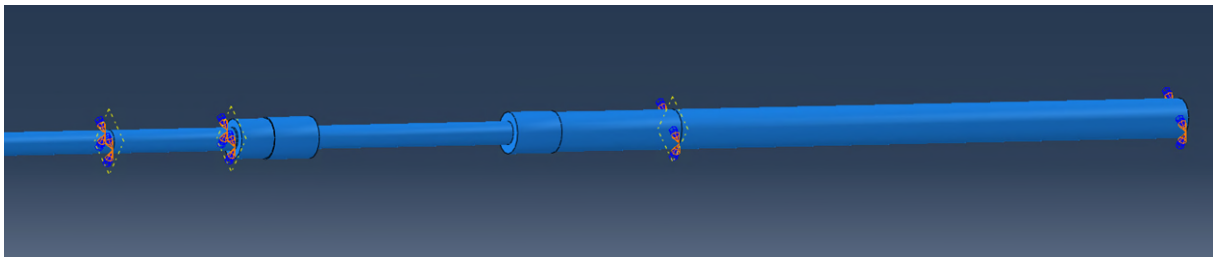


Figure 3: Shaft line boundary conditions details

- Load

No load is applied to the system for this modal analysis.

2.2. Casing Only

The calculation is performed on the below part:

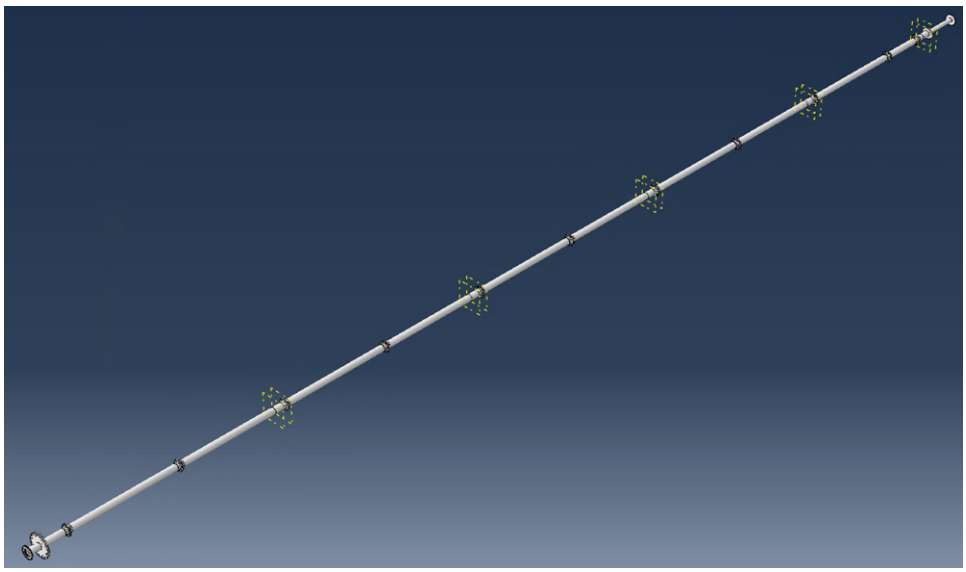


Figure 4: Pump Casing Model

- Meshing

The meshing characteristics are listed in Table 3 below:

	Elements Number	Nodes Number	Type
Casing 25AV24	493833	946598	Tetrahedral quadratic elements (C3D10)

Table 3: Meshing characteristics

- Material

The material is similar to the one used for the shaft line. See Table 2 for the properties of the material.

- Boundary Conditions

The below surface of the mounting flange is fixed in all directions and serves as anchor point.

We highlighted the surfaces in contact with the external centralizers. These surfaces are fixed in both lateral directions to simulate the operating conditions. For our calculation, we do not consider the stiffness of the centralizers because, as per experience, the centralizers are stiff enough to be considered as fixed points.

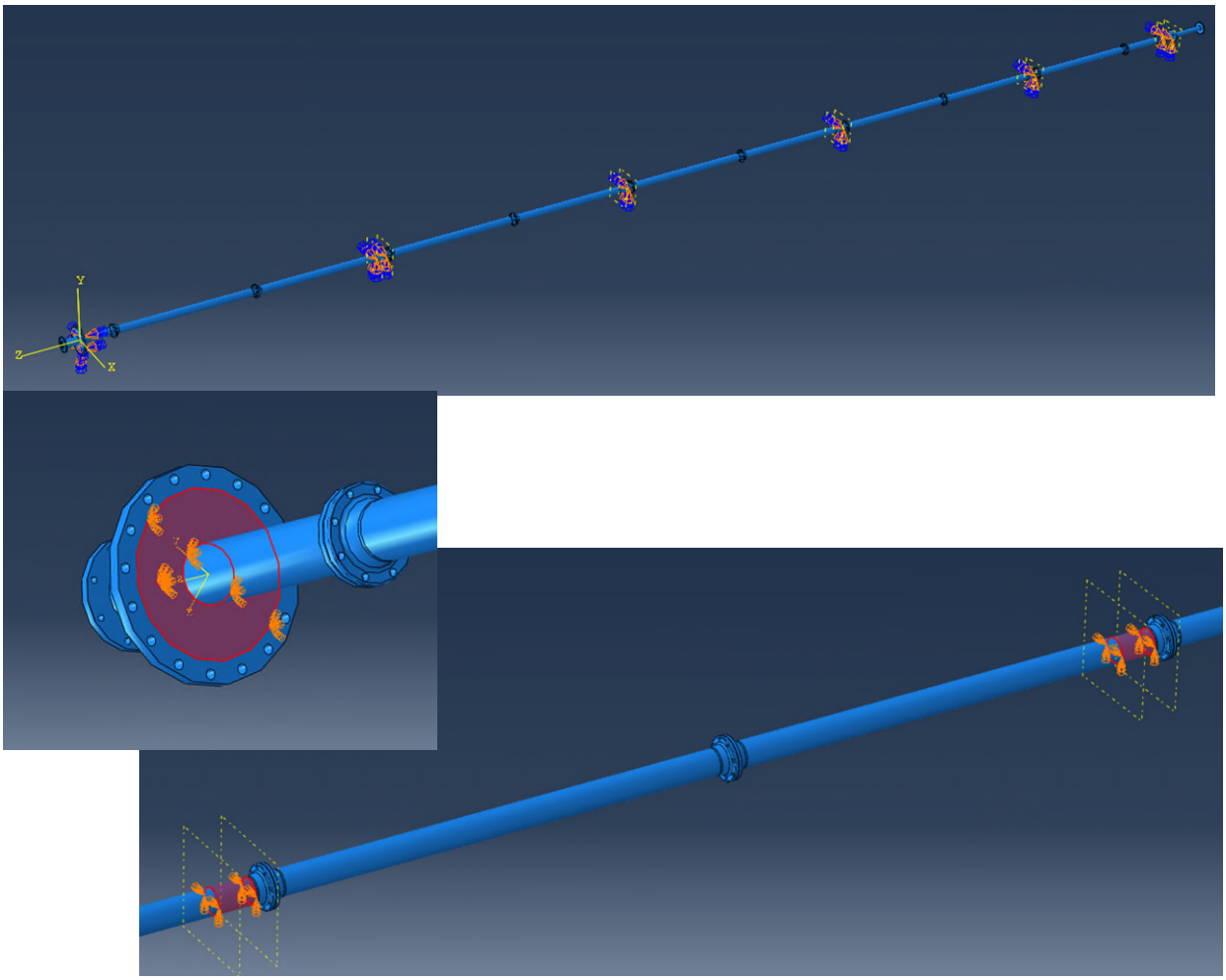


Figure 5: Pump Casing boundary conditions modeling

- Load

No load is applied to the system for this modal analysis.

3. Results

3.1. Shaft line only

The first eigen frequency value of the shaft line is 11.1 Hz. It is significantly larger than maximum excitation frequency of 1.97 Hz. Item eigen frequency is not presenting any issue on the shaft line integrity.

The part of the shaft line affected at this frequency is located between the mechanical seal and the first centralizer.

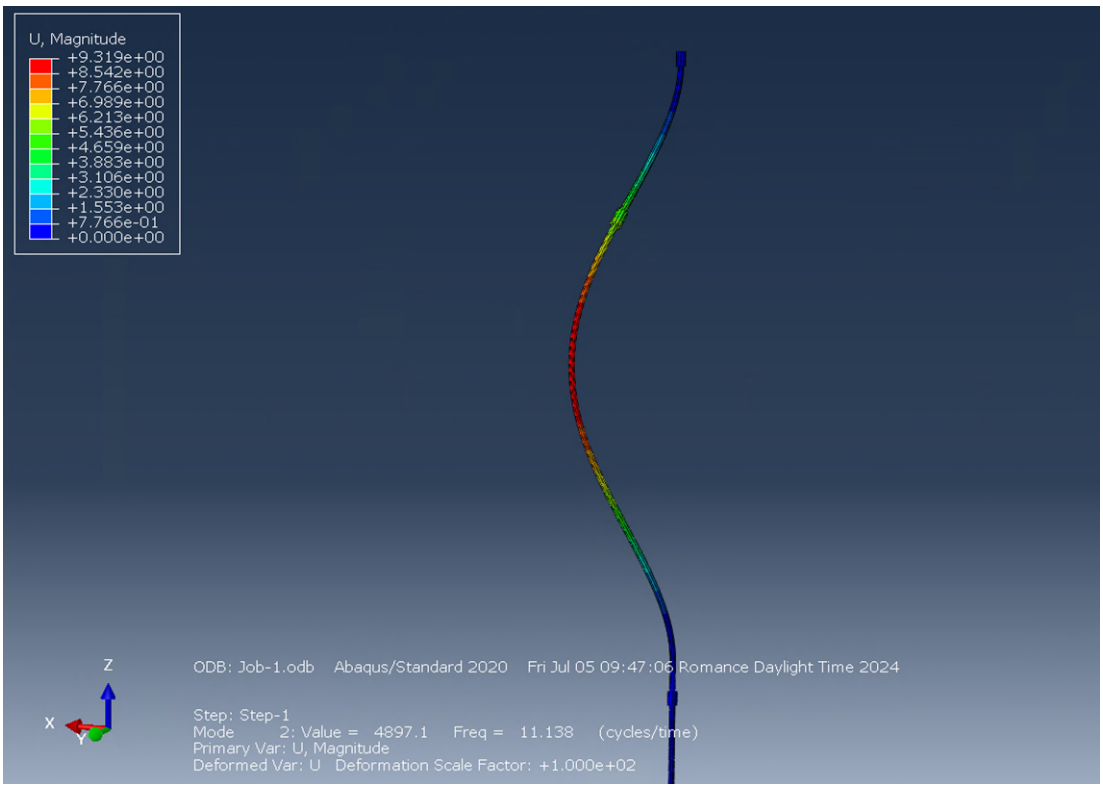


Figure 6: First eigen frequency value for the shaft line

The second frequency of excitation is at 20.6 Hz. This frequency corresponds to the eigen value of the shaft extension located between two centralizers.

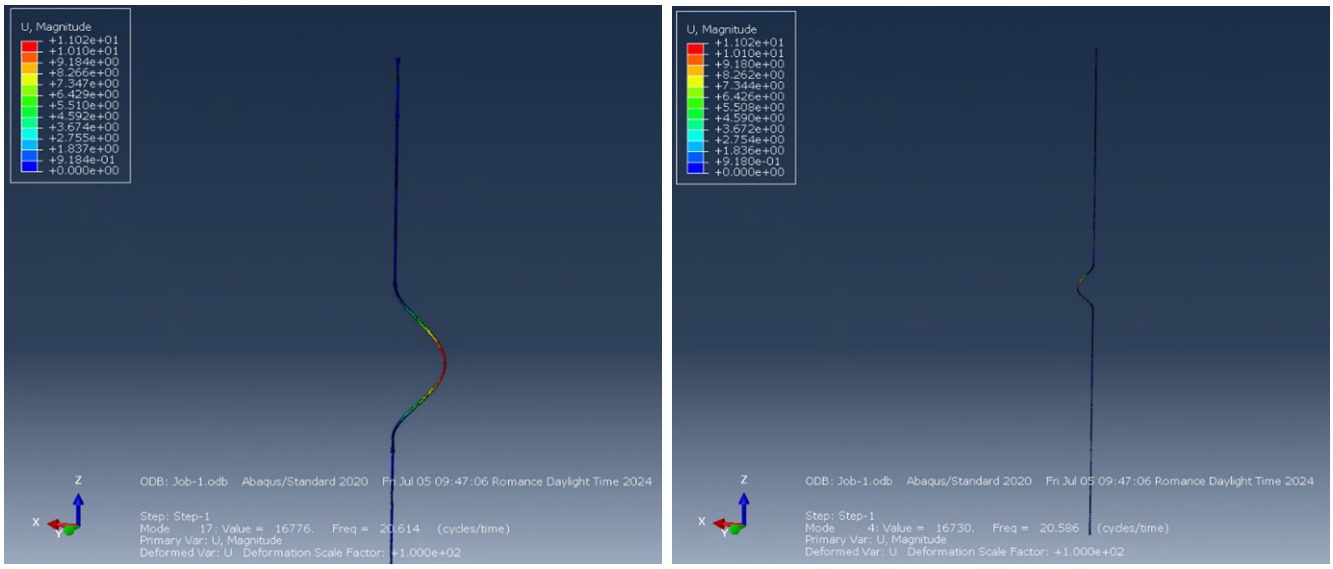


Figure 7: Second eigen frequency value for shaft line

The third eigen frequency value for the shaft line was recorded at 30.3 Hz.

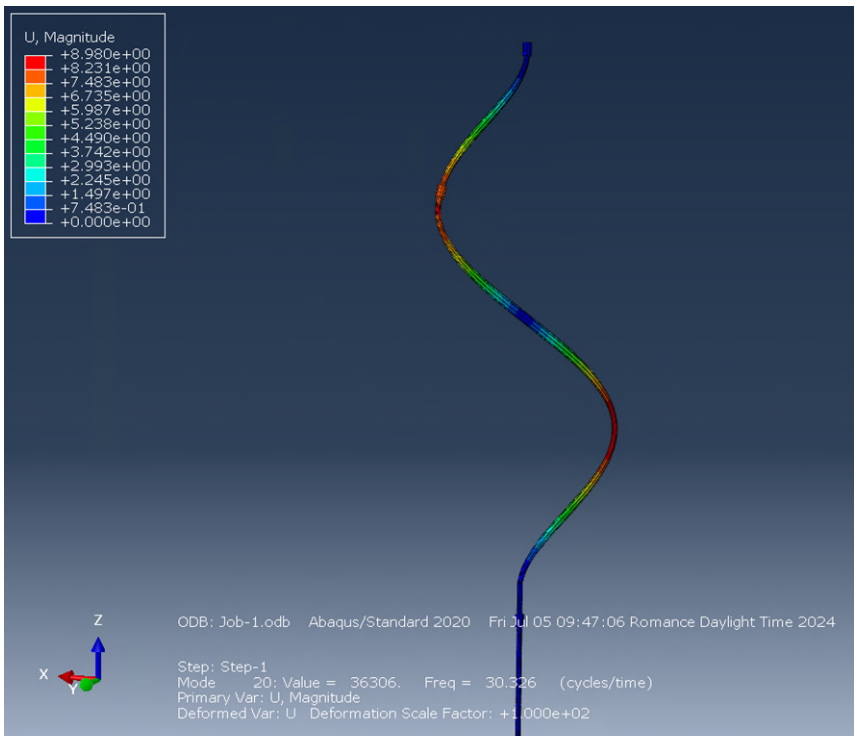


Figure 8: Third eigen frequency value for shaft line

3.2. Pump Casing only

For the pump casing, the first eigen frequency value is recorded at 22.4 Hz. It is larger than the first eigen value for the shaft line and consequently significantly larger than maximum excitation frequency of 1.97 Hz.

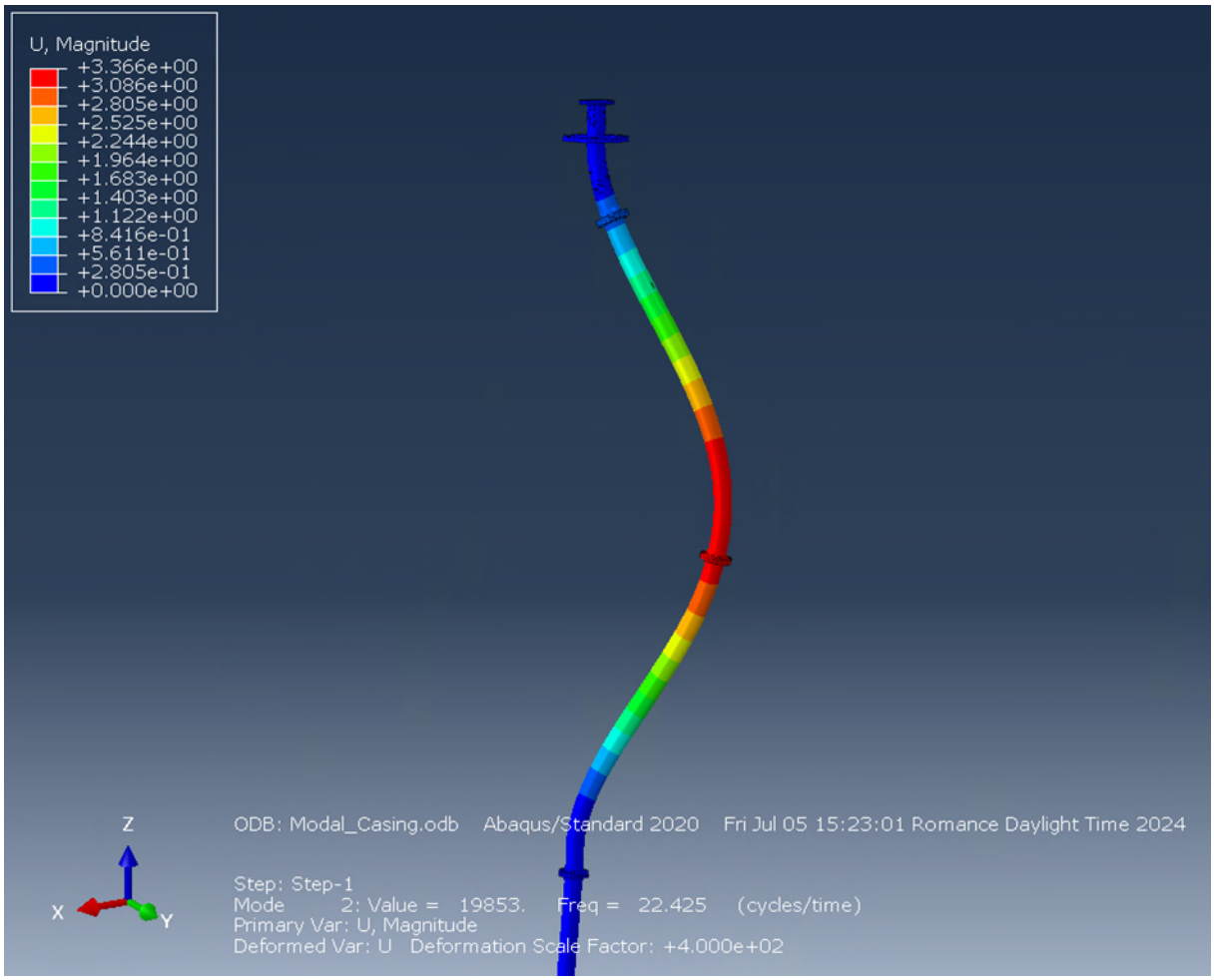


Figure 9: First eigen frequency value for pump casing

The second, third and fourth eigen frequency values of the pump casing were recorded at 25.7 Hz, 26.2 Hz and 26.7 Hz, respectively.

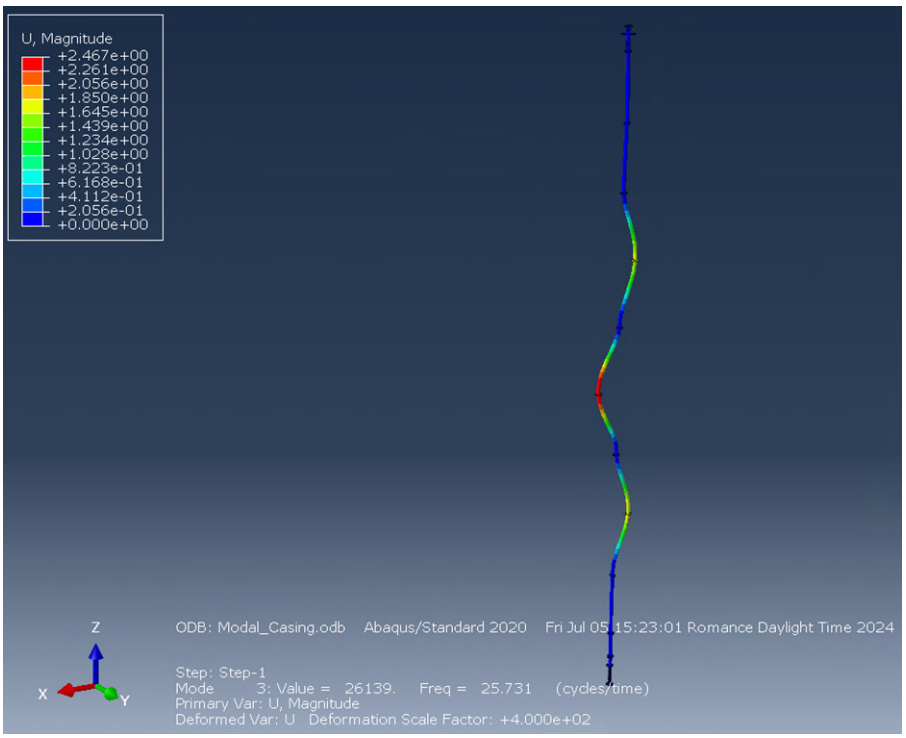


Figure 10: Second eigen frequency value for pump casing

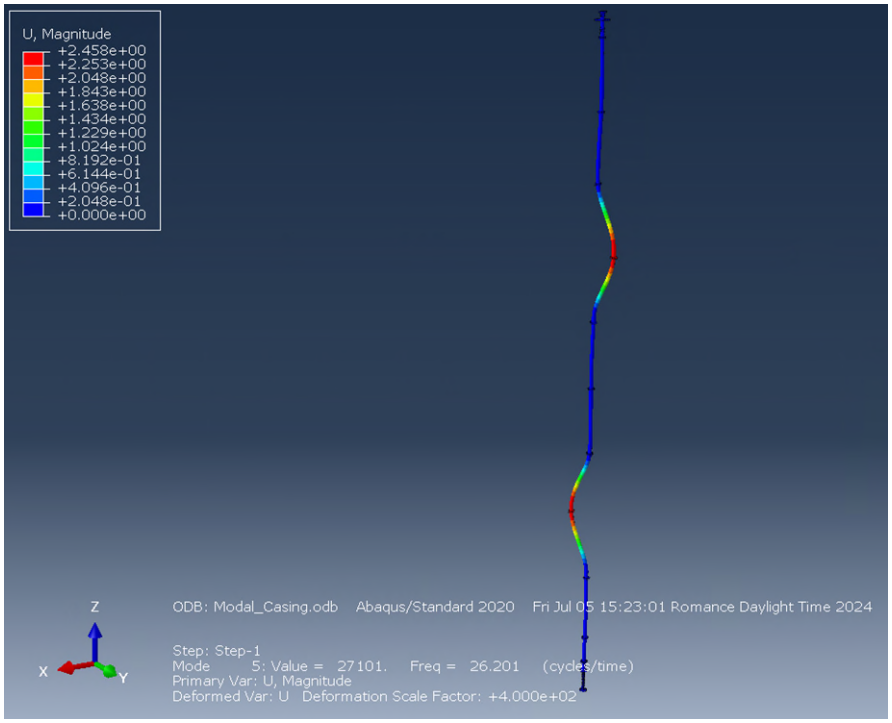


Figure 11: Third eigen frequency value for pump casing

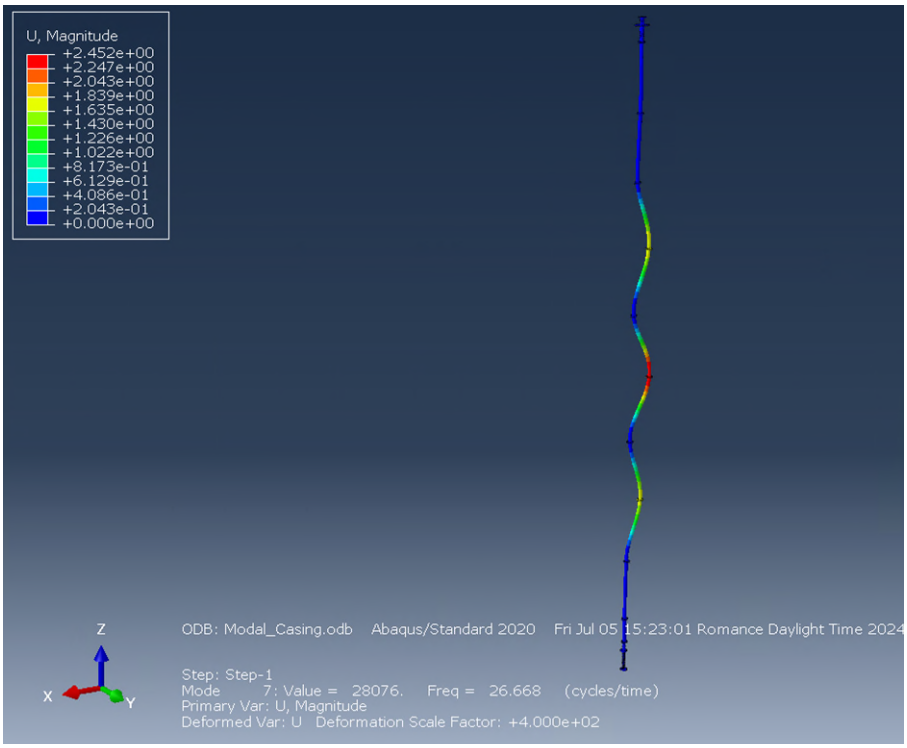


Figure 12: Fourth eigen frequency value for pump casing

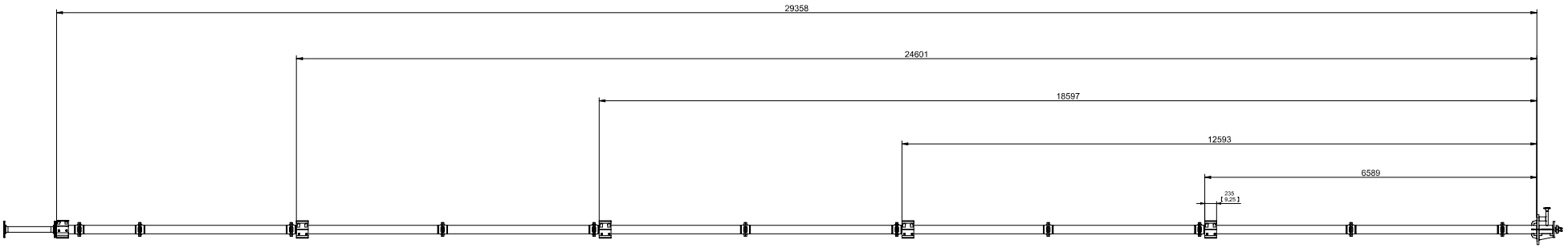
4. Conclusion

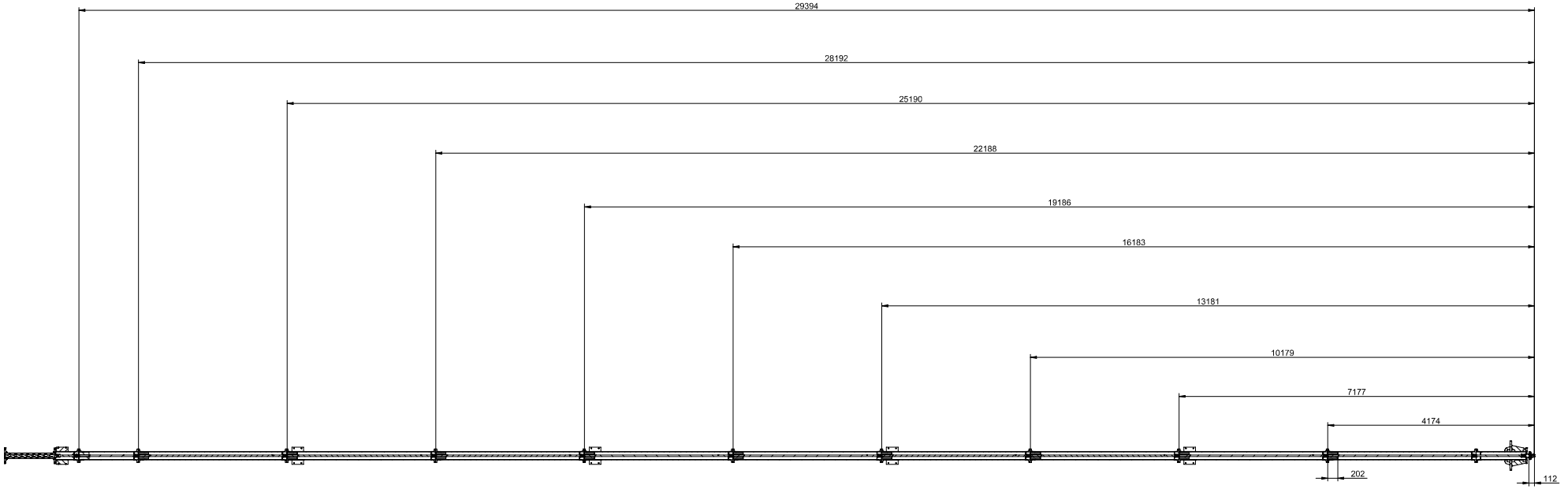
The lower proper frequency of the pump (shaft line or casing) is 11.1 Hz. The rotational speed of the shaft line is 118 rotation/minute that is to say 1.97 Hz.

	Pump Speed	Mode 1	Mode 2	Mode 3	Mode 4
Frequency (Hz)	1.97	11.1	20.6	22.4	25.7
Margin	0	5.6	10.5	11.4	13.0

The proper frequency of the pump is out of the operating range of the pump with a safety margin of **5.6**.

5. Appendices


29358
24601
18597
12593
6589
235
225.1


29394
28192
25190
22188
19186
16183
13181
10179
7177
4174
202
112

2 CERTIFICATION DOSSIER

2.1 ENGINEERING

2.1.1 INSPECTION AND TEST PLAN (ITP)

Base Load Power Hub (BLPH)

INSPECTION AND TEST PLAN (ITP)
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-QC-ITP-00002

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
ROSETTI MARINO SpA	07/11/24

Document Class: 2

02	16/10/2024	Accepted for Construction (AFC)	GLL	APD	AHN
01	08/07/2024	Accepted for Construction (AFC)	GLL	APD	AHN
00	10/06/2024	Issue for Review (IFR)	GLL	APD	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC) – According to rev00 comments / See CRS
02	Accepted for Construction (AFC) – According to rev01 comments / See CRS

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

INSPECTION TEST PLAN

Supplier : PCM | *Criticality rating : 2* | Prepared by : GLL | Checked by : FXB | Approved by : AHN | Rev. No. 02

Items: PROGRESSING CAVITY PUMPS - 25A24 | PO N°: 1724000936 | PCM Doc N° PCM001 | Date : 16/10/2024

Project Name 123A90A - HOLLANDSE KUST NOORD WIND PARK Project | Material Requisition : 123A90-DDL-MAC-MR-50012 | ROSETTI MARINO Doc N° 1724000936-QC-ITP-00002 | Contractor : ROSETTI MARINO

Pump Tag / Name P-50001 A/B / SEA WATER LIFT PUMPS | Final User : CROSSWIND

Activity	Scope	Inspection Process / Characteristic to be verified	Performed by	Specification and / or Reference Documents	Acceptance Criteria	Quality Record (Verifying Document)	Inspection Involvement				Remark
							Sub-Vendor	PCM	RM	CROSSWIND	
1 - PROJECT MANAGEMENT											
1,0	Pre Inspection Meeting	Compliance to QA/QC requirements	PCM	Material Requisition Progressive Cavity pump 123A90-DDL-MAC-MR-50012 / PO N° 172000936 Approved Inspection & Test Plan 1724000936-QC-ITP-00002 Submission and review of WPS 1724000936-WEL-PRO-00020 & NDE procedure 1724000936-NDT-PRO-00021	Approved Reference documents with minor comments	Minute of Meeting	-	H	W	W	
2 - CASING PARTS - WETTED PARTS											
2,0	Casing parts	Raw Materials : Chemical Analysi & Mechanical Properties	SRCI	MTC 3.1 / EN 10204:2004	Super Duplex Stainless Steel (25%Cr)	Material certificate 3.1 EN10204 EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
2,1	Casing parts	Welding Process including Welder qualification	SRCI	ASME Section IX	Compliance	WELD PROCEDURE SPECIFICATION (WPS), WELD LOCATION PLAN (WLP) AND QUALIFICATIONS (PQR) RECORDS 1724000936-WEL-PRO-00020	H	A	A	R	
2,2	Casing parts	Visual inspection (VT) Scope : 100% of welds of casing parts	SRCI	NON-DESTRUCTIVE EXAMINATIONS PROCEDURES (NDE) NDE OPERATORS LIST and QUALIFICATIONS 1724000936-NDT-PRO-00021 ASME Sec. V	Approved NON-DESTRUCTIVE EXAMINATIONS PROCEDURES (NDE) NDE OPERATORS LIST and QUALIFICATIONS 1724000936-NDT-PRO-00021	NDE / NDT records EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
2,3	Casing parts	Dye penetrant inspection (PT) Scope : 100% of welds of casing parts	SRCI	NON-DESTRUCTIVE EXAMINATIONS PROCEDURES (NDE) NDE OPERATORS LIST and QUALIFICATIONS 1724000936-NDT-PRO-00021 ASME Sec. V	Approved NON-DESTRUCTIVE EXAMINATIONS PROCEDURES (NDE) NDE OPERATORS LIST and QUALIFICATIONS 1724000936-NDT-PRO-00021	NDE / NDT records EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
2,4	Casing parts	Hydrotest	SRCI	HYDROSTATIC TEST PROCEDURE 1724000936-QC-PRO-00022	No permanent deformation, no crack, no leak, 30 barg, 30 min	Hydrostatic Test Report EQUIPMENT MRB 1724000936-QC-DB-00028	H	W	W	W	
3 - SHAFT LINE (ROTOR, DRIVING SHAFT) - WETTED PARTS											
3,0	Shaft Line	Raw Materials : Chemical Analysi & Mechanical Properties	Supplier to be defined	MTC 3.1 / EN 10204:2004	Super Duplex Stainless Steel (25%Cr)	Material certificate 3.1 EN10204 EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
4 - STATOR, GASKET, BOLTS											
4,0	Stator / Sheath / O'rings	Raw Materials : Chemical Analysi & Mechanical Properties	PCM	MTC 2.2 / EN 10204:2004	NBR	Material certificate 2.2 EN10204 EQUIPMENT MRB 1724000936-QC-DB-00028	-	H	R	R	
4,2	Fasteners / None-Wetted	Raw Materials : Chemical Analysi & Mechanical Properties	Supplier to be defined	MTC 2.2 / EN 10204:2004	SS316/316L	Material certificate 2.2 EN10204 EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
4,3	Fasteners / Wetted	Raw Materials : Chemical Analysi & Mechanical Properties	Supplier to be defined	MTC 3.1 / EN 10204:2004	Super Duplex Stainless Steel (25%Cr)	Material certificate 3.1 EN10204 EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
4,4	Top Side Strutural parts	Raw Material: Chemical analysis & Mechanical properties	Supplier to be defined	MTC 2,2 / EN 10204:2004	S235 Carbon Steel	Material certificate 2.2 EN10204 EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
5 - MOTOR											
5,1	LV Motor	Type Test on one project motor Visual inspection, Terminal markings and direction of rotation, Resistance measurement at the ambient temperature, No load test at rated voltage and frequency Vibration level test / Withstand voltage test Short circuit test at rated current and frequency Insulation resistance measurement Starting performance test / Temperature rise test Overload test / Partial loads Determination of efficiency	ABB	Manufacturer Type test procedure ELECTRIC MOTOR DATA SHEET 1724000936-MAC-DS-00014	IEC/EN 60034-1:2022	Motor test report EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
6 - SEALING SYSTEM - MECHANICAL SEAL, PLAN 51 & Tubing											
6,0	Mechanical seal (sleeve & glands - wetted parts)	Raw Material: Chemical analysis & Mechanical properties	Flowserve	MTC 3.1 / EN 10204:2004	Super Duplex Stainless Steel (25%Cr)	Material certificate 3.1 EN10204 EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
6,1	Sealing system Plan 51 (Pressurized parts)	Raw Material: Chemical analysis & Mechanical properties	Flowserve	MTC 3.1 / EN 10204:2004	SS316/316L	Material certificate 3.1 EN10204 EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
6,2	Interconnection Tubing	Raw Material: Chemical analysis & Mechanical properties	Supplier to be defined	MTC 3.1 / EN 10204:2004	SS316/316L	Material certificate 3.1 EN10204 EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	

INSPECTION TEST PLAN

Supplier : PCM | *Criticality rating : 2* | Prepared by : GLL | Checked by : FXB | Approved by : AHN | Rev. No. 02

Items: PROGRESSING CAVITY PUMPS - 25A24 | PO N°: 1724000936 | PCM Doc N° PCM001 | Date : 16/10/2024

Project Name 123A90A - HOLLANDSE KUST NOORD WIND PARK Project | Material Requisition : 123A90-DDL-MAC-MR-50012 | ROSETTI MARINO Doc N° 1724000936-QC-ITP-00002 | Contractor : ROSETTI MARINO

Pump Tag / Name P-50001 A/B / SEA WATER LIFT PUMPS | Final User : CROSSWIND

Activity	Scope	Inspection Process / Characteristic to be verified	Performed by	Specification and / or Reference Documents	Acceptance Criteria	Quality Record (Verifying Document)	Inspection Involvement				Remark
							Sub-Vendor	PCM	RM	CROSSWIND	
7 - PSV & Heating Jacket											
7,0	PSV (wetted parts)	Raw Material: Chemical analysis & Mechanical properties	Supplier to be defined	MTC 3.1 / EN 10204:2004	Nozzle > Super Duplex Stainless Steel (25%Cr) Body, bonnet & cap > Carbon Steel Disc > Inconel Sping > SS316	Material certificate 3.1 EN10204 EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
7,1	PSV	Functional test	Supplier to be defined	API 527	API 527 criteria	PSV test report EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
7,2	PSV	Hazardous Certification	Supplier to be defined	ATEX 94/9/CE Directive IEC 60034 / IEC 60079	II 2G IIB T3	ATEX certificates EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
7,2	Heating jacket	Hazardous Certification	Supplier to be defined	ATEX 94/9/CE Directive IEC 60034 / IEC 60079	II 2G IIB T3	ATEX certificates EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
8 - PAINTING											
8,0	LV Motor	Painting / Final DFT & Color check	ABB	COATING PROCEDURE 1724000936-MAT-PRO-00018 ABB Manufacturer standard / C5-M & ISO 12944	Color : Munsell 8B 4.5/3.25 (ABB standard) Min DFT: 240µm	ABB Manufacturer confirmation letter EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
8,1	Pump parts (Gearbox / Structural / Bearing / PSV) Carbon Steel & Cast Iron	Painting / Final DFT & Color check	PCM	COATING PROCEDURE 1724000936-MAT-PRO-00018 PCM painting Process N°5 / C5-H & ISO 12944	Color : RAL 7038 Min DFT: 320µm	Painting report EQUIPMENT MRB 1724000936-QC-DB-00028	-	H	W	W	Stainless Steel not painted To be done during FAT / No witness during painting execution
9 - COMPLETE UNIT											
9,0	Complete unit	Dimensional and visual check	PCM	General Arrangement Drawing - 1724000936-MAC-DA-00004	Compliance with General Arrangement Drawing	FAT report EQUIPMENT MRB 1724000936-QC-DB-00028	-	H	W	W	
9,1	Complete unit	Mechanical Run Test (1 hour) / Test with water	PCM	FAT Test Procedure - 1724000936-QC-PRO-00023 Pump Datasheet - 1724000936-MAC-DS-00012 API 676 & deviation/clarification list	Absence of leakage, abnormal noise, abnormal vibration abnormal temperature increase.	FAT report EQUIPMENT MRB 1724000936-QC-DB-00028	-	H	W	W	
9,2	Complete unit	Performance Test / Test with water	PCM	FAT Test Procedure - 1724000936-QC-PRO-00023 Pump Datasheet - 1724000936-MAC-DS-00012 API 676 & deviation/clarification list	Flowrate Tolerance Min/Norm 2,5m3/h / Max 3,4m3/h Discharge Pressure at rated pressure (5,9barg)	FAT report EQUIPMENT MRB 1724000936-QC-DB-00028	-	H	W	W	
9,3	Complete unit	Global Sound pressure Measurement	PCM	FAT Test Procedure - 1724000936-QC-PRO-00023 Pump Datasheet - 1724000936-MAC-DS-00012 API 676 & deviation/clarification list	Noise Level < 85 dBA @ 1m of the equipment	FAT report EQUIPMENT MRB 1724000936-QC-DB-00028	-	H	W	W	
9,4	Complete unit	Vibration test	PCM	FAT Test Procedure - 1724000936-QC-PRO-00023 Pump Datasheet - 1724000936-MAC-DS-00012 API 676 & deviation/clarification list	Max vibration level < 7,1mm/s at bearing houising	FAT report EQUIPMENT MRB 1724000936-QC-DB-00028	-	H	W	W	
9,5	Complete unit	EC Declaration of Conformity & CE Marking	PCM	EC – Directive Machinery (2006/42/EC) EC - Low-voltage directive (2014/35/EU)	Compliance to EC – Directive Machinery (2006/42/EC) EC - Low-voltage directive (2014/35/EU)	EC Declaration of Conformity & nameplate picture (CE marking) EQUIPMENT MRB 1724000936-QC-DB-00028	-	H	R	R	
9,6	Complete unit	Inspection Release Certificate	PCM	Punch list if any	Punch list clear	Inspection Release Note	-	R	W	W	
9,7	Complete unit	Packing, Preservation and Marking	IDEA	Packing & Preservation Procedure 1724000936-QC-PRO-00032	Seaworthy Packing - SEI 4C	Packing list & Preservation record	-	H	R	R	
9,8	Complete unit	Manufacturing Record Book	PCM	EQUIPMENT MRB Index 1724000936-QC-LIS-00025	Compliance	EQUIPMENT MRB 1724000936-QC-DB-00028	-	H	R	R	

Terms / Abbreviation / Definition

H : (Hold) point
The Supplier may not carry out :
- any fabrication and/or repair work, or any shipment without having received CONTRACTOR's comments,
- any controls and tests without CONTRACTOR 'S attendance, as the case may be .
In the second case, CONTRACTOR's attendance is mandatory. The Supplier must notify CONTRACTOR by fax, or mail of the inspection activity involved at least ten (15) working days in advance.
The Supplier may not depart from this rule unless specifically approved by CONTRACTOR in writing.

W : (Witness) & RW (random Witness)
CONTRACTOR 'S witnessing is not mandatory, but optional. The Supplier must notify CONTRACTOR of the dedicated inspection activity at least fifteen (15) working days in advance.
If CONTRACTOR do not elect to be present, the Supplier may proceed with his own inspection, provided controls and tests records are made available to CONTRACTOR for review.

R : (Review) - Review of Documents
The Supplier has either to submit to CONTRACTOR for comments the documents required prior to the performance of the dedicated activity or to transmit or make available for the review of CONTRACTOR the results of the controls and tests conducted, as the case may be.

A: (Approval) - Approval of documents
The Supplier has to submit to CONTRACTOR for approval the documents required prior to the performance of the dedicated activity and get approval from CONTRACTOR/COMPANY.

2.2 MANUFACTURING PROCEDURE

2.2.1 WELD PROCEDURE SPECIFICATION (WPS), WELD LOCATION PLAN (WLP) AND QUALIFICATIONS (PQR) RECORDS

2.2.2 NON-DESTRUCTIVE EXAMINATIONS PROCEDURES (NDE) NDE OPERATORS LIST AND QUALIFICATIONS

2.2.3 HYDROSTATIC AND OR PNEUMATIC TEST PROCEDURE

2.2.4 COATING PROCEDURE- ACCORDING TO CROSSWIND PROJECT SPECIFICATION

2.2.5 FAT (FINAL ACCEPTANCE TEST) PROCEDURES

2.2.6 PRE-COMMISSIONING -COMMISSIONING PROCEDURES

2.2.7 PACKING PROCEDURE

2.2.8 PRESERVATION PROCEDURE

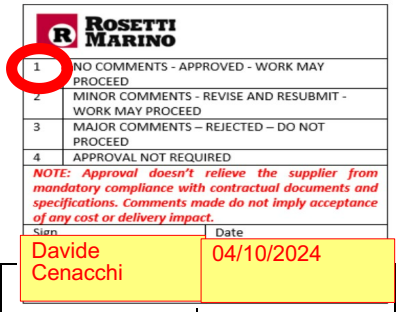
This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Base Load Power Hub (BLPH)

WELD PROCEDURE SPECIFICATION (WPS), WELD LOCATION PLAN (WLP) AND QUALIFICATIONS (PQR) RECORDS
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-WEL-PRO-00020

Document Class: 2



03	03/10/2024	Accepted for Construction (AFC)	APD	GLL	AHN
02	05/09/2024	Accepted for Construction (AFC)	APD	GLL	AHN
01	01/08/2024	Issue for Review (IFR)	APD	GLL	AHN
00	03/07/2024	Issue for Review (IFR)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Issue for Review (IFR)
02	Accepted for Construction (AFC)
03	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

SRCI l'innovation Z.A. Harfleur 71200 LE CREUSOT RAISON SOCIALE DU CONSTRUCTEUR *MANUFACTURER'S CORPORATE NAME*	**CAHIER DE SOUDAGE** *Welding Book – ASME BPVC Sec IX*	**Cahier de soudage** **N ° 2024-022 Rev D** *Welding Book Nr* ***Page 1/8*** **Affaire SRCI : 24121**

Client *CUSTOMER*	**PCM**
Référence Client *CUSTOMER ORDER N°*	**PO070-24-07599**
Désignation pièce *PIECE DESIGNATION*	**RALLONGE 6" / EMBOUT STATOR 6" / CORPS CL150 DN 100 CLOCHE**
N° Plan *DRAWING Nr*	**W-004942/ W-008199 / W-008202**
N° Projet *PROJECT Nr*	**/**
Documents de référence *REFERENCE DOCUMENTS*	**ASME BPVC Sec. IX:2017**: Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators

Objet de la révision :

A – Emission du document / *Issue of document*

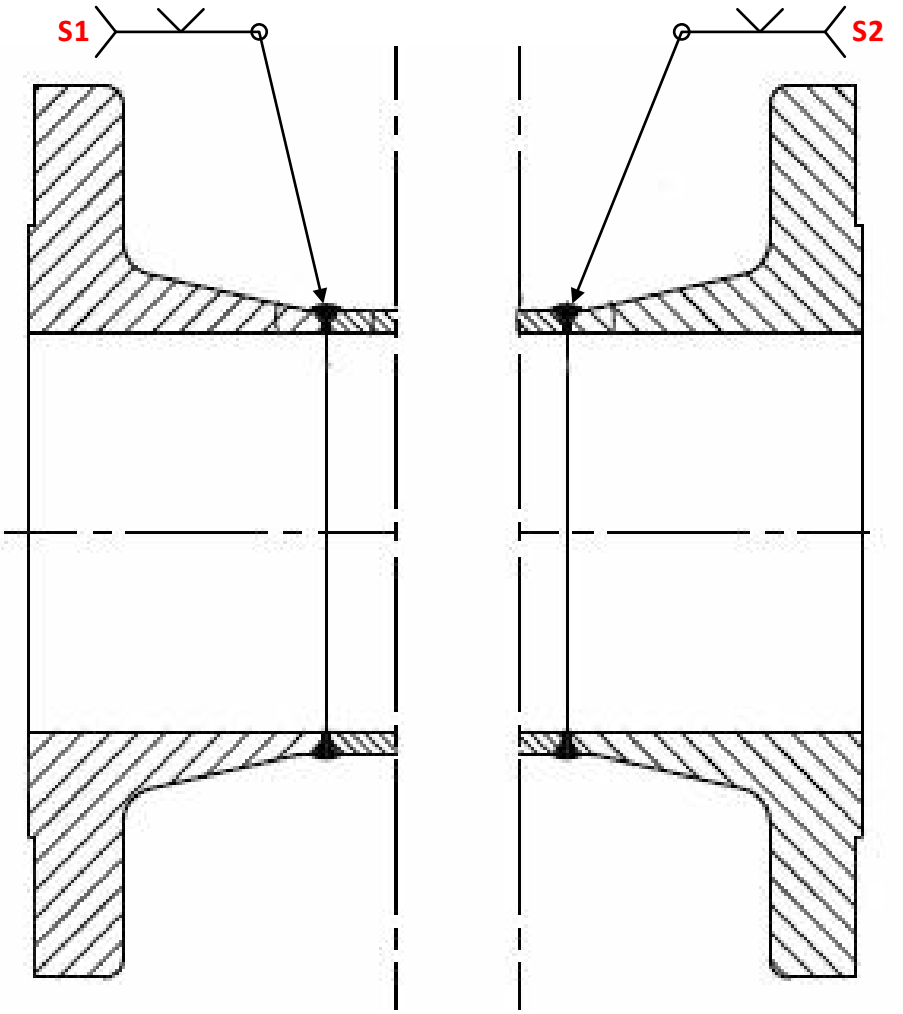
B – Modification / *Update acc. To comments of 2024 31 07*

C – Modification / *WPQR update by Veritas*

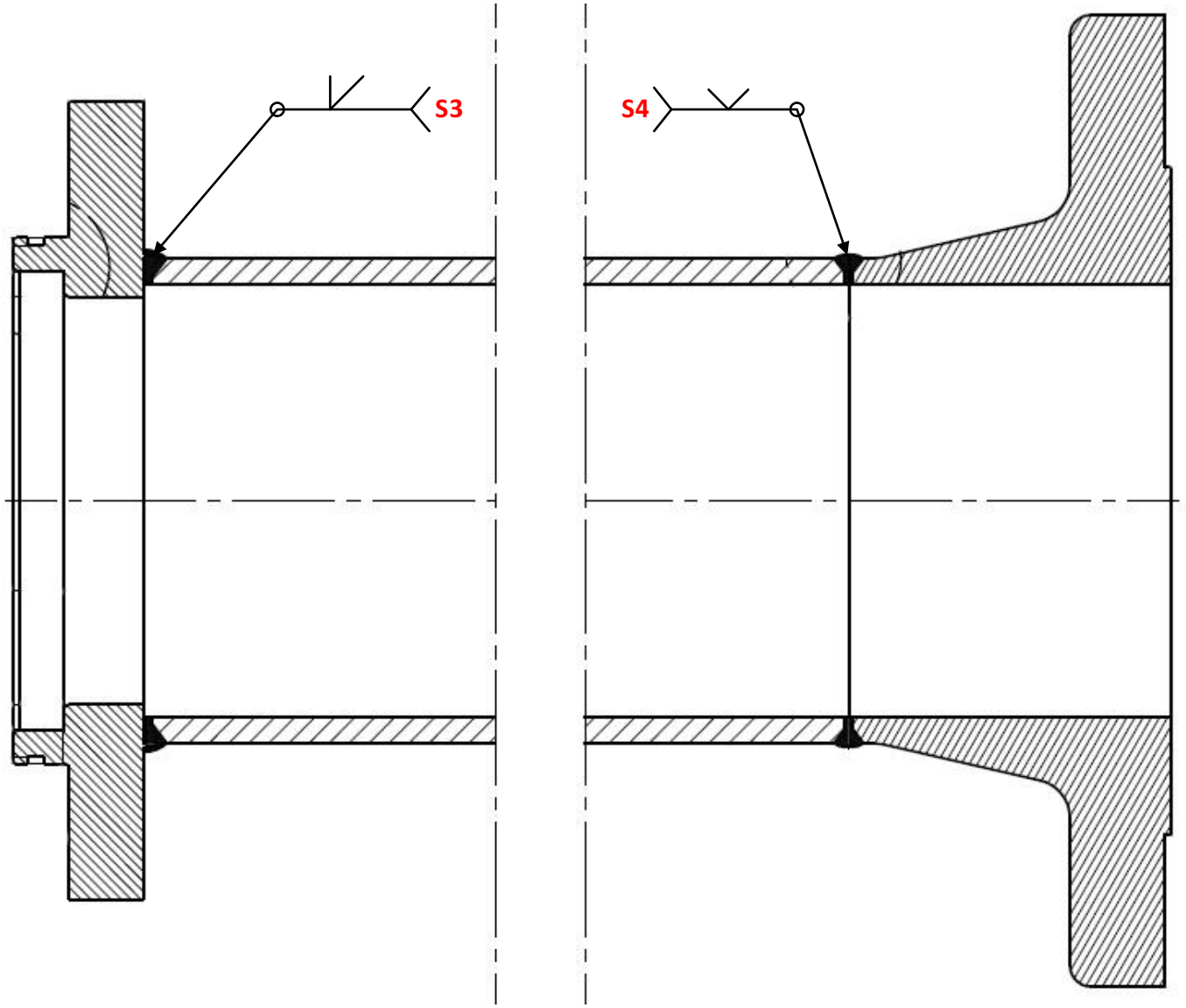
D – Modification / *Update acc. To comments of 2024 10 02*

Rev.	NOM – *Name*	VISA	DATE		NOM – *Name*	VISA	DATE
A	*L.BONICEL* *Coordinateur soudage*		*03/07/2024*		*C. VAYSSE LABONDE* *Resp. QSE*		*03/07/2024*
B	*L.BONICEL* *Coordinateur soudage*		*31/07/2024*		*C. VAYSSE LABONDE* *Resp. QSE*		*31/07/2024*
C	*L.BONICEL* *Coordinateur soudage*		*27/08/2024*		*C. VAYSSE LABONDE* *Resp. QSE*		*27/08/2024*
D	*L.BONICEL* *Coordinateur soudage*		*02/10/2024*		*C. VAYSSE LABONDE* *Resp. QSE*		*02/10/2024*
REDACTEUR - *Writter*					**APPROUVE PAR –** *Approved by*		

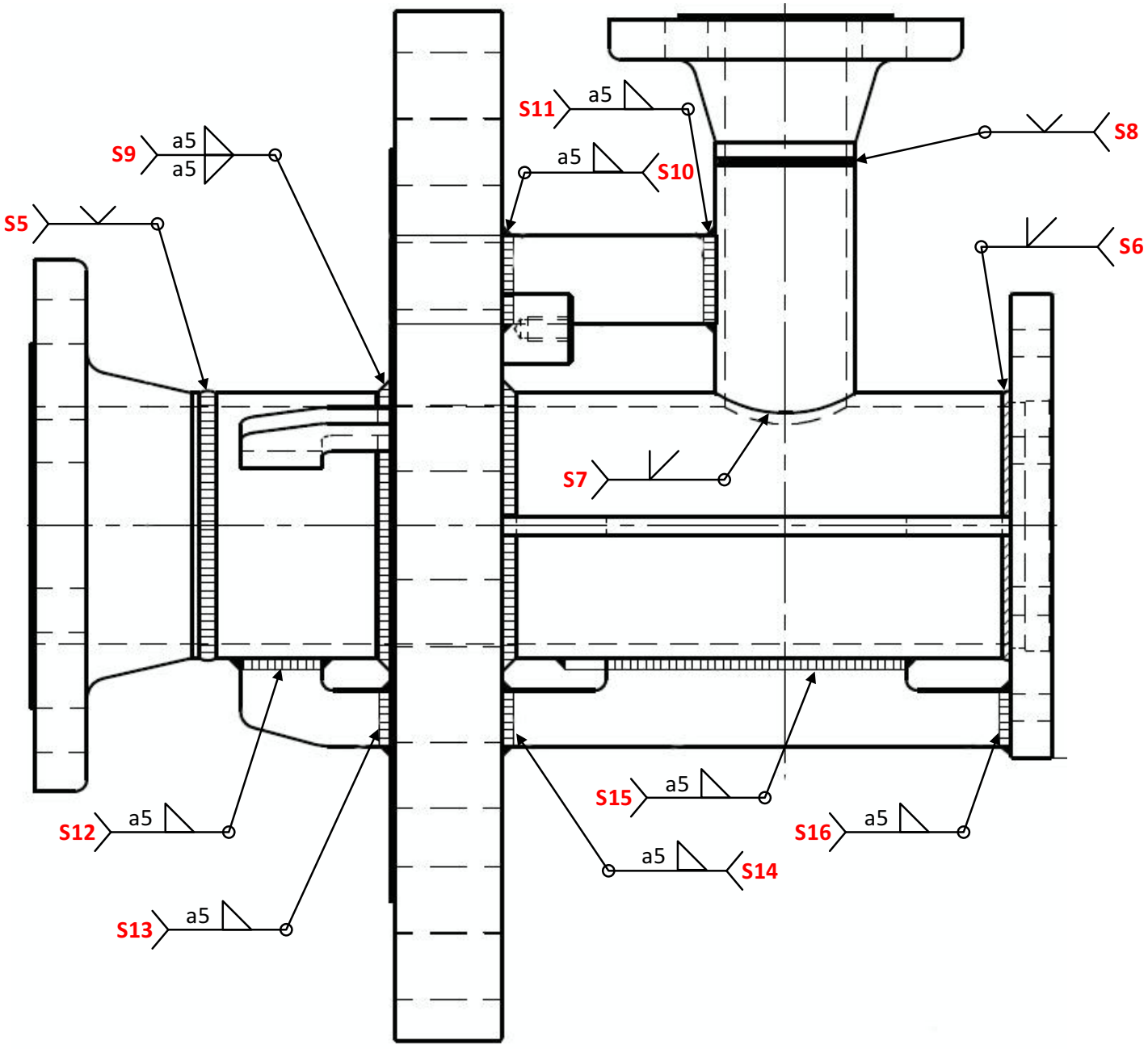
Plan : W-004942



Plan : W-008199



Plan : W-008202

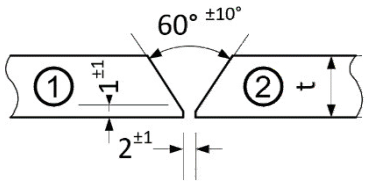


N° des joints *Joints N°*	Type de joint *Joint Type*	Material 1		Material 2		Procédé *Process*	Pos. *Pos.*	DMOS *WPS*	QMOS *WPQ-R*	QS *WPQ*	Contrôle Non Destructif – *Non destructive testing*			Remarque *Remarks*
		Dim.	Nuance *Grade*	Dim.	Nuance *Grade*						VT	PT	RT	
S1	BW	*D* 168.3 *t* 7.11	1.4410 *ASTM A240*	*D* 168.3 *t* 7.11	1.4410 *ASTM A182*	GTAW	F	**21031-1**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	
S2	BW	*D* 168.3 *t* 7.11	1.4410 *ASTM A240*	*D* 168.3 *t* 7.11	1.4410 *ASTM A182*	GTAW	F	**21031-1**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	
S3	BC	*D* 168.3 *t* 7.11	1.4410 *ASTM A240*	*D* 168.3 *t* 7.11	1.4410 *ASTM A182*	GTAW	F	**21031-2**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	
S4	BW	*D* 168.3 *t* 7.11	1.4410 *ASTM A790*	*D* 168.3 *t* 7.11	1.4410 *ASTM A240*	GTAW	F	**21031-1**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	
S5	BW	*D* 168.3 *t* 7.11	1.4410 *ASTM A790*	*D* 168.3 *t* 7.11	1.4410 *ASTM A240*	GTAW	F	**21031-1**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	
S6	BC	*D* 168.3 *t* 7.11	1.4410 *ASTM A182*	*D* 168.3 *t* 7.11	1.4410 *ASTM A240*	GTAW	F	**21031-2**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	
S7	BC	*D* 168.3 *t* 7.11	1.4410 *ASTM A182*	*D* 48.3 *t* 3.68	1.4410 *ASTM A182*	GTAW	F	**21031-2**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	
S8	BW	*D* 48.3 *t* 3.68	1.4410 *ASTM A790*	*D* 48.3 *t* 3.68	1.4410 *ASTM A240*	GTAW	F	**21031-1**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	
S9	FW	*D* / *t* 7.11	1.4410 *ASTM A240*	*D* / *t* 36	F53 *ASTM A182*	GTAW	F	**21031-3**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	a = 5
S10	FW	*D* / *t* 10	F53 *ASTM A240*	*D* / *t* 36	1.4410 *ASTM A790*	GTAW	F	**21031-3**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	a = 5
S11	FW	*D* / *t* 10	F53 *ASTM A240*	*D* / *t* 3.68	1.4410 *ASTM A790*	GTAW	F	**21031-3**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	a = 5
S12	FW	*D* / *t* 10	F53 *ASTM A240*	*D* / *t* 7.11	1.4410 *ASTM A790*	GTAW	F	**21031-3**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	a = 5
S13	FW	*D* / *t* 10	1.4410 *ASTM A240*	*D* / *t* 36	1.4410 *ASTM A240*	GTAW	F	**21031-3**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	a = 5
S14	FW	*D* / *t* 10	1.4410 *ASTM A240*	*D* / *t* 36	1.4410 *ASTM A240*	GTAW	F	**21031-3**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	a = 5
S15	FW	*D* / *t* 10	1.4410 *ASTM A240*	*D* / *t* 7.11	1.4410 *ASTM A240*	GTAW	F	**21031-3**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	a = 5
S16	FW	*D* / *t* 10	1.4410 *ASTM A790*	*D* / *t* 24	1.4410 *ASTM A240*	GTAW	F	**21031-3**	LYN.15.B.116	QPAP-FR-23-00395-V1	**100%**	**100%**	*I*	a = 5

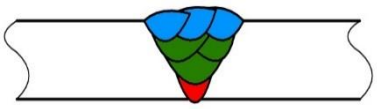
DMOS*(WPS) N°* **21031-1**	**REV. : B**	**QMOS*(PQR) N°*** **LYN.15.B.116**

Métal de base 1 *(Base metal 1)* **- QW-403**		**Métal de base 2** *(Base metal 2)* **- QW-403**		Support permanent *(Permanent Backing)*	Epaisseur déposé *(deposit metal)*
Nuance *(Grade)*	**See attached table**	Nuance *(Grade)*	**See attached table**		
Norme / Spécification	**See attached table**	Norme / Spécification	**See attached table**		
P-No / Group No	**10H / 1**	P-No / Group No	**10H / 1**		
Epaisseur *(Thickness)*	**See attached table**	Epaisseur *(Thickness)*	**See attached table**	Non	**Max 12 mm**
Diamètre *(Diameter)*	**See attached table**	Diamètre *(Diameter)*	**See attached table**		

Préparation de l'assemblage *(Assembly preparation)* **- QW-402**



Répartition des passes *(Bead sequence)* **- QW-402**



Préparation des bords *(Prepared by)*: Meulage *(grinding)*, Usinage *(machining)*, Autre (*other*) : *Oxycoupage, laser, Plasma*

N° des passes *(Pass n°)*	1	2	3
Position de soudage *(Welding position)* **- QW-405**	**F** (1)	**F** (1)	**F** (1)
Procédé et degré mécanisation *(process and d° of mechaniz.)*	**GTAW**	**GTAW**	**GTAW**
Sens de progression *(Weld progression)*	/	/	/
Métal d'apport *(Filler metal)* **groupe**			
F-No / A-No	6 / 8	6 / 8	6 / 8
Spécification SFA (SFA specification)	A5.9	A5.9	A5.9
Classification AWS (AWS classification)	ER2594	ER2594	ER2594
Désignation commerciale *(Commercial Designation)*	**Thermanit 25/09 CuT**	**Thermanit 25/09 CuT**	**Thermanit 25/09 CuT**
Marque *(Trade name)*	Böhler Welding	Böhler Welding	Böhler Welding
Type de produit *(Filler metal product form)*	Solid Wire	Solid Wire	Solid Wire
∅ (mm)	2	2	2
Protection gazeuse ou flux *(Gas shielding or flux)*			
Désignation normalisée *(Standardized designation)*	88% Ar+10% He+2% N2	88% Ar+10% He+2% N2	88% Ar+10% He+2% N2
Désignation commerciale *(Commercial designation)*	**ARCAL 37**	**ARCAL 37**	**ARCAL 37**
Débit endroit *(Face flow)*: (l/mn)	12	12	12
Nature et débit envers *(Root flow)*: (l/mn)	20-10 (2)	10	10
Type de courant & polarité *(Current type & polarity)*	CC -	CC -	CC -
Mode de transfert *(Transfert mode)*	/	/	/
Electrode réfractaire (*Tungsten*) : type & ∅	WL15 - ø2,4	WL15 - ø2,4	WL15 - ø2,4
Intensité *(Intensity)*: **I** (amp.)	**120**	**120**	**120**
Tension *(Voltage)*: **U** (volts)	**14.6**	**12.8**	**12.8**
Vitesse de fil *(Wire speed)*: (m/min)			
Vitesse d'avance *(Travel speed)* : **V** (mm/min)	**88.6**	**104**	**104**
Apport de chaleur *(heat input)* : **Q** (J/mm) - **QW-409**	**1186**	**886**	**886**
Temp. préchauffage *(Preheat temp)*: (° C) mini - **QW-406**	/	20	20
Temp. entre passes *(Interpass temp)*: (° C) mini / maxi	/	90	90
Post chauffage *(Postheat)* : Durée & temp. *(Time & temp)*	/		
Traitement thermique *(Heat treatment)* - **QW-407**	No		

TECHNIQUE - QW-410

(1): See QW-461

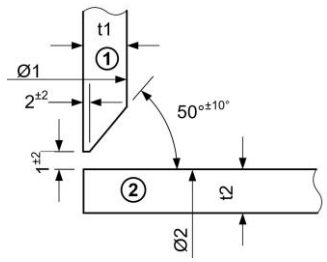
(2): Oxygen level (gaz backing) : 198 ppm max

Contrôles prévus *Planned Tests*	**Visuel** *Visual*	**Dimens.** *Dimens.*	**CND** *NDT*	**G. CHAUMIER** 31/07/2024
% de contrôle. *% of testing*	**100%**	**100%**	**See attached table**	

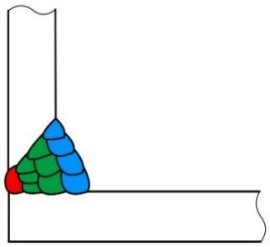
DMOS*(WPS) N°*	**21031-2**	**REV. :**	**C**	**QMOS*(PQR) N°***	**LYN.15.B.116**

Métal de base 1 *(Base metal 1)* **- QW-403**		**Métal de base 2** *(Base metal 2)* **- QW-403**		Support permanent *(Permanent Backing)*	Epaisseur déposé *(deposit metal)*
Nuance *(Grade)*	**See attached table**	Nuance *(Grade)*	**See attached table**		
Norme / Spécification	**See attached table**	Norme / Spécification	**See attached table**		
P-No / Group No	**10H / 1**	P-No / Group No	**10H / 1**		
Epaisseur *(Thickness)*	**See attached table**	Epaisseur *(Thickness)*	**See attached table**	Non	**Max 12 mm**
Diamètre *(Diameter)*	**See attached table**	Diamètre *(Diameter)*	**See attached table**		

Préparation de l'assemblage *(Assembly preparation)* **- QW-402**



Répartition des passes *(Bead sequence)* **- QW-402**



Préparation des bords *(Prepared by)*: Meulage *(grinding)*, Usinage *(machining)*, Autre (*other) : Oxycoupage, laser, Plasma*

N° des passes *(Pass n°)*	**1**	**2**	**3**
Position de soudage *(Welding position)* **- QW-405**	**F** (1)	**F** (1)	**F** (1)
Procédé et degré mécanisation *(process and d° of mechaniz.)*	**GTAW**	**GTAW**	**GTAW**
Sens de progression *(Weld progression)*	/	/	/
Métal d'apport *(Filler metal)* **groupe**			
F-No / A-No	6 / 8	6 / 8	6 / 8
Spécification SFA (SFA specification)	A5.9	A5.9	A5.9
Classification AWS (AWS classification)	ER2594	ER2594	ER2594
Désignation commerciale *(Commercial Designation)*	**Thermanit 25/09 CuT**	**Thermanit 25/09 CuT**	**Thermanit 25/09 CuT**
Marque *(Trade name)*	Böhler Welding	Böhler Welding	Böhler Welding
Type de produit *(Filler metal product form)*	Solid Wire	Solid Wire	Solid Wire
∅ (mm)	2	2	2
Protection gazeuse ou flux *(Gas shielding or flux)*			
Désignation normalisée *(Standardized designation)*	88% Ar+10% He+2% N2	88% Ar+10% He+2% N2	88% Ar+10% He+2% N2
Désignation commerciale *(Commercial designation)*	**ARCAL 37**	**ARCAL 37**	**ARCAL 37**
Débit endroit *(Face flow)*: (l/mn)	12	12	12
Nature et débit envers *(Root flow)*: (l/mn)	20-10 (2)	10	10
Type de courant & polarité *(Current type & polarity)*	CC -	CC -	CC -
Mode de transfert *(Transfert mode)*	/	/	/
Electrode réfractaire (*Tungsten*) : type & ∅	WL15 - ø2,4	WL15 - ø2,4	WL15 - ø2,4
Intensité *(Intensity)*: **I** (amp.)	**120**	**120**	**120**
Tension *(Voltage)*: **U** (volts)	**14.6**	**12.8**	**12.8**
Vitesse de fil *(Wire speed)*: (m/min)			
Vitesse d'avance *(Travel speed)* : **V** (mm/min)	**88.6**	**104**	**104**
Apport de chaleur *(heat input)* : **Q** (J/mm) **- QW-409**	**1186**	**886**	**886**
Temp. préchauffage *(Preheat temp)*: (° C) mini **- QW-406**	/	202	20
Temp. entre passes *(Interpass temp)*: (° C) mini / maxi	/	90	90
Post chauffage *(Postheat)* : Durée & temp. *(Time & temp)*	/		
Traitement thermique *(Heat treatment)* **- QW-407**	No		

TECHNIQUE - QW-410

(1): See QW-461

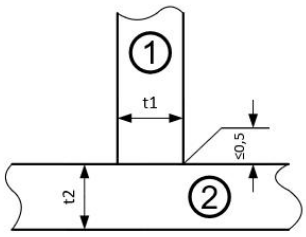
(2): Oxygen level (gaz backing) : 198 ppm max

Contrôles prévus *Planned Tests*	**Visuel** *Visual*	**Dimens.** *Dimens.*	**CND** *NDT*	**G. CHAUMIER** 02/10/2024
% de contrôle. *% of testing*	**100%**	**100%**	**See attached table**	

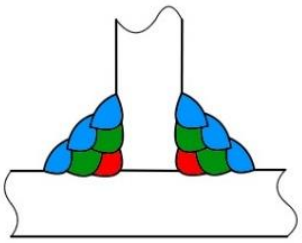
DMOS*(WPS) N°*	**21031-3**	**REV. :**	**B**	**QMOS*(PQR) N°***	**LYN.15.B.116**

Métal de base 1 *(Base metal 1)* **- QW-403**		**Métal de base 2** *(Base metal 2)* **- QW-403**		Support permanent *(Permanent Backing)*	Epaisseur déposé *(deposit metal)*
Nuance *(Grade)*	**See attached table**	Nuance *(Grade)*	**See attached table**		
Norme / Spécification	**See attached table**	Norme / Spécification	**See attached table**		
P-No / Group No	**10H / 1**	P-No / Group No	**10H / 1**		
Epaisseur *(Thickness)*	**See attached table**	Epaisseur *(Thickness)*	**See attached table**	Non	**a = 5**
Diamètre *(Diameter)*	**See attached table**	Diamètre *(Diameter)*	**See attached table**		

Préparation de l'assemblage *(Assembly preparation)* **- QW-402**



Répartition des passes *(Bead sequence)* **- QW-402**



Préparation des bords *(Prepared by)*: Meulage *(grinding)*, Usinage *(machining)*, Autre (*other*) : *Oxycoupage, laser, Plasma*

N° des passes *(Pass n°)*	**1**	**2**	**3**
Position de soudage *(Welding position)* **- QW-405**	**F** (1)	**F** (1)	**F** (1)
Procédé et degré mécanisation *(process and d° of mechaniz.)*	**GTAW**	**GTAW**	**GTAW**
Sens de progression *(Weld progression)*	/	/	/
Métal d'apport *(Filler metal)* **groupe**			
F-No / A-No	6 / 8	6 / 8	6 / 8
Spécification SFA (SFA specification)	A5.9	A5.9	A5.9
Classification AWS (AWS classification)	ER2594	ER2594	ER2594
Désignation commerciale *(Commercial Designation)*	**Thermanit 25/09 CuT**	**Thermanit 25/09 CuT**	**Thermanit 25/09 CuT**
Marque *(Trade name)*	Böhler Welding	Böhler Welding	Böhler Welding
Type de produit *(Filler metal product form)*	Solid Wire	Solid Wire	Solid Wire
∅ (mm)	2	2	2
Protection gazeuse ou flux *(Gas shielding or flux)*			
Désignation normalisée *(Standardized designation)*	88% Ar+10% He+2% N2	88% Ar+10% He+2% N2	88% Ar+10% He+2% N2
Désignation commerciale *(Commercial designation)*	**ARCAL 37**	**ARCAL 37**	**ARCAL 37**
Débit endroit *(Face flow)*: (l/mn)	12	12	12
Nature et débit envers *(Root flow)*: (l/mn)	20-10 (2)	10	10
Type de courant & polarité *(Current type & polarity)*	CC -	CC -	CC -
Mode de transfert *(Transfert mode)*	/	/	/
Electrode réfractaire (*Tungsten*) : type & ∅	WL15 - ø2,4	WL15 - ø2,4	WL15 - ø2,4
Intensité *(Intensity)*: **I** (amp.)	**120**	**120**	**120**
Tension *(Voltage)*: **U** (volts)	**14.6**	**12.8**	**12.8**
Vitesse de fil *(Wire speed)*: (m/min)			
Vitesse d'avance *(Travel speed)* : **V** (mm/min)	**88.6**	**104**	**104**
Apport de chaleur *(heat input)* : **Q** (J/mm) **- QW-409**	**1186**	**886**	**886**
Temp. préchauffage *(Preheat temp)*: (° C) mini **- QW-406**	/	20	20
Temp. entre passes *(Interpass temp)*: (° C) mini / maxi	/	90	90
Post chauffage *(Postheat)* : Durée & temp. *(Time & temp)*	/		
Traitement thermique *(Heat treatment)* **- QW-407**	No		

TECHNIQUE - QW-410
(1): See QW-461
(2): Oxygen level (gaz backing) : 198 ppm max

Contrôles prévus *Planned Tests*	**Visuel** *Visual*	**Dimens.** *Dimens.*	**CND** *NDT*	**G. CHAUMIER** 02/10/2024
% de contrôle. *% of testing*	**100%**	**100%**	**See attached table**	

Certificat n°	Page
LYN.15.B.116	1/2
Identification particulière	Rév.
6249199	1

QW- 483 PROCEDURE QUALIFICATION RECORD (PQR)

(See QW-200.2, Section IX edition 2013, ASME Boiler and Pressure Vessel Code)

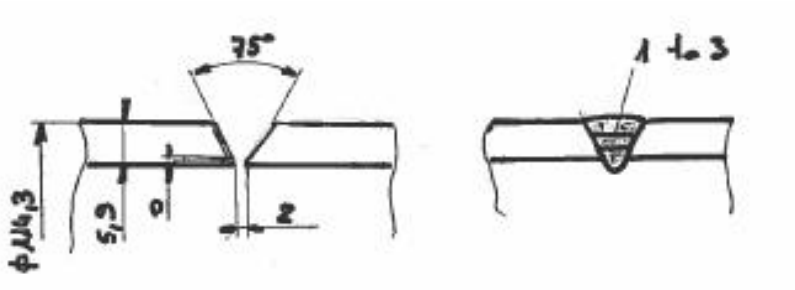
Record Actual Conditions Used to Weld Test Coupon

QW-483 CERTIFICAT DE QUALIFICATION D'UN MODE OPERATOIRE DE SOUDAGE (QMOS)
(Voir QW-200.2, Section IX, Code ASME Chaudières et Appareils à pression)
Enregistrement des conditions appliquées pour le soudage de l'assemblage d'essai

ADD. specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC- AEEC-DER-000043

Compagny Name - *Nom du constructeur* : **SRCI – 4 allée des Bruyères – 71200 Le Creusot - FRANCE**
Procedure Qualification Record No. - *Certificat de qualification N°* **LYN.15.B.116** **Date** - *Date* : **24/02/2015**
WPS No. - *DMOS n°* : ***2 rev.0 Date: 07/04/2015***
Welding Process(es) - *Procédé(s) de soudage* : **GTAW**
Types (Manual, Automatic, Semi-Automatic) - *Types (manuel, automatique ou semi automatique)* : ***MANUAL***

JOINTS (QW-402) - *PREPARATION (QW-402)*



Groove Design of Test Coupon - *Préparation de l'assemblage de qualification*
(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)
(Pour une qualification utilisant plusieurs procédés ou plusieurs métaux d'apport, l'épaisseur du métal déposé correspondant à chacun d'entre eux doit être enregistrée)

BASE METALS (QW-403) - *METAUX DE BASE (QW-403)*
Material Spec. - *Spécification des métaux* : ***ASTM A790***
Type or Grade - *Type ou nuance* : ***UNS S32750***
P-No. - *N° P* : ***10H Gr. 1*** **to P-No.** - *à N° P* : ***10H Gr. 1***
Thickness of Test Coupon - *Epaisseur de l'assemblage de qualification* : ***5.9 mm (machining in 6.02)***
Diameter of Test Coupon - *Diamètre de l'assemblage de qualification* : ***114.3 mm.***
Other - *Autres informations* :
Supplier: ***TUBACEX - heat number: 49441-*** **(see annex 2)**

FILLER METALS (QW-404) - *METAUX D'APPORT (QW-404)*

SFA Specification - *Spécification (SFA)* :	***A5.9***
AWS Classification - *Classification AWS* :	***ER 2594***
Filler Metal F-No. - *N° F du métal d'apport* :	***6***
Weld Metal Analysis A-No. - *N° A de l'analyse du métal déposé* :	***8***
Size of Filler Metal - *Dimensions du métal d'apport* :	***Dia. 2 mm (manual wire fed)***
Other - *Autres informations* :	***Dia. 1.2 mm (automatic wire fed)***

Solid wire - Supplier : BOHLER WELDING - Batch N° 101601 (Dia. 1.2 and 2 mm.) / Wire speed: 1.02 m. / mn.
Weld Metal Thickness - Epaisseur de métal déposé : ***5.9 mm.***
2.5 mm. with manual wire fed and 2.9 mm. with automatic wire fed

POSITION (QW-405) - *POSITION DE SOUDAGE (QW-405)*
Position of groove - *Position du chanfrein* : ***1G***
Weld Progression (Uphill, Downhill) - *Sens de progression (montant ou descendant)* : **not applicable**
Other - *Autres informations* : ***/***

PREHEAT (QW-406) - *PRECHAUFFAGE (QW-406)*
Preheat Temperature - *Température de préchauffage* : ***20° C***
Interpass Temperature - *Température entre passes* : ***90°C***
Other - *Autres informations* : ***/***

POSTWELD HEAT TREATMENT (QW-407) - *TRAITEMENT THERMIQUE APRES SOUDAGE (QW-407)*
Temperature - *Température* : ***Not applicable***
Time - *Temps* : ***Not applicable***
Other - *Autres informations* : ***/***

GAS (QW-408) - *GAZ (QW-408)*
Percent Composition - *Composition en pourcentage*
Gas - Gaz **Flow rate** - *Débit*
Shielding - *Protection endroit* : ***88% Ar / 10% He/ 2% N2 (ARCAL 37)*** ***12 Liters/ minute***
Backing - *Protection envers* ***100% ARGON (ARCAL 1) 20 Liters/ minute and 10 L / min. at the end (layer 1)***
Backing - *Protection envers* : **100% ARGON (ARCAL 1) 10 Liters/ minute (layers 2 to 3)**
Level of oxygen during fisrt layer: 400 ppm maxi / Level of oxygen during other layers: 40 ppm maxi

ELECTRICAL CHARACTERISTICS (QW-409) - *CARACTERISTIQUES ELECTRIQUES (QW-409)*
Current - *Type du courant* : ***DC***
Polarity - *Polarité* : ***EN (-)***
Amps. - *Ampérage* : ***120 (layers 1and 2) / 130 (layer 3)***
Volts - *Voltage* : **14.6 (layer 1) / 12.8 (layer 2) / 13 (layer 3)**
Tungsten Electrode Size - *Diamètre de l'électrode de tungstène* : **WL15– dia. 2.4mm.**

TECHNIQUE (QW-410) - *TECHNIQUE DE SOUDAGE (QW-410)*
Travel Speed - *Vitesse d'avance mm/mn* **: 88.6 *mm / minute (layer 1) / 104 mm / minute (layer 2) / 112 mm / minute (layer 3)***
Energie de soudage*/Heat input* **1186 J/mm/mn (layer 1) / 886 J/mm/mn (layer 2) / 921 J/mm/mn (layer 3)**
String or Weave Bead - *Passe étroite ou passe balayée* : ***string***
Oscillation - *Oscillation* : ***No***
Multipass or Single Pass (Per Side) - *Multipasse ou monopasse par côté* : **MULTIPLE**
Single or Multiple electrodes - *Mono ou multi électrodes* : ***SINGLE***
Other - *Autres informations* :
Peening : No
Use of thermal processes : No
Out chamber : NA

Certificat n°	Page
LYN.15.B.116	2/2
Identification particulière	Rév.
6249199	1

QW- 483

Tensile Test (QW-150)
Essai de traction (QW-150)

Specimen No. *Repère de l'éprouvette*	Width *Largeur mm*	Thickness *Epaisseur mm*	Area *Surface mm²*	Ultimate Total Load *Charge totale N*	Ultimate Unit Stress *Rm 800 N/mm² mini*	Type of Failure and Location *Type et position de la cassure*
511 766	***19.04***	***4.44***	***84.54***	***73157***	***865***	***CONFORM – In base metal***
511 767	***19.03***	***4.51***	***85.83***	***75537***	***880***	***CONFORM – In base metal***

Guided-Bend Tests (QW-160)
Essais de pliage guidés (QW-160)

Type and Figure No. *Type et n° de figure*	Result *Résultat*
TRANSVERSAL FACE BEND TEST – 511769	***CONFORM***
TRANSVERSAL FACE BEND TEST – 511770	***CONFORM***
TRANSVERSAL ROOT BEND TEST – 511771	***CONFORM***
TRANSVERSAL ROOT BEND TEST – 511772	***CONFORM***

Toughness Tests (QW-170)
Essai de résilience (QW-170)

Specimen No. *Repère de l'éprouvette*	Notch Location *Emplacement de l'entaille*	Specimen Size *Dimension de l'éprouvette mm*	Test Temperature *Température d'essai*	Impact Values *Valeur de résilience*			Drop Weight Break (Y/N) *Rupture de l'éprouvette (Oui/Non)*
				Joules	% Shear *Cristallinité %*	Lateral expansion mm	
511 780/1	***In weld***	***10 x 5***	***-20°C***	***93***	/	/	/
511 780/1	***In weld***	***10 x 5***	***-20°C***	***93***	/	/	/
511 780/1	***In weld***	***10 x 5***	***-20°C***	***93***	/	/	/
511 781/1	***In HAZ +2***	***10 x 5***	***-20°C***	***103***	/	/	/
511 781/2	***In HAZ +2***	***10 x 5***	***-20°C***	***103***	/	/	/
511 781/3	***In HAZ +2***	***10 x 5***	***-20°C***	***98***	/	/	/
511 782/1	***In HAZ +5***	***10 x 5***	***-20°C***	***103***	/	/	/
511 782/2	***In HAZ +5***	***10 x 5***	***-20°C***	***98***	/	/	/
511 782/3	***In HAZ +5***	***10 x 5***	***-20°C***	***98***	/	/	/

Comments - *Autres examens* : ***FOR INFORMATION***

Fillet-Weld Test (QW-180)
Assemblage et qualification en angle (QW- 180)

Result - Satisfactory - *Résultat satisfaisant* : ☐ **Yes** - *Oui* ☐ **No** - *Non* **Penetration into Parent Metal** - *Pénétration dans le métal de base* : ☐ **Yes** - *Oui* ☐ **No** - *Non*

Macro - Results - *Résultat de l'examen macrographique* :

Other tests
Autres essais

.

DOCUMENTATION : **ANNEX 1** : WPS / **ANNEX 2** : BASE MATERIAL CERTIFICATE / **ANNEX 3** : FILLER METAL CERTIFICATE
ANNEX 4 : PENETRANT TEST / **ANNEX 5** : RADIOGRAPHIC TEST REPORT / **ANNEX 6** : MECHANICAL TEST REPORT

Welder's Name : ***LEVEFRE Julien*** *Nom du soudeur*
Clock No. : ***LF*** *N° pointage*
Stamp No. : / *N° poinçon*

Tests Conducted by : ***SRCI, Mr DUMAY and Witness by P. NOYEL Bureau Véritas*** *Essais effectués par*
Laboratory Test No. : ***C-170415-04146 (27966-0)*** *Repère du laboratoire*

Rev.1 : 06/08/2024 : correction of the temperature of toughness tests. J.TARSIGUEL

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME BOILER AND PRESSURE VESSEL CODE and ADD. specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC- AEEC-DER-000043.
Nous certifions l'exactitude des renseignements ci-avant et que les essais de soudage ont été préparés, soudés et testés en accord avec les exigences de la Section IX du CODE ASME CHAUDIERES ET APPAREILS A PRESSION

Manufacturer - *Constructeur* : **SRCI – 4 allée des Bruyères – 71200 Le Creusot - FRANCE**

Date - *Date* : ***07/05/2015*** **By** - *Par* : ***Mr DUMAY*** **Signature** - *Signature* :

SRCI
Z.A. Hurlleur
71200 LE CREUSOT

DESCRIPTIF DE MODE OPERATOIRE DE SOUDAGE (WPS) ASME

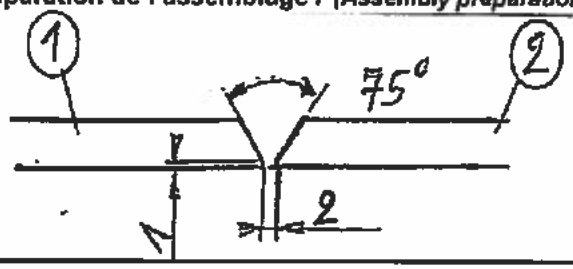
N° D'AFFAIRE: 15229
DMOS(WPS) N°: 1
QMOS(PQR) N°: /

Métal de base 1 (Base metal 1) - QW-403	Métal de base 2 (Base metal 2) - QW-403	Procédé(s) (Process(es))	Epaisseur(s) de métal déposé (weld deposit metal)
Nuance (Grade) : S32760	Nuance (Grade) : S32760	GTAW	2,87 mm
Norme (Specification) : ASTM A790	Norme (Specification) : ASTM A790		/ mm
P-No / Group No : 10H / 1	P-No / Group No : 10H / 1		/ mm
Epaisseur (Thickness) : 2,87 mm	Epaisseur (Thickness) : 2,87 mm		
Diamètre (Diameter) : 26,7 mm	Diamètre (Diameter) : 26,7 mm		

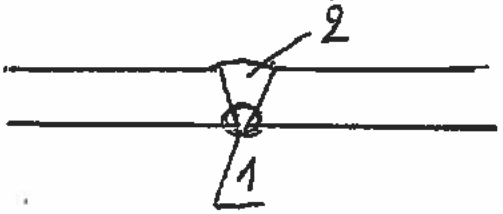
Type d'assemblage (*Joint design*) - **QW-402 :**

Soudure repère (*Weld number*) - **QW-402 :**

Préparation de l'assemblage / *(Assembly preparation)*



Répartition des passes / *(Bead sequence)*



Préparation des bords (*Prepared by*): ☐ Meulage (*grinding*), ☒ Usinage (*machining*), ☐ Autre (*other*).....

N° des passes (*Pass n°*):		1	2			
Position de soudage (*Welding position*) - **QW-405**		1G	1G			
Procédé et degré mécanisation (*process and d° of mechaniz.*)		GTAW/M	GTAW/M			
Mode de transfert (*Transfert mode*)		/	/			
Métal d'apport (*Filler metal*) - **QW-404**						
F-No / A-No		6 / 6	6 / 6			
Norme (*specification*)		AWS 5.9	AWS 5.9			
Désignation normalisée (*Standardized designation*):		ER 2594	ER 2594			
Désignation commerciale (*Commercial Designation*):		THERMANIT 25/09 CUT				
Marque (*Trade name*):		BÖHLER				
Ø (mm)		2	2			
Protection gazeuse (*Gas shielding*) – **QW-408**						
Endroit (Face)	Composition (*Mixture*):	ARCAL 39 / Ar+10% + 2%N2				
	Désignation normalisée (*Standardized designation*)	N2 SVT ISO 14175				
	Débit (*flow*): (l/mn) ± 10 %	12	12			
Envers (Backing)	Composition (*Mixture*):	ARGON	ARGON			
	Désignation normalisée (*Standardized designation*)	I1 SVT ISO 14175				
	Débit (*flow*): (l/mn) ± 10 %	10	10			
Type de courant & polarité (*Current type & polarity*):		CC -	CC -			
Electrode réfractaire (*Tungsten*) : type & Ø		WL15 Ø2,4	WL15 Ø2,4			
Intensité (*Intensity*): I (amp.) ± 10 %		90	90			
Tension (*Voltage*): U (volts) ± 10 %		14,9	14,2			
Vitesse de fil (*Wire speed*): (m/min) ± 10 %		/	/			
Vitesse d'avance (*Travel speed*) : V (mm/mn) ± 10 %		89,7	97			
Apport de chaleur Q (*heat input*) U.I.10 / V/A (J/mm)		896 max	790 max			
Temp. préchauffage (*Preheat temp*) - **QW-406** (° C)		Ambiant	/			
Temp. entre passes (*Interpass temp*): (° C) mini / maxi		/	90			
Post chauffage (*Postheat*) : Durée & temp. (*Time & temp*)		/	/			

T.T.A.S. (*P.W.H.T*) - **QW-407** Oui (*Yes*) ☐ Non (*No*) ☒

Vitesse de montée (*Heating rate*): / ° C/h

Vitesse de descente (*Cooling rate*): / ° C/h

Temp. de palier (*Holding temp.*) : / ° C/h

Durée du palier (*Holding time*) : / h

TECHNIQUE - QW-410
Balayage (weave sequence) : tiré avec leger balayage (string with slight weave)
Nettoyage entre passe (interpass cleannig) : meulage (grinding)
Buse (Gaz cup size) : Ø10

Nom : Patrick DUMAY

Date : 07/04/2015

Visa :

(A01) Salzgitter Mannesmann Stainless Tubes Italia Srl
(A05) Via Pió 30 - 24062 Costa Volpino (BG) - ITALY
www.smst-tubes.com

SALZGITTER MANNESMANN STAINLESS TUBES

INSPECTION CERTIFICATE

(A02) EN 10204: 2004 TYPE 3.1

(A03) No 4-12-16531-rev.01

(A06) Purchaser	(A07) Customer Order No	
TEULING STAAL BV	112030744	SNF
Lindsedijk 100	(A08) SMST-Tubes Order No	
3336 LE Zwijndrecht	0000245911	
Zuid-Holland	SMST-Item	(A09) Part No
Paesi Bassi	0000245911-000002	300

TEULING STAAL BV
QA / QC
CERT. NO.: 80886
DATE: 10/01/13
SIGNATURE: ML

(B01)(B02)(B04) Product Description
Seamless Stainless Steel Cold Finished Pipes Solution Annealed Free From Scale Plain Ends Square Cut Deburred

Specifications	ASME SA 790M 11 a;ASTM A 790M 11;MDS D51 Rev. 4;NACE MR0103 2007;NACE MR0175/ISO 15156-3 2009
Grade	UNS S32760
Tolerances	A 790M / A999

(B03) Supplementary Requirements
None

(B06)(C01) Marking of the Product

Technical marking	DMV-I ASME SA 790 ASTM A 790 UNS S32760 NPS 3/4 X SCH 40S 26.70 MM X 2.87 MM - SML UT HEAT $HEAT_NBR$ $QUAL_LOT_NBR$ ITALY NR.$INDIV_NBR$
End marking	BUNDLE $BUNDLE_NBR$

Country of Origin of the tubes: Italy

(B07) Heat	Quality Lot	SMST-Item	Quantity (B08) Pieces	(B13) Weight	(B16) Length	Dimensions (B09) OD	(B10) WT	(B11) Ordered Length min	(B11) Ordered Length max
F06249	QL40017659	000002	16	190.00 kg	165.000 m	26.70 mm	2.87 mm	5000 mm	7000 mm
				418.88 lbs	354.33 ft	NPS 3/4	SCH 40S	16.40 ft	22.97 ft
				418.88 lbs	354.33 ft	1.051 "	0.113 "	16.40 ft	22.97 ft
W70282	QL40017658	000002	32	330.00 kg	192.000 m	26.70 mm	2.87 mm	5000 mm	7000 mm
				727.53 lbs	629.92 ft	NPS 3/4	SCH 40S	16.40 ft	22.97 ft
				727.53 lbs	629.92 ft	1.051 "	0.113 "	16.40 ft	22.97 ft

Heat Analysis

(B07) Heat	Heat Origin	(C70) Melting Process	C	Si	Mn	P	S	Cr	Ni	Mo	N
		Request	0.00	0.00	0.00	0.00	0.00	24.00	6.00	3.00	0.20
		Max	0.050	1.00	1.00	0.030	0.0100	26.00	8.00	4.00	0.30
			%	%	%	%	%	%	%	%	%
F06249	Italy	E+AOD	0,020	0,50	0,50	0,022	0,0003	25,47	7,33	3,60	0,243
W70282	Austria	E+AOD	0,022	0,37	0,52	0,024	<0,0003	25,73	7,10	3,64	0,250

(B07) Heat	Heat Origin	(C70) Melting Process	Cu	W	PREN
		Request	0.50	0.50	41.0
		Max	1.00	1.00	99.9
			%	%	
F06249	Italy	E+AOD	0,66	0,84	41,24
W70282	Austria	E+AOD	0,54	0,52	41,74

(A01) Salzgitter Mannesmann Stainless Tubes Italia Srl
(A05) Via Pio 30 - 24062 Costa Volpino (BG) - ITALY
www.smst-tubes.com

SALZGITTER MANNESMANN STAINLESS TUBES

INSPECTION CERTIFICATE

(A02) EN 10204: 2004 TYPE 3.1

(A03) No 4-12-16531-rev.01

Product Analysis

ASTM A 790M // ASME SA 790M // TS MDS 301-3.1 REV.2

	Request	C	Si	Mn	P	S	Cr	Ni	Mo	N
	Min	0.00	0.00	0.00	0.00	0.00	24.00	6.00	3.00	0.20
	Max	0.050	1.00	1,00;1.00	0.030	0.0100	26.00	8.00	4.00	0.30
Quality Lot	(C00) Sample	%	%	%	%	%	%	%	%	%
QL40017658	40142484	0.024	0,38	0,56	0,027	0,0003	25,87	7,16	3,60	0,25
	40142485	0.021	0,39	0,56	0,026	0,0003	25,93	7,17	3,55	0,23
	40142488	0.022	0,40	0,55	0,025	0,0003	25,90	7,16	3,56	0,23
	40142489	0,023	0,39	0,56	0,027	0,0002	25,88	7,15	3,62	0,25
	40142490	0.022	0,31	0,52	0,020	0,0003	25,96	7,17	3,72	0,26
QL40017659	40142491	0.020	0,50	0,55	0,025	0,0008	25,51	7,25	3,564	0,26
	40142494	0.020	0,50	0,54	0,025	0,0008	25,55	7,23	3,56	0,26

	Request	Cu	W	PREN
	Min	0.50	0.50	41.0
	Max	1.00	1.00	99.9
Quality Lot	(C00) Sample	%	%	%
QL40017658	40142484	0,51	0,59	41,8
	40142485	0.52	0,57	41,3
	40142488	0,50	0,57	41,3
	40142489	0,52	0,60	41,8
	40142490	0.51	0.51	42.4
QL40017659	40142491	0.52	0,52	41,2
	40142494	0.50	0,61	41,3

Tensile Test at Room Temperature

ASTM A 370 // TS MDS 301-3.1 REV.2

(C02) Direction : LONGITUDINAL

		(C11)	(C12)	(C13)	(C13)
		YS 0.2%	U.T.S.	EL	EL
		Rp 0,2%	Rm	2"	50mm
Request	Min	550	800	25	25
	Max				
Quality Lot	(C00) Sample	MPa	MPa	%	%
QL40017658	40142490	809	958	30	30
QL40017659	40142494	776	935	31	31

(A01) Salzgitter Mannesmann Stainless Tubes Italia Srl
(A05) Via Pio 30 - 24062 Costa Volpino (BG) - ITALY
www.smsi-tubes.com

SALZGITTER MANNESMANN STAINLESS TUBES

INSPECTION CERTIFICATE

(A02) EN 10204: 2004 TYPE 3.1

(A03) No 4-12-16531-rev.01

(C10) Tensile Test at elevated Temperature

ASTM A 370 // TS MDS 301-3.1 REV.2

(C02) Direction : LONGITUDINAL

(C03) Temperature : 250 °Celsius

		(C11) YS 0.2% Rp 0,2%	(C12) U.T.S. Rm	(C13) EL	(C13) EL 50mm
Request	Min	405	0	0	0
	Max		999	999	999
Quality Lot	(C00) Sample	MPa	MPa	%	%
QL40017658	40142490	804,99	804	23	24
QL40017659	40142494	578,39	795	24	25

(C30) Hardness Test

ASTM A 370 // NACE MR0103 // TS MDS 301-3.1 REV.2

			(C30) HRC		
		Request			32 max
Quality Lot	(C00) Sample	Result	(C31) Min	(C34) Max	(C32) Avg
QL40017658	40142485		29.0	30.0	29.6
	40142490		28.0	29.0	28.5
QL40017659	40142491		29.0	30.0	29.5
	40142494		29.0	30.0	29.5

Vickers Hardness Test

ASTM A 370 // ASTM E 18 // ASTM E 384 // TS MDS 301-3.1 REV.2

Request	Min						
	Max	320					
Quality Lot	(C00) Sample	(C31) Read 1	(C31) Read 2	(C31) Read 3	(C31) Read 4	(C31) Read 5	
QL40017658	40142486	286,00	298,00	291,00	283,00	283,00	
	40142487	288,00	295,00	289,00	280,00	291,00	
QL40017659	40142492	283,00	282,00	280,00	281,00	278,00	
	40142493	282,00	280,00	283,00	279,00	278,00	

(C50) Flattening Test

ASTM A 999 // TS MDS 301-3.1 REV.2

Quality Lot	(C00) Sample			Result
QL40017658	40142484	40142485	40142490	OK
QL40017659	40142491	40142494		OK

(A01) Salzgitter Mannesmann Stainless Tubes Italia Srl
(A05) Via Pila 30 - 24062 Costa Volpino (BG) - ITALY
www.amsi-tubes.com

SALZGITTER MANNESMANN STAINLESS TUBES

INSPECTION CERTIFICATE

(A02) EN 10204: 2004 TYPE 3.1

(A03) No 4-12-16531-rev.01

Pitting Corrosion Resistance Test

ASTM G 48 METHOD A // TS MDS 301-3.1 REV.2

Description : PITTING MAX 0.025 MM

Quality Lot	Request Max Unit (C00) Sample	hours Holding time	°Celsius Temperature	g/m² Loss Weight	Pitting	Result
QL40017658	40142490	24	50	0.11820	No pitting at 20X	Satisfactory
QL40017659	40142494	24	50	0.00000	No pitting at 20X	Satisfactory

Micrographic Examination

Structure

ASTM E 407/ ASTM A 923 Pr.A — 0 max

Quality Lot	(C00) Sample	(C02) Direction	Result
QL40017658	40142490	TRANSVERSAL	OK
QL40017659	40142494	TRANSVERSAL	OK

Intermetallic Phases

ASTM E 407/ ASTM A 923 Pr.A — 0 max

Quality Lot	(C00) Sample	(C02) Direction	Result
QL40017658	40142490	TRANSVERSAL	OK
QL40017659	40142494	TRANSVERSAL	OK

Ferrite

ASTM E 562 — 40.0 - 55.0

Quality Lot	(C00) Sample	(C02) Direction	Result %
QL40017658	40142490	TRANSVERSAL	54.30
QL40017659	40142494	TRANSVERSAL	53.92

Carbides and precipitates

ASTM E 407/ ASTM A 923 Pr.A — 0 max

Quality Lot	(C00) Sample	(C02) Direction	Result	Observations
QL40017658	40142490	TRANSVERSAL	OK	FREE FROM CARB. & PREC.
QL40017659	40142494	TRANSVERSAL	OK	FREE FROM CARB. & PREC.

(A01) Salzgitter Mannesmann Stainless Tubes Italia Srl
(A05) Via Pili 30 - 24052 Costa Volpino (BG) - ITALY
www.smst-tubes.com

SALZGITTER MANNESMANN STAINLESS TUBES

INSPECTION CERTIFICATE

(A02) EN 10204: 2004 TYPE 3.1

(A03) No **4-12-16531-rev.01**

Other Tests and Declarations

QL40017658; QL40017659

Heat treatment 1070/1140°C Holding time 2 min/mm WT
Rapid water quenching cooling
PMI examination acc. to doc. D-200 OK
Visual and dimensional examination acc. to customer order OK
Hydrostatic test 170 Bar / 15 s OK acc. to ASTM A999
Ultrasonic testing on the 100% of the tubes EN ISO 9303L2B/9305L2B/10543/10893-12/10893-10U2B OK
Material in accordance with T5 MDS 301-3.1 rev.2-Norsok MDS D31 rev.4 NACE MR0175/ISO 151653 NACE MR0103 and Shell mesc 74/014 ed. 2010
Straightness: 1,5 mm max. Roughness (int./ext.): Ra max 12,5 microns
Quality plan: PCQ 714 rev.0 .
Hydrostatic test performed with water containing less than 200 ppm of chlorides
Salzgitter Mannesmann Stainless Tubes guarantees that the corrosion is in compliance to ASTM A 923 Meth C, with weight loss<=10mdd
For micro picture see annex 1

The material is conforming to directive 2000/53/EC, 2002/95/EC and CD 2005/618/EC

No Weld Repair

(Z01) SMST declares that the product is in compliance with the order.

Tubes are free from mercury contamination and from radioactiv contamination

Confirmation with reference to Pressure Equipment Directive 97/23/EC:
The works operates a quality management system that has undergone a specific assessment for materials for pressure equipment and is certified by a competent body

(Z02) Mill's Inspector **Francesco Annibali** Date of Edition **24/12/2012**

This certificate is issued by a computerized system and valid without signature. In case the owner of the original would release a copy of it he must attest its conformity and will be responsible for any unlawful or not allowed use. Any alterations or falsification will be subject to law.

Salzgitter Mannesmann Stainless Tubes Italia Srl

attachment to INSPECTION CERTIFICATE

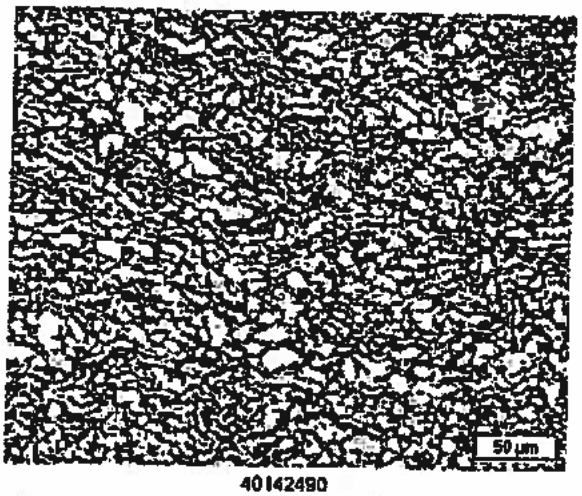
Certificate Nr.: 4-12-16531-rev.01

Customer Order: 0000245911

SALZGITTER MANNESMANN STAINLESS TUBES

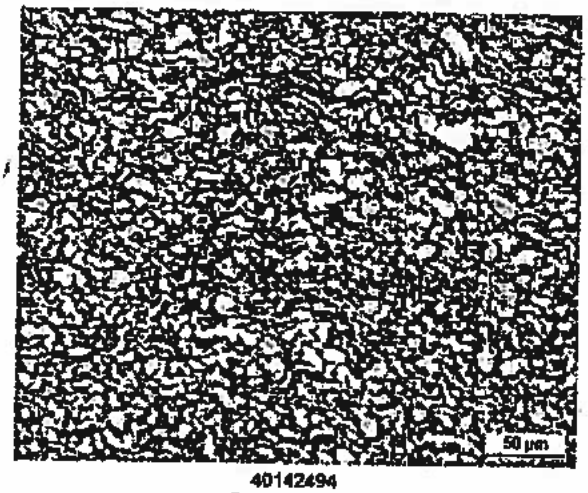
Picture-Management

Micrographic Examination



40142490
Structure 400X

Micrographic Examination



40142494
Structure 400X

TQR N° 2/N.13.5.113 ANNEX 2 Page 7/14

NON DESTRUCTIVE TEST REPORT

Proces verbal de Control Non Destructive
Prüfbericht Zerstörungsfreie Prüfungen
Rapporto CND

SALZGITTER MANNESMANN STAINLESS TUBES

Method of inspection / Metodo di controllo: ULTRASONIC TESTING (UT)

MST order / Conferma	0000245911	Customer / Cliente	TEULING STAAL BV
MST item / Posizione MST	000002	Part nr / Part nr	300
HU id / Fascio	40029383000	Customer PO / PO cliente	112030744

Type of product / Descrizione prodotto

ZPSC	SOLUTION ANNEALED		FREE FROM SCALE PLAIN ENDS SQUARE CUT DEBURRED				
Product specification / Norme	ASME SA 790M 11 a;ASTM A 790M 11;MDS DS1 Rev. 4;NACE MR0103 2007;NACE MR0175/ISO 15156-3 2						
Dimensions / Dimensioni	(mm)		(inch)		OLT lot / Lotto	QL40017859	
OD x WT	26.7	2.87			Heat nr / Colata	F0G246	
Length / Lunghezza	min (mm)		max (mm)		Material / Materiale	DMV25.7N	
	10200		14200		Tube id / Numero Tubo	from	to

Testing conditions / Condizioni di esame

Applicable Standard / Standard Applicabile	EN ISO 9303 L28 / EN ISO 9305 L28 / EN ISO 10543 / ISO 10893-12/10 UR8	Applied Procedure / Procedura Applicata	D-CP-164 REV. 1
Testing equipment / Linea di controllo	ROTA 65	Reference tube / Campione NDT	U0008884

	Long	Transv	Obliq	WT
Probe 1 / Sonda 1	P542	P544		J760
Frequency 1 / Frequenza	5 MHz	5 MHz		5 MHz
Amplitude 1 / Amplificazione 1	30 dB	36 dB		43 dB
Probe 2 / Sonda 2	P543	P545		
Frequency 2 / Frequenza	5 MHz	5 MHz		
Amplitude 2 / Amplificazione 2	30 dB	37 dB		
Technique / Tecnica	Immersion	Couplant / Accoppiante		Recycled water
Examination direction / Direzione rotazione sonde	Clockwise/Counterclockwise	Frequency of calibration check / Frequenza della verifica taratura		4 h
Threshold Level / Soglia intervento	50 %	Pulsing Rate Frequency / Frequenza impulsi		9 KHz
Focal point / Punto focale	22 mm	Diffraction angle / Angolo di rifrazione		51°
Feed Speed / Velocità avanzamento	20 m/min	Scanning Pitch / Passo di Scansione		5,7 mm
Rotation Speed / Velocità Rotazione	3500 giri/min			

	Depth (mm)	Length (mm)	Width (mm)	Shape (mm)	Orientation Angle
Internal Longitudinal Notch / Intaglio Longitudinale Interno	0,20	12	0,4	U	
External Longitudinal Notch / Intaglio Longitudinale Esterno	0,20	12	0,4	U	
Internal Transversal Notch / Intaglio Trasversale Interno	0,20	12	0,4	U	
External Transversal Notch / Intaglio Trasversale Esterno	0,20	12	0,4	U	
Internal Oblique Notch 1 / Intaglio Obliquo Interno 1					
External Oblique Notch 1 / Intaglio Obliquo Esterno 1					
Internal Oblique Notch 2 / Intaglio Obliquo Interno 2					
External Oblique Notch 2 / Intaglio Obliquo Esterno 2					
Lamination / Stratificatura					
Wall Thickness / Spessore	min	2,51	max	3,44	
Detect location to detect shadow zone at both ends / Dilatt per rilevamento zona di ombra alle estremità	80 mm				
Overlapping / Sovrapposizione	20%				

Results / Risultati

	Checked / Controllati	Accepted / Accettati	Rejected/ Scartati
I run / 1° Passaggio	9	9	0
II run / 2° Passaggio	0	0	0
Total quantity / Buoni Finali	9	Examination date / Data Controllo	Dec 11 2012 5:01PM
Untested ends / Estremità non controllate	Length / Lunghezza 100 mm	After testing / Dopo la prova: Cut / Tagliata	X
NDT operator / Operatore NDT	palametti.gianluca	NDT Surveyor / NDT Surveyor	Daniele Mosconi
Level / Livello	2	Level / Livello	3

Remarks / Note

The results are in comply with the applied test documents / Il risultato è conforme ai richiesti dei documenti applicati		Report number / Certificato numero	
Page 1/1	Date / Data 27/dic/2012	Customer Representative / Rappresentante Cliente	

Salzgitter Mannesmann Stainless Tubes Italy

ISO 9001 - IQG 9408 - IQG A2F04

SALZGITTER MANNESMANN STAINLESS TUBES
S. Giovanni in Persiceto (Bologna)
NDT Level 3

TUK IV 27.V.75.1775 ANNEX 0/74

NON DESTRUCTIVE TEST REPORT

Proces verbal de Control Non Destructive
Prüfbericht Zerstörungsfreie Prüfungen
Rapporto CND

SALZGITTER MANNESMANN STAINLESS TUBES

Method of inspection / Metodo di controllo: ULTRASONIC TESTING (UT)

MST order / Conferma	0000245911	Customer / Cliente	TEULING STAAL BV
MST item / Posizione MST	000002	Part nr / Part nr	300
HU id / Fascio	40329366000	Customer PO / PO cliente	112030744

Type of product / Descrizione prodotto

ZPSC	SOLUTION ANNEALED			FREE FROM SCALE PLAIN ENDS SQUARE CUT DEBURRED			
Product specification / Norme	ASME SA 790M 11 a;ASTM A 790M 11;MDS D51 Rev. 4;NACE MR0103 2007;NACE MR0175/ISO 15156-3 2						
Dimensions / Dimensioni	(mm)		(inch)		QLT lot / Lotto	QL40017658	
OD x WT	26.7	2.87			Heat nr / Colata	W70262	
Length / Lunghezza	min (mm)		max (mm)		Material / Materiale	DMV25 7N	
	10200		14200		Tube id / Numero Tubo	from	to

Testing conditions / Condizioni di esame

Applicable Standard / Standard Applicable	EN ISO 9303 1:20 / EN ISO 9305 1:20 / EN ISO 10543 / ISO 10893-12/10 U:20	Applied Procedure / Procedura Applicata	D-CP-164 REV. 1
Testing equipment / Linea di controllo	ROTA 65	Reference tube / Campione NDT	U0008884

	Long	Transv	Oblin	WT
Probe 1 / Sonda 1	P542	P544		J750
Frequency 1 / Frequenza 1	5 MHz	5 MHz		5 MHz
Amplitude 1 / Amplificazione 1	30 dB	36 dB		43 dB
Probe 2 / Sonda 2	P543	P545		
Frequency 2 / Frequenza 2	5 MHz	5 MHz		
Amplitude 2 / Amplificazione 2	30 dB	37 dB		
Technique / Tecnica	Immersion	Couplant / Accoppiante		Recycled water
Examination direction / Direzione rotazione sonda	Clockwise/Counterclockwise	Frequency of calibration check / Frequenza della verifica taratura		4 h
Threshold Level / Soglia intervento	50 %	Pulsing Rate Frequency / Frequenza impulsi		9 KHz
Focal point / Punto focale	22 mm	Diffraction angle / Angolo di rifrazione		51°
Feed Speed / Velocità avanzamento	20 m/min	Scanning Pitch / Passo di Scansione		5.7 mm
Rotation Speed / Velocità Rotazione		3500 giri/min		

	Depth (mm)	Length (mm)	Width (mm)	Shape (mm)	Orientation Angle
Internal Longitudinal Notch / Intaglio Longitudinale Interno	0,20	12	0,4	U	
External Longitudinal Notch / Intaglio Longitudinale Esterno	0,20	12	0,4	U	
Internal Transversal Notch / Intaglio Trasversale Interno	0,20	12	0,4	U	
External Transversal Notch / Intaglio Trasversale Esterno	0,20	12	0,4	U	
Internal Oblique Notch 1 / Intaglio Obliquo Interno 1					
External Oblique Notch 1 / Intaglio Obliquo Esterno 1					
Internal Oblique Notch 2 / Intaglio Obliquo Interno 2					
External Oblique Notch 2 / Intaglio Obliquo Esterno 2					
Lamination / Strozzatura					
Wall Thickness / Spessore	min	2,51	max	3,44	
Defect location to detect shadow zone at both ends / Difetti per rilevamento zona di ombra alle estremità	80 mm				
Overlapping / Sovrapposizione	20%				

Results / Risultati

	Checked / Controllati	Accepted / Accettati	Rejected / Scartati
1st run / 1° Passaggio	21	21	0
2nd run / 2° Passaggio	0	0	0
Final quantity / Buoni Finali	21	Examination date / Data Controllo	Dec 11 2012 5:56PM
Untested ends / Estremità non controllate	Length / Lunghezza 100 mm	After testing / Dopo la prova — Cut / Tagliate	X
NDT operator / Operatore NDT	pelamatti gianluca	NDT Surveyor / NDT Surveyor	Daniele Mossoni
Level / Livello	2	Level / Livello	3
Remarks / Note			

The results are in comply with the applied test documents / Il risultato è conforme ai richiesti dei documenti applicati		Report number / Certificato numero	
Page 1/1 — Date / Data	27/dic/2012	Customer Representative / Rappresentante Cliente	

Salzgitter Mannesmann Stainless Tubes Italy — ISO 9001 - IQG 9408 - IQG A2F04

SALZGITTER MANNESMANN STAINLESS TUBES
ELIE MOSKOUN — LEVEL 3 NDT
SNT-TC-1A

FORONI S.p.A.

21055 Gorla Minore (VA)
Italia

CERTIFIED MATERIAL TEST REPORT

Certificat de reception EN 10204-3.1

Cert. n° 2011/3018
Rev. 0
Date 23/11/2011

Client: SALZGITTER MANNESMANN STAINLESS TUBES FRANCE S.A.S.
Matériau: DMV 25.7N.
Commande: 3220000769 AV.1 + Confirm. commande 2011/110731 Pos.: 3
Condition de livraison: Forge et degrossi.
Spécifications: DMV.MS 001 Rev.08 + e-mail FORONI S.p.A. 30/01/08; DMV.MS 002 Rev.16 + fax FORONI S.p.A. 03/11/10.

AOD / VIDP n°: F06249
VAR / ESR n°:
Procédé de fusion: E.A.F./A.O.D.

Traitement thermique: Lot n°: CTT n°:

Description: Rond
Dimension: 180 mm
Longueur: mm
N° pièces: 9
Poids: 9850 Kg
Identification barre:
Corroyage: 12,5

Analyse chimique

% p	Coulée	Produit
C	0,020	
MN	0,50	
SI	0,50	
CR	25,47	
NI	7,33	
MO	3,60	
S	0,0003	
P	0,022	
CU	0,55	
CO	0,05	
AL	0,007	
N	0,243	
TI	0,002	
NB	0,005	
V	0,09	
W	0,64	
B	0,0021	
PREN	41,2	
PREW	42,3	
O		0,0051

Caractéristiques mécaniques

			Essai n°	1	2
	Type			Tête [1]	Pied [1]
Traction	Position				
	Orientation				
	Température	°C			
	Lim.el. 0,2%	MPa			
	Lim.el. 1%	MPa			
	Rupture	MPa			
	Allongement	%			
	Striction	%			
	Dureté	HB			
		HRC			
	comme envoyé				
Résilience	Position			Centre	Centre
	Orientation			TRV	TRV
	Température	°C		-10	-10
	Charpy A	J		179	192
				186	180
				192	177
	Expansion latéral	mm			
	Aire ductile	%			
Stress-rupt.	Température	°C			
	Charge	MPa			
	Accr. charge				
	Durée	heures			
	Allongement	%			

Autres caractéristiques

	Spécification:	Description:	Résultat.
Taille de grain selon	ASTM E112-10	Comparison method	6
Teneur de ferrite		Fischer feritscope	52 %
Essai de corrosion selon ISO 3651-2:1998		Méthode A	Conforme
Macro-etch test			
Test microstructure			
Teneur inclusions selon	ASTM E45-10	Méthode A	A= 0 B= 1 C= 0,5 D= 1,5
Ultrasons selon	API 6A 20th Ed.	PSL3 (par. 7.4.2.3.15)	Conforme
Contrôle visuel			Conforme
Contrôle dimensionnel			Conforme
P.M.I.			Conforme
Fatigue test			

Notes: Matériau pas visé pour une utilisation pour application aérospatiale/aviation.
- Matériau fabriqué sans Nickel Cubain.
- Matériau conforme aux directives 2000/53/EC, 2002/95/EC et CD 2005/618/EC.
- [1] Position échantillons prise et entaille selon dessin de la spécification n° SMST/MET 10001 Rev.00; échantillons mis en solution en laboratoire à 1080°C ± 20° - Eau.

* Matériau fabriqué en Italie. Sans soudure, sans mercure et contamination radioactive.

Le materiel est fabriqué en accord aux spécifications mentionnées. Materiel produit en accord au système de qualité indiqué dans le manuel MSQ de FORONI S.p.A..

Manuel Système Qualité: MSQ Ed. 2003 Rev. 3 (13/12/2010)

S.C.Q. Département: M.Gallina — H. Gallina

R.S.Q. Inspecteur:

La reproduction totale ou partielle de ce document est interdite sans approbation écrite de FORONI S.p.A.

PO K N 4YN.15.13.115 ANNEX 2 Page 3/44

FORONI S.p.A.

21056 Gorla Minore (VA)
Italia

CERTIFIED MATERIAL TEST REPORT

Inspection certificate EN 10204-3.1

Cert. n° 2011/3018
Rev. 0
Date 23/11/2011

Customer SALZGITTER MANNESMANN STAINLESS TUBES FRANCE S.A.S.
Material: DMV 25.7N.
Order n°: 3220000789 AV.1 + Order confirmation 2011/110731 **Item:** 3
Delivery condition: Forged and peeled.
Specifications: DMV.MS 001 Rev.08 + e-mail FORONI S.p.A. 30/01/08; DMV.MS 002 Rev.16 + fax FORONI S.p.A. 03/11/10.

AOD / VIDP n° F08249
VAR / ESR n°
Steel making process: E.A.F./A.O.D.

Heat Treatment: Lot n°: CTT n°:

Description: Round bar
Size: 180 mm
Length: mm
N° of pieces: 0
Weight: 8850 Kg
Bar identification:
Forging ratio: 12,5

Chemical analysis

% w	Heat	Product
C	0,020	
MN	0,50	
SI	0,50	
CR	25,47	
NI	7,33	
MO	3,80	
S	0,0003	
P	0,022	
CU	0,55	
CO	0,05	
AL	0,007	
N	0,243	
TI	0,002	
NB	0,005	
V	0,05	
W	0,64	
B	0,0021	
PREN	41,2	
PREW	42,3	
O		0,0051

Mechanical properties

	Type		Test n° 1	2
			Top [1]	Bottom [1]
Tensile properties	Position			
	Direction			
	Temperature	°C		
	Y.S. 0.2%	MPa		
	Y.S. 1%	MPa		
	U.T.S.	MPa		
	Elongation	%		
	Red. of Area	%		
	Hardness	HB		
		HRC		
	as delivered			
Impact properties	Position		Centre	Centre
	Direction		TRV	TRV
	Temperature	°C	-10	-10
	Charpy A	J	179	192
			186	180
			192	177
	Lateral expansion	mm		
	Shear	%		
Stress-rupt.	Temperature	°C		
	Load	MPa		
	Load increm.			
	Duration	hours		
	Elongation	%		

Other properties

	Specification:	Description:	Results:
Grain size to	ASTM E112-10	Comparison method	6
Ferrite content		Fischer feritscope	52 %
Corrosion test to	ISO 3651-2:1998	Method A	Passed
Macro examination			
Microstructure test			
Inclusional content to	ASTM E45-10	Method A	A= 0 B= 1 C= 0,5 D= 1,5
UT to	API 6A 20th Ed.	PSL3 (par. 7.4.2.3.15)	Passed
Visual check			Passed
Dimensional check			Passed
P.M.I. check			Passed
Fatigue testing			

Remarks: *Material not intended for use in aerospace/aircraft applications.*
- Material manufactured without using Cuban Nickel.
- Material in compliance with directives 2000/53/EC, 2002/95/EC and CD 2005/618/EC.
- [1] Extracted specimen position and notch as per drawing of specification n° SMST/MET 10001 Rev.00; specimens solution annealed in laboratory at 1080°C x 20' - W.Q.

Material made in Italy. *No welds, no mercury and radioactive contamination.*

The material is in compliance with the mentioned specifications. Material produced according to the Quality System described in the FORONI S.p.A. MSQ Manual.

Quality System Manual: MSQ Ed. 2003 Rev. 3 (13/12/2010)

S.C.Q. Department: U.Gallina — M. Gallina

R.S.Q. Inspector

Fully or partial reproduction of the document without a written approval by FORONI S.p.A. is forbidden

ANNEX 2 Page 10/14

FORONI S.p.A. 21055 Gorla Minore (VA) Italia	**COTATION D'INCLUSION** INCLUSION CONTENT	Cert. n° 2011/3018 Rev. 0 Date 23/11/2011 Annex A Matériau DMV 25.7N Coulée/Heat F06249

Commande 3220000789 AV.1
Order
+ Confirmation commande
+ Order confirmation dated 2011/110731

Centre				*Moyen rayon*				*Bord*				*Type*
A	*B*	*C*	*D*	*A*	*B*	*C*	*D*	*A*	*B*	*C*	*D*	
												Fine
				0	1,5	0,5	1,5	0	1	0,5	1,5	*Épaisse*
												Inclusion Métallique Allongées
												Inclusion Métallique AMAS

Inclusion type indéterminée

Plage d'ep. en micron		*13 ÷ 30*	*31 ÷ 50*	*51 ÷ 100*	*100 ÷ >*
Allongées	*nombre*				
	long.				
Globulaire	*nombre*	1	1		

S.C.Q. Department
S.Pivotto

Fully or partial reproduction of this document without a written approval by FORONI S.p.A. is forbidden.

ABNAHMEPRÜFZEUGNIS
INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION
EN 10204-3.1

TÜV CERT CERTIFIED TO DIN EN ISO 9001

BS EN ISO 9001

BÖHLER EDELSTAHL

No.: 122461 / 2012.05.23
Blatt/Sheet/Page: 1 / 3

Besteller/Purchaser/Acheteur:
Salzgitter Mannesmann Stainless
Tubes France SAS.
Route de Semur - B.P. 10
FR-21500 Montbard Cedex
France

Bestell-Nr./Purchaser order No./No. de commande:
3220001057 / 2012.02.09

Werksauftrags-Nr./Works order-No./No. de la commande de l'usine:
1568324 / 2012.02.10

Prüfgegenstand/Object of test/Object d'examen:
BÖHLER A911SC W-No.1.4501, DMV 25.7 N
Billet from ingot, forged, solution annealed, quenched
ECOFINISH

Empfänger/Consignee/Destinataire:
Salzgitter Mannesmann Stainless
Tubes France SAS.
Route de Semur - B.P. 10
FR-21500 Montbard Cedex
France

Empfängerref.-Nr./Receiver reference-No./Référence destinataire:
-

Lieferschein-Nr./Delivery note-No./Avisd'expedition du client:
50990229 / 2012.03.26

Anforderungen/Requirements/Exigence:
N°DMV.MS 001 Rev.09
N°DMV.MS 002 Rev.17
N°DMV/MET 86009 Rev.06
N°SMST/MET 10001 Rev.00

Volume of delivery

Pos./Los	Dimensions	Length	No. of Pieces	Weight kgs	Mat.-ID	Test No.	Heat No.
20/1	RD 273 MM	5.000 - 10.000 MM	6	17435	4W5J	1243750-1	W70282

Chemical Composition (%)

Chemical Composition Steelmaking Process: EAF+AOD										Heat No.
C	Si	Mn	P	S	Cr	Mo	Ni	V	W	
0,022	0,37	0,52	0,024	<0,0003	25,73	3,64	7,10	0,09	0,52	W70282
Cu	Co	Ti	Al	Nb	B	N	Pb	O	As	
0,54	0,07	<0,005	0,011	<0,005	0,0020	0,25	<0,0003	0,0025	<0,005	W70282
Sn	Sb	PREN*	PREW*							
<0,005	<0,0050	41,74	42,60							W70282

*PREN = Cr+3,3*Mo+16*N

PREW = Cr+3,3(Mo+0,5*W)+16*N

ABNAHMEPRÜFZEUGNIS
INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION
EN 10204-3.1

TÜV CERT EN ISO 14001

BS EN ISO 9001

BÖHLER EDELSTAHL

No.: 122461 / 2012.05.23
Blatt/Sheet/Page: 2 / 3

Metallographic Examination

Macro Etch test
The material fulfils the requirements

Non metallic inclusions acc.to DIN 50602 K3 = 0

Non metallic inclusions acc.to ASTM E45-11 method A

		A		B		C		D	
		thin	heavy	thin	heavy	thin	heavy	thin	heavy
361S	r	-	-	-	-	-	-	1,5	0,5
361S	1/2 r	-	-	-	-	-	-	1,5	0,5
362S	r	-	-	-	-	-	-	1,5	0,5
362S	1/2 r	-	-	0,5	-	-	-	1,5	0,5
363S	r	-	-	-	-	-	-	1,5	0,5
363S	1/2 r	-	-	-	-	-	-	1,5	0,5
361B	r	-	-	-	-	-	-	1,5	0,5
361B	1/2 r	-	-	-	-	-	-	1,5	0,5
362B	r	-	-	-	0,5	-	-	1,5	0,5
362B	1/2 r	-	-	0,5	-	-	-	1,5	0,5
363B	r	-	-	-	-	-	-	1,5	0,5
363B	1/2 r	-	-	-	-	-	-	1,5	0,5

Ferrite content examination
The ferrite content was determined in accordance with ASTM E562-11 using the point count method.

Ferrite	53 %
Austenite	47 %

Micrographic examination

The microstructure was examined acc.to N°DMV.MS 001 Rev.09.
The material is free from sigma phases.
Stringers: Better picture 1
Heap shapes: Better picture 1

Mechanical Properties

Hardness test in delivery condition

Test no.	Piece no.	Testing standard	Location	HBW10/3000
				<=250
1243750-1	-	-	Bars	241

ABNAHMEPRÜFZEUGNIS
INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION
EN 10204-3.1

TÜV CERT EN ISO 14001

BS EN ISO 9001

BÖHLER EDELSTAHL

No.: 122461 / 2012.05.23
Blatt/Sheet/Page: 3 / 3

Heat treatment of test specimen

	Temp.(°C)	Time (min)	Cooling
Solution annealed	1080°C	20	Water

Impact test on heat treated specimen

Key
H = hardest
W = softest
S = Top
M = Middle
B = Bottom

Test no.	*Piece no.	Testing standard	Location	Temp. grd C	Impact energy Charpy-V J	Lateral expansion LE mm	Shear area %
					>=200	info.	info.
1243750-1	361S	ASTM E23-07A E1	QZ	-10	200 239 219	1,36 1,80 1,52	100 100 100
					info.	info.	info.
1243750-1	361S	ASTM E23-07A E1	QZ	-45	74 65 79	0,46 0,46 0,84	50 45 40

Hot workability test (Gleeble test)
The material fulfils the requirements

Nondestructive Examination

Material identification test: Positive material identification

100% Ultrasonic test acc.to EN 10228-4
The material fulfils quality class 2

100% Surface Inspection
A visual test was performed.
The bars are without unacceptable surface defects.

Statements
The material is free of mercury contamination.
No weld repair has been performed on this material.
Country of origin and melt: AUSTRIA

The material is conforming to directive 2000/53/EC, 2002/95/EC and CD 2005/618/EC.
The material conforms with the requirements applicable to the order.
Material has been produced according quality programme that has been approved.
Material has been produced according Q.A. rules referenced to this order.
Material has been produced according Böhler General Quality Managment-Manual Version 1.5.

Radioaktivitätskontrolle/Radioactivity inspection: Co-60<0,1Bq/g;
hiermit kleiner als Grenzwert in der anzuwendenten Spezifikation IAEA RS-G-1.7 für unbedenkliche Stoffe.
therefore smaller than upper limit required according to specification IAEA RS-G-1.7 for inoffensive material.

Wir bestätigen hiermit, dass die obengenannten Erzeugnisse den Bestellvorschriften entsprechen.
We hereby certify that the above mentioned products are consistent with the order prescriptions.
Nous certifions que les produits énumérés ci-dessus sont conformes aux prescriptions de la commande.

Zeichen des Lieferwerks:
Brand of Manufacturer:
Marques de l'usine:

Besichtigung und Nachmessung: Keine Beanstandung
Inspection and Checking of Dimensions: Satisfactoty
Inspection of Control des dimensions: Satisfaisant

Zeichen des Prüfers:
Symbol of Inspector:
Symbole de l'inspecteur:

BÖHLER Edelstahl GmbH & Co KG
Mariazellerstrasse 25
8605 Kapfenberg, AUSTRIA
www.bohler-edelstahl.com

Ines.Archan@bohler-edelstahl.at
AUSSTELLER/
ORIGINATOR / AUTEUR

DER ABNAHMEBEAUFTRAGTE/
INSPECTOR'S REPRESENTATIVE/
DU CONTROLEUR

PQR N°2YN.15.B.113 ANNEX 5

Page 1/4

voestalpine Böhler Welding

voestalpine Böhler Welding France S.A.S
14, Place Georges Pompidou
78180 Montigny-Le-Bretonneux
T. +33 13005-4949
F. +33 13005-4900
www.voestalpine.com/welding

ANAIS
Z.a. des Morands
rue Maurice Herbinet
71210 MONTCHANIN
France

Certificat de réception 3.1
Inspection certificate 3.1

selon / as per : EN 10204
No. : No. : 2015-2015095272-000020-023
Rev. 0 Page / Page : 1 / 1

N° Commande	PO no.	31088	de / of	19.03.2015
Confirmation de commande	Order no.	1015064257		
Bordereau de livraison/Pos.	Delivery note/pos./splitt	2015095272/000000/000020	de / of	19.03.2015
Produit	Product	Baguette/fil TIG / GTAW rod/wire		231223 66579 15C8A00W 0015
Désignation commerciale	Trade name	THERMANIT 25/09 CUT		
Classification	Standard designation	EN ISO 14343-A: W 25 9 4 N L AWS A5.9: ER2594		
Dimensions	Dimension	2,0 x 1000 mm		
Coulée	Heat no.	101601		
Quantité livrée	Quantity	30,0 KG		

Composition chimique (%) du fil machine — **Chemical composition in % of the hot rolled wire**

C	Si	Mn	P	S	Cr	Mo	Ni	W	Cu	N				
0,02	0,3	0,8	0,021	0,001	25,6	3,8	9,6	0,5	0,5	0,25				

Propriétés mécaniques — **Mechanical properties** — **EN 10204: 2.2**

Test de traction — Tensile test — / according to : EN ISO 6892-1/09
Echantillon — Specimen preparation — / according to : EN ISO 5178

T	Rp 0,2 MPa	Rp 1,0 MPa	Rm MPa	A (Lo = 5d) %	Z %	TTAS PWHT	Remarques Remarks
20°C	≥ 600	≥ 650	≥ 750	≥ 25			

Test de flexion par choc — Impact test — / according to : EN ISO 148-1/10
Echantillon — Specimen preparation — / according to : EN ISO 9016 VWT 0/b

T	Energie de rupture Impact energy KV / J	Moyenne Average KV / J	Expansion latérale Lateral expansion mm	Cristallinité Shear fracture %	TTAS PWHT	Remarques Remarks
-40°C	≥ 50					
20°C	≥ 80					

Lieu / Town: Montigny-Le-Bretonneu
Date / Date: 19.03.2015

Ce document issu d'un traitement informatique ne requiert pas de signature.
This certificate was issued by DP-equipment and does not require signature.

Q.A. auth. repr. / Authorized representative
Legait

voestalpine
ONE STEP AHEAD.

Applus RTD

RAPPORT DE CONTRÔLE RADIOGRAPHIQUE

N° 2015/03/OM/309-1

page 1 / 3

CLIENT *Customer*	BUREAU VERITAS	**CONSTRUCTEUR** *Manufacturer*	**N° de commande :** *Order N°* /
MATERIEL CONTRÔLÉ *Radiographed Equipments*	WPS 1	**CODE**	ASME IX
SPECIFICATION INTERPRETATION	CHAPITRE QW191-1 ASME IX + SECTION 2 ASME V + Spécification Total GS EP PVV 614		

CONDITIONS OPERATOIRES - *Technical conditions*

FILM - *Film*

KODAK ☐ AGFA ■ — D4 — Classe: C4/C5

SIMPLE FILM ■ *Single film*
DOUBLE FILM ☐ *Double Film*
Format: 10X20 ■ 10X40 ☐

DÉVELOPPEMENT *Development*
MANUEL ☐ *Manual*
AUTOMATIQUE ■ *Automatic*

I.Q.I.
TYPE
ASME: FE
NF EN:
Int. ☐ Ext. ■

NUANCES
ACIER ☐
INOX ■
ALU ☐
AUTRES: _ _ _

RAYON γ *γ RAYS*
CO 60 ☐
IR 192 ☐
ACTIVITE *Activity* _____ Tbq
DIMENSIONS - *Dimensions*
DISTANCE FOCALE *Focal distance* mm
Temps de pose _ sec / ___ mn

RAYON X *X RAYON*
APPAREIL *Apparatus*: Sieffert
TYPE *Type*: ERESCO 42MF
FOYER *Focal spot*: 1.7x1.7
TENSION D'UTILISATION *Voltage*: <200KV
INTENSITE *Amps.*: 4.5mA
DISTANCE FOCALE *Focal distance*: 700 mm
Temps de pose: 45 sec / 6 mn

ÉCRANS-SCREENS
AU PLOMB *Lead* ■ ☐ _____

	Nbre Nber	Ep/Thickness X	Y
ANTERIEURS *Front*	■	0,03	
INTERMEDIAIRES *Intermediate*	☐		
POSTERIEURS *Back*	■	0,03	

FILTRES - *FILTERS*
AU PLOMB *Lead* ■ ☐ _____

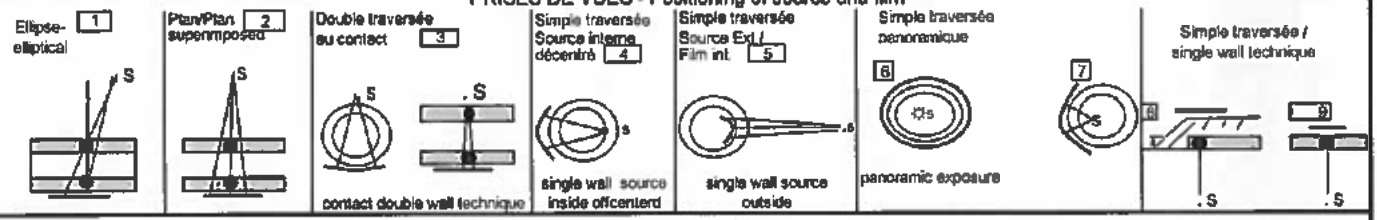
	Nbre Nber	Epai. Thick
ANTERIEURS *Front*	☐	
POSTERIEURS *Back*	■	2 mm

ETENDUE DU CONTRÔLE : *Quantity controles*: FULL

CLASSE DE SEVERITE : *Rules applied*: UW52

CIRCULAIRE - Circular ■
LONGITUDINALE - Longitudinal ☐
PIQUAGE - Stubbing ☐

PRISES DE VUES - Positioning of source and film



OBSERVATIONS - *Observations:*

EXECUTANTS *Operators*	CONTRÔLE APPLUS RTD Applus RTD supervision	CONTRÔLE CLIENT *Client supervision*
NOM - *Name et Niveau- Level*	J. BRAILLON	
VISA - *Visa*		
DATE - *Date*	14/04/2015	

Applus RTD

RAPPORT DE CONTRÔLE RADIOGRAPHIQUE Conditions Techniques

N° 2015/03/OM/309-1

Repère général figurant sur les clichés : LTM/CDE/DATE/APP/SOUDURE
General identification mark of radiographs

N° de commande : /
Order N°

Eléments ou zones concernées *Part inspected*	Repère particulier du cliché *Special identification mark*	Défauts - *Defects* — Désignation normalisée internationale *Identification International*																													Conclusion *Conclusion*		CONDITIONS TECHNIQUES TECHNICAL CONDITIONS				
		A Soufflures *Gas holes*		B Incl. Laitier *Slag inclusions*			Défauts- Forme			C	D	E Fissures *Cracks*		F																						
		Aa	Ab	Ba	Bb	Bc	Bd	Be	Bf			Ea	Eb																							
		Sphériques	Vermiculaires	Orientation quelconque	Alignées ou chapelet	Allongées	Défauts bumnage	Mauvaise reprise	Défauts croisement	Manque fusion	Manque Pénétration	Longitudinale	Transversale	Caniveaux ou sillons	Effondrement gouttes	Rochage	Tungstène	IQI ø fils	Densité	N° prise de vue Pagel	Conforme	Non Conforme	Distance source objet	distance de la face objet (coté source) au film	ø extérieur	Epaisseur	Epaisseur totale radiographiée
WPS 1		*Porosity*	*Worm holes*	*In any direction*	*Slag lines*	*Weaving faults*	*Fault from bad chipping*	*Fault at electrode change*	*Fault at junction of seams*	*Lack of fusion*	*Incomplete penetration*	*Longitudinal*	*Transverse*	*Undercutting*	*Sapped weld*	*Cauliflower*	*Tungsten*	*Wire diameter IQI*	*Density*	*Source positionning technique N°*	**Conform**	**Non Conforming**	*Source to object distance*	*Distance from source side of object to film*	*Outside ø*	*Thickness*	**Radiographed thickness**
1	**A**																	0,16	2,6	2	X		670	30	26,70	2,87	6,0
	B																	0,16	2,6	2	X		670	**30**	26,70	2,87	6,0
	C																	0,16	2,6	2	X		670	30	26,70	2,87	6,0
2	**A**																	0,16	2,5	2	X		670	30	26,70	2,87	6,0
	B																	0,16	2,5	2	X		670	30	26,70	2,87	6,0
	C																	0,16	2,5	2	X		670	30	26,70	2,87	6,0
3	**A**																	0,16	2,6	2	X		670	30	26,70	2,87	6,0
	B																	0,16	2,6	2	X		670	30	26,70	2,87	**6,0**
	C																	0,16	2,6	2	X		670	30	26,70	2,87	6,0
4	**A**																	0,16	2,6	2	X		670	30	26,70	2,87	6,0
	B																	0,16	2,6	2	X		670	30	26,70	**2,87**	**6,0**
	C																	0,16	2,6	2	X		670	30	26,70	2,87	6,0
5	**A**																	0,16	2,4	2	X		670	30	26,70	2,87	6,0
	B																	0,16	2,4	2	X		670	30	26,70	2,87	**6,0**
	C																	0,16	2,4	2	X		670	30	26,70	2,87	6,0
6	**A**																	0,16	2,5	2	X		670	30	26,70	2,87	6,0
	B																	0,16	2,5	2	X		670	30	26,70	2,87	6,0
	C																	0,16	2,5	2	X		670	30	26,70	2,87	6,0
7	**A**																	0,16	2,1	2	X		670	30	26,70	2,87	6,0
	B																	0,16	2,1	2	X		670	30	26,70	2,87	6,0
	C																	0,16	2,1	2	X		670	30	26,70	2,87	6,0

EXECUTANTS	*Name:* J. BRAILLON	*Level:* II	*Name:*	*LEVEL:*	
LECTURE DES FILMS PAR *Interpretation of films by*	**NOM:** E. THIOLLIER *Name:*	**NIVEAU:** II *Level:* ASNT-TC 1A	**VISA:**	**DATE:** 14/04/2015	

Applus RTD

RAPPORT DE CONTRÔLE RADIOGRAPHIQUE Conditions Techniques

N° 2015/03/OM/309-1

page 3 / 3

Repère général figurant sur les clichés : *General identification mark of radiographs* **LTM/CDE/DATE/APP/SOUDURE**

N° de commande : *Order N°* /

Eléments ou zones concernées *Part inspected*	Repère particulier du cliché *Special identification mark*	Défauts - *Defects* — Désignation normalisée internationale *Identification International*																			Conclusion *Conclusion*			CONDITIONS TECHNIQUES TECHNICAL CONDITIONS									
		A		B						C	D	E		F																		
		Soufflures *Gas holes*		Incl. Lattier *Slag inclusions*			Défauts- Forme					Fissures *Cracks*																					
		Aa	Ab	Ba	Bb	Bc	Bd	Be	Bf			Ea	Eb																			
		Sphériques	Vermiculaires	Orientation quelconque	Alignées ou chapelet	Allongées	Défauts burinage	Mauvaise reprise	Défauts cisaillement	Manque fusion	Manque Pénétration	Longitudinale	Transversale	Cuniveaux ou sillons	Effondrement gouttes	Rochage	Tungstène	IQI ø fils	Densité	N° prise de vue. Pagel	Conforme	Non Conforme	Distance source objet	distance de la face objet (coté source) au film	ø extérieur	Epaisseur	Epaisseur totale radiographiée
WPS 1		*Porosity*	*Worm holes*	*In any direction*	*Slag lines*	*Weaving faults*	*Fault from bad chipping*	*Fault at electrode change*	*Fault at junction of seams*	*Lack of fusion*	*Incomplete penetration*	*Longitudinal*	*Transverse*	*Undercutting*	*Sagged weld*	*Cauliflower*	*Tungsten*	*wire diameter IQI*	*Density*	Source positionning technique N°	Conform	Non Conforming	Source to object distance	Distance from source side of object to film	Outside ø	Thickness	Radiographed thickness
8	A																	0,16	2,1	2	X		670	30	26,70	2,87	6,0
	B																	0,16	2,1	2	X		670	30	26,70	2,87	6,0
	C																	0,16	2,1	2	X		670	30	26,70	2,87	6,0

EXECUTANTS	*Name:* J. BRAILLON	*Level:* II	*Name:*	*LEVEL:*
LECTURE DES FILMS PAR *Interpretation of films by*	NOM: *Name:* E. THIOLLIER	NIVEAU: *Level:* II ASNT-TC 1A	VISA:	DATE: 14/04/2015

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 1/35 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° : C-170415-04143 (27924-0)** *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

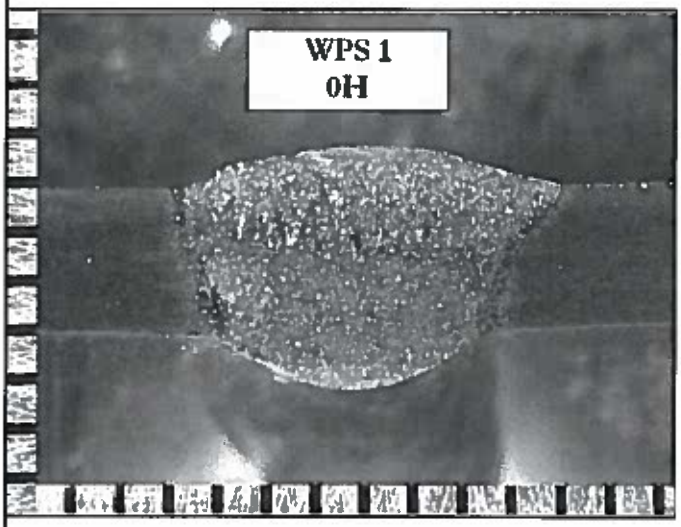
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MACROGRAPHIQUE / *MACROGRAPHIC INVESTIGATION TEST* Cofrac

Méthode d'essai / *Test method* : QW183 — **Examen N°/***Examination n°* : 511 570



Type d'assemblage
Tube Bout à Bout

Grossissement / *Magnification*
1 division correspond à 1 mm

Réactif / *Etchant*
Solution de soude à 10N

Résultat examen / *Examination result*
Fusion Correcte. Absence de défaut de compacité.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Observation(s) : Macrographie 0H

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS ACCREDITATION N° 1-2006 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats de ce rapport n'engagent que l'objet soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en entier, sans l'autorisation du laboratoire. Cofrac n'est ni auteur ni éditeur des informations contenues dans ce document sauf lorsqu'il est émetteur par l'intermédiaire, elles sont identifiées par le symbole 'Cofrac'
The results relate only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some data reported in this document are covered by the accreditation, they are identified by the 'Cofrac' symbol

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 2/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° : C-170415-04143 (27924-0)** *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

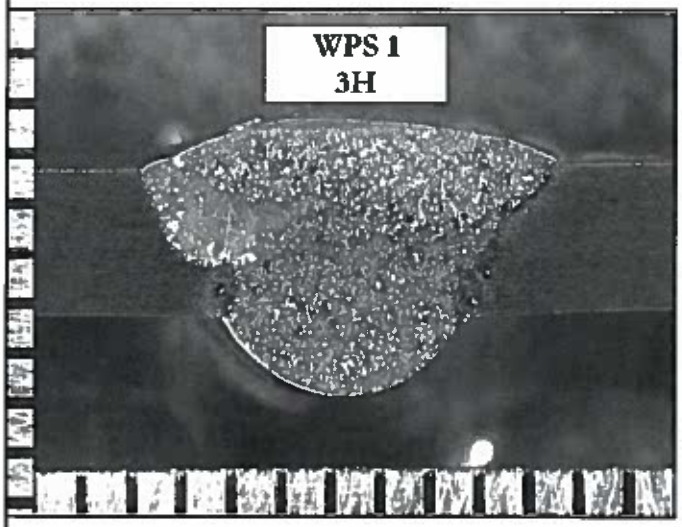
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MACROGRAPHIQUE / *MACROGRAPHIC INVESTIGATION TEST* Cofrac

Méthode d'essai / *Test method* : QW183 — **Examen N°/***Examination n°* : 511 571



Type d'assemblage
Tube Bout à Bout

Grossissement / *Magnification*
1 division correspond à 1 mm

Réactif / *Etchant*
Solution de soude à 10N

Résultat examen / *Examination result*
Fusion Correcte. Absence de défaut de compacité

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Observation(s) : Macrographie 3H

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf accord écrit du laboratoire. Dans le cas où seules certaines parties du rapport sont concernées par l'accréditation, elles sont identifiées par le symbole Cofrac.
The results relate only the items tested. This test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of tests duly reported in the document are covered by the accreditation, they are identified by the 'Cofrac' symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS 1828

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 3/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N°** : C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 **du:** 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE** : 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

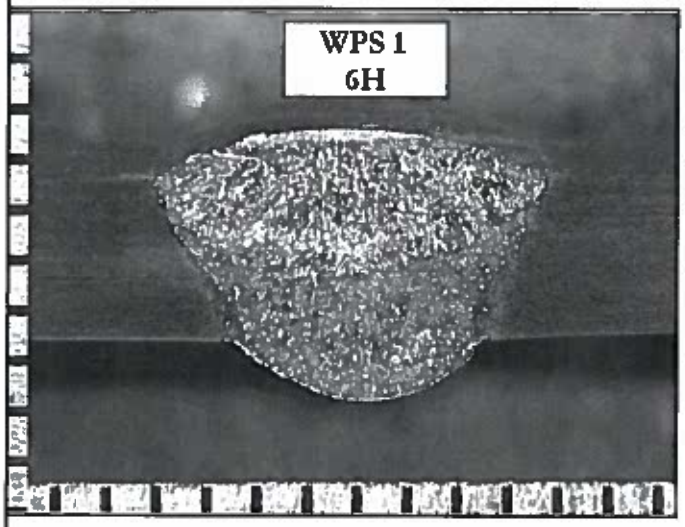
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MACROGRAPHIQUE / *MACROGRAPHIC INVESTIGATION TEST* Cofrac

Méthode d'essai / *Test method* : QW183 — **Examen N°/***Examination n°* : 511 572



Type d'assemblage
Tube Bout à Bout

Grossissement / *Magnification*
1 division correspond à 1 mm

Réactif / *Etchant*
Solution de soude à 10N

Résultat examen / *Examination result*
Fusion Correcte. Absence de défaut de compacité

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Observation(s) : Macrographie 6H

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1-0003 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf accord écrit du laboratoire. Dans le cas où des essais couverts par l'accréditation, sont sous-traités par le symbole 'Cofrac'
The results relate only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the 'Cofrac' symbol

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 4/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° :** C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.A + NR-268 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

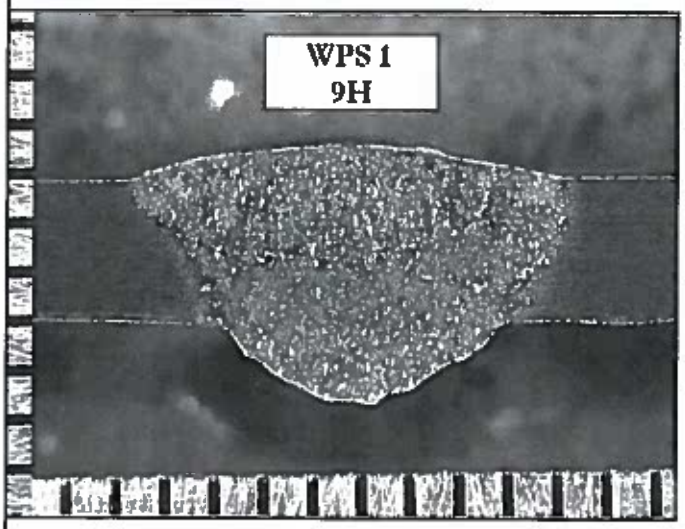
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MACROGRAPHIQUE / *MACROGRAPHIC INVESTIGATION TEST* Cofrac

Méthode d'essai / *Test method* : QW183 — **Examen N°/***Examination n°* : 511 573



Type d'assemblage
Tube Bout à Bout

Grossissement / *Magnification*
1 division correspond à 1 mm

Réactif / *Etchant*
Solution de soude à 10N

Résultat examen / *Examination result*
Fusion Correcte. Absence de défaut de compacité.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Observation(s) : Macrographie 9H

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en intégralité, sans l'accord écrit du laboratoire. Dans le cas où certains paragraphes répertoriés dans ce document sont couverts par l'accréditation, elles sont identifiées par le symbole Cofrac
The results relate only the items tested. The test report certificate shall not be reproduced except in full without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the "Cofrac" symbol

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 5/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N°** : C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE: 6249199 du:** 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE** : 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

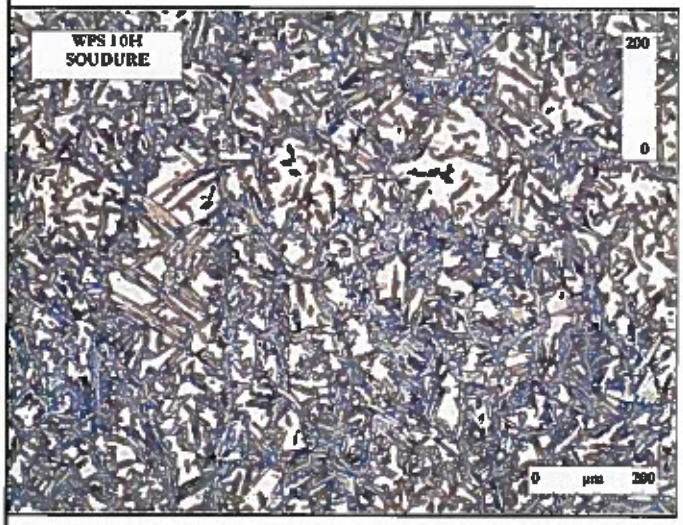
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/***Examination n°* : 511 575



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 0H Soudure

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x100

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1-2006 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en entier, sans l'autorisation du laboratoire. Dans le cas où seules certaines prestations couvertes dans ce document sont couvertes par l'accréditation, elles sont identifiées par le symbole Cofrac.
The results relate only the items tested. The test report may be reproduced except in full without written approval of the laboratory. Only in case of some tests covered in this document are covered by the accreditation, they are identified by the Cofrac symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 6/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N°** : C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 **du:** 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE** : 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°**/*Examination n°* : 511 576



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 0H Soudure

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x400

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date :

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1 2066 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en entier, sans l'autorisation du laboratoire. Dans le cas où seules certaines parties doivent être reproduites, elles sont identifiées par le symbole 'Cofrac'.
The results relate only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some to be reported in this document are covered by the accreditation. They are identified by the 'Cofrac' symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 7/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° :** C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-256 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

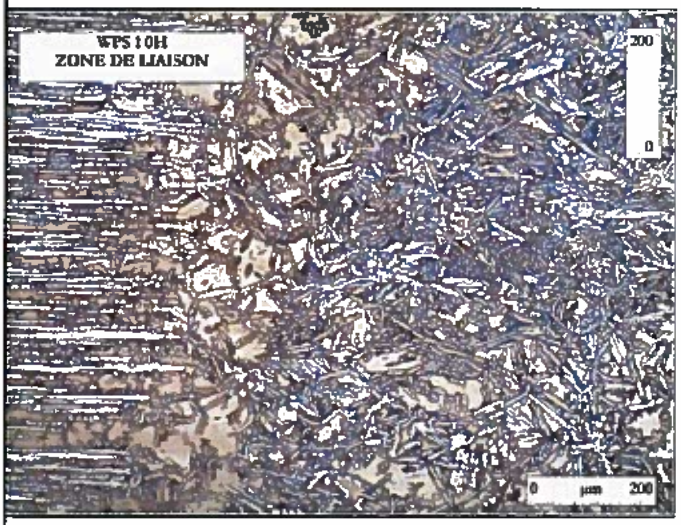
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°**/*Examination n°* : 511 577



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 0H Zone de liaison

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x100

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date :

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en intégralité, sans l'autorisation du laboratoire. Dans le cas où seules certaines parties du document sont couvertes par l'accréditation, elles sont identifiées par le symbole 'Cofrac'.
The results only apply to the items tested. The test report certificate shall not be reproduced except in full without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the 'Cofrac' symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 8/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N°** : C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE**: 6249199 **du:** 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE** : 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

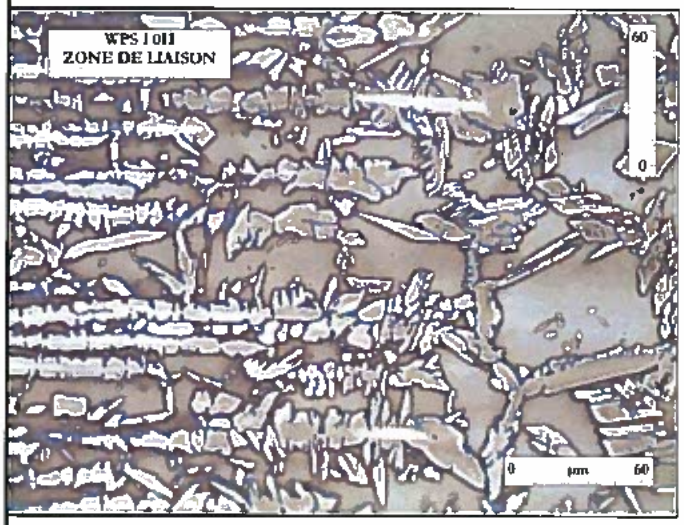
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Trials and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°**/*Examination n°* : 511 578



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 0H Zone de liaison

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x400

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date :

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

ACCREDITATION N° 1-2085 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf accord écrit de l'auteur. Dans le cas où l'objet serait soumis à l'agrément, aucun essai mentionné dans ce document n'est couvert par l'accréditation, sauf ceux identifiés par le symbole 'Cofrac'.
The results relate only to the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some tests carried in this document are covered by the accreditation, they are identified by the 'Cofrac' symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 9/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° : C-170415-04143 (27924-0)** *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* **BRIGNAIS**	**N° COMMANDE: 6249199 du: 10/04/2015** *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION *Specification*	**ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043**

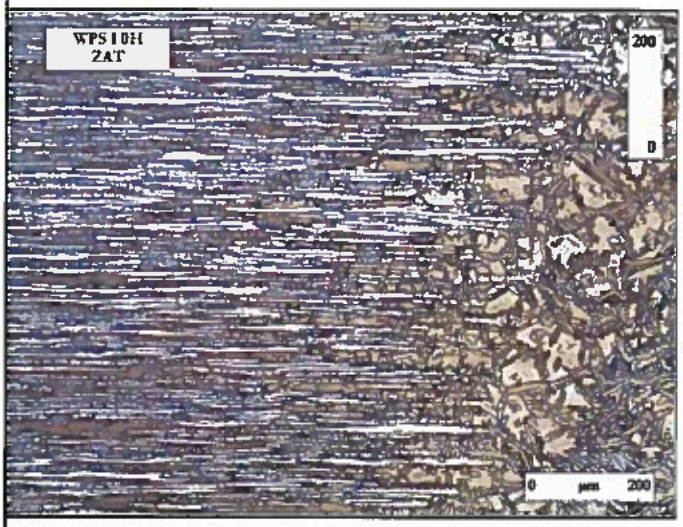
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/***Examination n°* : 511 579



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position OH Zat

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x100

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en entier, sans l'autorisation du laboratoire. Dans le cas où vous auriez certaines prescriptions spécifiques dans ce document non couvertes par l'accréditation, elles sont identifiées par le symbole "Extras".
The results relate only the items tested. This test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the "Extra" symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 10/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° : C-170415-04143 (27924-0)** *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

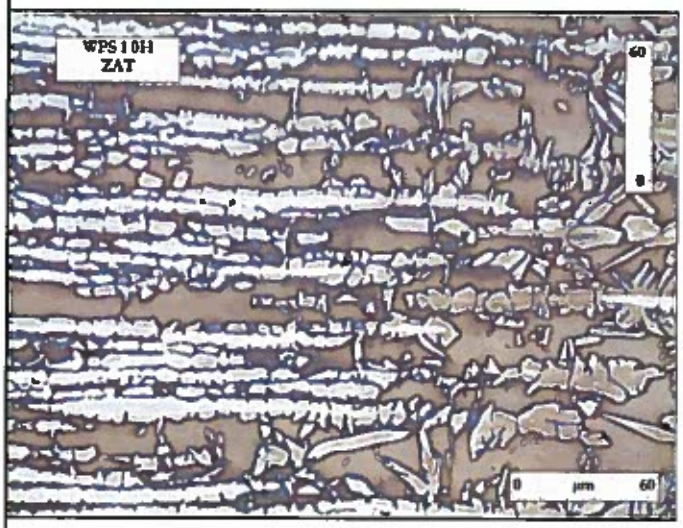
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/***Examination n°* : 511 580



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 0H Zat

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x400

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en intégralité, sans l'approbation du laboratoire. Dans le cas où certains paramètres / appréciations dans ce document sont couverts par l'accréditation, elles sont identifiées par le symbole 'Cofrac'.
The results relate only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the 'Cofrac' symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 11/36 **ANNEXES** / *Appendices* : **0**	**RAPPORT D'ESSAIS N° :** C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 **du:** 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

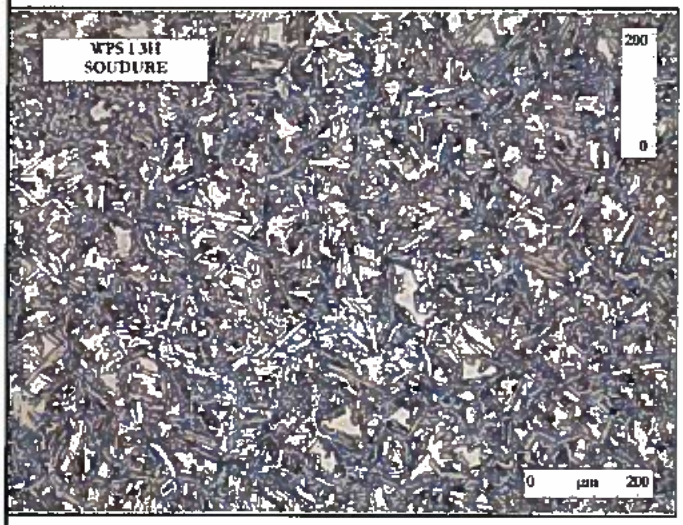
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°**/*Examination n°* : 511 581



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 3H Soudure

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x100

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date :

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCRÉDITATION N° 1-2055 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en totalité, sans l'autorisation du laboratoire. Dans le cas où figurent certaines prestations couvertes dans ce document sont couvertes par l'accréditation, elles sont identifiées par le symbole "Cofrac".
The results relate only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the "Cofrac" symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 12/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° : C-170415-04143 (27924-0)** *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 814 rev.4 + NR-266 DT R03 + NR-215 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

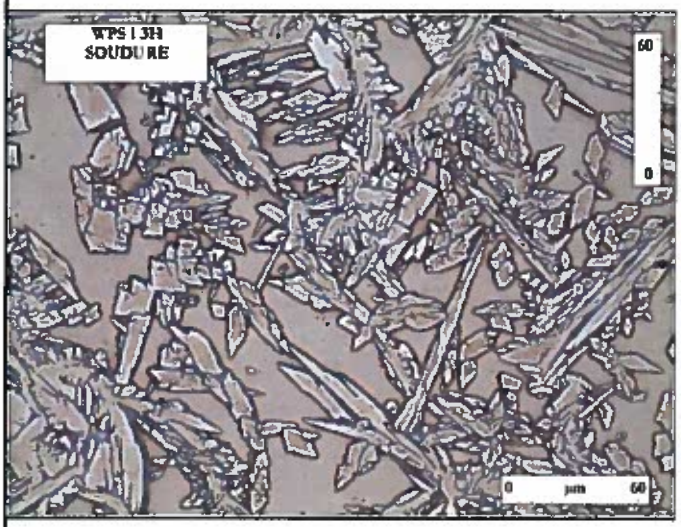
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26,7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°** / *Examination n°* : 511 582



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 3H Soudure

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x400

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1-2699 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en entier, sans l'autorisation du laboratoire. Dans le cas où seules certaines prestations couvertes dans ce document sont couvertes par l'accréditation, elles sont identifiées par le symbole Cofrac.
The results relate only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only those tests reported in this document are covered by the accreditation. they are identified by the Cofrac symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 13/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° : C-170415-04143 (27924-0)** *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* **BRIGNAIS**	**N° COMMANDE: 6249199 du: 10/04/2015** *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

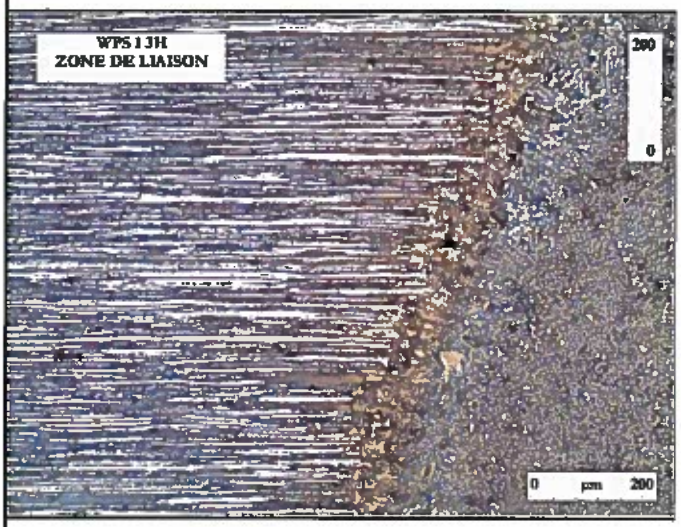
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/***Examination n°* : 511 583



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 3H Zone de liaison

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x100

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS ACCREDITATION N° 1-2023 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf accord écrit de l'auteur du laboratoire. Dans le cas où certains paragraphes spécifiques dans ce document font référence aux accréditations, elles sont identifiées par le symbole 'Cofrac'.
The results relate only the items tested. The test report certificate shall not be reproduced except in full without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation. They are identified by the 'Cofrac' symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 14/36 **ANNEXES** / *Appendices* : **0**	**RAPPORT D'ESSAIS N° :** C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 **du:** 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

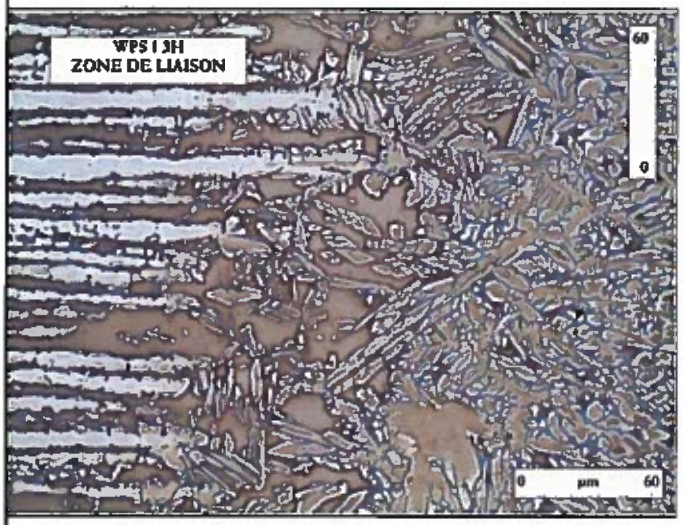
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°**/*Examination n°* : 511 584



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 3H Zone de liaison

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x400

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1-2006 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en entier, sans l'autorisation du laboratoire. Dans le cas où nous serions amenés à émettre des opinions ou interprétations, elles sont couvertes par le symbole "Cofrac".
The results relate only to items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of tests not covered by the accreditation, they are identified by the "Cofrac" symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 15/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° : C-170415-04143 (27924-0)** *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

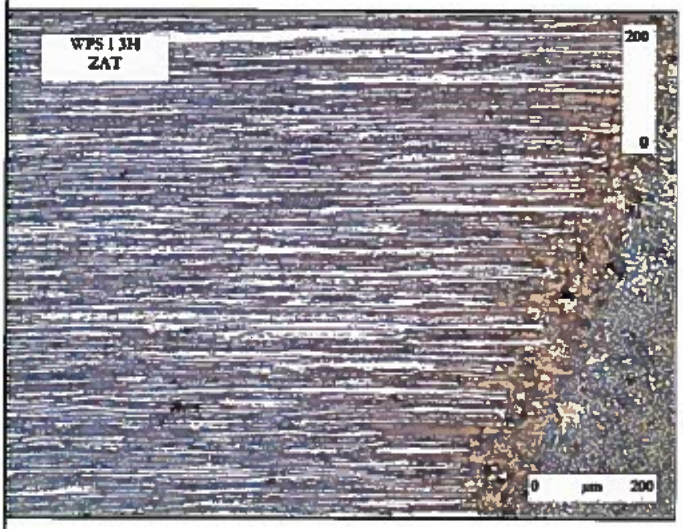
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°**/*Examination n°* : 511 585



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 3H Zat

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x100

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date :

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

ACCREDITATION N° 1-2006 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en entier, sans l'autorisation du laboratoire. Dans le cas où l'essai réalisé (prélèvement, mesures) est couvert par l'accréditation, ceux sont identifiés par le symbole "Cofrac".
The results relate only to the items tested. The test report cannot be reproduced except in full, without written approval of the laboratory. Only in case of tests covered by the accreditation, they are identified by the "Cofrac" symbol.

PQR N° LYN.15.B.115 ANNEX 6 Page 16/36

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 16/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° :** C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 **du:** 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

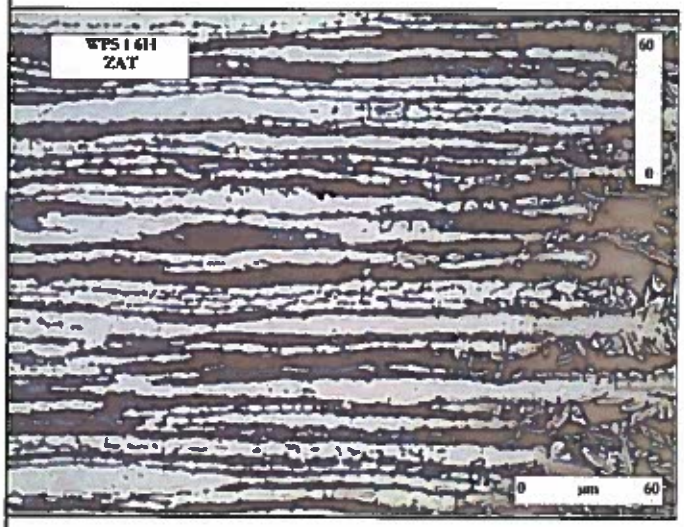
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/***Examination n°* : 511 586



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 3H Zat

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x400

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS ACCREDITATION N° 1-2056 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en intier sans l'autorisation du laboratoire. Dans le cas des essais couverts par l'accréditation, ceux sont identifiés par le symbole "Cofrac".
The results relate only the items tested. The test report certificate shall not be reproduced except in full without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the "Cofrac" symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 17/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N°** : C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE** : 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

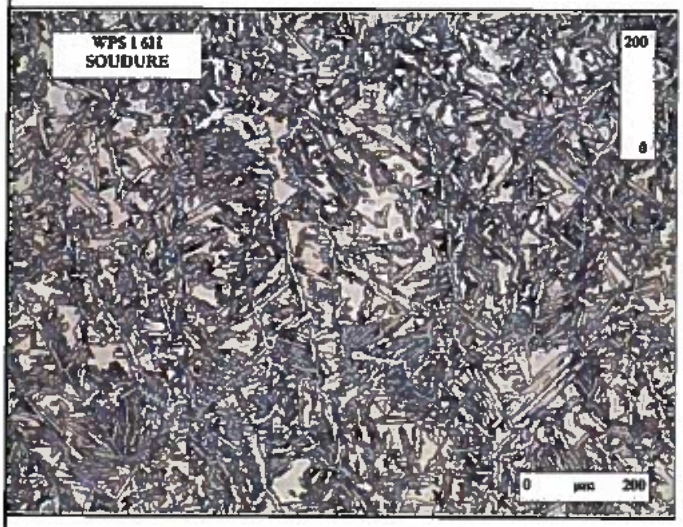
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/*Examination n°*** : 511 587



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 6H Soudure

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x100

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1-2099 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Ce rapport d'essai ne peut être reproduit, sauf autorisation écrite du laboratoire. Les résultats ne portent que sur les échantillons soumis à l'essai. Le présent rapport d'essai ne doit pas être reproduit, sauf autorisation écrite du laboratoire. Les résultats ne portent que sur les échantillons soumis à l'essai. This test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the 'Cofrac' symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 18/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N°** : C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* **BRIGNAIS**	**N° COMMANDE:** 6249199 **du:** 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE** : 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R01 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

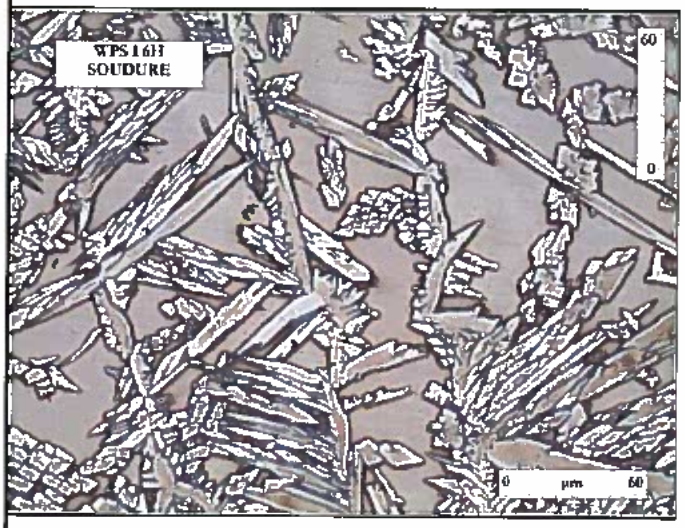
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°**/*Examination n°* : 511 588



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 6H Soudure

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x400

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date :

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCRÉDITATION N° 1 2066 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essais ne doit pas être reproduit, sauf en entier, sans l'autorisation du laboratoire. Dans le cas où l'objet contient des prestations réalisées dans le domaine non couvert par l'accréditation, elles sont identifiées par le symbole Cofrac.
The results apply only the items tested. The test report must not be reproduced except in full, without written approval of the laboratory. Only the cases of some tests reported in this document are covered by the accreditation. They are identified by the Cofrac symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 19/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° : C-170415-04143 (27924-0)** *Test report #*
CLIENT : BUREAU VERITAS SA - C8003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 on 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

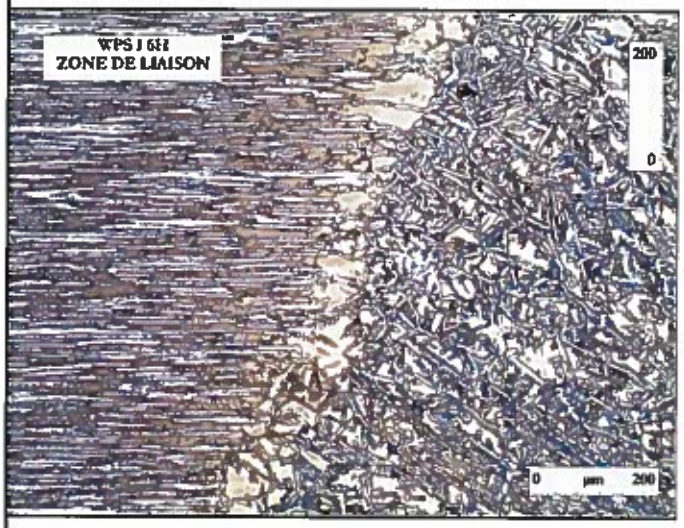
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/***Examination n°* : 511 589



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 6H Zone de liaison

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x100

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCRÉDITATION N° 1-2006 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en intégralité, sans l'autorisation du laboratoire. Dans le cas de limites certaines prestations exposées dans ce document sont couvertes par l'accréditation, elles sont identifiées par le symbole Cofrac.
The results relate only the items tested. The test report may not be reproduced except in full without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation they are identified by the "Cofrac" symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 20/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N°** : C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 **du:** 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE** : 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-215 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

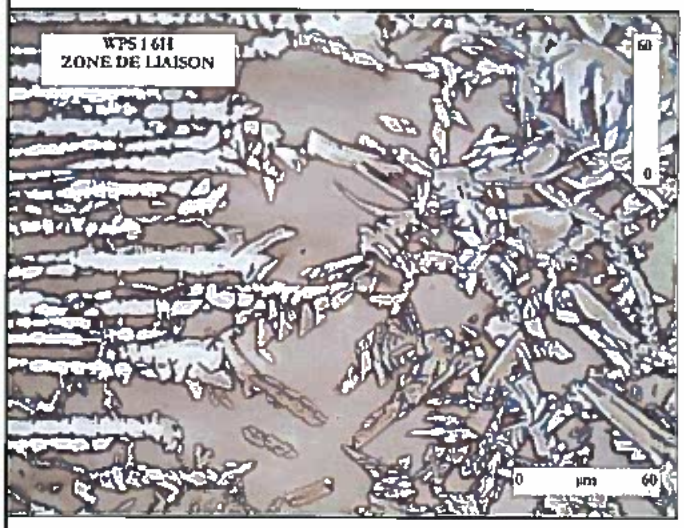
Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**

Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3

Examen N°/*Examination n°* : 511 590



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 6H Zone de liaison

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x400

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1-2054 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf accord écrit du laboratoire. Sous le nom de Bureau Veritas, il est identifié par le symbole Cofrac.
The results relate only the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory. Only in case of tests regularly in the document are covered by the accreditation, they are identified by the "Cofrac" symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 21/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° :** C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 on 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

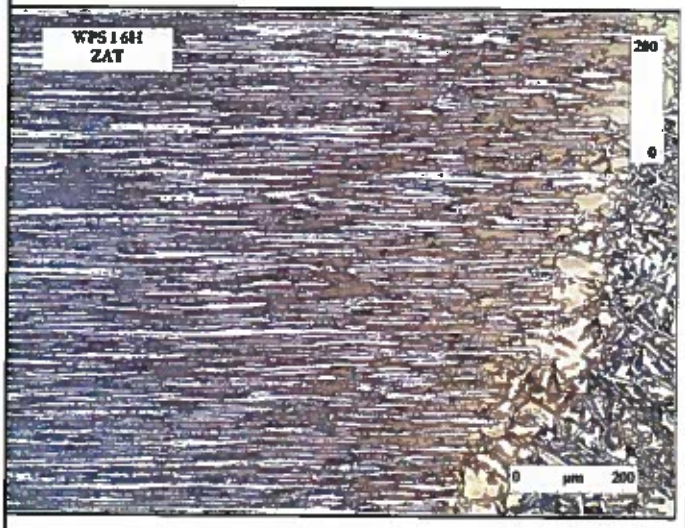
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°**/*Examination n°* : 511 591



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 8H Zat

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x100

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essais ne doit pas être reproduit, sauf en totalité, sans l'autorisation du laboratoire. Dans le cas où seules certaines parties/pages/annexes dans ce document sont accréditées par l'accréditeur, elles sont identifiées par le symbole. Cofrac.
The results relate only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the "Cofrac" symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 22/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° : C-170415-04143 (27924-0)** *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 on 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

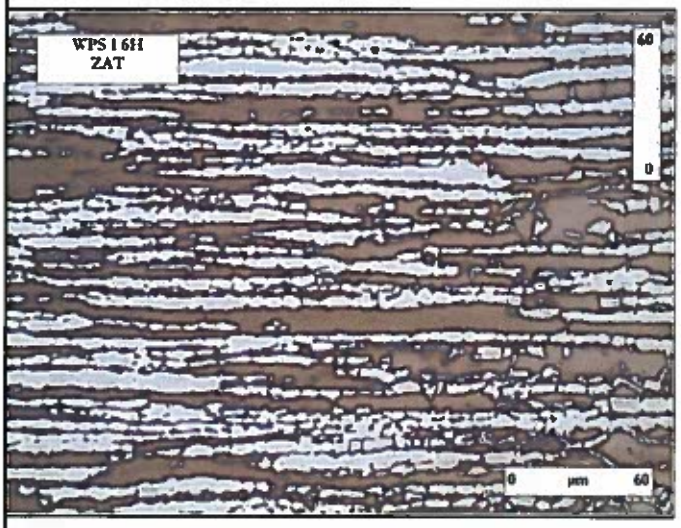
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/***Examination n°* : 511 592



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 6H Zat

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x400

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1 2966 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf avec l'autorisation du laboratoire. Dans le cas où seules certaines prestations apparaissent dans le document sont couvertes par l'accréditation, elles sont identifiées par le symbole Cofrac
The results apply only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the symbol Cofrac

PQR N° LYN. 15. B. 115 ANNEX 6 Page 23/36

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 23/36 **ANNEXES** / *Appendices* : **0**	**RAPPORT D'ESSAIS N° :** C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 **du:** 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

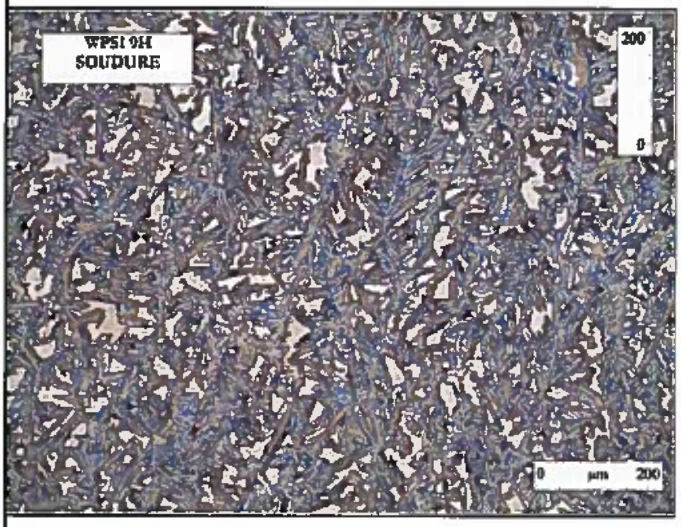
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/***Examination n°* : 511 593



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 9H Soudure

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x100

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION n° 1-2066 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf accord écrit du laboratoire. Dans le cas où des valeurs issues d'essais sous accréditation figurent dans ce document, elles sont identifiées par le symbole "Cofrac".
The results relate only the items tested. The test report certificate shall not be reproduced except in full without written approval of the laboratory. Only in case of tests body reported in this document are covered by the accreditation, they are identified by the "Cofrac" symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 24/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N°** : C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE** : 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 514 rev.4 + NR-256 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/***Examination n°* : 511 594



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 9H Soudure

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x400

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date :

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

ACCRÉDITATION N° 1-2003 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en intégralité, sans l'autorisation du laboratoire. Dans le cas où des résultats provenant de sous-traitants figurent dans ce document ils sont couverts par l'accréditation, sauf ceux identifiés par le symbole "Cofrac".
The results relate only the items tested. The test report may not be reproduced except in full without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the "Cofrac" symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 25/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° :** C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 on 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

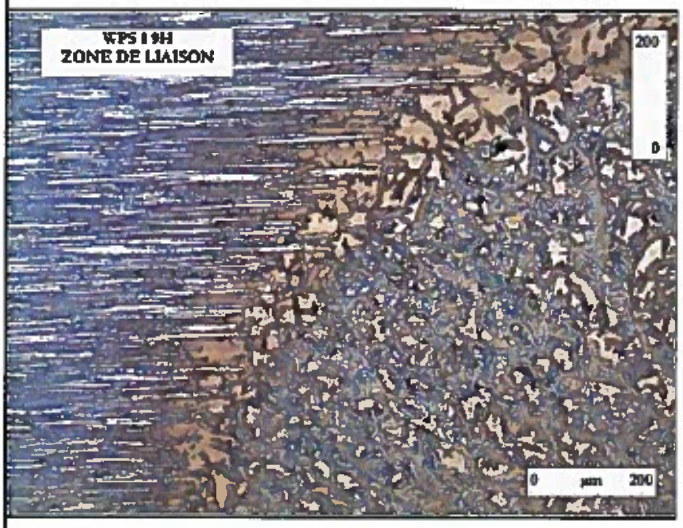
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/***Examination n°* : 511 595



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 9H Zone de liaison

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x100

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1-2886 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en intégralité, sans l'autorisation du laboratoire. Dans le cas où seules certaines parties du rapport sont proposées par l'établissement, elles sont identifiées par le symbole "Cofrac".
The results relate only the items tested. The test report certificate shall not be reproduced except in full without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the "Cofrac" symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 76 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 26/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N°** : C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE** : 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

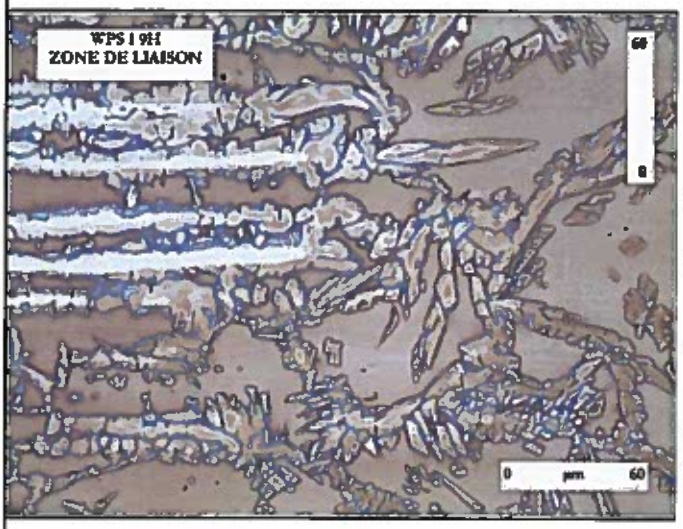
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/***Examination n°* : 511 596



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 9H Zone de liaison

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x400

Examens / *Examination result*
Absence de précipité et de phase intermétallique

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCRÉDITATION N° 1-2088 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf autorisation écrite du laboratoire. Dans le cas de tâches d'essais accréditées couvertes par l'accréditation, elles sont identifiées par le symbole 'Cofrac'.
The results relate only the items tested. The test report certificate shall not be reproduced except in full without written approval of the laboratory. Only in case of tests reported in the document are covered by the accreditation, they are identified by the 'Cofrac' symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 27/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° : C-170415-04143 (27924-0)** *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* **BRIGNAIS**	**N° COMMANDE: 6249199 du: 10/04/2015** *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

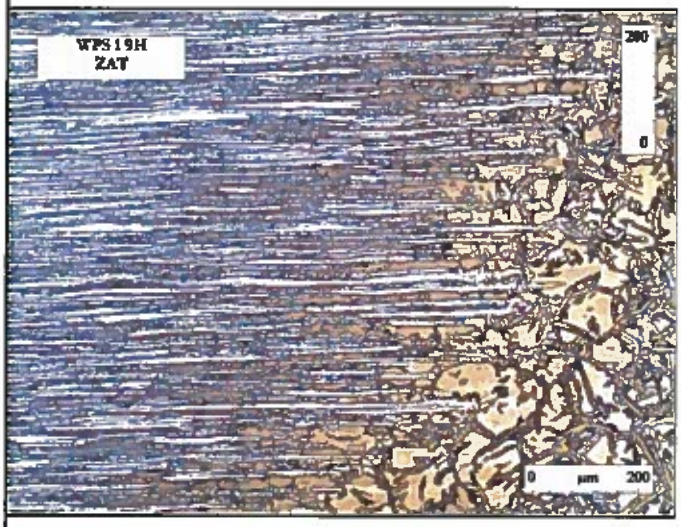
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/***Examination n°* : 511 597



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 9H Zat

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x100

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1-2088 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats de ce rapport s'appliquent aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en entier, sans l'autorisation du laboratoire. Dans le cas de toutes erreurs éventuelles rencontrées dans ce document sont couvertes par l'accréditation, elles sont identifiées par le symbole Cofrac.
The results relate only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of errors that appear in this document are covered by the accreditation, they are identified by the Cofrac' symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 28/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° :** C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 **du:** 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

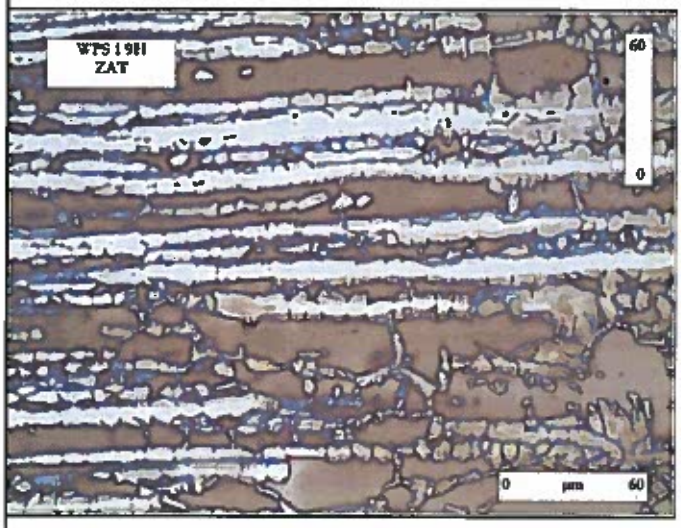
Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

EXAMEN MICROGRAPHIQUE / *MICROGRAPHIC INVESTIGATION*

Méthode d'essai / *Test method* : ASTM E3 — **Examen N°/***Examination n°* : 511 598



Prélèvement éprouvette / *Direction of sampling*
Travers soudure

Zone / *Localisation of sample*
Position 9H Zat

Attaque / *Etching*
Electrolytique

Réactif / *Etchant*
Solution de soude à 10N

Grossissement / *Magnification*
x400

Examens / *Examination result*
Absence de précipité et de phase intermétallique.

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 05/05/2015
Test date

Technicien de laboratoire : Agnès Faye
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1 2006 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essais ne doit pas être reproduit, sauf en intégralité, sans accord écrit du laboratoire. Dans le cas où les essais effectués mentionnés dans ce document sont couverts par l'accréditation, ils sont identifiés par le symbole 'Cofrac'.
The results relate only the items tested. The test report cannot be reproduced except in full, without written approval of the laboratory. Only in case of tests mentioned in this document are covered by the accreditation, they are identified by the 'Cofrac' symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 29/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° : C-170415-04143 (27924-0)** *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 **du:** 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 814 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**

Nuance / *Grade* : **UNS S32750**

RAPPORT DE TAUX DE FERRITE / *FERRITE RATE TEST REPORT*

MACHINE D'ESSAI / *Testing machine* : 1148DL301

NORME DE REFERENCE / *Standard* : ASTM E 562

Grossissement / *magnification* : X 400

Zone n° / Position	0H	3H	6H	9H
1	52.8 – 47.8	54.4 – 55.5	57.9 – 58.4	59.9 – 58.9
2	57.4 – 55.7	58.3 – 57.6	56.8 – 58.7	48.8 – 55.1
3	53.7 – 53.4	54.7 – 62.1	49.4 – 58.4	50.1 – 57.0
4	54.6 – 52.9	59.0 – 51.7	60.2 – 61.0	58.1 – 51.1
5	60.5 – 60.0	57.3 – 54.7	53.3 – 56.3	41.5 – 59.7
6	54.2 – 60.3	62.0 – 53.0	59.8 – 61.0	61.0 – 61.3
7	55.1 – 54.1	51.0 – 60.2	58.1 – 64.0	55.3 – 60.8
8	56.0 – 58.0	51.4 – 52.6	53.2 – 52.8	53.1 – 52.5
9	60.5 – 60.5	61.2 – 59.6	53.1 – 53.0	50.7 – 59.2

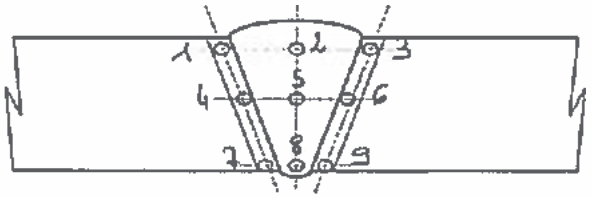


Figure 4A - Original weld and 3 mm ligament repair

Nom de l'opérateur / *Name of operator* : Agnès Faye

OBSERVATION(S) : Imposition : Taux de ferrite 35 - 65%

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1 2056 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en entier, sans l'autorisation du laboratoire. Dans le cas où seules certaines prestations apparaissent dans un document sous-traitées par l'organisme, elles sont identifiées par le symbole 'Cofrac'.
The results relate only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some test reports or this document are covered by the accreditation, they are identified by the 'Cofrac' symbol.

PQR N°LYN.15.B.115 ANNEX 6 Page 30/36

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 30/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° :** C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

ESSAI DE TRACTION / *TENSILE TEST* Cofrac

Méthode d'essai / *Test method* : ASTM A370

N° *Test specimen*	Dimensions *Dimensions* L x e (mm)	Position *Position* (1)	Section *Cross section* mm²	Temp. °C	Fm N	ReH	Rp 0.2%	Rp 1%	Rm MPa	A %	Z %	E	Position cassure *Fracture localisation (2)*
Imp. / *Req*									≥800	45			
511 561	13.09 x 2.74	T	35.87	20	33919				950	Conforme			S
Imp. / *Req*									≥800	45			
511 562	13.07 x 2.74	T	35.81	20	33820				945	Conforme			S

Machine d'essai *Testing machine* :	Méthode *Method* :	N°extensomètre *Extensometer* :	Micromètre d'extérieur *Palmer* :	Pied à coulisse *Caliper-gauge* :
1209FD301 (24/10/14)			1109DE301	1031DP301

(1) L : LONGITUDINAL / Longitudinal, T : TRANSVERSAL / Transvers, R : RADIAL / Radial, TA : TANGENTIEL / Tangential L : LONGITUDINAL / L

(2) S : RUPTURE EN SOUDURE / In weld, ZL : RUPTURE EN ZONE DE LIAISON / In bord area, MB : RUPTURE EN METAL DE BASE / In base metal, ZAT : ZONE AFFECTEE THERMIQUEMENT / Heat affected zone
< 1/3 L0 = distance entre la rupture et le repère le plus proche inférieur à L0/3
2/3 L0 = distance entre la rupture et le repère le plus proche supérieur à L0/3

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Technicien de laboratoire / *Laboratory technician* : Audrey Saby

Date d'execution des essais / *Test date* : du 27/04/2015 au 05/05/2015

Villars, le 07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS ACCREDITATION N° 1 2006 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en entier, sans l'autorisation du laboratoire. Dans le cas de toutes remarques pratiques rapportées dans ce document pour couvertes par l'accréditation, elles sont identifiées par le symbole 'Cofrac'
The results relate only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of comments reported in this document are covered by the accreditation, they are identified by the 'Cofrac' symbol

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 31/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° :** C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

ESSAI DE PLIAGE / *BEND TEST* Cofrac

Méthode d'essai / *Test method* : QW160

N° *Test specimen*	Type *Type (3)*	Position *Position (1)*	Dimensions *Dimensions* mm	Diamètre mandrin *Former* mm	Distance entre rouleaux *Distance between rollers* mm	Angle *Angle* °	Défaut *Defect*	Position cassure (2) *Fracture localisation*
511 564	TFBB	T	10 x 3	12	20	180°	aucun défaut apparent / no defect	---
511 565	TFBB	T	10 x 3	12	20	180°	aucun défaut apparent / no defect	---
511 566	TRBB	T	10 x 3	12	20	180°	aucun défaut apparent / no defect	---
511 567	TRBB	T	10 x 3	12	20	180°	aucun défaut apparent / no defect	---

(1) L : LONGITUDINAL / *Longitudinal*, T : TRANSVERSAL / *Transverse*

(2) S : SOUDURE / *In weld*, ZL : ZONE DE LIAISON / *In bord area*, MB : METAL DE BASE / *In base metal*, ZAT : ZONE AFFECTEE THERMIQUEMENT / *HAZ* : *Heat affected zone*

(3) FBB : Éprouvette de pliage endroit sur soudure bout à bout / *Face bend test specimen of butt weld*
RBB : Éprouvette de pliage envers sur soudure bout à bout / *Root bend test specimen of butt weld*
SBB : Éprouvette de pliage transversal de côté sur soudure bout à bout / *Transverse side bend test specimen of butt weld*
FBC : Éprouvette de pliage endroit sur revêtement, sans soudure bout à bout / *Face bend test specimen of cladding without a butt weld*
SBC : Éprouvette de pliage de côté sur revêtement, sans soudure bout à bout / *Side bend test specimen of cladding without a butt weld*
FBCB : Éprouvette de pliage endroit sur revêtement, avec soudure bout à bout / *Face bend test specimen of cladding with a butt weld*
SBCB : Éprouvette de pliage de côté sur revêtement, avec soudure bout à bout / *Side bend test specimen of cladding with a butt weld*

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Pied à coulisse / *Calliper-gauge* : 1031DP301
Machine d'essai / *Testing machine* : 1015FD301
Technicien de laboratoire / *Laboratory technician* : Audrey Saby
Date d'execution des essais / *Test date* : du 27/04/2015 au 05/05/2015

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCRÉDITATION N° 1-2006 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf accord écrit, sans l'autorisation du laboratoire. Dans le cas où des résultats provenant de sous-traitants figureraient dans ce rapport, ceux-ci sont couverts par l'accréditation, sauf mentionnés par le symbole 'Cofrac'.
The results relate only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the 'Cofrac' symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 32/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N°** : C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE** : 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

Produit / *Object.* : **Assemblage bout à bout de tube Dia. 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

ESSAI DE CORROSION PAR PIQURE DANS FECL3 / *FERRIC CHLORIDE CORROSION TEST* Cofrac

Méthode d'essai / *Test method* : ASTM A923 Méthode C — **Examen N°**/*Examination n°* : 517 090

Dimensions L x l x e / *Size*	48 x 10 x 3,5 mm
Surface testée / *Tested area*	1366,0 mm²
Préparation / *Preparation*	Mécanique / Mechanical
Température / *Temperature*	40°C
Solution corrosive / *Test solution*	100 g de FeCl3 6H2O dans 900 mL d'eau distillée / 100 g of FeCl3 6H2O in 900 mL of distilled water
Durée d'essai / *Duration of test*	24h
Masse initiale / *Initial weight*	11.552 g
Masse finale / *Finish weight*	11.552 g
Perte de masse / *Weight loss*	0.000 g
Vitesse de corrosion / *Corrosion speed*	0.00 mg/dm².j
Observation(s)	Absence de piqûre sous grossissement X20

L'usinage de(s) éprouvettes a été réalisé par nos soins (sous-traité) / *Test specimen were machined by us (subcontracted)*

Date d'execution des essais : 30/04/2015
Test date

Technicien de laboratoire : Audrey Saby
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1-2058 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en intégralité, sans l'accord écrit du laboratoire. Dans le cas où seules certaines prestations figurées dans le document sont couvertes par l'accréditation, elles sont identifiées par le symbole 'Cofrac'
The results relate only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the 'Cofrac' symbol

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 82 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 33/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° : C-170415-04143 (27924-0)** *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE: 6249199 du: 10/04/2015** *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 514 rev.4 + NR-265 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

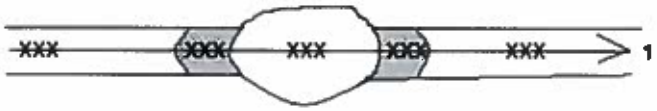
Produit / *Object* : **Assemblage bout à bout de tube Dia . 26.7 x 2**	Nuance / *Grade* : **UNS S32750**

ESSAI DE DURETE / *HARDNESS TEST*

EXAMEN N°/*Examination n°* : 511 599 **Méthode d'essai** / *Test method* : **ASTM E384 Méthode R**

MACHINE D'ESSAI / *Testing machine* : 1144FE301 Type / *Type* : **HV10 ASTM E384**

	Métal de base *Parent material*	ZAT *HAZ*	Zone fondue *Welding*	ZAT *HAZ*	Métal de base *Parent material*
1	288-285-284	280-278-279-281-280	275-273-274-278-286-279	280-279-279-280-279	277-277-281



Observation(s) / : 0h

Pour déclarer ou non, la conformité à la spécification, il n'a pas été tenu explicitement compte de l'incertitude associée au résultat/ *To state or not the compliance with specification, it was not explicitly taken into account the uncertainty associated to the result*

Date d'execution des essais : 07/05/2015
Test date

Technicien de laboratoire : Audrey Saby
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1-2004 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en entier, sans l'autorisation du laboratoire. Dans le cas où des parties contractuelles prévoient, rapportées dans ce document sont couvertes par l'accréditation elles sont identifiées par le symbole 'Cofrac'.
The results relate only the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the 'Cofrac' symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 34/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° : C-170415-04143 (27924-0)** *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* **BRIGNAIS**	**N° COMMANDE: 6249199 du: 10/04/2015** *Order number* 6249199 on 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-090043 *Specification*	

Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

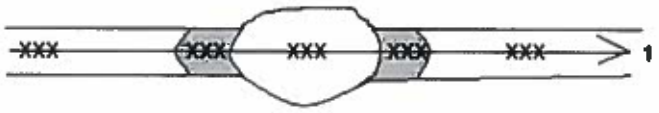
VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

ESSAI DE DURETE / *HARDNESS TEST*

EXAMEN N°/*Examination n°* : 511 600 **Méthode d'essai** / *Test method* : **ASTM E384 Méthode R**

MACHINE D'ESSAI / *Testing machine* : 1144FE301 **Type** / *Type* : **HV10 ASTM E384**

	Métal de base *Parent material*	ZAT *HAZ*	Zone fondue *Welding*	ZAT *HAZ*	Métal de base *Parent material*
1	279-281-281	311-316-294-291-276	273-276-270-268-272-274	280-280-281-278-278	277-279-279



Observation(s) / : 3h

Pour déclarer, ou non, la conformité à la spécification, il n'a pas été tenu explicitement compte de l'incertitude associée au résultat/ *To state or not the compliance with specification, it was not explicitly taken into account the uncertainty associated to the result*

Date d'execution des essais : 07/05/2015
Test date

Technicien de laboratoire : Audrey Saby
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1-2898 PORTEE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf accord écrit du laboratoire. Dans le cas où aucune mesure(s) provenant sous-traitant(s) ont contribué aux résultats, elles sont couvertes par l'accréditation. Les mesures identifiées par le symbole 'Cofrac' sont couvertes par l'accréditation.
The results relate only the items tested. The test report certificate shall not be reproduced except in full without written approval of the laboratory. Only in case of some data reported in this document are covered by the accreditation. They are identified by the 'Cofrac' symbol.

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 35/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N°** : C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 on 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE** : 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

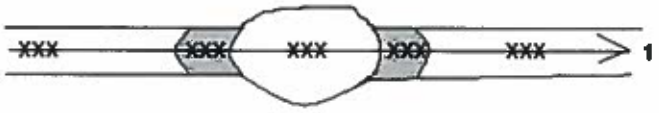
VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

ESSAI DE DURETE / *HARDNESS TEST*

EXAMEN N°/*Examination n°* : 511 601 **Méthode d'essai** / *Test method* : ASTM E384 Méthode R

MACHINE D'ESSAI / *Testing machine* : 1144FE301 **Type** / *Type* : HV10 ASTM E384

	Métal de base *Parent material*	ZAT *HAZ*	Zone fondue *Welding*	ZAT *HAZ*	Métal de base *Parent material*
1	280-281-281	281-277-279-282-280	274-281-277-288-274-272	273-283-285-283-279	274-276-273



Observation(s) / : 6h

Pour déclarer, ou non, la conformité à la spécification, il n'a pas été tenu explicitement compte de l'incertitude associée au résultat/ *To state or not the compliance with specification, it was not explicitly taken into account the uncertainty associated to the result*

Date d'execution des essais : 07/05/2015
Test date

Technicien de laboratoire : Audrey Saby
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1-2039 PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf en totalité, sans l'autorisation du laboratoire. Dans le cas des essais couverts par l'accréditation, ceux sont identifiés par le symbole 'Cofrac'
The results relate only the items tested. The test report certificate shall not be reproduced except in full, without written approval of the laboratory. Only in case of some tests reported in this document are covered by the accreditation, they are identified by the 'Cofrac' symbol

BUREAU VERITAS LABORATOIRES
Laboratoire d'Essais Métallurgiques
17 Avenue de l'Industrie
42390 VILLARS
Tél. +33 (0)4 77 92 41 44
Fax. +33 (0)4 77 79 70 34

BUREAU VERITAS

RAPPORT D'ESSAIS / TEST REPORT

PAGE: 36/36 **ANNEXES** / *Appendices* : 0	**RAPPORT D'ESSAIS N° :** C-170415-04143 (27924-0) *Test report #*
CLIENT : BUREAU VERITAS SA - CB003177 *Customer* BRIGNAIS	**N° COMMANDE:** 6249199 du: 10/04/2015 *Order number* 6249199 *on* 04/10/2015
DATE DE RECEPTION : 17/04/2015 *Receipt date* 04/17/2015	**AFFAIRE :** 6249199 SRCI *Contract*
SPECIFICATION ASME IX + specification TOTAL GS EP PVV 614 rev.4 + NR-266 DT R03 + NR-216 DT R307 E+ Doc. ENG-10-KSEC-AEEC-DER-000043 *Specification*	

Les éprouvettes et les chutes seront conservées 3 mois ou réexpédiées à vos frais / *Tries and cutting will be kept 3 months or send in your expenses.*

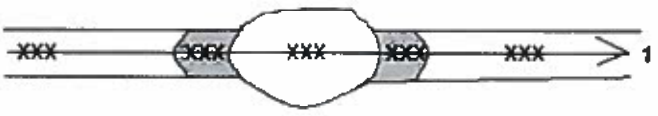
VI_C-170415-04143-001 (160 960 - BV92) / **WPS 1 / 1 à 8**

ESSAI DE DURETE / *HARDNESS TEST*

EXAMEN N°/*Examination n°* : 511 602 **Méthode d'essai** / *Test method* : **ASTM E384 Méthode R**

MACHINE D'ESSAI / *Testing machine* : 1144FE301 **Type** / *Type* : **HV10 ASTM E384**

	Métal de base *Parent material*	ZAT *HAZ*	Zone fondue *Welding*	ZAT *HAZ*	Métal de base *Parent material*
1	284-287-286	283-280-280-281-280	269-279-277-270-273-267	277-281-277-268-270	279-281-282



Observation(s) / : 9h

Pour déclarer, ou non, la conformité à la spécification, il n'a pas été tenu explicitement compte de l'incertitude associée au résultat/ *To state or not the compliance with specification, it was not explicitly taken into account the uncertainty associated to the result*

Date d'execution des essais : 07/05/2015
Test date

Technicien de laboratoire : Audrey Saby
Laboratory technician

Villars, le
07/05/2015

Chef de service ou suppléant :
Department head or his deputy
Jacques Reynaud

cofrac ESSAIS
ACCREDITATION N° 1-2004 PORTEE DISPONIBLE SUR www.cofrac.fr

Les résultats ne se rapportent qu'aux objets soumis à l'essai. Le rapport d'essai ne doit pas être reproduit, sauf autorisation du laboratoire. Dans le cas de tests couverts par l'accréditation, ceux sont identifiés par le symbole. Cofrac
The results relate only the items tested. The test report cannot be reproduced except in full, without written approval of the laboratory. Only in case of some tests covered on this document are covered by the accreditation, they are identified by the 'Cofrac' symbol.

BUTTWELD WELDER PERFORMANCE QUALIFICATIONS (WPQ) FOR SMAW, SAW, GMAW, FCAW, GTAW and PAW
Qualification de Soudeur sur soudure bout à bout (WPQ) pour les procédés SMAW, SAW, GMAW, FCAW, GTAW and PAW
(According to ASME Section IX, ASME Boiler and Pressure Vessel Code)

Welder's name: LEFEVRE Julien
Nom du Soudeur

Identification n°: LJ
Identification du Soudeur

Test Description
Description de l'essai

Identification of WPS followed: QS01
Référence du MOS suivi par le soudeur durant l'essai

Date welded: 12/12/2022
Date de Soudage

Test coupon ☒
Coupon d'essai

Specification and type/grade of base metal: 316L
Spécification avec Type et Grade ou Numéro du métal de base

Thickness: 10
Epaisseur

Testing Variables and Qualification Limits
Variables utilisées pendant l'essai et Domaine de validité

Welding Variables (QW-350) ***Variables de soudage***	**Actual Values** ***Valeurs relevées***	**Range Qualified** ***Domaine de validité***
Welding process *Procédé de soudage*	**GTAW**	**GTAW**
Manual or semi-automatic *Soudage Manuel ou Semi-Automatic*	Manuel	Manual
Backing (with/without) *Support envers (avec / sans)*	Sans support envers	Avec ou sans support envers
Plate ☐ Pipe or tube ☒ (enter diameter mm) *Plate Tube (indiquer le diametre)*	48.3 mm	≥ 25 mm
Base metal P-Number to P-Number *Métal de Base P- No sur P-No*	P N°8 / P N°8	P-N°1 through P-N15F, P-N°34, and P-N°41 through P-N°49
Welded without filler metal *Soudé sans metal d'apport*	/	/
Filler metal or electrode specification (info. only) *Spécification(s) relative au métal d'apport ou à l'électrode (pour info)*	AWS A5.9	N/A
Filler metal or electrode classification (info. only) *Classification(s) du métal d'apport ou de l'électrode (pour info)*	ER316L	N/A
Filler metal F-Number *Métal d'apport F N°*	FN°6	FN°6
Consumable insert *Insert consommable*	/	/
Filler Metal Product Form *Forme du metal d'apport*	Fil plein	Fil plein ou fourré de métal
Deposit weld metal thickness for each process: *Epaisseur de métal déposé pour chaque procédé*		
Process 1, - 3 layers minimum Yes ☒ or No ☐ *Procédé 1, - 3 Passes minimum*	10	≤ 20 mm
Process 2, -3 layers minimum Yes ☐ or No ☐ *Procédé 2, - 3 Passes minimum*	/	/
Position(s) / Position(s)	6G	F, O, H, V
Vertical progression (uphill or downhill) *Progression* verticale *(montante / descendante)*	uphill	uphill
Use of gas backing Yes ☒ or No ☐ *Gas de protection envers*	Avec gaz de protection envers	Avec gaz de protection envers
Transfer mode *Mode de transfer*	NA	NA
Current type/polarity (AC, DCEP, DCEN) *Type de courant et Polarité*	**CC-**	**CC-**

Qualification émise et approuvée par APAVE le 18/01/2023

BUTTWELD WELDER PERFORMANCE QUALIFICATIONS (WPQ) FOR SMAW, SAW, GMAW, FCAW, GTAW and PAW
Qualification de Soudeur sur soudure bout à bout (WPQ) pour les procédés SMAW, SAW, GMAW, FCAW, GTAW and PAW
(According to ASME Section IX, ASME Boiler and Pressure Vessel Code)

Results of Tests
Résultats des essais

Result of visual examination:- Completed weld : SATISFACTORY
Résultat de l'examen visuel sur la soudure terminée :

Butt welds - Type of bends:
Bout à bout – Types de pliages :

Transverse face and root bends ☐ *Transversal endroit & envers*

Longitudinal face and root bends ☐ *Longitudinal endroit & envers*

Side bends ☐ *Côté*

Type of test *Type d'essai*	Result *Résutat*	Type of test *Type d'essai*	Result *Résutat*	Type of test *Type d'essai*	Result *Résutat*

Mechanical tests conducted by : / *Essais mécaniques effectués par*

Laboratory test n°: / *Ref du rapport d'essai Labo*

Volumetric Examination Results (when permitted): RT ☒ or UT ☐ PV N° A534262743.12-025RT

Résultats des examens volumétriques (lorsqu'ils sont autorisés)

Film or specimens evaluated by : M. BAULIN *Films ou éprouvettes évaluées par*

Company : APAVE NDT *Société*

Welding supervised by : SRCI and Witnessed by APAVE

We certify that the statements in this record are correct and that the test coupons were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Boiler and Pressure Vessel Code Edition 2021
Nous certifions que les informations figurant dans ce procès-verbal sont exactes et que les assemblages d'essais ont été préparés, soudés et testés conformément aux exigences du Code ASME Section IX édition

Organization: SRCI
Fabricant

Date: 18/01/2023

Certified by : Céline VAYSSE-LABONDE
Certifié par

This welder performance qualification (WPQ) has been witnessed by APAVE who certifies the results.
La présente qualification de soudeur a été réalisée en présence de APAVE qui en certifie les résultats.

Date *(Date)*: 18/01/2023

Apave's Inspector name : LEFEVRE Philippe
Nom de l'inspecteur
Signature :
Visa

apave

BUTTWELD WELDER PERFORMANCE QUALIFICATIONS (WPQ) FOR SMAW, SAW, GMAW, FCAW, GTAW and PAW
Qualification de Soudeur sur soudure bout à bout (WPQ) pour les procédés SMAW, SAW, GMAW, FCAW, GTAW and PAW
(According to ASME Section IX, ASME Boiler and Pressure Vessel Code)

Approval certificate of welder according to directive 2014/68/EU
Approbation du certificat de qualification de soudeur selon la directive 2014/68/EU

This qualification certificate assessed to the essential safety requirements stated by 3.1.2, paragraphs 3, 4 and 5, of appendix I of the directive 2014/68/EU. This certificate acts as approval certificate of welder (NB n° 0060).
Cette qualification satisfait aux exigences essentielles de sécurité spécifiées au 3.1.2, paragraphes 3, 4 et 5, de l'annexe I de la directive 2014/68/UE. Ce certificat fait office d'attestation d'approbation de soudeur (ON n° 0060).

Norme européenne harmonisée de référence de l'approbation : EN ISO 9606-1:2017
Reference Harmonized European Standard for the approval

Complétée par Fiches d'orientations 2014/68/UE : F-08 et F-12
Supplemented by orientation sheets 2014/68/UE

☒ New performance qualification every 3 years *Nouvelle QS tous les 3 ans* *§ 9.3 a) acc. EN ISO 9606-1*	Valid until *Valable jusqu'au* 11/12/2025	☐ Revalidation every 2 years *Prolongation tous les 2 ans* *§ 9.3 b) acc. EN ISO 9606-1* *EN ISO 9606-2,3 ,4 et 5*	Valid until *Valable jusqu'au*

Confirmation of validity by employer for the following 6 months
Confirmation de validité par l'employeur pour les 6 mois

Date / *Date*	Visa / *Signature*	Position or title / *Fonction ou titre*	Date / *Date*	Visa / *Signature*	Position or title / *Fonction ou titre*
12/06/23		Coordinateur Soudeur			
12/12/23		Coordinateur Soudeur			
12/06/24		Coordinateur Soudeur			

Prolongation for qualification by examining body for the following 2 years
Prolongation de validité par l'organisme d'examen pour les 2 années suivantes

Date / *Date*	Validity / *Validité*	Name / *Nom*	Visa / *Signature*	Stamp / *Tampon*

Base Load Power Hub (BLPH)

ROSETTI MARINO

①	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
Comandini Massimo Level III NDT EN - ISO9712 WI CSWIP 3.1	22-02-2025

NON-DESTRUCTIVE EXAMINATIONS PROCEDURES (NDE) NDE OPERATORS LIST AND QUALIFICATIONS

For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-NDT-PRO-00021

Document Class: 2

03	03/02/2025	Accepted for Construction (AFC)	APD	GLL	AHN
02	30/10/2024	Accepted for Construction (AFC)	APD	GLL	AHN
01	18/09/2024	Accepted for Construction (AFC)	APD	GLL	AHN
00	04/07/2024	Issue for Review (IFR)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC) – No change
03	Accepted for Construction (AFC) – Procedures updated

HOLDS LIST

No.	Description
1	
2	
3	
4	

Table of Contents

1 Procedure for visual Testing according to ASME VIII & V (2019) 4

2 Procedure for Penetrant Testing of Welds in Accordance with ASME VIII & V Edition 2019 15

3 List Operator & Qualifications 27

1 Procedure for visual Testing according to ASME VIII & V (2023)

TECHNICAL INSTRUCTION

EXAMEN PAR VT

Procedure for visual testing according to ASME VIII & V (2023)

Référence du document : IT_NDT_506E_rév03 du 27/01/2025

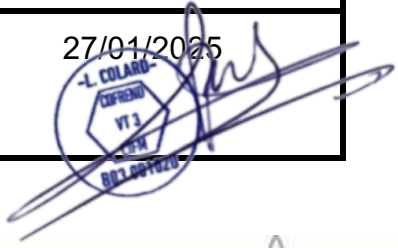
	NOM	DATE / VISA
Rédacteur	Stanislas PACCAULT	27/01/2025 
Vérifié par	Jean COUTIN	27/01/2025 
Approuvé par	Ludovic COLARD	27/01/2025 

Table des matières

1. SCOPE 2
2. REFERENCE DOCUMENTS 2
3. PERSONNEL QUALIFICATION 2
4. EQUIPMENT 2
5. VISUAL INSPECTION TECHNIQUE 2
5.1 DIRECT VISUAL EXAMINATION 2
5.2 REMOTE VISUAL EXAMINATION 3
6. REPORTING 3
7. ACCEPTANCE CRITERIA FOR VISUAL EXAMINATION 3
8. VISUAL INSPECTION REPORT 7

1. SCOPE

The purpose of this document is to describe the procedure to be used for visual inspection of welds. Technique: direct visual examination.

2. REFERENCE DOCUMENTS

Asme VIII div.2, 2023 edition	Rules for construction of pressure vessels.
Asme V, 2023 edition	Article 9, Visual Examination
SNT-TC-1A, 2024 edition	Personnel Qualification & Certification
EN ISO 9712 (03/22)	Certification of personnel

3. PERSONNEL QUALIFICATION

Personnel conducting visual inspection in accordance with this procedure shall be qualified in VT level 2 (or qualified NDT according to EN ISO 9712 or SNT-TC-1A).

All welds for pressure retaining parts shall be visually examined. Personnel performing visual examinations shall have vision, with correction if necessary, to read a Jaeger Type No. 2 Standard Chart at a distance of not less than 300 mm, and be capable of distinguishing and differentiating contrast between colors used. Compliance with this requirement shall be demonstrated annually.

4. EQUIPMENT

Visual inspectors shall have available sufficient equipment required to carry out their tasks. These items may be, but are not restricted to, Welding Institute Gauge, depth gauge, torch, magnifying glass, ruler, measuring tape, optical aids, etc.

5. VISUAL INSPECTION TECHNIQUE

5.1 DIRECT VISUAL EXAMINATION

Direct visual examination may usually be made when access is sufficient to place the eye within 24 in. (600 mm) of the surface to be examined and at an angle not less than 30° to the surface to be examined. Mirrors may be used to improve the angle of vision, and aids such as a magnifying lens may be used to assist examinations.

Illumination (natural or supplemental white light) of the examination surface is required for the specific part, component, vessel, or section thereof being examined.

The minimum light intensity shall be 1076 lux. The light intensity, natural or supplemental white light source, shall be measured with a white light meter prior to the examination or a verified light source shall be used.

Verification of light sources is required to be demonstrated only one time, documented, and maintained on file. All visual inspections shall be carried out in accordance with the requirements of this procedure.

5.2 REMOTE VISUAL EXAMINATION

In some cases, remote visual examination may have to be substituted for direct examination. Remote visual examination may use visual aids such as mirrors, telescopes, borescopes, fiber optics, cameras, or other suitable instruments.
Such systems shall have a resolution capability at least equivalent to that obtainable by direct visual observation.

6. REPORTING

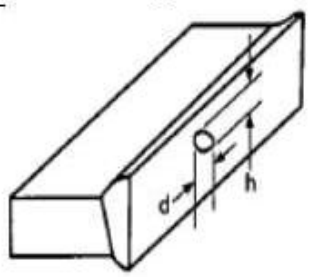
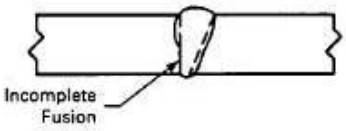
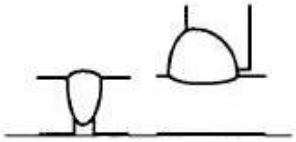
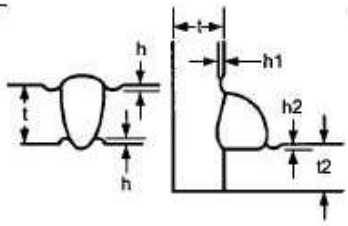
Visual inspections shall be reported on a Visual Inspection Report **MQD_002**, which shall include all relevant technical details.

A written report of the examination shall contain the following information:

1) The date of the examination
2) Procedure identification and revision used
3) Technique used
4) Results of the examination
5) Examination personnel identify, and, when required by the referencing Code Section, qualification level
6) Identification of the part or component examined.

7. ACCEPTANCE CRITERIA FOR VISUAL EXAMINATION

Welds that are observed to have indications exceeding the criteria given in Tables 1 & 2 are unacceptable. Unacceptable indications shall be removed or reduced to an indication of acceptable size. Whenever an indication is removed by chipping or grinding and subsequent repair by welding is not required, the area shall be blended into the surrounding surface so as to avoid notches, crevices, or corners.

n°	Type of Imperfection (note 1)		Acceptance Criteria	
1	Cracks (all)	...	Not permitted	
2	Gas cavity (all) Shrinkage cavity (all)		Not permitted	
3	Slag inclusions (all) Flux inclusions (all) Oxide inclusions (all) Metallic inclusions (all)	...	Not permitted when occurring at the surface 2	
4	Incomplete fusion (all)		Not permitted	
5	Lack of penetration		Not permitted if a complete penetration weld is required.	
6	Undercut		Refer to [Note (3)] for acceptable undercut.	

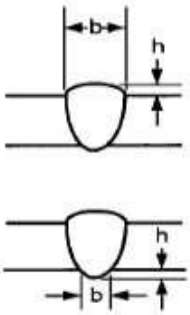
7	Weld reinforcement		Acceptable weld reinforcement in butt welding joints shall be in accordance with [Note (4)]. A smooth transition is required.	
8	Stray flash or arc strike	...	Not permitted [Note (2)].	
9	Spatter	...	Spatter shall be minimized [Note (2)].	
10	Torn surface Grinding mark Chipping mark	...	Not permitted [Note (2)].	
11	Concavity		Refer to [Note (4)] for acceptable concavity.	

Table 1: Acceptance criteria

NOTES:

1) The following symbols are used in this Table:

a = nominal fillet weld
throat thickness b = width
of weld reinforcement d =
diameter of pore h = height
of imperfections
t = wall or plate thickness

2) These imperfections may be removed by blend grinding.

3) Type No.1 Butt Joints.

Weld Penetration and Reinforcement
A reduction in thickness due to the welding process is acceptable provided all of the following conditions are met.
Note that it is not the intent of this paragraph to require measurement of reductions in thickness due to the welding process. If a disagreement between the Manufacturer and the Inspector exists as to the acceptability of any reduction in thickness, the depth shall be verified by actual measurement.

a) The reduction in thickness shall not reduce the material of the adjoining surfaces below the minimum required thickness at any point.
b) The reduction in thickness shall not exceed 0.8 mm or 10% of the nominal thickness of the adjoining surface, whichever is less.

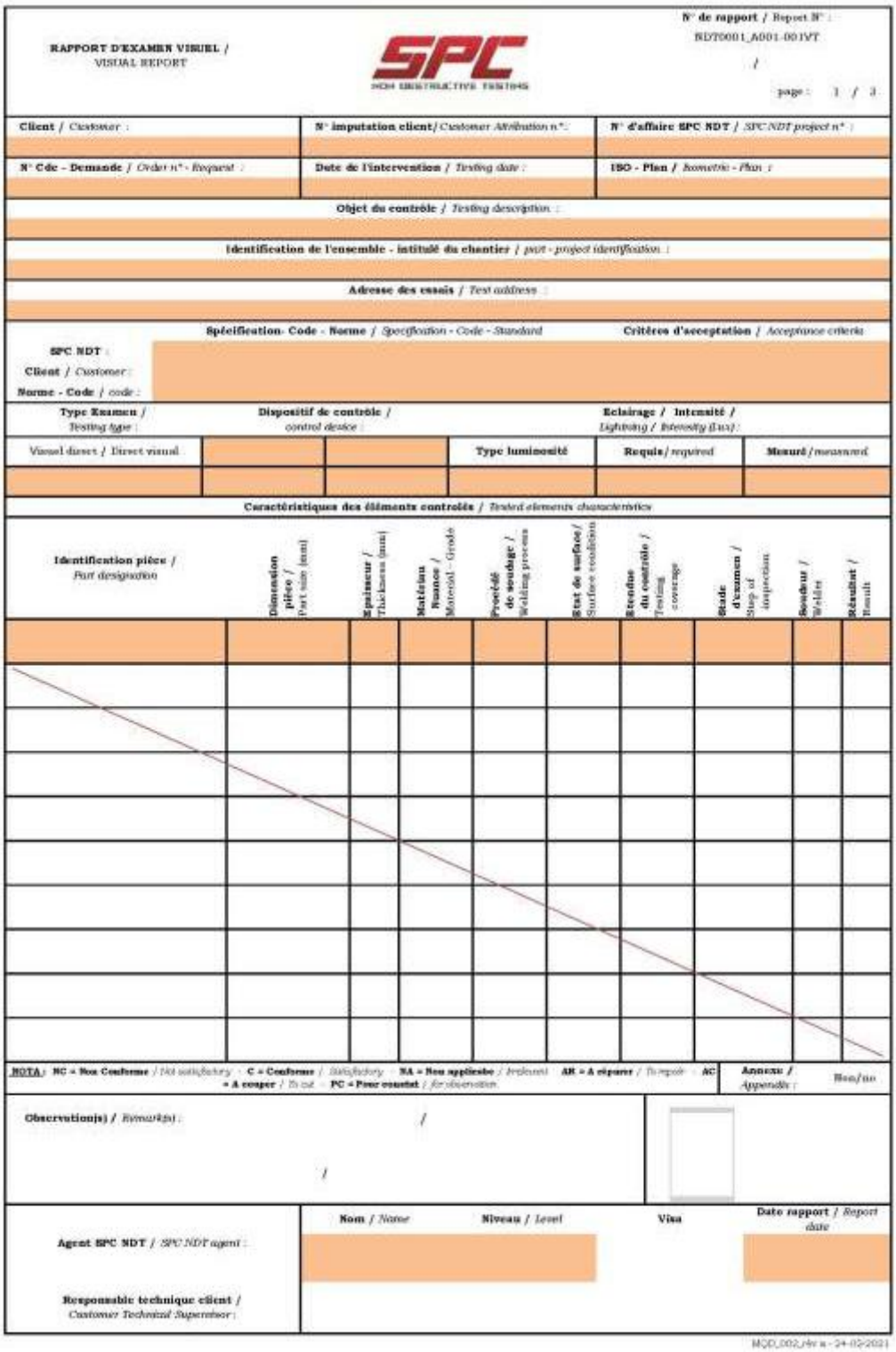
4) Type No.1 Butt Joints.

Weld Reinforcement - to assure that the weld grooves are completely filled so that the surface of the weld metal at any point does not fall below the surface of the adjoining base materials, weld metal may be added as reinforcement on each face of the weld. The thickness of the weld reinforcement on each face shall not exceed that shown in Table 2.
Concavity due to the welding process on the root side of a single welded circumferential butt weld is permitted when the resulting thickness of the weld is at least equal to the thickness of the thinner member of the two sections being joined and the contour of the concavity is smooth.

Section Thickness (mm)	Circumferential joint in Pipe and Tubing	Other Welds
2.5 < t	2.5	0.8
2.5 ≤ t < 5	2.5	1.5
5 ≤ t < 13	3	2.5
13 ≤ t < 25	4	2.5
25 ≤ t < 50	4	3
50 ≤ t < 76	4	4
76 ≤ t < 100	5.5	5.5
100 ≤ t < 125	6	6
125 ≥ t	8	8

Table 2: Maximum reinforcement for Welded Joints

8. VISUAL INSPECTION REPORT



RAPPORT D'EXAMEN VISUEL / VISUAL REPORT

N° de rapport / Report N° : RD70001_A001-00 IVT / page : 1 / 3

Client / Customer :	N° imputation client / Customer Attribution n°:	N° d'affaire SPC NDT / SPC NDT project n° :
N° Cde – Demande / Order n° - Request :	Date de l'intervention / Testing date :	ISO - Plan / Isometric - Plan :

Objet du contrôle / Testing description :

Identification de l'ensemble - intitulé du chantier / part - project identification :

Adresse des essais / Test address :

Spécification- Code - Norme / Specification - Code - Standard	Critères d'acceptation / Acceptance criteria
SPC NDT : Client / Customer : Norme - Code / code :	

Type Examen / Testing type :	Dispositif de contrôle / control device :		Eclairage / Intensité / Lightning / Intensity (Lux) :		
Visuel direct / Direct visual			Type luminosité	Requis / required	Mesuré / measured

Caractéristiques des éléments contrôlés / Tested elements characteristics

Identification pièce / Part designation	Dimension pièce / Part size (mm)	Epaisseur / Thickness (mm)	Matériau Nuance / Material - Grade	Procédé de soudage / Welding process	Etat de surface / Surface condition	Etendue du contrôle / Testing coverage	Stade d'examen / Step of inspection	Soudeur / Welder	Résultat / Result

NOTA : NC = Non Conforme / Not satisfactory ; C = Conforme / Satisfactory ; NA = Non applicable / Irrelevant ; AR = A réparer / To repair ; AC = A couper / To cut ; PC = Pour contrôle / For observation

Annexe / Appendix : Non/no

Observation(s) / Remark(s) : /

Agent SPC NDT / SPC NDT agent : Nom / Name | Niveau / Level | Visa | Date rapport / Report date

Responsable technique client / Customer Technical Supervisor :

MOD_002_rév a - 24-02-2021

RAPPORT D'EXAMEN VISUEL / *VISUAL REPORT*

N° de rapport / *Report N° :*
NDT0001_A001-001VT
/

page : 2 / 3

Repère zone et n° indication / *Zone mark and indication n°*	**Position indication /** *Indication location (mm)* X	Y	Z	**Dimensions**	**Type /** *Shape*	**Conforme /** *Conform*	**Observation /** *remark*

NOTA: NC = Non Conforme / Not satisfactory - **C = Conforme /** Satisfactory - **NA = Non applicable /** Irrelevant **AR = A réparer /** To repair
AC = A couper / To cut - **PC=Pour constat /** for observation

Observation(s) / *Remark(s) :* /

	Nom / *Name*	**Niveau /** *Level*	**Visa**	**Date rapport /** *Report date*
Agent SPC NDT / *SPC NDT agent :*				
Responsable technique client / *Customer supervisor :*				

MQD_002_rév a-24.02.2021

RAPPORT D'EXAMEN VISUEL /
VISUAL REPORT

N° de rapport / *Report N°* :
NDT0001_A001-001VT
/

page : 3 / 3

Plan :

Visa :

MQD_002_rév a-24-02-2021

2 Procedure for Penetrant Testing of Welds in Accordance with ASME VIII & V Edition 2023

PROCEDURE END

EXAMEN PAR RESSUAGE

Procedure for penetrant testing of welds in accordance with ASME VIII & V edition 2023

Référence du document : IT_NDT_302F_rév03 du 27/01/2027

	NOM	DATE / VISA
Rédacteur	PERRET Ghislain	27/01/2025
Vérifié par	Jean COUTIN	27/01/2025
Approuvé par	Ludovic COLARD	27/01/2025

Table des matières

1. SCOPE 2
2. REFERENCE DOCUMENTS 2
3. PERSONNEL QUALIFICATION 2
4. DESCRIPTION OF EXAMINATION 2
4.1 Method 2
4.2 Time and extent of examination 3
4.3 Examination conditions 3
4.3.1 Lighting 3
4.3.2 Direct visual examination 3
4.4 Application 3
4.4.2 Penetrant application 4
4.4.3 Excess penetrant removal 4
4.4.4 Drying after excess penetrant removal 4
4.4.5 Developer application 5
4.4.6 Interpretation 5
4.5 Post cleaning 5
4.6 Type of products used or equivalent 5
4.7 Flow diagram of procedure 6
5. ACCEPTANCE CRITERIA 7
5.1. Evaluation of indications 7
6. REPAIRS 7
7. REPORTS 7
8. PENETRANT TESTING INSPECTION REPORT 8

1. SCOPE

This procedure provides instructions to perform liquid penetrant examination using water or solvent removable products and details the acceptance criteria for welds.
The purpose of this document is to assure the quality of application and interpretation for liquid penetrant examination by providing a well-documented work description.

2. REFERENCE DOCUMENTS

Asme VIII, 2023 edition	Rules for construction of pressure vessels div.1 app.8 & div.2 part 7
Asme V, 2023 edition	Article 6, liquid penetrant examination
SNT-TC-1A, 2024 edition	Personnel Qualification & Certification
EN ISO 9712 (03/22)	Certification of personnel

3. PERSONNEL QUALIFICATION

Performance of the examination and evaluation of the results will be carried out by a Level 2 operator (as minimum).
All levels will be in accordance with the SNT-TC-1A or NF EN ISO 9712.
Each technician has vision, with correction if necessary, to enable him to read a Jaeger Type No. 2 Standard Chart at a distance of not less than 12 in. (300 mm), and is capable of distinguishing and differentiating contrast between colors used. These requirements shall be checked annually.

4. DESCRIPTION OF EXAMINATION

4.1 Method

The liquid penetrant examination is an effective means for detecting discontinuities which are open to the surface on metals and other materials.

Typical discontinuities detectable by this method are cracks, laps, seams, cold shuts, laminations and porosity.

A liquid penetrant is applied to the surface to be examined and allowed to enter discontinuities. All excess penetrant is then removed, the surface is dried and a developer is applied.

The developer functions both as a blotter to absorb penetrant that has been trapped in discontinuities, and as a contrasting background to enhance the visibility of penetrant indications. After application of the developer, the surface is inspected visually, in order to determine the presence or absence of any discontinuity. Note: Mixing of different trademarks and/or family product is prohibited

4.2 Time and extent of examination

Final examination of welds shall be carried out after completion of the PWHT cycle, if PWHT is required. Examination of progressive stages of welding may be performed before post weld heat treatment.

4.3 Examination conditions

4.3.1 Lighting

Natural or artificial light, sufficient (1076 lux) to illuminate the area to be examined. Light intensity should be routinely checked to assure adequate lighting at the surface of the part being examined.

4.3.2 Direct visual examination

Direct visual examination may be made when access is sufficient to enable examination within 610 mm of the surface to be examined and an angle of not less than 30° to the surface to be examined. Mirrors may be used to improve the angle of vision.

4.4 Application

4.4.1 Surface preparation

a. Satisfactory results are normally obtained in the as-welded conditions. Surface preparation by grinding is necessary when surface irregularities might mask the indications of unacceptable discontinuities, or otherwise interfere with the effectiveness of the examination.

b. Prior to liquid penetrant examination, the surface to be examined and all adjacent areas within at least 25 mm shall be dry and free of all dirt, grease, lint, scale, welding flux and spatter, oil, or other extraneous matter that could interfere with the examination.

c. Cleaning if necessary, shall be performed with a wire brush, by grinding or using alcohol. If using alcohol for cleaning, surface should be left for 5 minutes before applying any penetrant allowing alcohol to evaporate.

4.4.2 Penetrant application

a. The penetrant shall be applied to the whole surface being examined by either using a clean brush or by spraying; in which case the original spray shall be used.

b. The temperature of the surface being examined and the penetrant shall be between 5° C and 52° C. If the surface temperature is outside this range, a specific procedure will be written in accordance with ASME Code Section V paragraph T-653 and appendix III.

c. The time allowed for penetration shall be minimum 5 minutes and maximum 60 minutes. During this time the dye penetrant must stay humid; this can be achieved by additional spraying.

4.4.3 Excess penetrant removal

a. After the penetration time has elapsed, any penetrant remaining on the surface shall be removed.

b. Water washable penetrant:

c. The water pressure for removing water washable penetrant shall not exceed 2 bars, and the water temperature shall not exceed 43°C to minimize removal of penetrant from possible discontinuities.

d. Solvent removable penetrant:

e. Excess solvent removable penetrant shall be removed by wiping with a cloth or absorbent paper, and repeating the operation until most traces of the penetrant have been removed. Any remaining traces shall be removed by lightly wiping the surface with cloth or absorbent paper moistened with solvent. Care shall be taken to avoid the use of excess solvent. FLUSHING THE SURFACE DIRECTLY WITH SOLVENT IS PROHIBITED.

4.4.4 Drying after excess penetrant removal

a. Water washable penetrant:

The surface may be dried by blotting with clean materials or by circulating warm air; in this case the surface temperature must not be raised above 52° C. As minimum the developer shall not be applied within 10 minutes after drying.

b. Solvent removable penetrant:

The surface may be dried by normal evaporation, blotting, wiping or with circulated air. As minimum the developer shall not be applied within 10 minutes after drying

c. The air pressure for the various operations shall not exceed 50 psi (350kPa), and the air should be filtered and oil free.

4.4.5 Developer application

The developer shall be applied as soon as possible after removal of the penetrant by spraying a uniformly thin coating over the whole surface. The spray must be thoroughly agitated before and during application of the developer.

4.4.6 Interpretation

a. The type of discontinuities is difficult to evaluate if the penetrant diffuses excessively into developer. Therefore, the surface shall be closely observed during the application of the developer to monitor the behavior of indications that bleed-out profusely.

b. Final interpretation of the examination shall be made after allowing the penetrant to bleed-out. The length of time should not be less than 10 minutes with a maximum of 60 minutes. If the surface to be examined is too large to allow complete examination within the prescribed time, then the surface shall be examined in sections.

c. If the penetrant has not been sufficiently removed the surface will show indication with an overall light pink color. In this case a new examination is required.

4.5 Post cleaning

d. Cleaning shall be carried out as promptly as possible after inspection so that developer does not fix to the area. All products shall be removed by spraying with water.

4.6 Type of products used or equivalent

Penetrant	Water washable Babb'Co DP55	Solvent washable Babb'Co DP55
Remover	Water	Babb'Co N120
Developer	Wet developer Babb'Co D100	Wet developer Babb'Co D100

The composition of all products used is to be controlled. Products shall be delivered with a manufacturer's certificate, which shall include the penetrant manufacturer's batch number and the test results obtained.

Specific requirements for products used on austenitic stainless steels, nickel, nickel-alloys and titanium are that the chlorine, fluorine and sulfur content should be limited to 1 % for the remover and the developer and to 0,1% for the dye penetrant.

4.7 Flow diagram of procedure

PRE-CLEAN	
As-welded-Wire brushing-Grinding-Alcohol. Including at least 25 mm adjacent areas. Surface free of all foreign matter	
PENETRANT	**APPLICATION**
Water washable Babb'Co DP55	Solvent washable Babb'Co DP55
Surface temperature : 5 - 52° C Penetrant time : 5 - 60 minutes The penetrant shall stay humid, eventually by an additional spraying	
EXCESS PENETRANT REMOVAL	
Water washable Pressurized water: < 2 bars. Water-wash temperature : 16 - 43° C.	Solvent washable Cloth or absorbent paper. Remaining traces removed with cloth or absorbent paper moistened with solvent Babb'Co N120. FLUSHING THE SURFACE DIRECTLY WITH SOLVENT IS PROHIBITED
DRY SURFACES	
Water washable Clean, cloth, absorbent paper or warm air (52° C maximum)	Solvent washable Normal evaporation
APPLY DEVELOPER	
Babb'Co D100	
INTERPRETATION	
10 - 60 minutes after application of developer. Lighting 1000 lux minimum is recommended.	
POST CLEAN	
Pressurized water	

5. ACCEPTANCE CRITERIA

5.1. Evaluation of indications

An indication of an imperfection may be larger than the imperfection that causes it; however, the size of the indication is the basis for acceptance evaluation.
Only indications with major dimensions greater than 1, 5 mm shall be considered relevant.

- A linear indication is one having a length greater than three times the width.
- A rounded indication is one of circular or elliptical shape with a length equal or less than three times its width.
- Any questionable or doubtful indications shall be re-examined to determine whether or not they are relevant.

All examined surfaces shall be free of:

- relevant linear indications;
- relevant rounded indications greater than 5 mm;
- Four or more relevant rounded indications in a line separated by 1, 5 mm or less, edge to edge.

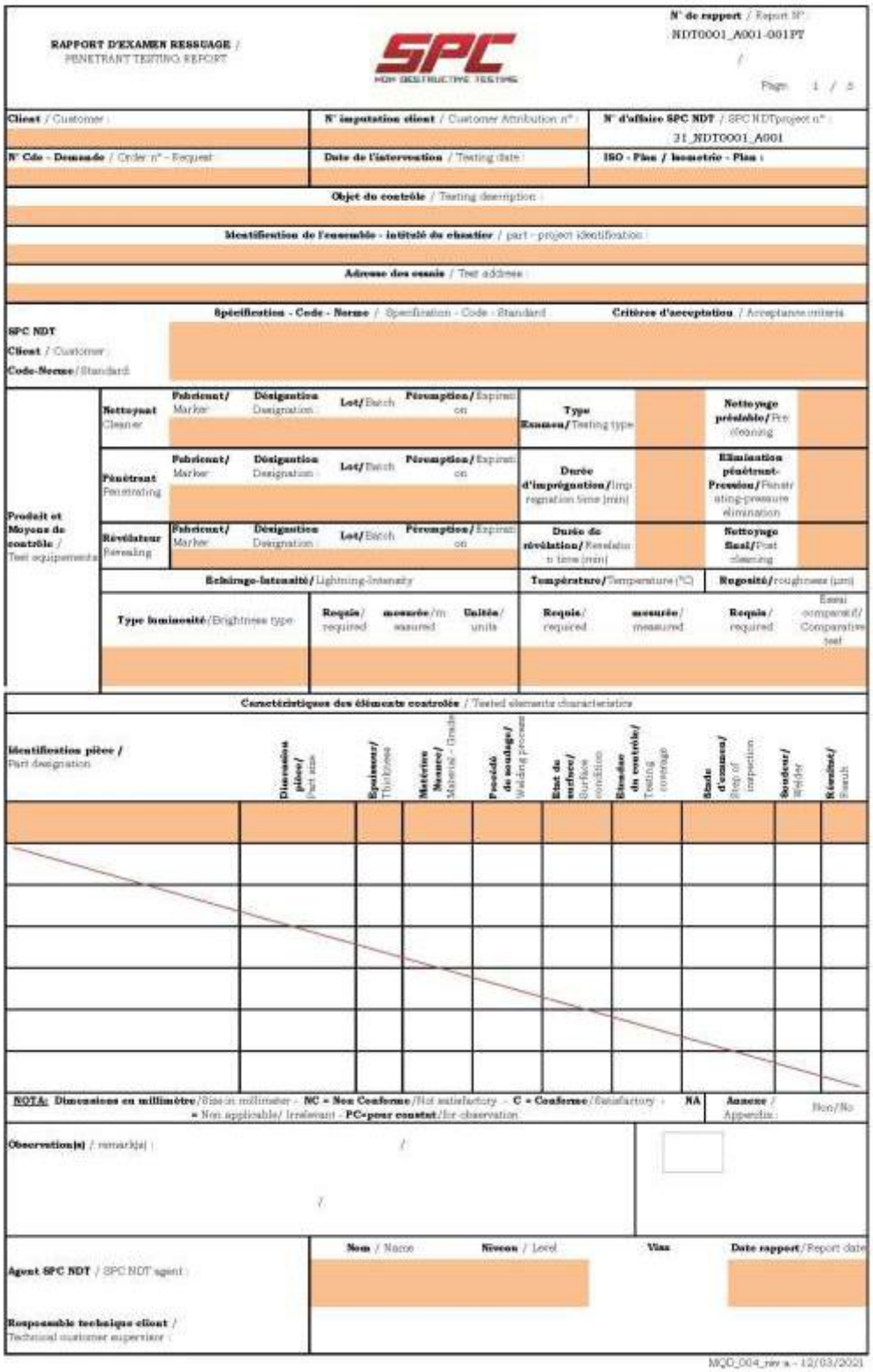
6. REPAIRS

Unacceptable imperfections shall be removed and re-examination made to assure complete removal.
Whenever an imperfection is removed by chipping or grinding and subsequent repair by welding is not required, the excavated area shall be blended into the surrounding surface so as to avoid sharp notches, crevices, or corners.
Where welding is required after removal of an imperfection, the area shall be cleaned and welding performed in accordance with a qualified welding procedure.
After an imperfection is thought to have been removed and prior to making weld repairs, the area shall be examined by suitable methods to ensure that the imperfection has been eliminated.
When repairs have been made, the repaired area shall be blended into the surrounding surface so as to avoid sharp notches, crevices, or corners, and re-examined by the dye penetrant method and by all other methods of examination that were originally required for the affected area, except that, when the depth of the repair is less than the radiographic sensitivity required, the radiography can be deleted.

7. REPORTS

A dye penetrant examination report (MQD_004) shall be recorded for all examined welds. All areas with defects shall be documented with the location and the local position, size and orientation.

8. PENETRANT TESTING INSPECTION REPORT



RAPPORT D'EXAMEN RESSUAGE / PENETRANT TESTING REPORT

N° de rapport / Report N°: NDT0001_A001-001PT

Page 1 / 5

Client / Customer :

N° imputation client / Customer Attribution n° :

N° d'affaire SPC NDT / SPC NDTproject n° : 21_NDT0001_A001

N° Cde - Demande / Order n° – Request :

Date de l'intervention / Testing date :

ISO - Plan / Isometric - Plan :

Objet du contrôle / Testing description :

Identification de l'ensemble - intitulé du chantier / part - project identification :

Adresse des essais / Test address :

Spécification - Code - Norme / Specification - Code - Standard :

Critères d'acceptation / Acceptance criteria :

SPC NDT

Client / Customer :

Code-Norme / Standard :

Produit et Moyens de contrôle / Test equipments

	Fabricant / Marker	Désignation / Designation	Lot / Batch	Péremption / Expiration
Nettoyant / Cleaner				
Pénétrant / Penetrating				
Révélateur / Revealing				

Type Examen / Testing type :

Nettoyage préalable / Pre cleaning :

Durée d'imprégnation / Impregnation time (min) :

Elimination pénétrant-Prossion / Penetrating-pressure elimination :

Durée de révélation / Revelation time (min) :

Nettoyage final / Post cleaning :

Eclairage-Intensité / Lightning-Intensity

Température / Temperature (°C)

Rugosité / roughness (µm)

Type luminosité / Brightness type	Requis / required	mesurée / measured	Unités / units	Requis / required	mesurée / measured	Requis / required	Essai comparatif / Comparative test

Caractéristiques des éléments contrôlés / Tested elements characteristics

Identification pièce / Part designation	Dimension pièce / Part size	Epaisseur / Thickness	Matériau Nuance / Material - Grade	Procédé de soudage / Welding process	Etat de surface / Surface condition	Etendue du contrôle / Testing coverage	Stade d'examen / Step of inspection	Soudeur / welder	Repère / Mark

NOTA: Dimensions en millimètre / Sizes in millimeter - NC = Non Conforme / Not satisfactory - C = Conforme / Satisfactory - NA = Non applicable / Irrelevant - PC=pour contrat / For observation

Annexe / Appendix : Non/No

Observation(s) / remark(s) :

Agent SPC NDT / SPC NDT agent :

Nom / Name : Niveau / Level : Visa : Date rapport / Report date :

Responsable technique client / Technical customer supervisor :

MQD_004_rev x - 12/03/2021

RAPPORT D'EXAMEN RESSUAGE / PENETRANT TESTING REPORT

N° de rapport / Report N° : NDT0001_A001-001PT

/

page : 2 / 3

Repère zone et n° indication / Zone mark and indication n°	**Position** / location X	Y	Z	**Dimensions**	**Type** / Shape	**Conforme** / Conform	**Observation** / Remark

NOTA: Dimensions en millimètre/Size in millimeter - **NC = Non Conforme**/Not satisfactory - **C = Conforme**/Satisfactory - **NA = Non applicable**/ Irrelevant - **PC=pour constat**/for observation

Observation(s) / remark(s) /

/

	Nom / Name	**Niveau** / Level	**Visa**	**Date rapport**/Report date
Agent SPC NDT / SPC NDT agent :				
Responsable technique client / Technical customer supervisor :				

MQD_004_rév a-12/03/2021

RAPPORT D'EXAMEN RESSUAGE /
PENETRANT TESTING REPORT

SPC NON DESTRUCTIVE TESTING

N° de rapport / Report N° :
NDT0001_A001-001PT
/
page : 3 / 3

Plan :

Visa :

MQD_004_rév a-12/03/2021

3 List Operator & Qualifications

COFREND
Confédération Française pour les Essais Non Destructifs

ETPR / *RTPO*
directive 2014/68/UE

Certificat END / *NDT Certificate*

V6



NOM Prénom / *NAME First Name:*
AGOPIAN Jérémie
N° COFREND : 017711

est certifié(e) / *Is certified* :

Référentiel *	Secteur - Sous-secteur / *Sector - subsector*	Niveau-méthode* / *Level-method*	Option*	Début de validité / *effective date*	Fin de validité / *Expiry date*
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / VT /**		**25/11/2020**	**25/11/2025**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / PT /**		**24/03/2017**	**24/03/2027**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / MT /**		**22/09/2022**	**22/09/2027**

* les certifications sont émises dans le champ d'accréditation COFRAC 4-0007 (certification de personnes, portée disponible sur www.cofrac.fr) de la COFREND à l'exception des certifications « VT / gnv » et des options. *Certifications are issued in the COFRAC 4-0007 accreditation field (certification of persons, scope available on www.cofrac.fr) of COFREND with the exception of "VT / gnv" certifications and options.*

La validité de la (des) certification(s) peut être vérifiée sur / *Validity of certification(s) is available on* :
www.cofrend.gericco.com

Date de dernière validation / *Last validation date* : **22/09/2022** par **JP.CHARLET**

Date d'édition : **17/09/2024**
N ° : **20240917:09.56.24**

COFREND
Confédération Française pour les Essais Non Destructifs

ETPR / *RTPO*
directive 2014/68/UE

Certificat END / *NDT Certificate*

V6



NOM Prénom / *NAME First Name:*
CARLOT Florian
N° COFREND : 031774

est certifié(e) / *Is certified* :

Référentiel *	Secteur - Sous-secteur / *Sector - subsector*	Niveau-méthode* / *Level-method*	Option*	Début de validité / *effective date*	Fin de validité / *Expiry date*
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / PT /**		**12/07/2023**	**11/07/2028**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / MT /**		**01/09/2023**	**31/08/2028**

* les certifications sont émises dans le champ d'accréditation COFRAC 4-0007 (certification de personnes, portée disponible sur www.cofrac.fr) de la COFREND à l'exception des certifications « VT / gnv » et des options. *Certifications are issued in the COFRAC 4-0007 accreditation field (certification of persons, scope available on www.cofrac.fr) of COFREND with the exception of "VT / gnv" certifications and options.*

La validité de la (des) certification(s) peut être vérifiée sur / *Validity of certification(s) is available on* :
www.cofrend.gericco.com

Date de dernière validation / *Last validation date* : **01/09/2023** par **JP.CHARLET**

Date d'édition : **17/09/2024**
N ° : **20240917:09.54.44**

COFREND
Confédération Française pour les Essais Non Destructifs

ETPR / *RTPO*
directive 2014/68/UE

Certificat END / *NDT Certificate*

V6



NOM Prénom / *NAME First Name:*
PERRET Ghislain
N° COFREND : 007561

est certifié(e) / *Is certified* :

Référentiel *	Secteur - Sous-secteur / *Sector - subsector*	Niveau-méthode* / *Level-method*	Option*	Début de validité / *effective date*	Fin de validité / *Expiry date*
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / RT / x,g**		**21/09/2020**	**21/09/2025**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / TOFD /**		**08/06/2016**	**08/06/2026**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / PT /**		**20/02/2008**	**19/02/2028**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / MT /**		**07/07/2023**	**06/07/2028**

* les certifications sont émises dans le champ d'accréditation COFRAC 4-0007 (certification de personnes, portée disponible sur www.cofrac.fr) de la COFREND à l'exception des certifications « VT / gnv » et des options. *Certifications are issued in the COFRAC 4-0007 accreditation field (certification of persons, scope available on www.cofrac.fr) of COFREND with the exception of "VT / gnv" certifications and options.*

La validité de la (des) certification(s) peut être vérifiée sur / *Validity of certification(s) is available on* :
www.cofrend.gericco.com

Date de dernière validation / *Last validation date* : **07/07/2023** par **JP.CHARLET**

Date d'édition : **17/09/2024**
N° : **20240917:09.58.01**

Confédération Française pour les Essais Non Destructifs
Maison des END - 64 rue Ampère – 75017 Paris – France
cofrend@cofrend.com – Tél : +33 (0)1 44 19 76 18
www.cofrend.com
Association Loi 1901 – Code APE : 9499Z – Siret : 351 979 653 00034 – TVA : FR75 351 979 653

COFREND
Confédération Française pour les Essais Non Destructifs

ETPR / *RTPO*
directive 2014/68/UE

Certificat END / *NDT Certificate*

V6



NOM Prénom / *NAME First Name:*
COUTIN Jean
N° COFREND : 005889

est certifié(e) / *Is certified* :

Référentiel *	Secteur - Sous-secteur / *Sector - subsector*	Niveau-méthode* / *Level-method*	Option*	Début de validité / *effective date*	Fin de validité / *Expiry date*
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / MT /**		**12/04/2010**	**12/04/2025**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / PT /**		**22/02/2006**	**22/02/2026**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / RT /**		**27/04/2007**	**27/04/2027**

* les certifications sont émises dans le champ d'accréditation COFRAC 4-0007 (certification de personnes, portée disponible sur www.cofrac.fr) de la COFREND à l'exception des certifications « VT / gnv » et des options. *Certifications are issued in the COFRAC 4-0007 accreditation field (certification of persons, scope available on www.cofrac.fr) of COFREND with the exception of "VT / gnv" certifications and options.*

La validité de la (des) certification(s) peut être vérifiée sur / *Validity of certification(s) is available on* :
www.cofrend.gericco.com

Date de dernière validation / *Last validation date* : **05/05/2022** par **X.LE GOFF**

Date d'édition : **17/09/2024**
N ° : **20240917:09.58.28**

COFREND
Confédération Française pour les Essais Non Destructifs

ETPR / *RTPO*
directive 2014/68/UE

Certificat END / *NDT Certificate*

V6



NOM Prénom / *NAME First Name:*
COLARD Ludovic
N° COFREND : 001020

est certifié(e) / *Is certified* :

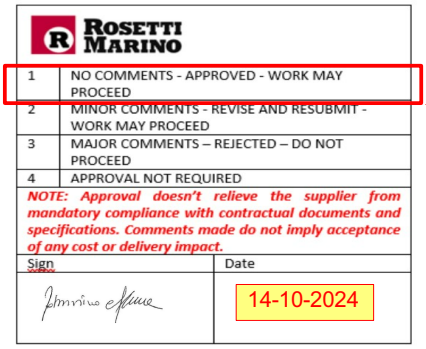
Référentiel *	Secteur - Sous-secteur / *Sector - subsector*	Niveau-méthode* / *Level-method*	Option*	Début de validité / *effective date*	Fin de validité / *Expiry date*
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / TOFD /**		**28/01/2020**	**28/01/2025**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**3 / VT /**		**07/12/2020**	**07/12/2025**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**3 / UT /**		**24/10/2011**	**24/10/2026**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**3 / PT /**		**20/04/2017**	**20/04/2027**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / VT /**		**22/05/2017**	**22/05/2027**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / UT /**		**26/11/2007**	**27/11/2027**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / PT /**		**12/05/2008**	**11/05/2028**
NF EN ISO 9712: 2012	**Fabrication et maintenance - Fabrication et Maintenance**	**3 / MT /**		**11/12/2023**	**10/12/2028**
NF EN ISO 9712: 2022	**Fabrication et maintenance - Fabrication et Maintenance**	**2 / UT PA /**		**29/04/2024**	**28/04/2029**

* les certifications sont émises dans le champ d'accréditation COFRAC 4-0007 (certification de personnes, portée disponible sur www.cofrac.fr) de la COFREND à l'exception des certifications « VT / gnv » et des options. *Certifications are issued in the COFRAC 4-0007 accreditation field (certification of persons, scope available on www.cofrac.fr) of COFREND with the exception of "VT / gnv" certifications and options.*

La validité de la (des) certification(s) peut être vérifiée sur / *Validity of certification(s) is available on* :
www.cofrend.gericco.com

Date de dernière validation / *Last validation date* : **29/04/2024** par **S.GENEAU**

Date d'édition : **17/09/2024**
N ° : **20240917:09.52.39**



ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	14-10-2024

Base Load Power Hub (BLPH)

NOTE
FINAL ACCEPTANCE WILL BE ACHIEVED WHEN CROSSWIND RELEASES A "CLOSE OUT" CRS

HYDROSTATIC TEST PROCEDURE

For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-QC-PRO-00022

Document Class: 3

02	02/10/2024	Issue for Information (IFI)	APD	GLL	AHN
01	05/09/2024	Issue for Information (IFI)	APD	GLL	AHN
00	04/07/2024	Issue for Information (IFI)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)
01	Issue for Information (IFI)
02	Issue for Information (IFI)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Affaire SRCI : 24121 - Affaire PCM : PO070-24-07599

SCOPE

This testing procedure applies to all kind of stainless steel casing subjected to hydraulic pressure.

APPLICATION

This document concerns all parts produced by SRCI.

REFERENCE DOCUMENTS

- Drawings concerning the part to be inspected.
- ASME B31.3 / API 6763rd edition § 8 3.2

SAFETY PRECAUTION

An equipment will assure the support on the length of the body and pipe. The rise in pressure will be made in landing.

The test zone will be determined.

The personal in charge for following the hydraulic test are a SRCI's operator, a SRCI's responsible and witness of the Company and/or Inspection Agency's representative(s).

TESTING

The test pressure as well as the time during which the pressure will be kept, will be define by the customer :
1,5 x 20 barg for Rallonge Corps – W-004942
1,5 x 20 barg for Corps – W-008202
1,5 x 20 barg for Embout Stator – W-008199

1. Test pressure shall be mentioned for each tag no. as agreed before
2. Duration shall be ☒ **30 minutes** ❑ 60 minutes

The operating pressure test is 30 barg (1.5 x MACP).

Document, propriété exclusive de SRCI, ne peut être reproduit ni communiqué à des tiers, tout ou partie, sans autorisation

The pump pressure indicator is an indicator, only a calibrated gauge (accuracy 1,6%), assembled to the item, will be used for the test. The gauge is calibrated every year.

Stainless steel valves, able to resist the efforts triggered by the pressure test, will be used for the test.

The hydraulic test will be performed with demineralized water. The chloride content of liquids used to test austenitic stainless steel materials shall not exceed 50 ppm.

Each test will be carry after the NDT.

All piping shall be completely drained of all testing fluid. All piping tested with water shall be thoroughly dried. This piping shall be blown-down with air before surface treatment.

If during the test, we found a leak (or notice pressure drop) :

1. We spot the leak.
2. We decrease the pressure slowly.
3. We analyze and treat the defect
4. Test again body and casing

RESULT

Neither leak nor pressure fall will to be observed the time during which the pressure is being kept.

Every hydraulic test is subjected to a certificate n° DS019.

Writter	Checker	Approval
Céline VAYSSE LABONDE/ Resp. QSE signature	Loic BONICEL / Resp. Production Signature	Frédéric VAYSSE LABONDE/ Président signature

Document, propriété exclusive de SRCI, ne peut être reproduit ni communiqué à des tiers, tout ou partie, sans autorisation

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE

LEAKAGE TEST

N °

N/Réf.

Client *Customer*	**Plan** *Drawing*
N° Commande Client *Order n°*	**Repère** / *Marking*
N° Poste *Item*	**Matière** *Material*
Pièces *Parts*	**Spécifications** *Specification*

Parties examinées
Portions examined

Nature de l'épreuve *Test nature* → **Epreuve d'étanchéité** *Leakage test*

Conditions requises - *Required conditions*

- **Pression d'épreuve** *Test pressure* →
- **Vitesse de montée en pression** *Pressure rising speed* →
- **Durée du maintien en pression** *Pressure holding time* →
- **Hauteur pétrole** *Heigh of lamp oil* →

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →

- **Eau** *Water* ☐ **Huile** *Oil* ☐
- **Air** *Air* ☐ **Pétrole** *Lamp-oil* ☐

- **Température du fluide** *Fluid temperature* → _____ °C
- **Pression** *Pressure* → _____
- **Vitesse de montée en pression** *Pressure rising speed* → _____
- **Durée du maintien en pression** *Pressure holding time* → _____
- **Hauteur pétrole** *Heigh of lamp oil* → _____

Résultats de l'épreuve - *Test results*

_____

_____

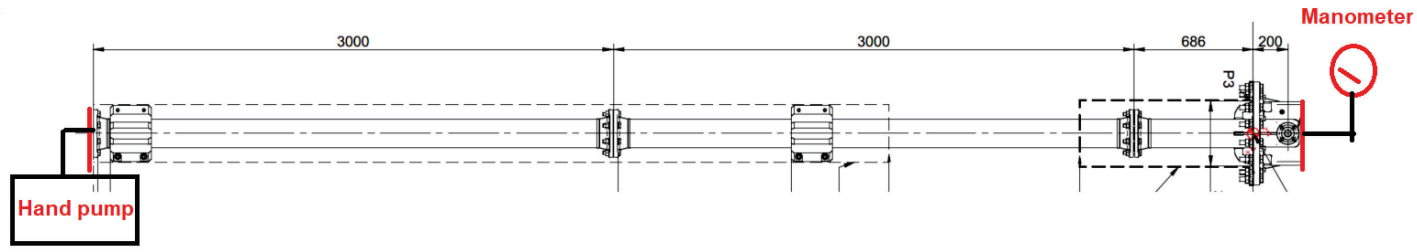
Date Contrôle *Examin.date*	**Accepté** *Accepted* **OUI** *Yes* ☐ **NON** *No* ☐	**Fiche d'anomalie N°** *Non conformity report*	**Voir croquis annexe** *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*				**Resp. Qualité** *Quality*			
Resp. Interpret. *Interpreter*							

Edition du 05/2024 - réf. DS 019 ind. C

Document, propriété exclusive de SRCI, ne peut être reproduit ni communiqué à des tiers, tout ou partie, sans autorisation

TEST CONFIGURATION



Base Load Power Hub (BLPH)

COATING PROCEDURE- ACCORDING TO CROSSWIND PROJECT SPECIFICATION
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAT-PRO-00018

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
Michele Sacchi	20-12-2024

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
03	09/12/2024	Approved for Construction (AFC)	GLL	APD	AHN
02	30/10/2024	Approved for Construction (AFC)	GLL	APD	AHN
01	30/09/2024	Approved for Construction (AFC)	GLL	APD	AHN
00	31/07/2024	Issue for Review (IFR)	GLL	APD	AHN

PCM keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Approved for Construction (AFC) Adding Ambient & Subtract temp Min/Max (Section 5.1 of PCM procedure) Adding Reference documents years (Section 7 of PCM procedure)
02	Approved for Construction (AFC) Adding test table in section 2.2 & Notes for Section 3 (PCM Procedure)
03	Approved for Construction (AFC) No change

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Table of contents

1 DOCUMENT SCOPE 4

2 GENERAL NOTES 4

2.1 Parts to be painted 4

2.2 Tests to be done 4

3 PCM PAINTING PROCEDURE (N°5 – C5-H) 5

4 ABB PAINTING PROCEDURE (C5-M) 25

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

1 DOCUMENT SCOPE

This document aims at describing painting procedure for Sea Water Lift Progressive Cavity Pumps (P-50001 A/B).

2 GENERAL NOTES

2.1 PARTS TO BE PAINTED

Item N°	Part N°	Description	Material	Painting System	Color
60	T600004051	BEARING HOUSING	Carbon steel	PCM N°5 Section N°3	RAL 7038
88	W-007527274	SPACER	Carbon steel	PCM N°5 Section N°3	RAL 7038
300	W-008268046	TRUNK	Carbon steel	PCM N°5 Section N°3	RAL 7038
C11B	FGAHXCG1256CEAA	GEARBOX	Cast-Aluminum	PCM N°5 Section N°3	RAL 7038
C11	DI317464-03	MOTOR	Cast-iron	C5-M - ABB Section N°4	Munsell 8B 4.5/3.25 (ABB standard)

Note that Stainless steel parts (SS316L & SDSS) won't painted.

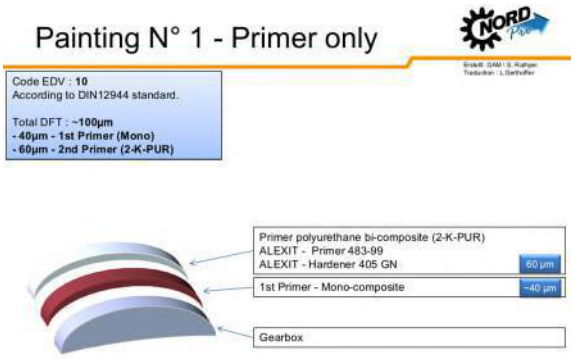
2.2 TESTS TO BE DONE

Please refer to section 4.4 & 5.2 & 6.2 of procedure PCM PAINTING SPECIFICATION – PROCESS N°5.
Note that Adhesion test is not included.

Please find here below table to sum-up test to be done.

Test type	Method	Frequency	Acceptance Criteria	Consequence
Environmental conditions	ISO 8502-4 (Ambiant & Surface temp/ Relative Humidity / Dew point)	Before each shift / Two a day as minimum	3°C above dew point < 85% RH	No Blasting or painting
Cleanliness	ISO 8501-1	100% surface	Sa 2.5	Re-blasting
Roughness	ISO 8503-2	1 per part	Medium	Re-blasting
Film Thickness	ISO 19840	20 points on all parts	1st layer 60µm 2nd layer 260µm 3rd layer 320µm	Repair, add coats or recoating

Note that gearboxes will be provided by sub-supplier with primer and PCM will apply 2nd & final layer only as per PCM PAINTING SPECIFICATION – PROCESS N°5.



Motors will be painted by ABB according to C5-M system without painting reports.

3 PCM PAINTING PROCEDURE (N°5 – C5-H)

Notes to be considered :

- Section 4.1 > PCM is following ISO 8503-1 to 4
- Section 4.2 > GH050 from W Abrasives is used

PCM PAINTING SPECIFICATION – PROCESS N°5

HISTORY OF CHANGES			
Revision	**Date**	**Changes Description**	**Page(s) modified**
A	01/27/2016	Document creation	All
2	02/15/2017	Change Grade of Cleanliness to Sa 2,5 Availability of new Paint Control: “Pull-off test for adhesion”	§4.4 – p3 4 ; 5 ; 7 ; 8
3	18/06/2020	Include deviations on §4 and 5 regarding assembled equipment’s delivered with primer coating.	3 - 4
4	12/05/2022	Increase of paint intermediate thickness to meet C5-VH Painting system	
5	16/09/2024	Temperature limits added for painting application and update of document reference versions	4 - 5

BROADCASTING LIST		
World Wide Marketing and Sales Manager F&I	Market managers	WW O&G Marketing Manager
Innovation & Industrialization Manager	Industrialization Manager	O&G Product Champion
World Engineering Manager	Tender Team Manager	Project team manager
Engineering Pump F&I manager	Methods Manager	
Operation Manager (Assembly & Test)	Production supervisors	France Quality Manager

	Written / Modified by	Approved by
NAME	Ayoub LEGUEMIRI	Christophe WAQUET
Fonction	Production engineer	Methods Manager
Date	17/09/2024	17/09/2024

Contents

1. Scope 2
2. Certification of personnel 3
3. Surfaces concerned 3
4. Surface preparation 3
   - 4.1. Preparation before blasting 3
   - 4.2. Abrasives 3
   - 4.3. Blast cleaning 3
   - 4.4. Controls 3
5. Paint application 4
   - 5.1. Records 4
   - 5.2. Controls at each layer of the painting work 4
   - 5.3. Products to be used 4
6. Drying of each layer 5
   - 6.1. Controls 5
   - 6.2. Control reports 5
7. Reference documents 5
8. Annexes – Control report 6
   - 8.1. Paints Technical data sheets 6
   - 8.2. Painting follow-up worksheet 17
   - 8.3. Pull-off test adhesion report 18

1. Scope

This specification defines the technical requirements for the execution of painting works of positive displacement pumps called « process n°5 ». The specification is based on the use of high durability painting system whose design is anticipated to meet the requirements of ISO 12944 atmospheric corrosion category C5 – very high corrosion. The durability category of such a system is anticipated to be more than 25 years as “Very High (VH)”.

The specification does not cover other PCM painting systems such as « process n 3 ».

2. Certification of personnel

Operators: Painters are individually certified by an approved organization (ACQPA level 2 as a minimum)

3. Surfaces concerned

Surfaces concerned by this specification are Carbon Steel and Cast iron. Stainless steel and other metals are excluded.

4. Surface preparation

4.1. Preparation before blasting

All surfaces to be coated shall be blast cleaned[1].

All oil or grease shall be removed by washing the item to be painted with appropriate solvents or any other suitable means before beginning blast-cleaning operations.

4.2. Abrasives

- The use of copper slag or silica sand is prohibited

4.3. Blast cleaning

All surfaces to be coated shall be blast-cleaned according to :

- Grade of cleanliness (ISO 8501 standard)
- Surface profile Grit Medium (ISO 8503 standard – roughness meter with adapted visio-tactile surface profile comparator)

After blast-cleaning, all dust must be removed using dry air without lubricant

4.4. Controls

Measures	Target value	Standard	Mean of measurement
Abrasive reference	Angular for Grit	ISO 8503	Supplier Technical data sheet
Batch number of abrasive			Certificate of compliance from supplier
Dew Point	< 85%HR	ISO 8502-4	Dew Point meter
Grade of cleanliness	Sa 2,5	ISO 8501-1	Comparison to standard pictures
Roughness	Medium	ISO 8503-2	Surface Roughness comparator
Date and Time			

In any case, any surface that has been blast-cleaned shall be coated on the same day.

[1] except surfaces from assembled equipment's delivered with primer coating from the following manufacturer list: NORD, ABB.

5. Paint application

5.1. Records

- Dew Point
- Relative Humidity (moisture)
- Substrate temperature

Painting works shall not proceed if:

- Temperature of substrate is less than 3°C above the dew point
- The relative Humidity is more than 85% RH
- Ambient and substrate temperature is less than 10°C
- Ambient and substrate temperature is more than 40°C
- The minimum or maximum temperature of the ambient atmosphere and the substrate are outside the limits given in the product data sheets

5.2. Controls at each layer of the painting work

Measures	Target values	Standard	Mean of measurement
Relative Humidity	< 85% RH	ISO 8502-4	Dew Point meter
Ambient air temperature			
Dew Point			
Substrate Temperature	3°C above the dew point		
Date and Time			

5.3. Products to be used

The coating system shall be composed of the following products from International Coatings:

	Supplier : International coatings	
	Product name	**Minimum Thickness**
Primer[2]	Interzinc 52	60 µm
Intermediate	Intergard 475 HS	200 µm
Top coat	Interthane 990	60 µm
Complete system	**TOTAL**	**320 µm**

For each base-hardener mixture of two component paintings, the pot life shall not be exceeded. In case of time limit exceeded, the mixture of base, hardener and thinner shall be thrown away

The default color according to RAL standard of the topcoat are **"Capri blue" RAL5019**, **"Sapphire blue" RAL 5003, "iron Grey" RAL 7011**and **"Pire White" RAL 9010.** It can be replaced by other color on customer request.

[2] except for surfaces from assembled equipment's delivered with primer coating from the following manufacturer list: NORD, ABB.

6. Drying of each layer

The drying time limit recommended by the paint manufacturer on the technical data sheet, i.e. minimum and maximum over coating intervals shall be observed.

6.1. Controls

Measures	Target value	Standard	Mean of measurement
Dry Film Thickness	According to § 4.d	ISO 19840	Film Thickness gauge
(On demand only) Pull-off test	5 MPa	ISO 4624	Adhesion Pull-off tester

6.2. Control reports

Throughout the duration of the work, PCM shall check the following points and record the results in its quality control report. The following data shall be available:

Default paint report

- Painting follow-up worksheet – document n° ERWA0042
  - Dates
  - Times
  - Temperatures
  - Moisture – Dewpoint, Relative Humidity
  - Thickness

On demand report

- Pull-off test Adhesion report – document n° ERWA0277

7. Reference documents

Reference	Title
ISO 12944-1:2017	Paints and varnishes-Corrosion protection of steel structures by paint systems. Part 1: General introduction
ISO 12944-2:2017	Paints and varnishes-Corrosion protection of steel structures by paint systems. Part 2: Classifications of environments
ISO 12944-3:2017	Paints and varnishes-Corrosion protection of steel structures by paint systems. Part 3: Design and constructive requirements
ISO 12944-4:2017	Paints and varnishes-Corrosion protection of steel structures by paint systems. Part 4: Surface types and preparation
ISO 12944-7:2017	Paints and varnishes-Corrosion protection of steel structures by paint systems. Part 7: Execution and supervision of painting work
ISO 12944-8:2017	Paints and varnishes-Corrosion protection of steel structures by paint systems. Part 8: Development of specifications for new and maintenance work
ISO 8501-1:2007 ISO 8501-3:2006	Preparation of steel substrates before application of paints and related products. Visual assessment of surface cleanliness.
ISO 8502-4:2017	Preparation of steel substrates before application of paints and related products. Tests for the assessment of surface cleanliness
ISO 8503-2:2012 ISO 8503-3:2012	Preparation of steel substrates before application of paints and related products. Surface profile of abrasive blast-cleaned steel
ISO 8504-1:2001 ISO 8504-2:2001 ISO 8504-3:2001	Preparation of steel substrates before application of paints and related products. Methods for surface preparation
ISO 19840:2012	Paints and varnishes. Determination of dry film thickness. Nondestructive magnetic flux method
ISO 4624:2024	Paints and varnishes – Pull-off test for adhesion

8. Annexes – Control report

8.1. Paints Technical data sheets

International

Interzinc® 52

Epoxy Zinc-Rich

PRODUCT DESCRIPTION

A two component, metallic zinc rich epoxy primer which complies with the composition and performance requirements of SSPC Paint 20.

INTENDED USES

As a high performance primer to give maximum protection as part of any anti-corrosive coating system for aggressive environments including those found on offshore structures, petrochemical facilities, pulp and paper plants, bridges and power plants.
Interzinc 52 has been designed to provide excellent corrosion resistance in both maintenance and new construction situations.

PRACTICAL INFORMATION FOR INTERZINC 52

Color	Blue, Gray, Green
Gloss Level	Matte
Volume Solids	59%
Typical Thickness	2-3 mils (50-75 microns) dry equivalent to 3.4-5.1 mils (85-127 microns) wet
Theoretical Coverage	315 sq.ft/US gallon at 3 mils d.f.t and stated volume solids 7.90 m²/liter at 75 microns d.f.t and stated volume solids
Practical Coverage	Allow appropriate loss factors
Method of Application	Airless Spray, Air Spray, Brush

Drying Time

Temperature	Touch Dry	Hard Dry	Overcoating Interval with recommended topcoats: *Minimum*	*Maximum*
41°F (5°C)	2 hours	10 hours	8 hours	Extended[1]
59°F (15°C)	90 minutes	6 hours	4 hours	Extended[1]
77°F (25°C)	75 minutes	4 hours	3 hours	Extended[1]
104°F (40°C)	45 minutes	2 hours	2 hours	Extended[1]

[1] See International Protective Coatings Definitions & Abbreviations
For curing at low temperatures an alternative curing agent is available. See Product Characteristics for details. Maximum overcoating intervals are shorter when using polysiloxane topcoats. Consult International Protective Coatings for further details.

REGULATORY DATA

Flash Point	Part A 84°F (29°C); Part B 86°F (30°C); Mixed 84°F (29°C)
Product Weight	21.0 lb/gal (2.52 kg/l)
VOC	2.80 lb/gal (336 g/lt) EPA Method 24 152 g/kg EU Solvent Emissions Directive (Council Directive 1999/13/EC)

See Product Characteristics section for further details

Protective Coatings — Worldwide Product

AkzoNobel

Page 1 of 4
Issue Date:7/7/2009
Ref:2561

International. Interzinc® 52

Epoxy Zinc-Rich

SURFACE PREPARATION

All surfaces to be coated should be clean, dry and free from contamination. Prior to paint application, all surfaces should be assessed and treated in accordance with ISO 8504:2000.

Oil or grease should be removed in accordance with SSPC-SP1 solvent cleaning.

Abrasive Blast Cleaning

Abrasive blast clean to a minimum of SSPC-SP6 or Sa2½ (ISO 8501-1:2007). If oxidation has occurred between blasting and application of Interzinc 52, the surface should be reblasted to the specified visual standard.

Surface defects revealed by the blast cleaning process, should be ground, filled, or treated in the appropriate manner.

A surface profile of 1.6-3.0 mils (40-75 microns) is recommended.

Shop Primed Steelwork

Interzinc 52 is suitable for application to unweathered steelwork freshly coated with zinc silicate shop primers.

If the zinc shop primer shows extensive or widely scattered breakdown, or excessive zinc corrosion products, overall sweep blasting will be necessary. Other types of shop primer are not suitable for overcoating and will require complete removal by abrasive blast cleaning.

Weld seams and damaged areas should be cleaned to a minimum St3 (ISO 8501-1:2007) or SSPC-SP3. Optimum performance will be achieved with blasting to Sa2½ (ISO 8501-1:2007) or SSPC-SP6; where this is not practical, hand preparation to SSPC-SP11 is recommended.

APPLICATION

Mixing

Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. Once the unit has been mixed, it must be used within the working pot life specified.

(1) Agitate Base (Part A) with a power agitator.

(2) Combine entire contents of Curing Agent (Part B) with Base (Part A) and mix thoroughly with power agitator.

Mix Ratio

4 part(s) : 1 part(s) by volume

Working Pot Life

41°F (5°C)	59°F (15°C)	77°F (25°C)	104°F (40°C)
24 hours	12 hours	5 hours	2 hours

Airless Spray

Recommended

Tip Range 17-21 thou (0.43-0.53 mm)
Total output fluid pressure at spray tip not less than 2503 psi (176 kg/cm²)

Air Spray (Pressure Pot)

Recommended

Gun DeVilbiss MBC or JGA
Air Cap 704 or 765
Fluid Tip E

Brush

Suitable - Small areas only

Typically 2.0-3.0 mils (50-75 microns) can be achieved

Roller

Not recommended

Thinner

International GTA220 (or International GTA415)

Do not thin more than allowed by local environmental legislation

Cleaner

International GTA822 (or International GTA415)

Work Stoppages

Do not allow material to remain in hoses, gun or spray equipment. Thoroughly flush all equipment with International GTA822. Once units of paint have been mixed they should not be resealed and it is advised that after prolonged stoppages work recommences with freshly mixed units.

Clean Up

Clean all equipment immediately after use with International GTA822. It is good working practice to periodically flush out spray equipment during the course of the working day. Frequency of cleaning will depend upon amount sprayed, temperature and elapsed time, including any delays.

All surplus materials and empty containers should be disposed of in accordance with appropriate regional regulations/legislation.

International.

Interzinc® 52

Epoxy Zinc-Rich

PRODUCT CHARACTERISTICS

In order to ensure good anti-corrosive performance, it is important to achieve a minimum dry film thickness of Interzinc 52 of 1.5 mils (40 microns). To achieve a uniform, coalesced, closed film at this dry film thickness, it will be necessary to thin Interzinc 52 with 10% with International thinners. The film thickness of Interzinc 52 applied must be compatible with the blast profile achieved during surface preparation. Low film thickness should not be applied over coarse blast profiles.

Care should be exercized to avoid the application of dry film thicknesses in excess of 6 mils (150 microns).

Care should be exercised to avoid over-application which may result in cohesive film failure with subsequent high builds, and to avoid dry spray which can lead to pinholing of subsequent coats. Over-application will also result in slower curing and extended handling and overcoating times.

Over-application of Interzinc 52 will extend both the minimum overcoating periods and handling times, and may be detrimental to long term overcoating properties.

When Interzinc 52 is allowed to weather before topcoating ensure all zinc salts are removed prior to paint application and only topcoat with recommended materials.

Surface temperature must always be a minimum of 5°F (3°C) above dew point.

Interzinc 52 is not normally recommended for underwater use. Please consult International Protective Coatings for further details in this situation.

Interzinc 52 is suitable for the localized repair of damaged inorganic zinc primer - consult International Protective Coatings for specific advice.

Low Temperature Curing

An alternative curing agent is available for applications at temperatures less than 41°F (5°C). When using this alternative curing agent it should be noted that the VOC will increase to 3 lb/gal (360 g/l).

Interzinc 52 is capable of curing at temperatures below 32°F (0°C). However, this product should not be applied at temperatures below 32°F(0°C) where there is a possibility of ice formation on the substrate.

			Minimum overcoating interval with recommended topcoats	
Temperature	Touch Dry	Hard Dry	Minimum	Maximum
23°F (-5°C)	6 hours	32 hours	36 hours	Extended*
32°F (0°C)	3 hours	16 hours	18 hours	Extended*
5°C (41°F)	2 hours	6 hours	6 hours	Extended*

Touch dry times shown above are actual drying times due to chemical cure, rather than physical set due to solidification of the coating film at temperatures below 32°F (0°C).

*See International Protective Coatings Definitions & Abbreviations

For further details regarding cure times and overcoatability, please contact International Protective Coatings.

This product has the following specification approvals:
- Steel Structures Painting Council - SSPC Paint 20

On consultation with International Protective Coatings this product is compatible with alternative application methods such as flow coating.

Note: VOC values are typical and are provided for guidance purpose only. These may be subject to variation depending on factors such as differences in color and normal manufacturing tolerances.

Low molecular weight reactive additives, which will form part of the film during normal ambient cure conditions, will also affect VOC values determined using EPA Method 24.

SYSTEMS COMPATIBILITY

Interzinc 52 is designed for application to correctly prepared steel. It is possible to apply over approved prefabrication primers. Details of these can be obtained from International Protective Coatings.

Recommended topcoats are:

Intercure 200	InterH2O 401
Intercure 420	Interseal 670HS
Interfine 629HS	Interthane 990
Intergard 251	Interzone 1000
Intergard 269	Interzone 505
Intergard 475HS	Interzone 954
Intergard 740	

For other suitable topcoats, consult International Protective Coatings.

International.

Interzinc® 52

Epoxy Zinc-Rich

ADDITIONAL INFORMATION

Further information regarding industry standards, terms and abbreviations used in this data sheet can be found in the following documents available at www.international-pc.com:

- Definitions & Abbreviations
- Surface Preparation
- Paint Application
- Theoretical & Practical Coverage

Individual copies of these information sections are available upon request.

SAFETY PRECAUTIONS

This product is intended for use only by professional applicators in industrial situations in accordance with the advice given on this sheet, the Material Safety Data Sheet and the container(s), and should not be used without reference to the Material Safety Data Sheet (MSDS) which International Protective Coatings has provided to its customers.

All work involving the application and use of this product should be performed in compliance with all relevant national, Health, Safety & Environmental standards and regulations.

In the event welding or flame cutting is performed on metal coated with this product, dust and fumes will be emitted which will require the use of appropriate personal protective equipment and adequate local exhaust ventilation.

If in doubt regarding the suitability of use of this product, consult International Protective Coatings for further advice.

PACK SIZE

Unit Size	Part A		Part B	
	Vol	Pack	Vol	Pack
10 liter	8 liter	10 liter	2 liter	2.5 liter
3 US gal	2.4 US gal	3.5 US gal	0.6 US gal	1 US gal

For availability of other pack sizes contact International Protective Coatings

SHIPPING WEIGHT

Unit Size	Part A	Part B
10 liter	24.5 kg	2.1 kg
3 US gal	63.3 lb	5.3 lb

STORAGE

Shelf Life: 12 months minimum at 77°F (25°C). Subject to re-inspection thereafter. Store in dry, shaded conditions away from sources of heat and ignition.

Important Note

The information in this data sheet is not intended to be exhaustive: any person using the product for any purpose other than that specifically recommended in this data sheet without first obtaining written confirmation from us as to the suitability of the product for the intended purpose does so at their own risk. All advice given or statements made about the product (whether in this data sheet or otherwise) is correct to the best of our knowledge but we have no control over the quality or the condition of the substrate or the many factors affecting the use and application of the product. Therefore, unless we specifically agree in writing to do so, we do not accept any liability at all for the performance of the product or for (subject to law) any loss or damage arising out of the use of the product. All products supplied and technical advice given are subject to our Conditions of Sale. You should request a copy of this document and review it carefully. The information contained in this data sheet is liable to modification from time to time in the light of experience and our policy of continuous development. It is the user's responsibility to check with their local International Paint representative that this data sheet is current prior to using the product.

Issue date: 7/7/2009

Copyright © AkzoNobel, 7/7/2009.

International. *Copyright © AkzoNobel, 7/7/2009.*

www.international-pc.com

International. Intergard® 475HS

Epoxy

PRODUCT DESCRIPTION

A low VOC, high solids, high build, two component epoxy coating. Available with conventional pigmentation, or alternatively can be pigmented with micaceous iron oxide to provide enhanced overcoating properties.

INTENDED USES

For use as a high build epoxy coating to improve barrier protection for a range of anti-corrosive coating systems in a wide range of environments including offshore structures, petrochemical plants, pulp and paper mills and bridges. Suitable for use in both maintenance and new construction situations as part of an anti-corrosive coating system. The micaceous iron oxide variant improves long term overcoating properties, better facilitating application in the fabrication shop, prior to shipping, with final overcoating on site.

PRACTICAL INFORMATION FOR INTERGARD 475HS

Color	Light gray MIO and a selected range of colors
Gloss Level	Matte
Volume Solids	80%
Typical Thickness	4-8 mils (100-200 microns) dry equivalent to 5-10 mils (125-250 microns) wet
Theoretical Coverage	257 sq.ft/US gallon at 5 mils d.f.t and stated volume solids 6.40 m²/liter at 125 microns d.f.t and stated volume solids
Practical Coverage	Allow appropriate loss factors
Method of Application	Airless Spray, Air Spray, Brush, Roller

Drying Time

			Overcoating Interval with recommended topcoats	
Temperature	**Touch Dry**	**Hard Dry**	*Minimum*	*Maximum*
23°F (-5°C)	150 minutes	48 hours	48 hours	Extended[1]
41°F (5°C)	90 minutes	16 hours	16 hours	Extended[1]
59°F (15°C)	75 minutes	10 hours	10 hours	Extended[1]
77°F (25°C)	60 minutes	5 hours	5 hours	Extended[1]

[1] See International Protective Coatings Definitions & Abbreviations

Maximum overcoating intervals are shorter when using polysiloxane topcoats. Consult International Protective Coatings for further details.

For curing at elevated temperatures an alternative curing agent is available. See Product Characteristics for details.

REGULATORY DATA

Flash Point	Part A 93°F (34°C); Part B 88°F (31°C); Mixed 91°F (33°C)
Product Weight	17.5 lb/gal (2.10 kg/l)
VOC	1.72 lb/gal (207 g/lt) EPA Method 24 92 g/kg EU Solvent Emissions Directive (Council Directive 1999/13/EC)

See Product Characteristics section for further details

International. Intergard® 475HS

Epoxy

SURFACE PREPARATION

All surfaces to be coated should be clean, dry and free from contamination. Prior to paint application, all surfaces should be assessed and treated in accordance with ISO 8504:2000.

Primed Surfaces

Intergard 475HS should always be applied over a recommended anti-corrosive coating scheme. The primer surface should be dry and free from all contamination, and Intergard 475HS must be applied within the overcoating intervals specified (consult the relevant product data sheet).

Areas of breakdown, damage etc., should be prepared to the specified standard (e.g. SSPC-SP6 or Sa2½ (ISO 8501 -1:2007), Abrasive Blasting, or SSPC-SP11, Power Tool Cleaning) and patch primed prior to the application of Intergard 475HS.

Zinc Primed Surfaces

Ensure that the surface of the primer is clean, dry and free from contamination and zinc salts before application of Intergard 475HS. Ensure zinc primers are fully cured before overcoating.

APPLICATION

Mixing

Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. Once the unit has been mixed, it must be used within the working pot life specified.

(1) Agitate Base (Part A) with a power agitator.
(2) Combine entire contents of Curing Agent (Part B) with Base (Part A) and mix thoroughly with power agitator.

Mix Ratio

3 part(s) : 1 part(s) by volume

Working Pot Life

23°F (-5°C)	41°F (5°C)	59°F (15°C)	77°F (25°C)
3 hours	3 hours	2.5 hours	2 hours

Airless Spray	Recommended	Tip Range 21-25 thou (0.53-0.63 mm) Total output fluid pressure at spray tip not less than 2702 psi (190 kg/cm²)	
Air Spray (Pressure Pot)	Recommended	Gun Air Cap Fluid Tip	DeVilbiss MBC or JGA 704 or 765 E
Brush	Suitable	Typically 3.0 mils (75 microns) can be achieved	
Roller	Suitable	Typically 3.0 mils (75 microns) can be achieved	
Thinner	International GTA007	Do not thin more than allowed by local environmental legislation	

Cleaner

International GTA822 (or International GTA415)

Work Stoppages

Do not allow material to remain in hoses, gun or spray equipment. Thoroughly flush all equipment with International GTA822. Once units of paint have been mixed they should not be resealed and it is advised that after prolonged stoppages work recommences with freshly mixed units.

Clean Up

Clean all equipment immediately after use with International GTA822. It is good working practice to periodically flush out spray equipment during the course of the working day. Frequency of cleaning will depend upon amount sprayed, temperature and elapsed time, including any delays.

All surplus materials and empty containers should be disposed of in accordance with appropriate regional regulations/legislation

International.

Intergard® 475HS

Epoxy

PRODUCT CHARACTERISTICS

Intergard 475HS is primarily designed for use as a high build barrier coat to impart barrier protection to a coating system. It is recommended that it should be overcoated with a durable finish from the Interfine or Interthane range when appearance is important.

Maximum film build in one coat is best attained by airless spray. When applying by methods other than airless spray, the required film build is unlikely to be achieved. Application by air spray may require a multiple cross spray pattern to attain maximum film build. Lower or high temperatures may require specific application techniques to achieve maximum film build.

When applying Intergard 475HS by brush or roller, it may be necessary to apply multiple coats to achieve the total specified system dry film thickness.

Surface temperature must always be a minimum of 5°F (3°C) above dew point. When applying Intergard 475HS in confined spaces, ensure adequate ventilation. Exposure to unacceptably low temperatures and/or high humidities during, or immediately after, application may result in incomplete cure and surface contamination that could jeopardize subsequent intercoat adhesion.

Elevated Temperature Curing

An alternative curing agent is available for applications at temperatures greater than 77°F (25°C).

			Overcoating Interval with recommended topcoats	
Temperature	Touch Dry	Hard Dry	*Minimum*	*Maximum*
77°F (25°C)	90 minutes	6 hours	6 hours	Extended *
104°F (40°C)	60 minutes	2 hours	2 hours	Extended *

* See International Protective Coatings Definitions and Abbreviations

Interchanging standard and elevated temperature curing agents during application to a specific structure will give rise to an observable color change due to the difference in the yellowing/discoloration process common to all epoxies on exposure to UV light. In common with all epoxies, Intergard 475HS will chalk and discolor on exterior exposure. However, these phenomena are not detrimental to anti-corrosive performance.

Intergard 475HS is not designed for continuous water immersion.

The micaceous iron oxide variant of this product is frequently used as a "travel coat" prior to final overcoating on site. To ensure best extended overcoating properties, ensure overapplication does not occur and that the surface is fully cleaned of any contamination which may be present in the surface texture due to the coarse nature of the micaceous iron oxide pigmentation.

When applying Intergard 475HS at temperatures less than 59°F (15°C) or wet film thicknesses of 6 mils (150 microns) or less, addition of around 5% International GTA007 thinners will improve film appearance, sprayability and aid film thickness control.

Note: VOC values are typical and are provided for guidance purpose only. These may be subject to variation depending on factors such as differences in color and normal manufacturing tolerances.

Low molecular weight reactive additives, which will form part of the film during normal ambient cure conditions, will also effect VOC values determined using EPA Method 24.

SYSTEMS COMPATIBILITY

Intergard 475HS is designed for use over correctly primed steel. Suitable primers are:

Intercure 200	Interzinc 22 (mist coat or tie coat recommended)*
Intergard 251	Interzinc 315
Intergard 269	Interzinc 52

Suitable topcoats are:

Intergard 740	Interfine 629HS
Interthane 990	Intergard 475HS

For alternative primers and finishes, consult International Protective Coatings.

* See relevant product data sheet for details.

International.

Intergard® 475HS

Epoxy

ADDITIONAL INFORMATION

Further information regarding industry standards, terms and abbreviations used in this data sheet can be found in the following documents available at www.international-pc.com:

- Definitions & Abbreviations
- Surface Preparation
- Paint Application
- Theoretical & Practical Coverage

Individual copies of these information sections are available upon request.

SAFETY PRECAUTIONS

This product is intended for use only by professional applicators in industrial situations in accordance with the advice given on this sheet, the Material Safety Data Sheet and the container(s), and should not be used without reference to the Material Safety Data Sheet (MSDS) which International Protective Coatings has provided to its customers.

All work involving the application and use of this product should be performed in compliance with all relevant national, Health, Safety & Environmental standards and regulations.

In the event welding or flame cutting is performed on metal coated with this product, dust and fumes will be emitted which will require the use of appropriate personal protective equipment and adequate local exhaust ventilation.

If in doubt regarding the suitability of use of this product, consult International Protective Coatings for further advice.

PACK SIZE	Unit Size	Part A		Part B	
		Vol	Pack	Vol	Pack
	20 liter	15 liter	20 liter	5 liter	5 liter
	5 US gal	3 US gal	5 US gal	1 US gal	1 US gal
	For availability of other pack sizes contact International Protective Coatings				

SHIPPING WEIGHT	Unit Size	Part A	Part B
	20 liter	35.4 kg	9.3 kg
	5 US gal	57.1 lb	8.4 lb

STORAGE	Shelf Life	12 months minimum at 77°F (25°C). Subject to re-inspection thereafter. Store in dry, shaded conditions away from sources of heat and ignition.

Disclaimer

The information in this data sheet is not intended to be exhaustive; any person using the product for any purpose other than that specifically recommended in this data sheet without first obtaining written confirmation from us as to the suitability of the product for the intended purpose does so at their own risk. All advice given or statements made about the product (whether in this data sheet or otherwise) is correct to the best of our knowledge but we have no control over the quality or the condition of the substrate or the many factors affecting the use and application of the product. Therefore, unless we specifically agree in writing to do so, we do not accept any liability at all for the performance of the product or for (subject to the maximum extent permitted by law) any loss or damage arising out of the use of the product. We hereby disclaim any warranties or representations, express or implied, by operation of law or otherwise, including, without limitation, any implied warranty of merchantability or fitness for a particular purpose. All products supplied and technical advice given are subject to our Conditions of Sale. You should request a copy of this document and review it carefully. The information contained in this data sheet is liable to modification from time to time in the light of experience and our policy of continuous development. It is the user's responsibility to check with their local International Paint representative that this data sheet is current prior to using the product.

This Technical Data Sheet is available on our website at www.international-marine.com or www.international-pc.com, and should be the same as this document. Should there be any discrepancies between this document and the version of the Technical Data Sheet that appears on the website, then the version on the website will take precedence.

Copyright © AkzoNobel, 12/19/2011.

International. *Copyright © AkzoNobel, 12/19/2011.*

www.international-pc.com

International

Interthane® 990

Polyurethane

PRODUCT DESCRIPTION

A two component acrylic polyurethane finish giving excellent durability and long term recoatability.

INTENDED USES

Suitable for use in both new construction and as a maintenance finish which can be used in a wide variety of environments including offshore structures, chemical and petrochemical plants, bridges, pulp and paper mills, and in the power industry.

PRACTICAL INFORMATION FOR INTERTHANE 990

Color	Wide range via the Chromascan® system
Gloss Level	High Gloss
Volume Solids	57% ± 3% (depends on color)
Typical Thickness	2-3 mils (50-75 microns) dry equivalent to 3.5-5.3 mils (88-132 microns) wet
Theoretical Coverage	457 sq.ft/US gallon at 2 mils d.f.t and stated volume solids 11.40 m²/liter at 50 microns d.f.t and stated volume solids
Practical Coverage	Allow appropriate loss factors
Method of Application	Airless Spray, Air Spray, Brush, Roller

Drying Time

			Overcoating Interval with recommended topcoats	
Temperature	**Touch Dry**	**Hard Dry**	*Minimum*	*Maximum*
41°F (5°C)	5 hours	24 hours	24 hours	Extended[1]
59°F (15°C)	150 minutes	10 hours	10 hours	Extended[1]
77°F (25°C)	90 minutes	6 hours	6 hours	Extended[1]
104°F (40°C)	60 minutes	3 hours	3 hours	Extended[1]

[1] See International Protective Coatings Definitions & Abbreviations

REGULATORY DATA

Flash Point (Typical)	Part A 93°F (34°C); Part B 120°F (49°C); Mixed 95°F (35°C)	
Product Weight	10.1 lb/gal (1.21 kg/l)	
VOC	3.50 lb/gal (420 g/lt) 341 g/kg	EPA Method 24 EU Solvent Emissions Directive (Council Directive 1999/13/EC)

See Product Characteristics section for further details

International. Interthane® 990

Polyurethane

SURFACE PREPARATION

All surfaces to be coated should be clean, dry and free from contamination. Prior to paint application, all surfaces should be assessed and treated in accordance with ISO 8504:2000.

Primed Surfaces

Interthane 990 should always be applied over a recommended anti-corrosive coating scheme. The primer surface should be dry and free from all contamination, and Interthane 990 must be applied within the overcoating intervals specified (consult the relevant product data sheet).

Areas of breakdown, damage etc., should be prepared to the specified standard (e.g. SSPC-SP6 or Sa2½ (ISO 8501-1:2007), Abrasive Blasting, or SSPC-SP11, Power Tool Cleaning) and patch primed prior to the application of Interthane 990.

APPLICATION

Mixing

Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. Once the unit has been mixed, it must be used within the working pot life specified.

(1) Agitate Base (Part A) with a power agitator.
(2) Combine entire contents of Curing Agent (Part B) with Base (Part A) and mix thoroughly with power agitator.

Mix Ratio

6 part(s): 1part(s) by volume

Working Pot Life

41°F (5°C)	59°F (15°C)	77°F (25°C)	104°F (40°C)
12 hours	4 hours	2 hours	45 minutes

Airless Spray	Recommended	Tip Range 13-18 thou (0.33-0.45 mm) Total output fluid pressure at spray tip not less than 2204 psi (155 kg/cm²)
Air Spray (Pressure Pot)	Recommended	Gun: DeVilbiss MBC or JGA Air Cap: 704 or 765 Fluid Tip: E
Air Spray (Conventional)	Suitable	Use suitable proprietary equipment.
Brush	Suitable	Typically 1.6-2.0 mils (40-50 microns) can be achieved
Roller	Suitable	Typically 1.6-2.0 mils (40-50 microns) can be achieved
Thinner	International GTA713 (or International GTA733 or GTA056)	Do not thin more than allowed by local environmental legislation
Cleaner	International GTA713 (or International GTA733 or GTA056)	
Work Stoppages	Do not allow material to remain in hoses, gun or spray equipment. Thoroughly flush all equipment with International GTA056. Once units of paint have been mixed they should not be resealed and it is advised that after prolonged stoppages, work recommences with freshly mixed units.	
Clean Up	Clean all equipment immediately after use with International GTA713. It is good working practice to periodically flush out spray equipment during the course of the working day. Frequency of cleaning will depend upon amount sprayed, temperature and elapsed time, including any delays. All surplus materials and empty containers should be disposed of in accordance with appropriate regional regulations/legislation.	

International.

Interthane® 990

Polyurethane

PRODUCT CHARACTERISTICS

Interthane 990 is available in a range of metallic finishes - please consult the separate Interthane 990 Metallic Working Procedures document for further information.

Level of sheen and surface finish is dependent on application method. Avoid using a mixture of application methods whenever possible.

Best results in terms of gloss and appearance will always be obtained by conventional air spray application.

For brush and roller application, and in some colors, two or more coats of Interthane 990 may be required to give uniform coverage, especially when applying Interthane 990 over dark undercoats, and when using certain lead free bright colors such as yellows and oranges. Best practice is to use a color compatible intermediate or anticorrosive coating under the Interthane 990.

When overcoating after weathering, or aging, ensure the coating is fully cleaned to remove all surface contamination such as oil, grease, salt crystals and traffic fumes, before application of a further coat of Interthane 990.

Absolute measured adhesion of topcoats to aged Interthane 990 is less than that to fresh material, however, it is adequate for the specified end use.

This product must only be thinned using the recommended International thinners. The use of alternative thinners, particularly those containing alcohols, can severely inhibit the curing mechanism of the coating.

Surface temperature must always be a minimum of 5°F (3°C) above dew point.

When applying Interthane 990 in confined spaces, ensure adequate ventilation.

Condensation occurring during or immediately after application may result in a matte finish and an inferior film.

Premature exposure to ponding water will cause color change, especially in dark colors and at low temperatures.

This product is not recommended for use in immersion conditions. When severe chemical or solvent splashing is likely to occur, contact International Protective Coatings for information regarding suitability.

A modified version of Interthane 990 is available for use within the Korean marketplace in order to provide improved workability.

Note: VOC values quoted are based on maximum possible for the product taking into account variations due to color differences and normal manufacturing tolerances.

Low molecular weight reactive additives, which will form part of the film during normal ambient cure conditions, will also effect VOC values determined using EPA Method 24.

SYSTEMS COMPATIBILITY

The following primers/intermediates are recommended for Interthane 990:

Intercure 200	Interseal 670HS
Intercure 200HS	Interzinc 315
Intercure 420	Interzinc 52
Intergard 251	Interzinc 52HS
Intergard 269	Interzone 505
Intergard 345	Interzone 954
Intergard 475HS	Interzone 1000

Interthane 990 is designed to be topcoated with itself.

For other suitable primers/intermediates, consult International Protective Coatings.

8.2. Painting follow-up worksheet

keep it moving

FICHE DE SUIVI D'EXECUTION PEINTURE – procédé 5
PAINTING FOLLOW-UP WORKSHEET – process n°5

PROCESSUS :	WR4	CODE :	ERWA0042	INDICE :	C
EMIS PAR :	Guillaume GODARD	LE :	05/12/2022	PAGE :	Page 2 sur 3

SURFACES ACIER ET FONTES / STEEL AND CAST IRON SURFACES — **PROCEDE STANDARD PCM N°5 / STANDARD PCM PROCESS N°5**

N° de série ou commande / *Serial number or order* | **N° d'ordre de fabrication** / *Work order* | **Pièces** / *Parts*

PREPARATION DE SURFACE / *SURFACE PREPARATION*

DECAPAGE / *BLASTING*

ABRASIF / *ABRASIVE*: **Acier** / *Steel* — **Type** / *Type*: **Angulaire** / *Grit*

Date	Heure / *Time*	Humidité relative (%HR) / *Relative Humidity*	Températures (°C)			Degré de soin / *Cleanliness*		Rugosité / *Roughness*		NOM OPERATEUR / *OPERATOR NAME*
			Support (Ts)	Point de rosée (Td) / *Dew point*	ΔT (Ts-Td)	Cible / *Target*	Mesure / *Measurement*	Cible / *Target*	Mesure / *Measurement*	
						Sa 2,5		Moyen / *Medium*		
		Max 85% HR			Mini + 3°C	Selon / *According to* ISO 8501-1		Selon / *According to* ISO 8503-2		

MOYENS DE CONTRÔLE / *MEANS OF CONTROL*

Moyen / *Mean of control*	Fabricant / *Manufacturer*	Modèle / *Model*	PCM Quality reference Serial number	A vérifier le / *To be checked on*
Thermo-Hygromètre / *Dew Point meter*				
Comparateur Visio-tactile / *Roughness comparator*				

keep it moving

FICHE DE SUIVI D'EXECUTION PEINTURE – procédé 5
PAINTING FOLLOW-UP WORKSHEET – process n°5

PROCESSUS :	WR4	CODE :	ERWA0042	INDICE :	C
EMIS PAR :	Guillaume GODARD	LE :	05/12/2022	PAGE :	Page 3 sur 3

SURFACES ACIER ET FONTES / STEEL AND CAST IRON SURFACES — **PROCEDE STANDARD N°5 / STANDARD PROCESS N°5**

N° de série ou commande / *Serial number or order* | **N° d'ordre de fabrication** / *Work order* | **Pièces** / *Parts*

APPLICATION PEINTURE / *PAINTING APPLICATION* - **équipement / *equipment :*** Pistolet conventionnel / *Conventional spray gun*

Couche n° / *Layer*	Peinture / *Paint*	Date	Heure / *Time*	N° lot / *Batch numbers*	Humidité relative (%HR) / *Relative humidity*	Temperatures (°C)			Mesure de l'épaisseur totale (µm) / *Measurement of total Thickness (µm)*			NOM OPERATEUR / *OPERATOR NAME*
						Support (Ts) / *Substrate*	Point de rosée (Td) / *Dew point*	ΔT (Ts-Td)	Epaisseur cible de la couche / *Target thickness of the layer*	Cible (valeurs réelles lues) / *Target (real values to be read)*	Mesures / *Measurement* (20 points mini)	
1	Interzinc 52			Base / Durcisseur / *Curing agent*					60 µm	85 µm		
2	Intergard 475 HS			Base / Durcisseur / *Curing agent*					200 µm	285 µm		
3	Interthane 990			Base / Durcisseur / *Curing agent*					50 µm	345 µm		
					Max 85% HR			Mini 3°C				

MOYENS DE CONTRÔLE / *MEANS OF CONTROL*

Moyen / *Mean of control*	Fournisseur / *Supplier*	Modèle / *Model*	PCM Quality reference	A vérifier le / *To be checked on*
Thermo-Hygromètre / *Dew Point meter*	TQC	DewCheck 4	HY1	
Mesureur d'épaisseur / *Thickness meter*	Elcometer	☐ Elcometer 456 *Top Dual Fe/NFe*	ME 5	
	Fischer	☐ Dualscope MPOR-FP	ME 4	

8.3. Pull-off test adhesion report

keep it moving

Procès-verbal d'essai de traction – Painting pull-off test report

PROCESS :	WR52	**CODE :**	ERWA0277	**INDEX :**	A
AUTHOR :	Le Nouail Loïc	**ISSUE DATE :**	2016-11-25	**PAGE :**	Page **1** of **2**
CONFIDENTIALITY :	Internal				

Please make sure you use the latest version of the form when filling the record **N°** :

Suivant la norme ISO 4624:2002 / *According to ISO 4624:2002 standard*

Contrôle / *Control* : ☐ Interne / *Internal* ☐ Externe / *External*

N° de série ou commande / *Serial number or order* :.....

N° Document de fabrication / *Work order* :.....

Procédé de peinture / Painting system

☐ Multicouches / Multicoat ☐ Autre / *Other*

Pour des informations plus précises sur le système de peinture, merci de se référer au PV d'application peinture / *For more information about painting system, please refer to the painting report.*

Conditions climatiques / *Climatic condition*

	Date *Date*	Heures *Time*	Température / *Temperature* (°C)			Taux d'humidité / *Degree of moisture* (%)
			Température ambiante / *Room temperature* (Ta)	Support / *Support* (Ts)	Point de rosée / *Dew point* (Tpr)	
Au collage *During Glueing*						
A la traction *During traction*						

Adhéromètre / *Adherometer*

Type d'instrument / *Instrument type* : ☐ Hydraulique et manuel / *Manual and hydraulic* ☐*Autre / Other*:.....

Ref interne / *Internal Item* :..... Etalonné le / *Calibrated on:* ..... Prochain étalonnage/ *Next calibration date*:.....

Support / *Support*	**Colle / *Glue***	**Plots d'adhérence / *Traction Dollies***
☐ Acier / *Steel* Code matière / *Material item*: ..... Nuance / Grade : ..... ☐ Acier inoxydable / *Stainless steel* Code matière / *Material item*: ..... Nuance / Grade : ..... ☐ Alliage d'aluminium / *Aluminium* Code matière / *Material item*: ..... Nuance / Grade :	Type / *Type* : ☐Cyanoacrylate/ *Cyanoacrylate* ☐Autre / *Other* : ..... Marque / *Brand* : ..... Dénomination / *Name* : ..... Temps de prise conseillé / *Setting time* :.....	☐ Ø20 mm ☐ Autre / *Other* :..... **Outil de découpe / *Cutting tool*** ☐ Découpe Ø20,1 mm ☐ Autre / Other :.....

keep it moving

Procès-verbal d'essai de traction – Painting pull-off test report

PROCESS :	WR52	CODE :	ERWA0277	INDEX :	A
AUTHOR :	Le Nouail Loïc	ISSUE DATE :	2016-11-25	PAGE :	Page **2** of **2**
CONFIDENTIALITY :	Internal				

Please make sure you use the latest version of the form when filling the record N° :

Nature de la rupture / *Nature of the failure*					
Plot N° / *Dolly's item*	**Repérage / *Location***	**Epaisseur / *Thickness* (µm)**	**Valeur obtenue / *Value* (MPa)**	**Nature de la rupture / *Nature of failure***	**Valeur cible / *Target value***
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Moyenne / Average					

Résultats / *Results*

Critère de validation / *Validation criterion* :

- Valeurs mesurées / *Measured values* ≥ Valeur cible / *Target value* → Conforme / *Compliant*
- Valeurs mesurées / *Measured values* < Valeur cible / *Target value* → Non conforme / *Non-compliant*

Décision / *Decision*: ☐ CONFORME / *COMPLIANT* ☐ NON CONFORME / NON-COMPLIANT

Si non conforme, décision / *If non-compliant, decision* :

Commentaires / *Comment* :

Contrôle Qualité PCM : (Nom, Date et signature) / *PCM Quality inspection : (Name, Date and signature)*

Contrôle Client (facultatif) / *Customer control (optional)*

Date / *Date* : Nom / *Name* : Visa / *Initial* :

4 ABB PAINTING PROCEDURE (C5-M)

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

LEAFLET

Surface treatment and paint systems
for IEC low voltage cast iron frame motors



This document describes the different paint systems available for IEC low voltage cast iron motors.
ABB standard paint color is blue, Munsell 8B 4.5/3.25. Others colors are available and can be ordered with variant codes 114 or 179.
The availability of the paint systems depends from the production unit aswell as from the product and the order type (limited availability for stock orders and more options for production orders). The paint systems and film thickness combinations for the different production units are all tested according to ISO12944-6.

Paint systems, suitability for atmospheric-corrosivity categories in accordance with EN ISO 12944-2							
Corrosivity category	**C1**	**C2**	**C3, durability medium** [1]	**C4, durability medium** [1]	**C5, durability medium** [1]	**C5, durability high** [1]	**CX**[2]
Variant code			**111** **ABB standard paint system**	**115** **Special paint system**	**754** **Special paint system**	**711** **Special paint system**	**719** **Special paint system**
Examples of typical environments (informative only)							
Exterior	-	Atmospheres with low levels of pollution: mostly rural areas	Urban and industrial atmospheres, moderate sulfur dioxide pollution, coastal areas with low salinity.	Industrial ares and coastal areas with moderate salinity	Industrial areas with high humidity and aggressive atmospheres and coastal areas with high salinity	Industrial areas with high humidity and aggressive atmospheres and coastal areas with high salinity	Offshore areas with high salinity, and industrial areas with extreme humidity and an aggressive atmosphere, and sub-tropical and tropical atmospheres
Interior	Heated buildings with clean atmospheres, e.g., offices, shops, schools, hotels	Unheated buildings where condensation can occur, e.g., depots, sports halls	Production rooms with high humidity ans some air pollution, e.e. food-processing plants, laundries, breweries, dairies	Chemical plants, swimming pools, coastal ship- and boatyards	Buildings or areas with almost permanent condensation and with high pollution	Buildings or areas with almost permanent condensation and with high pollution.	Industrial areas with extreme humidity and an aggressive atmosphere
Durability							
			from 7 to 15 years	from 7 to 15 years	from 7 to 15 years	from 15 to 25 years	from 15 to 25 years
Cast iron parts							
Surface preparation			Blast-cleaning Sa 2 ½	Blast-cleaning Sa 2 ½	Blast-cleaning Sa 2 ½	Blast-cleaning Sa 2 ½	Blast-cleaning Sa 2 ½
Primer coat			2-component zinc rich epoxy primer	2-component zinc rich epoxy primer	2-component zinc rich epoxy primer	2-component zinc rich epoxy primer	2-component zinc rich epoxy primer
			alternatively	**alternatively**			
			2-component epoxy primer	2-component epoxy primer			
			alternatively				
			1-comp epoxy ester				

[1] Tested acc. to ISO 12944-6

[2] As alternative for CX paint system, ABB offers variant codes 710 and 755 that are acc. to Norsok M-501 standard.

[3] Nominal dry film thickness, µm (micro meter). The total film thickness results from the used coat combinations.

Paint systems, suitability for atmospheric-corrosivity categories in accordance with EN ISO 12944-2							
Corrosivity category	**C1**	**C2**	**C3, durability medium [1]**	**C4, durability medium [1]**	**C5, durability medium [1]**	**C5, durability high [1]**	**CX[2]**
Variant code			**111**	**115**	**754**	**711**	**719**
			ABB standard paint system	**Special paint system**	**Special paint system**	**Special paint system**	**Special paint system**
Intermediate coats			No intermediate coat	2-component epoxy primer	2-component epoxy primer	2-component epoxy primer	2-component epoxy primer
			alternatively				
			2-component epoxy primer				
Topcoat			2-component epoxy topcoat	2-component epoxy topcoat	2-component epoxy topcoat	2-component epoxy acrylic (NISO)	2-component epoxy acrylic (NISO)
			alternatively	**alternatively**	**alternatively**	**alternatively**	**alternatively**
			2-component polyurethane topcoat	2-component polyurethane topcoat	2-component polyurethane topcoat	2-component polyurethane topcoat	2-component polyurethane topcoat
			alternatively				
			1-component acrylic topcoat				
Total NDFT, µm[3]			100 or 80	160 or 180	200 or 240	320	min. 280
Fan cover							
Topcoat			Polyester power coat	Polyester power coat	Polyester power coat	Polyester power coat	Polyester power coat
			alternatively	**alternatively**	**alternatively**	**alternatively**	**alternatively**
			Polyester power coat + wet paint (2-component epoxy/ polyurethane topcoat)	Polyester power coat + wet paint (2-component epoxy/ polyurethane topcoat)	Polyester power coat + wet paint (2-component epoxy/ polyurethane topcoat)	Polyester power coat + wet paint (2-component epoxy/ polyurethane topcoat)	Polyester power coat + wet paint (2-component epoxy/ polyurethane topcoat)

[1] Tested acc. to ISO 12944-6

[2] As alternative for CX paint system, ABB offers variant codes 710 and 755 that are acc. to Norsok M-501 standard.

[3] Nominal dry film thickness, µm (micro meter). The total film thickness results from the used coat combinations.

—

abb.com/motors-generators

—

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB AG does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

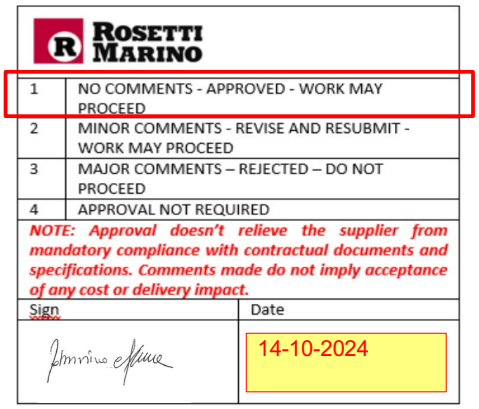
We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB AG.
Copyright© 2022 ABB
All rights reserved

9AAU000000023 EN 12-2022

Base Load Power Hub (BLPH)

FAT (FINAL ACCEPTANCE TEST) PROCEDURES
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-QC-PRO-00023



ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	14-10-2024

Document Class: 2

NOTE
FINAL ACCEPTANCE IS ACHIEVED WHEN CROSSIWIND RELEASES A "CLOSE OUT" CRS

Rev.	Date	Description	Prepared	Reviewed	Approved
02	30/09/2024	Accepted for Construction (AFC)	GLL	APD	AHN
01	23/08/2024	Accepted for Construction (AFC)	GLL	APD	AHN
00	31/07/2024	Issue for Review (IFR)	GLL	APD	AHN

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Table of contents

1 Document Scope 4
2 Reference Documents 4
3 General 4
4 Mechanical Run Test 5
4.1 Description 5
4.2 Acceptance criteria 5
5 Performance Test 6
5.1 Description 6
5.2 Acceptance criteria at rated pressure 6
6 Vibration test 7
6.1 Description 7
6.2 Acceptance criteria 7
7 Noise Test 8
7.1 Description 8
7.2 Acceptance criteria 8
8 Dimensional check, Visual Inspection & Nameplates check 8
9 FAT Configuration 9
10 APPENDIX – Report Template 10

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

1 DOCUMENT SCOPE

This procedure aims at describing final acceptance tests to be performed on Sea Water Lift Progressive Cavity Pumps (P-50001 A/B) including Mechanical Run, Performance, Noise & Vibration tests.

2 REFERENCE DOCUMENTS

- General Arrangement Drawing // 1724000936-MAC-DA-00004
- Pump data sheet // 1724000936-MAC-DS-00012
- Inspection and Test Plan // 1724000936-QC-ITP-00002
- Performance curves for equipment and auxiliaries // 1724000936-MAC-DS-00015
- Positive Displacement – Pumps Rotary // API STANDARD 676 THIRD EDITION

3 ABBREVIATION

- FAT: Factory Acceptance Test
- API: American Petroleum Institute
- SPL: Sound pressure level
- PSV: Pressure Safety Valve
- RMS: Root Mean Square

4 GENERAL

FAT will be achieved in accordance with above project documentation in "Complete Unit" configuration with job Motor (PM-50001 A/B) & API plan 51. The test is performed with water (Chloride content below 50ppm) which will be set between 10°C & 30°C (Target 20°C). The test will be performed at 400 V – 50Hz.

The FAT will be composed of the following tests:

- Mechanical run test (Section 2)
- Performance test (Section 3)
- Vibration measurement (Section 4)
- Global noise measurement test (SPL @1m) (Section 5)
- Dimensional, visual & nameplates checks. (Section 6)

Readings are according to the accuracy of the measuring instruments used. Instruments are chosen to have measures between 20% and 80% of the scale of measures. These instruments are identified

and regularly controlled. Valid calibration certificates for measurement devices will be provided during FAT and attached to FAT report.

Here is the list of instruments to be used during FAT:

- Manometer to record discharge pressure,
- Flowmeter to record flow rate,
- Thermometer to record water, bearing & gearbox temperature,
- Speedometer to record pump rotation speed,
- Multimeter to record Voltage, Intensity, frequency & power consumption.

5 MECHANICAL RUN TEST

5.1 DESCRIPTION

This test consists of a run test of 1 hour at rated speed and rated differential pressure. The following parameter will be recorded every 30 minutes (3 points in total): flow rate, Gearbox & Bearing skin temperature, water temperatures, differential pressure, pump speed, voltage, intensity, and power consumption of the motor.

Due to PCM well depth of 20/21 meters, Pumps will be assembled in short test configuration by removing 4 casing extension (12m) for a total length of 18m below mounting flange. Note that discharge pressure will be corrected to take into consideration the pump's sections removed. As we have 12m removed, Discharge pressure will be increased by 1.2bar.

Notes:

- Due to motor load, speed could be slightly different to pump datasheet,
- It is assumed that the suction pressure is equal to the atmospheric pressure, and the discharge pressure is equal to the differential pressure using water at "rated" temperature. (test configuration – section 9.1)

5.2 ACCEPTANCE CRITERIA

Mechanical Run test is stated as conform, in absence of leaks, abnormal noise, vibrations and temperature increase.

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

6 PERFORMANCE TEST

6.1 DESCRIPTION

This test will be performed after Mechanical run test and consists in performance test of pump at 0bar, rated and PSV differential pressure at rated speed. It is performed at the end of the Mechanical run test.

The following parameters will be recorded: flow rate, water & stator temperature, differential pressure, pump speed, voltage, intensity, and power consumption of the motor.

Notes:

- Due to motor load, speed could be slightly different to pump datasheet,
- It is assumed that the suction pressure is equal to the atmospheric pressure, and the discharge pressure is equal to the differential pressure using water at "rated" temperature.
- As the project fluid density and viscosity is close to potable water it is not necessary to perform corrections to the test data.

6.2 ACCEPTANCE CRITERIA AT RATED PRESSURE

	Datasheet & Pump curves figures	Tolerances (Acceptance Criteria)	Test	
			Min	Max
Differential pressures (bar)	5.3 full length 6.5 reduced length	Manometer tolerance	5.2 6.3	5.4 6.6
Flow rate (m3/h)	2.5	As per API676 deviation	2.5	3.4
Mechanical power (kW)	1.45	+4%	0	1.51
Motor absorbed power (KW)	1.64	+4%	0	1.70
Fluid Temperature (°C)	10 to 30	Target 20°C	10	30
Pump speed (rpm)	118	+/-5	113	123

Note: 0barg & PSV set pressure (7.6barg corrected to 8.8barg – see note 2 below) figures & will be recorded for information without acceptance criteria.

Note2: Due to PCM well depth of 20/21 meters, Pumps will be assembled in short test configuration by removing 4 casing extension (12m) for a total length of 18m below mounting flange. Note that discharge pressure will be corrected to take into consideration the pump's sections removed. As we have 12m removed, Discharge pressure will be increased by 1.2bar.

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

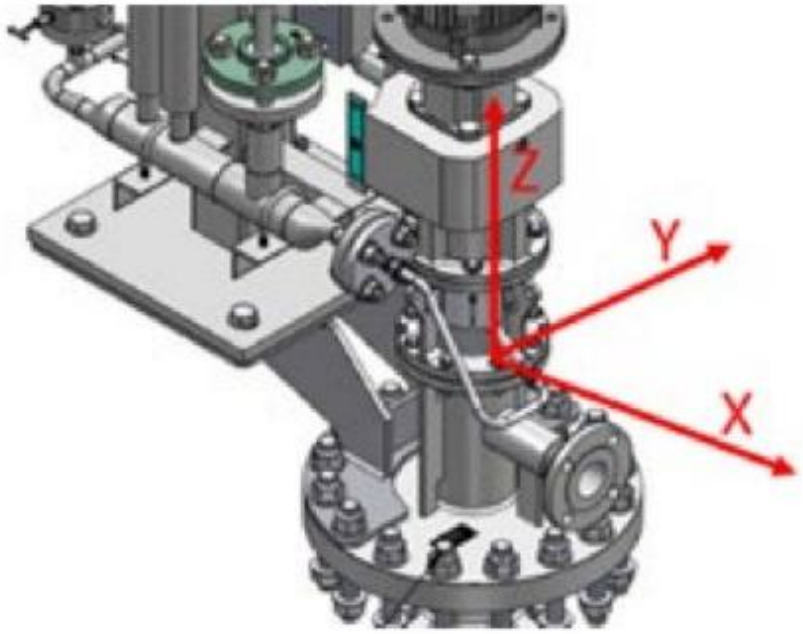
7 VIBRATION TEST

7.1 DESCRIPTION

The vibration test is performed on the pump during Performance test at rated conditions in our factory.

This test is performed according to API 676 section 6.11.1.

Vibration test will be performed at rated condition and measurements will be done on pump spacer.



7.2 ACCEPTANCE CRITERIA

The vibration level is recorded in X (radial), Y (axial) and Z (vertical) directions.

According to API 676, the maximum vibration level acceptable is:

- Vu<7.1 mm/s RMS (with Vu the unfiltered velocity) on pump bearing housing.

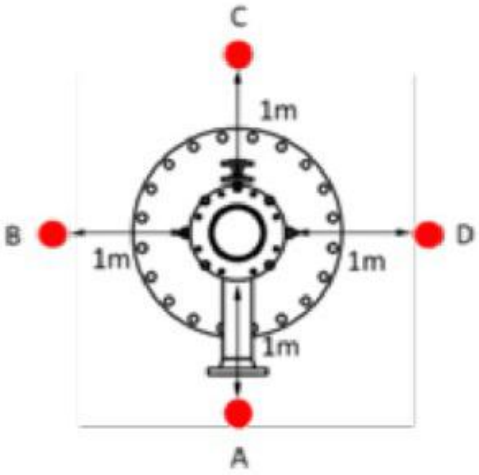
This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

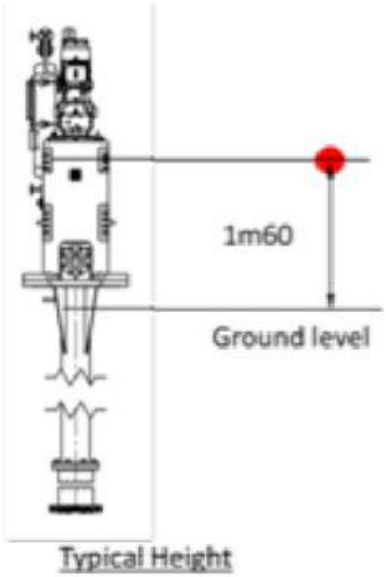
8 NOISE TEST

8.1 DESCRIPTION

The noise test is performed on the pump during Performance test at rated conditions in our factory before delivery. This test is performed according to the machinery directive 2006/42/EC.

Measurement will be performed at rated conditions at 1.6m height around the pump and 1.0 m from baseplate edge (see sketch below). The A-weighted emission sound pressure level at workstations is then measured in dB(A).





8.2 ACCEPTANCE CRITERIA

A-weighted emission sound pressure level ≤ 85 dB(A) @1m distance (in PCM factory environment)

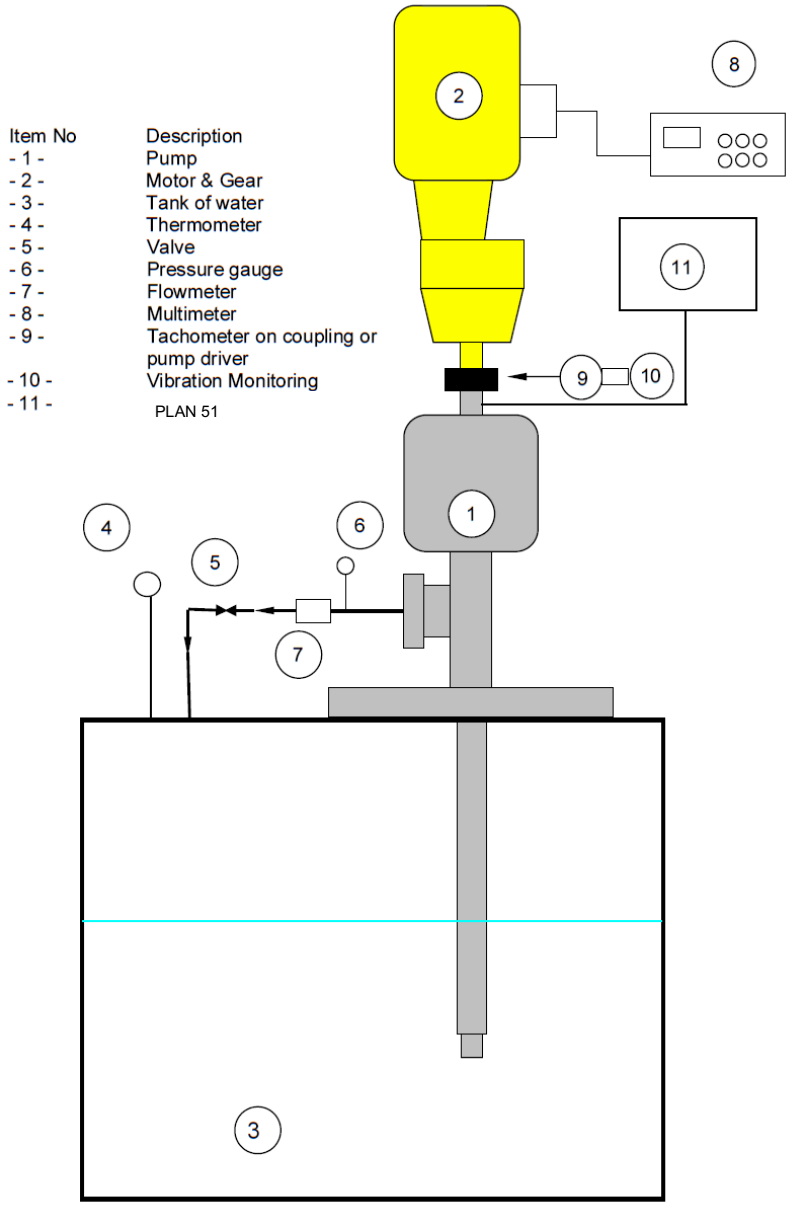
9 DIMENSIONAL CHECK, VISUAL INSPECTION & NAMEPLATES CHECK

Overall dimensions of the pump will be checked and compared to general arrangement drawing. This task will be performed using conventional measuring tape during Performance tests. Records will be compiled in Dimensional control report and GAD will be updated accordingly as as-built revision.

During this check, all nameplates will be also checked and compared to Nameplate drawings.

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

10 FAT CONFIGURATION



Note: Sealing system PLAN 51 will be set as per Pump P&ID

11 APPENDIX – REPORT TEMPLATE

PCM keep it moving

PROCES VERBAL D'ESSAIS
TEST REPORT

REF. CLIENT / CLIENT REF : P300
NUMERO DE SERIE / SERIAL NUMBER : 070PCCC
MODELE / MODEL : 40A12

RAPPORT ESSAI DE PERFORMANCE / PERFORMANCE TEST REPORT

				instrument	
				TAG	Validity
PRESSION DIFFERENTIELLE DIFERENTIAL PRESSURE	bar	0	8		
DEBIT FLOW-RATE	m3/h				
VITESSE DE ROTATION OUTPUT SPEED	rpm				
TENSION VOLTAGE	V				
INTENSITE INTENSITY	A				
PUISSANCE ABSORBEE NOMINAL POWER	kW				
VARIATION DE FREQUENCE FREQUENCY VARIATION	Hz				
TEMPERATURE DU FLUIDE FLUID TEMPERATURE	°C				
TEMPERATURE DU STATOR STATOR TEMPERATURE	°C				

COMMENTAIRES:
COMMENTS

Résultat / *Result :*

☐ Accepté / *Accepted*

☐ Non accepté / *Not accepted*

Date de l'essai / Test date

Test effectué par / Test carried out by

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

PCM keep it moving

PROCES VERBAL D'ESSAIS
TEST REPORT

REF. CLIENT / CLIENT REF : P300
NUMERO DE SERIE / SERIAL NUMBER : 070PCCC
MODELE / MODEL : 40A12

RAPPORT ESSAI D'ENDURANCE / RUN TEST REPORT

Test Duration Durée du test	

				instrument	
		beginning of the test Début du test	end of the test Fin du test	TAG	Validité Validity
HEURE HOUR					
PRESSION DIFFERENTIELLE DIFERENTIAL PRESSURE	bar				
DEBIT FLOW-RATE	m3/h				
VITESSE DE ROTATION OUTPUT SPEED	rpm				
TENSION VOLTAGE	V				
INTENSITE INTENSITY	A				
PUISSANCE ABSORBEE NOMINAL POWER	kW				
VARIATION DE FREQUENCE FREQUENCY VARIATION	Hz				
TEMPERATURE DU FLUIDE FLUID TEMPERATURE	°C				
TEMPERATURE DU STATOR STATOR TEMPERATURE	°C				

L'essai d'endurance est conforme en cas d'absence de fuite, de bruit anormal, d'augmentation des vibrations et d'augmentation de la temperature.
Mechanical Run test is stated as conform, in absence of leaks, abnormal noise, increased vibrations and increased temperature.

COMMENTAIRES:
COMMENTS

Résultat / *Result :*

☐ Accepté / *Accepted*

☐ Non accepté / *Not accepted*

PCM keep it moving

WW0221 Rapport d'essai vibration et bruit _Vibration and noise test report

PROCESS :	WR52	CODE :	WW0221	INDEX :	B
AUTHOR :	C. Guennec	ISSUE DATE :	2016-09-06	PAGE :	Page 1 of 1
CONFIDENTIALITY :	External				

Please make sure you use the latest version of the form when filling the record N° :

DONNEES POMPE ET ESSAI / *PUMP & TEST DATA*

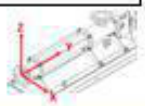
NUMERO DE SERIE / *SERIAL NUMBER*	
MODELE / *MODEL :*	
OPERATEUR / *OPERATOR NAME :*	
DATE DE TEST / *TEST DATE :*	
VITESSE POMPE / *PUMP SPEED :*	rpm
PRESSION D'ASPIRATION / *SUCTION PRESSURE :*	barg
PRESSION DE REFOULEMENT / *DISCHARGE PRESSURE :*	barg
ESSAI REALISE / *TEST REALIZED :*	☐ Essai de vibration / Vibration test **Appareil d'essai / Test device** -Numéro de série / Serial number : …… -Certificat de calibration valide jusqu'à / Certificate of conformity valid until : …… ☐ Essai de bruit / Noise test **Appareil d'essai / Test device** -Numéro de série / Serial number : …… -Certificat de calibration valide jusqu'à / Certificate of conformity valid until : ……

RAPPORT D'ESSAI DE VIBRATION / *VIBRATION TEST REPORT*

Critère d'acceptation / ***Acceptance criteria :*** ☐ Vibration ≤ 3.8mm/s RMS
☐ Vibration ≤ 7.1mm/s RMS
☐ Other : vibration ≤ …. mm/s RMS

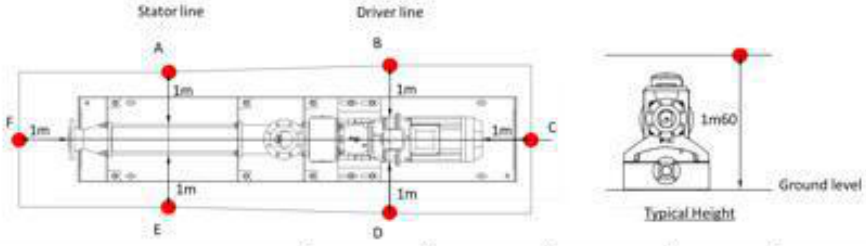
Direction / Direction	X (radial)	Y (axial)	Z (vertical)
Niveau de vibration au palier / *Vibration level on bearing* [mm/s RMS]	mm/s	mm/s	mm/s

Résultat / ***Result :*** ☐ Accepté / *Accepted*
☐ Accepté sous dérogation / *Accepted under derogation*
☐ Non accepté / *Not accepted*



RAPPORT D'ESSAI DE BRUIT / *NOISE TEST REPORT*

Critère d'acceptation / ***Acceptance criteria :*** Niveau de pression acoustique / *Sound pressure level* ≤ 80 dB(A)



Application point	A	B	C	D	E	F
Niveau de bruit / *Noise level*	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)

Résultat / ***Result :*** ☐ Accepté / *Accepted*
☐ Accepté sous dérogation / *Accepted under derogation*
☐ Non accepté / *Not accepted*

http://mypcm.world.pcm.local/en/sbu-department/Quality/Lists/pcm-public-documents/WW0221_Rapport%20d%E2%80%99essai%20vibration%20et%20bruit%20_Vibration%20and%20noise%20test%20report.docx

Base Load Power Hub (BLPH)

PRE-COMMISSIONING -COMMISSIONING PROCEDURES
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-COM-PRO-00024

Document Class: 2

01	17/01/2025	Accepted for Construction (AFC)	GLL	APD	AHN
00	01/10/2024	Issue for Review (IFR)	GLL	APD	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

Table of contents

1 DOCUMENT SCOPE 4

1.1 REFERENCES 4

1.2 DEFINITIONS AND ABBREVIATIONS 4

2 EXTRACT OF PCM Standard IOM for vertical pumps. 4

List of tables

Table 1 - Reference Documents 4

Table 2 - Definitions and Abbreviations 4

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

1 DOCUMENT SCOPE

This document aims at describing the required actions for Pre-commissioning & Commissioning. Note that Installation, Commissioning, Start-up, Operation & Maintenance procedures will be in Installation, Operatio & Maintenance Manual

1.1 REFERENCES

Doc. No.	Description
1724000936-MAC-MAN-00031	INSTALLATION, OPERATING AND MAINTENANCE MANUAL (PUMP AND MOTOR, INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)
1724000936-MAC-DS-00012	PUMP DATA SHEETS INCLUDING WEIGHT DATA SHEET
1724000936-MAC-DA-00004	GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS
1724000936-MAC-DD-00006	PUMP CROSS SECTIONAL DRAWING AND BILL OF MATERIAL
1724000936-MAC-DD-00007	SHAFT SEAL DRAWING AND BILLS OF MATERIAL

Table 1 - Reference Documents

1.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
VENDOR:	PCM

Table 2 - Definitions and Abbreviations

2 EXTRACT OF PCM STANDARD IOM FOR VERTICAL PUMPS.

3. Operation

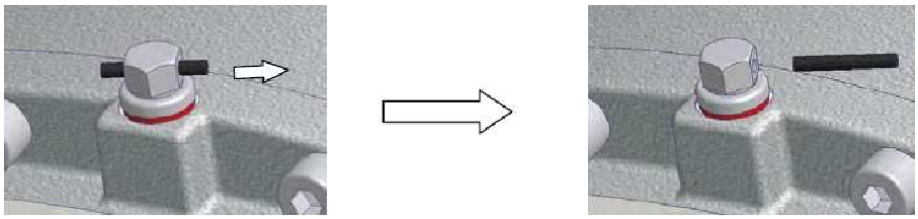
3.1. Commissioning

Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

3.1.1. Before start-up

Ensure that:

- The motor and baseplate are grounded (earthed).
- The electrical connections are correct and their arrangement does not lead to supplementary risks (falls).
- The gearbox has been filled with lubricant to the correct level.
- The motor has been filled with lubricant to the correct level.
- The gearbox screw (or vent valve or oil expansion tank) has been correctly installed and activated.



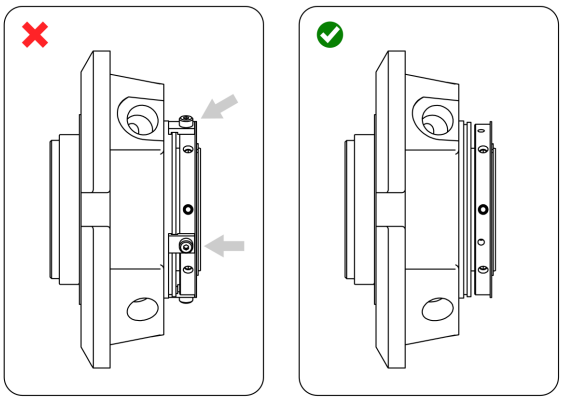
Activation of the vent screw



Installation of the vent valve

NOTE: for the positioning of the vent screw and the connection of the expansion tank, see the drive system instructions in the appendix.

- The product to be pumped is present in the tank and the pump body.
- The mechanical seal is connected to its sealing plan.
- The mechanical seal is vented (if used in a vertical installation or with a barrier fluid).
- The spacers (shown by the arrows on the diagram below) have been removed from the mechanical seal and conserved for maintenance operations.



- All valves installed upstream and downstream from the pump are open.
- The temperature and type of product to be pumped are correct.
- The alignment of the coupling has been checked.
- The screws are tightened to the right torque for their diameter.
- The direction of shaft rotation corresponds to the desired direction of pumped fluid flow.

Also follow the motor manufacturer's instructions (supplied in the appendix).

3.1.2. Start-up

WARNING: Never allow the pump to run dry!

To prevent dry running, PCM can supply a dry run protection system.

If the pump is not primed, you are advised to fill the pump body by hand. If the pump is temporarily not primed, the small amount of liquid remaining in the pump is enough to lubricate the stator until the next priming.

During the first few minutes of operation, check the following:

- The liquid being pumped reaches the end of the discharge pipe.
- The pump is not vibrating abnormally.
- No unusual noise.
- Sealing system functioning well.
- Check that the pressure stabilises, if a pressure gauge is installed.
- No abnormal heating of the stator or sealing system.

Check that the parameters (speed, flow rate, pressure, viscosity, and temperature) match the design parameters of the pump.

Note: it is normal for a fine black powder to form behind the mechanical seal. This is due to wear of the fix throttle bushing in the first moments of operation.

WARNING: If the values are not those indicated, consult your PCM service centre.

3.2. Normal operating procedure

The pump and its drive system can reach significant surface temperatures.



Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

3.2.1. Start-up procedure

Before each start-up, check the following:

- Fluid present at suction.
- Valves open on the suction and discharge pipes.
- Correct temperature of the product to be pumped.

Start the pump.

3.2.2. General Operating Precautions

During operation, ensure that:

- The pump is continuously supplied with product and power.
- The discharge pressure remains stable and below the maximum capacity of the pump.
- The temperature of the product being pumped remains within the operating limits.
- The operating instructions in force at the production site are observed.

3.2.3. Shutdown Procedure

This shutdown procedure depends on the type of product being pumped. Refer to the specific characteristics on the technical description (see Appendices).

The shutdown procedure is therefore defined by the process.

Nonetheless, the minimum procedure is to switch off the pump, then close the suction and discharge valves.



WARNING: for a product which settles, clean the pump using a suitable product in order to enable the pump to be restarted without damage. .



It is important to protect the pump against water hammer, which could destroy the equipment and cause a risk to staff and other equipment nearby.

WARNING: it is important to limit the time for which food is in contact with the pump components, and to flush the pump in the event of a prolonged stoppage (over 30 minutes).

3.2.4. Operating Procedure in the Event of an Incident

In the event of operating irregularities, such as:

- Pump does not start.
- Pump does not prime itself.
- Flow rate too low or irregular.
- Pump stops.
- Pump is not delivering.
- Pump is abnormally noisy.

Proceed as follows:

- Shut down the pump according to the shutdown procedure (see page 24).
- Hydraulically isolate the pump (suction, discharge).
- See "Troubleshooting" section (see page 37).

3.2.5. Automatic control

It is advisable to use devices that automatically control the operation of the pump.

Examples: pressure switch, valves with electrical position contact, dry running protection probe (capacitance probe).

Base Load Power Hub (BLPH)

PACKING PROCEDURE
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-QC-PRO-00032

Document Class: 3

ROSETTI MARINO

1	APPROVED - WORK MAY PROCEED
2N	REVISE AND RE-SUBMIT - DO NOT PROCEED
2Y	REVISE AND RE-SUBMIT - WORK MAY PROCEED
3	REJECTED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	22/10/2024

01	17/10/2024	Issue for Information (IFI)	GLL	APD	AHN
00	01/10/2024	Issue for Information (IFI)	GLL	APD	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)
01	Issue for Information (IFI)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Table of contents

1 DOCUMENT SCOPE 4

1.1 REFERENCES 4

1.2 DEFINITIONS AND ABBREVIATIONS 4

2 IDEA PACKING PROCEDURE (PCM Sub-supplier) 5

List of tables

Table 1 - Reference Documents 4

Table 2 - Definitions and Abbreviations 4

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

1 DOCUMENT SCOPE

This document aims at describing how pumps will be packed according S.E.I. 4C (Seaworthy packing)

Due to the long length, pumps will be packed dismounted in several elements:

- Pump head parts including pump discharge body
- Sealing system (API Plan 51)
- Casing elements
- Shaft elements
- Stators

1.1 REFERENCES

Doc. No.	Description
1724000936-QC-PRO-00033	PRESERVATION PROCEDURE
1724000936-MAC-DS-00012	PUMP DATA SHEETS INCLUDING WEIGHT DATA SHEET
1724000936-MAC-DA-00004	GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS
1724000936-MAC-DD-00006	PUMP CROSS SECTIONAL DRAWING AND BILL OF MATERIAL
S.E.I.L.A	Union of Industrial Packaging and Associated Logistics

Table 1 - Reference Documents

1.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
VENDOR:	PCM
COG:	Center of Gravity

Table 2 - Definitions and Abbreviations

2 IDEA PACKING PROCEDURE (PCM SUB-SUPPLIER)

Packing is done by our sub-supplier IDEA according to SEI 4C (section 6.1.4 of below procedure). The seaworthy packing consists of crates with closed joints and physical-chemical protection. The corrosion protection is guaranteed by a vapor and corrosion inhibitor wrapping and by addition of desiccant bags (number depending on the crate size – Datasheet on last page).

The parts are cleaned, dried, and protected before the packing.

Caps are used to ensure the protection of the pumps discharge nozzles.

The bolting & loose parts are distributed into dedicated boxes as per Packing list if any.

During initial packing, full pictures report will be made and available for information.

Marking will include as minimum on top, side & end crate sides:

- Country of destination
- PCM Manufacturing order N°
- Net & Gross Weight (kg)
- Dimensions (cm)
- COG Location
- Crate N°

IDEA	**EN - INSTRUCTION** **GENERAL SPECIFICATION** **INDUSTRIAL PACKAGING** **CUSTOMER PCM**	Site : IEN – prestation PCM Date d'application : 17/04/17 1/34

Written by : S. Jaumouillé On : 02/04/17	Verifed by : C. Lafoucrière On : 13/04/17	Approved by : O. Renaud On : 17/04/17

Original validé

No individual protection equipments, it's about a technical instruction

CONTENTS

1 Introduction
- 1.1 Objective 2
- 1.2 Industry Codes and applicable standards 3

2 SECURITY AND LATENT DEFECTS 4

3 GENERALITIES 5
- 3.1 Foreword to packaging process 6
- 3.2Packaging alternatives 6
- 3.3 Spare parts 7

4 PACKAGING OPTIONS 7
- 4.1 Climatic conditions 7
- 4.2 Packages weight and dimensions 7
- 4.3 Packaging options 7
- 4.4 Special requirements 8
- 4.5Packing list 8
- 4.6 Checking parcels

5 PACKAGING INSTRUCTIONS
- 5.1 Generalities and Particularities 8
- 5.2 Packaging and Marking 9

6 Packaging methods 13
- 6.1 Main protections 13
  - 6.1.1 Protection a : Contact 13
  - 6.1.2 Protection b: Rainproof wrap 13
  - 6.1.3 Protection ba18: Antirust wrap 13
  - 6.1.4 Protection c: Dessicant bags 13
  - 6.1.5 Protection d: Antishock and antivibration devices 15
- 6.2Constructions material 16
- 6.3 Principal Packaging categories 19
  - 6.3.1 Catégorie 1 :Saddles and bases 19
  - 6.3.2 Catégorie 2 : Bundles, palletization 21
  - 6.3.3 Catégorie 3 : Packaging in crates 21
  - 6.3.4 Catégorie 4 : Packing cases 22
  - 6.3.5 Catégorie 5 : Carboard boxes 27
  - 6.3.6 Catégorie 7 : Reels 28
  - 6.3.7 Catégorie 8 : Containers 28
  - 6.3.8 Catégorie 9 : Covering and cladding 29

7 Marking 33
- 7.1External marking 31
- 7.2Minimum standards 32
- 7.3 Marking and pictogram charts 34
- 7.4 Marking of treated wood 35

1 INTRODUCTION

1.1.Objective

1.1.1 Subject

This specification aims to specify the conditions of protection, packaging, marking and transport of the equipment ordered by the CUSTOMER'S customers.

1.1.2 Field of application

It takes up the Industrial Packaging syndicate specifications which, unless stated otherwise in the purchase order, constitutes the minimum required for the packing and marking of the equipment

1.1.3 Specific demands

The packaging considers the transportation conditions (road, rail, boat or air), as well as the conditions of transfer, handling and storage in compliance with professional use.

Not any previsible damages due to transport, handling or climatic conditions are to be excluded from this specification.

For any material not specifically described in this document, IDEA will have to supply the most adequat packaging, according to the industry's codes of practise as well as cost efficiency.

The NIMP15 / ISMP15 shall be applied as far as wood for international packages is used.

1.2 Industry Applicable Codes, Standards

S.E.I.L.A.	Spécifications Techniques des méthodes d'emballage des matériels industriels et applications diverses
EN 13 307-1	Classification for plywood – Part1 General terms
EN 635-2	Classification for plywood – Part2 Hardwood
EN 635-3	Classification for plywood – Part 3 softwood
EN 635-5	Classification for plywood – Part 5 according to the surface appearance
ISO 16 979	Wooden panels. Determination of moisture contents
ISO 445	Pallets for handling and transport – a glossary
ISO TR 11444	Quality of the wood used in the making of pallets.
NF B 53-664	Wooden pallets - Moisture contents- assessment methods for one pallet or estimated for a batch.
NF H 00-310	Heat-weldable and soft materials with low water stream transmission coefficient. (P< 0,3 g/m^2.24 hrs).
NF H 00-310-1	Heat-weldable soft materials. Polyethylene monosheet with a water stream transmission coefficient (P) between 1g/m^2.24h <_ 4 g/m2.24
NF H 00-321	Dessicant bags
NF H 20-008	Holding devices for ready-to-ship packages to be handled individually
ISO 780	Packages: markings and symbols related to the handling of goods
ISO 668	Containers: classification, dimensions and weights.
ISO 7000	Symbols
US MIL-P-116	US military: Method to preserve the materials used
US MIL-STD-2073-1	US military: Military packing standards

2 SECURITY AND LATENT DEFECTS

2.1 The manufacturer will have to guarantee satisfactory performance under general terms of use, and for the values mentioned in the documents specific to the project or according to the Manufacturer's specifications when agreed by the CUSTOMER.

The SEI guarantee is valid during the entire time of transportation the packaging is aimed for, from the day it was completed till its opening, the overall period should not exceed12 months. In case the transportation of the goods should be interrupted, the SEI guarantee stops when the packaging is opened.

2.2 In case the goods and materials should be damaged, the packer guaranties should not be appealed when:

- **A:** When the packaging method or technique have been imposed totally or partially by the user or customer.
- **B:** When the customer imposed, applied or provided a part or all the materials or goods used to protect, wrap or package.
- **C:** In case wrong or incomplete information have been provided about the goods or materials to be packaged.
- **D:** When the information about the transportation of the materials are incomplete, wrong or hidden.
- **E:** In case the damage occuring results from rust or oxidation, and when the customer has not accepted an extra antirust wrap
- **F:** When the damage results from the material itself
- **G:** In unforeseen circumstances cases

3 GENERALITIES

3.1 Foreword to the packaging process

Customer goods features

WEIGHT

DIMENSIONS
FRAGILITY

MEANS OF TRANSPORT FEATURES

By plane: the packaging has to be light (cardboard)

By sea: strong packaging, protection ag. High humidity

By road : Strong packaging

UNLOADING METHODS / FLOW

Folding cases: Easy opening - screwing

Re-usable cases

Storage duration

Final destination country features

Climatic factors (Protection type choice and dessicant bags)

Ismp 15 norm: marking and requirement acc. to the country

->> Packaging type definition

+

->> Protection type definition

3.2 Packing suggestions

3.2.1 Generalities

The inside and outside of the packing must comply with the Seila general specification.

Packing takes into account the transport conditions, transshipment, handling and storage, according to professional use. It can't avoid unforeseeable risks due to transport conditions, handling and environmental conditions.

3.2.2 Packaging requirements

Any packing such as crates, cases, of wood or any other structures will have to be made so as to protect efficiently the equipment of partial or total deterioration against advert weather conditions, storage movement, mechanical constraints, and handling related to transport operation. When possible, all packing from the same order and shipping operation will be consolidated by the packer.

All packaging must be made following the same instructions:

- Final clients requirements
- The ratio cost / packaging and main transport
- Avoid wasted space in a parcel
- Design parcels fit for transport ans handling

Equipment originating from different orders must not be packed together (Except final client's preliminary approval)

3.3 Spare Parts

Spare parts have to be packaged and placed in cases different from the ones containing the main equipment.

4 PACKING OPTIONS

4.1 Climatic conditions

The equipment may suffer constraints due to various climatic environments between the making and the first use. Therefore the analysis of the packing will take into account:

- The logistic chain
- The climatic conditions during the transport of the goods
- The constraints undergone by the materials
- The length of time these constraints may apply

4.2 Weight and dimensions

4.2.1 Standard sized parcels

During the making of the parcel, the dimensions will be reduced to their most & the weight controlled so as to limit the size of the parcel to an average size parcel, according to the domestic & international standards to: 11, 80 x 2, 30 x 2,30 m — gross weight : 3 000 kg or according to the transport regulations in use for the origin & destination countries.

If the parcel did exceed one of the measures mentioned above, the PACKER will have to warn the CUTOMER & will have to supply the following information:

a) Overall dimensions of the parcel during transport
b) Gross weight & net weight in kg
c) Centre of gravity lengthways & sideways if off centre
d) Type of packing for the purpose of transport

4.3 Packaging options

The equipment will be packed according to the specifications of the project & the category of packing required for the equipment concerned.

4.4 Specific requirements

The making of the packing will have to be reasonably cost efficient while allowing for handling, transport & storage of the equipment as well as taking into account the specifications of the end customer.

The making of the packing will have to, on top of its protective capacities, allow the handling of the parcel, would it be by crane with anchor points, fork lift truck with prongs access, & other means of handling, and this in all safety for the workforce as well as the goods.

4.5 Packing List

A copy will be placed in a waterproof envelope fixed to the outside of the parcel. The type of packing list to be used will be defined by the CUSTOMER on a case to case basis.

4.6 Checking parcels

No parcel will be closed with prior agreement from the CUSTOMER.

The PACKER will have to allow the order to be inspected by a Surveyor commissioned by the CUSTOMER, or the principal and will have to allow access to the workshop during the inspection.

The PACKER will also have to provide the staff & the equipment necessary to the inspection.

Please note that an Inspector is in his full right to request to check the reference number of a part, the contents of a parcel against the packing list, the protection of the part or parts, dunnage, marking, and to control the dimensions, weight as well as the quality of the packing.

5 PACKING INSTRUCTIONS

5.1 Generalities and particularities

.

The following instructions represent guidelines for packing & protecting the equipment purchased. The CUSTOMER agrees that it is the PACKER's responsibility to respect the packing instructions.

These instructions will be the bare minimum to help protect the equipment bound for export, transport & storage.

The equipment that is moisture sensitive (instrumentation, electric components, etc...) will have to be packed in a watertight cover; heat sealed & shrink wrapped with the addition of desiccant bags.

The inside of the parcel will be made so as to provide an efficient barrier against rodents.

It is the PACKER's responsibility to pack the small size & fragile equipment into boxes supplied to this aim so as to guarantee the maximum possible protection.

Any loose piece of equipment will have to undergo adequate wedging.

The CUSTOMER must inform the PACKER in case some corrosive repellant substance has been applied to the equipment; if necessary a cleaning method will have to be supplied.

5.2 Packing and Marking

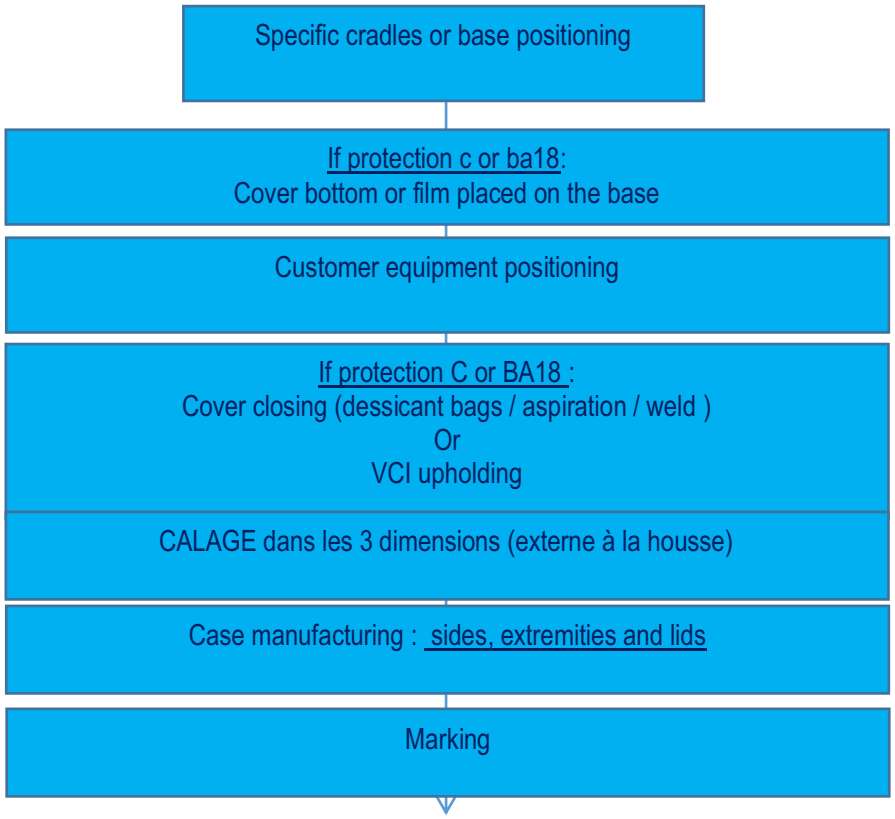
5.2.1 Definition

This section covers the methodology of packaging protection of sensitive instruments and other electrical components against atmospheric and physical shocks that may occur during transport or as a result of storage for a period of 1 year.

5.2.2 General

This section is only the guidance for the CLIENT; the PACKER is responsible for the choice and use of the appropriate packaging materials.

5.2.3 Methodology



- Securing the packaging

  Prior to packaging the equipment, the customer must check that all the spare parts are wedged and secured and that all the openings are plugged.

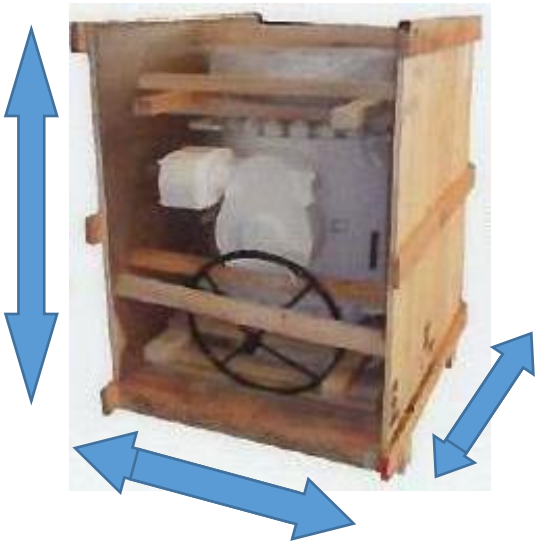
  The customer must check that the equipment have been correctly labeled for material ID.

5.2.4 Wedging

5.2.4.1 Wedging principles

⇨ Facing the package, you have to wedge the equipment according the 3 axes of possible shifting.

Up/Down + forward / backward +t o the right / to the left



⇨ **Wedge the equipment upright standing on the base in priority**

Important :

1- THE EQUIPMENT MUST BE STOWED TO THE BASE

2- NO CONTACT PACKAGE/EQUIPMENT

3- NO WOOD WEDGES INSIDE THE COVERS

The wedges placed inside the cover must be non hygroscopic. The use of wood is limited, avoided if possible.

5.2.4 Packaging material

- Selected wood meets the choice 3 of the lumber grading standards. (EN 1611-1).
- A particular attention is paid to the quality of the used wood
- The wood causing metal corrosion, such as oak, red cedar, chestnut must not be used.
- The platforms will be sole or skating.

5.2.5 Securing the panels inside the wooden box

Panels will be wedged and secured with wooden reinforcements and equipment in accordance with the equipment' 'fragility. This protection aims at realizing a non-deformable package, avoiding the equipment to warp during transportation, storage or handling operations. Wedges are the interface between the equipment and the package. To ensure the coherence of the whole, all moving or cantilevered parts inside an inside an item of the product must be immobilized or supported by means provided by the manufacturer

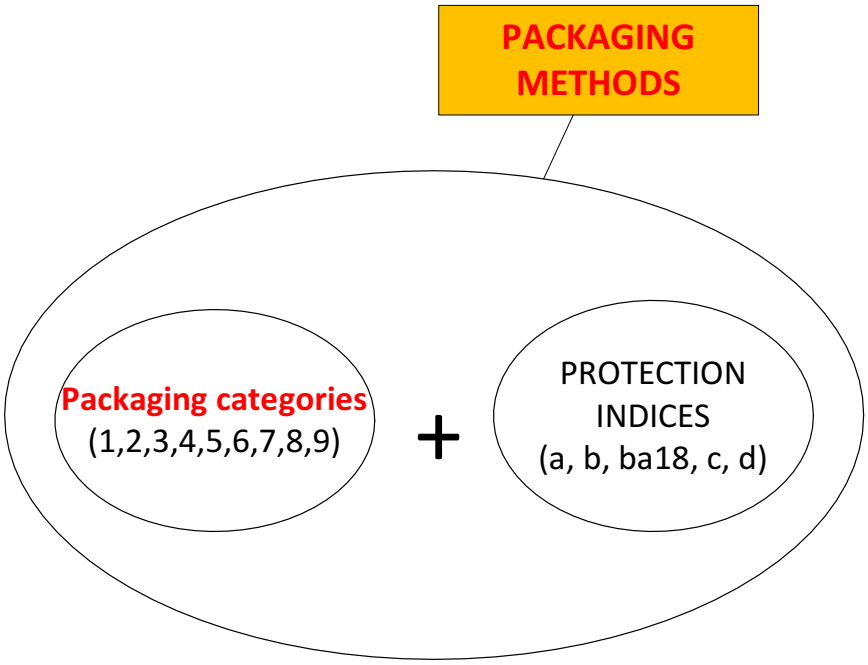
a) The fibers of wood or any other hygroscopic materials should not be used
b) Straw and Hay should not be used

5.2.6 Marking of the Packaging cases

- The package will be marked according to the client's instructions

6 PACKAGING METHODS

$$M = C + P$$



CATEGORIES	TYPES
1	Saddles - Bases
2	Wooden pallets
3	Crates
4	Wooden box
5	Cardboard boxes
7	Reels
8	Container
9	Covering and cladding

PROTECTION	TYPES
a	Contact protection
b	Watertightness
ba18	Antirust film
c	Dessicant bags
d	Anti- shock and vibration devices

6.1 Main protections

6.1.1 a protection (contact protection)

Contact protection will be provided by the client such as paint, oily film, protective varnish…

6.1.2 b protection (rain-tightness, waterproof)

This protection is waterproof. It is applicable when the material is water sensitive but unsensitive to vapour or when it bears a temporary contact protection but this protection does not stand up to rain-tightness

6.1.3 BA 18 protection (Corrosion proof oily film)

Corrosion –proof oil having rust inhibiting properties in the vapour phase.
Corrosion-proof substance leaving a waxy film after the evaporation of a solvent inside the packaging.

6.1.4 c protection (Dehydrating)

This protection is mainly used in wooden box to avoid ripping the protective cover.

.

The equipment which is sensible to corrosion must be wrapped in a protective cover.
Various covers' qualities are available according to the client's need.

The choice is made according to:
Need of rain-tightness (permeability criteria) – It determines the quantity of dessicant bags needed.
Solidity: Use of a reinforced cover – Mainly used for the bases.
Customer's specificity: a special product demand

It will be imperative to wrap with a heat sealed plastic cover of 0.2 mm the equipment sensitive to corrosion. When choosing the type of protective cover to be used (polyethylene or aluminium composite) the conditions of transport, storage & the final destination country will have to be taken into account when deciding. The cover must comply with NF H 00-310 or US MIL B 131 standards. Any spout, socket or other tubing and piping will have to undergo protection suitable to their shape. The emptying & drying of circuits are the responsibility of the CUSTOMER or the equipment manufacturer, the PACKER must ensure this operation has been correctly performed.

The dessicant bags placed inside the wrap are efficient for 1 year and NF H 00-320, NF H 00-321 ou DIN55473 or US MIL D 3464 standards.

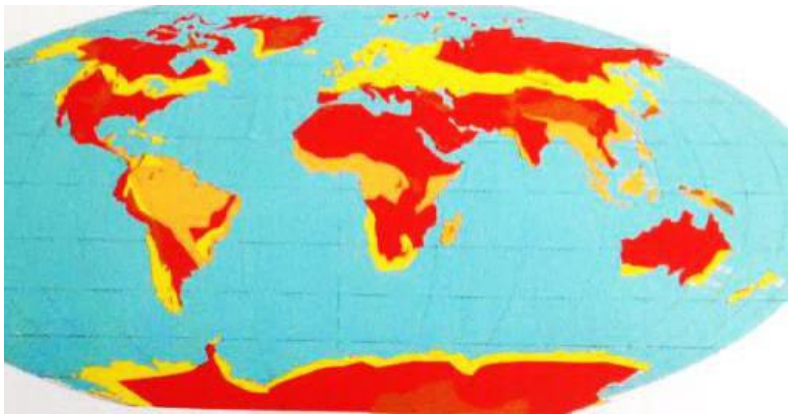
Inside the cover, dessicant bags are placed equally. The number of units of dessicant is calculated using a defined formula:

⇨ **Detailed formula :**

$$nU = 0{,}7p\,STF + XK$$

= 0 if there is no wood in the case

nU :Is the French Number of Units of dessicant bags
p: Is the permeability of the material expressed in g/m²/24 hours, measures at 38° and at 95% relative humidity
S: Is the area of the barrier in m²
T : Is the period of storage in years
F : Is the climatic factor taken from the appended figure (yellow=1,red = 1.5, orange=2.5)



6.1.5 d protection from impacts and vibration

This protection is aimed to attenuate impacts or vibrations during the handling of the packaging

It can be elastic materials:
- Foam
- Plates, blocks
- corners
- Brace, matresses
- Rubber cushions

Or mechanical devices
- Straps
- Traction springs
- Etc …

In a similar case, a fairest preliminary mechanical and rate proposition will be supplied.

6.2 CONSTRUCTION MATERIALS

6.2.1 Treated wood

6.2.1.1 Used materials

WOOD	
Type	**Dim. in mm**
Planks	18*100
Planks	18*150
Planks	27*100
Planks	27*150
Planks	27*TL
Planks	32*150
Planks	38*150
Planks	38*TL
Rafters	50*100
Rafters	63*80
Rafters	75*100
Planks	63*160/ 63*150/ 63*175
Planks	75*225 / 75*200

Wood Quality

Features of the wood to be used:

a) Variety of wood : scotch pine, Douglas, poplar, beech, ash, oak

b) No knot or defect exceeding 1/3 of the width of the planks

c) No wood split over 25 cm

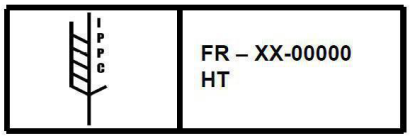
d) Planks with defects are acceptable as far as the mechanical resistance of the package and equipment is guaranteed.

e) The minimum width of the planks is 10 cm for 200 kg and above. No damages plank must be used.

6.2.1.2 Treated Wood

The woods to be used to produce the cases, the wedging and other needs will imperatively have to be treated according to NIMP 15 or ISMP 15 (I.E kiln-heated to 56°c at the core of the wood during 30 minutes)
The agreement of the IDEA site is delivered by the DRAF of its county (Direction de l'Agriculture et de l'Alimentation Française) The plant is audited every 2 years to check the storage rules, the treatments certificates filing are well respected.
A number ISMP 15 corresponding to the plant' agreement will be marked on the wood packages.

The marking is the only legal guarantee. Example:



It is compulsory for exportation

This norm concerns only the « simple » wood materials, and not panels because their fabrication process (heat / glue) removes the risk.

6.2.2 PLYWOODS/OSB

6.2.2.1 Materials used

Plywood and OSB	
Type	**Thickness in mm**
Plywood	9
Plywood	12
Plywood	15
Plywood	18
OSB	9
OSB	12
OSB	15

A) **Plywood** is a sheet material manufactured from thin layers or "plies" of wood veneer that are glued together with adjacent layers having their wood grain rotated up to 90 degrees to one another

THICKNESSES - SIZES		
NOMINAL	TOLERANCES	MIN. NUMBER OF PLIES
10	8,7 to 10 mm	3
12	11,1 to 12,5 mm	5
15	14,3 to 15,8 mm	5
18	17,5 to 19 mm	7

B) **Oriented strand board** (**OSB**), also known as flake board, sterling board and aspenite in British English, is a type of engineered lumber similar to particle board, formed by adding adhesives and then compressing layers of wood strands (flakes) in specific orientations.

NF EN 300 norm classifies the OSB panels in 4 categories, class 3 and 4 are the only ones used for the packing of industrial equipments.

OSB PANELS MUST NOT BE USED TO MANUFACTURE LIDS AND HOODS

6.3 PACKAGING MAIN CATEGORIES

6.3.1 CATEGORY 1 (saddles and bases)

Usually manufactured with thick wood planks

Metal hinges, flats, plats or slings cling the equipment

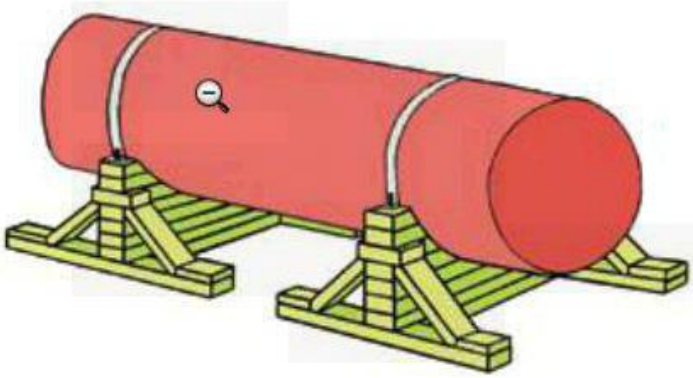
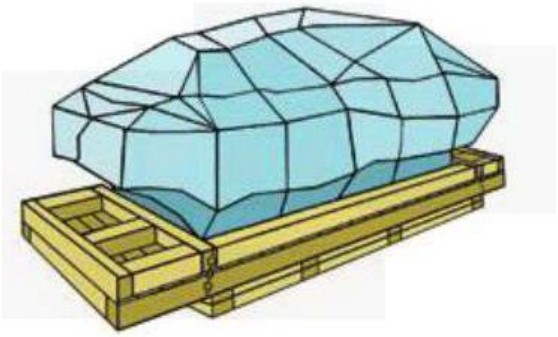


Figure 1 Single cradle with 45 ° reinforcements

Figure 2 Trey + Base



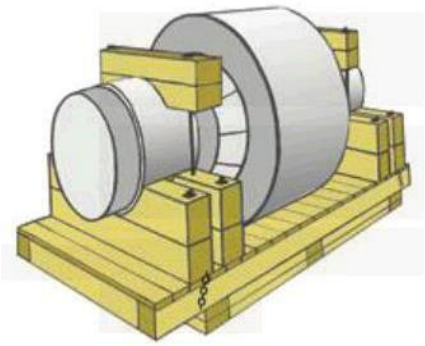


Figure 3 Trey + cradles

6.3.2 Category 2 (bundles and palletization)

The bundle will be preferred for slender parts having structures not likely to be damaged during normal handling

Pallets will be preferred for the grouping of small items not vulnerable to crushing.

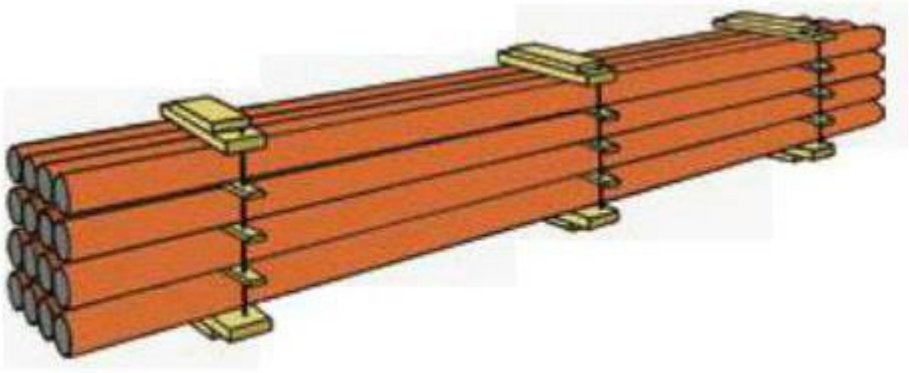
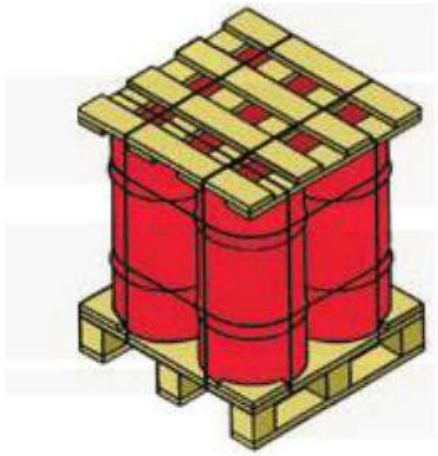
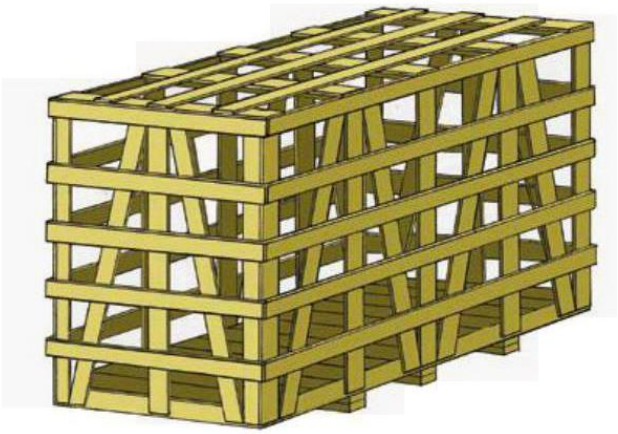


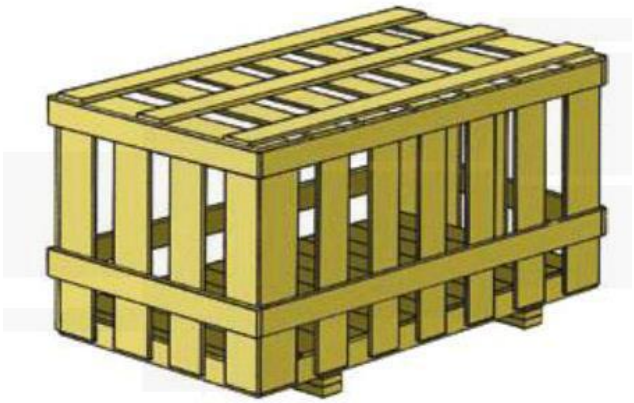
Figure 4 Bundle bounds with wooden blocks and tie rods



6.3.3 Category 3 (packaging in crates)

Crates are used to package complex fabricated equipments and non fragile equipments, wedged,on bases for « door to door « by container, or road transport.





6.3.4 Category 4 (Packing cases)

The packing case is made of unpaned wood with closed joints, of plywood or OSB and used for any assembly needing mechanical or physico-chemical protection…

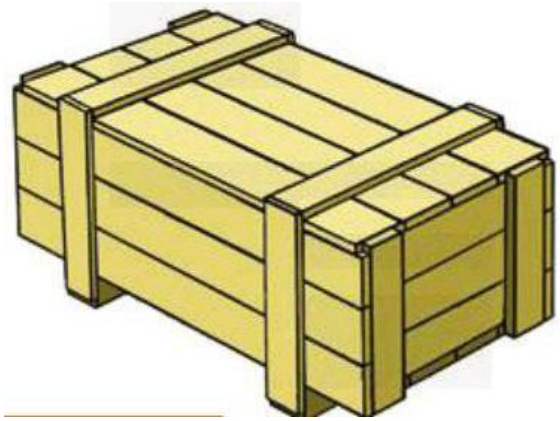
6.3.4.1 Sawn timber cases

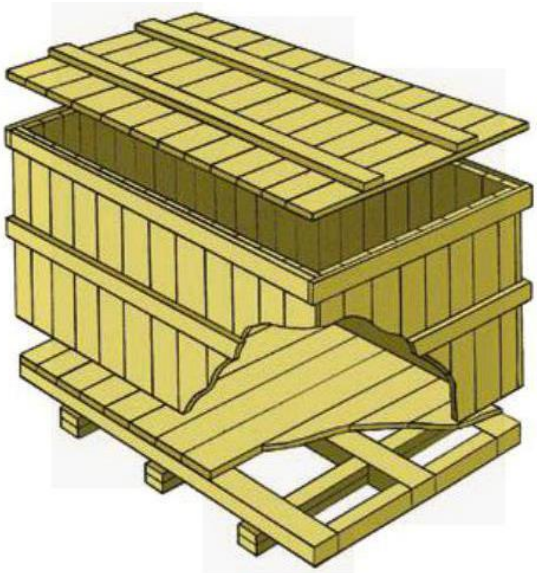
Wood cases / required minimum

NET WEIGHT OF EQUIPMENT	THICKNESS(*) OF BOARDS BEFORE PLANING	THICKNESS(*) OF BATTENS BEFORE PLANING
Up to 500 kg	≥ 18 mm	≥ 18 mm
From 500 to 2000 kg	≥ 22 mm	≥ 22 mm
From 2000 to 5000 kg	≥ 22 mm	≥ 25 mm
From 5000 to 10000 kg	≥ 25 mm	≥ 25 mm
From 10000 to 15000 kg	≥ 32 mm	≥ 32 mm
Over 15000 kg	≥ 38 mm	≥ 38 mm

Each type of case has its own characteristics :

- Timber sawn wood nailed cases
- Simple case
- American type case
- Framed ends cases
- Cleated packing case

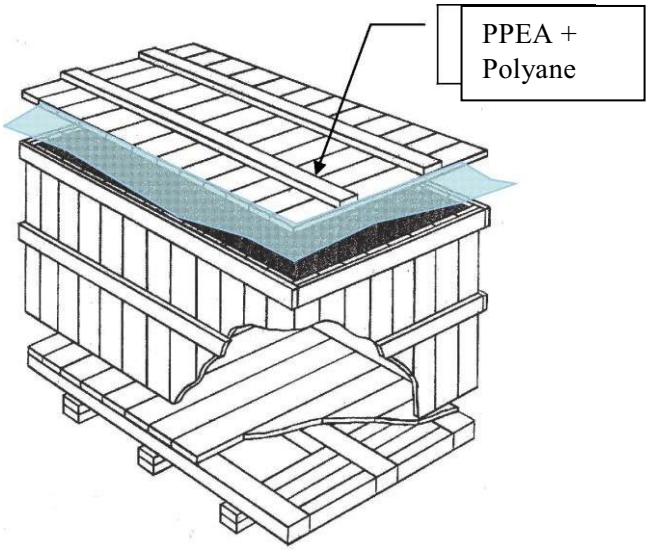




The size of the planks used to manufacture the lids or panels will be between 100mm to 200 mm and a thickness of ≥ 25 mm. . The lid will be screwed to the beams of the case

No planks with holes, cracked or knotty beyond acceptable standards is accepted in the making of the crates.

The lid of the case will have to be designed so as to protect the case from any water seeping in. To achieve this, the lid requiring joints will include polyethylene or AKYLUX (PPEA) sheeting.

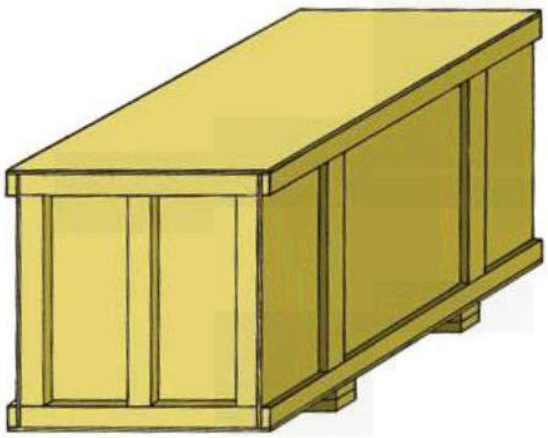


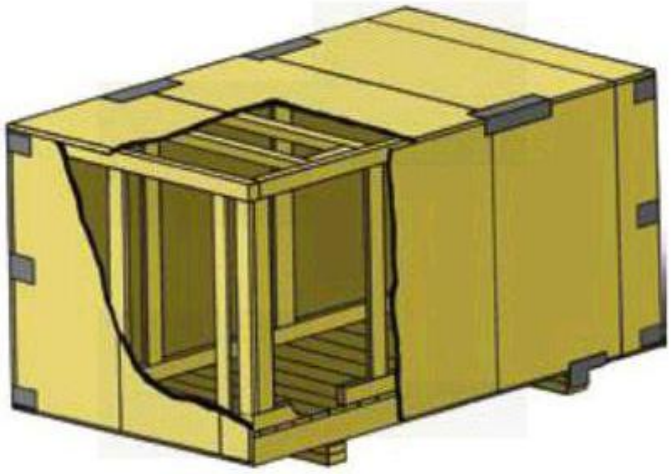
6.3.4.2 WOOD, PLYWOOD OR OSB CASES

Wood, plywood or OSB cases, minimum required

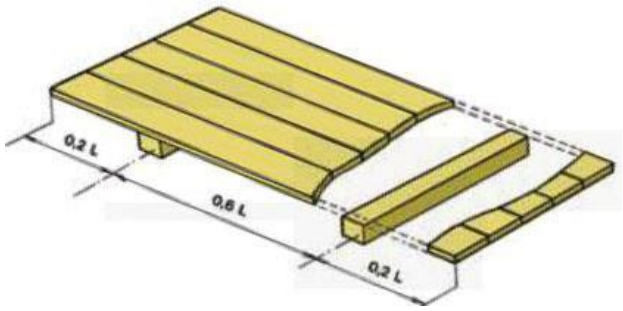
PREFERRED SIZES		
NET WEIGHT OF EQUIPMENT	THICKNESS (*) OF PANELS	THICKNESS (*) OF BATTENS
Up to 500 kg	≥ 6 mm	≥ 18 mm
From 500 to 2000 kg	≤ 10 mm	≥ 22 mm
From 2000 to 5000 kg	≥10 mm	≥ 25 mm
From 5000 to 15000 kg	≥ 12 mm	≥ 38 mm
Over 15000 kg	≥ 15 mm	≥ 38 mm

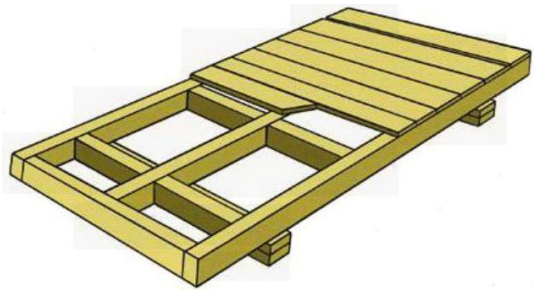
- The plywood or OSB cases manufaturing is different from sawn timber cases.
- The plywood cases' structure has to be studied according to :
- The type and volume of the equipment.
- The type of wedges
- The thickness of the panels used
- It can be cleated inside or outside



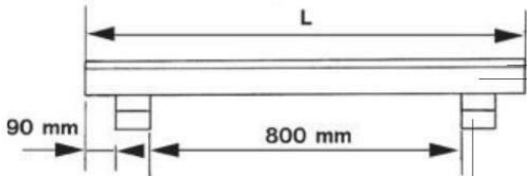


6.3.4.3 WOOD





⇨ minima 590 mm for fork lift slots



- **Fork lift slots :**

⇨ Fork lift slots 100mm mini

⇨ Fork lift slots de 800 mm mini

⇨ minima 590 mm for fork lift slots

Skids are compulsory if gross weight > 5 tons

GRIPPING DEVICES		
GROSS WEIGHT OF PACKAGE	MEMBER	
	HEIGHT (mm)	WIDTH (mm)
From 100 to 5000 kg	H ≥ 95	Width must be at least equal to height
From 5000 to 15000 kg	H ≥ 120	
Above 15000 kg	H ≥ 140	

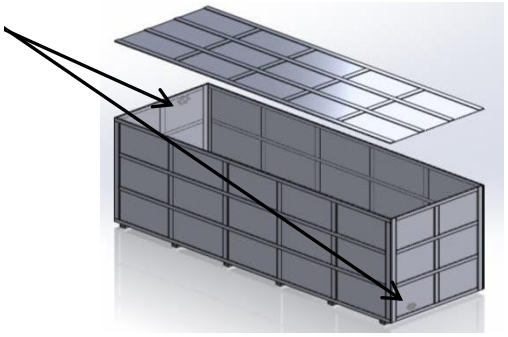
6.3.4.4 VENTILATION SURFACES

Ventilation surfaces must be provided except for small cases (less than 1.5 m3)

They should be placed on the top and at the bottom of the case (no insert should block the ventilation surfaces)



Ventilation surfaces



N case bottom has open joints, the ventilation surfaces at the bottom of the vertical panels may be eliminated if the open joints are not blocked by in the insert.

Ventilation surface size : 20cm² min.

Ventilation surfaces number: 2 each 10 meters

Never, as much as possible, store cases outdoors. If neither shed nor warehouse is available, the parcels will have to be covered with a tarpaulin.

6.3.5 Category 5 (Carboard cases)

Cases are only used for small and medium equipment, the collective or grouping packages or shipping parcels.

.

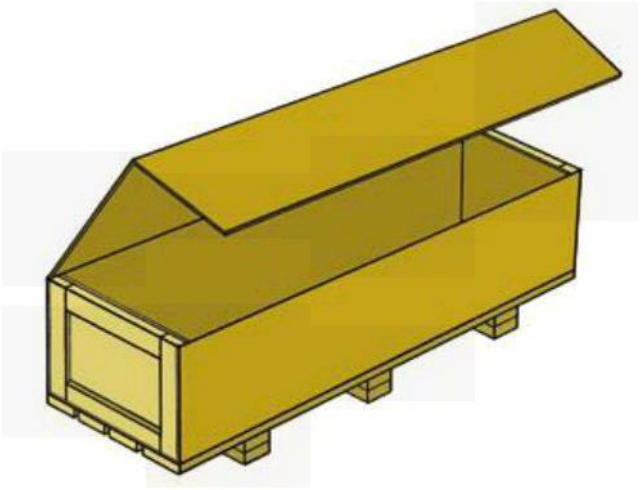
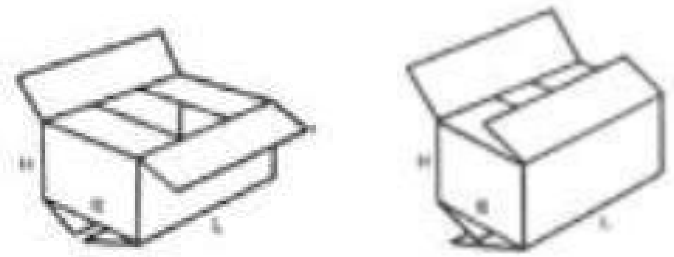
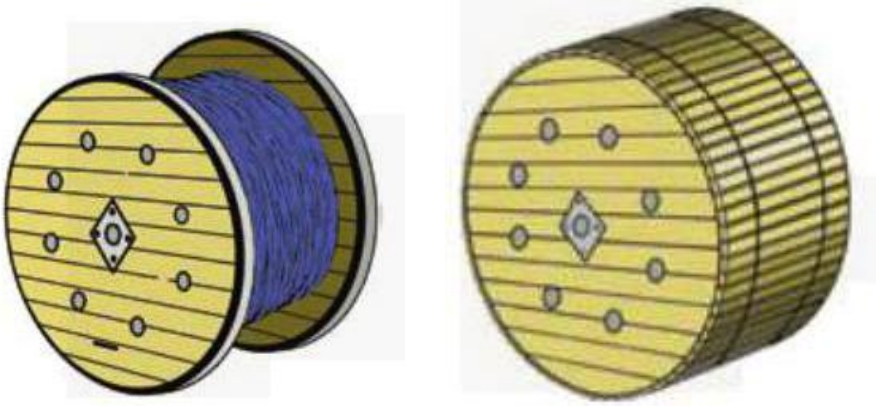


Figure 5 wrap around on cardboard



6.3.6 Category 7 (REELS)

This category concerns all cables delivered on wood or plywood reels bu the supplier. It may be grouped in packaging cat n° 3 or 4.



6.3.7 Category 8 (containers)

An **intermodal container** is a large standardized shipping container, (International Standardization Organization: ISO)

EXAMPLES OF MARITIME CONTAINERS								
I.S.O. container		20' x 8' x 8'6"	40' x 8' x 8'6"	20' x 8' x 8'	20' x 8' x 8'6"	40' x 8' x 8'6"	20' x 8' x 8'6"	40' x 8' x 8'6"
Size and type		**20 OT**	**40 OT**	**20 GP**		**40 GP**	**20 PL**	**40 PL**
Interior dimensions								
Length	L1	5867	11998	5867	5867	11998	5840	12040
Width	l1	2330	2330	2330	2330	2330	2060	2060
Height	h1	(1)	(1)	2197	2350	2350	2170	1950
Door opening dimensions								
Width		2286	2286	2286	2286	2286		
Height		2261	2261	2134	2261	2261		
Height under siderail		(1)	(1)					
Maximum gross weight (kg)								
Containers built after 1986		24000 kg	30480 kg	24000 kg	24000 kg	30480 kg	24000 kg	30480 kg
(1) These dimensions are not standardised. Standard ISO 668 specifies they must be as large as possible.								

MARITIME CONTAINERS FOR GENERAL PURPOSE: GP					
GP: General Purpose container		I.S.O. container			
		20" x 8" x 8"	20" x 8" x 8"6	40" x 8" x 8"6	40" x 8" x 9"6
Size and type		**20 GP**		**40 GP**	**40 HC (**)**
Interior dimensions (1)					
Length	L1	5867	5867	11998	11998
Width	l1	2330	2330	2330	2330
Height	h1	2197	2350	2350	2600
Door opening dimensions					
Width	l2	2286	2286	2286	2320
Height	h2	2134	2261	2261	2560
Maximum gross weight (*) (kg)					
Containers built after 1986		24000 kg	24000 kg	30480 kg	30480 kg
(1) These dimensions are not standardised. Standard ISO 668 specifies they must be as large as possible.					
(*) Codes may vary according to country.					
(**) HC: Height Club or Jumbo (containers with extra height).					

The packer must follow these instructions :

- Respect the max weight authorized
- Choose the dimensions of the parcel so as to optimize container stuffing

The packer being responsible for the stowing inside the container, he has to take all necessary precautions so that the crates of goods are wedged and the proper stowing carried out.

The container must be sealed with certified leads (ISOPSAS 17712 NORM)

6.3.8 Category 9 (Covering-cladding)

This category defines a packaging process when the material to be package is delivered with a structure.

This structure most of the time allows the handling of the equipment, it can be cased with plywood, planks, covers or any other type of protection.

These panels will protect the equipment visibly or against projections.

7 MARKING

7.1 EXTERNAL MARKING

The outside marking aims at:

- Allowing to ID the parcel to avoid risk of loss, delay or mishipment.
- Drawing attention onto possible precautions to take during handling, transport and storage operations as well as unpacking prior to use of the equipment.

The marking must bear various inscriptions, **visible and legible**:

- ID marking, shipping, routing
- Markings and symbols related to handling, transport and storage of the goods
- Markings and symbols related to wood processing

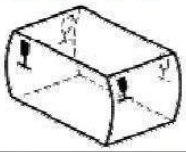
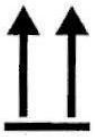
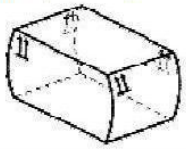
7.2 Minimum Standards

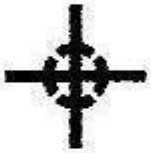
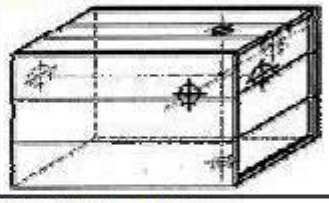
In case the equipment requests specific packaging related to the packing they need, or if using a container, marking by stenciling or by sticky labels is required.

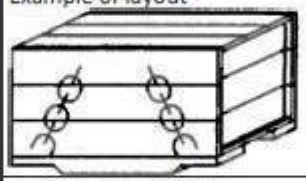
- Marking of crates will be done on plywood 3 mm thick minimum so as to be big enough to have the whole markings displayed on it.
- The marking of bundles will be done on the packing itself as far as possible In all the other cases a plywood support will have to show on the bundles for the marking required.
- The marking of the pallets is done fixing a piece of cardboard under a layer of shrink wrap layer on two opposite sides.
- The packer guarantees the marking comply to the quality standards.

7.3 MARKING AND SYMBOLS

On all crates, cases, bundles cradle the centre of gravity and lifting points will be clearly and distinctively marked. All cases containing equipment to handle with care will be marked with the international corresponding symbols. Al markings will comply with Iso 780 standard so as to readily understood.

No.	Instruction /Information	Symbol	Meaning	Reference / Remarks
1.	FRAGILE		The contents inside the packing are fragile and must therefore be handled with care.	ISO 7000, No. 0621 Example of layout: 
2.	DO NOT USE HOOKS		Hooks are forbidden for the handling of the shipping cases	ISO 7000, No. 0622z
3.	THIS WAY UP		Indicates the correct upwards position for the packing cases.	ISO 7000, No. 0623 Example of layout: 

No.	Instruction /Information	Symbol	Meaning	Reference / Remarks
4.	KEEP AWAY FROM LIGHT AND SUN		The packing cases must not be exposed to sunlight	ISO 7000, No. 0624
5.	NOT WATERPROOF		The packing must be kept away from rain.	ISO 7000, No. 0626
6.	CENTRE OF GRAVITY		Indicates the centre of gravity of the case to be handled as a single unit.	ISO 7000, No. 0627 Example of layout: 
7.	DO NOT ROLL		The packing must not be rolled.	ISO 7000, No. 2405
8.	HANDLING BY HANDTRUCK ON THIS SIDE IS FORDIDDEN		A hand truck must not be positioned on this side for the handling.	ISO 7000, No. 0629
9.	USE OF FORKLIFT TRUCK FORBIDDEN		The packing cases must not be handled by a forklift truck.	ISO 7000, No. 2406
10.	SIDE HANDLING BY CLAMPS ALLOWED HERE ONLY		The clamps must be placed on the sides indicated for the handling on the packing case.	ISO 7000, No. 0631

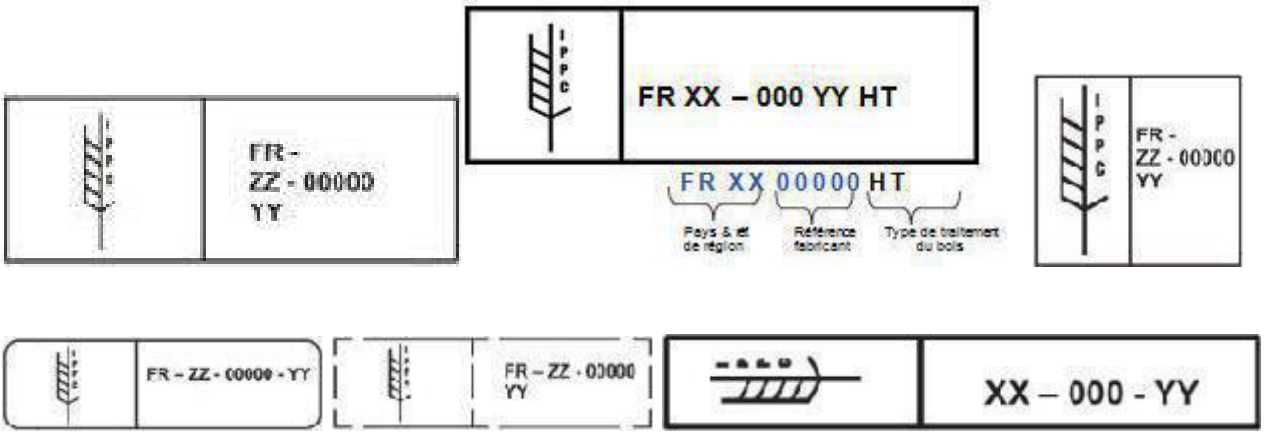
No.	Instruction /Information	Symbol	Meaning	Reference / Remarks
11.	DO NOT GRAB SIDEWAYS		The packing case must not be handled by clamps on the sides as indicated.	ISO 7000, No. 2404
12.	LIMITED STACKING		Indicates the stacking payload maximum allowed on this packing case.	ISO 7000, No. 0630
13.	STACKING LIMITED		Maximum number of similar packages that can be stacked on top of each other, where « *n* » is the limit.	ISO 7000, No. 2403
	DO NOT STACK		Stacking is forbidden and no loads must be placed on top.	ISO 7000, No. 2402
	SLING HERE		Where the slings must be positioned for lifting og the packing case.	ISO 7000, No. 0625 Example of layout 
	LIMIT OF TEMPERATURE		Indicates the limits of temperature the packing cases must not be kept above and handled	ISO 7000, No. 0632 Example of layout:  ...°C Min ...°C Max

Fragile symbol

The parcels containing « Fragile » Equipment will be packed accordingly and marked on 3 opposite sides with the mention "Fragile – Handle with care" and "This side Up" or the appropriate symbol.

7.4 MARKING OF TREATED WOOD

The wood to be used for the making of the packing will be treated wood in compliance with the standards NIMP15 or ISMP15 annex I, as described in paragraph 5.12 and the wood will be marked/stamped with the official mark as indicated below:

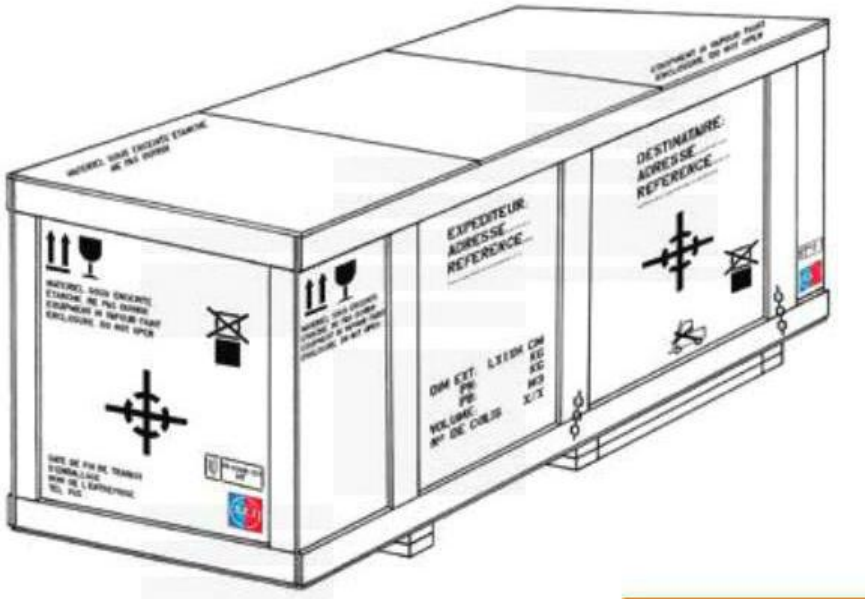


The ISMP 15 markings must be:

- Identical to the exemples above
- Legible
- Indelebile and non transferable
- clearly marked on two sides of the treated packages

Red or orange colours have to be avoided

Recycled re -conditioned or repaired wood packaging materials have to be certified, and marked again. Every component of such material must be treated.



Evolution and Diffusion

Date	Modified Pages	Description et raison de la modification
17/04/17	/	Création of the document

Date of diffusion	Name	Signature

DESICCANT BAGS

Edition Date June 26, 2023 Edition Number

Desi Pak® Bentonite Clay and Sorb-It® Silica Gel Desiccant Moisture Adsorbing Bags

Product Description

Our Desi Pak® bentonite clay, Sorb-It® silica gel, and Tri-Sorb® molecular sieve desiccant bags are highly active desiccants packaged in porous materials that allow them to effectively adsorb, sometimes commonly referred to as "absorb," moisture inside packaging or storage containers helping protect packaged goods from moisture damage.

Benefits

- Desiccant bags effectively adsorb moisture in product packaging to combat its damaging effects, including corrosion, mold, and degradation.
- Desiccant bags meet Mil-D-3464E (Mil-Spec) Types I, II, and III, as well as comply with JEDEC for semiconductor packaging (dry pack, dry packing).
- Desiccant bags meet various global specifications: German DIN 55473 and TL 6850-0008, French specification AFNOR NF H 00321, and MIL-D3464E (Mil-Spec).
- Clariant offers desiccant bags that meet relevant U.S. FDA specification for use in food and drug.
- Desiccant bags are a simple, dependable, and economical solution for preventing moisture damage in enclosed packages.
- Available in a variety of fills, including Desi Pak® bentonite clay, a natural, sustainable desiccant solution, Sorb-It® silica gel desiccant, and Tri-Sorb® molecular sieve.

Call or connect with us

For more information about our **desiccants**, cargo desiccants, oxygen absorbers, or humidity indicator cards and plugs, please call us or email desiccants@clariant.com

Join us on:

YouTube

Why do I need a desiccant bag?

Moisture can quickly affect the value or even destroy many types of valuable goods, causing rust, corrosion, mildew, mold and device malfunction. By sealing goods inside packaging with the appropriate desiccant, goods can be protected from moisture and maintain long shelf lives.

The desiccant reduces the humidity inside a sealed package as soon as they are placed inside.

The absorption capacity is dependent on the relative humidity (r.h.) of the surrounding air.

Desiccant Industries

Placed within a sealed package or container, desiccant bags will protect any number of products, including:

- aircraft storage
- laid-up ships (lay-up vessels)
- stacked rigs (mothballing)
- automobile parts
- electronics
- electronic components (example: surface mount devices, integrated circuits, circuit boards, capacitors, and resistors) used in dry pak per JEDEC J-STD-033
- engines
- semiconductors
- food
- leathers
- packaged foods - cartons, cans, boxes
- machinery
- medical devices
- metals
- military goods
- textiles
- 3D Printing Filament

Available Configurations

Desiccant bags are available in a variety configurations. Standard bag sizes range from 1/6 unit to 80 units (5½ grams to 2,640 grams).

One Unit of desiccant is equal to 26 grams of silica gel or 33 grams of bentonite.

- **Standard Heat Sealed Bags:** Clariant offers one of the most comprehensive lines of quality heat-sealed desiccant bags.
- **String-sewn Bags:** Tie bags include bags made with a sewn string or non-woven strap, ideal for protecting large items from rust, corrosion or other moisture damage. They can be hung on large equipment for transport or storage.

- **Kraft Bags:** Needed for some applications, Clariant offers a full line of desiccant bags packaged in Kraft (Crepe) material.
- **Netted Bags:** Clariant offers netted desiccant bags to protect powdered products, bulk solids, metals, and foods. Covered with a red, food-grade netting, the bags can be dropped directly into powdered products and are easily identified and discarded once the product is ready to be used.
- **Speciality Bags:** Clariant provides packaging services for customized desiccant bags incorporating humidity indication and special adsorption qualities.

Specifications

Clariant offers desiccant bags that meet many of industry's most rigorous specifications, including military specification Mil-D-3464E (Mil Spec). Mil Spec bags are classified as Type I (general use), Type II (non-dusting) and Type III (durability). Clariant's Desi Pak® and Sorb-It® bags are available to meet Type I requirements, and specific Tie-Bags are available to meet Type III specifications. Clariant's Desiccant Bags also meet Method II Packaging Standards, as described in Mil-P-116-E, which covers the basic requirements of military packaging methods of preparation. Designated Mil-Spec bags are rechargeable using bag-specific instructions printed on each bag.

Desiccant bags comply with the most significant industry specifications including:

- **Mil-Spec:** Clariant is listed on the Qualified Products List (QPL) as complying with the Mil-D-3464E as tested and qualified by the U.S. Department of the Navy.
- **DIN / AFNOR:** Clariant's desiccant bags comply with German DIN 55473 and TL 6850-0008 French specification AFNOR NF H 00321.
- **JEDEC:** Clariant Desiccant Bags, along with its Humitector™ Humidity Indicator Cards, meet the requirements for the dry packaging, dry packing, applications for semiconductors.
- **Food & drugs:** Clariant offers desiccant bags that meet relevant U.S. FDA specifications for use in food and drug applications.

Contact Us;
Please contact us for safety and regulatory details or the Material Safety Data Sheet (MSDS).

This information corresponds to the present state of our knowledge and is intended as a general description of our products and their possible applications. Clariant makes no warranties, express or implied, as to the information's accuracy, adequacy, sufficiency or freedom from defect and assumes no liability in connection with any use of this information. Any user of this product is responsible for determining the suitability of Clariant's products for its particular application.

* Nothing included in this information waives any of Clariant's General Terms and Conditions of Sale, which control unless it agrees otherwise in writing. Any existing intellectual/industrial property rights must be observed. Due to possible changes in our products and applicable national and international regulations and laws, the status of our products could change. Material Safety Data Sheets providing safety precautions, that should be observed when handling or storing Clariant products, are available upon request and are provided in compliance with applicable law. You should obtain and review the applicable Material Safety Data Sheet information before handling any of these products. For additional information, please contact Clariant.

* For sales to customers located within the United States and Canada the following applies in addition: No express or implied warranty is made of the merchantability, suitability, fitness for a particular purpose or otherwise of any product or service.

© Trademark of Clariant registered in many countries.
® 2019 Clariant International Ltd
www.clariant.com

Base Load Power Hub (BLPH)

PRESERVATION PROCEDURE
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-QC-PRO-00033

Document Class: 3

ROSETTI MARINO

1	APPROVED - WORK MAY PROCEED
2N	REVISE AND RE-SUBMIT - DO NOT PROCEED
2Y	REVISE AND RE-SUBMIT - WORK MAY PROCEED
3	REJECTED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
M. Zoppetti	07/11/2024

02	06/11/2024	Issue for Information (IFI)	GLL	APD	AHN
01	17/10/2024	Issue for Information (IFI)	GLL	APD	AHN
00	01/10/2024	Issue for Information (IFI)	GLL	APD	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)
01	Issue for Information (IFI)
02	Issue for Information (IFI)

HOLDS LIST

No.	Description
1	
2	
3	
4	

Table of contents

1 DOCUMENT SCOPE 4

1.1 REFERENCES 4

1.2 DEFINITIONS AND ABBREVIATIONS 4

2 LIMIT OF GUARANTEE 5

3 INITIAL PRESERVATION 5

4 LONG TERM STORAGE – EQUIPEMENT PACKED 5

5 PACKING DAMAGED 6

6 EQUIPMENT UNPACKED (BEFORE INSTALLATION) 6

7 EQUIPMENT INSTALLED / COMMISSIONING 7

List of tables

Table 1 - Reference Documents 4

Table 2 - Definitions and Abbreviations 4

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

1 DOCUMENT SCOPE

This document aims at describing how pumps will be initially preserved & preservation requirements when pumps are installed

1.1 REFERENCES

Doc. No.	Description
1724000936-QC-PRO-00032	PACKING PROCEDURE
1724000936-MAC-DS-00012	PUMP DATA SHEETS INCLUDING WEIGHT DATA SHEET
1724000936-MAC-DA-00004	GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS
1724000936-MAC-DD-00006	PUMP CROSS SECTIONAL DRAWING AND BILL OF MATERIAL
1724000936-MAC-MAN-00031	INSTALLATION, OPERATING AND MAINTENANCE MANUAL

Table 1 - Reference Documents

1.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
VENDOR:	PCM
OSD:	Overage- Shortage – Damage

Table 2 - Definitions and Abbreviations

2 LIMIT OF GUARANTEE

On reception of the pump, immediately inspect it for any obvious signs of damage. If it is visibly damaged, clearly note on the shipper's papers that the merchandise has been received damaged, briefly describing the type of damage observed. Purchaser Expediting Team will forward by email to PCM team all OSD including details of the discrepancy detected within 48 hours.

- Over (O) = Quantity higher than expected
- Short (S) = Quantity lower than expected
- Damaged (D) = Material is damaged

Storage conditions are explained in this document. To avoid any damage or accidents (in particular, when the pumped fluids are hazardous), it is essential that this equipment is not used for applications other than those initially designed for.

To maintain the original qualities of the pump, original PCM spare parts must be used.

3 INITIAL PRESERVATION

All parts are cleaned, dried, and protected, internally and externally, before the packing. Caps are used to ensure the protection of the pumps discharge nozzles. The bolting & loose parts are distributed into dedicated boxes if any. The long-term storage duration (12 months) is valid assuming that the instructions of the following sections are respected. During initial packing, full pictures report will be made and available for information.

4 LONG TERM STORAGE – EQUIPEMENT PACKED

All pumps will be seaworthy packed, for a guarantee period of 12 months.

The seaworthy packing (based on packing type S.E.I 4c) consists of crates with closed joints and physical-chemical protection. The corrosion protection is guaranteed by a vapor and corrosion inhibitor wrapping and by addition of desiccant bags (number depending on the crate size). Please refer to Packing Procedure.

The equipment must be kept in its original packing away from bad weather. Temperature must be kept between +3°C min and + 50°C max, +5% to 100% Humidity in outdoor conditions. Prevent crates from external vibration especially for bearing units & motors.

Every 2 months:

- Prior to open crates, they must be stored in storage building covered and ventilated to get the normal atmospheric conditions.
- Open shrink-wraps. When wraps are unsealed, make sure to avoid intrusion of water, dust, and sand on the equipment and especially on bearing units and couplings. Do not remove protecting flanges provided with the pumps on discharge nozzles.
- Pump rotor/motor shaft to be rotated (4/5 laps) by hand using the motor fan or the coupling as appropriate.
- Remove air from shrink-wraps & sealed them as per initial packing instructions.

Every 6 months:

- In addition to above operations, all desiccant bags for each individual wrap must be replaced.
- Remove air from shrink-wraps & sealed them as per initial packing instructions.

Pumps are delivered completely assembled and glycerin is initially applied between rotor and stator.

5 PACKING DAMAGED

If initial packing is damaged, crates must be stored in storage building covered and ventilated to get the normal atmospheric conditions & Section 6 instructions must be followed until new packing is done. Packing procedure must be followed to repack.

6 EQUIPMENT UNPACKED (BEFORE INSTALLATION)

When it is necessary to store unpacked pump unit for a short time before installation equipments/crates must be stored in storage building covered and ventilated to get the normal atmospheric conditions.

When the equipment is unpacked, the following instructions shall be followed:

Operation	Frequency of check				
	During unpacking	Monthly	2 Monthly	Yearly	Prior installation
Verify internal condition and lubrication of Rotor/Stator and if required: Apply glycerin inside opened inlet cavity of Stator by removing pump's strainer. Repeat the operation while doing step 3 to apply glycerin on all stator/rotor length.			X		
Check Bearing units and grease if necessary.			X		
Pump rotor to be rotated (4/5 laps) by hand using the motor fan or the coupling as appropriate. (Clockwise – same as normal operation)			X		

Other recommendations:

- Do not subject to shocks.
- Seal against dust with a plastic film.
- If some parts are damaged, they must be replaced before the running the pumps especially elastomers parts such as sheaths or stator.

7 EQUIPMENT INSTALLED / COMMISSIONING

When pumps are in place and until commissioning phases, below instructions must be followed:

Operation	Frequency of check				
	Weekly	Monthly	2 Monthly	Yearly	Prior to start
Verify internal condition and lubrication of Rotor/Stator and if required: Apply glycerin inside opened inlet cavity of Stator by removing pump's strainer. Repeat the operation while doing step 3 to apply glycerin on all stator/rotor length.			X		
Check Bearing units and grease if necessary.			X		
Pump rotor to be rotated (4/5 laps) by hand using the motor fan or the coupling as appropriate. (Clockwise – same as normal operation).			X		
Follow the requirements of the maintenance manuals.					X
In the case where the sealing system is pressurized, check if there is any leakage. It is recommended to not keep sealing system pressurized if pump is not used during more than 1 month (Barrier Fluid & N2).	X				

Other recommendations:

- The ageing of rubber is dependent on storage conditions: heat, temperature, humidity, etc…
- If stored more than 3 years, rubber parts such as stator & sheaths must be inspected to check if not showing any swelling, or cracking and must not stick at touch. In one or the other case, replacement of these rubber made components must be done.
- Commissioning spares includes all rubber parts (O-ring gaskets & sheaths) expect stator.

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

2.3 MANUFACTURING TEST REPORT

2.3.1 MATERIAL CERTIFICATE 3.1 / 2.2

2.3.2 NDE RECORDS

2.3.3 HYDROSTATIC TEST REPORT

2.3.4 MOTOR TEST REPORT

2.3.5 PSV TEST REPORT

2.3.6 PAINTING REPORT

2.3.7 FAT REPORT

2.3.8 PACKING LIST & PRESERVATION RECORD

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

2.3.1 MATERIAL CERTIFICATE 3.1 / 2.2

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS : WR2 **CODE :** ERWA0330 **INDICE :** H

Emetteur / *Written by :* JC Daujard **Date de création /** *Date :* 20/02/2025 **N° de commande /** *PCM Serial number :* MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Type de pompe / *Pump Type* **:** **25AV24** **Client /** *Customer* **:** **ROSETTI MARINO**

Quantité / *Quantity* **:** **2** **N° de nomenclature /** *BOM #* **:** **317873**

Repère* *Item**	Désignation *Description*	N° d'article *Part number*	Débit matière *Material number*	N° Commande *Order number*	N° de Coulée *Heat number*	Ordre de Fabrication *Production Order*	N° Lot *Bacht n°*
PCM Shaft Line							
20	**ROTOR 25-4P-E10 R1 C M** *ROTOR 25-4P-E10 R1 C M*	M-001931A257TS	F-001075257	PO070-24-10304	571004	OF0066519	L07024070015SE
22A	**RALLONGE FIXE D35 988 AV7** *EXTENSION FIX D35 988 AV7*	W-008209257	F-001102257	PO070-24-09159	568127	OF0066320	L07024090007SE
22B	**RALLONGE ARBRE D35 AV7** *EXTENSION SHAFT D35 AV7*	W-004958300257	F-001102257	PO070-24-09159	568127	OF0066321	L07024090007SE
22C	**RALLONGE FIXE D35 AV7** *EXTENSION FIX D35 AV7*	W-2001260257	F-001102257	PO070-24-09159	568127	OF0069294	L07024090007SE
36	**ARBRE COMMANDE D60 A6-7** *DRIVING SHAFT D60 AV6-7*	W-004571257	43069-257TS	A159163	545823 545115	OF0068686	MP2631
36B	**ARBRE REDUIT D35 AV7** *REDUCED DRIVING SHAFT AV7*	W-004946257	F-001005257	PO070-24-09159	568408	OF0066319	L07024090006SE
339	**JONCTION RALLONGE D35 AV7** *EXTENSION JUNCTIOND35 AV7*	W-004945257	F-001004257	PO070-24-09159	568408	OF0066318	L07024090005SE
515	**SUPPORT GM D90 AV7** *MS SUPORT D90 AV7*	W-008207257	F-001103257	PO070-24-09159	71591	OF0066322	L07024090001IT
Mechanical Seal							
16/17	**GARNITURE MECANIQUE** *MECHANICAL SEAL*	DIGIAN-392481-01	-	PO070-24-07869	569598 568692 293808	-	L07024110005NL
Casing							
50	**CORPS 6IN AV7** *BODY 6IN AV7*	W-008202257WP	-	PO070-24-07599	F1219 60418 E161501 / E141482 / 555083 567797 563544 E111017 / 44459 502079	-	L07024100243FR
50A	**EMBOUT STATOR 25AV24** *STATOR PIPING 25AV24*	W-008199257WP	-	PO070-24-07599	531188 60418 E161501 / E141482 / 555083	-	L07024100244FR
50B	**RALLONGE CORPS 6IN AV7** *EXTENSION BODY 6IN AV7*	W-004942300257WP	-	PO070-24-07599	E161501 / E141482 / 555083 60418	-	L07024100242FR
50C	**RALLONGE CORPS 6IN AV7** *EXTENSION BODY 6IN AV7*	W-004942060257WP	-	PO070-24-07599	E161501 / E141482 / 555083 60418	-	L07024100246FR
51	**ENVELOPP STATOR 25AV24** *STATOR CASING 25AV24*	W-008200257	-	PO070-24-07599	60418	-	L07024100245FR
54	**PIPE STATOR 25AV24** *PIPE STATOR 25AV24*	W-008198257	-	PO070-24-07808	73236	-	L07024090241FR
54A	**CREPINE PLATE 25AV AV7** *FLAT STRAINER 25AV AV7*	W-008189257T	-	PO070-24-07974	522214	-	L07024070191FR

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS : WR2 **CODE :** ERWA0330 **INDICE :** H

Emetteur / *Written by :* JC Daujard **Date de création /** *Date :* 20/02/2025 **N° de commande /** *PCM Serial number :* MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

API Plan 51 + Tubbing							
ACC	**PLAN 51 API** *API PLAN 51*	DI317873-02	-	PO070-24-07869	see below	-	L07024100007NL
265 (Qty=4)	**CONN. MALE 3-8NPT -D1-2** *MALE CONN. 3-8NPT -D1-2*	C14259S014T	-	PO070-24-10851	7CF,7BY 7YT 7AD 7TJ	-	L07024090006US
265 (Qty=2)	**CONN. MALE 3-8NPT -D1-2** *MALE CONN. 3-8NPT -D1-2*	C14259S014T	-	PO070-24-10851	7UD 7YT 7ZG 7ZL	-	L07024090006US
266	**RAC. UNION F 3-8NPT -D1-2** *UNION FEM. 3-8NPT -D1-2*	C14260S014T	-	PO070-24-02843	PLM PLR	-	L07024040110FR
267	**TUBE 1-2IN OD 316L** *TUBE 1-2IN OD 316L*	F-000335014T	-	PO070-24-02365	225274	-	L07024030006IN
268	**MAMELON 3-8 NPT** *NIPPLE 3-8 NPT*	W-003825014	-	PO070-24-04786	540412	-	L07024050111FR
550A	**RONDELLE M14 200HV** *WASHER M14 200HV*	C06001H014T	-	PO070-24-09451 PO070-23-15213	CF18581 CF17001	-	L07024080007CN L07024010004CN
551	**ECROU HEX H M14** *HEX NUT H M14*	C06002H014T	-	PO070-21-04650	YA13074	-	L07021050005IN
-	**TUBE 80X80 EP3** *TUBE 80X80 EP3*	F-001117014	-	PO070-24-11447	468010	OF0068175	L07024100007IT
-	**FER PLAT 200 X 10 MM** *FLAT IRON 200 X 10 MM*	F-001118014	-	PO070-24-11447	308007	OF0068175	L07024100008IT
-	**FER PLAT 60 X 10 MM** *FLAT IRON 60 X 10 MM*	F-001119014	-	PO070-24-11447	641701	OF0068175	L07024100009IT
-	**FER PLAT 80 X 10 MM** *FLAT IRON 80 X 10 MM*	F-001120014	-	PO070-24-11447	225091	OF0068175	L07024100010IT
Miscellaneous							
-	**TUBE D10 EP.1** *TUBE D10 THCK.1*	45868-014T	-	PO070-24-10305 PO070-23-03163	RSL-E741 CH-14437	-	L07024100002IN L07023030001IT
54B	**PLAT PERCE 7MM** *PLAT PERCE 7MM*	N-108928257T	43222-257T	PO070-21-10581	562325	OF0066323	L07021091457
82	**GOUJON M16 BM40-1023** *STUD M16 BM40-1023*	C06177W257T	-	PO070-24-08387	567778	-	L07024090002GB
103	**RONDELLE M16 200HV** *WASHER M16 200HV*	C06001I257T	-	PO070-21-05683	401134	-	L07021060106FR
105B	**VIS HC M12-16 TR** *SCREW HC M12-16 TR*	C06125C257T	-	PO070-24-08387	DC1354	-	L07024090001GB
107	**ECROU HEX H M20** *HEX NUT H M20*	C06002J257	-	PO070-24-08316	404975	-	L07024080018GB
114B	**VIS CHC M12-30** *SCREW CHC M12-30*	C06016D257TS	-	PO070-24-10400	DC0474	-	L07024100002GB
114C	**VIS HC M12-25 CU** *SCREW HC M12-25 CU*	C06240E257	-	PO070-24-08459	565527	-	L07024090005GB

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	CODE :	ERWA0330	INDICE :	H

Emetteur / *Written by :* JC Daujard

Date de création / *Date :* 21/02/2025

N° de commande / *PCM Serial number :* MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Repère* *Item**	**Désignation** *Description*	**N° d'article** *Part number*	**Débit matière** *Material number*	**N° Commande** *Order number*	**N° de Coulée** *Heat number*	**Ordre de Fabrication** *Production Order*	**N° Lot** *Bacht n°*
Miscellaneous (continuous)							
204	**RONDELLE M20 200HV** *WASHER M20 200HV*	C06001J257	-	PO070-24-08316	531118	-	L07024080017GB
240	**ECROU HEX H M16** *HEX NUT H M16*	C06002I257T	-	PO070-24-07880	555481	-	L07024080057FR
250A	**VIS H M20-90** *SCREW H M20-90*	C06203J257TS	-	PO070-24-07386	234188	-	L07024090077FR
302	**CALE REGLAGE AV5** *SETTING SHIMS AV5*	W-007034014T	-	PO070-24-09499	533863	-	L07024090221FR
304	**BUTEE REGLAGE AV5** *STOP SETTING AV5*	W-007035014T	-	PO070-24-10050	372446	-	L07024090162FR
401	**VIS CHC M16-90-44** *SCREW CHC M16-90-44*	C06034P257T	-	PO070-24-10400	409716	-	L07024100003GB
556	**RESTRICTION DEBIT 2MM** *FLOW RESTRICTION 2MM*	W-004064014	43539-014	PO070-23-14460	541961	OF0067335	L07023120734
557 (Qty=2)	**CONN. MALE 3-8NPT -D10** *MALE CONN. 3-8NPT -D10*	C14259B014	-	PO070-24-12399	4DX 7WD 4EP 7KJ,7LR,7KM	-	L07024110003US
557 (Qty=1)	**CONN. MALE 3-8NPT -D10** *MALE CONN. 3-8NPT -D10*	C14259B014	-	PO070-24-10007	4DX 7WD 4EP 7KJ,7LR,7KM	-	L07024090002US
557 (Qty=1)	**CONN. MALE 3-8NPT -D10** *MALE CONN. 3-8NPT -D10*	C14259B014	-	PO070-24-09770	4DX 7WD 4EP 7KJ,7LR,7KM	-	L07024080001US
ACC	**SOUPAPE 1IN 150 X 2IN 150** *PSV 1IN 150 X 2IN 150*	DIGIAN-392481-05	-	PO070-24-07627	LE9017 KG8881 KG4516 293127 421208 802926 BC2768 232808	-	IT

Reference document: PUMP CROSS SECTIONAL DRAWING AND BILL OF MATERIAL 1724000936-MAC-DD-00006

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#20
Description
ROTOR 25-4P-E10 R1 C M
PCM Reference
M-001931A257TS

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

Alleima

CERTIFICATE

A03/Z02
No. A/24-186721 **Rev** 00
Date 2024-07-10 **Page** 1/5

A02/Z03
INSPECTION CERTIFICATE acc to
EN 10204 3.1

INSPECTION STAMP
SVQ

A06
STAPPERT DEUTSCHLAND GMBH
WILLSTÄTTER STRASSE 13
40549 DüSSELDORF
GERMANY

Customer References A07
104466/W

Customer order
2024-02-26

340-03168 STAPPERT

Alleima References A08

Order No.	Subs No.	Dispatch note
606971	725748	08846/53

Suppl. No	C.Code
285-85748	24

Material description B01/B04
HOT WORKED BAR STEEL
ROLLED
ANNEALED & STRAIGHTENED
PEEL TURNED AND POLISHED

Metallurgical process C70
EAF+AOD+LRF

Origin
Sweden

Steel/material Designations B02

Alleima	UNS
SAF 32760+	S32760

EN no
1.4501

Technical requirements B03
ISO 14067:2018(CO2e), EN 10088-3:-2014, EN10272:-2016*, EN10060:2003,
EN10222-5:-2017*, PED 2014/68/EU, ISO 17781:2017:QL1,IOGP S-563:2018
NACE MR0175/ISO 15156-3:-2020, NACE MR0103/ISO 17945-1:-2015
ASTM A-276-24A, ASME SA-276-ED-23 SECT II PART A, EN 10221:1996
ASTM A-479-24, ASME SA-479-ED-23 SECT II PART A,
ASTM A-484-24, ASTM A-182-24A*, ASTM A-1049-18(2023)*, ASTM A-314-23*
NORSOK M-630:2020, NORSOK MDS D57 REV. 6*
*For detailed information, please see the appendix

EXTENT OF DELIVERY B07-B13

It	Product designation	Heat	Lot	Pieces	Kg
01	MBR-SAF32760+-75 104466-3 W.-NR. 1.4501	571004	28491	14	2790.0
			Total	14	2790.0

Heat		Recycled material(%)
571004	Continuous casting	74.6

TEST RESULTS
Reduction ratio (times)

Lot	
28491	17.0

Chemical composition (weight%)
PRE: CR+(3,3xMO)+16xN
PRE2: Cr+3.3x(Mo+0.5xW)+16xN

Heat	PRE	PRE2 + W
571004	41.8	42.8

Quality assurance – Erik Jansson/QA-manager Primary Products A05/Z02
MTC Service / Certificates

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
571004	0.015	0.31	0.64	0.021	0.0005	25.26	6.82	3.75

	W	Cu	N
571004	0.61	0.55	0.261

Tensile test at room temperature acc. to ASTM A370/ISO 6892-1
Longitudinal
Location half radius

	Yield strength		Tensile strength	Elongation	
	Mpa	MPa	Mpa	%	%
Lot	Rp0.2	Rp1.0	Rm	A	2"
28491	593	675	820	40	44

	Red.of Area
	%
	Z
	74

Hardness test acc.to ASTM A-370/ISO 6506-1
Location half radius

Lot	HRC		
28491	23	23	23

Near surface

Lot	HRC		
28491	25	25	26

Impact test, J, Longitudinal acc. to ASTM A-370/ISO 148-1
Location half radius

	Single values			Avg.	Temperature
Lot	Joule			Joule	°C
28491	299	273	301	291	-50
	304	309	339	317	20

Lateral expansion

				Temperature
Lot	mm			°C
28491	2.19	1.82	2.05	-50

Impact test, J, Transversal acc. to ASTM A-370
Location half radius

	Single values			Avg.	Temperature
Lot	Joule			Joule	°C
28491	118	146	129	131	-50

Lateral expansion

				Temperature
Lot	mm			°C
28491	0.93	1.17	1.19	-50

Corrosion test according to ASTM G-48A, 50°C for 24 hours.
In delivery condition. No pitting corrosion found at 20x enlargement.
Test location acc to NORSOK MDS D57

	Specimen weight loss
Lot	g/m2
28491	0.03
	0.05

Ferrite acc to ASTM E-562
Tested at surface, half radius and center.

Lot	%
28491	51.5
	51.1
	50.9

Austenite Spacing
acc. to DNV-RP-F112 Section 7

Lot	µm
28491	18.0

Following controls/tests have been satisfactorily performed:
- Positive Material Identification (PMI)
- Ultrasonic testing (*)
- Visual inspection and dimensional control.

HEAT TREATMENT:
Up to 74.9 mm: Batch furnace. Material soaking 1100°C, min. 30 minutes. Quenched in water. Water temp. pre-quench max 38°C, after quench max 49°C.
Transfer time furnace to quenching <150 seconds.

75 - 180mm: Continuous heat treatment furnace. Material soaking 1100°C, min. 30 minutes. Alleima is using a continuous water spray quenching process. Water temp pre-quench max 38°C, after quench max 49°C. Transfer time furnace to quenching <60 seconds.

>180 - 250mm: Batch furnace. Material soaking 1100°C, min. 60 minutes. water. Water temp pre-quench max 38°C, after quench max 49°C
Transfer time furnace to quenching <150 seconds

The raw material is free from radioactive contamination.

Microscopic Examination X 500 acc. to ASTM A 923 Method A/NORSOK M630
Free from grain boundary carbides and intermetallic phases.

Material free from mercury contamination.

No welding or weld repair.

NORSOK M-650 QTR NO: 25 Cr Duplex SS UNS S32760

Certified acc. Pressure Equipment Directive (2014/68/EU Annex 1 para 4.3) TUEV CERT-Certification body for pressure equipment of the TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the specifications and requirements of the order.

The material is manufactured according to a Quality system, approved and registered to ISO 9001:2015.

No unauthorized alterations. The contents of this Inspection Certificate may not be modified or revised in any way without the prior written approval of Alleima.
Unauthorized alterations to the Inspection Certificate, including introduction of false, fictitious or fraudulent statements or entries, may be punishable by fines, imprisonment, or both. This Inspection Certificate may be copied only in the manner and for the purposes specified in Section 6 of EN 10204:2004. Contravention of this notice will be prosecuted to the fullest extent of applicable law.

The certificate is produced with EDP and valid without signature.

APPENDIX

Lab accreditation
Our lab is accredited under SWEDAC Accreditation number 1636 for testing as per ISO/IEC 17025

Applicable only to specific dimensions
12,5mm – 160mm: EN 10088-5 EN (Only valid for CE marked products together with Alleima Declaration of Performance certificate).
12,5mm – 160mm: PED 2014/68/EU EN 10272 (Stainless steel bars for pressure purposes)
12,5mm – 250mm: EN 10222-5 (Chemical composition only)
12,5mm – 180mm: NORSOK M-630 – NORSOK MDS D57 (for length max 7500 mm)

Suitable for manufacturing of components in acc, with ASTM A-182 (F55), ASTM A-1049 & ASTM A-314.

Test location
Mechanical, ferrite testing:
Bar dim < 50 mm – Longitudinal test pieces in center of the bar.
Bar dim > 50mm & < 100 mm – Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface.
Bar dim > 100 mm & < 250 mm – Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface. Transversal test pieces, 1/4 T and minimum 100 mm from any second surface.

One set of test samples per heat treatment lot.
Maximum lot size 15 ton.

Micro: To ensure a sound, and unaffected structure all through the material three samples are taken, one close to surface, half radius, and in the center of the bar.

Furnace calibration every third month according to API 6A 21th Edition Annex M, Thermocouples of S-type (+/- 5°C tolerance) are used to monitor the Furnace temperature.

Ultrasonic test
Dim 29 – 74 mm: EN 10308 quality class 3
Dim 75 mm – : EN 10228-4, Tab 3 Scan coverage 1a 100%, Tab 5 Quality Class 3, ASTM A-388, API 6A PSL3/3G.

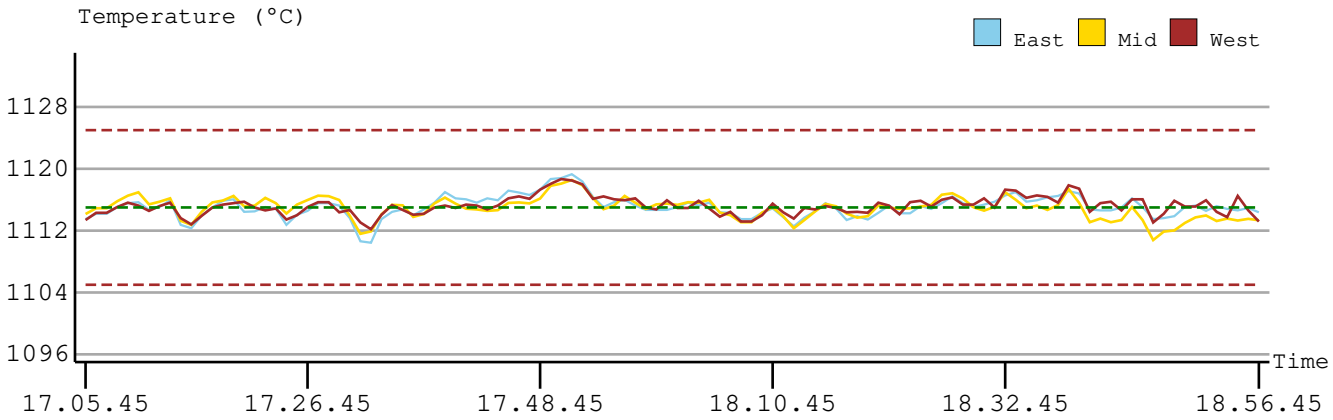
EN 10204 2.2
Climate change impact (acc. to ISO 14067:2018)

The CO2e of this product is:
Diameter 75-180 mm: 2078 kg/tonne

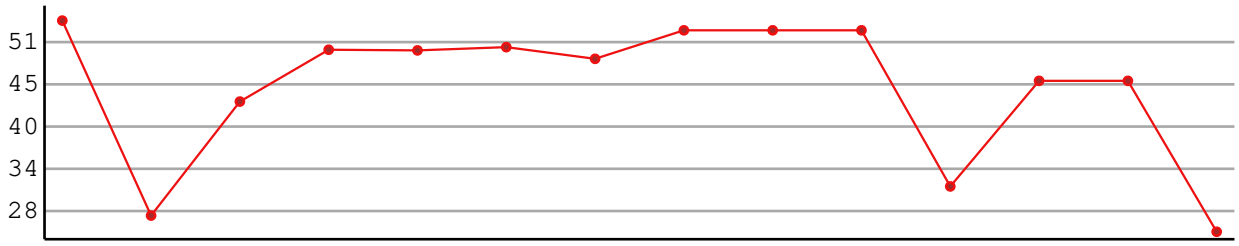
LCA / Life Cycle Assessment report is available.

						Setpoints					
Work order	Num. of pieces	Dim (mm)	Weight (kg)	Steel Grade	Heat Number	Strategy	Zone 3 (°C)	Mtrl. temp. out furn. (°C)	Total time (mm)	Cooling time 1 (mm:ss)	Cooling time 2 (mm:ss)
28491	14	85.4	3654	2RDKW99	571004	80	1115	1115	112	1:15	1:35

Heating Temperature (°C) – Zone 3 – Soaking



Temperature after cooling (°C)



keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#22A
Description
EXTENSION FIX D35 988 AV7
PCM Reference
W-008209257

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

A02/Z03
INSPECTION CERTIFICATE acc to
EN 10204 3.1

INSPECTION STAMP
SVQ

A06
STAPPERT SOISSON
RUE JACQUES HENRI
02201 SOISSONS
FRANCE

Customer References A07
97152

Customer order
2024-07-29

200-00991 STAPPERT-W

Alleima References A08

Order No.	Subs No.	Dispatch note
612056	729123	09205/53

Suppl. No **C.Code**
285-92264 46

Material description B01/B04
HOT WORKED BAR STEEL
ROLLED
ANNEALED & STRAIGHTENED
PEEL TURNED AND POLISHED

Melt Source
ALLEIMA AB SWEDEN

Metallurgical process **Origin** C70
EAF+AOD+LRF Sweden

Steel/material Designations B02

Alleima	UNS
SAF 2507+	S32750

EN no
1.4410

Technical requirements B03
ISO 14067:2018(CO2e),ISO 17781:2017:QL1, EN10088-3:-2014,
EN10060:2003, EN10221:1996, EN10222-5:-2017*, EN10272:-2016
NACE MR0175/ISO 15156-3:-2020, NACE MR0103/ISO 17945-1:-2015
ASTM A-479-23A, ASME SA-479-ED-21 SECT II PART A,
ASTM A-276-23, ASTM A-484-23, ASTM A-182-23A*, ASTM A-1049-18(2023)*
ASTM A-314-19*, NORSOK M-630:2020, NORSOK MDS D57 REV.6*
IOGP S-563:2018, PED 2014/68/EU
*For detailed information, please see the appendix.

EXTENT OF DELIVERY B07-B13

It	Product designation	Heat	Lot	Pieces	Kg
01	MBR-SAF2507+-35	568127	45101	21	923.0
			Total	21	923.0

Heat		Recycled material(%)
568127	Continuous casting	80.4

TEST RESULTS
Reduction ratio (times)

Lot	
45101	85.3

Chemical composition (weight%)

Heat	PRE
568127	42.0

Quality assurance - Erik Jansson/QA-manager Primary Products A05/Z02
MTC Service / Certificates

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
568127	0.010	0.29	0.78	0.020	<0.0005	24.94	6.87	3.79

	Cu	N
568127	0.17	0.286

Tensile test at room temperature acc. to ASTM A370/ISO 6892-1

Longitudinal
Location radius

	Yield strength		Tensile strength	Elongation	
	Mpa	MPa	Mpa	%	%
Lot	Rp0.2	Rp1.0	Rm	A	2"
45101	622	664	826	41	41

	Red.of Area
	%
	Z
	78

Hardness test acc.to ASTM A-370/ISO 6506-1

Location radius

Lot	HRC		
45101	23	23	24

Impact test, J, Longitudinal acc. to ASTM A-370/ISO 148-1

Location radius

	Single values			Avg.	Temperature
Lot	Joule			Joule	°C
45101	324	337	327	329	-50
	349	343	330	341	20

Lateral expansion

				Temperature
Lot	mm			°C
45101	2.03	2.21	2.13	-50

Corrosion test according to ASTM G-48A, 50°C for 24 hours.

In delivery condition. No pitting corrosion found at 20x enlargement.
Test location acc to NORSOK MDS D57

	Specimen weight loss
Lot	g/m2
45101	0.00

Ferrite acc to ASTM E-562

Tested at surface, half radius and center.

Lot	%
45101	41.0
	41.1
	40.1

Austenite Spacing

acc. to DNV-RP-F112 Section 7

Lot	µm
45101	13.3

Following controls/tests have been satisfactorily performed:

- Positive Material Identification (PMI)
- Ultrasonic testing (*)
- Visual inspection and dimensional control.

Melt Source
Heat 568127 ALLEIMA AB SWEDEN

HEAT TREATMENT:
Up to 74.9 mm: Batch furnace. Material soaking 1100°C, min. 30 minutes
Quenched in water. Water temp pre-quench max 38°C
after quench max 49°C, Transfer time furnace to quenching <150 seconds

75 - 180mm: Continuous heat treatment furnace. Material soaking 1090°C
min. 30 minutes. Alleima is using a continuous water spray quenching
process. Water temp pre-quench max 38°C, after quench max 49°C.
Transfer time furnace to quenching <60 seconds

All testing has been done acc. to ISO 17781

The raw material is free from radioactive contamination.

Microscopic Examination X 500 acc. to ASTM A 923 Method A/NORSOK M630
Free from grain boundary carbides and intermetallic phases.

Material free from mercury contamination.

No welding or weld repair.

NORSOK M-650 ED-4 QTR NO: 25 Cr Duplex SS

Certified acc. Pressure Equipment Directive (2014/68/EU Annex 1 para
4.3) TUEV CERT-Certification body for pressure equipment of the
TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the specifications and
requirements of the order.

The material is manufactured according to a Quality system,
approved and registered to ISO 9001:2015.

No unauthorized alterations. The contents of this Inspection
Certificate may not be modified or revised in any way without the
prior written approval of Alleima.
Unauthorized alterations to the Inspection Certificate, including
introduction of false, fictitious or fraudulent statements or entries,
may be punishable by fines, imprisonment, or both. This Inspection
Certificate may be copied only in the manner and for the purposes
specified in Section 6 of EN 10204:2004. Contravention of this notice
will be prosecuted to the fullest extent of applicable law.

The certificate is produced with EDP and valid without signature.

APPENDIX

Lab accreditation
Our lab is accredited under SWEDAC Accreditation number 1636 for testing as per ISO/IEC 17025.

Applicable only to specific dimensions
20mm - 160mm: EN 10088-5 EN (Only valid for CE marked products together with Alleima Declaration of Performance certificate).
20mm - 160mm: PED 2014/68/EU, *EN 10272 (Stainless steel bars for pressure purposes).
20mm - 250mm: *EN 10222-5 (Chemical composition only)
20mm - 250mm: NORSOK M-630 - NORSOK MDS D57 (for length max 7500 mm)

Suitable for manufacturing of components in acc. with *ASTM A-182, ASTM A-1049, ASTM A-314.

Test location
Mechanical, ferrite testing:
Bar dim <=50 mm - Longitudinal test pieces in center of the bar.
Bar dim > 50 mm - 180 mm - Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface.
Bar dim > 100 mm - 180 mm - Transversal test piece, 1/4 T and minimum 100 mm from any second surface.

One set of test samples per heat treatment lot.
Maximum lot size 15 ton.

Micro: To ensure a sound, and unaffected structure all through the material three samples are taken, one close to surface, half radius, and in the center of the bar.

Furnace calibration every third month according to API 6A 21th Edition Annex M, Thermocouples of S-type (+/- 5°C tolerance) are used to monitor the Furnace temperature.

Ultrasonic test
Dim 29 - 74 mm: EN 10308 quality class 3
Dim 75 mm - : EN 10228-4, Tab 3 Scan coverage 1a 100%, Tab 5 Quality Class 3, ASTM A-388, API 6A PSL3/3G.

EN 10204 2.2
Climate change impact (acc. to ISO 14067:2018)

The CO2e of this product is:
Diameter 75-185 mm: 2075 kg/tonne

LCA / Life Cycle Assessment report is available.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#22B
Description
EXTENSION SHAFT D35 AV7
PCM Reference
W-004958300257

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

A02/Z03
INSPECTION CERTIFICATE acc to
EN 10204 3.1

INSPECTION STAMP
SVQ

A06
STAPPERT SOISSON
RUE JACQUES HENRI
02201 SOISSONS
FRANCE

Customer References A07
97152

Customer order
2024-07-29

200-00991 STAPPERT-W

Alleima References A08

Order No.	Subs No.	Dispatch note
612056	729123	09205/53

Suppl. No **C.Code**
285-92264 46

Material description B01/B04
HOT WORKED BAR STEEL
ROLLED
ANNEALED & STRAIGHTENED
PEEL TURNED AND POLISHED

Melt Source
ALLEIMA AB SWEDEN

Metallurgical process **Origin** C70
EAF+AOD+LRF Sweden

Steel/material Designations B02

Alleima	UNS
SAF 2507+	S32750

EN no
1.4410

Technical requirements B03
ISO 14067:2018(CO2e),ISO 17781:2017:QL1, EN10088-3:-2014,
EN10060:2003, EN10221:1996, EN10222-5:-2017*, EN10272:-2016
NACE MR0175/ISO 15156-3:-2020, NACE MR0103/ISO 17945-1:-2015
ASTM A-479-23A, ASME SA-479-ED-21 SECT II PART A,
ASTM A-276-23, ASTM A-484-23, ASTM A-182-23A*, ASTM A-1049-18(2023)*
ASTM A-314-19*, NORSOK M-630:2020, NORSOK MDS D57 REV.6*
IOGP S-563:2018, PED 2014/68/EU
*For detailed information, please see the appendix.

EXTENT OF DELIVERY B07-B13

It	Product designation	Heat	Lot	Pieces	Kg
01	MBR-SAF2507+-35	568127	45101	21	923.0
			Total	21	923.0

Heat		Recycled material(%)
568127	Continuous casting	80.4

TEST RESULTS
Reduction ratio (times)

Lot	
45101	85.3

Chemical composition (weight%)

Heat	PRE
568127	42.0

Quality assurance - Erik Jansson/QA-manager Primary Products A05/Z02
MTC Service / Certificates

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
568127	0.010	0.29	0.78	0.020	<0.0005	24.94	6.87	3.79

	Cu	N
568127	0.17	0.286

Tensile test at room temperature acc. to ASTM A370/ISO 6892-1

Longitudinal
Location radius

	Yield strength		Tensile strength	Elongation	
	Mpa	MPa	Mpa	%	%
Lot	Rp0.2	Rp1.0	Rm	A	2"
45101	622	664	826	41	41

	Red.of Area
	%
	Z
	78

Hardness test acc.to ASTM A-370/ISO 6506-1

Location radius

Lot	HRC		
45101	23	23	24

Impact test, J, Longitudinal acc. to ASTM A-370/ISO 148-1

Location radius

	Single values			Avg.	Temperature
Lot	Joule			Joule	°C
45101	324	337	327	329	-50
	349	343	330	341	20

Lateral expansion

				Temperature
Lot	mm			°C
45101	2.03	2.21	2.13	-50

Corrosion test according to ASTM G-48A, 50°C for 24 hours.

In delivery condition. No pitting corrosion found at 20x enlargement.
Test location acc to NORSOK MDS D57

	Specimen weight loss
Lot	g/m2
45101	0.00

Ferrite acc to ASTM E-562

Tested at surface, half radius and center.

Lot	%
45101	41.0
	41.1
	40.1

Austenite Spacing

acc. to DNV-RP-F112 Section 7

Lot	µm
45101	13.3

Following controls/tests have been satisfactorily performed:

- Positive Material Identification (PMI)
- Ultrasonic testing (*)
- Visual inspection and dimensional control.

Melt Source
Heat 568127 ALLEIMA AB SWEDEN

HEAT TREATMENT:
Up to 74.9 mm: Batch furnace. Material soaking 1100°C, min. 30 minutes
Quenched in water. Water temp pre-quench max 38°C
after quench max 49°C, Transfer time furnace to quenching <150 seconds

75 - 180mm: Continuous heat treatment furnace. Material soaking 1090°C
min. 30 minutes. Alleima is using a continuous water spray quenching
process. Water temp pre-quench max 38°C, after quench max 49°C.
Transfer time furnace to quenching <60 seconds

All testing has been done acc. to ISO 17781

The raw material is free from radioactive contamination.

Microscopic Examination X 500 acc. to ASTM A 923 Method A/NORSOK M630
Free from grain boundary carbides and intermetallic phases.

Material free from mercury contamination.

No welding or weld repair.

NORSOK M-650 ED-4 QTR NO: 25 Cr Duplex SS

Certified acc. Pressure Equipment Directive (2014/68/EU Annex 1 para
4.3) TUEV CERT-Certification body for pressure equipment of the
TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the specifications and
requirements of the order.

The material is manufactured according to a Quality system,
approved and registered to ISO 9001:2015.

No unauthorized alterations. The contents of this Inspection
Certificate may not be modified or revised in any way without the
prior written approval of Alleima.
Unauthorized alterations to the Inspection Certificate, including
introduction of false, fictitious or fraudulent statements or entries,
may be punishable by fines, imprisonment, or both. This Inspection
Certificate may be copied only in the manner and for the purposes
specified in Section 6 of EN 10204:2004. Contravention of this notice
will be prosecuted to the fullest extent of applicable law.

The certificate is produced with EDP and valid without signature.

APPENDIX

Lab accreditation
Our lab is accredited under SWEDAC Accreditation number 1636 for testing as per ISO/IEC 17025.

Applicable only to specific dimensions
20mm - 160mm: EN 10088-5 EN (Only valid for CE marked products together with Alleima Declaration of Performance certificate).
20mm - 160mm: PED 2014/68/EU, *EN 10272 (Stainless steel bars for pressure purposes).
20mm - 250mm: *EN 10222-5 (Chemical composition only)
20mm - 250mm: NORSOK M-630 - NORSOK MDS D57 (for length max 7500 mm)

Suitable for manufacturing of components in acc. with *ASTM A-182, ASTM A-1049, ASTM A-314.

Test location
Mechanical, ferrite testing:
Bar dim <=50 mm - Longitudinal test pieces in center of the bar.
Bar dim > 50 mm - 180 mm - Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface.
Bar dim > 100 mm - 180 mm - Transversal test piece, 1/4 T and minimum 100 mm from any second surface.

One set of test samples per heat treatment lot.
Maximum lot size 15 ton.

Micro: To ensure a sound, and unaffected structure all through the material three samples are taken, one close to surface, half radius, and in the center of the bar.

Furnace calibration every third month according to API 6A 21th Edition Annex M, Thermocouples of S-type (+/- 5°C tolerance) are used to monitor the Furnace temperature.

Ultrasonic test
Dim 29 - 74 mm: EN 10308 quality class 3
Dim 75 mm - : EN 10228-4, Tab 3 Scan coverage 1a 100%, Tab 5 Quality Class 3, ASTM A-388, API 6A PSL3/3G.

EN 10204 2.2
Climate change impact (acc. to ISO 14067:2018)

The CO2e of this product is:
Diameter 75-185 mm: 2075 kg/tonne

LCA / Life Cycle Assessment report is available.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#22C
Description
EXTENSION FIX D35 AV7
PCM Reference
W-2001260257

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

A02/Z03
INSPECTION CERTIFICATE acc to
EN 10204 3.1

INSPECTION STAMP
SVQ

A06
STAPPERT SOISSON
RUE JACQUES HENRI
02201 SOISSONS
FRANCE

Customer References A07
97152

Customer order
2024-07-29

200-00991 STAPPERT-W

Alleima References A08

Order No.	Subs No.	Dispatch note
612056	729123	09205/53

Suppl. No **C.Code**
285-92264 46

Material description B01/B04
HOT WORKED BAR STEEL
ROLLED
ANNEALED & STRAIGHTENED
PEEL TURNED AND POLISHED

Melt Source
ALLEIMA AB SWEDEN

Metallurgical process **Origin** C70
EAF+AOD+LRF Sweden

Steel/material Designations B02

Alleima	UNS
SAF 2507+	S32750

EN no
1.4410

Technical requirements B03
ISO 14067:2018(CO2e),ISO 17781:2017:QL1, EN10088-3:-2014,
EN10060:2003, EN10221:1996, EN10222-5:-2017*, EN10272:-2016
NACE MR0175/ISO 15156-3:-2020, NACE MR0103/ISO 17945-1:-2015
ASTM A-479-23A, ASME SA-479-ED-21 SECT II PART A,
ASTM A-276-23, ASTM A-484-23, ASTM A-182-23A*, ASTM A-1049-18(2023)*
ASTM A-314-19*, NORSOK M-630:2020, NORSOK MDS D57 REV.6*
IOGP S-563:2018, PED 2014/68/EU
*For detailed information, please see the appendix.

EXTENT OF DELIVERY B07-B13

It	Product designation	Heat	Lot	Pieces	Kg
01	MBR-SAF2507+-35	568127	45101	21	923.0
			Total	21	923.0

Heat		Recycled material(%)
568127	Continuous casting	80.4

TEST RESULTS
Reduction ratio (times)

Lot	
45101	85.3

Chemical composition (weight%)

Heat	PRE
568127	42.0

Quality assurance - Erik Jansson/QA-manager Primary Products A05/Z02
MTC Service / Certificates

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
568127	0.010	0.29	0.78	0.020	<0.0005	24.94	6.87	3.79

	Cu	N
568127	0.17	0.286

Tensile test at room temperature acc. to ASTM A370/ISO 6892-1

Longitudinal
Location radius

	Yield strength		Tensile strength	Elongation	
	Mpa	MPa	Mpa	%	%
Lot	Rp0.2	Rp1.0	Rm	A	2"
45101	622	664	826	41	41

	Red.of Area
	%
	Z
	78

Hardness test acc.to ASTM A-370/ISO 6506-1

Location radius

Lot	HRC		
45101	23	23	24

Impact test, J, Longitudinal acc. to ASTM A-370/ISO 148-1

Location radius

	Single values			Avg.	Temperature
Lot	Joule			Joule	°C
45101	324	337	327	329	-50
	349	343	330	341	20

Lateral expansion

				Temperature
Lot	mm			°C
45101	2.03	2.21	2.13	-50

Corrosion test according to ASTM G-48A, 50°C for 24 hours.

In delivery condition. No pitting corrosion found at 20x enlargement.
Test location acc to NORSOK MDS D57

	Specimen weight loss
Lot	g/m2
45101	0.00

Ferrite acc to ASTM E-562

Tested at surface, half radius and center.

Lot	%
45101	41.0
	41.1
	40.1

Austenite Spacing

acc. to DNV-RP-F112 Section 7

Lot	µm
45101	13.3

Following controls/tests have been satisfactorily performed:

- Positive Material Identification (PMI)
- Ultrasonic testing (*)
- Visual inspection and dimensional control.

Melt Source
Heat 568127 ALLEIMA AB SWEDEN

HEAT TREATMENT:
Up to 74.9 mm: Batch furnace. Material soaking 1100°C, min. 30 minutes
Quenched in water. Water temp pre-quench max 38°C
after quench max 49°C, Transfer time furnace to quenching <150 seconds

75 - 180mm: Continuous heat treatment furnace. Material soaking 1090°C
min. 30 minutes. Alleima is using a continuous water spray quenching
process. Water temp pre-quench max 38°C, after quench max 49°C.
Transfer time furnace to quenching <60 seconds

All testing has been done acc. to ISO 17781

The raw material is free from radioactive contamination.

Microscopic Examination X 500 acc. to ASTM A 923 Method A/NORSOK M630
Free from grain boundary carbides and intermetallic phases.

Material free from mercury contamination.

No welding or weld repair.

NORSOK M-650 ED-4 QTR NO: 25 Cr Duplex SS

Certified acc. Pressure Equipment Directive (2014/68/EU Annex 1 para
4.3) TUEV CERT-Certification body for pressure equipment of the
TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the specifications and
requirements of the order.

The material is manufactured according to a Quality system,
approved and registered to ISO 9001:2015.

No unauthorized alterations. The contents of this Inspection
Certificate may not be modified or revised in any way without the
prior written approval of Alleima.
Unauthorized alterations to the Inspection Certificate, including
introduction of false, fictitious or fraudulent statements or entries,
may be punishable by fines, imprisonment, or both. This Inspection
Certificate may be copied only in the manner and for the purposes
specified in Section 6 of EN 10204:2004. Contravention of this notice
will be prosecuted to the fullest extent of applicable law.

The certificate is produced with EDP and valid without signature.

APPENDIX

Lab accreditation
Our lab is accredited under SWEDAC Accreditation number 1636 for testing as per ISO/IEC 17025.

Applicable only to specific dimensions
20mm - 160mm: EN 10088-5 EN (Only valid for CE marked products together with Alleima Declaration of Performance certificate).
20mm - 160mm: PED 2014/68/EU, *EN 10272 (Stainless steel bars for pressure purposes).
20mm - 250mm: *EN 10222-5 (Chemical composition only)
20mm - 250mm: NORSOK M-630 - NORSOK MDS D57 (for length max 7500 mm)

Suitable for manufacturing of components in acc. with *ASTM A-182, ASTM A-1049, ASTM A-314.

Test location
Mechanical, ferrite testing:
Bar dim <=50 mm - Longitudinal test pieces in center of the bar.
Bar dim > 50 mm - 180 mm - Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface.
Bar dim > 100 mm - 180 mm - Transversal test piece, 1/4 T and minimum 100 mm from any second surface.

One set of test samples per heat treatment lot.
Maximum lot size 15 ton.

Micro: To ensure a sound, and unaffected structure all through the material three samples are taken, one close to surface, half radius, and in the center of the bar.

Furnace calibration every third month according to API 6A 21th Edition Annex M, Thermocouples of S-type (+/- 5°C tolerance) are used to monitor the Furnace temperature.

Ultrasonic test
Dim 29 - 74 mm: EN 10308 quality class 3
Dim 75 mm - : EN 10228-4, Tab 3 Scan coverage 1a 100%, Tab 5 Quality Class 3, ASTM A-388, API 6A PSL3/3G.

EN 10204 2.2
Climate change impact (acc. to ISO 14067:2018)

The CO2e of this product is:
Diameter 75-185 mm: 2075 kg/tonne

LCA / Life Cycle Assessment report is available.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#36
Description
DRIVING SHAFT D60 AV6-7
PCM Reference
W-004571257

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

SANDVIK

CERTIFICATE

A03/Z02 No. A/17-651500 Rev 00
Date 2017-04-12 Page 1/4

A02/Z03
INSPECTION CERTIFICATE acc to EN 10204 3.1

A06
PCM Manufacturing France
RUE DE L'ANCIENNE GARE
49123 CHAMPTOCE SUR LOIRE
FRANCE

43069-257 TS NP

Customer References A07

A159163 — Customer order 2017-04-11

200-00991 PCM

Sandvik References A08

Order No.	Subs No.	ABSMT Dispatch note
475455	628157	10745/53
ABSMT No.	**C.Code**	
284-32789	25	

Material description B01/B04

HOT WORKED STAINLESS BAR STEEL
ROLLED
ANNEALED & STRAIGHTENED
PEEL TURNED AND POLISHED

Steel making process C70 **Origin**
E+AOD+LRF — Sweden

Steel/material Designations B02

Sandvik	UNS
SAF 2507	S32750
EN no	
1.4410	

Technical requirements B03

EN 10088-3:-2005, EN10272:-2007*, EN10060:2003, EN 10221:1996
EN10222-5:-1999*, PED 2014/68/EU,
NACE MR0175/ISO 15156-3:2015, NACE MR0103/ISO 17945:2015,
ASTM A-276-16,
ASTM A-479-16A, ASME SA-479-ED-15 SECT II PART A,
ASTM A-484-16, ASTM A-182-16*, ASTM A-1049-10(15)*, ASTM A-314-15*,
NORSOK M-630 ED-6, NORSOK MDS D57 REV. 5*
*For detailed information, please see the appendix

EXTENT OF DELIVERY B07-B13

It	Product designation	Heat	Lot	Pieces	Kg
01	MBR-SAF2507-65	545813	07451	1	69.0
		545115	83221	1	125.0
			Total	2	194.0

TEST RESULTS
Chemical composition (weight%)

Heat	PRE
545115	42.1
545813	42.2

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
545115	0.015	0.33	0.80	0.020	0.0005	24.93	6.87	3.81
545813	0.014	0.31	0.78	0.024	0.0005	24.90	6.90	3.79

Heat	Cu	N
545115	0.11	0.286
545813	0.13	0.297

Quality assurance - Viktor Hellberg/QA-manager Primary Products
MTC Service / Certificates A05/Z02

Tensile test at room temperature acc. to ASTM A370/ISO 6892-1
Longitudinal
Location half radius

	Yield strength		Tensile strength	Elongation	
	Mpa	MPa	Mpa	%	%
Lot	Rp0.2	Rp1.0	Rm	A	2"
07451	574	665	813	41	41
83221	611	669	816	40	40

	Red.of Area
	%
	Z
	76
	78

Hardness test acc.to ASTM A-370/ISO 6506-1
Location half radius

Lot	HRC	
07451	20	22
83221	22	22

Impact test, J, -50°C, Longitudinal acc. to ASTM A-370
Location half radius

	Single values			Average
Lot	Joule			Joule
07451	327	327	353	336
83221	325	325	343	331

Lateral expansion

Lot	mm		
07451	2.50	1.84	2.02
83221	2.47	2.52	1.93

Corrosion test according to ASTM G-48A, 50°C for 24 hours.
No pitting corrosion found at 20x enlargement.
Location half radius

	Specimen weight loss
Lot	g/m2
07451	0.10
83221	0.00

Ferrite acc to ASTM E-562
Location half radius

Lot	%
07451	43.4
83221	42.5

Following controls/tests have been satisfactorily performed:
- Material Identification.
- Visual inspection and dimensional control.

Heat Treatment:
Solution annealed and quenched
(*For details see appendix)

The raw material is free from radioactive contamination.

Microscopic Examination X 500 acc. to ASTM A 923 Method A/NORSOK M630
Free from grain boundary carbides and intermetallic phases.

Material free from mercury contamination.

No welding or weld repair.

NORSOK M-650 ED-4 QTR NO: 25 Cr Duplex SS

Certified acc. Pressure Equipment Directive (2014/68/EU) by
TUEV CERT-Certification body for pressure equipment of the
TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the specifications and
requirements of the order.

The material is manufactured according to a Quality system,
approved and registered to ISO 9001:2008.

No unauthorized alterations. The contents of this Inspection
Certificate may not be modified or revised in any way without the
prior written approval of AB Sandvik Materials Technology.
Unauthorized alterations to the Inspection Certificate, including
introduction of false, fictitious or fraudulent statements or entries,
may be punishable by fines, imprisonment, or both. This Inspection
Certificate may be copied only in the manner and for the purposes
specified in Section 6 of EN 10204:2004. Contravention of this notice
will be prosecuted to the fullest extent of applicable law.

The certificate is produced with EDP and valid without signature.

APPENDIX

Lab accreditation
Our lab is accredited under SWEDAC Accreditation number 1636 for testing as per ISO/IEC 17025.

Applicable only to specific dimensions

20mm - 160mm: EN 10088-5 EN (Only valid for CE marked products together with Sandvik Declaration of Performance certificate).
20mm - 160mm: PED 2014/68/EU *EN 10272 (Stainless steel bars for pressure purposes)
20mm - 250mm: *EN 10222-5 (Chemical composition only)
20mm - 250mm: NORSOK M-630 Ed. 6 - NORSOK MDS D57 Rev.5*

Suitable for manufacturing of components in acc, with *ASTM A-182, ASTM A-1049 & ASTM A-314.

Test location
Bar dim <50mm - Longitudinal test pieces in center of the bar.
Bar dim >50mm - 250 mm - Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface.
Bar dim >100mm- 250 mm - Transversal test pieces, 1/4 T and minimum 100 mm from any second surface.

One set of test samples per heat treatment lot.
Maximum lot size 15 ton.

Micro: To ensure a sound, and unaffected structure all through the material three samples are taken, one close to surface, half radius, and in the center of the bar.

*Heat treatment
20 - 70mm: Material soaking 1100°C, min. 20 minutes. Quenched in water. Water temp pre-quench max 40°C, after quench max 50°C
75 - 180mm: Material soaking 1090°C, min. 30 minutes. Quenched in water. Water temp pre-quench max 40°C, after quench max 50°C
185 - 250mm: Material soaking 1100°C, min. 60 minutes. Quenched in water. Water temp pre-quench max 40°C, after quench max 50°C

Furnace calibration every third month according to API 6A
Thermocouples of S-type (+/- 5°C tolerance) are used to monitor the furnace temperature.

Disclaimer: The Appendix information is general Sandvik product information, and is not related to the 3.1 certification for this particular product.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#36B
Description
REDUCED DRIVING SHAFT AV7
PCM Reference
W-004946257

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

CERTIFICATE

A03/Z02
No. A/24-187056 **Rev** 00
Date 2024-07-30 **Page** 1/4

A02/Z03
INSPECTION CERTIFICATE acc to
EN 10204 3.1

INSPECTION STAMP
SVQ

A06
STAPPERT SOISSON
RUE JACQUES HENRI
02201 SOISSONS
FRANCE

Customer References A07
97152

Customer order
2024-07-29

200-00991 STAPPERT-W

Alleima References A08

Order No.	Subs No.	Dispatch note
612056	729123	09205/53

Suppl. No **C.Code**
285-92264 46

Material description B01/B04
HOT WORKED BAR STEEL
ROLLED
ANNEALED & STRAIGHTENED
PEEL TURNED AND POLISHED

Melt Source
ALLEIMA AB SWEDEN

Metallurgical process **Origin** C70
EAF+AOD+LRF Sweden

Steel/material Designations B02

Alleima	UNS
SAF 2507+	S32750

EN no
1.4410

Technical requirements B03
ISO 14067:2018(CO2e),ISO 17781:2017:QL1, EN10088-3:-2014,
EN10060:2003, EN10221:1996, EN10222-5:-2017*, EN10272:-2016
NACE MR0175/ISO 15156-3:-2020, NACE MR0103/ISO 17945-1:-2015
ASTM A-479-23A, ASME SA-479-ED-21 SECT II PART A,
ASTM A-276-23, ASTM A-484-23A, ASTM A-182-23A*, ASTM A-1049-18(2023)*
ASTM A-314-23*, NORSOK M-630:2020, NORSOK MDS D57 REV.6*
IOGP S-563:2018, PED 2014/68/EU
*For detailed information, please see the appendix.

EXTENT OF DELIVERY B07-B13

It	Product designation	Heat	Lot	Pieces	Kg
02	MBR-SAF2507+-65	568408	60162	2	253.0
			Total	2	253.0

Heat		Recycled material(%)
568408	Continuous casting	61.5

TEST RESULTS
Reduction ratio (times)

Lot	
60162	26.6

Chemical composition (weight%)

Heat	PRE
568408	41.9

Quality assurance - Erik Jansson/QA-manager Primary Products A05/Z02
MTC Service / Certificates

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
568408	0.011	0.26	0.79	0.020	<0.0005	25.05	6.89	3.79

	Cu	N
568408	0.12	0.269

Tensile test at room temperature acc. to ASTM A370/ISO 6892-1
Longitudinal
Location half radius

	Yield strength		Tensile strength	Elongation	
	Mpa	MPa	Mpa	%	%
Lot	Rp0.2	Rp1.0	Rm	A	2"
60162	589	654	808	41	41

	Red.of Area
	%
	Z
	80

Hardness test acc.to ASTM A-370/ISO 6506-1
Location half radius

Lot	HRC		
60162	23	24	24

Impact test, J, Longitudinal acc. to ASTM A-370/ISO 148-1
Location half radius

	Single values			Avg.	Temperature
Lot	Joule			Joule	°C
60162	300	297	293	297	-50
	376	327	337	347	20

Lateral expansion

				Temperature
Lot	mm			°C
60162	2.22	2.23	2.20	-50

Corrosion test according to ASTM G-48A, 50°C for 24 hours.
In delivery condition. No pitting corrosion found at 20x enlargement.
Test location acc to NORSOK MDS D57

	Specimen weight loss
Lot	g/m2
60162	0.00

Ferrite acc to ASTM E-562
Tested at surface, half radius and center.

Lot	%
60162	49.1
	48.1
	49.8

Austenite Spacing
acc. to DNV-RP-F112 Section 7

Lot	µm
60162	18.7

Following controls/tests have been satisfactorily performed:
- Positive Material Identification (PMI)
- Ultrasonic testing (*)
- Visual inspection and dimensional control.

Melt Source
Heat 568408 ALLEIMA AB SWEDEN

HEAT TREATMENT:
Up to 74.9 mm: Batch furnace. Material soaking 1100°C, min. 30 minutes
Quenched in water. Water temp pre-quench max 38°C
after quench max 49°C, Transfer time furnace to quenching <150 seconds

75 - 180mm: Continuous heat treatment furnace. Material soaking 1090°C
min. 30 minutes. Alleima is using a continuous water spray quenching
process. Water temp pre-quench max 38°C, after quench max 49°C.
Transfer time furnace to quenching <60 seconds

All testing has been done acc. to ISO 17781

The raw material is free from radioactive contamination.

Microscopic Examination X 500 acc. to ASTM A 923 Method A/NORSOK M630
Free from grain boundary carbides and intermetallic phases.

Material free from mercury contamination.

No welding or weld repair.

NORSOK M-650 ED-4 QTR NO: 25 Cr Duplex SS

Certified acc. Pressure Equipment Directive (2014/68/EU Annex 1 para
4.3) TUEV CERT-Certification body for pressure equipment of the
TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the specifications and
requirements of the order.

The material is manufactured according to a Quality system,
approved and registered to ISO 9001:2015.

No unauthorized alterations. The contents of this Inspection
Certificate may not be modified or revised in any way without the
prior written approval of Alleima.
Unauthorized alterations to the Inspection Certificate, including
introduction of false, fictitious or fraudulent statements or entries,
may be punishable by fines, imprisonment, or both. This Inspection
Certificate may be copied only in the manner and for the purposes
specified in Section 6 of EN 10204:2004. Contravention of this notice
will be prosecuted to the fullest extent of applicable law.

The certificate is produced with EDP and valid without signature.

APPENDIX

Lab accreditation
Our lab is accredited under SWEDAC Accreditation number 1636 for testing as per ISO/IEC 17025.

Applicable only to specific dimensions
20mm - 160mm: EN 10088-5 EN (Only valid for CE marked products together with Alleima Declaration of Performance certificate).
20mm - 160mm: PED 2014/68/EU, *EN 10272 (Stainless steel bars for pressure purposes).
20mm - 250mm: *EN 10222-5 (Chemical composition only)
20mm - 250mm: NORSOK M-630 - NORSOK MDS D57 (for length max 7500 mm)

Suitable for manufacturing of components in acc. with *ASTM A-182, ASTM A-1049, ASTM A-314.

Test location
Mechanical, ferrite testing:
Bar dim <=50 mm - Longitudinal test pieces in center of the bar.
Bar dim > 50 mm - 180 mm - Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface.
Bar dim > 100 mm - 180 mm - Transversal test piece, 1/4 T and minimum 100 mm from any second surface.

One set of test samples per heat treatment lot.
Maximum lot size 15 ton.

Micro: To ensure a sound, and unaffected structure all through the material three samples are taken, one close to surface, half radius, and in the center of the bar.

Furnace calibration every third month according to API 6A 21th Edition Annex M, Thermocouples of S-type (+/- 5°C tolerance) are used to monitor the Furnace temperature.

Ultrasonic test
Dim 29 - 74 mm: EN 10308 quality class 3
Dim 75 mm - : EN 10228-4, Tab 3 Scan coverage 1a 100%, Tab 5 Quality Class 3, ASTM A-388, API 6A PSL3/3G.

EN 10204 2.2
Climate change impact (acc. to ISO 14067:2018)

The CO2e of this product is:
Diameter 75-185 mm: 2075 kg/tonne

LCA / Life Cycle Assessment report is available.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#339
Description
EXTENSION JUNCTION D35 AV7
PCM Reference
W-004945257

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

CERTIFICATE

A03/Z02
No. A/24-187056 **Rev** 00
Date 2024-07-30 **Page** 1/4

A02/Z03
INSPECTION CERTIFICATE acc to
EN 10204 3.1

INSPECTION STAMP
SVQ

A06
STAPPERT SOISSON
RUE JACQUES HENRI
02201 SOISSONS
FRANCE

Customer References A07
97152

Customer order
2024-07-29

200-00991 STAPPERT-W

Alleima References A08

Order No.	Subs No.	Dispatch note
612056	729123	09205/53

Suppl. No **C.Code**
285-92264 46

Material description B01/B04
HOT WORKED BAR STEEL
ROLLED
ANNEALED & STRAIGHTENED
PEEL TURNED AND POLISHED

Melt Source
ALLEIMA AB SWEDEN

Metallurgical process **Origin** C70
EAF+AOD+LRF Sweden

Steel/material Designations B02

Alleima	UNS
SAF 2507+	S32750

EN no
1.4410

Technical requirements B03
ISO 14067:2018(CO2e),ISO 17781:2017:QL1, EN10088-3:-2014,
EN10060:2003, EN10221:1996, EN10222-5:-2017*, EN10272:-2016
NACE MR0175/ISO 15156-3:-2020, NACE MR0103/ISO 17945-1:-2015
ASTM A-479-23A, ASME SA-479-ED-21 SECT II PART A,
ASTM A-276-23, ASTM A-484-23A, ASTM A-182-23A*, ASTM A-1049-18(2023)*
ASTM A-314-23*, NORSOK M-630:2020, NORSOK MDS D57 REV.6*
IOGP S-563:2018, PED 2014/68/EU
*For detailed information, please see the appendix.

EXTENT OF DELIVERY B07-B13

It	Product designation	Heat	Lot	Pieces	Kg
02	MBR-SAF2507+-65	568408	60162	2	253.0
			Total	2	253.0

Heat		Recycled material(%)
568408	Continuous casting	61.5

TEST RESULTS
Reduction ratio (times)

Lot	
60162	26.6

Chemical composition (weight%)

Heat	PRE
568408	41.9

Quality assurance - Erik Jansson/QA-manager Primary Products A05/Z02
MTC Service / Certificates

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
568408	0.011	0.26	0.79	0.020	<0.0005	25.05	6.89	3.79

	Cu	N
568408	0.12	0.269

Tensile test at room temperature acc. to ASTM A370/ISO 6892-1
Longitudinal
Location half radius

	Yield strength		Tensile strength	Elongation	
	Mpa	MPa	Mpa	%	%
Lot	Rp0.2	Rp1.0	Rm	A	2"
60162	589	654	808	41	41

	Red.of Area
	%
	Z
	80

Hardness test acc.to ASTM A-370/ISO 6506-1
Location half radius

Lot	HRC		
60162	23	24	24

Impact test, J, Longitudinal acc. to ASTM A-370/ISO 148-1
Location half radius

	Single values			Avg.	Temperature
Lot	Joule			Joule	°C
60162	300	297	293	297	-50
	376	327	337	347	20

Lateral expansion

				Temperature
Lot	mm			°C
60162	2.22	2.23	2.20	-50

Corrosion test according to ASTM G-48A, 50°C for 24 hours.
In delivery condition. No pitting corrosion found at 20x enlargement.
Test location acc to NORSOK MDS D57

	Specimen weight loss
Lot	g/m2
60162	0.00

Ferrite acc to ASTM E-562
Tested at surface, half radius and center.

Lot	%
60162	49.1
	48.1
	49.8

Austenite Spacing
acc. to DNV-RP-F112 Section 7

Lot	µm
60162	18.7

Following controls/tests have been satisfactorily performed:
- Positive Material Identification (PMI)
- Ultrasonic testing (*)
- Visual inspection and dimensional control.

Melt Source
Heat 568408 ALLEIMA AB SWEDEN

HEAT TREATMENT:
Up to 74.9 mm: Batch furnace. Material soaking 1100°C, min. 30 minutes
Quenched in water. Water temp pre-quench max 38°C
after quench max 49°C, Transfer time furnace to quenching <150 seconds

75 - 180mm: Continuous heat treatment furnace. Material soaking 1090°C
min. 30 minutes. Alleima is using a continuous water spray quenching
process. Water temp pre-quench max 38°C, after quench max 49°C.
Transfer time furnace to quenching <60 seconds

All testing has been done acc. to ISO 17781

The raw material is free from radioactive contamination.

Microscopic Examination X 500 acc. to ASTM A 923 Method A/NORSOK M630
Free from grain boundary carbides and intermetallic phases.

Material free from mercury contamination.

No welding or weld repair.

NORSOK M-650 ED-4 QTR NO: 25 Cr Duplex SS

Certified acc. Pressure Equipment Directive (2014/68/EU Annex 1 para
4.3) TUEV CERT-Certification body for pressure equipment of the
TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the specifications and
requirements of the order.

The material is manufactured according to a Quality system,
approved and registered to ISO 9001:2015.

No unauthorized alterations. The contents of this Inspection
Certificate may not be modified or revised in any way without the
prior written approval of Alleima.
Unauthorized alterations to the Inspection Certificate, including
introduction of false, fictitious or fraudulent statements or entries,
may be punishable by fines, imprisonment, or both. This Inspection
Certificate may be copied only in the manner and for the purposes
specified in Section 6 of EN 10204:2004. Contravention of this notice
will be prosecuted to the fullest extent of applicable law.

The certificate is produced with EDP and valid without signature.

APPENDIX

Lab accreditation
Our lab is accredited under SWEDAC Accreditation number 1636 for testing as per ISO/IEC 17025.

Applicable only to specific dimensions
20mm - 160mm: EN 10088-5 EN (Only valid for CE marked products together with Alleima Declaration of Performance certificate).
20mm - 160mm: PED 2014/68/EU, *EN 10272 (Stainless steel bars for pressure purposes).
20mm - 250mm: *EN 10222-5 (Chemical composition only)
20mm - 250mm: NORSOK M-630 - NORSOK MDS D57 (for length max 7500 mm)

Suitable for manufacturing of components in acc. with *ASTM A-182, ASTM A-1049, ASTM A-314.

Test location
Mechanical, ferrite testing:
Bar dim <=50 mm - Longitudinal test pieces in center of the bar.
Bar dim > 50 mm - 180 mm - Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface.
Bar dim > 100 mm - 180 mm - Transversal test piece, 1/4 T and minimum 100 mm from any second surface.

One set of test samples per heat treatment lot.
Maximum lot size 15 ton.

Micro: To ensure a sound, and unaffected structure all through the material three samples are taken, one close to surface, half radius, and in the center of the bar.

Furnace calibration every third month according to API 6A 21th Edition Annex M, Thermocouples of S-type (+/- 5°C tolerance) are used to monitor the Furnace temperature.

Ultrasonic test
Dim 29 - 74 mm: EN 10308 quality class 3
Dim 75 mm - : EN 10228-4, Tab 3 Scan coverage 1a 100%, Tab 5 Quality Class 3, ASTM A-388, API 6A PSL3/3G.

EN 10204 2.2
Climate change impact (acc. to ISO 14067:2018)

The CO2e of this product is:
Diameter 75-185 mm: 2075 kg/tonne

LCA / Life Cycle Assessment report is available.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#515
Description
MS SUPORT D90 AV7
PCM Reference
W-008207257

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

ITALFOND
STAINLESS STEEL AND SUPERALLOYS
A GIUDA GROUP

Tel. (+39).(030).6829911
Fax. (39).(030).6820616
Via Industriale, 1 - 25021 BAGNOLO MELLA (BS) ITALY

BESCHEINIGUNG ÜBER QUALITÄT UND WERKSTOFFPRÜFUNGEN

CERTIFICATE OF QUALITY AND MATERIAL TESTING

ABNAHMEPRÜFZEUGNIS-Nr. AC/ **2372** **DATUM : 10/07/2023**
Certficate-No. Date :

nach EN 10204.3.1 - according to EN 10204.3.1

BESTELLER: **STAPPERT DEUTSCHLAND GMBH**
Customer

BESTELL-Nr.: **90704/W** **AUFTRAGBESTÄTIGUNG: :** **211914**
Order-No. Order confirmation:

Schmelze-Nr. *Heat-No.*	Stücke *Pieces*	MATERIAL-BEZEICHNUNG *Material description*	WERKSTOFF-Nr. *Material grade*
71591	**5**	FORGED ROUND PEELED BARS Ø210mm Geschmiedeter Geschälter stab Ø210mm	**W.nr.1.4410** **TL123 Ed. 07/2019** **Norsok M-630 Ed.6 - MDS D57 Rev.5** **DIN EN 10272** **DIN EN 10088-3**
7159103100		1247kg x 4546mm length	**DIN EN 10250-4**
7159103200		1155kg x 4221mm length	**DIN 7527/6**
7159104100		1341kg x 4910mm length	**UNS S32750**
7159104200		1323kg x 4842mm length	**ASTM A276**
7159105100		1404kg x 5128mm length	**ASTM A479** **ASTM A484** **ASME Sect.II Part A SA479 Ed.2021** **ASME Sect.II Part A SA484 Ed.2021** **NACE MR0175:2021/ ISO15156:2020** **NACE MR0103/ISO 17945-1:2015**

Zeichen des Lieferwerkes *Trade mark* | *Stempel des Werkssachverständigen* *Inspector's stamp*

Wärmebehandlungszustand: **Solution annealed 1100°C (15h) + water quenched - H.T. lot: 1/2280**
Condition of heat treatment: Quench bath temperature: Start 20°C - Finish 23°C - Transfer time <60s

Schmelzanalyse / Heat analysis [% by mass]

C	Mn	Si	P	S	Cr	Ni	Mo	Cu	Sn
0,015	0,59	0,39	0,024	0,0003	25,01	6,91	3,79	0,237	
Ca	**N**	**V**	**Ti**	**W**	**Ta**	**As**	**PRE***	**Grain Size ASTM E112**	
	0,277						41,95	4	

PRÜFERGEBNISSE / TEST RESULTS ON ACTUAL BAR PROLONGATION

Temp. [°C]	Norm Direction	$Rp_{0,2}$ [MPa]	Rp_1 [MPa]	Rm [MPa]	A [%]	Z [%]	KV_2 EN (10 X 10 mm) [J] KV_8 ASTM (10 X 10 mm) [J]	Hardness
RT	**EN/T**	580		802	40,8	68,1		**HBW:**
RT	**ASTM/L**	552		771	45,0	76,6		248
20	**EN/T**						262 - 250 - 256	**HRc:** <22
Informativ Zertifizierten Prüfergebnisse - Results provided for information								
-50	**ASTM/L**						114 - 112 - 119	

Die informativ zertifizierten Prüfergebnisse gelten nur in Bezug auf die Probe, die nicht unbedingt repräsentativ der ganzen Lieferung ist.
Results provided for information can be referred to the test sample only and are not necessarily representative of the total supply

Erschmelzung E.A.F. + A.O.D. / Steelmaking process E.A.F. + A.O.D. refining
Material ohne Quecksilberverunreinigungen / Material free from Mercury contamination
Material durch Gammaspektrometer überprüft und ohne radioactive Verunreinigung über die nach EU-Radiation Protection 122-part 1, festgestellten Grenzwerte, wenn zugehörig / Material inspected with a gamma spectrometer and with no radioactive contamination beyond the limits provided for by the EU-Radiation Protection 122-part 1, when relevant.
Material ohne Schweißen / No welding perfomed on material
Verformungsgrad / Forging Ratio 7,4:1
Gefügeart: superduplex / Microstructure: superduplex
Mechanische Prüfungen gem./Mechanical tests performed according to UNI EN ISO 6892-1 (Probe/tensile Ø10mmx50mm) + ASTM A370 (Ø12,5mm-50mm length) + UNI EN ISO 6506-1/ASTM E10+ UNI EN ISO 6508-1/ASTM E18 + UNI EN ISO 148-1/ASTM E23. Bei Raumtemperature / At room temperature.
Werkstoff nach DIN EN ISO 3651-2 Verfahren C, ASTM A262 Pr.E interkristallinische Korrosion beständig / Material resistant to intercrystalline corrosion according to DIN EN ISO 3651-2 Method C, ASTM A262 Pr.E
Chemische Zusammensetzung und mechanische Prüfungen nach ASTM A182 (F53) / Chemical analysis and mechanical properties according to ASTM A182 (F53)
*PRE= Cr + 3,3*Mo + 16*N
Besichtigung und Maßnachprüfung ohne Beanstandung / Visual inspection and dimensional control without objection
Art der Verwechslungsprüfung: spektralanalytisch / PMI performed with a x-ray spectrometer
Norsok M650 Ed.4 - Qualification documents: Italfond QTR 04-F53 Rev.04
Augestellt in Einvernehmen mit dem TÜV Süd (März 1995) / Issued in agreement with TÜV Süd Industrie Service GmbH (March 1995)
QMS nach DGRL 2014/68/EU, Anhang I, Absatz 4.3 die Notifizierte Stelle - Kennnummer 0036
QMS approved according to PED 2014/68/EU, Annex I, Para. 4.3 by Notified Body 0036
(Zertifikat Nr. DGR-0036-QS-W 55/2002/MUC) / (Certification no. DGR-0036-QS-W 55/2002/MUC)
Ursprungsland / Country of origin: Italy
Erschmelzungsland / Country of melt and pour: Italy
Geliefertes Material in Übereinstimmung mit Bestellnormen, -spezifikationen u. -anforderungen
The delivered products comply with the standards, specifications and requirements of the order

DER SACHVERSTÄNDIGE *Surveyors*	DER KUNDENSACHVERSTÄNDIGE *Customer Inspector*	ITALFOND S.p.A. *Der Qualitätsleiter*
		ITALFOND GARANZIA QUALITA' DAVIDE DELLA VALLE

ITALFOND
STAINLESS STEEL AND SUPERALLOYS
A GIVA GROUP

Tel. (+39).(030).6829911
Fax. (39).(030).6820616
Via Industriale, 1 - 25021 BAGNOLO MELLA (BS) ITALY

BESCHEINIGUNG ÜBER QUALITÄT UND WERKSTOFFPRÜFUNGEN

CERTIFICATE OF QUALITY AND MATERIAL TESTING

ULTRASCHALLPRÜFUNG

ULTRASONIC TEST

ABNAHMEPRÜFZEUGNIS-Nr. UT/ **2372** **DATUM : 10/07/2023**
Certficate-No. Date :

nach EN 10204.3.1 - according to EN 10204.3.1

BESTELLER: **STAPPERT DEUTSCHLAND GMBH**
Customer

BESTELL-Nr.: **90704/W** **AUFTRAGBESTÄTIGUNG: :** **211914**
Order-No. Order confirmation:

Schmelze-Nr. *Heat-No.*	Stücke *Pieces*	MATERIAL-BEZEICHNUNG *Material description*	WERKSTOFF-Nr. *Material grade*
71591	**5**	FORGED ROUND PEELED BARS Ø210mm Geschmiedeter Geschälter stab Ø210mm	**W.nr.1.4410** **TL123 Ed. 07/2019** **Norsok M-630 Ed.6 - MDS D57 Rev.5** **DIN EN 10272** **DIN EN 10088-3** **DIN EN 10250-4** **DIN 7527/6** **UNS S32750** **ASTM A276** **ASTM A479** **ASTM A484** **ASME Sect.II Part A SA479 Ed.2021** **ASME Sect.II Part A SA484 Ed.2021** **NACE MR0175:2021/ ISO15156:2020** **NACE MR0103/ISO 17945-1:2015**
7159103100		1247kg x 4546mm length	
7159103200		1155kg x 4221mm length	
7159104100		1341kg x 4910mm length	
7159104200		1323kg x 4842mm length	
7159105100		1404kg x 5128mm length	

Wärmebehandlungszustand: **Solution annealed 1100°C (15h) + water quenched - H.T. lot: 1/2280**
Condition of heat treatment: Quench bath temperature: Start 20°C - Finish 23°C - Transfer time <60s

ULTRASCHALLPRÜFBERICHT - *ULTRASONIC TEST REPORT*

PRÜFGERÄT	**:**	**KRAUTKRAMER USM GO+**
Equipment	:	
JUSTIERUNGSVERFAHREN	**:**	**Rückwandecho**
Calibration Method	:	Back wall echo
KOPPLUNGSMITTEL	**:**	**Gel**
Couplant	:	Gel
PRÜFKOPF	**:**	**B2S**
Kind of Probe	:	
BEARBEITUNGSZUSTAND	**:**	**Geschälter**
Surface Condition	:	Peeled
PRÜFUMFANG	**:**	**100% US-Prüfung**
Inspection scope	:	100% UT-inspected
PRÜFVERFAHREN	**:**	**DIN EN 10308**
Testing procedure	:	
ZULÄSSIGKEITSGRENZE	**:**	**Quality Class 3**
Acceptance Criteria	:	
PRÜFVERFAHREN	**:**	**ASTM A388**
Testing procedure		
ZULÄSSIGKEITSGRENZE	**:**	**ASME VIII Div.2 Par. 3.3.4**
Acceptance Criteria	:	
PRÜFERGEBNIS	**:**	**Keine registrierpflichtigen Anzeigen**
Test result	:	No recordable indications found

DER SACHVERSTÄNDIGE *Surveyors*	DER KUNDENSACHVERSTÄNDIGE *Customer Inspector*	ITALFOND S.p.A. *NDE Inspector*
		ISO 9712 - UT PT Lev. 2 SNT-TC-1A - UT PT Lev. II MOHAMMED MAJOUBI

ITALFOND
STAINLESS STEEL AND SUPERALLOYS
A GIVA GROUP

Tel. (+39).(030).6829911
Fax. (39).(030).6820616
Via Industriale, 1 - 25021 BAGNOLO MELLA (BS) ITALY

BESCHEINIGUNG ÜBER QUALITÄT UND WERKSTOFFPRÜFUNGEN

CERTIFICATE OF QUALITY AND MATERIAL TESTING

MIKROGRAPHISCHE PRÜFUNG

MICROGRAPHIC EXAMINATION

ABNAHMEPRÜFZEUGNIS-Nr. ME/ **2372** **DATUM : 10/07/2023**
Certficate-No. Date :

nach EN 10204.3.1 - according to EN 10204.3.1

BESTELLER: **STAPPERT DEUTSCHLAND GMBH**
Customer

BESTELL-Nr.: **90704/W** **AUFTRAGBESTÄTIGUNG: :** **211914**
Order-No. Order confirmation:

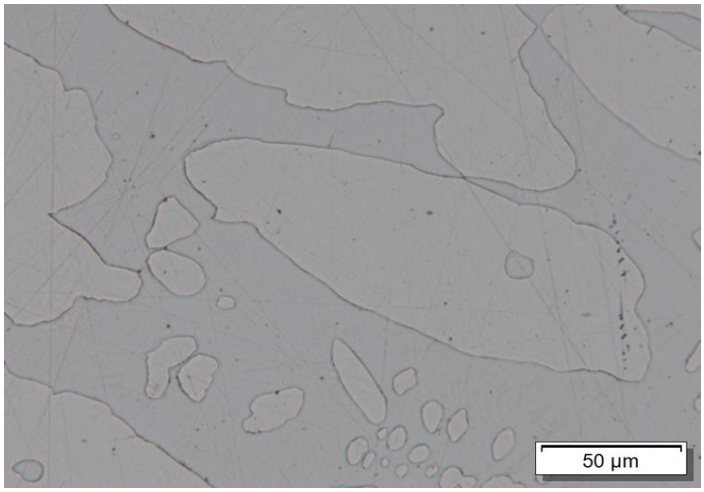
Schmelze-Nr. *Heat-No.*	Stücke *Pieces*	MATERIAL-BEZEICHNUNG *Material description*	WERKSTOFF-Nr. *Material grade*
71591	**5**	FORGED ROUND PEELED BARS Ø210mm Geschmiedeter Geschälter stab Ø210mm	**W.nr.1.4410** **TL123 Ed. 07/2019** **Norsok M-630 Ed.6 - MDS D57 Rev.5** **DIN EN 10272** **DIN EN 10088-3** **DIN EN 10250-4** **DIN 7527/6** **UNS S32750** **ASTM A276** **ASTM A479** **ASTM A484** **ASME Sect.II Part A SA479 Ed.2021** **ASME Sect.II Part A SA484 Ed.2021** **NACE MR0175:2021/ ISO15156:2020** **NACE MR0103/ISO 17945-1:2015**
7159103100		1247kg x 4546mm length	
7159103200		1155kg x 4221mm length	
7159104100		1341kg x 4910mm length	
7159104200		1323kg x 4842mm length	
7159105100		1404kg x 5128mm length	

Wärmebehandlungszustand: **Solution annealed 1100°C (15h) + water quenched - H.T. lot: 1/2280**
Condition of heat treatment: Quench bath temperature: Start 20°C - Finish 23°C - Transfer time <60s

MIKROGRAPHISCHE PRÜFUNG - MITTE RADIUS

MICROGRAPHIC EXAMINATION - MID RADIUS

Vergrößerung : 500 x **- Magnification:** 500 x
Ätzen : elektrolytische, oxalic acid 3v 20s nach ASTM E407
Etching : eletrolitic, oxalic acid 3v 20s according to ASTM E407



ERGEBNIS : Frei von intermetallischen Phasen aund Ausscheidungen
RESULT: Free from intermetallic phases and precipitates
Ferrite content according to ASTM E562 Point counting 30 fields 16 points per field : **46,00 ± 3,00%**
Ferrit-Gehalt gem. ASTM E562 Punkte Berechnung 30 Felder 16 Punkte per Feld : **46,00 ± 3,00%**

DER SACHVERSTÄNDIGE *Surveyors*	DER KUNDERSACHVERSTÄNDIGE *Customer Inspector*	ITALFOND S.p.A. *Der Qualitätsleiter*
		ITALFOND GARANZIA QUALITA' DAVIDE DELLA VALLE

ITALFOND
STAINLESS STEEL AND SUPERALLOYS
A GIVA GROUP

Tel. (+39).(030).6829911
Fax. (39).(030).6820616
Via Industriale, 1 - 25021 BAGNOLO MELLA (BS) ITALY

BESCHEINIGUNG ÜBER QUALITÄT UND WERKSTOFFPRÜFUNGEN

CERTIFICATE OF QUALITY AND MATERIAL TESTING

KORROSIONSPRÜFUNG

CORROSION TEST

ABNAHMEPRÜFZEUGNIS-Nr. CO/ **2372** **DATUM : 10/07/2023**
Certficate-No. Date :

nach EN 10204.3.1 - according to EN 10204.3.1

BESTELLER: **STAPPERT DEUTSCHLAND GMBH**
Customer

BESTELL-Nr.: **90704/W** **AUFTRAGBESTÄTIGUNG: :** **211914**
Order-No. Order confirmation:

Schmelze-Nr. *Heat-No.*	Stücke *Pieces*	MATERIAL-BEZEICHNUNG *Material description*	WERKSTOFF-Nr. *Material grade*
71591	**5**	FORGED ROUND PEELED BARS Ø210mm Geschmiedeter Geschälter stab Ø210mm	**W.nr.1.4410** **TL123 Ed. 07/2019** **Norsok M-630 Ed.6 - MDS D57 Rev.5** **DIN EN 10272** **DIN EN 10088-3** **DIN EN 10250-4** **DIN 7527/6** **UNS S32750** **ASTM A276** **ASTM A479** **ASTM A484** **ASME Sect.II Part A SA479 Ed.2021** **ASME Sect.II Part A SA484 Ed.2021** **NACE MR0175:2021/ ISO15156:2020** **NACE MR0103/ISO 17945-1:2015**
7159103100		1247kg x 4546mm length	
7159103200		1155kg x 4221mm length	
7159104100		1341kg x 4910mm length	
7159104200		1323kg x 4842mm length	
7159105100		1404kg x 5128mm length	

Wärmebehandlungszustand: **Solution annealed 1100°C (15h) + water quenched - H.T. lot: 1/2280**
Condition of heat treatment: Quench bath temperature: Start 20°C - Finish 23°C - Transfer time <60s

KORROSIONSPRÜFUNG - *CORROSION TEST*

PRÜFVERFAHREN Test Procedure	**ASTM G48 method A**
PRÜFBEDINGUNG UND DAUER Test condition and duration	**24h at 50 ± 1°C**
CHEMISCHE BEHANDLUNG DER PROBENOBERFLÄCHE Sample condition	**Pickled - 20%HNO3 5%HF 5' 60°C**
PROBENABMESSUNGEN Sample dimensions	**50,13 23,95 10,44 [mm]**
START GEWICHT Starting weigth	**95,0342 [g]**
GEWICHT NACH DER PRÜFUNG Wegth after test	**95,0331 [g]**
SPEZIFISCHER GEWICHTSVERLUST Specific weigth loss	**0,2786 [g/m2]**
SICHTPRÜFUNGSERGEBNIS Visual examination results	**Frei von gruben bei 20x prüfung** Free from pits at 20x examination
TESTER GEBNIS Test result	**ZUFRIEDENSTELLEND** Satisfactory

DER SACHVERSTÄNDIGE *Surveyors*	DER KUNDENSACHVERSTÄNDIGE *Customer Inspector*	ITALFOND S.p.A. *Der Qualitätsleiter*
		ITALFOND GARANZIA QUALITA' DAVIDE DELLA VALLE

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#16/17
Description
MECHANICAL SEAL
PCM Reference
DIGIAN-392481-01

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

FLOWSERVE

This is to Certify

PCM MANUFACTURING FRANCE SAS
RUE DE L'ANCIENNE GARE
49123 CHAMPTOCE-SUR-LOIRE
FRANCE

Certificate Date	October 31, 2024
Customer PO / Item No.	PO070-24-07869-line 2
Delivery No. / Item No.	W-004921
Sales Order / Item No.	400370175-line 100

Certificate of Compliance with the Order according to EN-10204 2.1

We hereby certify that the goods described hereon have been inspected and tested in accordance with the conditions and requirements of the contract or purchase order, and unless otherwise noted below, conform in all respects to the specification(s), drawing(s) relevant thereto.

Flowserve Material	C100033781
Material Description	Mechanical Seal, Single
Quantity	4

N van Dijk

Quality Assurance Department

This certificate is prepared by a data-processing system and need not to be signed for validity. This is in accordance with EN-10204 and ISO-10474.

Flowserve BV
Parallelweg 6, 4878 AH Etten-Leur
PO Box 25, 4870 AA Etten-Leur
The Netherlands
Tel: +31 (0)76 502 8200
www.flowserve.com

Flowserve B.V. is a "Besloten Vennootschap" established according to Dutch law
Registered at the Chamber of Commerce West-Brabant Breda, The Netherlands under
Trade register number 20052878
EORI: NL006147616
Our general conditions apply to this invoice which are available at our Chamber of Commerce

CERTIFIED ISO 9001

Page 1 of 26

FLOWSERVE

This is to Certify

PCM MANUFACTURING FRANCE SAS
RUE DE L'ANCIENNE GARE
49123 CHAMPTOCE-SUR-LOIRE
FRANCE

Certificate Date	October 31, 2024
Customer PO / Item No.	PO070-24-07869-line 2
Delivery No. / Item No.	W-004921
Sales Order / Item No.	400370175-line 100

Inspection Certificate

According EN 10204 3.1

Flowserve Material	C100033781
Material Description	Mechanical Seal, Single
Marking	10739779
Quantity	4

that attached is(are) the material certificate(s) for:

Description	Part Number	Marking	Heat Number	Page
SLEEVE 2507	C100036102	10737155	569598	2-11
DRIVE 2507	C100036102	10737155	568692	12-21
GLAND 2507	C100036104	10724702	293808	22-25

N van Dijk

Quality Assurance Department
QA030002RD

N.v.Dijk

Flowserve BV
Parallelweg 6, 4878 AH Etten-Leur
PO Box 25, 4870 AA Etten-Leur
The Netherlands
Tel: +31 (0)76 502 8200
www.flowserve.com

Flowserve B.V. is a "Besloten Vennootschap" established according to Dutch law
Registered at the Chamber of Commerce West-Brabant Breda, The Netherlands under
Trade register number 20052878
EORI: NL006147616
Our general conditions apply to this invoice which are available at our Chamber of Commerce

CERTIFIED ISO 9001

Langley Alloys Ltd
The Wharf
504-506 Lowfield Drive
Newcastle
Staffordshire
ST5 0UU

Tel: +44 (0)1782 610250
Email: sales@langleyalloys.com
Company No: 03059791
VAT No: GB 576 220 247

MATERIAL TEST CERTIFICATE No:DN071495-Z18109

ALLOY 2507

Customer Details	ZZ0205	Order Details	
Flowserve BV Parallelweg 6 PO Box 25, 4870 AA 4878 AH Etten-Leur The Netherlands		Date	**22/03/2024**
		Lot No	**Z18109**
		Cast / Heat No	**569598**
		Form	**S-DUPLEX 32750 3.1/2" Dia Machined Bar**

Conforming Specifications	**UNS S32750, ASTM A276-24 S32750, ASTM A479-21 S32750, NACE MR 0175/ ISO 15156-3:2015**

Works Order No. **SO199264** Cust Order No. **4500306043**

Item 1 1 Each LA0000733776 145.40 Kgs

Enclosures

Mill Certificate

The following results are actual values taken from tests carried out on a sample from this Lot

Chemical Analysis (WT%)

Element:	C	Si	Mn	P	S	Cr
Specification:	0.000 - 0.030	0.00 - 0.80	0.00 - 1.20	0.000 - 0.035	0.0000 - 0.0200	24.00 - 26.00
Actual:	0.017	0.30	0.76	0.018	<0.0005	24.87

Element:	Ni	Mo	W	Cu	N	Fe
Specification:	6.00 - 8.00	3.00 - 5.00		0.00 - 0.50	0.240 - 0.320	
Actual:	6.93	3.80		0.10	0.298	Balance

MELTED & MANUFACTURED BY AN ISO:9001 APPROVED BODY WITHIN WESTERN EUROPE
MELTING IS CARRIED OUT BY ELECTRIC ARC FURNACE
THIS MATERIAL HAS BEEN REFINED BY ARGON-OXYGEN DECARBURIZATION
THIS MATERIAL HAS BEEN REFINED BY LADLE REFINERY FURNACE
HOT ROLLED PEELED BAR, NO WELD REPAIR, NO MERCURY CONTAMINATION
THE MATERIAL SUPPLIED IS FREE FROM RADIOACTIVE CONTAMINATION

Certified that the whole of the supplies hereon has been inspected, tested and unless otherwise stated above conforms in all respects with their requirements of the contract or order. The quality control arrangements adopted in respect of these supplies have accorded with the conditions of our BS EN ISO 9001 approval.
This test certificate is issued in accordance with EN 10204:2004 3.1.

Signed Date 22/03/2024

Gary Wilson- Quality Manager *Certificate not valid without QA stamp*

LA 7

Mechanical Results

Tensile Strength Long	N/mm²	825.0	Rockwell C	HRC	24.0
0.2% Proof Stress	N/mm²	570.0	Pitting Resistance Equiv No.		42.2
Elongation 4D% (A4)	%	44.0			
Brinell Hardness	BHN	245	Diameter / Thickness	mm	88.90

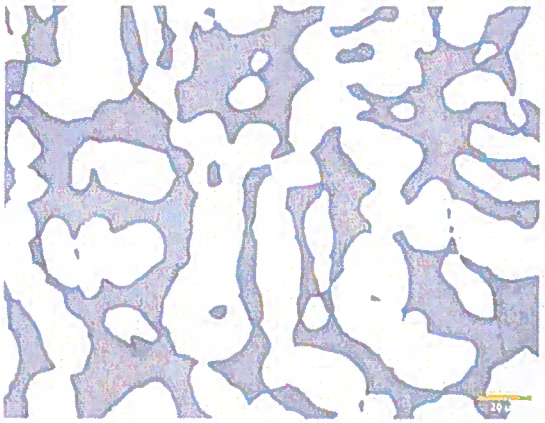
HEAT TREATMENT

Solution Treated followed by Water Quenching 1,100 °C 0.50 Hrs

ANCILLIARY TESTING

Ferrite Count ASTM E562	Ferrite content according to ASTM E562 43.50 %

PHOTOMICROGRAPH



Etched Photomicrograph
Magnification: X 500

Certified that the whole of the supplies hereon has been inspected, tested and unless otherwise stated above conforms in all respects with their requirements of the contract or order. The quality control arrangements adopted in respect of these supplies have accorded with the conditions of our BS EN ISO 9001 approval.
This test certificate is issued in accordance with EN 10204:2004 3.1.

Signed  Date 22/03/2024

Gary Wilson- Quality Manager *Certificate not valid without QA stamp*

LA 7

Alleima

CERTIFICATE

A03/Z02
No. A/23-174327 **Rev** 00
Date 2023-11-27 **Page** 1/5

Z18107

A02/Z03
INSPECTION CERTIFICATE acc to
EN 10204 3.1

INSPECTION STAMP
SVQ

A06
LANGLEY ALLOYS LTD UK DIRECT
THE WHARF 504-506 LOWFIELD DRIVE
ST5 0UU NEWCASTLE
UNITED KINGDOM

Customer References A07
PO299559
Customer order 2023-09-27

180-08965 LANGLEY DI

Alleima References A08
Order No. Subs No. Dispatch note
48369/53
Suppl. No C.Code
285-78763 03

Material description B01/B04
HOT WORKED STAINLESS BAR STEEL
ROLLED
ANNEALED & STRAIGHTENED
PEEL TURNED

Melt Source
ALLEIMA AB SWEDEN
Metallurgical process **Origin** C70
EAF+AOD+LRF Sweden

Steel/material Designations B02
Alleima **UNS**
SAF 2507+ S32750
EN no
1.4410

Technical requirements B03
ISO 17781:2017:QL1, Langley PS:SD3275:B Rev 9 + Alleima DDR,
EN10221:1996, EN10222-5:-2017*, PED 2014/68/EU,
NACE MR0175/ISO 15156-3:-2020, NACE MR0103/ISO 17945-1:-2015
ASTM A-479-23A, ASME SA-479-ED-21 SECT II PART A,
ASTM A-276-23, ASTM A-484-23A, ASTM A-182-23*, ASTM A-1049-18(2023)*,
ASTM A-314-19*, EN10272:-2016, EN10060:2003,
IOGP S-563:2018, NORSOK M-630:2020, NORSOK MDS D57 REV.6*
EN10088-3:-2014, *Please see the appendix.

EXTENT OF DELIVERY B07-B13

It	Product designation	Heat	Lot	Pieces	Kg
01	XMBR-SAF2507-31/2"	569598	87871	20	5460.0
			Total	20	5460.0

Heat **Recycled material(%)**
569598 Continuous casting 66.2

TEST RESULTS
Reduction ratio (times)
Lot
87871 14.2

Chemical composition (weight%)
Heat **PRE**
569598 42.2

Verified True Copy of Original Mill Cert
Z18109
Langley Alloys

Quality assurance - Erik Jansson/QA-manager Primary Products A05/Z02
MTC Service / Certificates

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
569598	0.017	0.30	0.76	0.018	<0.0005	24.87	6.93	3.80
	Cu	N						
569598	0.10	0.298						

Tensile test at room temperature acc. to ASTM A370/ISO 6892-1

Longitudinal

Location half radius

	Yield strength		Tensile strength	Elongation	
	Mpa	MPa	Mpa	%	%
Lot	Rp0.2	Rp1.0	Rm	A	2"
87871	570	648	825	44	44
	Red.of Area				
	%				
	Z				
	80				

Hardness test acc.to ASTM A-370/ISO 6506-1

Location half radius

Lot	HBW	HBW	HBW
87871	251	248	236

Hardness test acc. to ASTM E-10

Near Surface

Lot	HBW	HBW	HBW
87871	263	263	256

Impact test, J, Longitudinal acc. to ASTM A-370/ISO 148-1

Location half radius

	Single values			Avg.	Temperature
Lot	Joule			Joule	°C
87871	340	333	348	340	-50
	406	382	391	393	20

Lateral expansion

				Temperature
Lot	mm			°C
87871	2.14	1.50	2.20	-50
	2.21	2.24	2.10	20

Impact test, J, Transversal acc. to ASTM A-370

Location half radius

	Single values			Avg.	Temperature
Lot	Joule			Joule	°C
87871	218	207	219	215	-50
	SHEAR FRACTURE				
	%				
	60	60	60		

Lateral expansion

				Temperature
Lot	mm			°C
87871	1.61	1.51	1.38	-50

Corrosion test according to ASTM G-48A, 50°C for 24 hours.
In delivery condition. No pitting corrosion found at 20x enlargement.
Test location acc to NORSOK MDS D57

Lot	Specimen weight loss g/m2
87871	0.29

Ferrite acc to ASTM E-562
Tested at surface, half radius and center.
20 Fields and 25 Points per Field (*)

Lot	%
87871	46.4
	43.5
	44.7

Austenite Spacing
acc. to DNV-RP-F112 Section 7

Lot	mym
87871	10.6

Following controls/tests have been satisfactorily performed:
- Positive Material Identification (PMI)
- Ultrasonic testing (*)
- Visual inspection and dimensional control.

Melt Source
Heat 569598 ALLEIMA AB SWEDEN

HEAT TREATMENT:
Up to 74.9 mm: Batch furnace. Material soaking 1100°C, min. 30 minutes
Quenched in water. Water temp pre-quench max 38°C
after quench max 49°C, Transfer time furnace to quenching <150 seconds

75 - 180mm: Continuous heat treatment furnace. Material soaking 1090°C
min. 30 minutes. Alleima is using a continuous water spray quenching
process. Water temp pre-quench max 38°C, after quench max 49°C.
Transfer time furnace to quenching <60 seconds

All testing has been done acc. to ISO 17781

The raw material is free from radioactive contamination.

Microscopic Examination X 500 acc. to ASTM A 923 Method A/NORSOK M630
Free from grain boundary carbides and intermetallic phases.

Material free from mercury contamination.

No welding or weld repair.

NORSOK M-650 ED-4 QTR NO: 25 Cr Duplex SS

Certified acc. Pressure Equipment Directive (2014/68/EU Annex 1 para
4.3) TUEV CERT-Certification body for pressure equipment of the
TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the specifications and
requirements of the order.

The material is manufactured according to a Quality system, approved and registered to ISO 9001:2015.

No unauthorized alterations. The contents of this Inspection Certificate may not be modified or revised in any way without the prior written approval of Alleima.
Unauthorized alterations to the Inspection Certificate, including introduction of false, fictitious or fraudulent statements or entries, may be punishable by fines, imprisonment, or both. This Inspection Certificate may be copied only in the manner and for the purposes specified in Section 6 of EN 10204:2004. Contravention of this notice will be prosecuted to the fullest extent of applicable law.

The certificate is produced with EDP and valid without signature.

APPENDIX

Lab accreditation
Our lab is accredited under SWEDAC Accreditation number 1636 for testing as per ISO/IEC 17025.

Applicable only to specific dimensions
20mm - 160mm: EN 10088-5 EN (Only valid for CE marked products together with Alleima Declaration of Performance certificate).,
20mm - 160mm: PED 2014/68/EU, *EN 10272 (Stainless steel bars for pressure purposes).
20mm - 250mm: *EN 10222-5 (Chemical composition only)
20mm - 250mm: NORSOK M-630 - NORSOK MDS D57 (for length max 7500 mm)

Suitable for manufacturing of components in acc. with *ASTM A-182, (F53), ASTM A-1049, ASTM A-314.

Test location
Mechanical, ferrite testing:
Bar dim <=50 mm - Longitudinal test pieces in center of the bar.
Bar dim > 50 mm - 180 mm - Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface.
Bar dim > 100 mm - 180 mm - Transversal test piece, 1/4 T and minimum 100 mm from any second surface.

One set of test samples per heat treatment lot.
Maximum lot size 15 ton.

Micro: To ensure a sound, and unaffected structure all through the material three samples are taken, one close to surface, half radius, and in the center of the bar.

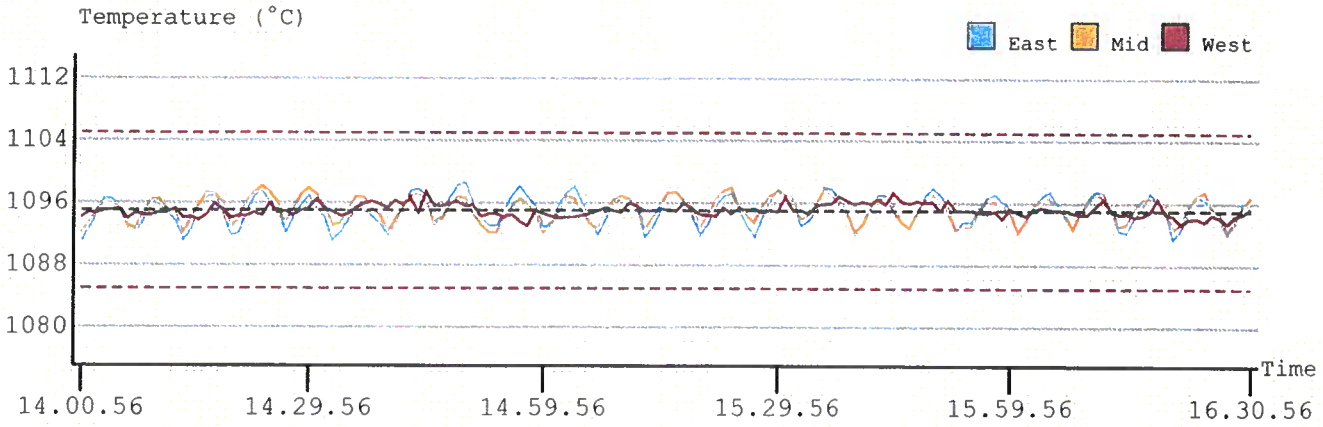
Furnace calibration every third month according to API 6A 21th Edition Annex M, Thermocouples of S-type (+/- 5°C tolerance) are used to monitor the Furnace temperature.

Ferrite Testing: Alleima ferrite testing per ASTM E-562 at 20 fields and 25 points, is fulfilling the requirements of ASTM E-562 testing at 30 fields and 16 points.

Ultrasonic test
Dim 29 - 74 mm: EN 10308 quality class 3
Dim 75 mm - : EN 10228-4, Tab 3 Scan coverage 1a 100%, Tab 5
Quality Class 3, ASTM A-388, API 6A PSL3/3G.

						Setpoints					
Work order	Num. of pieces	Dim (mm)	Weight (kg)	Steel Grade	Heat Number	Strategy	Zone 3 (°C)	Mtrl. temp. out furn. (°C)	Total time (mm)	Cooling time 1 (mm:ss)	Cooling time 2 (mm:ss)
87871	20	93.6	6200	2RD99	569598	60	1095	1090	151	1:30	1:50

Heating Temperature (°C) - Zone 3 - Soaking



Temperature after cooling (°C)



Alleima

NONDESTRUCTIVE TESTING
Inspection Report

Date	Customer	Specification	
2023-11-18	Langley Alloys Ltd	EN 10228-4, EN 10308, ASTM A388 and API 6A PSL 3/3G	
Alleima Order No	Grade	Procedure No.	Testpiece No.
	2RD99	72-4031	39415
Level 1 Operator Certified acc.: ISO 9712 and ASNT-SNT-TC-1A		Level 2 Technician Certified acc.: ISO 9712 and ASNT-SNT-TC-1A	
Performed by 17214 - Bällgren		Approved by 17658 - Pyykönen	

EQUIPMENTS

Apparatus EcoMAC FD4	Sorting	Marking	Alarm X	Recording X
Apparatus	Sorting	Marking	Alarm	Recording
Apparatus	Sorting	Marking	Alarm	Recording

Transducer Technisonic	Type ILD-0208-SP 2.25MHz/6"	Size 25,4 mm	Beam width mm	Focal length mm	Freq 2,25 MHz
Transducer	Type	Size mm	Beam width mm	Focal length mm	Freq MHz
Transducer	Type	Size mm	Beam width mm	Focal length mm	Freq MHz

EQUIPMENTS

	Contact	Rotation Speed of								
X	Immersion	X	Tube/Bar		Transducer	128,9 RPM	Pitch	44 mm/Rev	Testspeed	5,67 m/min

Scanning		Sensitivity/calibration	/testing
	Axial		/testing
	Longitudinal Defects, Two Way Search		
	Axial	Sensitivity/calibration	/testing
	Transverse Defects, Two Way Search		
		Sensitivity/calibration	/testing
	Axial Straight Beam		
		Sensitivity/calibration	/testing
X	Circumferential Straight Beam	FBH Ø 3,0 mm	100%
Couplant Water		Surface condition Peeled	
Note			

RESULT OF TESTING

Dim in mm	Lot No	Heat No	Number of tested tubes/bars	Accepted without report	Accepted with report	Not Accepted	Note
Ø 88,9	87871	569598	20	20			

Microstructure Examination Report

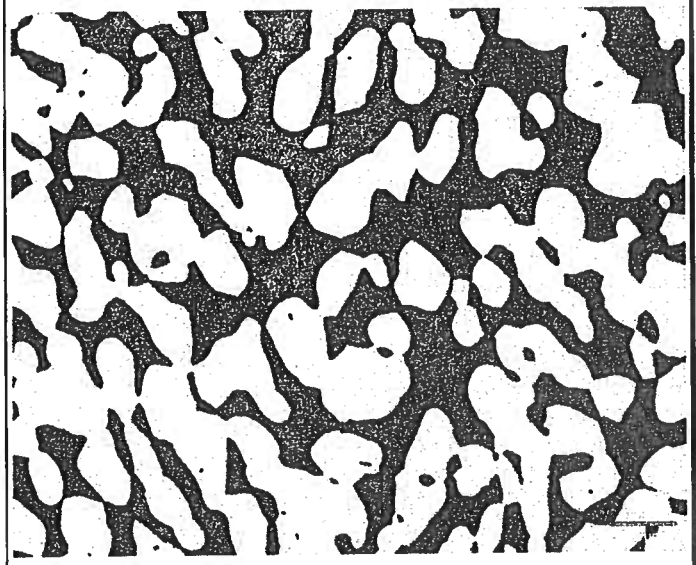
Material Information

Grade	SAF2507
Heat	569598
Lot	87871
Dim	88.90 x

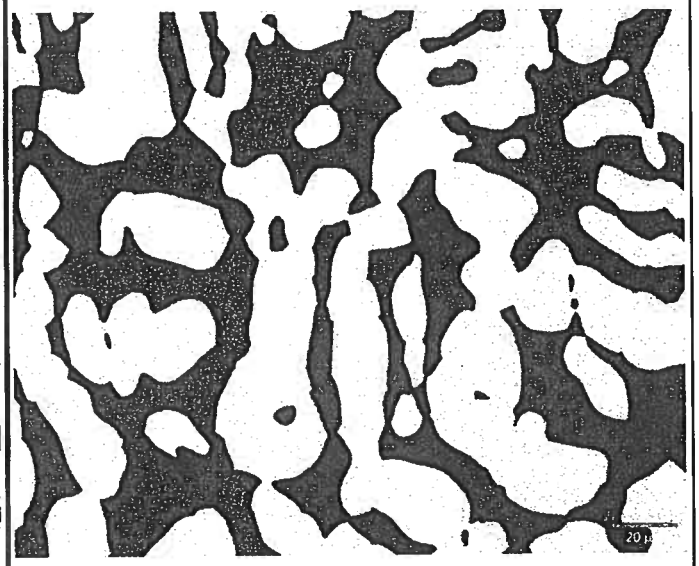
Technical Information

Certificate No.	A/23-174327
Test Date	2023-11-20
Etchant	NAOH
Test Result	OK

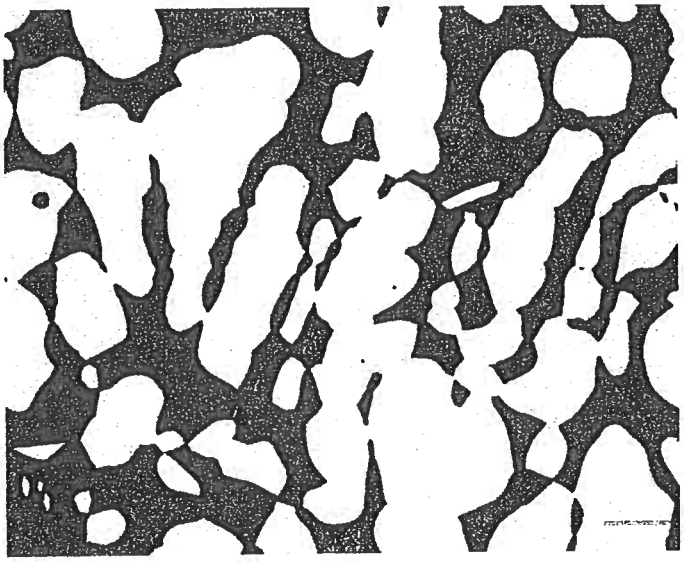
Test No: 12806 O	Magnification: 500x



Test No: 12807 R	Magnification: 500x



Test No: 12808 C	Magnification: 500x



STQD:Erik Dahlin (mtritech\ed17163)

Langley Alloys Ltd
The Wharf
504-506 Lowfield Drive
Newcastle
Staffordshire
ST5 0UU

Tel: +44 (0)1782 610250
Email: sales@langleyalloys.com
Company No: 03059791
VAT No: GB 576 220 247

MATERIAL TEST CERTIFICATE No:DN072830-Z17560

ALLOY 32760

Customer Details	ZZ0205	Order Details	
Flowserve BV Parallelweg 6 PO Box 25, 4870 AA 4878 AH Etten-Leur The Netherlands		Date	06/06/2024
		Lot No	Z17560
		Cast / Heat No	568692
		Form	S-DUPLEX 32760 3" Dia Machined Bar

Conforming Specifications	UNS S32760, ASTM A276-24 S32760, ASTM A479-21 S32760, BS EN 10088-3:2023 1.4501, NACE MR 0175/ ISO 15156-3:2015

Works Order No.	SO203232	Cust Order No.	PO 4500333980
Item 1	1 Each	LA0000749007	71.30 Kgs

Enclosures

Mill Certificate

The following results are actual values taken from tests carried out on a sample from this Lot

Chemical Analysis (WT%)

Element:	C	Si	P	S	Cr	Ni
Specification:	0.000 - 0.030	0.00 - 1.00	0.000 - 0.030	0.0000 - 0.0100	24.00 - 26.00	6.00 - 8.00
Actual:	0.011	0.35	0.021	<0.0005	25.27	6.82

Element:	Mo	W	Cu	N	Mn	Sn
Specification:	3.00 - 4.00	0.50 - 1.00	0.50 - 1.00	0.200 - 0.300	0.00 - 1.00	
Actual:	3.78	0.61	0.58	0.268	0.56	

Element:	Al	Pb	Fe
Specification:			
Actual:	0.016		Balance

MELTED & MANUFACTURED BY AN ISO:9001 APPROVED BODY WITHIN WESTERN EUROPE
MELTING IS CARRIED OUT BY ELECTRIC ARC FURNACE
THIS MATERIAL HAS BEEN REFINED BY ARGON-OXYGEN DECARBURIZATION
THIS MATERIAL HAS BEEN REFINED BY LADLE REFINERY FURNACE
HOT ROLLED PEELED BAR, NO WELD REPAIR, NO MERCURY CONTAMINATION
THE MATERIAL SUPPLIED IS FREE FROM RADIOACTIVE CONTAMINATION

Certified that the whole of the supplies hereon has been inspected, tested and unless other wise stated above conforms in all respects with their requirements of the contract or order.
The quality control arrangements adopted in respect of these supplies have accorded with the conditions of our BS EN ISO 9001 approval.
This test certificate is issued to the intent of EN 10204: 3.2. MTT Report 321491 refers. Inspection agency: TUV.

Signed  Date 06/06/2024

Gary Wilson- Quality Manager

Certificate not valid without QA stamp

LA 7

Mechanical Results

Diameter / Thickness	mm	76.20	Tensile Strength Long	N/mm²	809.0
Pitting Resistance Equiv No.		42.0	Elongation 4D% (A4)	%	42.0
PREN-W		43.0	Brinell Hardness	BHN	244
0.2% Proof Stress	N/mm²	584.0	Rockwell C	HRC	24.7

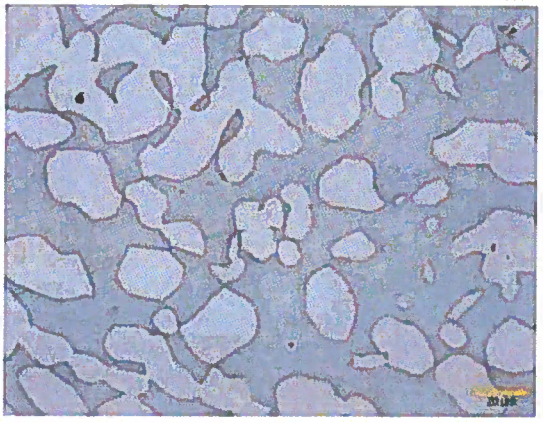
HEAT TREATMENT

Solution Treated followed by Water Quenching 1,100 °C 0.50 Hrs

ANCILLIARY TESTING

Ferrite Count ASTM E562	Ferrite content according to ASTM E562 43.22 %

PHOTOMICROGRAPH



Etched Photomicrograph
Magnification: X 500

Certified that the whole of the supplies hereon has been inspected, tested and unless other wise stated above conforms in all respects with their requirements of the contract or order.
The quality control arrangements adopted in respect of these supplies have accorded with the conditions of our BS EN ISO 9001 approval.
This test certificate is issued to the intent of EN 10204: 3.2. MTT Report 321491 refers. Inspection agency: TUV.

Signed  Date 06/06/2024

Gary Wilson- Quality Manager *Certificate not valid without QA stamp*

LA 7

Alleima

CERTIFICATE

A03/Z02
No. A/23-161974 **Rev 00**
Date 2023-07-18 **Page** 1/5

Z17560 4C

A02/Z03
INSPECTION CERTIFICATE acc to
EN 10204 3.1

INSPECTION STAMP
SVQ

A06
LANGLEY ALLOYS LTD UK DIRECT
THE WHARF 504-506 LOWFIELD DRIVE
ST5 0UU NEWCASTLE
UNITED KINGDOM

Customer References A07
PO290367

Customer order
2023-03-27

180-08965 LANGLEY DI

Alleima References A08

Order No.	Subs No.	Dispatch note
		45293/53
Suppl. No	**C.Code**	
285-73573	03	

Material description B01/B04
HOT WORKED STAINLESS BAR STEEL
ROLLED
ANNEALED & STRAIGHTENED
PEEL TURNED

Melt Source
ALLEIMA AB SWEDEN

Metallurgical process	**Origin** C70
EAF+AOD+LRF	Sweden

Steel/material Designations B02

Alleima	**UNS**
SAF 32760+	S32760

EN no
1.4501

Technical requirements B03
Langley PS:SD3276:B Rev.10 + Alleima DDR
EN 10088-3:-2014, EN10272:-2016*, EN10060:2003, EN 10221:1996
EN10222-5:-2017*, PED 2014/68/EU, ISO 17781:2017:QL1,IOGP S-563:2018
NACE MR0175/ISO 15156-3:-2020, NACE MR0103/ISO 17945-1:-2015
ASTM A-276-17, ASME SA-276-ED-21 SECT II PART A,
ASTM A-479-23A, ASME SA-479-ED-21 SECT II PART A,
ASTM A-484-23, ASTM A-182-23*, ASTM A-1049-18(2023)*, ASTM A-314-19*,
NORSOK M-630:2020, NORSOK MDS D57 REV. 6*, *Please see the appendix

EXTENT OF DELIVERY B07-B13

It	Product designation	Heat	Lot	Pieces	Kg
05	XMBR-SAF32760+-3	568692	60191	32	6815.0
			Total	32	6815.0

Heat		**Recycled material (%)**
568692	Continuous casting	74.6

TEST RESULTS
Reduction ratio (times)

Lot	
60191	17.0

Chemical composition (weight%) acc. to ASTM A-751

Heat	**PRE**	**PRE2 + W**
568692	42.0	43.0

Verified True Copy
Z17560
Langley Alloys
of Original Mill Cert

Quality assurance - Erik Jansson/QA-manager Primary Products A05/Z02
MTC Service / Certificates

Chemical composition (weight%)

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
568692	0.011	0.35	0.56	0.021	<0.0005	25.27	6.82	3.78
	W	Co	V	Ti	Cu	Al	Nb	B
568692	0.61	0.081	0.060	0.003	0.58	0.016	0.01	0.0024
	O	N						
568692	0.0040	0.268						

Tensile test at room temperature acc to ASTM A-370

Longitudinal

Location half radius

	Yield strength		Tensile strength	Elongation	
	Mpa	MPa	Mpa	%	%
Lot	Rp0.2	Rp1.0	Rm	A	2"
60191	581	674	822	41	41

Red.of Area
%
Z
74

Hardness test acc. to ASTM E-10

Location half radius

Lot	HRC	HRC	HRC
60191	24	25	25

Near Surface

Lot	HRC	HRC	HRC
60191	24	25	24

Impact test, J, Longitudinal acc. to ASTM A-370/ISO 148-1

Location half radius

	Single values			Avg.	Temperature
Lot	Joule			Joule	°C
60191	311	303	313	309	-50
	298	303	306	302	20

Lateral expansion

				Temperature
Lot	mm			°C
60191	2.03	1.97	2.05	-50

Impact test, J, Transversal acc. to ASTM A-370

Location half radius

	Single values			Avg.	Temperature
Lot	Joule			Joule	°C
60191	200	203	207	203	-50

SHEAR FRACTURE		
%		
60	60	60

Lateral expansion

				Temperature
Lot	mm			°C
60191	1.68	1.69	1.73	-50

Corrosion test according to ASTM G-48A, 50°C +/-1°C for 24 hours.
In delivery condition. No pitting corrosion found at 20x enlargement.
Test location acc to NORSOK MDS D57

Lot	Specimen weight loss g/m2
60191	0.00

Ferrite acc to ASTM E-562
Tested at surface, half radius and center.
20 Fields and 25 Points per Field (*)

Lot	%
60191	44.5
	50.1
	53.5

Austenite Spacing
acc. to DNV-RP-F112 Section 7

Lot	mym
60191	21.0

Following controls/tests have been satisfactorily performed:
- Material Identification.
- Ultrasonic testing (*)
- Visual inspection and dimensional control.

Melt Source
Heat 568692 ALLEIMA AB SWEDEN

HEAT TREATMENT:
Up to 74.9 mm: Batch furnace. Material soaking 1100°C,
min. 30 minutes. Quenched in water. Water temp. pre-quench max 38°C,
after quench max 49°C.
Transfer time furnace to quenching <150 seconds.

75 - 180mm: Continuous heat treatment furnace. Material
soaking 1090°C, min. 30 minutes. Alleima is using a continuous water
spray quenching process. Water temp pre-quench max 38°C,
after quench max 49°C. Transfer time furnace to quenching
<60 seconds.

>180 - 250mm: Batch furnace. Material soaking 1100°C,
min. 60 minutes. Quenched in water. Water temp pre-quench max 38°C,
after quench max 49°C.
Transfer time furnace to quenching <150 seconds.

The raw material is free from radioactive contamination.

Microscopic Examination X 500 acc. to ASTM A 923 Method A/NORSOK M630
Free from grain boundary carbides and intermetallic phases.

Material free from mercury contamination.

No welding or weld repair.

Certified acc. Pressure Equipment Directive (2014/68/EU Annex 1 para
4.3) TUEV CERT-Certification body for pressure equipment of the
TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the specifications and requirements of the order.

The material is manufactured according to a Quality system, approved and registered to ISO 9001:2015.

No unauthorized alterations. The contents of this Inspection Certificate may not be modified or revised in any way without the prior written approval of Alleima.
Unauthorized alterations to the Inspection Certificate, including introduction of false, fictitious or fraudulent statements or entries, may be punishable by fines, imprisonment, or both. This Inspection Certificate may be copied only in the manner and for the purposes specified in Section 6 of EN 10204:2004. Contravention of this notice will be prosecuted to the fullest extent of applicable law.

The certificate is produced with EDP and valid without signature.

ADDITIONAL INFORMATION

Lab accreditation
Our lab is accredited under SWEDAC Accreditation number 1636 for testing as per ISO/IEC 17025

Applicable only to specific dimensions
12,5mm - 160mm: EN 10088-5 EN (Only valid for CE marked products together with Alleima Declaration of Performance certificate).
12,5mm - 160mm: PED 2014/68/EU EN 10272 (Stainless steel bars for pressure purposes)
12,5mm - 250mm: EN 10222-5 (Chemical composition only)
12,5mm - 180mm: NORSOK M-630 - NORSOK MDS D57 (for length max 7500 mm)

Suitable for manufacturing of components in acc, with ASTM A-182 (F55), ASTM A-1049 & ASTM A-314.

Test location
Mechanical, ferrite testing:
Bar dim < 50 mm - Longitudinal test pieces in center of the bar.
Bar dim > 50mm & < 100 mm - Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface.
Bar dim > 100 mm & < 250 mm - Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface. Transversal test pieces, 1/4 T and minimum 100 mm from any second surface.

One set of test samples per heat treatment lot.
Maximum lot size 15 ton.

Micro: To ensure a sound, and unaffected structure all through the material three samples are taken, one close to surface, half radius, and in the center of the bar.

Furnace calibration every third month according to API 6A 21th Edition Annex M, Thermocouples of S-type (+/- 5°C tolerance) are used to monitor the Furnace temperature.

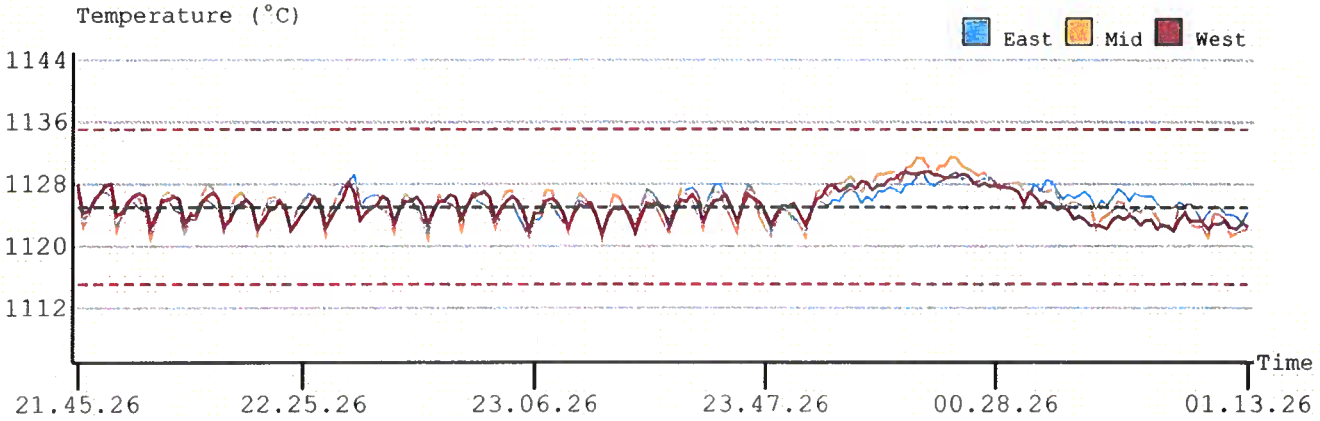
Ferrite Testing: Alleima ferrite testing per ASTM E-562 at 20 fields and 25 points, is fulfilling the requirements of ASTM E-562 testing at 30 fields and 16 points.

Ultrasonic test
Dim 29 - 74 mm: EN 10308 quality class 3
Dim 75 mm - : EN 10228-4, Tab 3 Scan coverage 1a 100%, Tab 5 Quality Class 3, ASTM A-388, API 6A PSL3/3G.

Alleima, formerly Sandvik Materials Technology. During a brand transition period, both Sandvik and Alleima marking on products may exist.

						Setpoints					
Work order	Num. of pieces	Dim (mm)	Weight (kg)	Steel Grade	Heat Number	Strategy	Zone 3 (°C)	Mtrl. temp. out furn. (°C)	Total time (mm)	Cooling time 1 (mm:ss)	Cooling time 2 (mm:ss)
60191	32	85.4	8640	2RDKW99	568692	80	1125	1115	209	1:15	1:35

Heating Temperature (°C) - Zone 3 - Soaking



Temperature after cooling (°C)



Alleima

NONDESTRUCTIVE TESTING
Inspection Report

Date	Customer		Specification	
2023-06-25	Langley Alloys Ltd		EN 10228-4, EN 10308, ASTM A388 and API 6A PSL 3/3G	
Alleima Order No		Grade	Procedure No.	Testpiece No.
		2RDKW99	72-4031	35809
Level 1 Operator Certified acc.: ISO 9712 and ASNT-SNT-TC-1A			Level 2 Technician Certified acc.: ISO 9712 and ASNT-SNT-TC-1A	
Performed by 72223 - Danielzon			Approved by 17658 - Pyykönen	

EQUIPMENTS

Apparatus EcoMAC FD4	Sorting	Marking	Alarm X	Recording X
Apparatus	Sorting	Marking	Alarm	Recording
Apparatus	Sorting	Marking	Alarm	Recording

Transducer Technisonic	Type ILD-0208-SP 2.25MHz/6"	Size 25,4 mm	Beam width mm	Focal length mm	Freq 2,25 MHz
Transducer	Type	Size mm	Beam width mm	Focal length mm	Freq MHz
Transducer	Type	Size mm	Beam width mm	Focal length mm	Freq MHz

EQUIPMENTS

	Contact	Rotation Speed of								
X	Immersion	X	Tube/Bar		Transducer	150,4	RPM	Pitch 44	mm/Rev	Testspeed 6,62 m/min

Scanning		Sensitivity/calibration	/testing
	Axial		/testing
	Longitudinal Defects, Two Way Search		
	Axial	Sensitivity/calibration	/testing
	Transverse Defects, Two Way Search		
		Sensitivity/calibration	/testing
	Axial Straight Beam		
		Sensitivity/calibration	/testing
X	Circumferential Straight Beam	FBH Ø 3,0 mm	100%
Couplant Water		Surface condition Peeled	
Note			

RESULT OF TESTING

Dim in mm	Lot No	Heat No	Number of tested tubes/bars	Accepted without report	Accepted with report	Not Accepted	Note
Ø 76,2	60191	568692	32	32			

Microstructure Examination Report

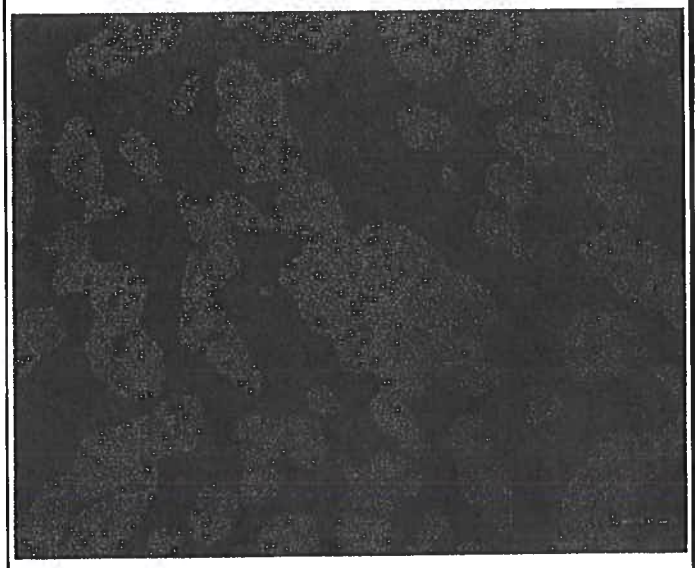
Material Information

Grade	SAF32760+
Heat	568692
Lot	60191
Dim	76.20 x

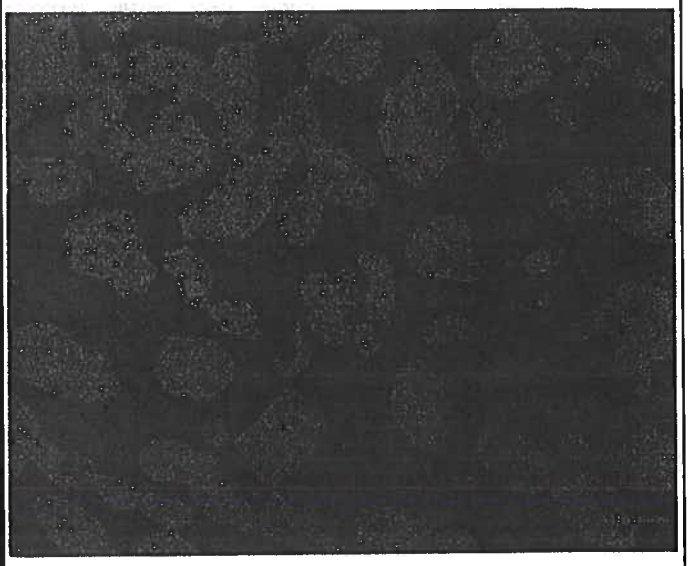
Technical Information

Certificate No.	A/23-161974
Test Date	2023-07-04
Etchant	NAOH
Test Result	OK

Test No: 382 O	Magnification: 500X



Test No: 383 R	Magnification: 500X



Test No: 384 C	Magnification: 500X



STQD:Toni Norling (mtrltech\TN17940)

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i. Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37 Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION - CERTIFICADO DE INSPECCIÓN

In conformità a / Nach/According to/Selon/De conformidad con: EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1

Certificato nr. / Prüfung/Test/Essai/Num. de certificado: MEST095084 / 2024 /

Cliente / Besteller/Purchaser/Client/Cliente:
VALBRUNA CENTRAL EUROPE S.R.O.
LIBUSINA 342/97
77900 - OLOMOUC - CZECH REPUBLIC - CZ

Ordine nr. / Bestell / Your order / Commande / Num. de pedido: PO23001238-JC

Conferma ordine nr. / Werks/Our Order/Ref nr. / Num. de confirmación de pedido: EI23005998

Avviso di Spedizione / Lieferanzeige/Packing list/B.L. / Aviso de embarque: D-VI24016728

Stato di fornitura / Lieferzustand / Delivery state / Etat de livraison / Estado de la entrega: Forged Annealed - Peeled

Tipo di Elaborazione / Erschmelzungsart / Melting process / Mode d'elaboration / Método de fusión: E+AOD

JAKOST: 0646

Qualità / Werkstoff/Grade/Nuance / Calidad: 1.4410/S32750/F53

Marca / Markenbezeichnung / Brand / Nuance / Marca: V257M

Produttore / Hersteller/Item/Usine productrice/Productor:
ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica / Zeichen des Liefernwerkes / Trade marks / Sigles de l'usine productrice / Marcas de fábrica: AV

Punzone del Collaudatore / Stempel des Werkssachverständigen / Inspector's stamp/Poinçon de l'assayeur / Sello del Comprobador: MR

Punzonatura / Kennzeichnung / Marking / Marquage / Sello: 1.4410/S32750/F53

SPECIFICHE : / Anforderungen / Requirements / Exigences / Especificaciones

VAL STOCK A 1.4410/F53 A
MDS D57 5. S32750 A (0)
ASME SA182 2017 S32750 A (1)
ASME SA479 2023 S32750 A (2)
ASTM A182 2021 S32750 A (3)
ASTM A276 2024A S32750 A
ASTM A370 2022 .
ASTM A479 2023A S32750 A
ASTM E562 2019 . (4)
ASTM G48 2011 METHOD A (5)
EN 10088 PART 3 2014 1.4410
EN 10272 2016. 1.4410
ISO 148-1 2016 .
ISO 6892-1 2019 .
NACE MR0103 2015 S32750 A (6)
NACE MR0175 2015 S32750 A (7)

Note: / Aufzeichnungen / Notes / Notes / Notas

(0)Norsok-standard M-630 Edition 6, October 2013 Approval Norsok-standard M-650 Edition 4, September 2011 QTR N°58/A for forged bars and N°57/A for hot rolled bars.
(1)Section II Part A 2017 EDITION For products machined directly from bar refer to ASME SA479.
(2)Section II Part A 2023 EDITION
(3)For products machined directly from bar refer also to ASTM A479.
(4)19E01
(5)11R15
(6)ANSI/NACE MR0103/ISO 17945 November 23, 2015
(7)ANSI/NACE MR0175/ISO 15156-3, second edition 2009-10-15 Technical circular 1:2011 Published 2011-06-14

Pos. nr. / Pos. nr. / Item nr. / Nr. de poste / Número de artículo	Oggetto / Gegenstand / Product description / Descrip. du produit / Descripción del producto	Tolleranza: k12 (Toleranz/Allowance/Tolerance/Tolerancia) Dimensioni - mm / Abmessungen / Dimension / Dimension / Dimensiones	Lunghezza - mm / Lange / Length / Longueur / Longitud	Colata / Schmelze / Heat / Coulée / Colada	Pezzi / Stückzahl / Pieces / Pieces / Piezas	Peso - KG / Gewicht / Weight / Poids / Peso	Lotto nr. / Losnr. / Lot nr. / Lot nr. / Lote nro.
0010	Round	160,000	4592/ 4592	293808	1	722,0	320006220

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER ACCORDING TO ISO 9001 : 2015, IATF 16949 : 2016, AS 9100D

Vicenza, 16/07/2024
VCQ008 - MEST095084

Direzione Qualità / Qualitätsmanagement/Quality Management/Gestion Qualité/Gerente de calidad
R.BERTELLI

Direzione Prodotto / Produktmanagement/Product Management/Direction Produit/Gerente de producto
P.MESSORI

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i. Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37 Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION - CERTIFICADO DE INSPECCIÓN

In conformità a / Nach/According to/Selon/De conformidad con: EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1

Certificato nr. / Prüfung/Test/Essai/Num. de certificado: MEST095084 / 2024 /

Cliente / Besteller/Purchaser/Client/Cliente:
VALBRUNA CENTRAL EUROPE S.R.O.
LIBUSINA 342/97
77900 - OLOMOUC - CZECH REPUBLIC - CZ

Ordine nr: PO23001238-JC
Bestell / Your order / Commande / Num. de pedido

Conferma ordine nr: EI23005998
Werks/Our Order/Ref nr. / Num. de confirmación de pedido

Avviso di Spedizione: D-VI24016728
Lieferanzeige/Packing list/B.L. / Aviso de embarque

Stato di fornitura: Forged Annealed - Peeled
Lieferzustand / Delivery state / Etat de livraison / Estado de la entrega

Tipo di Elaborazione: E+AOD
Erschmelzungsart / Melting process / Mode d'elaboration / Método de fusión

Qualità: 1.4410/S32750/F53
Werkstoff/Grade/Nuance / Calidad

Marca: V257M
Markenbezeichnung / Brand / Nuance / Marca

Produttore / Hersteller/Item/Usine productrice/Productor:
ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica: AV
Zeichen des Liefernwerkes / Trade marks / Sigles de l'usine productrice / Marcas de fábrica

Punzone del Collaudatore: MR
Stempel des Werkssachverständigen / Inspector`s stamp/Poinçon de l`assayeur / Sello del Comprobador

Punzonatura: 1.4410/S32750/F53
Kennzeichnung / Marking / Marquage / Sello

TEST ALLO STATO DI FORNITURA

Test on delivery condition — Prüefung auf lieferbereitem produkt — test a l'etat de fourniture — Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab (Specimen/Eprouvette Larg.diam Spess. / Breite Diam. Dicke / Width Diam. Thickness / Larg. diam. epais / mm / Probeta)	°C	Posiz. Saggio (Probentage / Location / Emplacement / Ubicación 1))	Snervamento (Streckgrenze/Yield Stress / Limite elastique / Limite elástico) Rp 0,2% N/mm2	Snervamento (Streckgrenze/Yield Stress / Limite elastique / Limite elástico)	Resistenza (Zugfestigkeit/Tensile strengt / Resistance à traction / Resistencia a la tracción) Rm N/mm2	Allungamento (Bruchdehnung / Elongation / Allongement / Elongación) A5 %		Strizione (Einschnürung / Reduction of area / Striction / Reducción de área) Z %		Resilienza (Kerbschlagarbeit / Impact Value/ Resilience / Prueba de impacto)			Durezza (Haerte / Hardness / Durete / Dureza) HB		
Valori richiesti (Anforderungen/Required values / Valeurs démandées / Valores requeridos)		min / max		530	-	730 / 930	25	-	-	-	-			-	290		
A	10	20	L	551		799	41		75					252			

Test On Delivering Condition

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	HRc		32,0	22,3

TEST ALLO STATO DI FORNITURA

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	Delta Ferrite	35,0	55,0	37,0 %

Charpy per ASTM E23

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab (Specimen/Eprouvette Larg.diam Spess. / Breite Diam. Dicke / Width Diam. Thickness / Larg. diam. epais / mm / Probeta)	°C	Posiz. Saggio (Probentage / Location / Emplacement / Ubicación 1))	Resilienza (Kerbschlagarbeit / Impact Value / Resilience / Prueba de impacto) KV2 J			Espansione laterale (Lateral Expansion) -			Shear (Shear) -		
Valori richiesti (Anforderungen/Required values / Valeurs démandées / Valores requeridos)		min / max		45	45	45	-	-	-	-	-	-
B	10X10	-46	L	119	89	123						

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab (Specimen/Eprouvette Larg.diam Spess. / Breite Diam. Dicke / Width Diam. Thickness / Larg. diam. epais / mm / Probeta)	°C	Posiz. Saggio (Probentage / Location / Emplacement / Ubicación 1))	Snervamento (Streckgrenze/Yield Stress / Limite elastique / Limite elástico) Rp 0,2% N/mm2	Snervamento (Streckgrenze/Yield Stress / Limite elastique / Limite elástico)	Resistenza (Zugfestigkeit/Tensile strengt / Resistance à traction / Resistencia a la tracción) Rm N/mm2	Allungamento (Bruchdehnung / Elongation / Allongement / Elongación) E 4d %		Strizione (Einschnürung / Reduction of area / Striction / Reducción de área) RA %		Resilienza (Kerbschlagarbeit / Impact Value/ Resilience / Prueba de impacto)			Durezza (Haerte / Hardness / Durete / Dureza) HB		
Valori richiesti (Anforderungen/Required values / Valeurs démandées / Valores requeridos)		min / max		550	-	760	-	25	-	-				-	310		
C	12,5	20	L	550		796		43		71				250			

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i. Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37 Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION - CERTIFICADO DE INSPECCIÓN

In conformità a / Nach/According to/Selon/De conformidad con: EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1

Certificato nr. / Prüfung/Test/Essai/Num. de certificado: MEST095084 / 2024 /

Cliente / Besteller/Purchaser/Client/Cliente:
VALBRUNA CENTRAL EUROPE S.R.O.
LIBUSINA 342/97
77900 - OLOMOUC - CZECH REPUBLIC - CZ

Ordine nr. / Bestell / Your order / Commande / Num. de pedido: PO23001238-JC

Conferma ordine nr. / Werks/Our Order/Ref nr. / Num. de confirmación de pedido: EI23005998

Avviso di Spedizione / Lieferanzeige/Packing list/B.L. / Aviso de embarque: D-VI24016728

Stato di fornitura / Lieferzustand / Delivery state / Etat de livraison / Estado de la entrega: Forged Annealed - Peeled

Tipo di Elaborazione / Erschmelzungsart / Melting process / Mode d'elaboration / Método de fusión: E+AOD

Qualità / Werkstoff/Grade/Nuance / Calidad: 1.4410/S32750/F53

Marca / Markenbezeichnung / Brand / Nuance / Marca: V257M

Produttore / Hersteller/Item/Usine productrice/Productor:
ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica / Zeichen des Liefernwerkes / Trade marks / Sigles de l'usine productrice / Marcas de fábrica: AV

Punzone del Collaudatore / Stempel des Werkssachverständigen / Inspector's stamp/Poinçon de l'assayeur / Sello del Comprobador: MR

Punzonatura / Kennzeichnung / Marking / Marquage / Sello: 1.4410/S32750/F53

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm / Probeta	°C	Posiz. Saggio Probenlage Location Emplacement Ubicación 1)	Snervamento Streckgrenze/Yield Stress Limite elastique Limite elástico Rp 0,2% N/mm2	Snervamento Streckgrenze/Yield Stress Limite elastique Limite elástico	Resistenza Zugfestigkeit/Tensile strength Resistance à traction Resistencia a la tracción Rm N/mm2	Allungamento Bruchdehnung Elongation Allongement / Elongación E 4d %		Strizione Einschnurung Reduction of area Striction / Reducción de área RA %		Resilienza Kerbschlagarbeit Impact Value/ Resilience Prueba de impacto			Durezza Haerte Hardness Durete / Dureza HB		
Valori richiesti Anforderungen/Required values Valeurs démandées / Valores requeridos		min max		550	-	760	-	25	-	-	-			-	310	
D	12.5	20	T	557		799		36		61				253		

Charpy per ASTM E23

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm / Probeta	°C	Posiz. Saggio Probenlage Location Emplacement Ubicación 1)	Resilienza Kerbschlagarbeit Impact Value Resilience / Prueba de impacto KV2 J			Espansione laterale Lateral Expansion			Shear Shear		
Valori richiesti Anforderungen/Required values Valeurs démandées / Valores requeridos		min max		45	45	45	-	-	-	-	-	-
E	10X10	-46	T	45	46	47						

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm / Probeta	°C	Posiz. Saggio Probenlage Location Emplacement Ubicación 1)	Resilienza Kerbschlagarbeit Impact Value Resilience / Prueba de impacto KV2 J			Espansione laterale Lateral Expansion			Shear Shear		
Valori richiesti Anforderungen/Required values Valeurs démandées / Valores requeridos		min max		100	100	100	-	-	-	-	-	-
H	10X10	20	L	369	360	359						

Mechanical properties according to ASTM A370.

Ferrite content tested according to ASTM E562.

Impact testing according to ISO 148-1

Tensile testing according to ISO 6892-1

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique/Análisis químico

Colata/Heat/Coulée, Schmelze/Colada	min	41,0	-	-	-	24,00	3,00	-	6,00	-	-	-	0,24	-	-	-
	max	45,0	0,030	0,80	1,20	26,00	4,50	0,50	8,00	-	0,035	0,015	0,32	-	-	-
	PRE		C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	W %	P %	S %	N %			
293808	42,5		0,019	0,32	0,68	25,18	3,80	0,30	7,03	0,035	0,025	0,001	0,30			

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER ACCORDING TO ISO 9001 : 2015, IATF 16949 : 2016, AS 9100D

Vicenza, 16/07/2024

VCQ008 - MEST095084

Direzione Qualità / Qualitätsmanagement/Quality Management/Gestion Qualité/Gerente de calidad: R.BERTELLI

Direzione Prodotto / Produktmanagement/Product Management/Direction Produit/Gerente de producto: P.MESSORI

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i. Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37 Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION - CERTIFICADO DE INSPECCIÓN

In conformità a / Nach/According to/Selon/De conformidad con: EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1

Certificato nr. / Prüfung/Test/Essai/Num. de certificado: MEST095084 / 2024 /

Cliente / Besteller/Purchaser/Client/Cliente:
VALBRUNA CENTRAL EUROPE S.R.O.
LIBUSINA 342/97
77900 - OLOMOUC - CZECH REPUBLIC - CZ

Ordine nr. / Bestell / Your order / Commande / Num. de pedido: PO23001238-JC

Conferma ordine nr. / Werks/Our Order/Ref nr. / Num. de confirmación de pedido: EI23005998

Avviso di Spedizione / Lieferanzeige/Packing list/B.L. / Aviso de embarque: D-VI24016728

Stato di fornitura / Lieferzustand / Delivery state / Etat de livraison / Estado de la entrega: Forged Annealed - Peeled

Tipo di Elaborazione / Erschmelzungsart / Melting process / Mode d'elaboration / Método de fusión: E+AOD

Qualità / Werkstoff/Grade/Nuance / Calidad: 1.4410/S32750/F53

Marca / Markenbezeichnung / Brand / Nuance / Marca: V257M

Produttore / Hersteller/Item/Usine productrice/Productor:
ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica / Zeichen des Liefernwerkes / Trade marks / Sigles de l'usine productrice / Marcas de fábrica: AV

Punzone del Collaudatore / Stempel des Werkssachverständigen / Inspector's stamp/Poinçon de l'assayeur / Sello del Comprobador: MR

Punzonatura / Kennzeichnung / Marking / Marquage / Sello: 1.4410/S32750/F53

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	**SATISFACTORY**

Corrosion test per ASTM G48 PRACTICE A (50°C/24h):
no pitting at 20x magnification.
Material is free from intermetallic phases and precipitates.
Reduction ratio = 14,1 : 1
Solution annealed 1080°C for 5,5 h /water cooled.
SURFACE QUALITY GUARANTEE BY ET INSPECTION (max defect depth 1% DIAMETER)
UT ACC. TO ASTM A388

Corrosion test in ferric chloride solutions

Test standard: ASTM G48 method A [50C/24h]

Pickling	Test	Length of Period [h]	Test temp [°C]	corrosion rate [g/m²]		
				min	max	
5' at 60°C (20% HNO3 + 5% HF)	Pitting corrosion	24	50		4,0000	0,5100

NOTES

No pitting at 20 x magnification

Sono state soddisfatte tutte le condizioni richieste / Die gestellen Anforderungen sind it. Anlage erfüllt / The material has been furnished in accordance with the requirements / Le materiel à eté trouvé conforme aux exigences / El material cumple de acuerdo a los requisitos

Controllo antimescolanza con tecnica XRF/OES portatile : OK / Verwechslungprüfung: durch XRF/QES Gerät geführt : OK / Antimixing testing performed with XRF/OES portable : OK / Contrôle antimélange svt technique XRF/OES portable : OK / Prueba de anti mezcla con técnica XRF/OES portátil: OK

Controllo visivo e dimensionale: soddisfa le esigenze / Besichtigung und Ausmessung: ohne Beanstandung / Visual inspection and dimensional checks:satisfactory / Contrôle visuel et dimensions: satisfaisant / Inspección visual y dimensional: cumple los requisitos

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according to Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
The Quality Management System is also Certified according to PER 2016/1105, Schedule 2, Part 4, Para 31 (8) by Competent Body TÜV SUD BABT Unlimited.
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.
Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.
The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSPAC6C30DA62FBE1DA630C662E80DEDCB7

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER ACCORDING TO ISO 9001 : 2015, IATF 16949 : 2016, AS 9100D

Vicenza, 16/07/2024 VCQ008 - MEST095084	**Direzione Qualità** Qualitätsmanagement/Quality Management/Gestion Qualité/Gerente de calidad **R.BERTELLI**	**Direzione Prodotto** Produktmanagement/Product Management/Direction Produit/Gerente de producto **P.MESSORI**	Pagina 4 di 4

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

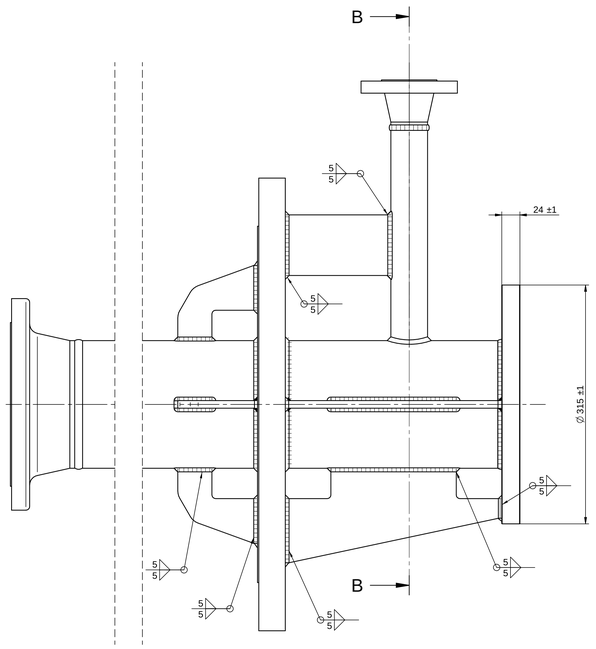
Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

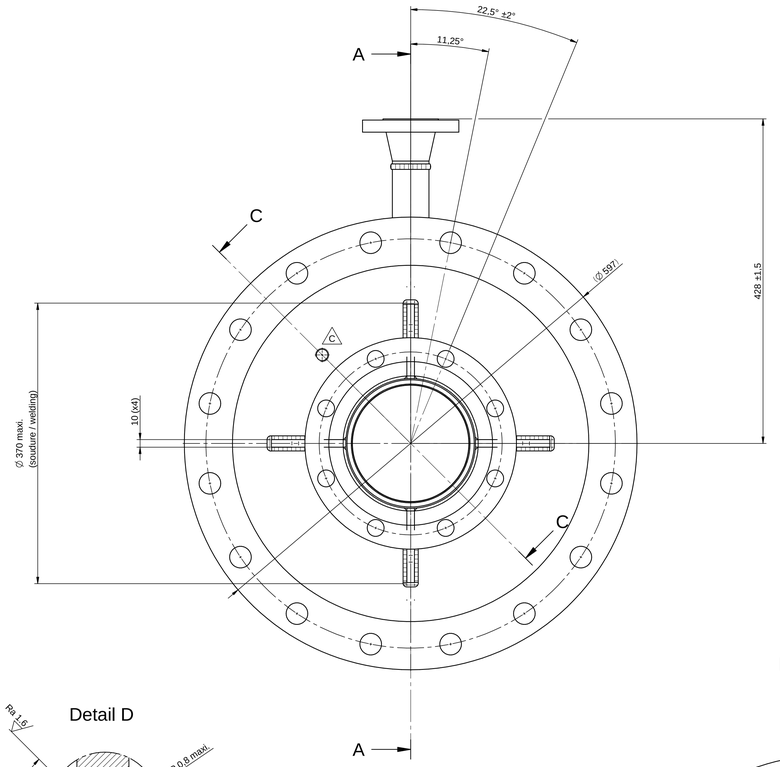
A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

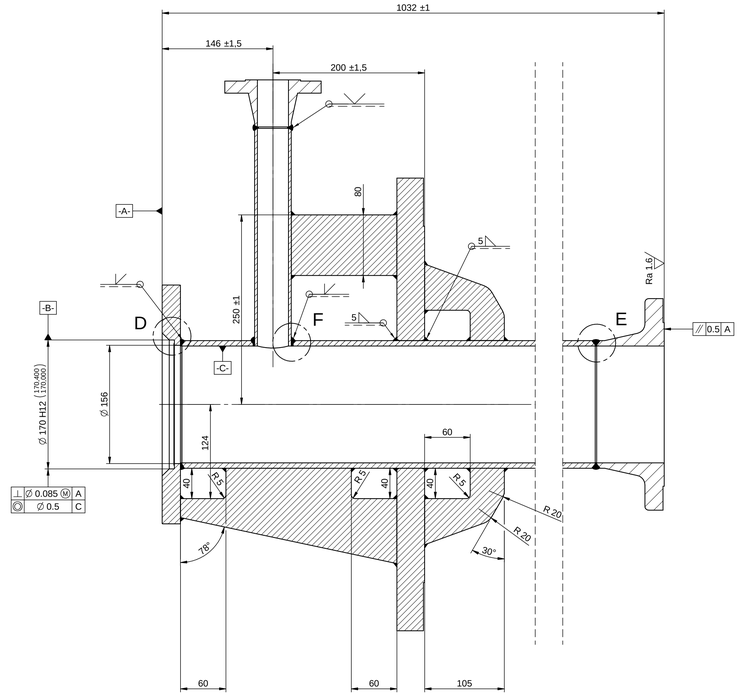
Item
#50
Description
BODY 6IN AV7
PCM Reference
W-008202257WP

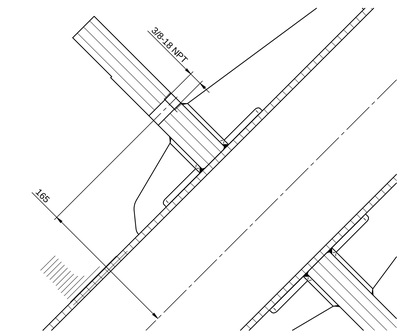
PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

SRCI & P2MI	**Traçabilité Matière -** *Material Traceability* ***Affaire PO070-24-07599***			**Ref SRCI : 24121-02**
PLAN DRAWING	**DESIGNATION**	**MATIERE MATERIAL**	**N° COULEE HEAT N°**	**REP**
W-008202-C	Thickness 30mm	SUPERDUPLEX	F1219	**4**
W-008202-C	Pipe 6" SCH40S	SUPERDUPLEX	60418	**3**
W-008202-C	Flange 6" 150# WN RF - SCH40S	SUPERDUPLEX	E161501 / E141482 555083	**1** **2**
W-008202-C	Pipe 1" 1/2 SCH40S	SUPERDUPLEX	567797	**5**
W-008202-C	Flange 1" 1/2 150# WN RF - SCH40S	SUPERDUPLEX	563544	**6**
W-008202-C	Blind flange 1" 1/2 150# RF	SUPERDUPLEX	E111017 44459	**7** **8**
W-008202-C	Thickness 10mm	SUPERDUPLEX	502079	**9**

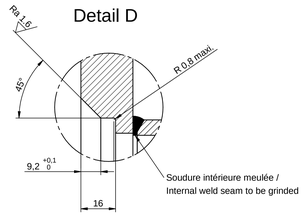


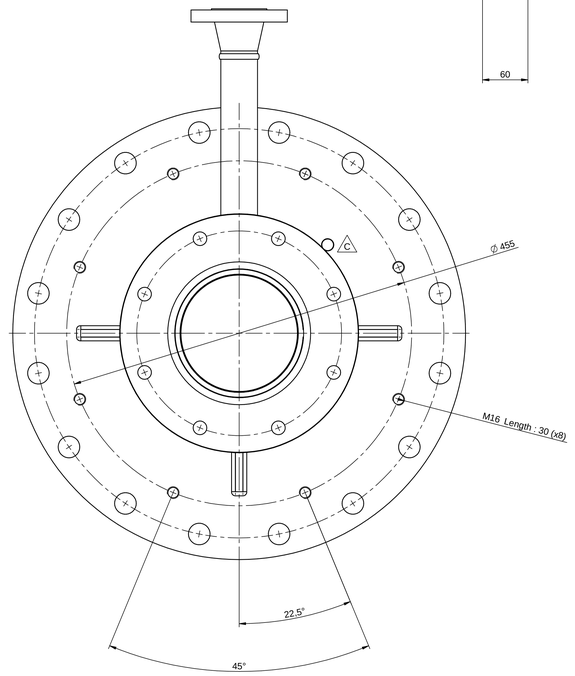


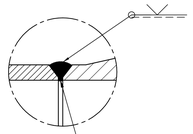


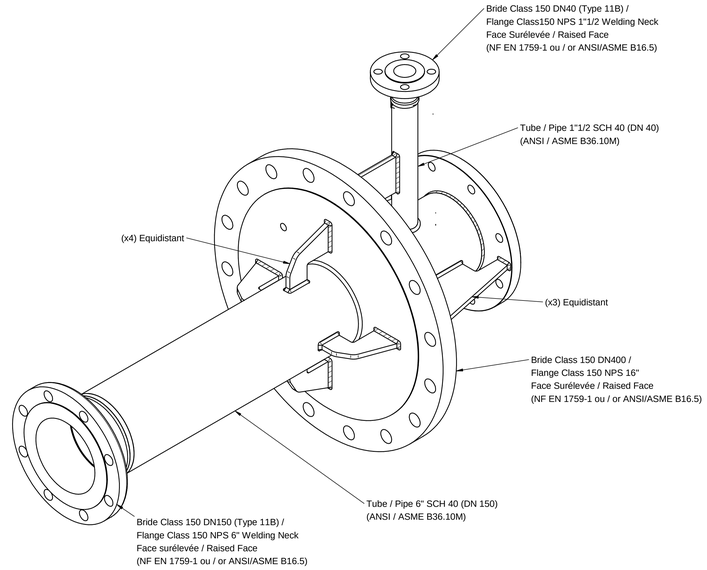


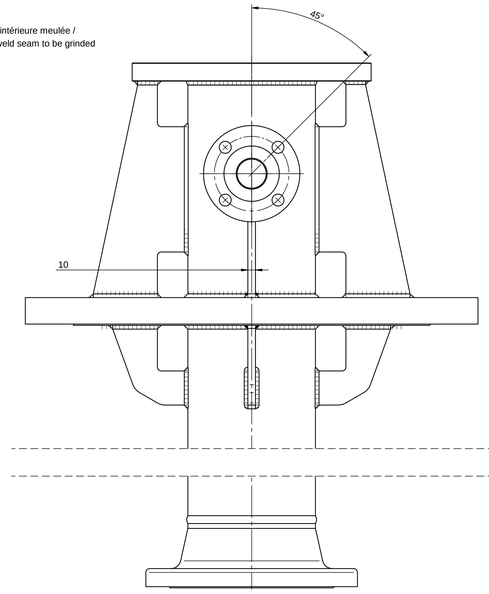
Coupe / Section C-C

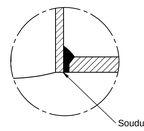


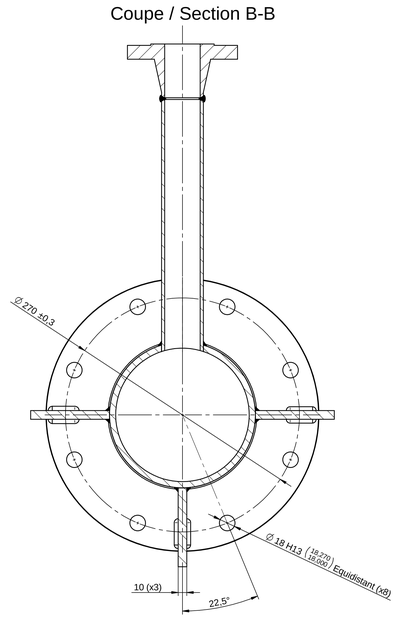












Casser les arêtes vives / *Smooth sharp angles*

C	A.POUPLARD	Changement position taraudage sur bride de pose		APD	07/08/2024
Ind.	Par / By	Objet / Subject		Vérifié / Verified par	Le / On

PCM keep it moving
Rue René Monteau
49 123 Champtocé/Loire
FRANCE
Phone : +33 (0)1.77.68.31.00
www.pcm.eu

CORPS CL150 DN100 - BASE CL150 DN450 - CLOCHE
BODY CL 150 NPS4" - BASE PLATE CL150 NPS18" - TRUNK

Type	AV7							
Masse / Weight	127.99 kg / 282.1 lbs	Tol.	ISO 2768-cK	√	Ra 3.2	Mat.	Voir Ordre Fabrication / Achat *See Manufacturing / Purchasing Order*	
Par / By	A.POUPLARD	Le / On	13/06/2024	Feuille / Sheet	Format	N°	W-008202	Rév. / C
				1 / 1	A0			

Tous droits réservés, diffusion ou reproduction interdite sans autorisation écrite de PCM.
All rights reserved, reproduction or distribution prohibited without written permission from PCM.

CERTIFICAT DE RECEPTION 3.2 / EN 10204:2004
Inspection Certificate 3.2 / EN 10204:2004
Prüfbescheinigung 3.2 / EN 10204:2004

Numéro de document / Document number / Bescheinigungnummer: 2022-304919 Rev 00

Page / Sheet / Seite: 001 / 017

Inspection Number : 600227415

ArcelorMittal

Client - Purchaser - Besteller

Référence client - Purchase order - Kaufauftrag: 81814 REV 00

Projet - Project - Projekt

Repère poste - - L10

INDUSTEEL France
Site : Le Creusot 56 RUE CLEMENCEAU 71200 LE CREUSOT

102984
102985

Produit - Product - Erzeugnis: Tôle(s)

Commande / Poste - Internal order - Werksbestellung: 1329132 / 000100

Bordereau de livraison - Delivery note - Lieferungsdokument

010 - PRODUITS LIVRES - DELIVERED PRODUCTS - GELIEFERTEN GEGENSTÄNDE

Nuance - Grade - Werkstoff	Selon norme - According to - Entsprechend
X2CrNiMoN25-7-4 (1.4410)	AD 2000-Merkblatt W10
X2CrNiMoN25-7-4 (1.4410)	AD 2000-Merkblatt W2
X2CrNiMoN25-7-4 (1.4410)	DIN EN 10028-7
X2CrNiMoN25-7-4 (1.4410)	EN 10088-2
UNS S32750 (Type 2507)	ASTM A240/A240M
UNS S32750 (Type 2507)	ASME Sect.II, Part A SA-240/M
X2CrNiMoN25-7-4 (1.4410)	EN 10088-4
UNS S32750 (Type 2507)	Norsok MDS-D55

Epaisseur - Thickness - Dicke	Largeur - Width - Breite	Longueur - Length - Länge
30.00 mm	2,500 mm	6,000 mm

Spécification - Specification - Spezifikation

IDUSTEEL FRANCE - Le Creusot quality-assurance system in accordance
ith the Pressure Equipment Directive 2014/68/EU Annex I, point 4.3

ne manufacturer INDUSTEEL, Le Creusot Plant is in compliance with
e requirements of NORSOK M-650 QTR N°: 32750 Rev.1.
is QTR is valid until November 2023.

ACQUET JMS 08 rev 02

orsok MDS-D55 Rev.6 up to 60 mm inclusive

NSI / NACE MR0175 / ISO 15156-3 : 2015

NSI / NACE MR0103 / ISO 17945-1 : 2016

https://eservices.industeel.be

État thermique de livraison - Heat treatment state of delivery - Wärmebehandlung Lieferzustand

Supertrempe eau (1105 (-15/+15) - 2 min/mm) - Solution annealed and water quenched - Wasser abgeschreckt

Nbre Nbr Stz	N° produit Product Erzeugnis	N° de coulée Ladle nr. Schmelze nr.	N° de lot de contrôle Inspection lot nr. Prüflos nr.	Nbre Nbr Stz	N° produit Product Erzeugnis	N° de coulée Ladle nr. Schmelze nr.	N° de lot de contrôle Inspection lot nr. Prüflos nr.
1	290245.11	F1219	290245.21-T.1/4	01	290245.21	F1219	290245.21-T.1/4

Total - Total - Gesamtzahl: 002

Edition - Ausgabe:
IN EN10028-7 : 10/2016
N10088-2 : 12/2014
N10088-4 : 08/2009
STM A240/A240M : 2020a
SME Section II SA-240/SA-240M : 2021

elivery condition: Hot-Rolled Annealed & Pickled (HRAP)
elting Process: Electric-Arc Furnace + V.O.D.
ate free of radioactivity.
o weld repair.
nish 1D.

JV SÜD Industrie Service GmbH :
bnahme (Prüfumfang und Anforderungen) gemäss AD 2000-Merkblatt W 10/W 2
spection (scope and technical requirements) according to AD 2000-Merkblatt W 10 /W 2

Nous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande.
We hereby certify that the above mentioned products are complying with the order requirements.
Wir bestätigen hiermit, dass die obengenannten Erzeugnisse den Bestellungvorschriften entsprechen.

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

CERTIFICAT DE RECEPTION 3.2 / EN 10204:2004
Inspection Certificate 3.2 / EN 10204:2004
Prüfbescheinigung 3.2 / EN 10204:2004

Inspection Number : 600227415

Numéro de document — Rev 00
Document number
Bescheinigungnummer
2022-304919

Page 002 / 017
Sheet
Seite

ArcelorMittal

Client - Purchaser - Besteller J.

Référence client - Purchase order - Kaufauftrag 81814 REV 00

Projet - Project - Projekt Repère poste -- L10

INDUSTEEL France
Site : Le Creusot 56 RUE CLEMENCEAU 71200 LE CREUSOT

Produit - Product - Erzeugnis Tôle(s)

Commande / Poste - Internal order - Werksbestellung 1329132 / 000100

Bordereau de livraison - Delivery note - Lieferungsdokument

102984
102985

spection (étendu et exigences techniques) selon AD 2000-Merkblatt W 10/W 2

CE

0036
15
0036-CPR-M-083-2015
EN 10088-4
Hot-rolled stainless steel plates
Intended use : Building construction and civil engineering
X2CrNiMoN25-7-4 (1.4410)
https://industeel.arcelormittal.com/downloads/certifications-quality/
DOPIC012_1.4410

ous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande.
e hereby certify that the above mentioned products are complying with the order requirements.
r bestätigen hiermit, dass die obengenannten Erzeugnisse den Bestellungvorschriften entsprechen.

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

TÜV SÜD Industrie Service GmbH 00 36 Notified Body

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

CERTIFICAT DE RECEPTION 3.2 / EN 10204:2004
Inspection Certificate 3.2 / EN 10204:2004
Prüfbescheinigung 3.2 / EN 10204:2004

Inspection Number : 600227415

Numéro de document — Rev 00
Document number
Bescheinigungnummer
2022-304919

Page 003 / 017
Sheet
Seite

ArcelorMittal

Client - Purchaser - Besteller

Référence client - Purchase order - Kaufauftrag 81814 REV 00

Projet - Project - Projekt — Repère poste - - L10

INDUSTEEL France
Site : Le Creusot 56 RUE CLEMENCEAU 71200 LE CREUSOT

Produit - Product - Erzeugnis — Tôle(s)

Commande / Poste - Internal order - Werksbestellung 1329132 / 000100

Bordereau de livraison - Delivery note - Lieferungsdokument

102984
102985

020 - ANALYSE CHIMIQUE DE COULEE - HEAT CHEMICAL COMPOSITION - SCHMELZE CHEMISCHE ZUSAMMENSETZUNG

	C	Mn	P	S	Si	Cu	Ni	Cr	Mo
	%	%	%	%	%	%	%	%	%
Min.							6.0	24.0	3.0
F1219	0.016	0.81	0.022	0.0004	0.32	0.20	6.5	25.1	3.8
Max.	0.030	1.20	0.035	0.0150	0.80	0.50	8.0	26.0	4.0
	N	(01)	Co						
	%		%						
Min.	0.24	41.00							
F1219	0.28	42.18	0.071						
Max.	0.32								

(01) PREN = Cr+(3.3*Mo)+(16*N)

042 - PMI - POSITIVE MATERIAL IDENTIFICATION - VERWECHSLUNGSPRÜFUNG

Produit - Product - Erzeugnis 290245.11

ıce - Face - Stirnseite Supérieure

orme applicable 1 - Applicable standard 1 - IC/CND/028

ésultat du contrôle - Examination result - Prüfergebnis

Conforme aux spécifications précitées - Conforming to above specifications - Entspricht der vorgenannten vorschriften

BONIN RIOTTE Sarah 26/04/2022					

Produit - Product - Erzeugnis 290245.21

ıce - Face - Stirnseite Supérieure

orme applicable 1 - Applicable standard 1 - IC/CND/028

ésultat du contrôle - Examination result - Prüfergebnis

Conforme aux spécifications précitées - Conforming to above specifications - Entspricht der vorgenannten vorschriften

BONIN RIOTTE Sarah 26/04/2022					

ous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande.
e hereby certify that the above mentioned products are complying with the order requirements.
r bestätigen hiermit, dass die obengenannten Erzeugnisse den Bestellungvorschriften entsprechen.

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

TÜV SÜD Industrie Service GmbH 00 36 Notified Body

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

CERTIFICAT DE RECEPTION 3.2 / EN 10204:2004
Inspection Certificate 3.2 / EN 10204:2004
Prüfbescheinigung 3.2 / EN 10204:2004

Numéro de document / Document number / Bescheinigungnummer: 2022-304919 Rev 00

Page / Sheet / Seite: 004 / 017

ArcelorMittal

Inspection Number : 600227415

Client - Purchaser - Besteller

Référence client - Purchase order - Kaufauftrag: 81814 REV 00

Projet - Project - Projekt

Repère poste - - L10

INDUSTEEL France
Site : Le Creusot 56 RUE CLEMENCEAU 71200 LE CREUSOT

102984
102985

Produit - Product - Erzeugnis: Tôle(s)

Commande / Poste - Internal order - Werksbestellung: 1329132 / 000100

Bordereau de livraison - Delivery note - Lieferungsdokument

072 ESSAIS MECANIQUES - MECHANICAL TESTS - MECHANISCHE PRÜFUNGEN

DURETE SUR COUPON - HARDNESS ON SAMPLE - HÄRTE AUF COUPON

DURETE BRINELL 10
Test description - Prüfbeschreibung

N° lot QM	Etat	Loc	Epr.	T°	Uni	Mac		Uni	HB10 Ind	HB10 Ind	HB10 Ind	HB10 Moy
									HB	HB	HB	HB
								Min				
								Max	310	310	310	310
290245.21-T.1/4	000	T1/4	PSS	20	°C	003			250	242	242	245

Norme: ASTM E10

Machine de casse: M14 INNOVATEST

DURETE SUR COUPON - HARDNESS ON SAMPLE - HÄRTE AUF COUPON

DURETE ROCKWELL C
Test description - Prüfbeschreibung

N° lot QM	Etat	Loc	Epr.	T°	Uni	Mac		Uni	HRC Ind	HRC Ind	HRC Ind	HRC Moy
									HRC	HRC	HRC	HRC
								Min				
								Max	32	32	32	32
290245.21-T.1/4	000	T1/4	PSS	20	°C	003			30	30	30	30

Norme: ASTM E18

Machine de casse: M14 INNOVATEST

TRACTION A L' AMBIANTE - ROOM TEMPERATURE TENSILE TEST - ZUGVERSUCH BEI RT

TRACTION CYLINDRIQUE
Test description - Prüfbeschreibung

N° lot QM	Etat	Loc	Epr.	T°	Uni	Mac		Uni	Rp 0,2%	Rm	A Lo=50mm	A Lo=5,65V So
									MPa	MPa	%	%
								Min	550	795	25	20
								Max		930		
290245.21-T.1/4	000	T1/4	1/2ST	20	°C	001			592	819	39	35

Norme: EN ISO 6892-1 / ASTM E8

Commentaire: Neareast 1/6 thickness

Machine de casse: M01 MOHR & FEDERHAFF

Commentaire: Specimen Ø12.5mm

TRACTION A CHAUD - HOT TENSILE TEST - WARMZUGVERSUCH

TRACTION CYLINDRIQUE
Test description - Prüfbeschreibung

N° lot QM	Etat	Loc	Epr.	T°	Uni	Mac		Uni	Rp 0,2%	Rm	A Lo=5,65V So
									MPa	MPa	%
								Min	380	630	
								Max			
290245.21-T.1/4	000	T1/4	1/6ST	250	°C	001			414	696	37

Norme: DIN EN ISO 6892-2 Verfahren B

Machine de casse: MO2 ROELL KORTHAUS

Nous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande.
We hereby certify that the above mentioned products are complying with the order requirements.
Wir bestätigen hiermit, dass die obengenannten Erzeugnisse den Bestellungvorschriften entsprechen.

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

TÜV SÜD Industrie Service GmbH 00 36 Notified Body

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

CERTIFICAT DE RECEPTION 3.2 / EN 10204:2004
Inspection Certificate 3.2 / EN 10204:2004
Prüfbescheinigung 3.2 / EN 10204:2004

Inspection Number : 600227415

Numéro de document Rev 00
Document number
Bescheinigungnummer
2022-304919

Page 005 / 017
Sheet
Seite

ArcelorMittal

Client - Purchaser - Besteller

Référence client - Purchase order - Kaufauftrag 81814 REV 00

Projet - Project - Projekt Repère poste - - L10

INDUSTEEL France
Site : Le Creusot 56 RUE CLEMENCEAU 71200 LE CREUSOT

Produit - Product - Erzeugnis Tôle(s) :

Commande / Poste - Internal order - Werksbestellung 1329132 / 000100 102984

Bordereau de livraison - Delivery note - Lieferungsdokument 102985

ESILIENCE - TOUGHNESS - KERBSCHLAGZÄHIGKEIT

CHARPY V
Test description - Prüfbeschreibung

N° lot QM	Etat	Loc	Epr.	T°	Uni	Mac	Uni	Energ Ind J	Energ Ind J	Energ Ind J	Energ Moy J	ExLat Ind mm	ExLat Ind mm	ExLat Ind mm	ExLat Moy mm
							Min	35	35	35	45	0.380	0.380	0.380	0.380
							Max								
290245.21-T.1/4	000	T1/4	1/2ST	-46	°C	004		244	190	264	233	2.400	1.900	2.200	2.167

rme ASTM E23
mmentaire Size specimens [10x10mm]
achine de casse MO6 SCHENK TREBEL 450J

ESILIENCE - TOUGHNESS - KERBSCHLAGZÄHIGKEIT

CHARPY V
Test description - Prüfbeschreibung

N° lot QM	Etat	Loc	Epr.	T°	Uni	Mac	Uni	Energ Ind J	Energ Ind J	Energ Ind J	Energ Moy J
							Min	28	28	28	40
							Max				
290245.21-T.1/4	000	T1/4	PST	-40	°C	004		173	153	183	170

rme DIN EN ISO 148-1
mmentaire Size specimens [10x10mm]
achine de casse MO6 SCHENK TREBEL 450J

ESILIENCE - TOUGHNESS - KERBSCHLAGZÄHIGKEIT

CHARPY V
Test description - Prüfbeschreibung

N° lot QM	Etat	Loc	Epr.	T°	Uni	Mac	Uni	Energ Ind J	Energ Ind J	Energ Ind J	Energ Moy J
							Min	63	63	63	90
							Max				
290245.21-T.1/4	000	T1/4	PST	20	°C	004		268	269	250	262

rme DIN EN ISO 148-1
mmentaire Size specimens [10x10mm]
achine de casse MO6 SCHENK TREBEL 450J

oc	1/4	Quart - 1/4 Width - 1/4 Breite
oc	T	Tête - Top - Kopf
pr. Epaisseur	1/2	Mi épaisseur - 1/2 Thickness - 1/2 Dicke
pr. Epaisseur	1/6	Sixième épaisseur - 1/6 Thickness - 1/6 Dicke
pr. Epaisseur	P	Peau - Rolled Surface - Walzfläche
pr. Face	S	Supérieure - Upper face - obere
pr. Sens	S	Standard - Standard - Standard
pr. Sens	T	Travers - Transverse - Quer
at	000	Etat thermique de livraison - Heat treatment state of delivery - Wärmebehandlung Lieferustand
pr.Ep./Face/Sens	1/2ST	Mi épaisseur - 1/2 Thickness - 1/2 Dicke / Supérieure - Upper face - obere / Travers - Transverse - Quer
pr.Ep./Face/Sens	1/6ST	Sixième épaisseur - 1/6 Thickness - 1/6 Dicke / Supérieure - Upper face - obere / Travers - Transverse - Quer
pr.Ep./Face/Sens	PSS	Peau - Rolled Surface - Walzfläche / Supérieure - Upper face - obere / Standard - Standard - Standard
pr.Ep./Face/Sens	PST	Peau - Rolled Surface - Walzfläche / Supérieure - Upper face - obere / Travers - Transverse - Quer

ous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande.
e hereby certify that the above mentioned products are complying with the order requirements.
r bestätigen hiermit, dass die obengenannten Erzeugnisse den Bestellungvorschriften entsprechen.

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

CERTIFICAT DE RECEPTION 3.2 / EN 10204:2004
Inspection Certificate 3.2 / EN 10204:2004
Prüfbescheinigung 3.2 / EN 10204:2004

Inspection Number : 600227415

Numéro de document Rev 00
Document number
Bescheinigungnummer
2022-304919

Page 006 / 017
Sheet
Seite

ArcelorMittal

Client - Purchaser - Besteller L

Référence client - Purchase order - Kaufauftrag 81814 REV 00

Projet - Project - Projekt Repère poste - - L10

INDUSTEEL France
Site : Le Creusot 56 RUE CLEMENCEAU 71200 LE CREUSOT

Produit - Product - Erzeugnis Tôle(s)

Commande / Poste - Internal order - Werksbestellung 1329132 / 000100

Bordereau de livraison - Delivery note - Lieferungsdokument

102984
102985

082 ESSAIS TECHNOLOGIQUES - TECHNOLOGICAL TESTS - TECHNOLOGISCHE PRÜFUNGEN

TRUCTURE - STRUCTURE - GEFÜGE

STRUCTURE
Test description - Prüfbeschreibung

N° lot QM	Etat	Loc	Epr.	T°	Uni	Mac
290245.21-T.1/4	000	T1/4	SSS	20	°C	

nexe AN_0001329132_000100_290245.21_002
mmentaire Cover near surface and 1/2 Th
cification client NORSOK MDS D55
sultat de l'essai Structure homogène

FERRITE SUR COUPON - FERRITE ON SAMPLE - FERRIT AUF COUPON

FERRITE%
Test description - Prüfbeschreibung

N° lot QM	Etat	Loc	Epr.	T°	Uni	Mac		%ferrite	RA
							Uni	%	%
							Min	35	
							Max	60	20
290245.21-T.1/4	000	T1/4	SSS	20	°C			53	20

nexe AN_0001329132_000100_290245.21_001
rme ASTM E 1245
mmentaire RA = Relative Accuracy

CORROSION - CORROSION - KORROSION

CORROSION INTERGRANULAIRE
Test description - Prüfbeschreibung

N° lot QM	Etat	Loc	Epr.	T°	Uni	Mac
290245.21-T.1/4	000	T1/4	PSL	20	°C	

rme ISO 3651-2-C
sultat de l'essai Conforme selon norme

CORROSION - CORROSION - KORROSION

CORROSION PIQURE
Test description - Prüfbeschreibung

N° lot QM	Etat	Loc	Epr.	T°	Uni	Mac		Vit. corrosion
							Uni	mdd
							Min	
							Max	10
290245.21-T.1/4	000	T1/4	SSL	40	°C			0.0

rme ASTM A923C
mmentaire No pits
mmentaire Period = 24 hours
sultat de l'essai Satisfaisant selon norme

ous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande.
e hereby certify that the above mentioned products are complying with the order requirements.
r bestätigen hiermit, dass die obengenannten Erzeugnisse den Bestellungvorschriften entsprechen.

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

TÜV SÜD Industrie Service GmbH 00 36 Notified Body

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

CERTIFICAT DE RECEPTION 3.2 / EN 10204:2004
Inspection Certificate 3.2 / EN 10204:2004
Prüfbescheinigung 3.2 / EN 10204:2004

Inspection Number : 600227415

Numéro de document / Document number / Bescheinigungnummer : 2022-304919 Rev 00

Page / Sheet / Seite : 007 / 017

ArcelorMittal

Client - Purchaser - Besteller

Référence client - Purchase order - Kaufauftrag : 81814 REV 00

Projet - Project - Projekt : Repère poste - - L10

INDUSTEEL France
Site : Le Creusot 56 RUE CLEMENCEAU 71200 LE CREUSOT

Produit - Product - Erzeugnis : Tôle(s)

Commande / Poste - Internal order - Werksbestellung : 1329132 / 000100

Bordereau de livraison - Delivery note - Lieferungsdokument :

102984
102985

ORROSION - CORROSION - KORROSION

CORROSION PIQURE
Test description - Prüfbeschreibung

N° lot QM	Etat	Loc	Epr.	T°	Uni	Mac		Uni	Perte de masse g/m2
								Min	
								Max	1
290245.21-T.1/4	000	T1/4	SST	50	°C				0.00

rme	ASTM G48A
paration de surface de l'échantillon	Préparation Chimique
mmentaire	No pits at 20x magnification
cification client	NORSOK MDS D55
mmentaire	Period = 24 hours
sultat de l'essai	Satisfaisant selon norme

oc	1/4	Quart - 1/4 Width - 1/4 Breite
oc	T	Tête - Top - Kopf
or. Epaisseur	P	Peau - Rolled Surface - Walzfläche
or. Epaisseur	S	Standard - Standard - Standard
or. Face	S	Supérieure - Upper face - obere
or. Sens	L	Long - Longitudinal - Längs
or. Sens	S	Standard - Standard - Standard
or. Sens	T	Travers - Transverse - Quer
at	000	Etat thermique de livraison - Heat treatment state of delivery - Wärmebehandlung Lieferustand
or.Ep./Face/Sens	PSL	Peau - Rolled Surface - Walzfläche / Supérieure - Upper face - obere / Long - Longitudinal - Längs
or.Ep./Face/Sens	SSL	Standard - Standard - Standard / Supérieure - Upper face - obere / Long - Longitudinal - Längs
or.Ep./Face/Sens	SSS	Standard - Standard - Standard / Supérieure - Upper face - obere / Standard - Standard - Standard
or.Ep./Face/Sens	SST	Standard - Standard - Standard / Supérieure - Upper face - obere / Travers - Transverse - Quer

ous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande.
e hereby certify that the above mentioned products are complying with the order requirements.
r bestätigen hiermit, dass die obengenannten Erzeugnisse den Bestellungvorschriften entsprechen.

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

CERTIFICAT DE RECEPTION 3.2 / EN 10204:2004
Inspection Certificate 3.2 / EN 10204:2004
Prüfbescheinigung 3.2 / EN 10204:2004

Inspection Number : 600227415

Numéro de document / Document number / Bescheinigungnummer : 2022-304919 Rev 00

Page / Sheet / Seite : 008 / 017

ArcelorMittal

Client - Purchaser - Besteller

Référence client - Purchase order - Kaufauftrag : 81814 REV 00

Projet - Project - Projekt : Repère poste - - L10

INDUSTEEL France
Site : Le Creusot 56 RUE CLEMENCEAU 71200 LE CREUSOT

INTERNATIONAL :
102984
102985

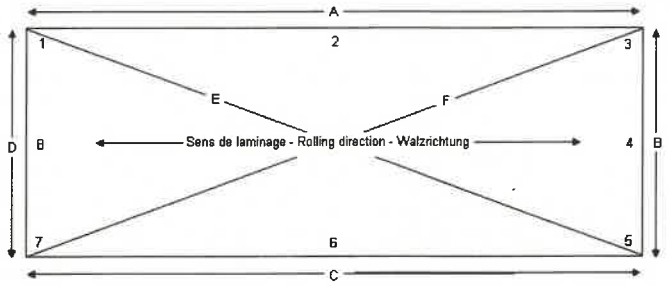
Produit - Product - Erzeugnis : Tôle(s)

Commande / Poste - Internal order - Werksbestellung : 1329132 / 000100

Bordereau de livraison - Delivery note - Lieferungsdokument

102 - DIMENSIONNEL - DIMENSIONAL CHECK - MASSKONTROLLE

Cahier des charges Longueur - Specification Length -	ISO 18286 CLASSE A
Cahier des charges Largeur - Specification Width -	ISO 18286 CLASSE A
Cahier des charges Epaisseur - Specification Thickness -	ISO 18286



Produit - Product - Erzeugnis : 290245.11

Face - Face - Stirnseite : Supérieure

Résultat du contrôle - Examination result - Prüfergebnis

Conforme aux spécifications précitées - Conforming to above specifications - Entspricht der vorgenannten vorschriften

BONIN RIOTTE Sarah
26/04/2022

Longueur - Length - Länge	A	C
	mm	
Mini - -	6000	
Relevé - Actual - Ist-wert	6020	6019
Maxi - -	6040	

Largeur - Width - Breite	B	D
	mm	
Mini - -	2500	
Relevé - Actual - Ist-wert	2509	2509
Maxi - -	2520	

Diagonale - Diagonal - Diagonale	E	F
	mm	
Ecart maxi - Max gap - Maximaler abstand		
Relevé - Actual - Ist-wert	6522	6520

Epaisseurs - Thicknesses - Dicken	Mini	Maxi
	mm	mm
Mini imposé - Min required - Mindeste anforderung	29.70	29.70
Relevé - Actual - Ist-wert	30.50	30.90
Maxi imposé - Max required - Maximale anforderung	31.90	31.90

Produit - Product - Erzeugnis : 290245.21

Face - Face - Stirnseite : Supérieure

Résultat du contrôle - Examination result - Prüfergebnis

Conforme aux spécifications précitées - Conforming to above specifications - Entspricht der vorgenannten vorschriften

Nous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande.
We hereby certify that the above mentioned products are complying with the order requirements.
Wir bestätigen hiermit, dass die obengenannten Erzeugnisse den Bestellungvorschriften entsprechen.

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

TÜV SÜD Industrie Service GmbH 00 36 Notified Body

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

CERTIFICAT DE RECEPTION 3.2 / EN 10204:2004
Inspection Certificate 3.2 / EN 10204:2004
Prüfbescheinigung 3.2 / EN 10204:2004

Inspection Number : 600227415

Numéro de document — Rev 00
Document number
Bescheinigungnummer
2022-304919

Page 009 / 017
Sheet
Seite

ArcelorMittal

Client - Purchaser - Besteller

Référence client - Purchase order - Kaufauftrag 81814 REV 00

Projet - Project - Projekt — Repère poste - - L10

INDUSTEEL France
Site : Le Creusot 56 RUE CLEMENCEAU 71200 LE CREUSOT

Produit - Product - Erzeugnis — Tôle(s)

Commande / Poste - Internal order - Werksbestellung 1329132 / 000100

Bordereau de livraison - Delivery note - Lieferungsdokument

102984
102985

BONIN RIOTTE Sarah
26/04/2022

	A	C
Longueur - Length - Länge		
	mm	
Mini - -	6000	
Relevé - Actual - Ist-wert	6020	6019
Maxi - -	6040	
Largeur - Width - Breite	**B**	**D**
	mm	
Mini - -	2500	
Relevé - Actual - Ist-wert	2509	2509
Maxi - -	2520	
Diagonale - Diagonal - Diagonale	**E**	**F**
	mm	
Ecart maxi - Max gap - Maximaler abstand		
Relevé - Actual - Ist-wert	6522	6520

Epaisseurs - Thicknesses - Dicken	Mini	Maxi
	mm	mm
Mini imposé - Min required - Mindeste anforderung	29.70	29.70
Relevé - Actual - Ist-wert	30.50	30.90
Maxi imposé - Max required - Maximale anforderung	31.90	31.90

Nous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande.
We hereby certify that the above mentioned products are complying with the order requirements.
Wir bestätigen hiermit, dass die obengenannten Erzeugnisse den Bestellungvorschriften entsprechen.

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

TÜV SÜD Industrie Service GmbH 00 36 Notified Body

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

CERTIFICAT DE RECEPTION 3.2 / EN 10204:2004
Inspection Certificate 3.2 / EN 10204:2004
Prüfbescheinigung 3.2 / EN 10204:2004

Inspection Number : 600227415

Numéro de document — Rev 00
Document number
Bescheinigungnummer
2022-304919

Page 010 / 017
Sheet
Seite

ArcelorMittal

Client - Purchaser - Besteller

Référence client - Purchase order - Kaufauftrag 81814 REV 00

Projet - Project - Projekt — Repère poste - - L10

INDUSTEEL France
Site : Le Creusot 56 RUE CLEMENCEAU 71200 LE CREUSOT

Produit - Product - Erzeugnis — Tôle(s)

Commande / Poste - Internal order - Werksbestellung 1329132 / 000100

Bordereau de livraison - Delivery note - Lieferungsdokument 102984 102985

11 - VISUEL-ETAT DE SURFACE - VISUAL EXAMINATION-SURFACE CONDITION - SICHTPRÜFUNG-OBERFLÄCHENZUSTAND

ice - Face - Stirnseite 6 Faces

orme applicable 1 - Applicable standard 1 - EN 10163-2 Classe B sous-classe 3

ésultat du contrôle - Examination result - Prüfergebnis

Conforme aux spécifications précitées - Conforming to above specifications - Entspricht der vorgenannten vorschriften

ous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande.
e hereby certify that the above mentioned products are complying with the order requirements.
r bestätigen hiermit, dass die obengenannten Erzeugnisse den Bestellungvorschriften entsprechen.

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

TÜV SÜD Industrie Service GmbH 00 36 Notified Body

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

CERTIFICAT DE RECEPTION 3.2 / EN 10204:2004
Inspection Certificate 3.2 / EN 10204:2004
Prüfbescheinigung 3.2 / EN 10204:2004

Inspection Number : 600227415

Numéro de document — Rev 00
Document number
Bescheinigungnummer
2022-304919

Page / Sheet / Seite 011 / 017

ArcelorMittal

Client - Purchaser - Besteller

Référence client - Purchase order - Kaufauftrag 81814 REV 00

Projet - Project - Projekt — Repère poste - - L10

INDUSTEEL France
Site : Le Creusot 56 RUE CLEMENCEAU 71200 LE CREUSOT

Produit - Product - Erzeugnis — Tôle(s)

Commande / Poste - Internal order - Werksbestellung 1329132 / 000100

Bordereau de livraison - Delivery note - Lieferungsdokument

102984
102985

172 - PLANEITE - FLATNESS - EBENHEIT

Produit - Product - Erzeugnis 290245.11

Face - Face - Stirnseite: Supérieure

Norme applicable 1 - Applicable standard 1 - : SPECIFICATION CLIENT

Résultat du contrôle - Examination result - Prüfergebnis

Conforme aux spécifications précitées - Conforming to above specifications - Entspricht der vorgenannten vorschriften

BONIN RIOTTE Sarah
26/04/2022

Sens de mesure - Direction of measurement - Messrichtung: dans toutes les directions - within all directions - in allen richtungen

Méthode 1 - Method 1 - Verfahren 1: Règle 2 m

Flèche Max - Straightness max deviation - Max Geradheitsabweichung: 10.00 mm

Résultat 1 - Result 1 - Ergebnis 1: 4.00 mm

Produit - Product - Erzeugnis 290245.21

Face - Face - Stirnseite: Supérieure

Norme applicable 1 - Applicable standard 1 - : SPECIFICATION CLIENT

Résultat du contrôle - Examination result - Prüfergebnis

Conforme aux spécifications précitées - Conforming to above specifications - Entspricht der vorgenannten vorschriften

BONIN RIOTTE Sarah
26/04/2022

Sens de mesure - Direction of measurement - Messrichtung: dans toutes les directions - within all directions - in allen richtungen

Méthode 1 - Method 1 - Verfahren 1: Règle 2 m

Flèche Max - Straightness max deviation - Max Geradheitsabweichung: 10.00 mm

Résultat 1 - Result 1 - Ergebnis 1: 4.00 mm

Nous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande.
We hereby certify that the above mentioned products are complying with the order requirements.
Wir bestätigen hiermit, dass die obengenannten Erzeugnisse den Bestellungvorschriften entsprechen.

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

TÜV SÜD Industrie Service GmbH 00 36

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

CERTIFICAT DE RECEPTION 3.2 / EN 10204:2004
Inspection Certificate 3.2 / EN 10204:2004
Prüfbescheinigung 3.2 / EN 10204:2004

Numéro de document / Document number / Bescheinigungnummer: 2022-304919 Rev 00

Page / Sheet / Seite: 012 / 017

ArcelorMittal

Inspection Number : 600227415

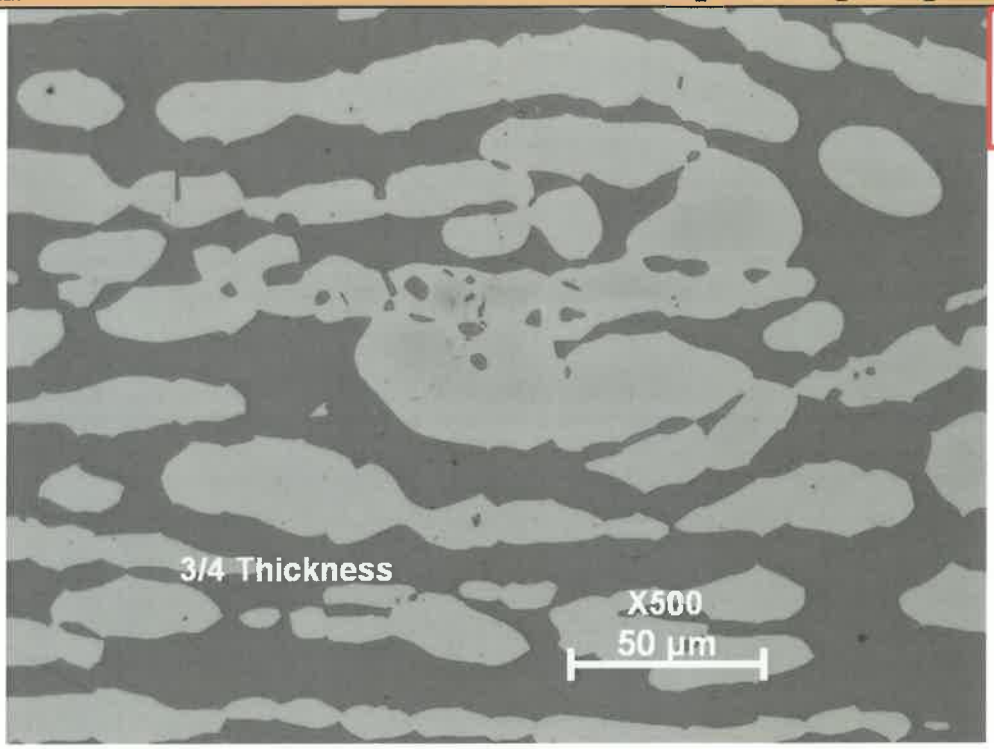
Client - Purchaser - Besteller

Référence client - Purchase order - Kaufauftrag: 81814 REV 00

Projet - Project - Projekt

Repère poste - - L10

ANNEXES - APPENDIX - ANLAGEN 290245.21 AN_0001329132_000100_290245.21_001



102984
102985

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

CERTIFICAT DE RECEPTION 3.2 / EN 10204:2004
Inspection Certificate 3.2 / EN 10204:2004
Prüfbescheinigung 3.2 / EN 10204:2004

Numéro de document / Document number / Bescheinigungnummer: 2022-304919 Rev 00

Page / Sheet / Seite: 013 / 017

Inspection Number : 600227415

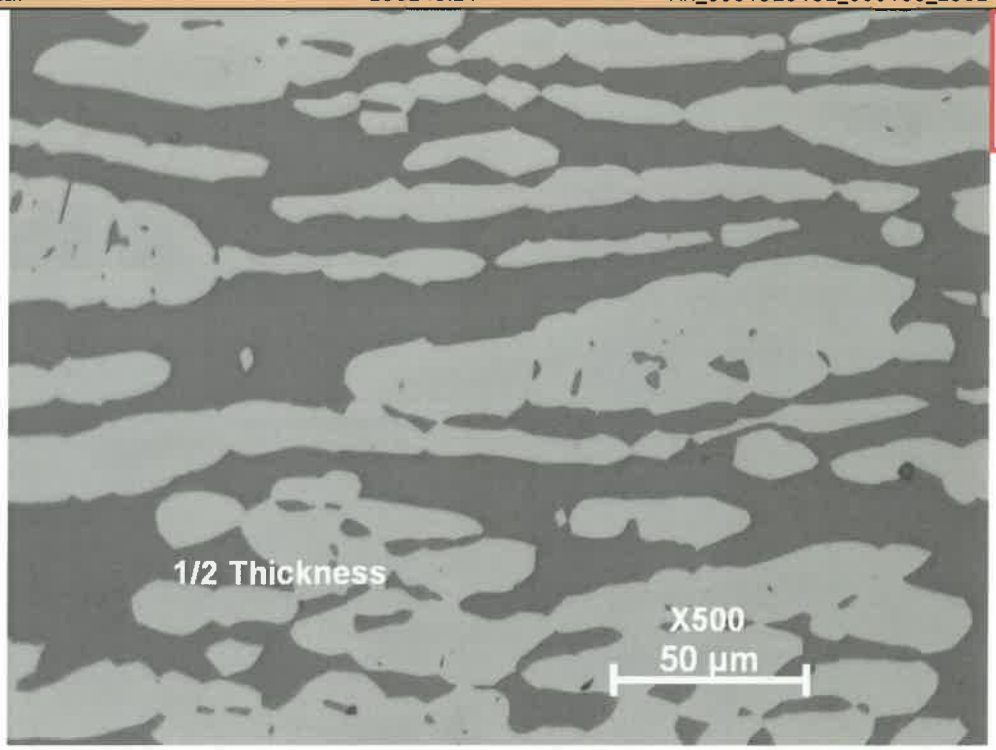
Client - Purchaser - Besteller

Référence client - Purchase order - Kaufauftrag: 81814 REV 00

Projet - Project - Projekt

Repère poste - - L10

ANNEXES - APPENDIX - ANLAGEN 290245.21 AN_0001329132_000100_290245.21_001



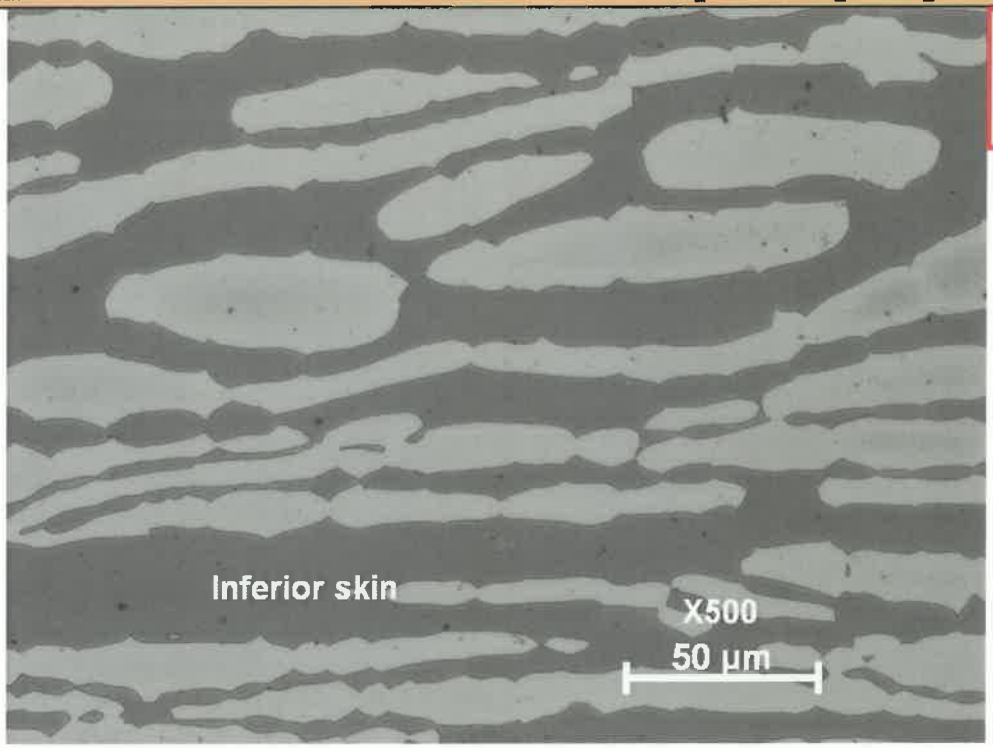
102984
102985

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

ANNEXES - APPENDIX - ANLAGEN 290245.21 AN_0001329132_000100_290245.21_001

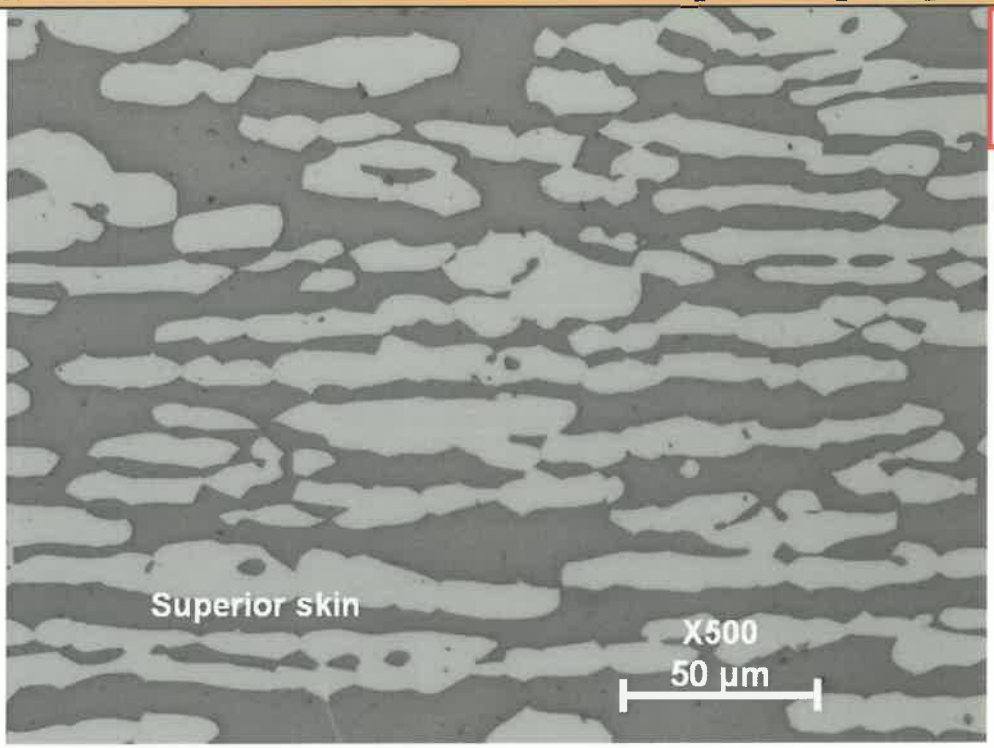


102984
102985

TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte



102984
102985

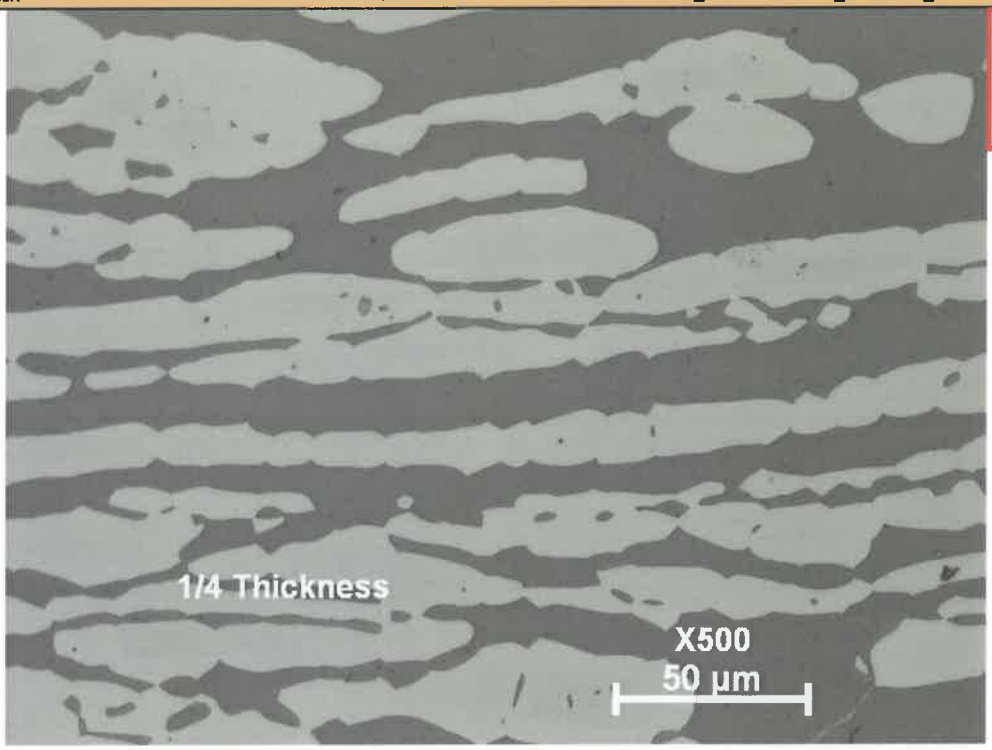
TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

00
36

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

102984
102985



TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

ArcelorMittal

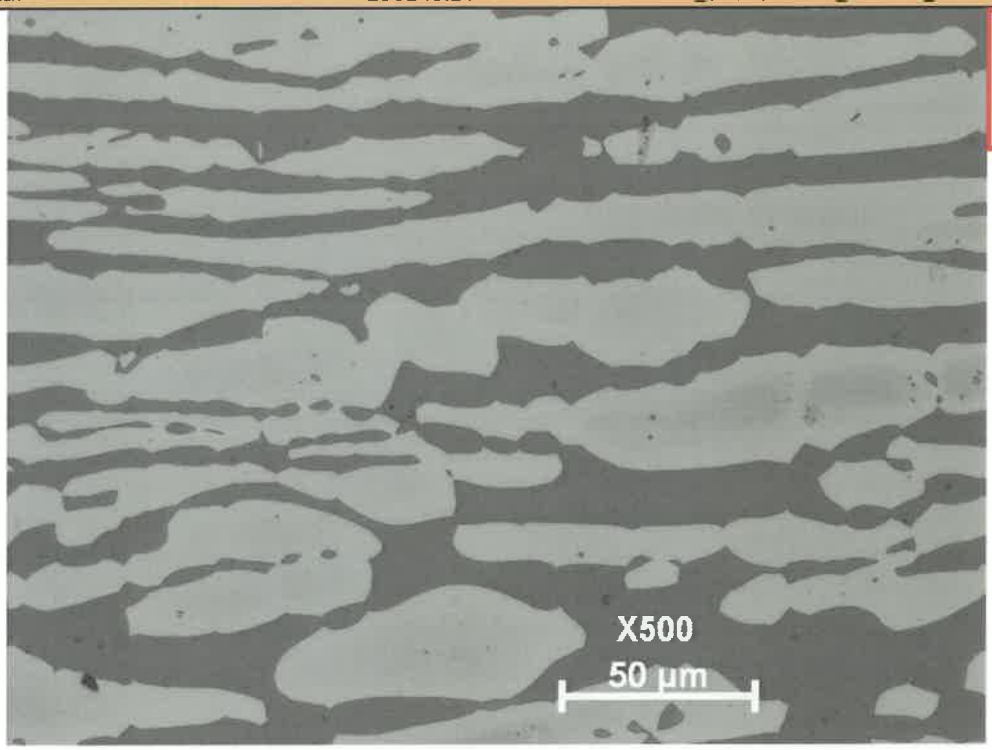
Client - Purchaser - Besteller

Référence client - Purchase order - Kaufauftrag 81814 REV 00

Projet - Project - Projekt Repère poste - - L10

ANNEXES - APPENDIX - ANLAGEN 290245.21 AN_0001329132_000100_290245.21_002

102984
102985



TÜV SÜD Industrie Service GmbH
Anlagensicherheit (IS-AN1-MAN)
Dudenstrasse 28
68167 Mannheim
Germany

Dipl.-Ing. M. Adam

OMAR DAFRI
10/05/2022
Gestionnaire Commande
Mill inspector
Werksbeauftragte

Heat code	QTY	Description
60418	60,89	PIPE -SMLS 6" SCH-40S STANDARD ASTM A790_UNS S32750 ASME B36.10/19

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RECEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 1 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

TTI - TUBACEX TUBOS INOXIDABLES

Registro Mercantil de Alava, Tomo 587, Folio 189, Hoja VI 2885 - N.I.F. A-01140227

Tres cruces, 8
01400 Llodio (Alava)
SPAIN

TL: 946721350
FAX: 946725062
E-MAIL:

CUSTOMER DESCRIPTION/DESCRIPCIÓN DEL CLIENTE/KUNDENBEZEICHNUNG/COMMETTANT

CLIENT SOLD TO/SOLICITANTE/AUFTRAGGEBER/COMMETTANT

TSS
TUBACEX SERVICE SOLUTIONS, S.A.U
POLIGONO INDUSTRIAL SARATXO
01470 AMURRIO

SOLD TO:WITTE TUBE & PIPE SYSTEMS GMBH
SOLD P.O. REF.:EB0010676
SOLD ORDER REF.:391923
COPY NUMBER: 001

CLIENT ORDER/PEDIDO CLIENTE/KUNDEN AUFTRAGSNUMMER/NO.DE COMMANDE: I011212
SALES ORDER/PEDIDO VENTAS/AUFTRAGSNUMMER/NO.DE COMMANDE D'USINE:

AENOR Empresa Registrada UNE EN ISO 9001

AENOR Gestión Ambiental UNE EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 2 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

MATERIAL:SEAML. STAINL. STEEL TUBES/PIPES/TUBOS INOXIDABLES SIN SOLDADURA/TUBES INOX SANS SOUDURE/NAHTLOSE EDELSTAHLROHRE
HEAT-TREATED, PICKLED / TRATADO, DECAPADO / HYPERTREMPE, DECAPE / WÄRMEBEHANDELT, GEBEIZT, PASSIVATED AS PER ASTM A380 / PASIVADO SEGUN ASTM A380 / PASSIVÉ (ASTM A380) / PASSIVIERT (ASTM A380)
GRADE / ACERO / GRADE / WERKSTOFF: S32750,1.4410,
STANDARD / NORMA / STANDARD / LIEFERUNG NACH: ASME SECT.II PART.A SA790/SA790M-2021 ED.
ASTM A790/A790M-23
EN 10216-5:2021 TC2
EN 10297-2:2005
NORSOK M650 QTR N.4
NORSOK M630:2020 MDS D51 REV.6
CHECK ANALYSIS
CORROSION TESTED ACC. TO ASTM A262 PRACTICE E
CORROSION TESTED ACC. TO ASTM A923-22 TEST METHOD C
CORROSION TESTED ACC. TO ASTM G48 TEST METHOD A
CORROSION TESTED ACC. TO EN ISO 3651-2 PRACTICE B
SHELL ES/247 REV.2 EXCEPT DPI (TABLE 1) AND SURFACE REQUIREMENTS (POINT 9.1)
HYDROTEST
ANSI/NACE MR0103/ISO 17945:2015
ANSI/NACE MR0175/ISO15156-3:2020
QAD 68 REV.0
RTX_D51S REV.6
SHELL MESC SPE 74/014 FEBRUARY 2021 EXCEPT:
NO LIQUID PENETRANT TEST (POINT 14.12.1),
TENSILE TEST ONLY IN LONGITUDINAL DIRECTION.
ULTRASONIC TEST ONLY FOR LONGITUDINAL DEFECTS.
IMPACT TEST (if applicable): Lateral expansion 0.38 mm. minimum.
ULTRASONIC TEST ACC. TO ASTM A999/A999M / ASTM E213
TOLERANCES / TOLERANCIAS / TOLERANCES / TOLERANZEN NACH: ASME SECT.II PART.A SA999/SA999M-2021 ED.
ASTM A999/A999M-18
EN ISO 1127/03.2019 D2/T2
RANDOM LENGTHS / LARGOS VARIABLES / LONGUEUR COURANTE / EINGEENGTE LÄNGE 6.000/7.000 MM
PLAIN ENDS / LISOS / EXTRÉMITÉ D'EQUERRE / GLATTE ENDEN,
DIMENSIONS/DIMENSIONES/DIMENSIONS/DIMENSIONS: 168,28 X 7,11 MM - 6" SCH 40S
HOT FINISHED/ACABADOS EN CALIENTE/WARMGEFORMT/FINIS A CHAUD

Sales Item Pos Ped. AuftrgPos Usine Pos	Client Item Pos Clnt Kunde Pos Com. Pos	Delivery No Nº Entrega Lieferung Avis. d'exp	Lot No. Nº lote Los Nr. Lot d`inspection	Heat No Colada Schmelze Coulée	Pieces Piezas Stück Pcs	Weight Peso Gewicht Poids	Tot Lgth Long. Tot Gesamtlänge Tolength	Un Lgth Long. Un Längentyp Long. Un
20		8110078629	P2305144	60418	15	3.013 KG	100,39 M	6000-7000 MM

RAW MATERIAL/DATOS MATERIAL/VORMATERIAL/MATIERE PREMIERE

Heat Nr:	Supplier	Method
60418	ACERALAVA (SPAIN)	Electric furnace+AOD

AENOR ER Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 3 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

CHEMICAL COMPOSITION (%)/COMPOSICIÓN QUÍMICA (%)/CHEMISCHE ZUSAMMENSETZUNG (%)/COMPOSITION CHIMIQUE(%)

*L: Ladle C:Products

*	Heat	Seq	C	Mn	Si	P	S	Ni	Cr	Mo	Al	Cu
L	60418	1	0,013	0,73	0,410	0,025	0,0006	7,25	25,50	3,57	0,011	0,11
C	60418	2	0,013	0,72	0,410	0,024	0,0006	7,26	25,42	3,63	0,010	0,11
C	60418	3	0,013	0,72	0,410	0,025	0,0006	7,31	25,44	3,61	0,011	0,11

*	Heat	Seq	V	Nb	W	Co	N	Pren
L	60418	1	0,074	0,003	0,050	0,075	0,2765	41,7050
C	60418	2	0,072	0,002	0,048	0,077	0,2765	41,8230
C	60418	3	0,074	0,002	0,048	0,076	0,2765	41,7770

HEAT TREATMENT/TRATAMIENTO TÉRMICO/WÄRMEBEHANDLUNG/TRAITEMENT THERMIQUE

HIPERTEMPLADOS A 1100 °C , 12 min , Agua
SOLUTION ANNEALED AT 1100 °C , 12 min , WATER
HYPERTREMPES 1100 °C , 12 min , L' EAU
LOESUNGSGEGLUEHT 1100 °C , 12 min , Wasser

TENSILE TEST/TEST DE TENSIÓN/ESSAI TRACTION/ZUGVERSUCH

Lot No.	Sample	T	Rp0.2	Rp1.0	Rm	A2"	A5	Type	Spc.Type	Spc.Dim
		°C	*MPa*	*MPa*	*MPa*	*%*	*%*			*mm*
P2305144	1	20	600	684	827	43	41	L	S	20,25
	2	20	600	683	827	44	42	L	S	20,09

IMPACT TEST/TEST DE IMPACTO/RESILIENCE/KERBSCHLAGVERSUCH

Lot No.	Sample	T	Wspec	Ecv 1	Ecv 2	Ecv 3	Ecv AVG	Type	Le1	Le2	Le3	Shear 1	Shear 2	Shear 3
		°C	*mm*	*J*	*J*	*J*	*J*		*mm*	*mm*	*mm*	*%*	*%*	*%*
P2305144	1	-51	5,00	117	116	113	115	L	1,25	1,12	1,20	70	60	70

CORROSION ACCORDING TO ASTM A923 C/CORROSION DE ACUERDO ASTM A923 C/CORROSION SUIVANT ASTM A923 C/CORROSION ACCORDING TO ASTM A923 C

Lot No.	Sample	T	Pits-20x	Wloss	time
		°C		*MDD*	*Horas*
P2305144	1	50	N	2,6620	24,0

Corrosion test ASTM G48 practice A/Corrosión ASTM G48 práctica A/TEST DE CORROSION ASTM G48 practice A/LOCHFRASSTEST ASTM G 48 PR.A

Lot No.	Sample	T	Pits-20x	W.loss	time
		°C		*g/m2*	*Horas*
P2305144	1	50	N	0,2662	24,0

HARDNESS TEST/TEST DE DUREZA/DUREE/HÄRTEPRÜFUNG

Lot No.	Sample	0ºExt1	0ºExt2	0ºExt3	0ºInt1	0ºInt2	0ºInt3	90ºExt1	90ºExt2	90ºExt3	90ºInt1	90ºInt2	90ºInt3	180ºExt1
		HRC	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*
P2305144	1	20,9	23,8	23,0	18,4	19,8	15,6	23,8	20,4	21,3	20,5	21,6	23,4	24,6

Lot No.	Sample	180ºExt2	180ºExt3	180ºInt1	180ºInt2	180ºInt3	270ºExt1	270ºExt2	270ºExt3	270ºInt1	270ºInt2	270ºInt3
		HRC	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*
P2305144	1	22,9	23,0	21,6	23,0	21,3	15,2	23,2	20,5	20,3	22,5	19,7

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 4 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

FERRITE ACCORDING TO ASTM E 562/Contenido de Ferrita según ASTM E562/FERRITE SUIVANT ASTM E562/FERRIT ENTSPRECHEND ASTM E562

Lot No.	Sample	%Fer	Dev.Ferr
		%	%
P2305144	1	46,61	2,04

METALURGICAL TESTS/ENSAYOS METALÚRGICOS/METALLURGISCHE PRÜFUNGEN/ESSAIS METALLURGIQUES

ETCH STRUCTURE ACC. ASTM A923 MET.A: UNAFFECTED STRUCTURE. MATERIAL FREE FROM INTERMETALLIC PHASES AND PRECIPITATES. UNIFORM STRUCTURE ACROSS FULL WALL THICKNESS
EXAMEN DE MICROESTRUCUTRA DE ACUERDO A ASTM A923 MET.A: ESTRUCTURA NO AFECTADA. MATERIAL LIBRE DE FASES INTERMETALICAS Y PRECIPITADOS. ESTRUCTURA UNIFORME A TRAVES DEL ESPESOR.
ETCH STRUCTURE ACC. ASTM A923 MET.A: UNAFFECTED STRUCTURE. MATERIAL FREE FROM INTERMETALLIC PHASES AND PRECIPITATES. UNIFORM STRUCTURE ACROSS FULL WALL THICKNESS

INTERGRANULAR CORROSION TEST ACC. TO ASTM A262 PRACT."E": SATISFACTORY
ENSAYO DE CORROSION INTERGRANULAR DE ACUERDO A ASTM A262 PRACT.E: SATISFACTORIO
BESTÄNDIGKEIT GEGEN INTERKRISTALLINE KORROSION ENTSPRECHEND ASTM A262 PRACT.E: IN ORDNUNG
ESSAI DE CORR. INTERGR. SELON ASTM A262 PRACT.E:SATISFAISANT
INTERGRANULAR CORROSION TEST ACC.TO DIN EN ISO 3651-2 MET.B: SATISFACTORY
ENSAYO DE CORROSION INTERGRANULAR DE ACUERDO A ISO 3651-2 MET.B: SATISFACTORIO
BESTÄNDIGKEIT GEGEN INTERKRISTALLINE KORROSION ENTSPRECHEND ISO 3651-2 MET."B": IN ORDNUNG
ESSAI DE CORR. INTERGR. SELON ASTM ISO 3651-2 MET."B":SATISFAISANT

NON-DESTRUCTIVE TESTS/ENSAYOS NO DESTRUCTIVOS/ZERSTÖRUNGSFREIE PRÜFUNGEN/ESSAIS NON DESTRUCTIFS

FERRITE CONTENT DETERMINED BY FISCHER FERRITOSCOPE TO 100% OF PRODUCTS
CONTENIDO EN FERRITA MEDIDO CON FERRITOSCOPIO SOBRE EL 100% DEL MATERIAL.
Ferritescope-Test auf 100% des Materials.

100% ULTRASONIC TEST ACC. TO ASTM A999 / E213: SATISFACTORY
100% ENSAYO DE ULTRASONIDOS DE ACUERDO A ASTM A999 / E213: SATISFACTORIO
100% ULTRASCHALLPRÜFUNG NACH ASTM A999 / E.213:IN ORDNUNG
100% ESSAI D´ULTRASON D'ACCORD A ASTM A999 / E.213: SATISFAISANTE

100% ULTRASONIC TEST ACC. TO EN 10246-7, U2C: SATISFACTORY
100% ENSAYO DE ULTRASONIDOS DE ACUERDO A EN 10246-7, U2C: SATISFACTORIO
100% ULTRASCHALLPRÜFUNG NACH EN 10246-7, U2C:

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 5 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

IN ORDNUNG
100% ESSAI D´ULTRASON D'ACCORD A EN 10246-7, U2C: SATISFAISANTE
POSITIVE MATERIAL IDENTIFICATION TEST ON EACH TUBE/PIPE BY
"X-RAY-FLUORESCENCE-ANALYZER": SATISFACTORY
VERIFICACION DEL GRADO DE ACERO EN CADA TUBO MEDIANTE "ANALIZADOR DE
FLUORESCENCIA DE RAYOS X": SATISFACTORIO
VERWECHSLUNGSPRUEFUNG AN JEDEM ROHR MIT
"RÖNTGEN-FLUORESZENZ-ANALYSATOR": IN ORDNUNG
VERIFICATION DE LA NUANCE SUR CHAQUE TUBE PAR
"X-RAY-FLUORESCENCE-ANALYZER": SATISFAISANT

HYDROSTATIC PRESSURE TESTED AT 190 bar, 2800 PSI DURING 5 SEC ON EACH
TUBE/PIPE: SATISFACTORY
ENSAYO HIDROSTÁTICO A 190 bar, 2800 PSI DURANTE 5 SEC EN CADA TUBO:
SATISFACTORIO
WASSERDRUCKPRÜFUNG BEI 190 bar, 2800 PSI HALTEZEIT 5 SEC JE ROHR: IN
ORDNUNG
ESSAI DE PRESSION HYDROSTATIQUE À 190 bar, 2800 PSI PENDANT 5 SEC SUR
CHAQUE TUBE: SATISFAISANT

DIMENSIONAL CHECKING ON EACH TUBE: SATISFACTORY
INSPECCION DIMENSIONAL AL 100% DE LOS TUBOS SATISFACTORIA
100% MASSKONTROLLE: O.B.
VERIFICATION DIMENTIONNELLE AU 100% DES TUBES, SATISFAISANTE

VISUAL INSPECTION ON EACH TUBE: SATISFACTORY
INSPECCION VISUAL AL 100% DE LOS TUBOS, SATISFACTORIA
100% BESIGCHTIGUNG: O.B.
EXAMEN VISUEL AU 100% DES TUBES, SATISFAISANT

TECHNOLOGICAL TESTS/ENSAYOS TECNOLÓGICOS/TECHNOLOGISCHE PRÜFUNGEN/TECHNOLOGICAL TESTS

FLATTENING TEST: SATISFACTORY
APLASTADO S.NORMA: SATISFACTORIO
RINGFALTVERSUCH: IN ORDNUNG
ESSAI D'APLATISSEMENT: SATISFAISANT

RING TENSILE TEST: SATISFACTORY

TRACCION DE ANILLO: SATISFACTORIO
RINGZUGVERSUCH: IN ORDNUNG
ESSAI DE TRACTION A L'ANNEAU: SATISFAISANT

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI
TUBACEX
GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 6 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

MARKING/ETIQUETADO/KENNZEICHNUNG/MARKSTEXT

TX2 TX1 TUBACEX 168,28 X 7,11 MM - 6" SCH 40S ASME SA790 ASTM A790 EN 10216-5 TC2 EN 10297-2 S32750 1.4410 HFD HF SMLS HEAT/ PMI-AV LOT NO/MADE IN SPAIN

REMARKS/OBSERVACIONES/ANMERKUNG/REMARQUES

NO MERCURY, MERCURY COMPOUNDS OR MERCURY BEARING INSTRUMENTS AND/OR EQUIPMENT HAVE BEEN USED ALONG MANUFACTURING AND INSPECTION PROCESS.
DURANTE LOS PROCESOS DE FABRICACIÓN E INSPECCIÓN NO SE HA USADO MERCURIO NI INSTRUMENTOS Y/O EQUIPOS CONTENIENDO MERCURIO O CON COMPONENTES DE MERCURIO.
KEINE QUEKSILBER, BZW. QUECKSILBERVERUNREINIGTES KOMPONENTEN ODER KUGELLAGERINSTRUMENTE UND/ODER GERÄTE SIND BENUTZT WORDEN PRODUKTIONS UND BESICHTIGUNGSPROZESS.
IL N'A PAS ÉTÉ FAIT USAGE DE MERCURE, DE COMPOSÉS CONTENANT DU MERCURE OU DE MATÉRIAUX ET/OU D'INSTRUMENT CONTENANT DU MERCURE TOUT AU LONG DES ÉTAPES DE FABRICATION ET DU PROCESSUS D'INSPECTION ET DE CONTRÔLE.

NO WELDING OR WELD REPAIRS WERE MADE
SIN REPARACION POR SOLDADURA
KEINE SCHWEISSBEARBEITUNG WURDE VORGENOMMEN
SANS RÉPARATION AVEC SOUDURE
MATERIAL MANUFACTURER APPROVED BY TÜV SÜD Industrie Service GmbH
(NOTIFIED BODY 036)TO ISSUE CERTIFICATES OF SPECIFIC PRODUCT CONTROL IN
ACCORDING TO PRESSURE EQUIPMENT DIRECTIVE 2014/68/EU ANNEX 1 POINT 4.3.
FABRICANTE DE MATERIALES APROBADO POR TÜV SÜD Industrie Service GmbH (ORGANISMO NOTIFICADO 0036) PARA LA EMISION DE CERTIFICADOS ESPECIFICOS DE CONTROL DE PRODUCTO DE ACUERDO AL ANEXO 1, PUNTO 4.3 DE LA DIRECTIVADE EQUIPOS A PRESION 2014/68/EU.
WERKSTOFFHERSTELLER MIT BERECHTIUNG ZUR AUSSTELLUNG VON BESCHEINIGUNGEN ÜBER SPEZIFISCHE PRÜFUNGEN AN DEN WERKSTOFFEN IM GELTUNGSBEREICH DER ZERTIFIZIERUNG UND IN ÜBEREINSTINSTIMMUNG MIT DER DRUCKGERÄTERICHTLINIE 2014/68/EU UND DEN ZUGRUNDE LIEGENDEN SPEZIFIKATIONEN ENTSPR. DER BENANNTEN STELLE NR.0036, TÜV SÜD Industrie Service GmbH
PRODUCTEUR DU MATERIEL APPROUVE PAR TÜV SÜD Industrie Service GmbH N.B. 0036) POUR EMISSION DES CERTIFICATS SPECIFIQUE DE CONTROLE DE PRODUIT SELON LA DIRECTIVE DES EQUIPES A PRESION 2014/68/EU ANNEXE 1 POINT 4.3.

MATERIAL CHARACTERISTICS COMPLY WITH POINT 7.5 OF ANNEX I TO PED BY HAVING AN ELONGATION AFTER RUPTURE AT TENSILE TEST NO LESS THAN 14% AND A BENDING RUPTURE ENERGY AT IMPACT TEST NO LESS THAN 27J AT 20ºC.
LAS CARACTERISTICAS DEL MATERIAL CUMPLEN CON LOS REQUISITOS DEL PUNTO 7.5 DE LA DIRECTIVA PED POR TENER UN ALARGAMIENTO TRAS ROTURA EN EL ENSAYO DE TRACCION NO INFERIOR AL 14% Y PO DE TRACCION NO INFERIOR AL 14% Y POR TENER UNA RESISTENCIA AL IMPACTO NO INFERIOR A 27 J A 20º C.
DIE WERKSTOFF-WERTE ENTSPRECHEN PUNKT 7.5. DER DGRL, ANHANG 1, MIT EINERBRUCHDEHNUNG = 14% IM NORMGEMÄSS DURCHGEFÜHRTEN ZUGVERSUCH UND DER KERBSCHLAGARBEIT = 27J AN EINER ISO - v PRO PROBE BEI EINER TEMPERATUR VON HÖCHSTENS 20ºC
LES CARACTERISTIQUES DU MATERIEL, AYANT UN ALLONGEMENT APRES RUPTURE A L'ESSAI DE TRACTION NON INFERIEUR DU 14% ET UNE RESISTENCE A LA FLEXION PAR CHOC A 20ºC NON INFERIEUR A 27J, SONT CONFORMES AUX PRESCIPTIONS DU PONT 7.5 DE L'ANNEXE I DE PED.

MATERIAL IS FREE OF RADIATION CONTAMINATION
EL MATERIAL ESTA LIBRE DE CONTAMINACION POR RADIACIONES
MATERIAL IS FREI VON RADIOAKTIVITÄT
MATÉRIEL LIBRE DE POLUTION RADIOACTIVE

AENOR ER Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TUBACEX GROUP

STRUCTURE EXAMINATION

MTC / Certificate
748412

MATERIAL IDENTIFICATION / IDENTIFICACIÓN DEL MATERIAL

Lot No. / Num Lote	**P2305144**	**Dimension** / Dimensión	168,28 x 7,11 mm - 6'SCH 40
Heat / Colada	60418	**Grado de acero /** Steel grade	S32750

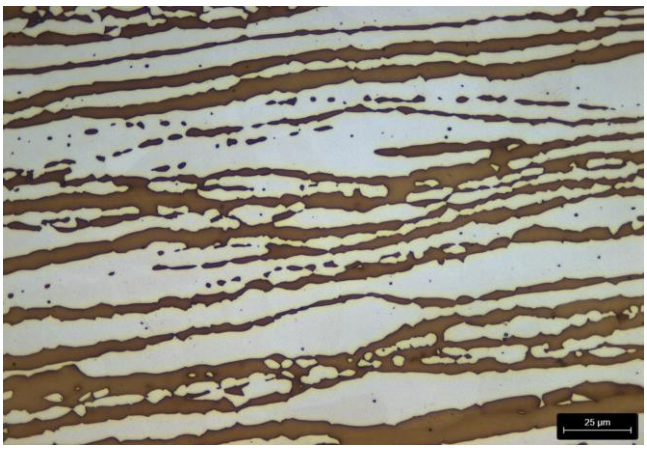
Type Of test / Tipo de Ensayo:	**MICROSTRUCTURE EVALUATION**

RESULTS / RESULTADO

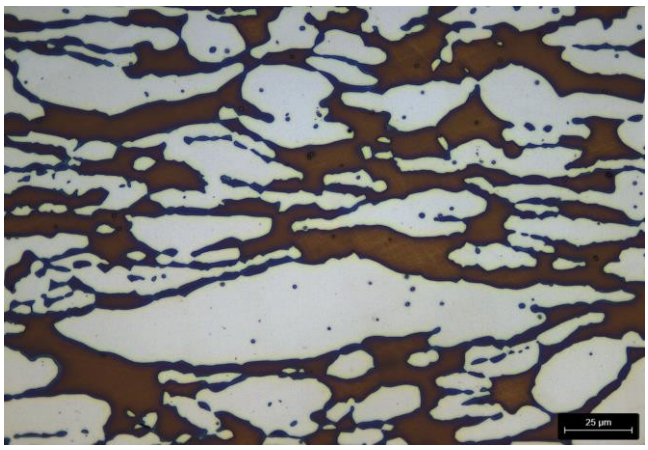
Result: The microestructure is formed by austenite and ferrite. The presence of intermetallic phases or precipitates is not observed. Uniform structure across full wall thickness Etching method according to ASTM E-407.

Resultado: la microestructura está compuesta por austenita y ferrita. No se observa la presencia de fases intermetálicas y precipitados. Estructura uniforme a través de todo el espesor. Método de ataque según ASTM E-407.

GRAPHICS RECORDS / REGISTROS FOTOGRÁFICOS:



Dir: LONGITUDINAL / MAG: 500X /



Dir: TRANSVERSAL / MAG: 500X /

Irene Castro
Responsable del Laboratorio
Laboratory Manager

OFFICINE SANTAFEDE s.r.l.
CAP SOC. € 156.000 INT. VERS
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 - TEL. +39 0341 988411
FAX +39 0341 979919
www.officinesantafede.com
info@officinesantafede.com
info@pec.officinesantafede.com

A104995

CERTIFICATO DI COLLAUDO/TEST CERT. EN 10204/3.1		Cliente/Customer
N.	DATA/DATE	--
D030203	14/07/2020	

DESCRIZIONE/DESCRIPTION

MATERIAL CONFORMING TO ASME SECTION II PART A ED. 2017 AND TO NACE MR0175/ISO 15156 -2015 & NACE MR0103-2016

Item 0020 Commessa 20C0321 Ordine/Order PH018999 AMENDMENT 1 Item Cli./Cust.Item 200 Tag 1: H060WN1004

COLATA/HEAT	MATERIALE/MATERIAL	ACCIAIERIA/STEEL PLANT	N/QTY	DESCRIZIONE/DESCRIPTION	TT/HT
E141482	A/SA 182 F55	OUTOKUMPU	8	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2

Analisi Chimiche / Chemical tests

C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Ca	B	C.Eq.
0,019	0,590	0,310	0,026	0,001	25,100	6,910	3,540			0,670				0,287			

Prove Meccaniche / Mechanical Tests

SNERVAMENTO Yield strength (RP)	ROTTURA Tensile Strength (RM)	ALLUNGAMENTO A%-ELONG	STRIZIONE Z%-REDUCT	TIPO TYPE	TEMP.C°	TEST 1	TEST 2	TEST 3	MEDIA AVERAGE	DUREZZA HARDNESS HB

Note PREN: 41,37
W=0,58
SEE ATTACHED TEST N. 1252/20

VERIFIED TRUE COPY OF ORIGINAL

Item 0020 Commessa 20C0321 Ordine/Order PH018999 AMENDMENT 1 Item Cli./Cust.Item 200 Tag 1: H060WN1004

COLATA/HEAT	MATERIALE/MATERIAL	ACCIAIERIA/STEEL PLANT	N/QTY	DESCRIZIONE/DESCRIPTION	TT/HT
E161501	A/SA 182 F55	OUTOKUMPU	2	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2

Analisi Chimiche / Chemical tests

C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Ca	B	C.Eq.
0,012	0,570	0,290	0,026	0,001	25,430	6,830	3,640			0,590				0,279			

Prove Meccaniche / Mechanical Tests

SNERVAMENTO Yield strength (RP)	ROTTURA Tensile Strength (RM)	ALLUNGAMENTO A%-ELONG	STRIZIONE Z%-REDUCT	TIPO TYPE	TEMP.C°	TEST 1	TEST 2	TEST 3	MEDIA AVERAGE	DUREZZA HARDNESS HB

Note PREN: 41,90
W=0,63
SEE ATTACHED TEST N. 1320/20

Item 0020.A Commessa 20C0321 Ordine/Order PH018999 AMENDMENT 1 Item Cli./Cust.Item 201 Tag 1: H020BL1000

COLATA/HEAT	MATERIALE/MATERIAL	ACCIAIERIA/STEEL PLANT	N/QTY	DESCRIZIONE/DESCRIPTION	TT/HT
E130620	A/SA 182 F55	OUTOKUMPU	8	ASME B16.5 A/SA 182 F55 150 BL RF 2"	2

Analisi Chimiche / Chemical tests

C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Ca	B	C.Eq.
0,018	0,590	0,340	0,023	0,001	25,550	7,150	3,810			0,590				0,280			

Prove Meccaniche / Mechanical Tests

SNERVAMENTO Yield strength (RP)	ROTTURA Tensile Strength (RM)	ALLUNGAMENTO A%-ELONG	STRIZIONE Z%-REDUCT	TIPO TYPE	TEMP.C°	TEST 1	TEST 2	TEST 3	MEDIA AVERAGE	DUREZZA HARDNESS HB
562,0	853,0	27,6	51,2	KV(J)	-50	141,00	147,00	152,00	146,667	236 241

Note PREN: 42,60
W=0,51
SEE ATTACHED TEST N. 1273/20

ALL MATERIAL DELIVERED AS PER ABOVE PO IS IN ACCORDANCE WITH THE RELATIVE SPECIFICATIONS.

a) **Trattamento termico / Heat treatment**
1) Normalizzato a 920°C e raffreddato in aria calma
Normalized at 920°C and cooled in still air
2) Solubilizzato / *Solution treated and quenched*
3) Bonificato / *Quenched and tempered*
4) Normalizzato e rinvenuto / *Normalized and tempered*
5) Vedi descrizione / *See description*

b) I valori delle analisi chimiche sono ricavati dal certificato di Acciaieria
Chemical analisys values are taken from base certificate
c) C. E. = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15
d) Prove secondo ASTM A 370 / *Test conforming to ASTM A 370*
e) Diametro provino 12,5 mm. / *Specimen diameter 12,5 mm.*
Lunghezza provino 50 mm / *Specimen length 50 mm*
Reduced specimens may be used when necessary
f) Dimensioni del provino 10x10x55 mm.
Specimen dimensions 10x10x55 mm.

Controllo visivo e dimensionale soddisfacente / *Satisfactory visual and dimensional check*
Acciaio elaborato al forno elettrico e calmato / *Killed steel made by electric furnace*

TRADE MARK	REDATTO DA / PRINTED BY	APPROVATO DA / APPROVED BY	ENTE COLLAUDATORE / INSPECTING AGENCY
SF	QC M. BENEDETTI	QUALITY MANAGER M. SACCHI	

OFFICINE SANTAFEDE s.r.l.
CAP SOC. € 156.000 I.V. VERS
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 - TEL. +39 0341 988411
FAX +39 0341 979919
www.officinesantafede.com
info@officinesantafede.com
info@pec.officinesantafede.com

CERTIFICATO DI COLLAUDO/TEST CERT. EN 10204/3.1		Cliente/Customer
N.	DATA/DATE	
D030203	14/07/2020	

DESCRIZIONE/DESCRIPTION

MATERIAL CONFORMING TO ASME SECTION II PART A ED. 2017 AND TO NACE MR0175/ISO 15156 -2015 & NACE MR0103-2016

PMI 100%CHECK PASSED

MATERIAL MANUFACTURED WITH AOD PROCESS

HEAT TREATMENT: SOLUTION TREATED TEMP 1050°C-10/+30°c
QUENCHING TEMP. BELOW 260°C
QUENCHING TRANSFER TIME: 60 SEC MAX
SOAKING TIME: 2min/1mm thh.
HOLDING TIME: SOAKING TIME + 2 hours
FOR F55
HEAT TREATMENT: SOLUTION TREATED TEMP 1120°C-10/+30°c
QUENCHING TEMP. BELOW 260°C
QUENCHING TRANSFER TIME: 60 SEC MAX
SOAKING TIME: 2min/1mm thh.
HOLDING TIME: SOAKING TIME + 2 hours

BASE+FINAL PRODUCT IS FROM WEST -EUROPA
FORGING RATIO: 4:1 MIN

FOR F51 QTR 01
FOR F55 QTR 03

MANUFACTURER APPROVED PED 2014/68/EU SECTION 4.3

ALL MATERIAL DELIVERED AS PER ABOVE PO IS IN ACCORDANCE WITH THE RELATIVE SPECIFICATIONS.

a) Trattamento termico / *Heat trestment*
1) Normalizzato a 920°C e raffreddato in aria calma
Normalized at 920° C and cooled in still air
2) Solubilizzato / *Solution treated and quenched*
3) Bonificato / *Quenched and tempered*
4) Normalizzato e rinvenuto / *Normalized and tempered*
5) Vedi descrizione / *See description*

b) I valori delle analisi chimiche sono ricavati dal certificato di Acciaio a
Chemical analsys values are taken from base corldicate
c) C. E. = C + Mn/6 - (Cr + Mo + V)/5 - (Ni + Cu)/15
d) Prove secondo ASTM A 370 / *Test conforming to ASTM A 370*
e) Diametro provino 12,5 mm. / *Specimen diameter 12,5 mm.*
Lunghezza provino 50 mm / *Specimen lengt) 50 mm*
Reduced specimens may be used when necessary
f) Dimensioni del provino 10x10x55 mm.
Specimen dimensions 10x10x55 mm.

Controllo visivo e dimensionale soddisfacente / *Satisfactory visual and dimensional check*
Acciaio elaborato al forno elettrico e calmato / *Killed steel made by electric furnace*

TRADE MARK	REDATTO DA / PRINTED BY	APPROVATO DA / APPROVED BY	ENTE COLLAUDATORE / INSPECTING AGENCY
SF	QC M. BENEDETTI	QA/QC MANAGER M. SACCHI	

OFFLINE

SANTAFEDE s.r.l.

PRODUCT ANALYSIS CERTIFICATE

Customer	Order	Certificate	Date
	PH018999 AMENDMENT 1	D030203	14/07/2020

Equipment	Description	Frequency
Laboratory	CHECK ANALYSIS	1 test each heat

Chemical tests **Analysis %**

Heat	Material	C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Fe	W	Ta	Co	Ca	B	Sb	As	Pb	Ceq	PREN
735109	A/SA 182 F51	0,017	1,511	0,265	0,025	0,000	22,572	5,402	3,069							0,178					0,000	0,0000					35,548
844301	A/SA 182 F51	0,020	1,594	0,511	0,019	0,000	22,556	5,558	3,139	0,006	0,003	0,393	0,009		0,181	0,155					0,000	0,0000					35,395
E140647	A/SA 182 F51	0,024	1,245	0,478	0,020	0,001	22,377	5,553	3,279							0,178											36,046
E142031	A/SA 182 F51	0,018	1,144	0,380	0,019	0,001	22,183	5,616	3,265							0,184											35,902
E150009	A/SA 182 F51	0,018	1,229	0,477	0,024	0,001	22,561	5,487	3,313							0,186											36,470
E151766	A/SA 182 F51	0,018	1,180	0,434	0,026	0,001	22,546	5,492	3,203							0,179											35,980
E170383	A/SA 182 F51	0,021	1,296	0,506	0,020	0,001	22,175	5,611	3,113							0,170											35,168
E181981	A/SA 182 F51	0,018	1,296	0,453	0,023	0,001	22,522	5,531	3,299							0,186											36,385
E182198	A/SA 182 F51	0,020	1,228	0,430	0,025	0,001	22,209	5,663	3,258							0,177											35,792
E182255	A/SA 182 F51	0,022	1,441	0,507	0,022	0,001	22,168	5,650	3,301							0,179											35,925
E190132	A/SA 182 F51	0,021	1,178	0,526	0,023	0,001	22,098	5,461	3,289							0,194											36,056
E190587	A/SA 182 F51	0,021	1,199	0,521	0,023	0,001	22,845	5,619	3,229							0,186											36,477
E191174	A/SA 182 F51	0,018	1,249	0,516	0,023	0,001	22,295	5,603	3,264							0,177											35,896
E191217	A/SA 182 F51	0,020	1,202	0,460	0,023	0,001	22,352	5,470	3,308							0,195											36,388
E191543	A/SA 182 F51	0,019	1,260	0,528	0,025	0,001	22,662	5,682	3,329							0,190											36,686
E200025	A/SA 182 F51	0,020	1,120	0,566	0,023	0,001	22,116	5,679	3,277							0,187											35,922
05040	A/SA 182 F55	0,020	0,501	0,526	0,022	0,000	25,769	6,980	3,672			0,565				0,269		0,684									42,191
185029	A/SA 182 F55	0,013	0,550	0,351	0,020	0,000	24,678	6,869	3,777			0,642				0,258		0,570									41,270
242086	A/SA 182 F55	0,020	0,628	0,591	0,028	0,001	25,552	7,046	3,548			0,590				0,246		0,606			0,000	0,0000					41,196
52391	A/SA 182 F55	0,022	0,563	0,436	0,017	0,000	24,853	7,615	3,537			0,629				0,241		0,630									40,381
57530	A/SA 182 F55	0,016	0,610	0,436	0,022	0,000	24,603	7,293	3,738			0,585				0,245		0,664									40,858
94114	A/SA 182 F55	0,018	0,677	0,512	0,030	0,001	25,534	6,531	3,763	0,003	0,064	0,524	0,012		0,016	0,250		0,569			0,001	0,0030					41,952
E121404	A/SA 182 F55	0,018	0,586	0,360	0,025	0,001	24,935	6,905	3,588			0,659				0,282		0,672									41,287
E121750	A/SA 182 F55	0,015	0,687	0,329	0,024	0,001	24,827	7,057	3,528			0,689				0,292		0,560									41,141
E130620	A/SA 182 F55	0,019	0,609	0,340	0,023	0,001	25,108	7,280	3,821			0,598				0,280		0,517									42,197
E141482	A/SA 182 F55	0,020	0,609	0,315	0,026	0,001	25,822	6,909	3,560			0,663				0,294		0,580									42,274
E142078	A/SA 182 F55	0,015	0,732	0,281	0,026	0,001	25,694	6,678	3,518			0,594				0,288		0,579									41,911
E161501	A/SA 182 F55	0,013	0,566	0,294	0,027	0,001	25,437	6,943	3,613			0,579				0,288		0,527									41,968

OFFICINE SANTAFEDE s.r.l.

PRODUCT ANALYSIS CERTIFICATE

E181G50	A/SA 182 F55	0,015	0,635	0,371	0,023	0,001	25,668	6,761	3,529			0,548				0,275		0,500								41,714

IT. 60 (H. [illegible]) – 120 (H. EK1478) – 130 (H. [illegible]) – 140 (H. [illegible])
IT. 160 (H EK1483) – 170 (H. EK1482) – 200 (H. EK1482)



OFF. SANTAFEDE s.r.l.
CORTABBIO DI PRIMALUNA (LC)

OFFICINE SANTAFEDE S.R.L.
23819 CORTABBIO DI PRIMALUNA (LECCO)
www.officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregere 1 23819 Cortabbio di Primaluna LC

Materiale *Material#* ASME SA/ASTM A182-20 F55 | Colata *Heat#* E141482 | Descrizione *Description#* | Rapporto Nr. *Report Nr.* 1252/20

PROVA DI TRAZIONE — *TENSILE TEST*

Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodo prova *Test Method*	Dimensioni *Dimensions* Ø [mm]	Lo [mm]	Posizione *Position*	Temp. *Temp.* [°C]	Snervamento *Yield Strength offset method* Rp0,2% [MPa]		Rottura *Tensile Strength* Rm [MPa]		Allungam. *Elongation after fracture* A [%]		Strizione *Area Reduc.* Z [%]		Ratio Rp/Rm	Risultato *Result*
20TS0942	2668	ASTM A370-19e1	6,25	25,04	T	23,4	(≥ 550)	568,4	(750 ÷ 895)	795,9	(≥ 25)	40,0	(≥ 45)	77	0,71	COMPLIANT
20TS0942	2668															COMPLIANT
20TS0942	2668															COMPLIANT

PROVA DI DUREZZA — *HARDNESS TEST*

Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodo prova *Test Method*	Tipo *Type*	Durezza *Hardness* Valore Singolo *Single Value*		Media *Average*		Risultato *Result*
20TS0942	2668	ASTM E10-18	HBW 2,5/187,5 (≤ 301)	250	246	244	246,7	COMPLIANT
20TS0942	2668	ASTM E18-20	ROCKWELL HRC (≤ 32)	22,2	22,3	22,6	22,4	COMPLIANT

PROVA DI RESILIENZA — *IMPACT TEST* — *Capacity* 450 J — *Striker radius* 8 mm

Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodo di prova *Test Method*	Dimensioni *Dimensions* SxWxL [mm]	Posizione *Position*	Temp. *Temp.* [°C]	Tipo *Type*	Energia Assorbita [J] *Valore Singolo Single Value*				*Abs. Energy* Media *Average*		Area Duttile [%] *Valore Singolo Single Value*				*Shear Area* Media *Average*		Esp. Laterale [mm] *Valore Singolo Single Value*				*Lateral Exp.* Media *Average*		Risultato *Result*
20TS0942	2669	ASTM E23-18	10x10x55	1/2 thk L	-51	KV	249,9	249,6	250,1	(≥ 50)	249,9	(≥ 65)	100	100	100	(info)	100,0	(info)	2,31	2,30	2,33	(≥ 0,38)	2,31	(info)	COMPLIANT
20TS0942	2670	ASTM E23-18	10x10x55	1/2 thk T	-51	KV	218,1	240,2	222,4	(≥ 35)	226,9	(≥ 45)	100	100	100	(info)	100,0	(info)	2,11	2,20	2,15	(≥ 0,38)	2,15	(info)	COMPLIANT

Tra parentesi i criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04, giudizio di conformità espresso senza considerare l'incertezza di misura / *in brackets acceptance criteria requested by customer in accordance to COLL03 rev.04, statement of conformity without consider the measurement uncertainty*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020				

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

° Dati forniti dal cliente / Campionamento eseguito a cura del cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
° Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.R.L.

23835 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA 1 - TEL. +39 0341 685111 - FAX +39 0341 374913
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1668 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*	Rapporto Nr. *Report Nr.* 1253/20

PROVA DI "PITTING" IN FERRO CLORURO *FERRIC CHLORIDE PITTING TEST* ASTM G48 Met. A

Dati Iniziali *Initial Data*

Prova Nr. *Test Nr.*	Provino *Specimen* ID	Metodo di prova *Test Method* ASTM	Posizione *Position*	Lunghezza *Length* [mm]	Larghezza *Width* [mm]	Spessore *Thickness* [mm]	Area *Area* [cm^2]	Decapaggio *Pickling*
20TS0942	2671	G48-11(2015) Met. A	T	50,02	25,06	10,09	40,22	20% HNO_3 + 5% HF, 60°C for 5 minutes

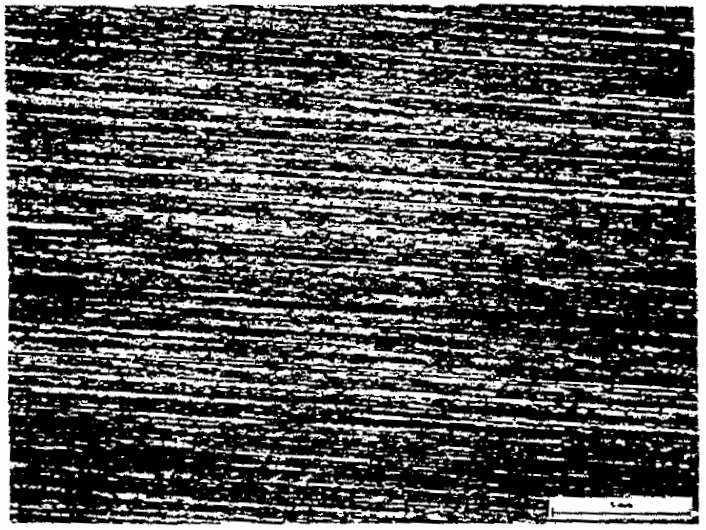
Condizioni Prova *Test Conditions*

Temperatura *Temperature* (°C)	Durata Prova *Test Period* [h]	Soluzione *Solution*	Finitura Superficiale *Surface finish* [grit]
50 ± 0,5	24	100 g of reagent grade ferric chloride, $FeCl_3 \cdot 6H_2O$, in 900 ml of Type IV reagent water (about 6 % $FeCl_3$ by mass)	120

Risultati Prova *Test Results*

Peso iniziale *Initial weight* [g]	Peso finale *Final weight* [g]	Perdita di peso *Weight loss* [g]	Velocità di corrosione *Corrosion rate* [g/m^2]	
98,5609	98,5608	0,0001	≤ 1	0,0

Esame visivo a 20X
Visual examination at 20X



Esame Pits
Pits examination
No pit riscontrati nel campione a 20X
No pits found in the specimen at 20X

Profondità media pits [µm]
Average pits depth [µm]
None

Massima profondità pits [µm]
Maximum pits depth [µm]
None

Densità dei pits [pit/cm^2]
Pits density [pit/cm^2]
None

Risultati
Results
COMPLIANT

Criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04, giudizio di conformità espresso senza considerare l'incertezza di misura / *Acceptance criteria requested by customer in accordance to COLL03 rev.04, statement of conformity without consider the measurement uncertainty*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H – Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*
25/05/2020	08/06/2020 ÷ 09/06/2020	09/06/2020			

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
 # Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.r.l.
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA 1 - TEL. +39 0341 995111 - FAX +39 0341 995199
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*		Rapporto Nr. *Report Nr.*	1256/20

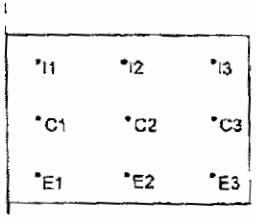
PROVA DI DUREZZA SU SEZIONE MACRO / HARDNESS TEST ON MACRO SECTION

	Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodi di Prova *Test Methods ASTM*	Tipo di Durezza *Hardness Type*
Dati Iniziali *Initial Data*	20TS0942	2673	E18-20	ROCKWELL HRC

Section A

Risultati Prova *Test Results*

INT 1 mm		*1/2 thk*		*EXT* 1 mm	
I1	23,1	C1	22,2	E1	23,4
I2	23,6	C2	22,6	E2	23,6
I3	23,9	C3	22,9	E3	23,3



Requisito Durezza *Hardness required*	≤ 32	ROCKWELL HRC	Risultati *Results*	COMPLIANT

Criteri di accettabilità richiesti dal cliente in accordo a COL03 rev.06, giudizio di conformità espresso senza considerare l'incertezza di misura / Acceptance criteria requested by customer in accordance to COL03 rev 04, statement of conformity without consider the measurement uncertainty

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk – Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020				

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

#Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
#Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.R.L.
23819 CORTABBIO DI PRIMALUNA (LECCO)
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*		Rapporto Nr. *Report Nr.*	1254/20

ESAME METALLOGRAFICO E DETERMINAZIONE DELLA FRAZIONE DI VOLUME TRAMITE CONTEGGIO MANUALE SISTEMATICO DEI PUNTI — ASTM E562

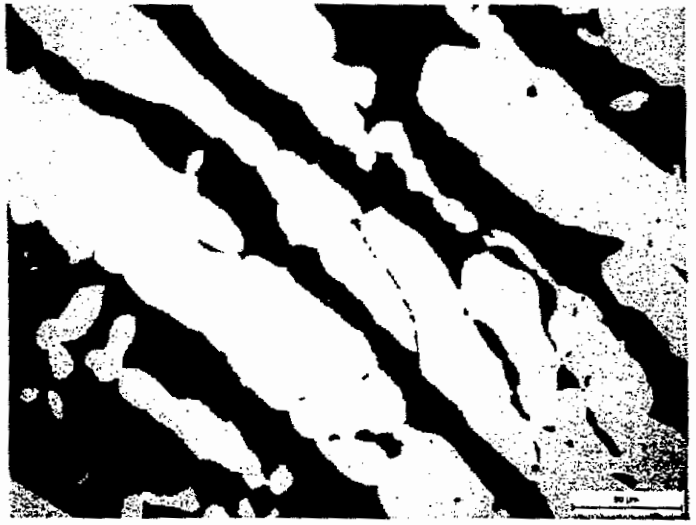
METALLOGRAPHIC EXAMINATION AND DETERMINING VOLUME FRACTION BY SYSTEMATIC MANUAL POINT COUNT

	Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodi di Prova *Test Methods* ASTM	Posizione *Position*
Dati Iniziali *Initial Data*	20TS0942	2672	E562-19, E3-11(2017) + E407-07(2015)e1	T

	Descrizione griglia *Grid description*	Numero campi *Number of fields*	Spaziatura Campi *Fields spacing*	Numero sezioni *Number of sections*
Condizioni Prova *Test Conditions*	25 points	30	Random	1 (20x20 mm)

Esame al microscopio a 400X *Microscope examination at 400X* — Attacco *Etching*: Electrolytic with 40 g of reagent grade NaOH to 100 g of distilled water (40% NaOH) — ASTM E407 Etchant nr. 220

Risultati Prova *Test Results*				
Frazione volume della Ferrite *Ferrite volume fraction*	49,4	%	(40 55%) *Required*
Deviazione Standard *Standard Deviation (s)*	4,1	%	
Intervallo di Confidenza *Confidence interval (95% CI)*	1,5	%	
Accuratezza Relativa *Relative Accuracy (% RA)*	3,1	%	
Struttura *Structure*	Austenite e Ferrite *Austenite and Ferrite*		
Risultati *Results*	COMPLIANT		



RAW DATA (%)	
52	48
53	47
54	50
46	46
48	42
51	52
49	48
56	56
54	55
47	51
44	42
48	46
46	54
42	54
50	50

Tra parentesi i criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04, giudizio di conformità espresso senza considerare l'incertezza di misura / *in brackets acceptance criteria requested by customer in accordance to COLL03 rev.04, statement of conformity without consider the measurement uncertainty*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020			

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presentati sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
 # Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.r.l.
23815 CORTABBIO DI PRIMALUNA (LECCO)
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*		Rapporto Nr. *Report Nr.*	1255/20

ESAME METALLOGRAFICO — *METALLOGRAPHIC EXAMINATION*

	Prova Nr. *Test Nr.*	Provino *Specimen ID*	Posizione *Position*	Metodi di Prova *Test Methods* ASTM
Dati Iniziali *Initial Data*	20TS0942	26/2	T	E3-11(2017) + E407-07(2015)e1

Condizioni Prova *Test Conditions*

Numero sezioni *Number of sections*: 1 (20x20 mm)

Esame al microscopio a 400X *Microscope examination at 400X* — Attacco *Etching*: Electrolytic with Oxalic Acid 10% + Electrolytic with 20 g of reagent grade NaOH to 100 g of distilled water (NaOH 20%) — ASTM E407 Etchant nr. 13 (a) + 220

Risultati Prova *Test Results*

Struttura *Structure*: Austenite e Ferrite

Precipitati assenti, Carburi assenti, Fasi intermetalliche assenti, Nitruri assenti

Austenite and Ferrite

Precipitates absence, Carbides absence, Intermetallic phases absence, Nitrides absence



Risultati *Results*: COMPLIANT

Criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04 / *Acceptance criteria requested by customer in accordance to COLL03 rev.04*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020				

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

* Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
* *Data provided by the customer / Sampling performed by customer / Test results only rojers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory*

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

% FERRITE CONTENT REPORT

Nr. D03020:

CUSTOMER	ORDER	JOB
	PH018999 AMENDMENT 1	20C0321

SURFACE	INSTRUMENT	CALIBRATION	DESCRIPTION METHOD
MACHINED	Ferritoscope Fisher FMP30	Daily	4 READING EACH PIECE

PRODUCT

Item	Description	Q.ty	N Heat	Ferrite %
0001	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	5	E142078	51
0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	E141482	49
0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	8	E142078	48
0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	185029	50
0003	ASME B16.5 A/SA 182 F55 300 BL RF 1"	5	94114	50
0004	ASME B16.5 A/SA 182 F55 600 BL RF 1"	5	52391	47
0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	9	E181650	48
0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	6	E130620	53
0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	2	185029	51
0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	13	57530	47
0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	2	E130620	48
0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	3	94114	45
0009	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	5	E121404	51
0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	3	E121750	47
0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	2	05040	44
0012	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	30	E142078	46
0013	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	20	E142078	51
0014	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	10	E142078	50
0015	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	20	E181650	50
0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	1	E141482	48
0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	19	E181650	49
0017	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	10	E141482	45
0018	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	10	E181650	49
0019	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	10	E161501	51
0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	8	E141482	43
0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2	E161501	49
0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	4	242086	52
0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E130620	47
0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E141482	45
0023	ASME B16.5 A/SA 182 F51 150 BL RF 3/4"	20	E190132	49
0024	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1"	20	E182198	50
0025	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1" 1/2	5	735109	52
0026	ASME B16.5 A/SA 182 F51 150 BL RF 2"	40	E190132	48
0027	ASME B16.5 A/SA 182 F51 300 BL RF 2"	20	E191543	47
0028	ASME B16.5 A/SA 182 F51 150 BL RF 4"	15	E151766	49
0030	ASME B16.5 A/SA 182 F51 300 BL RF 6"	5	E182255	49
0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	1	E142031	52
0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	4	E170383	53
0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E140947	47
0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E150009	45
0034	ASME B16.5 A/SA 182 F51 2500 BL RTJ 1"	5	E191543	43
0035	ASME B16.5 A/SA 182 F51 300 WN RF 1/2" SCH 80S	10	844301	49
0036	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 40S	20	E181981	51
0037	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 80S	10	E181981	50
0038	ASME B16.5 A/SA 182 F51 600 WN RF 2" SCH 40S	20	E182198	50
0039	ASME B16.5 A/SA 182 F51 300 WN RF 3" SCH 10S	15	E191217	49
0040	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 10S	20	E190587	50
0041	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 40S	5	E190587	47
0042	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 80S	10	E190587	52

0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	4	E200025	51
0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	6	E191174	49

Pozzoli Michele		Invernizzi Irene	14/07/2020

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 986411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

POSITIVE MATERIAL IDENTIFICATION

Nr. D030203/2

CUSTOMER:
ORDER: PH018999 AMENDMENT 1
EQUIPMENT: NITON XL800 S

SAMPLING: Test All Forgings
DATE OF TEST: 14/07/2020

Test according to: PMI PROCEDURE COLL. 06

Item	Description	Heat	Material	Qtà
10	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	E142078	A/SA 182 F55	5
Tag	Tag 1: H005BL3000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
24,467	25,852	6,692	6,854	3,517	3,613	0,573	0,584										5	//

Item	Description	Heat	Material	Qtà
20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	185029	A/SA 182 F55	1
Tag	Tag 1: H010BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
25,925	25,925	6,921	6,921	3,781	3,781	0,572	0,572										1	//

Item	Description	Heat	Material	Qtà
20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E141482	A/SA 182 F55	1
Tag	Tag 1: H010BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
24,718	24,718	6,847	6,847	3,563	3,563	0,580	0,580										1	//

Item	Description	Heat	Material	Qtà
20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E142078	A/SA 182 F55	8
Tag	Tag 1: H010BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
24,467	25,993	6,659	6,872	3,517	3,613	0,573	0,584										8	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
30	ASME B16.5 A/SA 182 F55 300 BL RF 1"	94114	A/SA 182 F55	5
Tag	Tag 1: H010BL3000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,004	25,378	6,426	6,557	3,733	3,797	0,571	0,590											5	//

Item	Description	Heat	Material	Qtà
40	ASME B16.5 A/SA 182 F55 600 BL RF 1"	52391	A/SA 182 F55	5
Tag	Tag 1: H010BL6000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,184	25,684	7,367	7,611	3,523	3,569	0,617	0,632											5	//

Item	Description	Heat	Material	Qtà
50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E130620	A/SA 182 F55	6
Tag	Tag 1: H030BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,779	25,818	7,056	7,180	3,780	3,847	0,501	0,515											6	//

Item	Description	Heat	Material	Qtà
50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E181650	A/SA 182 F55	9
Tag	Tag 1: H030BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,151	25,159	6,717	6,881	3,498	3,573	0,581	0,598											9	//

Item	Description	Heat	Material	Qtà
60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	185029	A/SA 182 F55	2
Tag	Tag 1: H040BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
25,628	25,925	6,779	6,921	3,781	3,791	0,572	0,572											2	//

Item	Description	Heat	Material	Qtà
60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	57530	A/SA 182 F55	13
Tag	Tag 1: H040BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,525	25,956	7,232	7,502	3,644	3,750	0,645	0,664											13	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	94114	A/SA 182 F55	3
Tag	Tag 1: H080BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,772	25,606	6,516	6,656	3,760	3,822	0,571	0,579											3	//

Item	Description	Heat	Material	Qtà
80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	E130620	A/SA 182 F55	2
Tag	Tag 1: H080BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,576	25,741	7,094	7,170	3,804	3,865	0,502	0,512											2	//

Item	Description	Heat	Material	Qtà
90	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	E121404	A/SA 182 F55	5
Tag	Tag 1: H020BL15J0			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,466	25,135	6,699	6,903	3,566	3,642	0,649	0,670											5	//

Item	Description	Heat	Material	Qtà
110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	05040	A/SA 182 F55	2
Tag	Tag 1: H010WN3004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,895	25,449	6,948	7,069	3,643	3,688	0,688	0,690											2	//

Item	Description	Heat	Material	Qtà
110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	E121750	A/SA 182 F55	3
Tag	Tag 1: H010WN3004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,394	25,550	6,801	6,949	3,514	3,588	0,541	0,557											3	//

Item	Description	Heat	Material	Qtà
120	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	E142078	A/SA 182 F55	30
Tag	Tag 1: H020WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,155	25,935	6,567	6,909	3,519	3,621	0,572	0,590											30	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 9884 1
FAX +39 0341 979919

Item	Description	Heat	Material	Qtà
130	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	E142078	A/SA 182 F55	20
Tag	Tag 1: H020WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,331	26,000	6,692	6,914	3,517	3,614	0,571	0,591									20	//

Item	Description	Heat	Material	Qtà
140	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	E142078	A/SA 182 F55	10
Tag	Tag 1: H020WN1008			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,171	25,993	6,659	6,872	3,517	3,613	0,572	0,584									10	//

Item	Description	Heat	Material	Qtà
150	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	E181650	A/SA 182 F55	20
Tag	Tag 1: H030WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,137	25,975	6,684	6,920	3,495	3,592	0,579	0,601									20	//

Item	Description	Heat	Material	Qtà
160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E141482	A/SA 182 F55	1
Tag	Tag 1: H040WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
25,811	25,811	6,888	6,888	3,603	3,603	0,571	0,571									1	//

Item	Description	Heat	Material	Qtà
160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E181650	A/SA 182 F55	19
Tag	Tag 1: H040WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,095	25,985	6,683	6,946	3,496	3,587	0,579	0,601									19	//

Item	Description	Heat	Material	Qtà
170	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	E141482	A/SA 182 F55	10
Tag	Tag 1: H040WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,180	25,688	6,815	6,982	3,507	3,583	0,571	0,588									10	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
180	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	E181650	A/SA 182 F55	10
Tag	Tag 1: H040WN3001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,269	25,975	6,684	6,917	3,498	3,592	0,579	0,596											10	//

Item	Description	Heat	Material	Qtà
190	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	E161501	A/SA 182 F55	10
Tag	Tag 1: H060WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,510	25,886	6,703	6,937	3,607	3,701	0,522	0,540											10	//

Item	Description	Heat	Material	Qtà
200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E141482	A/SA 182 F55	8
Tag	Tag 1: H060WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,180	25,189	6,815	6,952	3,507	3,583	0,571	0,588											8	//

Item	Description	Heat	Material	Qtà
200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E161501	A/SA 182 F55	2
Tag	Tag 1: H060WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,686	24,756	6,703	6,925	3,680	3,700	0,524	0,535											2	//

Item	Description	Heat	Material	Qtà
201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	242086	A/SA 182 F55	4
Tag	Tag 1: H020BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,915	25,512	7,096	7,220	3,542	3,605	0,608	0,616											4	//

Item	Description	Heat	Material	Qtà
201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E130620	A/SA 182 F55	8
Tag	Tag 1: H020BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,866	25,952	7,012	7,272	3,775	3,834	0,504	0,512											8	//

OFFICINE
SANTAFEDE s.r.l

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E141482	A/SA 182 F55	8
Tag	Tag 1: H020BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,180	25,189	6,815	6,952	3,507	3,583	0,571	0,588											8	//

PERFORMED	INSPECTOR	APPROVED	DATE
Pozzoli Michele		Invernizzi Irene	14/07/2020

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

ULTRASONIC EXAMINATION REPORT

UT N° UT703/2020

CUSTOMER	P.O.	JOB
1	PH018999 AMENDMENT 1	20C0321
SPECIFICATION	**PROCEDURE**	
ASTM A388 (ES 247 Tab.2)		
APPARATUS	**SURFACE CONDITION**	
Olympus EPOCH 650	Machined	
COUPLANT	**SENSITIVITY**	
FYp	DAC +6dB	
REFERENCE BLOCK	**NOTE**	
BCDS		

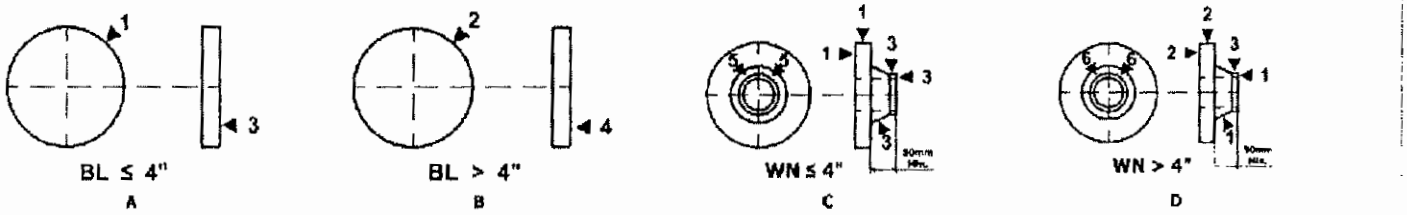
TRANSDUCERS

Position	Transducer Type	MHz	Straight	Angle	Dimension	Element	Serial	Trade
1	PF2 R-10	2	0°		Dia.10	Single		Panametrics
2	PF2 R-24	2	0°		Dia.24	Single		Panametrics
3	DL4R 3.5x10	4	0°		3,5x10	Double		Panametrics
4	DL4R 6x20	4	0°		6x20	Double		Panametrics
5	AM4R	4		45°	8x9	Single		Panametrics
6	AM2R	2		45°	20x22	Single		Panametrics

CALIBRATIONS

Calibration Type	Calibration Description
DAC-NOTCH	60Deg V-Notch, Depth <3%T mm
ECHO	Reference Echo

SCAN PLANS



ITEMS

Q.ty	Item	Object	Heat	Tag	Scanning
5	0001	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	E142078	H005BL3000	A
8	0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E142078	H010BL1000	A
1	0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E141482	H010BL1000	A
1	0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	185029	H010BL1000	A
5	0003	ASME B16.5 A/SA 182 F55 300 BL RF 1"	94114	H010BL3000	A
5	0004	ASME B16.5 A/SA 182 F55 600 BL RF 1"	52391	H010BL6000	A
9	0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E181650	H030BL1000	A
6	0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E130620	H030BL1000	A
2	0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	185029	H040BL1000	A
13	0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	57530	H040BL1000	A
2	0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	E130620	H080BL1000	B
3	0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	94114	H080BL1000	B
5	0009	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	E121404	H020BL15J0	A
2	0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	05040	H010WN3004	C
3	0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	E121750	H010WN3004	C
30	0012	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	E142078	H020WN1001	C

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

ULTRASONIC EXAMINATION REPORT — UT N° UT703/2020

ITEMS

Q.ty	Item	Object	Heat	Tag	Scanning
20	0013	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	E142078	H020WN1004	C
10	0014	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	E142078	H020WN1008	C
20	0015	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	E181650	H030WN1001	C
1	0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E141482	H040WN1001	C
19	0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E181650	H040WN1001	C
10	0017	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	E141482	H040WN1004	C
10	0018	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	E181650	H040WN3001	C
10	0019	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	E161501	H060WN1001	D
8	0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E141482	H060WN1004	D
2	0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E161501	H060WN1004	D
8	0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E130620	H020BL1000	A
8	0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E141482	H020BL1000	A
4	0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	242086	H020BL1000	A
20	0023	ASME B16.5 A/SA 182 F51 150 BL RF 3/4"	E190132	J007BL1000	A
20	0024	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1"	E182198	J010BL15J0	A
5	0025	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1" 1/2	735109	J015BL15J00	A
40	0026	ASME B16.5 A/SA 182 F51 150 BL RF 2"	E190132	J020BL1000	A
20	0027	ASME B16.5 A/SA 182 F51 300 BL RF 2"	E191543	J020BL3000	A
15	0028	ASME B16.5 A/SA 182 F51 150 BL RF 4"	F151766	J040BL1000	A
5	0030	ASME B16.5 A/SA 182 F51 300 BL RF 6"	E182255	J060BL3000	B
1	0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	E142031	J080BL3000	B
1	0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	E170383	J080BL3000	B
1	0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	E150009	J120BL3000	B
1	0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	E140947	J120BL3000	B
5	0034	ASME B16.5 A/SA 182 F51 2500 BL RTJ 1"	E191543	J010BL25J0	A
10	0035	ASME B16.5 A/SA 182 F51 300 WN RF 1/2" SCH 80S	844301	J005WN3008	C
20	0036	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 40S	E181981	J015WN3004	C
10	0037	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 80S	E181981	J015WN3008	C
20	0038	ASME B16.5 A/SA 182 F51 600 WN RF 2" SCH 40S	E182198	J020WN6004	C
15	0039	ASME B16.5 A/SA 182 F51 300 WN RF 3" SCH 10S	E191217	J030WN3001	C
20	0040	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 10S	E190587	J040WN3001	C
5	0041	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 40S	E190587	J040WN3004	C
10	0042	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 80S	E190587	J040WN3008	C
4	0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	E200025	J080WN3004	D
6	0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	E191174	J080WN3004	D

ACCEPTABLE		REPORTABLE INDICATIONS
■ YES	☐ NO	No reportable indications

OPERATOR	INSPECTOR	APPROVED	DATE
Panepinto Samuele SNT/ACCTA Level II; EN ISO 9712 Level 2			14/07/2020 0.00.00

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

CERTIFICATO DI ESAME LIQUIDI PENETRANTI

DYE PENETRANT EXAMINATION CERTIFICATE

LP n° D030203/1

Mod. COLL PC 13 rev. 2

CLIENTE/Customer	ORDINE/Order	COMMESSA/Job
	PH018999 AMENDMENT 1	20C0321

SPECIFICA/Specification	PROCEDURA/Procedure
ASME VIII DIV:1 App.8	Off.Santafede Coll 09

CONDIZIONI SUPERFICIALI/Surface Condition	SUPERFICI ESAMINATE/Examinated Surface
Lavorata/Machined	100% superfici accessibili/accessibile surface

METODO/Method	
Contrasto Di Colore/Color Contrast	Lavabili con acqua/Water washable
SGRASSATORE/Cleaner	PENETRANTE/Penetrant
Acetone o equivalente/ Aceton or equivalent	DeltaFlux - RED PENETRANT HD
PULITORE/Remover	RILEVATORE/Developer
Acqua/Water	DeltaFlux - WHITE DEVELOPER HD

MINIMO TEMPO DI PENETRAZIONE/Minimum Penetration Time	TEMPO DI SVILUPPO/Developing Time
Minuti/Minute 10	Min 10 Max 30 Minuti/Minute

PRODOTTO/Product

CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0001	10	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	5	E142078
Tag	Tag 1: H005BL3000				
Conform	0002	20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	8	E142078
Tag	Tag 1: H010BL1000				
Conform	0002	20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	E141482
Tag	Tag 1: H010BL1000				
Conform	0002	20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	185029
Tag	Tag 1: H010BL1000				
Conform	0003	30	ASME B16.5 A/SA 182 F55 300 BL RF 1"	5	94114
Tag	Tag 1: H010BL3000				
Conform	0004	40	ASME B16.5 A/SA 182 F55 600 BL RF 1"	5	52391
Tag	Tag 1: H010BL6000				
Conform	0005	50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	9	E181650
Tag	Tag 1: H030BL1000				
Conform	0005	50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	6	E130620
Tag	Tag 1: H030BL1000				
Conform	0006	60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	13	57530
Tag	Tag 1: H040BL1000				

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Date
Pozzoli Michele, SNT TC 1A Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

PRODOTTO/Product					
CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0006	60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	2	185029
Tag	Tag 1: H040BL1000				
Conform	0008	80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	3	94114
Tag	Tag 1: H080BL1000				
Conform	0008	80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	2	E130620
Tag	Tag 1: H080BL1000				
Conform	0009	90	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	5	E121404
Tag	Tag 1: H020BL1500				
Conform	0011	110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	2	05040
Tag	Tag 1: H010WN3004				
Conform	0011	110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	3	E121750
Tag	Tag 1: H010WN3004				
Conform	0012	120	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	30	E142078
Tag	Tag 1: H020WN1001				
Conform	0013	130	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	20	E142078
Tag	Tag 1: H020WN1004				
Conform	0014	140	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	10	E142078
Tag	Tag 1: H020WN1008				
Conform	0015	150	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	20	E181650
Tag	Tag 1: H030WN1001				
Conform	0016	160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	19	E181650
Tag	Tag 1: H040WN1001				
Conform	0016	160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	1	E141482
Tag	Tag 1: H040WN1001				
Conform	0017	170	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	10	E141482
Tag	Tag 1: H040WN1004				
Conform	0018	180	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	10	E181650
Tag	Tag 1: H040WN3001				
Conform	0019	190	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	10	E161501
Tag	Tag 1: H060WN1001				
Conform	0020	200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2	E161501
Tag	Tag 1: H060WN1004				
Conform	0020	200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	8	E141482
Tag	Tag 1: H060WN1004				

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Date
Pozzoli Michele, SNT TC 1A Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

OFFICINE SANTAFEDE S.r.l.
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

CERTIFICATO DI ESAME LIQUIDI PENETRANTI

DYE PENETRANT EXAMINATION CERTIFICATE

LP n° D030203/1

Mod. COLL PC 13 rev. 2

PRODOTTO/Product					
CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0020.A	201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	4	242086
Tag	Tag 1: H020BL1000				
Conform	0020.A	201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E130620
Tag	Tag 1: H020BL1000				
Conform	0020.A	201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E141482
Tag	Tag 1: H020BL1000				
Conform	0023	230	ASME B16.5 A/SA 182 F51 150 BL RF 3/4"	20	E190132
Tag	Tag 1: J007BL1000				
Conform	0024	240	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1"	20	E182198
Tag	Tag 1: J010BL15J0				
Conform	0025	250	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1" 1/2	5	735109
Tag	Tag 1: J015BL15J00				
Conform	0026	260	ASME B16.5 A/SA 182 F51 150 BL RF 2"	40	E190132
Tag	Tag 1: J020BL1000				
Conform	0027	270	ASME B16.5 A/SA 182 F51 300 BL RF 2"	20	E191543
Tag	Tag 1: J020BL3000				
Conform	0028	280	ASME B16.5 A/SA 182 F51 150 BL RF 4"	15	E151766
Tag	Tag 1: J040BL1000				
Conform	0030	300	ASME B16.5 A/SA 182 F51 300 BL RF 6"	5	E182255
Tag	Tag 1: J060BL3000				
Conform	0032	320	ASME B16.5 A/SA 182 F51 300 BL RF 8"	1	E142031
Tag	Tag 1: J080BL3000				
Conform	0032	320	ASME B16.5 A/SA 182 F51 300 BL RF 8"	4	E170383
Tag	Tag 1: J080BL3000				
Conform	0033	330	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E140947
Tag	Tag 1: J120BL3000				
Conform	0033	330	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E150009
Tag	Tag 1: J120BL3000				
Conform	0034	340	ASME B16.5 A/SA 182 F51 2500 BL RTJ 1"	5	E191543
Tag	Tag 1: J010BL25J0				
Conform	0035	350	ASME B16.5 A/SA 182 F51 300 WN RF 1/2" SCH 80S	10	844301
Tag	Tag 1: J005WN3808				
Conform	0036	360	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 40S	20	E181981
Tag	Tag 1: J015WN300M				

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Date
Pozzoli Michele, SNT TC 1A Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

OFFICINE SANTAFEDE s.r.l.
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

CERTIFICATO DI ESAME LIQUIDI PENETRANTI

DYE PENETRANT EXAMINATION CERTIFICATE

LP n° D030203/1

Mod. COLL PC 13 rev. 2

PRODOTTO/Product					
CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0037	370	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 80S	10	E181981
Tag	Tag 1: J015WN3008				
Conform	0038	380	ASME B16.5 A/SA 182 F51 600 WN RF 2" SCH 40S	20	E182198
Tag	Tag 1: J020WN6004				
Conform	0039	390	ASME B16.5 A/SA 182 F51 300 WN RF 3" SCH 10S	15	E191217
Tag	Tag 1: J030WN3001				
Conform	0040	400	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 10S	20	E190587
Tag	Tag 1: J040WN3001				
Conform	0041	410	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 40S	5	E190587
Tag	Tag 1: J040WN3004				
Conform	0042	411	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 80S	10	E190587
Tag	Tag 1: J040WN3008				
Conform	0044	430	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	4	E200025
Tag	Tag 1: J080WN3004				
Conform	0044	430	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	6	E191174
Tag	Tag 1: J080WN3004				

NOTE/Notes
Nessuna indicazione registrabile/No registrable indication

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Data
Pozzoli Michele, SNT TC 1A/ Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

A108075

officine alberoglio
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.98341
Fax 0341.983498 - 983497
lino.uberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
INSPECTION CERTIFICATE
CERTIFICAT D'ESSAIS

N. 166072 | DATA / DATE 17/06/21 | SHEET / 1/3

EN 10204 3.1

ORDINE / ORDER / C.DE: PH021077

DATA / DATE: 13/01/21 | COMMESSA: 68053

N. RIF.	ITEM	N / QUANTITY	DESCRIZIONE / DESCRIPTION / DÉSIGNATION	NOTE
SI 266	1530	5	A182F55 10" WN 150 RF SCH 10S	125-250AARH P331 QTR Nr. 3 / MDS D54 / MS11
SI198	1550	5	A182F55 12" WN 300 RF SCH 10S	125-250AARH P369 QTR Nr. 3 / MDS D54 / MS12
SI247	1400	15	A182F55 4" WN 300 RF SCH 10S	125-250AARH P71 QTR Nr. 3 / MDS D54 / MS11
SI247	1440	20	A182F55 6" WN 150 RF SCH 10S	125-250AARH P71 QTR Nr. 3 / MDS D54 / MS11
SI247	1450	30	A182F55 6" WN 150 RF STD/40S	125-250AARH P71 QTR Nr. 3 / MDS D54 / MS11
SI251	1230	25	A182F55 1 1/2" WN 150 RF STD/40S	125-250AARH P1465 QTR Nr. 3 / MDS D54 / MS11
SI253	1330	10	A182F55 3" WN 300 RF SCH 10S	125-250AARH P278 QTR Nr. 3 / MDS D54 / MS11
SI253	1340	20	A182F55 3" WN 300 RF STD/40S	125-250AARH P278 QTR Nr. 3 / MDS D54 / MS11
SI253	1380	20	A182F55 4" WN 150 RF STD/40S	125-250AARH P278 QTR Nr. 3 / MDS D54 / MS11
SI253	1480	25	A182F55 8" WN 150 RF SCH 10S	125-250AARH P489 QTR Nr. 3 / MDS D54 / MS11
SI258	1300	20	A182F55 3" WN 150 RF SCH 10S	125-250AARH P1756 QTR Nr. 3 / MDS D54 / MS11

N.	MATERIALE / MATERIAL / MATÉRIEL	HEAT / COULÉE	ACCIAIERIA / STEEL PLANT / ACIÉRIE	ORIGIN. CENT. / CENT. D'ORIGIN
SI 266	ASTM A182 F55	537832	SANDVIK	A/16-551986
SI198	ASTM A182 F55	543526	SANDVIK Refining method A.O.D.	A/15-527141
SI247	ASTM A182 F55	555083	SANDVIK Refining method A.O.D.	A/19-803842
SI251	ASTM A182 F55	557008	SANDVIK Refining method A.O.D.	A/19-844100
SI253	ASTM A182 F55	557009	SANDVIK Refining method A.O.D.	A/19-844101
SI258	ASTM A182 F55	557529	SANDVIK Refining method A.O.D.	A/19-855827
	ASME SA182F55			

ANALISI CHIMICA / CHEMICAL ANALYSIS / COMPOSITION CHIMIQUE

N. RIF.	C	Mn	Si	S	P	Cr	Ni	Mo	N	W	Cu			PRE
Min						24,000	6,000	3,000	0,200	0,500	0,500			40,000
Max	0,030	1,000	1,000	0,010	0,030	26,000	8,000	4,000	0,300	1,000	1,000			
SI 266Lad	0,016	0,560	0,280	0,000	0,022	25,170	6,760	3,760	0,258	0,590	0,540			41,706
SI 266Che	0,015	0,547	0,267	0,000	0,021	25,110	6,700	3,730	0,257	0,584	0,534			41,530
SI198Ladl	0,013	0,590	0,340	0,000	0,017	25,230	6,760	3,850	0,253	0,600	0,630			41,983
SI198Chec	0,023	0,603	0,353	0,000	0,017	25,300	6,830	3,880	0,254	0,607	0,637			42,170
SI247Ladl	0,016	0,640	0,240	0,000	0,022	25,360	6,780	3,750	0,255	0,570	0,580			41,815
SI247Chec	0,016	0,651	0,251	0,000	0,022	25,410	6,830	3,780	0,256	0,575	0,585			41,980
SI251Ladl	0,016	0,550	0,360	0,000	0,022	25,290	6,800	3,770	0,255	0,580	0,600			41,811
SI251Chec	0,015	0,548	0,358	0,000	0,021	25,280	6,790	3,770	0,255	0,579	0,599			41,800
SI253Ladl	0,016	0,590	0,300	0,000	0,024	25,250	6,820	3,740	0,259	0,620	0,560			41,736
SI253Chec	0,016	0,602	0,312	0,000	0,024	25,310	6,880	3,770	0,260	0,626	0,566			41,910
SI258Ladl	0,015	0,590	0,350	0,000	0,022	25,280	6,790	3,760	0,260	0,580	0,610			41,848
SI258Chec	0,014	0,577	0,337	0,000	0,021	25,220	6,730	3,730	0,259	0,574	0,604			41,670

PROVE MECCANICHE / MECHANICAL TESTS / ESSAIS MECANIQUES

N. RIF.	a mm.	SO mm.2	LU mm.	RE.-YIELD LIMITE	R.-TENSILE RUPTURE	A. %-ELONG. ALLONGEM.	C. %-REDUCT. STRICTION	RESILIENZA / IMPACT TEST / RESILIENCE MEDIO / AVERAGE MOYEN	MINIMO MINIMUM	TIPO TYPE	TEMP.	HARDNESS / DURETÉ
				MPA	MPA			Joule	Joule			H R C
				550,00	750-895	25,00	45,00	65	50		°C	max. 32
P331	12,50	122,65	50,00	591,00	805,00	30,10	63,46					22/24/24
LONG T/2								127	171	227	KV	- 51	24/25/25
L.E								1,2	1,4	1,5	mm		23/24/25
TRAN T/2								103	169	152	KV	- 51	
L.E								1,0	1,4	1,3	mm		

TRADE MARK | P. OFF. A. MELESI & C. | COLLAUDATORE / INSPECTOR / INSPECTEUR: Uberti p.i. Lino | ENTE COLLAUDATORE / INSPECTION AGENCY / AUTHORITÉE DE RECEYTE

officine artigiane
melesi
23813 Cortenova (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.98341
Fax 0341.983496 - 983497
lino.uberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
INSPECTION CERTIFICATE
CERTIFICAT D'ESSAIS

N. 166072 | DATA / DATE 17/06/21 | SHEET / 2/3

EN 10204 3.1

ORDINE / ORDER / C.DE PH021077

DATA / DATE 13/01/21 | COMMESSA 68053

P369	12,50	122,65	50,00	598,00	825,00	37,20	65,64						25/26/24
LONG T/2								145	196	249	KV	- 51	24/26/26
L.E								1,2	1,4	1,6	mm		25/24/25
TRAN T/2								103	157	195	KV	- 51	
L.E								0,9	1,1	1,3	mm		
LONG T/4								153	185	203	KV	- 51	
L.E								1,2	1,3	1,6	mm		
TRAN T/4								128	160	203	KV	- 51	
L.E								1,1	1,3	1,4	mm		
P71	12,50	122,65	50,00	574,00	792,00	30,27	59,68						22/23/24
LONG T/2								157	196	266	KV	- 51	23/22/23
L.E								1,3	1,4	1,6	mm		22/24/24
TRAN T/2								103	167	162	KV	- 51	
L.E								1,0	1,2	1,2	mm		
LONG T/4								134	249	214	KV	- 51	
L.E								1,2	1,5	1,5	mm		
TRAN T/4								111	189	159	KV	- 51	
L.E								1,0	1,3	1,2	mm		
P1465	12,50	122,65	50,00	651,00	824,00	33,92	66,85						23/25/25
LONG T/2								113	158	180	KV	- 51	24/23/26
L.E								1,2	1,3	1,4	mm		23/24/24
TRAN T/2								109	142	165	KV	- 51	
L.E								1,1	1,2	1,3	mm		
P278	12,50	122,65	50,00	582,00	823,00	32,85	66,36						23/24/22
LONG T/2								157	249	255	KV	- 51	22/24/25
L.E								1,3	1,5	1,6	mm		25/23/24
TRAN T/2								143	189	203	KV	- 51	
L.E								1,3	1,4	1,4	mm		
P489	12,50	122,65	50,00	567,00	783,00	31,00	72,44						23/22/24
LONG T/2								127	168	230	KV	- 51	25/25/23
L.E.								1,2	0,8	0,9	mm		24/23/25
TRAN T/2								144	191	278	KV	- 51	
L.E.								1,3	1,1	1,0	mm		
P1756	12,50	122,65	50,00	628,00	808,00	41,89	67,27						24/26/25
LONG								145	208	176	KV	- 51	23/25/25
L.E								1,3	1,5	1,4	mm		24/23/24
TRAN								118	179	150	KV	- 51	
L.E								1,1	1,4	1,3	mm		

N. RIF.	TRATTAMENTI TERMICI / *HEAT TREATMENTS / TRAITEMENTS THERMIQUES*
P331	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes
P369	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,23) hours,minutes
P71	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,01) hours,minutes
P1465	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,41) hours,minutes
P278	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes
P489	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes
P1756	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes

EN 10204 3.1
Surface and dimensional check according to ASME B16.5 2017.
Steel made by electric furnace.
Corrosion test carried out acc. to ASTM G48 method "A" at 50°C exposure time 24 hours.
Results: see attached Laboratory report.
Intergranular corrosion test acc. to ASTM A262 practice "E" with satisfactory results.
P.M.I. test performed with satisfactory results.

TRADE MARK	P. OFF. A. MELESI S.r.l.	COLLAUDATORE / *INSPECTOR / INSPECTEUR*	ENTE COLLAUDATORE / *INSPECTION AGENCY AUTHORITEE DE RECETTE*
		Uberti p.i. Lino	

officine meccaniche
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.98341
Fax 0341.983498 - 983497
lino.uberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
INSPECTION CERTIFICATE
CERTIFICAT D'ESSAIS

N.	DATA / *DATE*	SHEET /
166072	17/06/21	3/3

EN 10204 3.1

ORDINE / *ORDER* / *C.DE*: PH021077

DATA / *DATE*	COMMESSA
13/01/21	68053

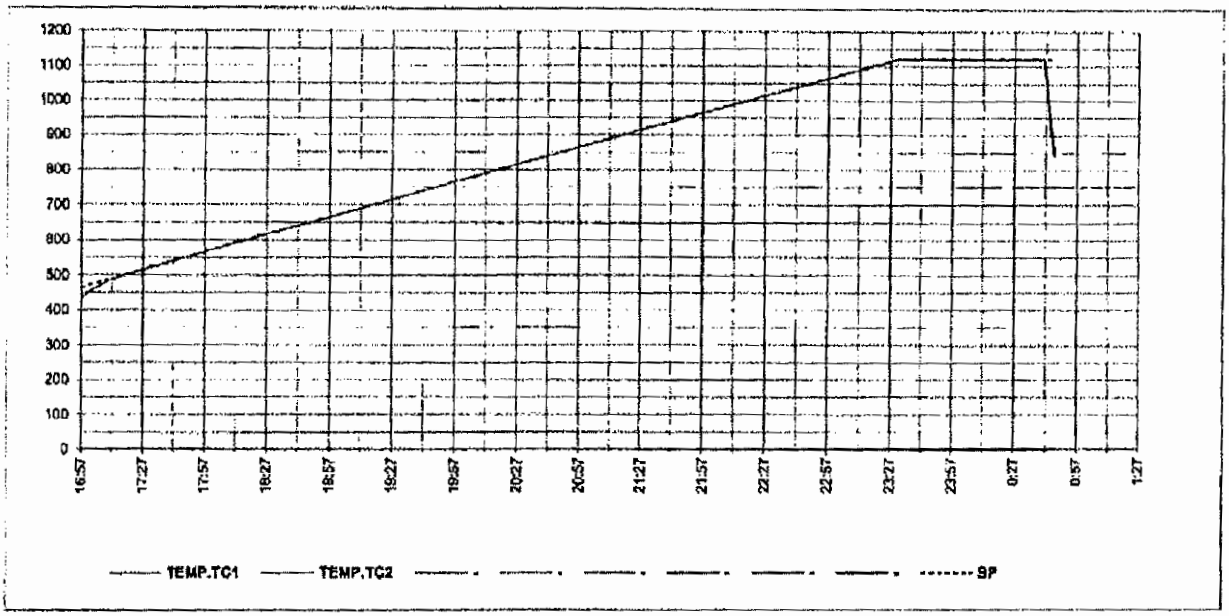
Material acc. to NACE MR 01-75 / ISO 15156 ed. 2015.
Material acc. to ASME SA182F55 ASME section II part A ed. 2019.
All surfaces are pickled and passivated as per P.O. requirements.
Reduction ratio > 4:1
The works operate a quality management system acc. to annex I, section 4.3 of the pressure equipment directive (PED) 2014/68/EU certificate by TUV certificate nr 58/2002/MUC.
Mechanical tests according to ASTM A370
Test specimen orientation: tensile transversal
Impact test specimen size 10 x 10 x 55 mm

ESITO DELLE PROVE / *TEST ISSUE* / *RESULTS DES ESSAIS*: FAVOREVOLE SATISFACTORY SATISFAISANT

TRADE MARK	P. OFF. A. MELESI S.p.A.	COLLAUDATORE / *INSPECTOR* / *INSPECTEUR*	ENTE COLLAUDATORE / *INSPECTION AGENCY* *AUTHORITÉE DE REGETTE*
		Uberti p.i. Lino	

RAPPORTO TRATTAMENTO TERMICO
HT REPORT

	FORNO *Furnace*				TEMPERATURA ACQUA *Water temperature*
	F6				27 °C



COMMESSA *Job*	RIGA *Row*	PO Item *PO Item*	QUANTITA' *Quantity*	LOTTO *Lot*	DESCRIZIONE *Description*	
68053	1450	1360	20	P71	A182F55 4" BL 300 RF	125-250AARH
68053	1490	1400	15	P71	A182F55 4" WN 300 RF SCH 10S	125-250AARH
68053	1500	1410	20	P71	A182F55 4" WN 300 RF STD/40S	125-250AARH
68053	1510	1420	40	P71	A182F55 6" BL 150 RF	125-250AARH
68053	1530	1440	20	P71	A182F55 6" WN 150 RF SCH 10S	125-250AARH
68053	1540	1450	30	P71	A182F55 6" WN 150 RF STD/40S	125-250AARH

Officine AMBROGIO MELESI & C. S.r.l.
23813 CORTENOVA

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.

POSITIVE MATERIAL IDENTIFICATION REPORT

FABRICATOR	PROJECT TITLE	MATERIAL GRADE	TIMING OF PMI EXECUTION	PROCEDURE	REPORT REF.
Officine Ambrogio Melesi & C.S.r.l.		ASTM A182 F55	After final marking	MELESI QC 037	PMI 166072
MELESI REF. N°	**PURCHASE ORDER**	**MATERIAL COLOR CODING**	**ANALYZER**	**CALIBRATION DATE**	**DATE OF TEST**
68053	PH021077		X-Ray Spectro	17/06/2021	17/06/2021

ITEM NO.	MATERIAL DESCRIPTION	PIECES TESTED	HEAT	MTC CERTIFICATE NO.	MTC DATE	ANALYSIS Cr Max (%)	Cr Min (%)	Ni Max (%)	Ni Min (%)	Mo Max (%)	Mo Min (%)	RESULTS ACCEPTED	REJECTED
						25,00	24,00	6,50	5,50	4,00	3,00		
1200	A182F55 1 1/2" WN 150 RF STD/40S 125-250AARH	25	557008	166072	17/06/2021	25,32	25,06	6,84	6,70	3,82	3,72	X	
1300	A182F55 3" WN 150 RF SCH 10S 125-250AARH	20	557529	166072	17/06/2021	25,36	25,18	6,94	6,60	3,89	3,75	X	
1330	A182F55 3" WN 300 RF SCH 10S 125-250AARH	10	557039	166072	17/06/2021	25,43	25,08	7,00	6,69	3,79	3,68	X	
1340	A182F55 3" WN 300 RF STD/40S 125-250AARH	20	557039	166072	17/06/2021	25,25	25,08	6,96	6,75	3,81	3,82	X	
1360	A182F55 4" WN 150 RF STD/40S 125-250AARH	20	557039	166072	17/06/2021	25,36	25,05	6,96	6,81	3,87	3,69	X	
1530	A182F55 10" WN 150 RF SCH 10S 125-250AARH	5	537632	166072	17/06/2021	25,34	25,04	6,84	6,72	3,81	3,71	X	
1550	A182F55 12" WN 300 RF SCH 10S 125-250AARH	5	543626	166072	17/06/2021	25,41	25,15	6,85	6,62	3,97	3,71	X	
1400	A182F55 8" WN 150 RF SCH 10S 125-250AARH	25	557039	166072	17/06/2021	25,35	25,13	6,82	6,81	3,86	3,61	X	
1420	A182F55 6" WN 300 RF SCH 10S 125-250AARH	15	555083	166072	17/06/2021	25,53	25,22	6,89	6,58	3,78	3,66	X	
1440	A182F55 6" WN 150 RF SCH 10S 125-250AARH	20	555083	166072	17/06/2021	25,37	25,26	6,81	6,64	3,90	3,74	X	

NOTE(s): PAGE 1 OF 2

SIGNATURES

OPERATOR	QUALITY CONTROL SUP.	CLIENT(S) INSPECTOR(S)
Gianni Buttara Level II	Lino Uberti Level III Officine AMBROGIO MELESI & C. s.r.l. 20813 CORNOVA	

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.

POSITIVE MATERIAL IDENTIFICATION REPORT

FABRICATOR Officine Ambrogio Melesi & C.S.r.l.	PROJECT TITLE	MATERIAL GRADE ASTM A182 F55	TIMING OF PMI EXECUTION After final marking	PROCEDURE MELESI QC 017	REPORT REF. PMI 166072
MELESI REF. N° 68053	PURCHASE ORDER PH021077	MATERIAL COLOR CODING	ANALYZER X-Ray Spectro	CALIBRATION DATE 17/06/2021	DATE OF TEST 17/06/2021

ITEM NO.	MATERIAL DESCRIPTION	PIECES TESTED	HEAT	MTC CERTIFICATE NO.	MTC DATE	ANALYSIS Cr Max (%)	Cr Min (%)	Ni Max (%)	Ni Min (%)	Mo Max (%)	Mo Min (%)					RESULTS ACCEPTED	REJECTED
						28,00	24,00	8,00	6,00	4,00	3,00						
1459	A182F55 8" WN 150 RF STD/40S 125-250AARH	30	503083	166872	17/06/2021	25,44	25,28	8,04	6,77	3,85	3,72					X	

NOTE(s): PAGE 2 OF 2

SIGNATURES

OPERATOR	QUALITY CONTROL SUP.	CLIENT(s) INSPECTOR(s)
Gionni Bittara Level II	Lino Uberti Level III Officine AMBROGIO MELESI & C. s.r.l. 23813 ERENOVA	

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.
Largo De Vecchi 11
23813 Cortenova (LC)
Italy
Phone: +39.0341.98341
Fax: +39.0341.983498 / 7
E-mail: info@melesi.it
Web site: www.melesi.it
Cap.Soc/Share Cap. 6500.000 Lv.
P.IVA - C.F. - R.I. Lecco
IT 02231830138
R.E.A. n. LC-106835
N.Meccan./Export n. LC005080

17 June 2021

Certificate Nr. M895

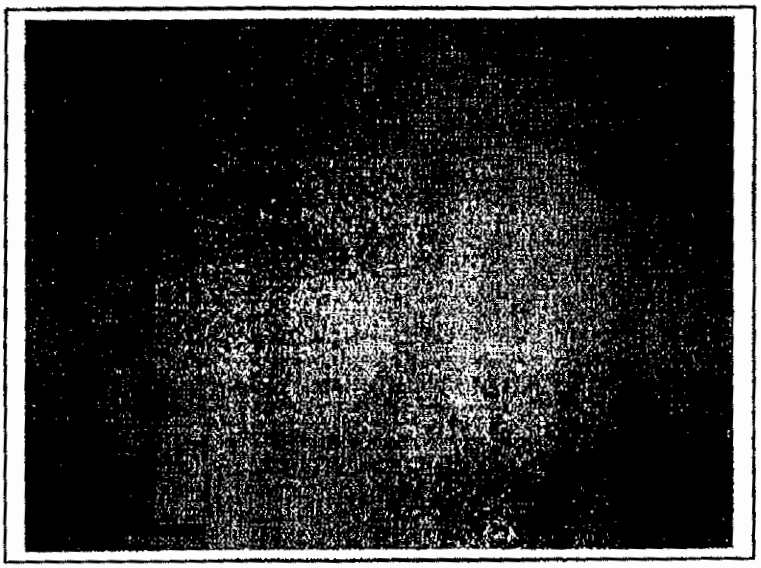
MICROSTRUCTURE

SAMPLE OF ASTM A182 F55 HEAT 555083 P71

THE RESULTS OF METALLOGRAPHIC EXAMINATION SHOW A REGULAR STRUCTURE FREE FROM INTERMETALLIC PHASES AND PRECIPITATES AS SHOWN ON BELOW PHOTO.

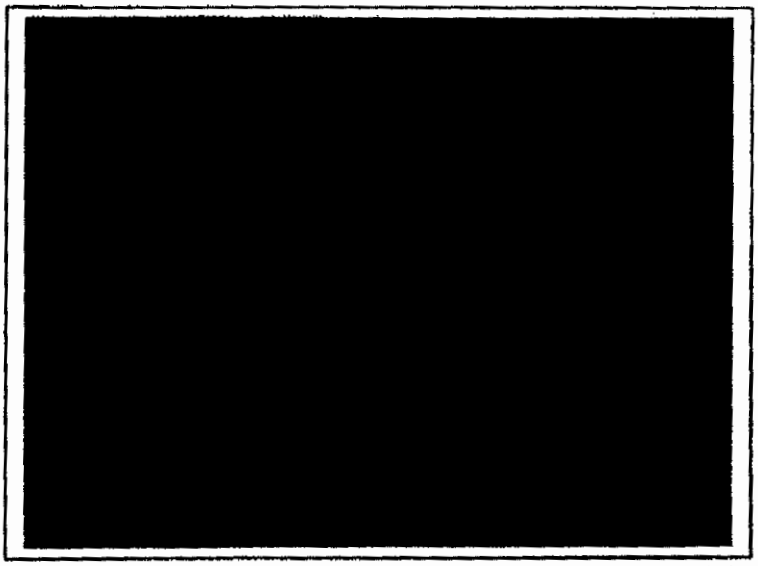
FERRITE CONTENT ACC. TO ASTM E562 = 49%
TEST PERFORMED ON ONE SECTION ETCHED 10% OXALIC ACID ELECTROLYTIC AND 20% NAOH ELECTROLYTIC ACCORDING TO ASTM E407
30 FIELDS EXAMINED, 16 POINTS (4x4 SQUARE GRID, 40x40mm) PER FIELD
TEST ACCORDING TO ISO 17781

MAGNIFICATION : 500X



ETCHING: 10% OXALIC ACID ELECTROLYTIC

Q. C.



Q. C.

ETCHING: 10% OXALIC ACID ELECTROLYTIC+ 20% NAOH ELECTROLYTIC

officine ambrogio melesi
25813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
Tel. +39.0341.98341
Fax +39.0341.983496/7
info@melesi.it
FLANGE E FORGIATI
FLANGES AND FORGINGS

PROVA CORROSIONE
CORROSION TEST

NR.	R2787	DATA DATE	
PAG. SHEET	1/1	OAM JOB COMMESSA	68053
ORDINE ORDER	PH021077	CLIENTE CUSTOMER	

SPECIFICA SPECIFICATION: ASTM G48 METHOD A

NOTE NOTES: LOCATION: TRASV T/2

POS. ITEM	Q.TA' Q.TY	DESCRIZIONE DESCRIPTION	COLATA HEAT	NOTE REMARKS
1306	20	A182 F55 4" BL 300 RF	555083	P71
1400	15	A182 F55 4" WN 300 RF SCH 10S	555083	P71
1410	20	A182 F55 4" WN 300 RF STD/40S	555083	P71
1420	40	A182 F55 6" BL 150 RF	555083	P71
1440	20	A182 F55 6" WN 150 RF SCH 10S	555083	P71
1450	30	A182 F55 6" WN 150 RF STD/40S	555083	P71

DIMENSIONI CAMPIONE START SPECIMEN DIMENSION		CONDIZIONI PROVA TEST CONDITIONS	
LUNGHEZZA LENGHT	49,95	TEMP. DI PROVA TEST TEMPERATURE	50°C
LARGHEZZA WIDTH	24,88	DURATA PROVA (H) PERIOD (H)	24
SPESSORE THICKNESS	9,90	ANGOLO / MANDRINO ANGLE / JIG	
SEZIONE (mm^2) SECTION	3.967	SOLUZIONE TEST SOLUTION	900ml whater tipo IV (H_2O) + 100g ferric chloride ($FeCl_3 \cdot 6H_2O$)
PESO INIZIALE (g) INITIAL WEIGHT	98,384		

RISULTATO DELLA PROVA
TEST RESULT

PESO FINALE (g) FINAL WEIGHT		PERDITA PESO (g) WEIGHT LOSS		CORROSIONE (g/m^2) CORROSION	
	98,384		0,000		0,03

ESITO ESAME AL MICROSCOPIO A 20 X OPTICAL MICROSCOPE EXAMINATION AT 20 X RESULTS			
	ASSENZA DI CORROSIONE PUNTIFORME NO PITTING ATTACK	< 1 g/m2	CONFORME CONFORM

NOTE REMARKS: Pickling on specimen for 5 minutes at 60 ° C in 20% HNO3 + 5% HF solution

QUALITY CONTROL	INSPECTOR	CUSTOMER
T.S. - Officine Ambrogio Melesi		

officine alfieri maggio
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
P.o. box 11
Tel 0341 98.341 ris.aut.
Fax 0341 90.15.06 - 90.14.88
FLANGE E FORGIATI

RAPPORTO ESAME ULTRASUONI
ULTRASONIC TEST REPORT

Nr.	Data / Date	Pag / Sheet	Commessa / Job
15050	17/06/21	1 / 1	66053
Ordine / Order		Cliente / Customer	
PH021077		"	

Specifica / Specification
ASTM A388

Criteri di accettazione / Acceptance criteria
ASME VIII, Div 1, Appendix 12

Procedura / Procedure
UT02 REV 2 ED 1

Stadio di controllo / Inspection phase
After final h.t. machined before drilling

Pos Item	Q.tà Quantity	Descrizione Description		Colata Heat	Cond. Superficiali Surface status
1230	25	A182F55 1 1/2" WN 150 RF STD/40S	125-250AARH	557008	LAVORATO/MACHINED
1300	20	A182F55 3" WN 150 RF SCH 10S	125-250AARH	557529	LAVORATO/MACHINED
1330	10	A182F55 3" WN 300 RF SCH 10S	125-250AARH	557009	LAVORATO/MACHINED
1340	20	A182F55 3" WN 300 RF STD/40S	125-250AARH	557009	LAVORATO/MACHINED
1380	20	A182F55 4" WN 150 RF STD/40S	125-250AARH	557009	LAVORATO/MACHINED
1400	15	A182F55 4" WN 300 RF SCH 10S	125-250AARH	555083	LAVORATO/MACHINED
1440	20	A182F55 6" WN 150 RF SCH 10S	125-250AARH	555083	LAVORATO/MACHINED
1450	30	A182F55 6" WN 150 RF STD/40S	125-250AARH	555083	LAVORATO/MACHINED
1480	25	A182F55 8" WN 150 RF SCH 10S	125-250AARH	557009	LAVORATO/MACHINED
1530	5	A182F55 10" WN 150 RF SCH 10S	125-250AARH	537832	LAVORATO/MACHINED
1550	5	A182F55 12" WN 300 RF SCH 10S	125-250AARH	543526	LAVORATO/MACHINED

APPARECCHIO / INSTRUMENT

Tipo / Type	Matricola / Serial Number	Costruita da / Manufactured by
USN 60	01H3B6	GE

SONDE / PROBES - Amplificazione durante esame / Amplification during examination +6 dB

Tipo Type	Costruita da Manufactured by	Matricola S.N.	Misura Size	Angolo Angle	Frequenza Frequency	Ampl. di regolazione Setting ampl.
B2 S EN	GE Sensing&Inspection Technologies	500036-60948	Diam. 24 mm		2 MHz	
SEB2 E	GE Sensing&Inspection Technologies	57487-50712	6 X 20 mm		2 MHz	
MWB45-2E	GE Sensing&Inspection Technologies	56921-500041	8 X 9 mm	45°	2 MHz	
MSEB2 E	GE Sensing&Inspection Technologies	57481-500083	3.5 x 10 mm		2 MHz	

CAVI / CABLES

Tipo Type	Lunghezza Lenght
RG 174 D	2 mt

CALIBRAZIONE / CALIBRATION

- [X] DGS Diagramma / DGS Diagram
- [ ] DAC
- [X] Eco di riferimento / Reference point echo + 6 db
- [X] Blocchi di calibrazione / Calibration blocks — Notch V 60° - Depth < 3% T
- [ ] Blocco di riferimento V2 / Reference block V2
- [ ] Blocco di riferimento V1 / Reference block V1

Riflettore di riferimento / Reference reflector
DGS Deq 3-6 mm notch< 3% T

Segnale di riferimento / Reference amplitude
DGS Deq 3-6 mm notch< 3% T

Accoppiante / Coupling
Olio / Oil

NOTE / NOTES
Conform to acceptance criteria

RISULTATI / RESULTS
Conforme

FIRME / SIGNATURES

OPERATORI / OPERATORS	SUPERVISORE C.Q. / QUALITY CONTROL SUP.
CALIZZI GIORGIO Lev. II	UBERTI LINO Lev. II
ENTE COLLAUDATORE / INSPECTION AUTHORITIES	ISPETTORE CLIENTE / CUSTOMER INSPECTOR

officine meccaniche
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
P.o. box 11
Tel 0341 98.341 rie.aut.
Fax 0341 90.15.06 - 90.14.88
FLANGE E FORGIATI

CERTIFICATO CONTROLLO CON LIQUIDI PENETRANTI
LIQUID PENETRANT TEST

Nr.	Data / Date	Pag / Sheet	Commessa / Job
15048	17/08/21	1 / 1	68083
Ordine / Order		Cliente / Customer	
PH021077			

Specifica / Specification
ASTM A961/E165 ASME V Art.6

Criteri di accettazione / Acceptance criteria
ASME VIII Div.1, Appendix 8

Procedura / Procedure
PT 01 - Rev. 1 Ed. 2

Stadio di controllo / Inspection phase
After final h.t. machined before drilling

Pos Item	Q.tà Quantity	Descrizione Description		Colata Heat	Cond. Superficiali Surface status
1300	20	A182F55 3" WN 150 RF SCH 10S	125-250AARH	557529	FINITO/FINISHED
1330	10	A182F55 3" WN 300 RF SCH 10S	125-250AARH	557009	FINITO/FINISHED
1340	20	A182F55 3" WN 300 RF STD/40S	125-250AARH	557009	FINITO/FINISHED
1380	20	A182F55 4" WN 150 RF STD/40S	125-250AARH	557009	FINITO/FINISHED
1400	15	A182F55 4" WN 300 RF SCH 10S	125-250AARH	555083	FINITO/FINISHED
1440	20	A182F55 6" WN 150 RF SCH 10S	125-250AARH	555083	FINITO/FINISHED
1450	30	A182F55 6" WN 150 RF STD/40S	125-250AARH	555083	FINITO/FINISHED
1480	25	A182F55 8" WN 150 RF SCH 10S	125-250AARH	557009	FINITO/FINISHED
1530	5	A182F55 10" WN 150 RF SCH 10S	125-250AARH	537832	FINITO/FINISHED
1550	5	A182F55 12" WN 300 RF SCH 10S	125-250AARH	543526	FINITO/FINISHED

TECNICA D'ESAME / EXAMINATION TECHNIQUE

- [ ] Fluorescente / Fluorescent
- [x] Contrasto colore / Color constract
- [ ]
- [x] Lavabile con acqua / Water washable
- [ ] Rimovibile con solvente / Solvent removable
- [ ]

FASI / STEPS	PRODOTTI / PRODUCTS - TIPO / TYPE FABBRICANTE / MANUFACTURER	LOTTO N. / BATCH NR.
Pulizia / Cleaning	Solvente/Cleaner CGM (R2.60 velnet solnet)	
Applicazione penetrante / Penetrant application	CGM (R2.71 RED "WW")	20/324
Rimozione eccesso penetrante / Excess penetrant removal	Acqua/Water Pressione/Pressure <275 kPa (40psi) Temperature/Temperature <40°C	
Asciugatura / Drying	Asciugatura con stracci / Wiping	
Applicazione rilevatore / Developer application	CGM (R.82 ROTRIVEL "U" / white)	21/131

TECNICA D'ESAME / EXAMINATION TECHNIQUE

Tempo di penetrazione / Penetrant dwell time	20 min
Tempo di sviluppo / Developer dwell time	12 min

ATTREZZATURA DI ILLUMINAZIONE / LIGHTING EQUIPMENT

>1076 Lux

NOTE / NOTES

No defects
Examination performed on 10% of pieces

RISULTATI / RESULTS

Conforme

FIRME / SIGNATURES	
OPERATORI / OPERATORS	SUPERVISORE C.Q. / QUALITY CONTROL SUP.
CAMINADA VALERIO Lev. II	UBERTI LINO Lev. II
ENTE COLLAUDATORE / INSPECTION AUTHORITIES	ISPETTORE CLIENTE / CUSTOMER INSPECTOR

Alleima

CERTIFICATE

A03/Z02
No. A/23-156535 **Rev 01**
Date 2023-05-30 **Page** 1/4
Rev.date 2023-06-08

A02/Z03
INSPECTION CERTIFICATE acc to
EN 10204 3.1

INSPECTION STAMP
QA-TUBE

A06
SVERDRUP STEEL AS
STRANDSVINGEN 2
4032 STAVANGER
NORWAY

Customer References A07
PO-05304/531502
Customer order 2022-12-27

125-00991 SVERDR EUR

Alleima References A08

Order No.	Subs No.	Dispatch note	
593796	716850	33371/54	33394/54

Suppl. No 300-49424 **C.Code** 03

Material description B01/B04
SEAMLESS STAINLESS HOT FINISHED

Metallurgical process C70
Electric furnace+AOD

Steel/material Designations B02
Alleima SAF 2507 **UNS** S32750
EN no 1.4410

Technical requirements B03
ASTM A-790-22, ASME SA-790-ED-21
NORSOK M-630:2020, NORSOK MDS D51 REV.6
IOGP S-563 DEC 2018, MDS ID251/251S REV 01, ISO 17781:2017
NACE MR0175/ISO 15156-3:-2015, NACE MR0103/ISO 17945-1:-2015
PED 2014/68/EU EN 10216-5 TC1
MDS:SFF-D51 REV.13

EXTENT OF DELIVERY B07-B13

It	Product designation	Heat	Lot	Pieces	Kg	M
02	TST-E-SAF2507-11/2-SCH40 48.26 X 3.68	567797	56526	49	1345.0	330.49
			Total	49	1345.0	330.49
04	TST-E-SAF2507-2-SCH80 60.33 X 5.54	567970	56694	42	1605.0	219.79
			Total	42	1605.0	219.79

TEST RESULTS
Chemical composition (weight%)

Heat	PRE
567797	42.8
567970	42.9

Quality assurance - Helen Jämtemyr / QA-manager A05/Z02
MTC Service / Certificates

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
567797	0.013	0.32	0.46	0.021	0.0009	25.59	6.53	3.82
567970	0.008	0.25	0.49	0.022	<0.0005	25.52	6.43	3.90

	Cu	N
567797	0.14	0.289
567970	0.14	0.283

Chemical composition, product (weight%)

Lot	C	Si	Mn	P	S	Cr	Ni	Mo
56526	0.015	0.32	0.46	0.022	0.002	25.45	6.54	3.81
56694	0.011	0.25	0.49	0.023	0.001	25.37	6.40	3.88

	Cu	N	PRE
56526	0.14	0.29	42.7
56694	0.14	0.29	42.8

Tensile test at room temperature acc. to ASTM A370/ISO 6892-1

Longitudinal

	Yield strength		Tensile strength	Elongation	
	Mpa	MPa	Mpa	%	%
Lot	Rp0.2	Rp1.0	Rm	A	2"
56526	642	680	827	36	33
56694	730	772	866	31	29

Hydrostatic test acc. to ASTM A-999.

Lot	Sec	Mpa
56526	5	17.3
56694	5	17.3

Hardness test acc to ASTM A-370

	Min	Max
Lot	HRC	HRC
56526	16	18
56694	28	30

Ferrite acc to ASTM E-562

Lot	%
56526	46.8
56694	43.3

Corrosion test according to ASTM G-48A, 50°C for 24 hours.

In delivery condition.

No pitting corrosion found at 20x enlargement.

	Specimen weight loss
Lot	g/m2
56526	0.25
56694	0.32

Following controls/tests have been satisfactorily performed:

- The structure, examined at 400-500x magnifications is free from detrimental intermetallic phases and precipitates.
- Flattening test according to ASTM A-999.
- Flaring test according to EN ISO 8493.
- 100% PMI-test.
- 100% Ferritescope in production. Fisher Ferrite is acceptable within the criteria set in SFF MDS (35-55%)
- Visual inspection and dimensional control.

Heat Treatment:
Solution annealed and quenched (*)

Marking:
ALLEIMA SAF 2507 ASTM A790 ASME SA790 EN10216-5 TC1 UNS S32750 EN 1.4410 HFD S ML 48.26 X 3.68 MM 1 1/2 SCH 40S HT 567797 SS LOT 56526 *QA-TUBE*
ALLEIMA SAF 2507 ASTM A790 ASME SA790 EN10216-5 TC1 UNS S32750 EN 1.4410 HFD S ML 60.33 X 5.54 MM 2 SCH 80S HT 567970 SS LOT 56694 *QA-TUBE*

(*) Hot finished
- OD 168-220 mm/WT 11-23 mm: In process annealed as a part of the extrusion process from a temperature of min 1040°C. Rapidly cooled with water.
- Other dimensions: Solution annealed at a temperature of 1075°C, 5 minutes and rapidly cooled with water.

(*) Cold finished: Solution annealed at a temperature of min 1070°C, for min 2 minutes and rapidly cooled with water or protective gas.

The raw material is free from radioactive contamination.

Material free from mercury contamination.

No welding or weld repair.

Surface condition:
Sizes
Below 1" Bright annealed polished.
From 1" and greater pickled and passivated in acc. to ASTM A380

NORSOK M-650 QTR NO: QTR25Cr_H_326 - Hot finished separate annealed quenched in water.

NORSOK M-650 QTR NO: QTR25Cr_C326 - Cold finished annealed quenched in water.

NORSOK M-650 QTR NO: QTR/SAF2507/R2000/2020 - Cold finished annealed rapidly cooled by protective gas.

NORSOK M-650 QTR NO: 25Cr Duplex SS - Cold finished annealed rapidly cooled by protective gas.

NORSOK M-650 QTR NO: QTR25Cr_H_IPAW - Hot finished in process annealed quenched in water.

NORSOK M-650 QTR NO: QTR/SAF2507/R1000/2020 - Cold finished annealed rapidly cooled by protective gas.

Approved acc. AD 2000-Merkblatt W0 and certified acc. to Pressure Equipment Directive (2014/68/EU, Annex 1 para 4.3) by TUEV NORD; notified body, reg.no. 0045.

The number of tests are based on the size of the manufacturing lot before cutting to finished lengths.

The delivered products comply with the specifications and requirements of the order.

The material is manufactured according to a Quality system, approved and registered to ISO 9001:2015.

No unauthorized alterations. The contents of this Inspection Certificate may not be modified or revised in any way without the prior written approval of Alleima.
Unauthorized alterations to the Inspection Certificate, including introduction of false, fictitious or fraudulent statements or entries, may be punishable by fines, imprisonment, or both. This Inspection Certificate may be copied only in the manner and for the purposes specified in Section 6 of EN 10204:2004. Contravention of this notice will be prosecuted to the fullest extent of applicable law.

The certificate is produced with EDP and valid without signature.

Alleima, formerly Sandvik Materials Technology. During a brand transition period, both Sandvik and Alleima marking on products may exist.

Microstructure Examination Report

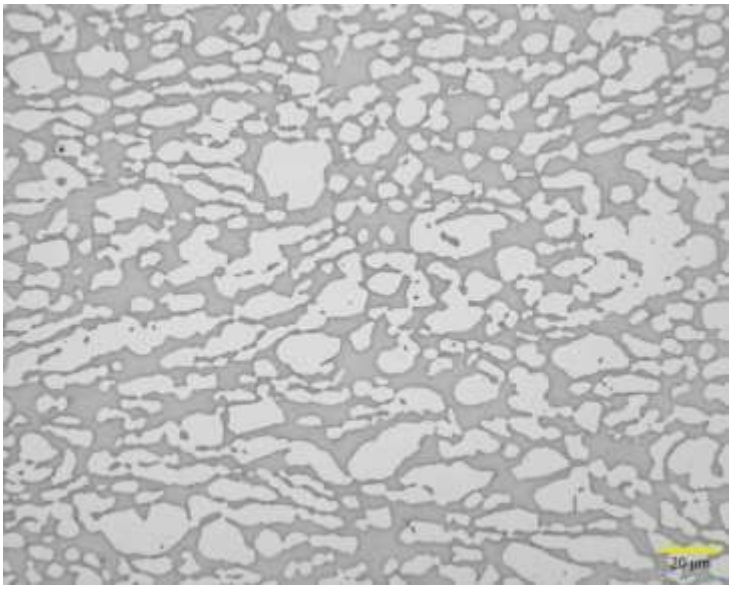
Material Information

Grade	SAF2507
Heat	567797
Lot	56526-7
Dim	48.26 x 3.68

Technical Information

Certificate No.	A/23-156535
Test Date	2023-04-20
Etchant	NAOH
Test Result	OK

Test No: 91839 C	**Magnification: 400X**



STQD:Toni Norling (mtrltech\TN17940)

Microstructure Examination Report

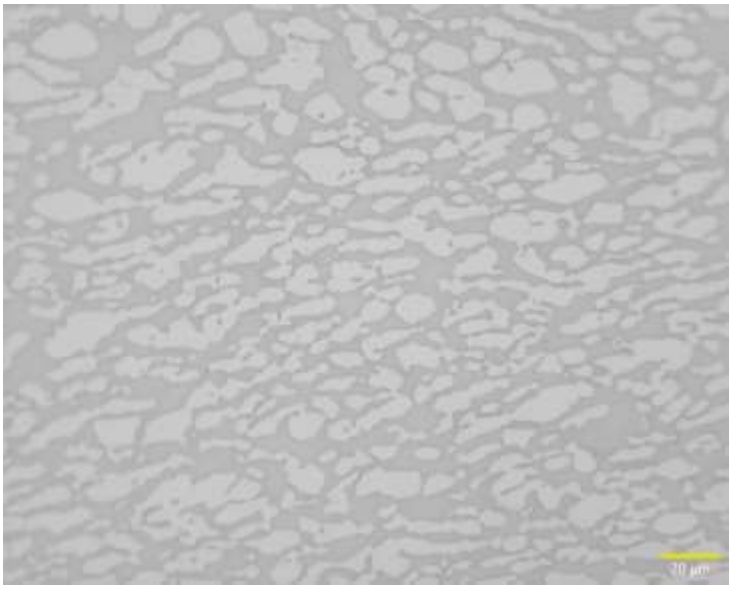
Material Information

Grade	SAF2507
Heat	567970
Lot	56694
Dim	60.33 x 5.54

Technical Information

Certificate No.	A/23-156535
Test Date	2023-04-24
Etchant	NAOH
Test Result	OK

Test No: 92768 C	**Magnification: 400x**



STQD:Emma Erstadius (mtrltech\ee115349)

OFFICINE NICOLA GALPERTI E FIGLIO S.p.A.
Capitale Sociale € 2.582.500,00 interamente versato
Sede Legale e Amministrativa: **23824 DERVIO (LC)** - Via Enrico Fermi, 46
C.C.I.A.A. Lecco n.00205990138 - R.E.A.79815 - C.F. e P.IVA IT00205990138
Stabilimento - Uffici Amministrativi / Workshop - Warehouse - Offices - Mailing address:
22010 GERA LARIO (CO) – Via Trivio Fuentes, 4 - Tel. 0344-97200 - Fax 0344-97210
E-mail : galperti@galperti.com - www.galperti.com

The Original

CERTIFICATO DI COLLAUDO EN 10204
TEST CERTIFICATE EN 10204
3.1

NS.ORDINE / INTERNAL JOB **220145**

C TIFICATE N.	DATA / DATE	VS.ORDINE / YOUR	DATA / DATE
032673/1	21/07/2022	503532 (STOCK)	17/01/2022

POS / ITEM	DESCRIZIONE / DESCRIPTION	QUANTITA' QUANTITY	S/A	MATERIALE / MATERIAL	N° COLATA / PROVA HEAT N°/TEST N°	ACCIAIERIA STEEL MILL	#
068/068	1,50" 150 WN RF 40S 32750 B1 F	200	S	ASTM A182-20 F53	563544/20	ALLEIMA ITALIA	A

ANALISI CHIMICA / CHEMICAL ANALYSIS

#		C %	MN %	SI %	P %	S %	CR %	NI %	MO %	CU %	V %	SN %	AL %	NB %	TI %	N %			
A	L	0,013	0,480	0,330	0,020	0,0005	25,500	6,540	3,830	0,160	0,063					0,300			
A	C	0,012	0,475	0,325	0,020	0,0003	25,480	6,520	3,820	0,160	0,063					0,300			
																			PI%
A	L																		42,939
A	C																		42,886

NOTE / NOTES

PI=Pitting Index CR+(3,3*MO)+(16*N)

L = ANALISI COLATA / LADLE ANALYSIS
C = ANALISI DI PRODOTTO / CHECK ANALYSIS

CARATTERISTICHE MECCANICHE / MECHANICAL PROPERTIES

#		TRAZIONE / TENSILE								RESILIENZA / CHARPY TEST *			
		TIPO TYPE	DIAMETRO DIAMETER mm.	SEZIONE AREA mm.	LUNGHEZZA LENGHT mm.	TEMP. TEMPERATURE C	ROTTURA TENSILE Mpa	SNERVAMENTO YIELD Mpa	ALL. ELONG %	CONTR. REDUCT. %	TIPO TYPE KV	TEMP. TEMP. C	VALORI VALUES Joule	DUREZZA HARDNESS HBW
A	S		12,50	122,70	50,00	20	800	550	15,0			-51	Min. 35 Med. 45	Max. 301
A	O		12,50	122,70	50,00	20	837	666	39,0	75,0	L	-51	106 - 111 - 114	263-258
A	S											-51	Min. 35 Med. 45	
A	O										T	-51	107 - 108 - 113	

NOTE / NOTES

* = CHARPY SPECIMEN 10 x 10 x 55 mm
O = OTTENUTE / OBTAINED
S = STANDARD
T = Trasversal dir.

#	TRATTAMENTI TERMICI / HEAT TREATMENTS
A	Solution annealled, at 1100 Dgr.C - Holding time 30 minutes per inch,
A	minimum 60 minutes. Cooled in water below 260 Dgr.C
A	Material according to MDS SFF D54 REV.13
A	Material according to QTR No.004 Rev.5
A	Material according to NORSOK M-650

NOTE GENERALI / GENERAL NOTES

FINITURE / ROUGHNESS
F =STOCK FINISH 125-250 AARH

STANDARD
B1 = ASME B16.5 ED.17 Inch STD

NOTE / NOTES
Material according to NACE MR-01-75 / ISO 15156
Finished products white pickled, including machined surfaces
Compliance to PED 14/68/EU

MARCHIO DI FABBRICA TRADE MARK	DATA COLLAUDO INT. INT. INSPECT DATE	COLLAUDATORE INT. INT. INSPECTOR
	21/07/2022	T.FASCENDINI

ENTE UFFICIALE DI COLLAUDO
INSPECTION AUTHORITY

SANDVIK

CERTIFICATE

A03/Z02
No. A/21-984808 **Rev** 00
Date 2021-12-02 **Page** 1/2

A02/Z03
INSPECTION CERTIFICATE acc to
EN 10204 3.1

A06
GALPERTI NICOLA E FIGLIO OFF.SPA
VIA ENRICO FERMI 46
23824 DERVIO LC

Customer References A07
G00365/D1
Customer order
2021-06-25

250-06897 GALPERTI N

Sandvik References A08

Order No.	Subs No.	SMT Dispatch note
325172	30975	27793/53

SMT No. 274-40311 **C.Code** 03

Material description B01/B04
HOT WORKED BILLETS
ROLLED
ANNEALED & STRAIGHTENED
PEEL TURNED AND POLISHED

Metallurgical process C70
Electric furnace

Steel/material Designations B02
Sandvik
SAF 2507

Technical requirements B03
ASTM A-182 CHEMICAL ANALYSIS ONLY

EXTENT OF DELIVERY B07-B13

It	Product designation	Heat	Lot	Pieces	Kg
01	XMBLR-SAF2507-80	563544	77351	29	6525.0
			Total	29	6525.0

Heat
563544 Continuous casting

TEST RESULTS
Reduction ratio (times)
Lot
77351 17.0

Chemical composition (weight%)

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
563544	0.013	0.33	0.48	0.020	<0.0005	25.50	6.54	3.83

	V	Cu	N
563544	0.063	0.16	0.30

Quality assurance - Erik Jansson/QA-manager Primary Products A05/Z02
MTC Service / Certificates

The raw material is free from radioactive contamination.

Material free from mercury contamination.

No welding or weld repair.

The delivered products comply with the specifications and requirements of the order.

The material is manufactured according to a Quality system, approved and registered to ISO 9001:2015.

No unauthorized alterations. The contents of this Inspection Certificate may not be modified or revised in any way without the prior written approval of Sandvik Materials Technology. Unauthorized alterations to the Inspection Certificate, including introduction of false, fictitious or fraudulent statements or entries, may be punishable by fines, imprisonment, or both. This Inspection Certificate may be copied only in the manner and for the purposes specified in Section 6 of EN 10204:2004. Contravention of this notice will be prosecuted to the fullest extent of applicable law.

The certificate is produced with EDP and valid without signature.



OFFICINE NICOLA GALPERTI & FIGLIO S.p.A.
Capitale Sociale €2.582.500 interamente versato
Sede Legale e Amministrativa:
23824 DERVIO (LC) – Via Enrico Fermi, 46
C.C.I.A.A. Lecco n.00205990138 - R.E.A. n. 79815 C.F. e P.IVA IT00205990138
Stabilimento - Uffici Amministrativi / Workshop - Warehouse - Offices - Mailing address:
22010 GERA LARIO (CO) – Località S.Agata – Tel. (0344) 97200
Telefax (0344) 97210 – E-MAIL ADDRESS: galperti@galperti.com
WEB SITE : galperti.com

TEST CERTIFICATE

No. 196-22-GN

Date 01/03/2022

IDENTIFICATION OF SAMPLE	MATERIAL	**ASTM A182 F53 (32750)**
	HEAT NO.	**563544**
	TEST NO.	**20**

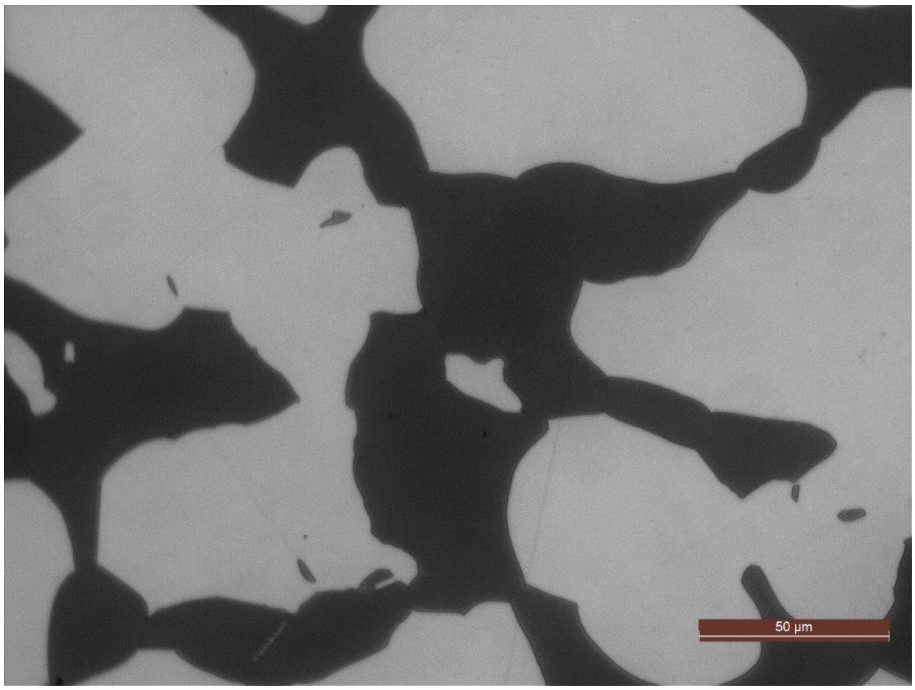
TEST DESCRIPTION

a) Microstructure examination and determination of ferrite % content
b) Corrosion test in accordance with ASTM G48 method A
c) Classification of etch structure in accordance with ASTM A923 method A
d) Corrosion test in accordance with ASTM A923 method C

EXECUTION

a) Microstructure examination and determination of ferrite % content - Result: **SATISFACTORY**

- Structure**: austenite + ferrite; no grain boundary precipitates and no intermetallic phases**.
- Evaluation of ferrite % content by point count method (30 fields and 16 points per field)in accordance with ASTM E 562 Ferrite Volume Fraction = **50,10**
- Examination after electrolytic etch in 10% oxalic acid solution: **No presence of chromium nitrides.**



-Photomicrograph: magnification 500x. Etch ASTM E 407 n.98:

b) Corrosion test in accordance with ASTM G48 method A - Result: **SATISFACTORY**

- Test solution: gr.100 of $FeCl_3 \cdot 6H_2O$ in ml.900 of distilled water.
- Test condition: 24hours exposure; test temperature 50°C.
- Examination after the exposure time : no pits at 20X magnification and no weight loss.

Edition of specification used: ASTM G48 –11(2020)e1 / ASTM E562-19e1/ ASTM A923-14

OFFICINE NICOLA GALPERTI & FIGLIO S.p.A.
Capitale Sociale €2.582.500 interamente versato
Sede Legale e Amministrativa:
23824 DERVIO (LC) – Via Enrico Fermi, 46
C.C.I.A.A. Lecco n.00205990138 - R.E.A. n. 79815 C.F. e P.IVA IT00205990138
Stabilimento - Uffici Amministrativi / Workshop - Warehouse - Offices - Mailing address:
22010 GERA LARIO (CO) – Località S.Agata – Tel. (0344) 97200
Telefax (0344) 97210 – E-MAIL ADDRESS: galperti@galperti.com
WEB SITE : galperti.com

TEST CERTIFICATE

No. 196-22-GN

Date 01/03/2022

c) Classification of etch structure in accordance with ASTM A923 method A - Result: **SATISFACTORY**

- Examination after electrolytic etch in sodium hydroxide solution: structure may be classified of the type: **"Unaffected Structures".**

d)Corrosion test in accordance with ASTM A923 method C - Result: **SATISFACTORY**

- Ferric Chloride corrosion test according to method C:
- Test solution: gr.100 of $FeCl_3 \bullet 6H_2O$ in ml.900 of distilled water (pH 1,3).
- Test condition : 24 hours exposure; test temperature 50°C.
- Examination after the exposure time : corrosion rate 0MDD, no weight loss and no pits at magnification of 20X.

Edition of specification used: ASTM G48 –11(2020)e1 / ASTM E562-19e1/ ASTM A923-14

OFFICINE NICOLA GALPERTI E FIGLIO S.p.A.
Capitale Sociale € 2.582.500,00 interamente versato
Sede Legale e Amministrativa:
***23824 DERVIO (LC)** - Via Enrico Fermi, 46*
C.C.I.A.A. Lecco n.00205990138 - R.E.A.79815 - C.F. e P.IVA IT00205990138
Stabilimento - Uffici Amministrativi / Workshop - Warehouse - Offices - Mailing address:
***22010 GERA LARIO (CO)** – Via Trivio Fuentes, 4*
Tel. 0344-97200 - Fax 0344-97210
E-mail : galperti@galperti.com - www.galperti.com

PMI EXAMINATION REPORT

Certificate No.: 220145-G-9
Revision No.: 0
Date : 21/07/2022

Main Information

Client Name: SFF AS
Client P.O.: 503532 (STOCK)
Project
Supplier Ref.: 220145

Procedure

Examination Procedure : PAMI-N
General Specification : -
Customer's Specification : -

Examination, Material

Instrument Used THERMO SCIENTIFIC NITON XL GOLDD **Serial Number :** 67717

Note:

Items		Description	Material grade	Heat / Code	Qty
ONG	CLI				
68	68	1,50" 150 WN RF 40S	ASTM A182-20 F53	563544/20	200

ELEMENTS VERIFIED

Cr	Ni	Mo	Cu								
24,9	6,99	4	0,26								

Result: Pmi performed on 100% of pieces.Values reported are % average of all quantity and are within the acceptance limit

Operator / Inspection

Tested by: M.Pedrolini
Date: 21/07/2022

External Inspector:

Verified by: T.Fascendini
Date: 21/07/2022

OFFICINE NICOLA GALPERTI & FIGLIO S.p.A.
Capitale Sociale €2.582.500 interamente versato
Sede Legale e Amministrativa:
23824 DERVIO (LC) – Via Enrico Fermi, 46
C.C.I.A.A. Lecco n.00205990138 - R.E.A. n. 79815 C.F. e P.IVA IT00205990138
Stabilimento - Uffici Amministrativi / Workshop - Warehouse - Offices - Mailing address:
22010 GERA LARIO (CO) – Località S.Agata – Tel. (0344) 97200
Telefax (0344) 97210 – E-MAIL ADDRESS: galperti@galperti.com
WEB SITE : galperti.com

Ferrite Test	Certificate N. 220145-001
	Date 21/07/2022

FERRITE TEST - Procedure FER1 - FISCHER FERITSCOPE MP30E-S serial no.035-21790A

Client : ***SFF AS***
Order N. : ***503532 (STOCK)***
Galperti Ref. : ***220145***
Material : ***ASTM A182 F53 (32750)***

Item	Values of ferrite content																			
067/067	48,4	48,4	51,1	50,1	50,2	51,8	51,1	51,1	51,6	51,8	49,7	49,3	48,2	49,4	48,1	48,9	48,7	48,6	50,5	49,8
	51,8	49,5	51,9	48,5	51,2	50,4	50,7	49,9	51,8	48,9	50,9	48,3	49,2	48,3	48,4	48,4	51,3	51,8	49,1	49,1
	50,0	49,5	48,3	50,6	51,5	48,5	48,3	50,5	48,7	49,9										
068/068	49,3	48,9	51,0	49,6	50,8	51,2	50,0	50,5	51,3	49,5	51,3	51,9	49,9	51,5	48,5	52,0	49,8	52,0	50,5	51,7
	48,0	51,2	51,5	51,0	51,8	49,6	50,5	49,0	49,5	48,0	51,3	51,2	51,5	51,4	50,2	51,3	51,2	49,6	48,9	48,8
	51,8	51,2	49,5	48,3	50,4	50,2	50,5	48,5	51,2	49,9	51,8	49,2	51,1	49,6	49,2	49,3	49,9	51,6	50,6	51,8
	48,8	50,7	49,6	48,1	51,1	51,9	48,9	51,2	48,5	48,3	50,0	51,3	50,4	48,0	51,0	49,3	50,4	49,1	49,4	50,2
	49,8	50,8	50,8	48,7	50,3	48,9	48,0	50,5	51,1	50,7	51,8	50,3	50,5	51,9	49,5	50,4	48,6	49,1	49,8	51,7
	50,9	49,1	48,6	50,2	49,9	48,7	50,5	49,1	51,5	50,1	48,8	50,8	48,1	49,0	50,5	50,7	48,5	50,3	50,2	49,8
	49,4	51,3	50,9	49,9	50,6	49,8	49,0	49,6	49,7	50,2	50,6	48,2	49,7	50,1	48,4	49,7	49,5	49,8	49,6	48,2
	50,4	51,6	52,0	51,9	49,1	49,0	49,4	49,2	48,3	48,0	48,4	51,1	48,8	50,4	50,5	50,3	51,4	48,6	51,6	50,5
	50,6	51,5	51,6	49,3	49,8	51,7	50,4	48,5	49,9	50,7	48,1	51,9	50,1	51,5	50,4	50,0	49,8	50,4	51,7	51,8
	50,9	49,5	50,7	50,0	49,8	49,0	49,0	50,3	51,2	50,4	49,0	48,6	51,0	49,4	50,3	49,0	52,0	50,4	50,8	51,5
069/069	51,8	50,8	49,1	50,0	51,0	51,6	48,1	50,8	50,3	49,7	49,5	49,6	50,8	51,7	49,6	50,8	48,4	50,3	49,7	50,2
075/075	48,0	49,7	50,1	51,9	49,6	50,7	50,5	48,9	48,6	51,9										

Operator		Inspector				
Examined By	T.Fascendini		Yes	☐	No	☐
Date	21/07/2022	Inspector's Present	Yes	☐	No	☐
Signature	Tania Fascendini	Signature				

OFFICINE NICOLA GALPERTI E FIGLIO S.p.A.
Capitale Sociale € 2.582.500,00 interamente versato
Sede Legale e Amministrativa:
***23824 DERVIO (LC)** - Via Enrico Fermi, 46*
C.C.I.A.A. Lecco n.00205990138 - R.E.A.79815 - C.F. e P.IVA IT00205990138
Stabilimento - Uffici Amministrativi / Workshop - Warehouse - Offices - Mailing address:
***22010 GERA LARIO (CO)** – Via Trivio Fuentes, 4*
Tel. 0344-97200 - Fax 0344-97210
E-mail : galperti@galperti.com - www.galperti.com

ULTRASONIC EXAMINATION REPORT

Certificate No.:	US1-220145-G2
Revision No.:	0
Date :	21/07/2022

Main Information

Client Name:	SFF AS
Client P.O.:	503532 (STOCK)
Project	
Supplier Ref.:	220145

Procedure

Examination Procedure :	US02
General Specification :	ASTM A388 - ASME VIII Div. 1
Customer's Specification :	

Examination, Material, Ultrasonic Technique

Area of Test	100 % of all accessible surface	**Surface Condition:**	Machined surface
Items:	As below detailed	**Material Type:**	ASTM A182/20 F53 (32750)

Type of Apparatus:	Epoch 650 s.n. 201026702	**Made by:**	Olimpus	**Couplant:**	Paste

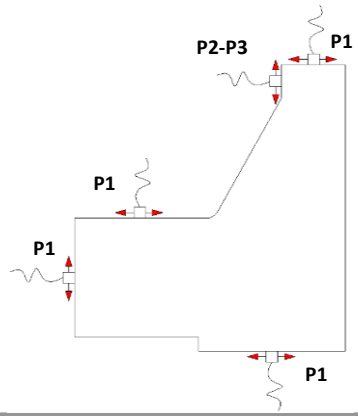
Trasducers Name (TD)	Type	Serial Number	Frequency	Dimension	Position
P25-2	Straight beam	SN 1775	2 Mhz (±0,1)	25mm	P1
TS210	Dual Element beam	SN 1165	2 Mhz (±0,1)	10 mm x 12 mm	P2
D10-2K	Angle beam	SN F668	2 Mhz (±0,1)	3,5 mm 10 mm	P3

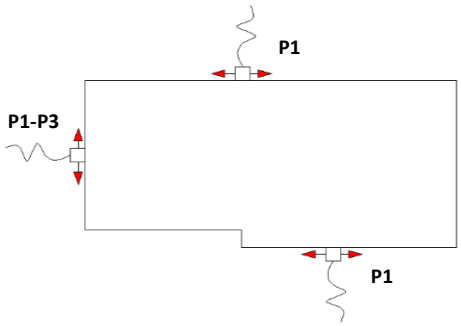
Items Description / Result

Items:

067-068-069-075

Drawing





Note:	N/A
Result:	Material found 100% in compliance with relevant specifications

Operator / Inspection

Tested by:	G.Romano
Level:	UNI EN ISO 9712
Date:	21/07/2022
Verify By:	T.Fascendini
Date:	21/07/2022

Tnia Fascendini

External Inspector:

OFFICINE NICOLA GALPERTI E FIGLIO S.p.A.
Capitale Sociale € 2.582.500,00 interamente versato
Sede Legale e Amministrativa:
***23824 DERVIO (LC)** - Via Enrico Fermi, 46*
C.C.I.A.A. Lecco n.00205990138 - R.E.A.79815 - C.F. e P.IVA IT00205990138
Stabilimento - Uffici Amministrativi / Workshop - Warehouse - Offices - Mailing address:
***22010 GERA LARIO (CO)** – Via Trivio Fuentes, 4*
Tel. 0344-97200 - Fax 0344-97210
E-mail : galperti@galperti.com - www.galperti.com

LIQUID PENETRANT EXAMINATION REPORT

Certificate No.:	LP1-220145-G4
Revision No.:	
Date :	21/07/2022

Main Information

Client Name:	SFF AS
Client P.O.:	503532 (STOCK)
Project	
Supplier Ref.:	220145

Procedure

Examination Procedure :	LPN03
Applicable specification	ASTM A961 S56
Acceptance criteria	ASME VIII Div. 1 App. 8

Examination, Material, Equipment and Liquid Penetrant Technique

Area of Test	100 % of all accessible surface	***Surface Condition:***	Machined surface
Items:	As below detailed	***Material Type:***	ASTM A182/20 F53 (32750)
Note:	Intensity at the examinated surface > 1076 lux		

Product Type	**Penetrant**	**Cleaner**	**Developer**
Product Name	Water red	Water	Rotrivel U
Manufactured by:	C.G.M.	N/A	C.G.M.
Application:	Brush	Manual	Spray
Penetrantion Time:	20 minutes	/	/
Developer Time:	/	/	15 minutes

Items Description / Result

Items: **067-068-069-075**

Result: Material found 100% in compliance with relevant specifications

Operator / Inspection

Tested by:	M.Codera
Level:	UNI EN ISO 9712
Date:	21/07/2022
Verify By:	T.Fascendini
Date:	21/07/2022

External Inspector:

OFFICINE NICOLA GALPERTI & FIGLIO S.p.A.
Capitale Sociale €.582.500 interamente versato
Sede Legale e Amministrativa:
23824 DERVIO (LC) – Via Enrico Fermi, 46
C.C.I.A.A. Lecco n.00205990138 - R.E.A. n. 79815 C.F. e P.IVA IT00205990138
Stabilimento - Uffici Amministrativi / Workshop - Warehouse - Offices - Mailing address:
22010 GERA LARIO (CO) – Località S.Agata – Tel. (0344) 97200
Telefax (0344) 97210 – E-MAIL ADDRESS: galperti@galperti.com
WEB SITE : galperti.com

Dimensional & Visual Inspection Report

 Date 21/07/2022

CLIENT	**SFF AS**	SUPPLIER :	**OFFICINE NICOLA GALPERTI E FIGLIO**
CLIENT ORDER No.	**503532 (STOCK)**	SUPPLIER'S Ref.No.	**220145**
ITEMS : **SEE ATTACHED LIST [G]**		ATTACHED CERTIFICATE	**SEE ATTACHED LIST [G]**

THE FOLLOWING OPERATION HAVE BEEN WITNESSED BY : *INTERNAL INSPECTOR*

- v DIMENSIONAL AND VISUAL INSPECTION
- v EXTERNAL VISUAL CHECK
- v VISUAL ROUGHNESS CONTROL ON FACING
- v MARKING

RESULTS : **SATISFACTORY ACCORDING TO:** ***ASME B16.5 ED.17***

S.AGATA : 21/07/2022 OFF. NICOLA GALPERTI & FIGLIO S.p.A.

Tania Fascendini

T. Fascendini
(Quality control department)

OFFICINE NICOLA GALPERTI & FIGLIO S.p.A.
Capitale Sociale €.582.500 interamente versato
Sede Legale e Amministrativa:
23824 DERVIO (LC) – Via Enrico Fermi, 46
C.C.I.A.A. Lecco n.00205990138 - R.E.A. n. 79815 C.F. e P.IVA IT00205990138
Stabilimento - Uffici Amministrativi / Workshop - Warehouse - Offices - Mailing address:
22010 GERA LARIO (CO) – Località S.Agata – Tel. (0344) 97200
Telefax (0344) 97210 – E-MAIL ADDRESS: galperti@galperti.com
WEB SITE : galperti.com

Certificate of Material Compliance

 Date 21/07/2022

CLIENT :	**SFF AS**	SUPPLIER :	**OFFICINE NICOLA GALPERTI E FIGLIO**
CLIENT ORDER No.	**503532 (STOCK)**	SUPPLIER'S Ref.No.	**220145**
ITEMS : **SEE ATTACHED LIST [G]**		ATTACHED CERTIFICATES	**SEE ATTACHED LIST [G]**

We hereby certify that all items supplied for the above purchase order meet all requirements of the applicable specifications of manufacture, the purchase order item descriptions, purchase specifications and purchase order requirements.We certify that all applicable heat treatments, chemical analysis, mechanical tests, non destructive examinations, etc., as required in the purchase order, were performed and that the results were in accordance with the requirements of the purchase order. We certify that all required analysis and tests were performed on final production parts, or on specimens which were representative in all respects, of the final production part. We certify that all the instruments used for all the measurements are properly calibrated according to our internal procedure P07.

MATERIAL ACCORDING TO: ***NACE MR-01-75/ISO 15156***

S.AGATA : 21/07/2022

p.Off. NICOLA GALPERTI & FIGLIO S.p.A.

Tania Fascendini

T. Fascendini
(Quality control department)

officine ambrogio
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.98341
Fax 0341.983496 - 983497
lino.uberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
WORKS CERTIFICATE
CERTIFICAT D'ESSAIS

N.	DATA / *DATE*	SHEET / *PAGE*
80639	28/04/12	1/1

ORDINE / *ORDER / C.DE*: PO1003453 ELDFISK
DATA / *DATE*: 22/12/11
COMMESSA: 47785
N

N. RIF.	ITEM	N / *QUANTITY*	DESCRIZIONE / *DESCRIPTION / DÉSIGNATION*	NOTE
SJ172	53	60	A182F53 3" WN 150 RF SCH 10S	CODE LD085371 125-250 RMS P261
SJ181	359	1	A182F53 20" WN 150 RF SCH 10S	CODE LD085380 125-250 RMS P300
SJ186	232	13	A182F53 2" WN 1500 RJ STD/40S	CODE LD086631 P298
SJ191	189	11	A182F53 16" BL 150 RF	CODE LD085360 125-250 RMS P530
SJ204	201	1	A182F53 12" BL 300 RF	CODE LD085718 125-250 RMS P551

N.	MATERIALE / *MATERIAL / MATÉRIEL*	HEAT / *COULÉE*	ACCIAIERIA / *STEEL PLANT / ACIÉRIE*	ORIGIN. CERT. / *CERT. D'ORIGIN*
SJ172	ASTM A182 F53 09a	I01664	OUTO KUMPU Refining Method A.O.D.	LP2704-10
SJ181	ASTM A182 F53 09a	E110521	OUTO KUMPU Refining Method A.O.D.	LP844-11
SJ186	ASTM A182 F53 09a	529309	SANDVIK Refining method A.O.D.	A/11-170728
SJ191	ASTM A182 F53 09a	E111017	OUTO KUMPU Refining Method A.O.D.	LP1610-11
SJ204	ASTM A182 F53 09a	45150	ACERALAVA Refining Method A.O.D.	537236

ANALISI CHIMICA / *CHEMICAL ANALYSIS / COMPOSITION CHIMIQUE*

N. RIF.	C	Mn	Si	P	S	Cr	Ni	Mo	N	Cu				PRE
SJ172	0,015	0,720	0,330	0,024	0,001	24,970	6,630	3,760	0,276	0,170				41,794
SJ181	0,014	0,680	0,350	0,025	0,001	24,960	6,610	3,840	0,287	0,170				42,224
SJ186	0,016	0,760	0,270	0,017	0,000	24,900	6,930	3,860	0,290	0,093				42,278
SJ191	0,020	0,690	0,350	0,020	0,001	24,930	6,600	3,710	0,276	0,140				41,589
SJ204	0,010	0,660	0,450	0,024	0,000	25,400	6,750	3,590	0,271	0,270				41,583

PROVE MECCANICHE / *MECHANICAL TESTS / ESSAIS MECANIQUES*

N. RIF.	ø mm.	SO mm.2	LU mm.	RS.-YIELD *LIMITE*	R.-TENSILE *RUPTURE*	A. %-ELONG. *ALLONGEM.*	C. %-REDUCT. *STRICTION*	RESILIENZA / *IMPACT TEST / RESILIENCE* MEDIO / *AVERAGE MOYEN*	MINIMO *MINIMUM*		TIPO *TYPE*	TEMP.	HARDNESS / *DURETÉ*
				MPA	MPA	2"		Joule	Joule				H R C
				550,00	800,00	15,00		45				°C	Max.32
P261	12,70	126,65	50,80	705,00	834,10	31,20	68,80	82	98	111	KV	- 46	22/24
P300	12,70	126,65	50,80	697,50	833,20	32,00	68,90	102	86	111	KV	- 46	23/25
P298	12,70	126,65	50,80	701,40	834,00	35,60	68,00	97	101	114	KV	- 46	24/25
P530	12,70	126,65	50,80	657,30	832,50	31,50	69,30	96	87	90	KV	- 46	21/23
P551	12,70	126,65	50,80	702,00	816,90	31,30	67,50	104	116	128	KV	- 46	22/24

TRATTAMENTI TERMICI / *HEAT TREATMENTS / TRAITEMENTS THERMIQUES*

N. RIF.		
SJ172	Solubilizzazione/Solution annealed	
SJ181	Solubilizzazione/Solution annealed	At 1120°C for min 1/2 h/inch
SJ186	Solubilizzazione/Solution annealed	Quenched water
SJ191	Solubilizzazione/Solution annealed	
SJ204	Solubilizzazione/Solution annealed	

Acc. DIN50049 3.1B/EN10204 3.1 Surface and dimensional check according to relevant standard.
Steel made by electric furnace.
Material acc. to NACE MR 01-75 / ISO 15156. Material acc. to MDS D54 Rev.4.
Corrosion test carried out acc. to ASTM G48 method "A" at 50°C exposure time 24 hours.
Results: no pitting attack, no weight loss.
P.M.I. test performed on 100% of pieces with satisfactory results.
Ferrite determined using farritoscope fisher MP3 on all pieces, results: > 35 on total body.
The works operate a quality mangement system acc. to annex I, section 4.3 of the pressure equipment directive (PED) 97/23/EC certificate by TUV certificate number 58/2002/MUC

ESITO DELLE PROVE / *TEST ISSUE / RESULTS DES ESSAIS*: FAVOREVOLE SATISFACTORY SATISFAISANT

TRADE MARK	P. OFF. A. MELESI & C.	COLLAUDATORE / *INSPECTOR / INSPECTEUR*	ENTE COLLAUDATORE / *INSPECTION AGENCY* *AUTHORITÉE DE RECETTE*
		Uberti p.i. Lino	

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.
23813 Cortenova (Lecco) - Italy
Largo De Vecchi 11
P.O. BOX 11
Tel. 0341.98.34.1
Fax 0341.98.34.98 - 98.34.97
E-mail: info@melesi.it
www.melesi.it
Part. I.V.A. 00231630138
R.E.A. Lecco n. 108835
R.I. Lecco n. 2130
N. Mecc. LO 005895

Messrs.

28 April 2012

Your P.O. Nr.
Our ref. 47785
Certificate Nr. M1491

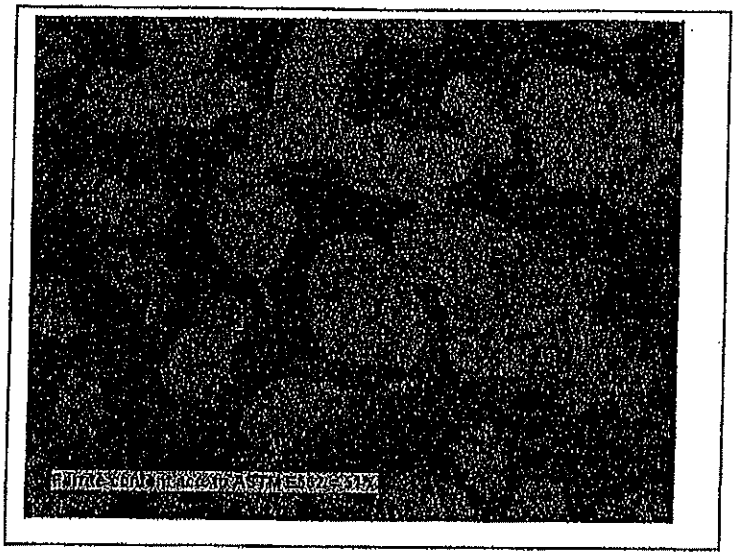
MICROSTRUCTURE

SAMPLE OF ASTM A182 F53 HEAT 101664 P261

THE RESULTS OF METALLOGRAPHIC EXAMINATION SHOW A REGULAR STRUCTURE FREE FROM GRAIN BOUNDARY CARBIDES, SIGMA, CHI AND LAVES PHASES AS SHOWN ON BELOW PHOTO.

ACC. TO STATOIL SPEC MAT-2010080 AND MELESI IO004

FERRITE CONTENT ACC. TO ASTM E562 = 51%



Q. X 500 A.

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.
23813 Cortenova (Lecco) - Italy
Largo De Vecchi 11
P.O. BOX 11
Tel. 0341.98.34.1
Fax 0341.98.34.96 - 98.34.97
E-mail: info@melesi.it
www.melesi.it
Part. I.V.A. 00231630138
R.E.A. Lecco n. 108835
R.I. Lecco n. 2130
N. Mecc. LC 005895

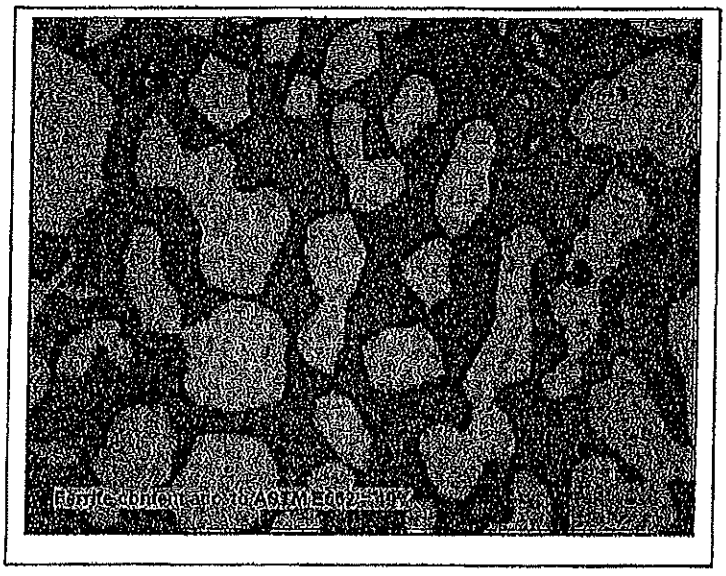
Messrs.

28 April 2012

Your P.O. Nr.
Our ref. 47785
Certificate Nr. M1492

MICROSTRUCTURE

SAMPLE OF ASTM A182 F53 HEAT E110521 P300
THE RESULTS OF METALLOGRAPHIC EXAMINATION SHOW A REGULAR STRUCTURE FREE FROM GRAIN BOUNDARY CARBIDES, SIGMA, CHI AND LAVES PHASES AS SHOWN ON BELOW PHOTO.
ACC. TO STATOIL SPEC MAT-2010080 AND MELESI IO004
FERRITE CONTENT ACC. TO ASTM E562 = 49%



X 500

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.
23813 Cortenova (Lecco) - Italy
Largo De Vecchi 11
P.O. BOX 11
Tel. 0341.98.34.1
Fax 0341.98.34.96 - 98.34.97
E-mail: info@melesi.it
www.melesi.it
Part. I.V.A. 00231630138
R.E.A. Lecco n. 108835
R.I. Lecco n. 2130
N. Mecc. LC 005895

Messrs.

28 April 2012

Your P.O. Nr.
Our ref. 47785
Certificate Nr. M1493

MICROSTRUCTURE

SAMPLE OF ASTM A182 F53 HEAT 529309 P298
THE RESULTS OF METALLOGRAPHIC EXAMINATION SHOW A REGULAR STRUCTURE FREE FROM GRAIN BOUNDARY CARBIDES, SIGMA, CHI AND LAVES PHASES AS SHOWN ON BELOW PHOTO.
ACC. TO STATOIL SPEC MAT-2010080 AND MELESI IO004
FERRITE CONTENT ACC. TO ASTM E562 = 50%



GX 500

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.
23813 Cortenova (Lecco) - Italy
Largo De Vecchi 11
P.O. BOX 11
Tel. 0341.98.34.1
Fax 0341.98.34.06 - 98.34.97
E-mail: info@melesi.it
www.melesi.it
Part. I.V.A. 00231630138
R.E.A. Lecco n. 108835
R.I. Lecco n. 2130
N. Mecc. LC 005895

Messrs.

28 April 2012

Your P.O. Nr.
Our ref. 47785
Certificate Nr. M1494

MICROSTRUCTURE

SAMPLE OF ASTM A182 F53 HEAT E111017 P530
THE RESULTS OF METALLOGRAPHIC EXAMINATION SHOW A REGULAR STRUCTURE FREE FROM GRAIN BOUNDARY CARBIDES, SIGMA, CHI AND LAVES PHASES AS SHOWN ON BELOW PHOTO.
ACC. TO STATOIL SPEC MAT-2010080 AND MELESI IO004
FERRITE CONTENT ACC. TO ASTM E562 = 49%



Q. X 500
A.

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.
23813 Cortenova (Lecco) - Italy
Largo De Vecchi 11
P.O. BOX 11
Tel. 0341.98.34.1
Fax 0341.98.34.96 - 98.34.97
E-mail: info@melesi.it
www.melesi.it
Part. I.V.A. 00231630138
R.E.A. Lecco n. 106835
R.I. Lecco n. 2130
N. Mecc. LC 005095

Messrs.

28 April 2012

Your P.O. Nr.
Our ref. 47785
Certificate Nr. M1495

MICROSTRUCTURE

SAMPLE OF ASTM A182 F53 HEAT 45150 P551

THE RESULTS OF METALLOGRAPHIC EXAMINATION SHOW A REGULAR STRUCTURE FREE FROM GRAIN BOUNDARY CARBIDES, SIGMA, CHI AND LAVES PHASES AS SHOWN ON BELOW PHOTO.

ACC. TO STATOIL SPEC MAT-2010080 AND MELESI IO004

FERRITE CONTENT ACC. TO ASTM E562 = 48%



X 500

Q. A.

officine ambrogio
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
P.o. box 11
Tel 0341 98.341 ric. aut.
Fax 0341 90.15.06 - 90.14.88

FLANGE E FORGIATI

CERTIFICATO CONTROLLO CON LIQUIDI PENETRANTI
LIQUID PENETRANT TEST

Nr.	Data/Date	Pag./Sheet	Commessa/Job
20851	28/04/2012	1 / 1	47785

Ordine/Order

Cliente/Customer

Specifica/Specification
ASTM E165

Stadio di controllo/Inspection phases
After final machining

Pos. Item	Q.tà Quantit	Descrizione Description	Colata Heat	Cond. superficiali Surface status
53	60	A182F53 3" WN 150 RF SCH 10S	101664	Finished
359	1	A182F53 20" WN 150 RF SCH 10S	E110521	Finished
189	11	A182F53 16" BL 150 RF	E111017	Finished
201	1	A182F53 12" BL 300 RF	45150	Finished

Metodo d'esame/Examination method

- ☐ Fluorescente / Fluorescent
- ☑ Contrasto di colore / Color contrast
- ☐
- ☑ Lavabili con acqua / Water washable
- ☐ Lavabili con solvente / Solvent removable
- ☐ Post emulsionabili / Post emulsifying
- ☐

Prodotti/Products		Lotto N./Batch Nr.
Pulizia/Cleaning	Solvents	01.0.100
Asciugatura/Drying	Wipers	
Penetrante/Penetrant	CGM	4648
Solvente/Solvent		
Rilevatore/Developer	CGM	4544

Tecnica d'esame/Tecnique examination

Tempo di penetrazione/Penetration dwell time	Tempo di sviluppo/Developer dwell time
20'	12'

Note/Notes
Acceptance criteria ASME VIII Div.1, Appendix 8.
No defects.

Risultati/Results: Conforme alla specifica/According to specification

Operatori/Operators	Capo c./Quality control sup.	Ente collaudatore/Inspection authorities
Quarenghi Gianbattista Lev. II	Uberti p.i. Lino	Non richiesto/Not required
		Ispettore cliente/Customer inspector: Non richiesto/Not required

officine alfieri maggio

meles i

23813 Colle Brianza (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.60341
Fax 0341.953480 - 993497
lino.alberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
WORKS CERTIFICATE
CERTIFICAT D'ESSAIS

N.	DATA / DATE	SHEET / PAGE
93623	6/08/13	1/1

ORDINE / ORDER / O.DE: B/20122/09 (STOCK)
DATA / DATE: 22/01/13
COMMESSA: 30096

N. RIF.	ITEM	N/QUANTITY	DESCRIZIONE / DESCRIPTION / DESIGNATION	NOTE
SJ172	051	25	A182F53 1/2" HN 600 GR RJ 908	without RTJ P335
SJ192	043	5	A182F53 16" BL 150 RF	125-250 RMS P532

N.	MATERIALE / MATERIAL / MATÉRIEL	COLATA / COULÉE	ACCIAIERIA / STEEL PLANT / ACIÉRIE	ORIGINE CERT. / CERT. D'ORIGIN
SJ172	ASTM A182 F53 09a ASME SA182 F53	101664	OUTO KUNPU Refining Method A.O.D.	LP2704-10
SJ192	ASTM A182 F53 09a ASME SA182 F53	44459	ACERATAVA Refining Method A.O.D.	525301

ANALISI CHIMICA / CHEMICAL ANALYSIS / COMPOSITION CHIMIQUE

N. RIF.	C	Mn	Si	P	S	Cr	Ni	Mo	N	Cu				PRE
SJ172Ladle	0,015	0,720	0,330	0,024	0,001	24,970	6,630	3,760	0,276	0,170				41,794
SJ172Check	0,012	0,721	0,332	0,025	0,001	24,960	6,631	3,762	0,275	0,172				41,783
SJ192Ladle	0,009	0,660	0,480	0,023	0,000	25,450	6,600	3,560	0,269	0,290				41,002
SJ192Check	0,010	0,620	0,490	0,024	0,000	25,460	6,610	3,580	0,270	0,280				41,594

PROVE MECCANICHE / MECHANICAL TESTS / ESSAIS MECANIQUES

N. RIF.	a mm.	SO mm.2	LO mm.	RS.YIELD LIMITE	R.TENSILE RUPTURE	A.%-ELONG. ALLONGEM.	C.%-REDUCT. STRICTION	RESILIENZA / IMPACT TEST / RESILIENCE MEDIO / AVERAGE	MINIMO MINIMUM	TIPO TYPE	TEMP.	HARDNESS / DURETE
				MPA	MPA	2"		Joule	Joule		°C	H R C
				550,00	800,00	15,00		60	34			Max.32
P335	12,70	126,65	50,80	688,90	836,70	34,20	71,00	94	111	126	KV	- 50	26/27
								1,1	1,2	1,3	L.I		
P532	12,70	126,65	50,80	657,00	828,40	36,00	71,00	94	80	97	KV	- 50	26/27
								0,9	1,1	1,2	L.I		

N. RIF.	TRATTAMENTI TERMICI / HEAT TREATMENTS / TRAITEMENTS THERMIQUES
SJ172	Solubilizzazione/Solution annealed At 1120°C for min 1/2 h/inch
SJ192	Solubilizzazione/Solution annealed Quenched water

Acc. DIN50049 3.1B/EN10204 3.1 Surface and dimensional check according to relevant standard.
Steel made by electric furnace.
Material acc. to ASME SA182F53 ASME section II part A ed.' 2010 plus addenda.
Corrosion test carried out acc. to ASTM G48 method "A" at 50°C exposure time 24 hours.
Results: no pitting attack at 20X, no weight loss.
P.M.I. test performed with satisfactory results.
Material acc. to NACE MR 01-75 / ISO 15156.
Material acc. to Shell spec. MS/247 Rev.1 / NORSOK MDS D54 Rev.4.

ESITO DELLE PROVE / TEST ISSUE / RESULTS OF EXAMS: FAVOREVOLE SATISFACTORY SATISFAISANT

TRADE MARK	P. OFF. A. MELESI & C.	COLLAUDATORE / INSPECTOR / INSPECTEUR	ENTE COLLAUDATORE / INSPECTION AGENCY AUTHORITÉS DE RECETTE
		Alberti p. i. Lino	

officine ambrogio melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
P.o. box 11
Tel 0341 66.341 r.c. aut.
Fax 0341 90.15.06 - 90.14.66

FLANGE E FORGIATI

CERTIFICATO CONTROLLO CON LIQUIDI PENETRANTI
LIQUID PENETRANT TEST

Nr.	Data/Date	Pag./Sheet	Commessa/Job
24843	06/09/2013	1 / 1	50096

Ordine/Order: E/20122/DS

Specifica/Specification: ASTM E 165/ASME V ART 6

Stadio di controllo/Inspection phases: After final machining

Pos. Item	Q.tà Quantity	Descrizione Description	Colata Heat	Cond. superficiali Surface status
051	25	A182F53 1/2" WN 600 GR RJ 80S	101664	Finished
043	5	A182F53 16" BL 150 RF	44459	Finished

Metodo d'esame/Examination method		Prodotti/Products	Lotto N./Batch Nr.
☐	Fluorescente / Fluorescent		
☐	Contrasto di colore / Color contrast		
☐			
☑	Lavabili con acqua / Water washable		
☐	Lavabili con solvente / Solvent removable		
☐	Post emulsionabili / Post emulsifying		
☐			

	Prodotti/Products	Lotto N./Batch Nr.
Pulizia/Cleaning	CGM R2.60	
Asciugatura/Drying	Wipers	
Penetrante/Penetrant	RED WW R2.71	166/13
Solvente/Solvent		
Rilevatore/Developer	Rotrivel U	102/13

Tecnica d'esame/Tecnique examination

Tempo di penetrazione/Penetration dwell time	Tempo di sviluppo/Developer dwell time
20'	12'

Note/Notes

No defects.
Acceptance criteria ASME VIII Div.1, Appendix 8

Risultati/Results: Conforme alla specifica/According to specification

Operatori/Operators	Capo c./Quality control sup.	Ente collaudatore/Inspection authorities
Papa Michele Lav. II	Uboldi p.i. Ugo	Non richiesto/Not required
		Ispettore cliente/Customer inspector: Non richiesto/Not required

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.
Largo Da Vinci 11 — Phone: +39.0341.68311 — Cap. Soc./Share Cap. 6500,00 i.v.
23811 Carlazzo (LC) — Fax: +39.0341.682107 / 7 — P.IVA - C.F. - R.I. Lecco
Italy — E-mail: info@melesi.it — IT 00231890136
Web site: www.melesi.it — R.E.A. n. LO-105935
Il Meccanografico n. LO0068895

6 September 2013

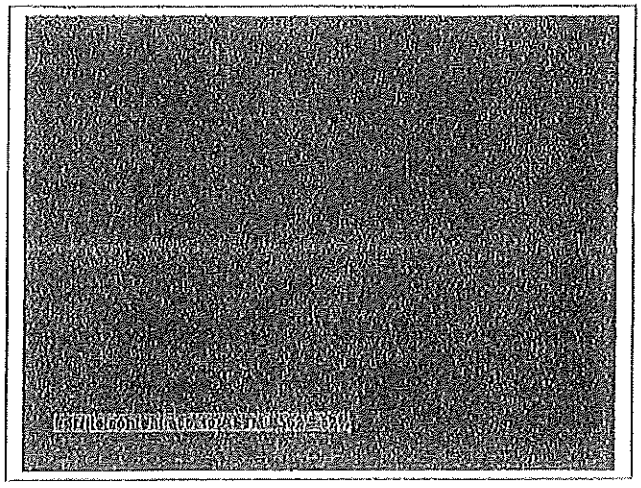
Your P.O. Nr. E/20122/DS
Our ref. 50096
Certificate Nr. M3035

MICROSTRUCTURE

SAMPLE OF ASTM A182 F53 HEAT 44459 P532

THE RESULTS OF METALLOGRAPHIC EXAMINATION SHOW A REGULAR STRUCTURE FREE FROM GRAIN BOUNDARY CARBIDES, SIGMA, CHI AND LAVES PHASES AS SHOWN ON BELOW PHOTO.

EXAMINATION FROM SAME AREA OF MECHANICAL TEST AND NEAR SURFACE.



X 500

Q. A.

outokumpu
high performance stainless steel

CERTIFICATE - ZEUGNIS - CERTIFICAT

EN 10204 - 3.1
20061543-EN-0

Invoice No. / Rechnung Nr. / N° de facture:
Page / Seite / Page: 1/2

Business Unit / QCM: BA Quarto Plate,Quarto Plate Europe
Date Datum Date: 22-Jun-2020
Load, Ladung, Charge No:
Acknowledged ID, Bestätigung, Commande ID: 360019239

Your ref, Ihre Ref., Votre ref: 81179 REV 00

Buyer, Besteller, Acheteur:

Consignee, Empfänger, Lieu de livraison:

Requirements, Anforderungen, Exigences:
Material specification JMS 08 rev 02
EN 10028-7, PED 2014/68/EU:16
EN 10088-2:14
ASME SA-240M Code Sect. II. Part A:2019
NORSOK Standard MDS D55:5
NACE MR0103 / ISO 17945:2015
ASTM A240M / NACE MR0175/ ISO 15156-3:19/2015
Co content shall be mentioned in certificates
B content shall be mentioned in certificates
Additional requirement, see "Other information"

101070
101071

Mark of Manufacturer / Zeichen des Lieferwerkes / Signe de producteur	Process / Erschmelzungsart / Mode de fusion	Inspector's stamp / Zeichen des Sachverständigen / Poinçon de l'expert	Grade, Werkstoff, Nuance
W	E+AOD	DJ 2	Outokumpu 2507 / 1.4410 — UNS S32750

Product, Erzeugnisform, Produit: Stainless steel hot rolled, Plate, 1D/No.1, Cut edge

Line / Reihe / Ligne	Item / Position / Poste	Heat-Lot No / Schmelze-Lot Nr / Coulée n° - Lot No	Size / Abmessungen / Dimensions	Pieces / Stückzahl / Nombre	Quantity/unit, Menge/Einheit, Quantité/Unité
1	3	502079-396842:0	10,0 X 2500,0 X 6000,0 mm	2	

	Plate No, Blech Nr, Tôle No
1	9925 2703,-2704

Chemical composition – Chemische Zusammenzetzung – Composition chimique %
Heat – Schmelze – coulee No

	C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Co	N	B		
Min						24.00	6.00	3.00			0.24			
Max	0.030	0.80	1.20	0.035	0.015	26.00	8.00	4.50	0.50		0.32			
502079	0.016	0.34	0.66	0.030	0.001	25.01	6.72	3.75	0.28	0.1500	0.28	0.0018		

Distribution: Certificate via e-Services

Direct. T = Transverse, L = Longitudinal
Top/Bot F = Front, B = Back
Form P = Flat, C = Round
Location 1 = Center, 2 = Close to Surface, 3 = Standard, 4 = At ¼ of thickness

Test results - Prüfergebnisse - Résultats des essais (1N/mm² = 1 MPa)

Mechanical properties

Tensile testing/Hardness Rockwell C

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Rp 0,2 MPa	Rm MPa	A5 %	A50 %	HRC HRC
Min						550	795	20	25	
Max							930			32
2703	T	F	2	P	20	687	871	35	36	27

Charpy impact test (V-notch) ASTM A370 10x7.5 (-46 °C)

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Value1 J	Value2 J	Value3 J	Average J	Lat ex1 mm	Lat ex2 mm	Lat ex3 mm
Min						29	29	29	38	0.38	0.38	0.38
2703	T	F	1	P	-46	188	214	185	196	2.14	2.23	2.08

Charpy impact test (V-notch) EN ISO 148-1 10x7.5 (-40 °C)

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Value1 J	Value2 J	Value3 J	Average J	Lat ex1 mm	Lat ex2 mm	Lat ex3 mm
Min									33	0.38	0.38	0.38
2703	T	F	2	P	-40	209	200	217	209	2.21	2.15	2.26

Charpy impact test (V-notch) EN ISO 148-1 10x7.5

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Value1 J	Value2 J	Value3 J	Average J	Lat ex1 mm	Lat ex2 mm	Lat ex3 mm
Min									75	0.38	0.38	0.38
2703	T	F	2	P	20	219	232	223	224	2.31	2.24	2.27

The results comply with the Requirements of the order / Die Ergebnisse entsprechen den Anforderungen der Bestellung / Les résultats sont conformes aux exigences de la commande

Outokumpu Stainless AB
BA Quarto Plate,Quarto Plate Europe
SE-, 693 81 DEGERFORS
SWEDEN
Regoffice: SWEDEN
V.A.T no: SE556001874801
, Regno: 556001-8748

Computer generated original
Quality Inspector

Liselotte Andersen

outokumpu
high performance stainless steel

CERTIFICATE - ZEUGNIS - CERTIFICAT

EN 10204 - 3.1
20061543-EN-0

Business Unit / QCM	Date Datum Date	Load, Ladung, Charge No	Acknowledged ID, Bestätigung, Commande ID
BA Quarto Plate,Quarto Plate Europe	22-Jun-2020		360019239

101070
101071

Corrosion

ASTM A923 Method C 24h

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Cor.rate mdd
Max						10
2703	T	F	3	P	40	0

EN ISO 3651-2 Method C

Plate-no	Result
2703F	OK

ASTM G48 Method A 24h

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Cor.rate g/m2*24h
Max						3.99
2703	T	F	3	P	50	0.00

Metallographic testing

Ferrite examination ASTM E562

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Ferrite %
Min						35
Max						55
2703	T	F	2	P	20	41

Ferrite examination Fischer Feritscope

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Ferrite %
Min						35
Max						65
2703	T	F	2	P	20	46

Microstructure examination NORSOK

Plate-no	Result
2703F	OK

Other Information

Country of origin (heat) :Sweden
Solution annealed at 1100°C and Quenched in water.
Dimensional control, visual inspection and grade check (PMI): Approved
Approved acc. to AD2000-Merkblatt W0 and certified acc. to
Pressure Equipment Directive (2014/68/EU) by
TUEV NORD, notified body, reg.no. 0045
Holding time approximately 1 minute/mm plate thickness
Norsok M-650 QTR. No.:
UNS S32750: QTR_S32750 Rev.17
UNS S32760: QTR_S32760 Rev.2
Material delivered in accordance with Outokumpu document - Control of Radioactive Contamination, dated 22 January 2019
No welding repairs have been performed.
PREN=CR+3.3Mo+16N: 42 (Min:41 Max:99)

Additional testing:
Charpy impact test (V-notch) ASTM A370 -46°C: Lat ex Min=0.38 (mm)

Tolerance	Standard	Class
Flatness tolerance	Manual	5
Length	EN ISO 18286/A480/A480M	EN ISO 18286 A/A480/A480M
Thickness	EN ISO 18286/A480/A480M	EN ISO 18286/A480/A480M
Width	EN ISO 18286/A480/A480M	EN ISO 18286 A/A480/A480M

The results comply with the requirements of the order - Die gestellten Anforderungen sind erfüllt - Les résultats sont conformes aux exigencies de la commande

Outokumpu Stainless AB
BA Quarto Plate,Quarto Plate Europe
SE-, 693 81 DEGERFORS
SWEDEN
Regoffice: SWEDEN
V.A.T no: SE556001874801
, Regno: 556001-8748

Computer generated original
Quality Inspector

Liselotte Andersen

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

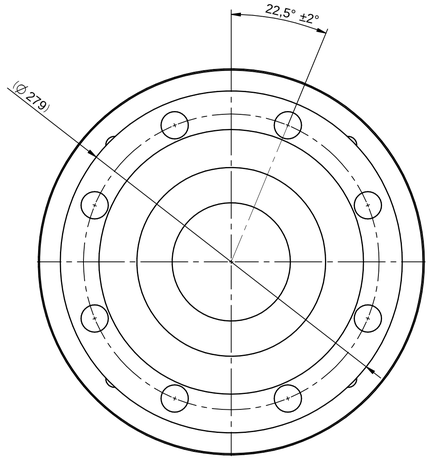
A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

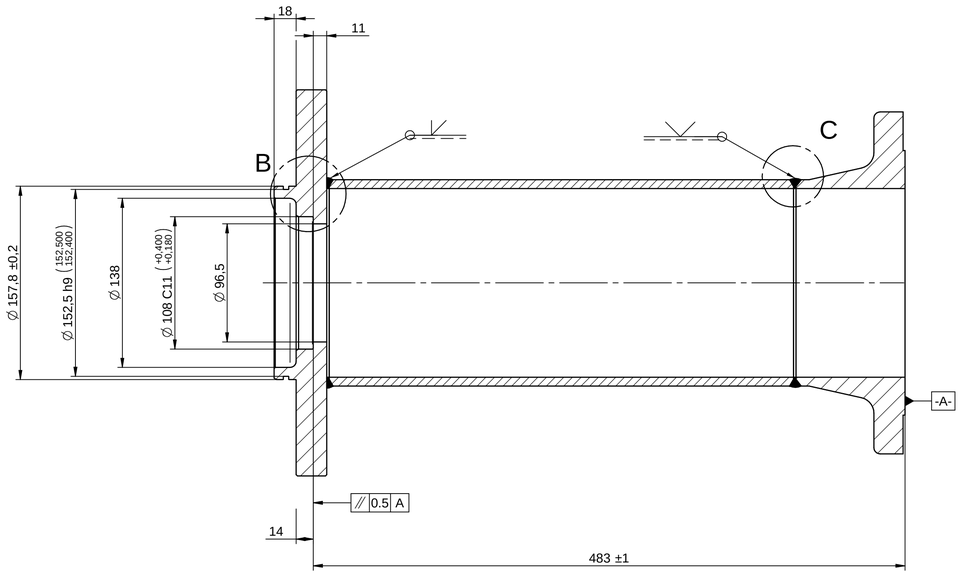
Item
#50A
Description
STATOR PIPING 25AV24
PCM Reference
W-008199257WP

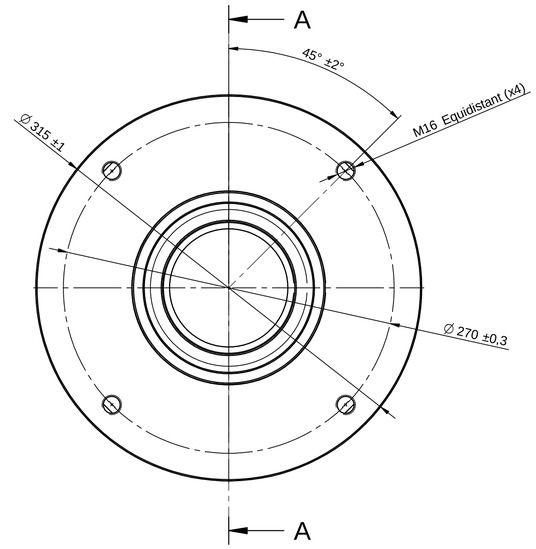
PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

SRCI & P2MI	**Traçabilité Matière -** *Material Traceability* ***Affaire PO070-24-07599***			**Ref SRCI : 24121-03**
PLAN DRAWING	**DESIGNATION**	**MATIERE MATERIAL**	**N° COULEE HEAT N°**	**REP**
W-008199-A	Thickness 45mm	SUPERDUPLEX	531188	**10**
W-008199-A	Pipe 6" SCH40S	SUPERDUPLEX	60418	**3**
W-008199-A	Flange 6" 150# WN RF - SCH40S	SUPERDUPLEX	E161501 / E141482 555083	**1** **2**

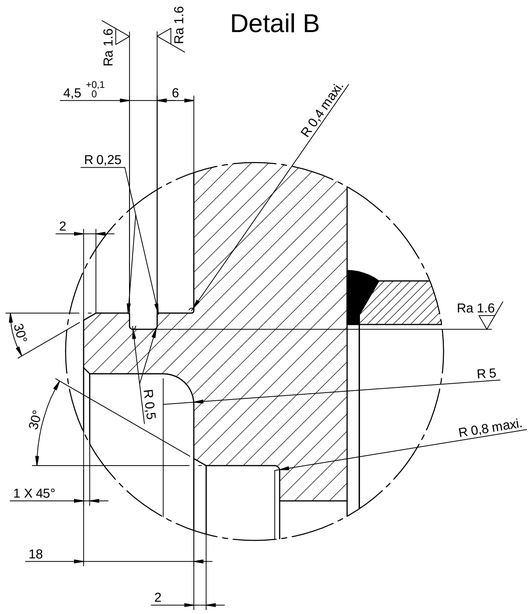
Coupe / Section A-A

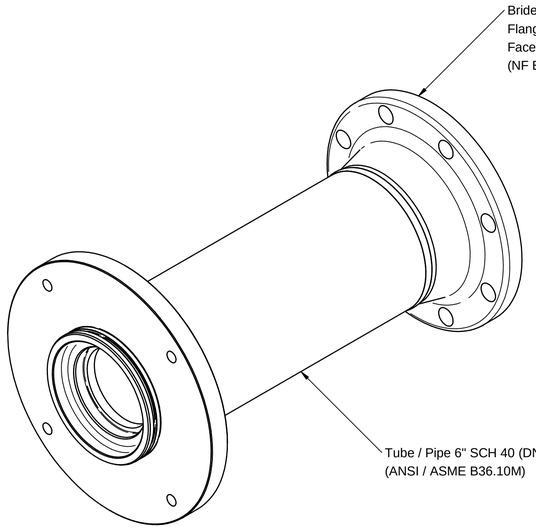




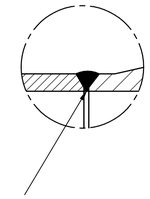


Detail B





Detail C



Casser les arêtes vives / *Smooth sharp angles*

A	A.POUPLARD	Première révision / First issue		GPE	13/06/2024
Rev.	Par / By	Objet / Subject	FNC / NOR	Vérifié par / Checked by	Le / On

PCM keep it moving
Rue René Moineau
49 123 Champtocé/Loire
FRANCE
Phone : +33 (0)1.77.68.31.00
www.pcm.eu

EMBOUT STATOR 6"

STATOR PIPING 6"

Type	25AV24								
Masse / *Weight*	35.89 kg / 79.1 lbs		Tol.	ISO 2768-mH	√	Ra 3.2	Mat.	Voir Ordre Fabrication / Achat *See Manufacturing / Purchasing Order*	
Par / *By*	A.POUPLARD	Le / *On*	13/06/2024		Feuille *Sheet*	Format	N°	W-008199	Rév. A
					1 / 1	A1			

Tous droits réservés, diffusion ou reproduction interdite sans autorisation écrite de PCM.
All rights reserved, reproduction or distribution prohibited without written permission from PCM.

outokumpu
high performance stainless steel

CERTIFICATE - ZEUGNIS - CERTIFICAT

EN 10204 - 3.1
23051891-EN-0

Invoice No. / Rechnung Nr. / N° de facture

Business Unit / QCM: BA Quarto Plate,Quarto Plate Europe
Date Datum Date: 30-May-2023
Load, Ladung, Charge No:
Acknowledged ID, Bestätigung, Commande ID: 360024840

Your ref, Ihre Ref., Votre ref: 82234 REV 00

Buyer. Besteller. Acheteur:

Consignee, Empfänger, Lieu de livraison:

Requirements, Anforderungen, Exigences:
Material specification JMS 08 rev 02
EN 10088-4:2009
EN 10088-2:14
ASME SA-240M Code Sect. II. Part A:2021
NORSOK Standard MDS D55 Rev.6
NACE MR0103 / ISO 17945:2015
ASTM A240M / NACE MR0175/ ISO 15156-3:20/2015
Additional requirement, see "Other information"

104091

Mark of Manufacturer / Zeichen des Lieferwerkes / Signe de producteur	Process / Erschmelzungsart / Mode de fusion	Inspector's stamp / Zeichen des Sachverständigen / Poinçon de l'expert	Grade, Werkstoff, Nuance
W	E+AOD	DJ 2	Outokumpu 2507 / 1.4410 — UNS S32750

Product, Erzeugnisform, Produit: Stainless steel hot rolled, Plate, 1D/No.1, Cut edge

Line / Reihe / Ligne	Item / Position / Poste	Heat-Lot No / Schmelze-Lot Nr / Coulée n° - Lot No	Size / Abmessungen / Dimensions	Pieces / Stückzahl / Nombre	Quantity/unit, Menge/Einheit, Quantité/Unité
1	2	531188-448546:0	50.0 X 2500.0 X 6000.0 mm	1	

	Plate No, Blech Nr, Tôle No
1	4026 2102

Chemical composition – Chemische Zusammenzetzung – Composition chimique %
Heat – Schmelze – coulee No

	C	Si	Mn	P	S	Cr	Ni	Mo	Cu	N
Min						24.00	6.00	3.00		0.24
Max	0.030	0.80	1.20	0.035	0.015	26.00	8.00	4.50	0.50	0.32
531188	0.015	0.39	0.65	0.029	0.001	25.02	6.69	3.80	0.27	0.28

Distribution: Certificate via e-Services.

Direct. T = Transverse L = Longitudinal
Top/Bot F = Front B = Back
Form P = Flat C = Round
Location 1 = Center 2 = Close to Surface 3 = Standard 4 = At ¼ of thickness

Test results - Prüfergebnisse - Résultats des essais (1N/mm² = 1MPa)

Mechanical properties

Tensile testing/Hardness Rockwell C

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Rp 0,2 MPa	Rm MPa	A5 %	A50 %	HRC HRC
Min						550	795	20	25	
Max							930			32
2102	T	F	4	C	20	592	822	37	38	20

Charpy impact test (V-notch) ASTM A370 (-46 °C)

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Value1 J	Value2 J	Value3 J	Average J	Lat ex1 mm	Lat ex2 mm	Lat ex3 mm
Min						35	35	35	45	0.38	0.38	0.38
2102	T	F	1	P	-46	169	161	151	161	1.66	1.68	1.55

Charpy impact test (V-notch) EN ISO 148-1 (-40 °C)

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Value1 J	Value2 J	Value3 J	Average J	Lat ex1 mm	Lat ex2 mm	Lat ex3 mm
Min									40	0.38	0.38	0.38
2102	T	F	4	P	-40	197	231	196	208	1.81	2.07	1.74

Charpy impact test (V-notch) EN ISO 148-1

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Value1 J	Value2 J	Value3 J	Average J	Lat ex1 mm	Lat ex2 mm	Lat ex3 mm
Min									60	0.38	0.38	0.38
2102	T	F	4	P	20	296	268	255	273	2.42	2.29	2.21

The results comply with the Requirements of the order - Die gestellten Anforderungen sind erfüllt - Les résultats sont conformes aux exigences de la commande

Outokumpu Stainless AB
BA Quarto Plate,Quarto Plate Europe
SE-, 693 81 DEGERFORS
SWEDEN
Regoffice: SWEDEN
V.A.T no: SE556001874801
, Regno: 556001-8748

Computer generated original
Quality Inspector

Herbert Wasserfaller

Herbert Wasserfaller

CE 13 0045 – CPR – 0519
UK CA 13 0879-CPR-10088-4-BE00080

outokumpu
high performance stainless steel

CERTIFICATE - ZEUGNIS - CERTIFICAT

EN 10204 - 3.1
23051891-EN-0

Business Unit / QCM	Date Datum Date	Load, Ladung, Charge No	Acknowledged ID, Bestätigung, Commande ID
BA Quarto Plate,Quarto Plate Europe	30-May-2023		360024840

104091

Corrosion

ASTM A923 Method C 24h

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Cor.rate mdd
Max						10
2102	T	F	3	P	40	0

EN ISO 3651-2 Method C

Plate-no	Result
2102F	OK

ASTM G48 Method A 24h

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Cor.rate g/m2*24h
Max						0.99
2102	T	F	3	P	50	0.00

Metallographic testing

Ferrite examination ASTM E1245

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Ferrite %
Min						35
Max						60
2102	T	F	3	P	20	48

Ferrite examination Fischer Feritscope

Plate-no	Direct.	Top/Bot	Location	Form	Temp. °C	Ferrite %
Min						35
Max						65
2102	T	F	2	P	20	47

Microstructure examination EN ISO 17781

Plate-no	Result
2102F	OK

Other Information

Country of melt: Sweden
Manufactured in Sweden.
Solution annealed at 1100°C and Quenched in water.
Dimensional control, visual inspection and grade check (PMI): Approved
Holding time approximately 1 minute/mm plate thickness.
Construction Products Regulation (305/2011/EU)
The Declaration of Performance (DoP), see www.outokumpu.com.
Material delivered in accordance with Outokumpu document - Control of Radioactive Contamination, dated 17 January 2022.
No welding repairs have been performed.
Material conforms to NACE MR0175/ISO 15156 in supplied condition.
Material conforms to NACE MR0103/ISO 17945 in supplied condition.
Norsok M-650 QTR. No.:
UNS S32750: QTR_S32750 Rev.19
UNS S32760: QTR_S32760 Rev.4
PREN=CR+3.3Mo+16N: 42.0 (Min:41.0 Max:99.0)
Photograph of the microstructure in certificates 400X.

Additional testing:
Charpy impact test (V-notch) ASTM A370 -46°C: Lat ex Min=0.38 (mm)

Tolerance	Standard	Class
Flatness tolerance	Manual	5
Length	EN ISO 18286/A480/A480M	EN ISO 18286 A/A480/A480M
Thickness	EN ISO 18286/A480/A480M	EN ISO 18286/A480/A480M
Width	EN ISO 18286/A480/A480M	EN ISO 18286 A/A480/A480M

The results comply with the requirements of the order - Die gestellten Anforderungen sind erfüllt - Les résultats sont conformes aux exigencies de la commande

Outokumpu Stainless AB
BA Quarto Plate,Quarto Plate Europe
SE-, 693 81 DEGERFORS
SWEDEN
Regoffice: SWEDEN
V.A.T no: SE556001874801
, Regno: 556001-8748

Computer generated original
Quality Inspector

Herbert Wasserfaller

CE 13 0045 – CPR – 0519
UKCA 13 0879-CPR-10088-4-SE00080

Heat code	QTY	Description
60418	60,89	PIPE -SMLS 6" SCH-40S STANDARD ASTM A790_UNS S32750 ASME B36.10/19

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RECEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 1 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

TTI - TUBACEX TUBOS INOXIDABLES

Registro Mercantil de Alava, Tomo 587, Folio 189, Hoja VI 2885 - N.I.F. A-01140227

Tres cruces, 8
01400 Llodio (Alava)
SPAIN

TL: 946721350
FAX: 946725062
E-MAIL:

CUSTOMER DESCRIPTION/DESCRIPCIÓN DEL CLIENTE/KUNDENBEZEICHNUNG/COMMETTANT

CLIENT SOLD TO/SOLICITANTE/AUFTRAGGEBER/COMMETTANT

TSS
TUBACEX SERVICE SOLUTIONS, S.A.U
POLIGONO INDUSTRIAL SARATXO
01470 AMURRIO

SOLD TO:WITTE TUBE & PIPE SYSTEMS GMBH
SOLD P.O. REF.:EB0010676
SOLD ORDER REF.:391923
COPY NUMBER: 001

CLIENT ORDER/PEDIDO CLIENTE/KUNDEN AUFTRAGSNUMMER/NO.DE COMMANDE: I011212
SALES ORDER/PEDIDO VENTAS/AUFTRAGSNUMMER/NO.DE COMMANDE D'USINE:

AENOR Empresa Registrada UNE EN ISO 9001

AENOR Gestión Ambiental UNE EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 2 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

MATERIAL:SEAML. STAINL. STEEL TUBES/PIPES/TUBOS INOXIDABLES SIN SOLDADURA/TUBES INOX SANS SOUDURE/NAHTLOSE EDELSTAHLROHRE
HEAT-TREATED, PICKLED / TRATADO, DECAPADO / HYPERTREMPE, DECAPE / WÄRMEBEHANDELT, GEBEIZT, PASSIVATED AS PER ASTM A380 / PASIVADO SEGUN ASTM A380 / PASSIVÉ (ASTM A380) / PASSIVIERT (ASTM A380)
GRADE / ACERO / GRADE / WERKSTOFF: S32750,1.4410,
STANDARD / NORMA / STANDARD / LIEFERUNG NACH: ASME SECT.II PART.A SA790/SA790M-2021 ED.
ASTM A790/A790M-23
EN 10216-5:2021 TC2
EN 10297-2:2005
NORSOK M650 QTR N.4
NORSOK M630:2020 MDS D51 REV.6
CHECK ANALYSIS
CORROSION TESTED ACC. TO ASTM A262 PRACTICE E
CORROSION TESTED ACC. TO ASTM A923-22 TEST METHOD C
CORROSION TESTED ACC. TO ASTM G48 TEST METHOD A
CORROSION TESTED ACC. TO EN ISO 3651-2 PRACTICE B
SHELL ES/247 REV.2 EXCEPT DPI (TABLE 1) AND SURFACE REQUIREMENTS (POINT 9.1)
HYDROTEST
ANSI/NACE MR0103/ISO 17945:2015
ANSI/NACE MR0175/ISO15156-3:2020
QAD 68 REV.0
RTX_D51S REV.6
SHELL MESC SPE 74/014 FEBRUARY 2021 EXCEPT:
NO LIQUID PENETRANT TEST (POINT 14.12.1),
TENSILE TEST ONLY IN LONGITUDINAL DIRECTION.
ULTRASONIC TEST ONLY FOR LONGITUDINAL DEFECTS.
IMPACT TEST (if applicable): Lateral expansion 0.38 mm. minimum.
ULTRASONIC TEST ACC. TO ASTM A999/A999M / ASTM E213
TOLERANCES / TOLERANCIAS / TOLERANCES / TOLERANZEN NACH: ASME SECT.II PART.A SA999/SA999M-2021 ED.
ASTM A999/A999M-18
EN ISO 1127/03.2019 D2/T2
RANDOM LENGTHS / LARGOS VARIABLES / LONGUEUR COURANTE / EINGEENGTE LÄNGE 6.000/7.000 MM
PLAIN ENDS / LISOS / EXTRÉMITÉ D'EQUERRE / GLATTE ENDEN,
DIMENSIONS/DIMENSIONES/DIMENSIONS/DIMENSIONS: 168,28 X 7,11 MM - 6" SCH 40S
HOT FINISHED/ACABADOS EN CALIENTE/WARMGEFORMT/FINIS A CHAUD

Sales Item Pos Ped. AuftrgPos Usine Pos	Client Item Pos Clnt Kunde Pos Com. Pos	Delivery No Nº Entrega Lieferung Avis. d'exp	Lot No. Nº lote Los Nr. Lot d`inspection	Heat No Colada Schmelze Coulée	Pieces Piezas Stück Pcs	Weight Peso Gewicht Poids	Tot Lgth Long. Tot Gesamtlänge Tolength	Un Lgth Long. Un Längentyp Long. Un
20		8110078629	P2305144	60418	15	3.013 KG	100,39 M	6000-7000 MM

RAW MATERIAL/DATOS MATERIAL/VORMATERIAL/MATIERE PREMIERE

Heat Nr:	Supplier	Method
60418	ACERALAVA (SPAIN)	Electric furnace+AOD

AENOR ER Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 3 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

CHEMICAL COMPOSITION (%)/COMPOSICIÓN QUÍMICA (%)/CHEMISCHE ZUSAMMENSETZUNG (%)/COMPOSITION CHIMIQUE(%)

*L: Ladle C:Products

*	Heat	Seq	C	Mn	Si	P	S	Ni	Cr	Mo	Al	Cu
L	60418	1	0,013	0,73	0,410	0,025	0,0006	7,25	25,50	3,57	0,011	0,11
C	60418	2	0,013	0,72	0,410	0,024	0,0006	7,26	25,42	3,63	0,010	0,11
C	60418	3	0,013	0,72	0,410	0,025	0,0006	7,31	25,44	3,61	0,011	0,11

*	Heat	Seq	V	Nb	W	Co	N	Pren
L	60418	1	0,074	0,003	0,050	0,075	0,2765	41,7050
C	60418	2	0,072	0,002	0,048	0,077	0,2765	41,8230
C	60418	3	0,074	0,002	0,048	0,076	0,2765	41,7770

HEAT TREATMENT/TRATAMIENTO TÉRMICO/WÄRMEBEHANDLUNG/TRAITEMENT THERMIQUE

HIPERTEMPLADOS A 1100 °C , 12 min , Agua
SOLUTION ANNEALED AT 1100 °C , 12 min , WATER
HYPERTREMPES 1100 °C , 12 min , L' EAU
LOESUNGSGEGLUEHT 1100 °C , 12 min , Wasser

TENSILE TEST/TEST DE TENSIÓN/ESSAI TRACTION/ZUGVERSUCH

Lot No.	Sample	T	Rp0.2	Rp1.0	Rm	A2"	A5	Type	Spc.Type	Spc.Dim
		°C	*MPa*	*MPa*	*MPa*	*%*	*%*			*mm*
P2305144	1	20	600	684	827	43	41	L	S	20,25
	2	20	600	683	827	44	42	L	S	20,09

IMPACT TEST/TEST DE IMPACTO/RESILIENCE/KERBSCHLAGVERSUCH

Lot No.	Sample	T	Wspec	Ecv 1	Ecv 2	Ecv 3	Ecv AVG	Type	Le1	Le2	Le3	Shear 1	Shear 2	Shear 3
		°C	*mm*	*J*	*J*	*J*	*J*		*mm*	*mm*	*mm*	*%*	*%*	*%*
P2305144	1	-51	5,00	117	116	113	115	L	1,25	1,12	1,20	70	60	70

CORROSION ACCORDING TO ASTM A923 C/CORROSION DE ACUERDO ASTM A923 C/CORROSION SUIVANT ASTM A923 C/CORROSION ACCORDING TO ASTM A923 C

Lot No.	Sample	T	Pits-20x	Wloss	time
		°C		*MDD*	*Horas*
P2305144	1	50	N	2,6620	24,0

Corrosion test ASTM G48 practice A/Corrosión ASTM G48 práctica A/TEST DE CORROSION ASTM G48 practice A/LOCHFRASSTEST ASTM G 48 PR.A

Lot No.	Sample	T	Pits-20x	W.loss	time
		°C		*g/m2*	*Horas*
P2305144	1	50	N	0,2662	24,0

HARDNESS TEST/TEST DE DUREZA/DUREE/HÄRTEPRÜFUNG

Lot No.	Sample	0ºExt1	0ºExt2	0ºExt3	0ºInt1	0ºInt2	0ºInt3	90ºExt1	90ºExt2	90ºExt3	90ºInt1	90ºInt2	90ºInt3	180ºExt1
		HRC	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*
P2305144	1	20,9	23,8	23,0	18,4	19,8	15,6	23,8	20,4	21,3	20,5	21,6	23,4	24,6

Lot No.	Sample	180ºExt2	180ºExt3	180ºInt1	180ºInt2	180ºInt3	270ºExt1	270ºExt2	270ºExt3	270ºInt1	270ºInt2	270ºInt3
		HRC	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*
P2305144	1	22,9	23,0	21,6	23,0	21,3	15,2	23,2	20,5	20,3	22,5	19,7

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 4 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

FERRITE ACCORDING TO ASTM E 562/Contenido de Ferrita según ASTM E562/FERRITE SUIVANT ASTM E562/FERRIT ENTSPRECHEND ASTM E562

Lot No.	Sample	%Fer	Dev.Ferr
		%	%
P2305144	1	46,61	2,04

METALURGICAL TESTS/ENSAYOS METALÚRGICOS/METALLURGISCHE PRÜFUNGEN/ESSAIS METALLURGIQUES

ETCH STRUCTURE ACC. ASTM A923 MET.A: UNAFFECTED STRUCTURE. MATERIAL FREE FROM INTERMETALLIC PHASES AND PRECIPITATES. UNIFORM STRUCTURE ACROSS FULL WALL THICKNESS
EXAMEN DE MICROESTRUCUTRA DE ACUERDO A ASTM A923 MET.A: ESTRUCTURA NO AFECTADA. MATERIAL LIBRE DE FASES INTERMETALICAS Y PRECIPITADOS. ESTRUCTURA UNIFORME A TRAVES DEL ESPESOR.
ETCH STRUCTURE ACC. ASTM A923 MET.A: UNAFFECTED STRUCTURE. MATERIAL FREE FROM INTERMETALLIC PHASES AND PRECIPITATES. UNIFORM STRUCTURE ACROSS FULL WALL THICKNESS

INTERGRANULAR CORROSION TEST ACC. TO ASTM A262 PRACT."E": SATISFACTORY
ENSAYO DE CORROSION INTERGRANULAR DE ACUERDO A ASTM A262 PRACT.E: SATISFACTORIO
BESTÄNDIGKEIT GEGEN INTERKRISTALLINE KORROSION ENTSPRECHEND ASTM A262 PRACT.E: IN ORDNUNG
ESSAI DE CORR. INTERGR. SELON ASTM A262 PRACT.E:SATISFAISANT
INTERGRANULAR CORROSION TEST ACC.TO DIN EN ISO 3651-2 MET.B: SATISFACTORY
ENSAYO DE CORROSION INTERGRANULAR DE ACUERDO A ISO 3651-2 MET.B: SATISFACTORIO
BESTÄNDIGKEIT GEGEN INTERKRISTALLINE KORROSION ENTSPRECHEND ISO 3651-2 MET."B": IN ORDNUNG
ESSAI DE CORR. INTERGR. SELON ASTM ISO 3651-2 MET."B":SATISFAISANT

NON-DESTRUCTIVE TESTS/ENSAYOS NO DESTRUCTIVOS/ZERSTÖRUNGSFREIE PRÜFUNGEN/ESSAIS NON DESTRUCTIFS

FERRITE CONTENT DETERMINED BY FISCHER FERRITOSCOPE TO 100% OF PRODUCTS
CONTENIDO EN FERRITA MEDIDO CON FERRITOSCOPIO SOBRE EL 100% DEL MATERIAL.
Ferritescope-Test auf 100% des Materials.

100% ULTRASONIC TEST ACC. TO ASTM A999 / E213: SATISFACTORY
100% ENSAYO DE ULTRASONIDOS DE ACUERDO A ASTM A999 / E213: SATISFACTORIO
100% ULTRASCHALLPRÜFUNG NACH ASTM A999 / E.213:IN ORDNUNG
100% ESSAI D´ULTRASON D'ACCORD A ASTM A999 / E.213: SATISFAISANTE

100% ULTRASONIC TEST ACC. TO EN 10246-7, U2C: SATISFACTORY
100% ENSAYO DE ULTRASONIDOS DE ACUERDO A EN 10246-7, U2C: SATISFACTORIO
100% ULTRASCHALLPRÜFUNG NACH EN 10246-7, U2C:

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 5 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

IN ORDNUNG
100% ESSAI D´ULTRASON D'ACCORD A EN 10246-7, U2C: SATISFAISANTE
POSITIVE MATERIAL IDENTIFICATION TEST ON EACH TUBE/PIPE BY
"X-RAY-FLUORESCENCE-ANALYZER": SATISFACTORY
VERIFICACION DEL GRADO DE ACERO EN CADA TUBO MEDIANTE "ANALIZADOR DE
FLUORESCENCIA DE RAYOS X": SATISFACTORIO
VERWECHSLUNGSPRUEFUNG AN JEDEM ROHR MIT
"RÖNTGEN-FLUORESZENZ-ANALYSATOR": IN ORDNUNG
VERIFICATION DE LA NUANCE SUR CHAQUE TUBE PAR
"X-RAY-FLUORESCENCE-ANALYZER": SATISFAISANT

HYDROSTATIC PRESSURE TESTED AT 190 bar, 2800 PSI DURING 5 SEC ON EACH
TUBE/PIPE: SATISFACTORY
ENSAYO HIDROSTÁTICO A 190 bar, 2800 PSI DURANTE 5 SEC EN CADA TUBO:
SATISFACTORIO
WASSERDRUCKPRÜFUNG BEI 190 bar, 2800 PSI HALTEZEIT 5 SEC JE ROHR: IN
ORDNUNG
ESSAI DE PRESSION HYDROSTATIQUE À 190 bar, 2800 PSI PENDANT 5 SEC SUR
CHAQUE TUBE: SATISFAISANT

DIMENSIONAL CHECKING ON EACH TUBE: SATISFACTORY
INSPECCION DIMENSIONAL AL 100% DE LOS TUBOS SATISFACTORIA
100% MASSKONTROLLE: O.B.
VERIFICATION DIMENTIONNELLE AU 100% DES TUBES, SATISFAISANTE

VISUAL INSPECTION ON EACH TUBE: SATISFACTORY
INSPECCION VISUAL AL 100% DE LOS TUBOS, SATISFACTORIA
100% BESIGCHTIGUNG: O.B.
EXAMEN VISUEL AU 100% DES TUBES, SATISFAISANT

TECHNOLOGICAL TESTS/ENSAYOS TECNOLÓGICOS/TECHNOLOGISCHE PRÜFUNGEN/TECHNOLOGICAL TESTS

FLATTENING TEST: SATISFACTORY
APLASTADO S.NORMA: SATISFACTORIO
RINGFALTVERSUCH: IN ORDNUNG
ESSAI D'APLATISSEMENT: SATISFAISANT

RING TENSILE TEST: SATISFACTORY

TRACCION DE ANILLO: SATISFACTORIO
RINGZUGVERSUCH: IN ORDNUNG
ESSAI DE TRACTION A L'ANNEAU: SATISFAISANT

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI
TUBACEX
GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 6 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

MARKING/ETIQUETADO/KENNZEICHNUNG/MARKSTEXT

TX2 TX1 TUBACEX 168,28 X 7,11 MM - 6" SCH 40S ASME SA790 ASTM A790 EN 10216-5 TC2 EN 10297-2 S32750 1.4410 HFD HF SMLS HEAT/ PMI-AV LOT NO/MADE IN SPAIN

REMARKS/OBSERVACIONES/ANMERKUNG/REMARQUES

NO MERCURY, MERCURY COMPOUNDS OR MERCURY BEARING INSTRUMENTS AND/OR EQUIPMENT HAVE BEEN USED ALONG MANUFACTURING AND INSPECTION PROCESS.
DURANTE LOS PROCESOS DE FABRICACIÓN E INSPECCIÓN NO SE HA USADO MERCURIO NI INSTRUMENTOS Y/O EQUIPOS CONTENIENDO MERCURIO O CON COMPONENTES DE MERCURIO.
KEINE QUEKSILBER, BZW. QUECKSILBERVERUNREINIGTES KOMPONENTEN ODER KUGELLAGERINSTRUMENTE UND/ODER GERÄTE SIND BENUTZT WORDEN PRODUKTIONS UND BESICHTIGUNGSPROZESS.
IL N'A PAS ÉTÉ FAIT USAGE DE MERCURE, DE COMPOSÉS CONTENANT DU MERCURE OU DE MATÉRIAUX ET/OU D'INSTRUMENT CONTENANT DU MERCURE TOUT AU LONG DES ÉTAPES DE FABRICATION ET DU PROCESSUS D'INSPECTION ET DE CONTRÔLE.

NO WELDING OR WELD REPAIRS WERE MADE
SIN REPARACION POR SOLDADURA
KEINE SCHWEISSBEARBEITUNG WURDE VORGENOMMEN
SANS RÉPARATION AVEC SOUDURE
MATERIAL MANUFACTURER APPROVED BY TÜV SÜD Industrie Service GmbH
(NOTIFIED BODY 036)TO ISSUE CERTIFICATES OF SPECIFIC PRODUCT CONTROL IN
ACCORDING TO PRESSURE EQUIPMENT DIRECTIVE 2014/68/EU ANNEX 1 POINT 4.3.
FABRICANTE DE MATERIALES APROBADO POR TÜV SÜD Industrie Service GmbH (ORGANISMO NOTIFICADO 0036) PARA LA EMISION DE CERTIFICADOS ESPECIFICOS DE CONTROL DE PRODUCTO DE ACUERDO AL ANEXO 1, PUNTO 4.3 DE LA DIRECTIVADE EQUIPOS A PRESION 2014/68/EU.
WERKSTOFFHERSTELLER MIT BERECHTIUNG ZUR AUSSTELLUNG VON BESCHEINIGUNGEN ÜBER SPEZIFISCHE PRÜFUNGEN AN DEN WERKSTOFFEN IM GELTUNGSBEREICH DER ZERTIFIZIERUNG UND IN ÜBEREINSTINSTIMMUNG MIT DER DRUCKGERÄTERICHTLINIE 2014/68/EU UND DEN ZUGRUNDE LIEGENDEN SPEZIFIKATIONEN ENTSPR. DER BENANNTEN STELLE NR.0036, TÜV SÜD Industrie Service GmbH
PRODUCTEUR DU MATERIEL APPROUVE PAR TÜV SÜD Industrie Service GmbH N.B. 0036) POUR EMISSION DES CERTIFICATS SPECIFIQUE DE CONTROLE DE PRODUIT SELON LA DIRECTIVE DES EQUIPES A PRESION 2014/68/EU ANNEXE 1 POINT 4.3.

MATERIAL CHARACTERISTICS COMPLY WITH POINT 7.5 OF ANNEX I TO PED BY HAVING AN ELONGATION AFTER RUPTURE AT TENSILE TEST NO LESS THAN 14% AND A BENDING RUPTURE ENERGY AT IMPACT TEST NO LESS THAN 27J AT 20ºC.
LAS CARACTERISTICAS DEL MATERIAL CUMPLEN CON LOS REQUISITOS DEL PUNTO 7.5 DE LA DIRECTIVA PED POR TENER UN ALARGAMIENTO TRAS ROTURA EN EL ENSAYO DE TRACCION NO INFERIOR AL 14% Y PO DE TRACCION NO INFERIOR AL 14% Y POR TENER UNA RESISTENCIA AL IMPACTO NO INFERIOR A 27 J A 20º C.
DIE WERKSTOFF-WERTE ENTSPRECHEN PUNKT 7.5. DER DGRL, ANHANG 1, MIT EINERBRUCHDEHNUNG = 14% IM NORMGEMÄSS DURCHGEFÜHRTEN ZUGVERSUCH UND DER KERBSCHLAGARBEIT = 27J AN EINER ISO - v PRO PROBE BEI EINER TEMPERATUR VON HÖCHSTENS 20ºC
LES CARACTERISTIQUES DU MATERIEL, AYANT UN ALLONGEMENT APRES RUPTURE A L'ESSAI DE TRACTION NON INFERIEUR DU 14% ET UNE RESISTENCE A LA FLEXION PAR CHOC A 20ºC NON INFERIEUR A 27J, SONT CONFORMES AUX PRESCIPTIONS DU PONT 7.5 DE L'ANNEXE I DE PED.

MATERIAL IS FREE OF RADIATION CONTAMINATION
EL MATERIAL ESTA LIBRE DE CONTAMINACION POR RADIACIONES
MATERIAL IS FREI VON RADIOAKTIVITÄT
MATÉRIEL LIBRE DE POLUTION RADIOACTIVE

AENOR ER Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TUBACEX GROUP

STRUCTURE EXAMINATION

MTC / Certificate
748412

MATERIAL IDENTIFICATION / IDENTIFICACIÓN DEL MATERIAL

Lot No. / Num Lote	**P2305144**	**Dimension** / Dimensión	168,28 x 7,11 mm - 6'SCH 40
Heat / Colada	60418	**Grado de acero /** Steel grade	S32750

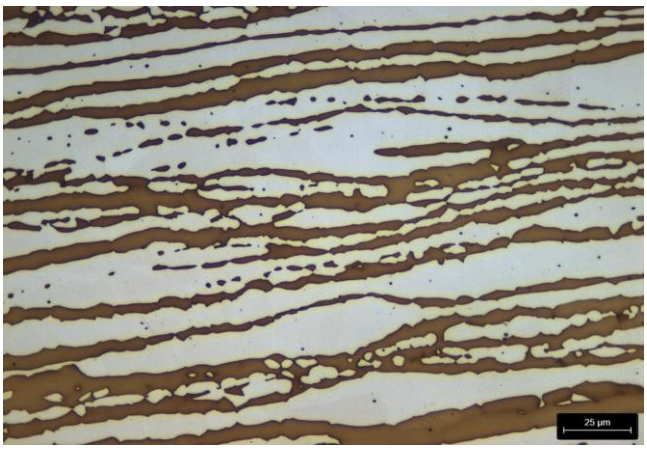
Type Of test / Tipo de Ensayo:	**MICROSTRUCTURE EVALUATION**

RESULTS / RESULTADO

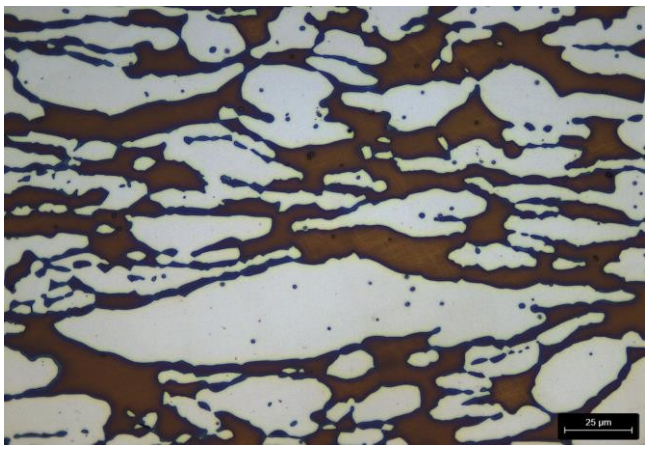
Result: The microestructure is formed by austenite and ferrite. The presence of intermetallic phases or precipitates is not observed. Uniform structure across full wall thickness Etching method according to ASTM E-407.

Resultado: la microestructura está compuesta por austenita y ferrita. No se observa la presencia de fases intermetálicas y precipitados. Estructura uniforme a través de todo el espesor. Método de ataque según ASTM E-407.

GRAPHICS RECORDS / REGISTROS FOTOGRÁFICOS:



Dir: LONGITUDINAL / MAG: 500X /



Dir: TRANSVERSAL / MAG: 500X /

Irene Castro
Responsable del Laboratorio
Laboratory Manager

OFFICINE SANTAFEDE s.r.l.
CAP SOC. € 156.000 INT. VERS
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 - TEL. +39 0341 988411
FAX +39 0341 979919
www.officinesantafede.com
info@officinesantafede.com
info@pec.officinesantafede.com

A104995

CERTIFICATO DI COLLAUDO/TEST CERT. EN 10204/3.1		Cliente/Customer
N.	DATA/DATE	--
D030203	14/07/2020	

DESCRIZIONE/DESCRIPTION

MATERIAL CONFORMING TO ASME SECTION II PART A ED. 2017 AND TO NACE MR0175/ISO 15156 -2015 & NACE MR0103-2016

Item 0020 Commessa 20C0321 Ordine/Order PH018999 AMENDMENT 1 Item Cli./Cust.Item 200 Tag 1: H060WN1004

COLATA/HEAT	MATERIALE/MATERIAL	ACCIAIERIA/STEEL PLANT	N/QTY	DESCRIZIONE/DESCRIPTION	TT/HT
E141482	A/SA 182 F55	OUTOKUMPU	8	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2

Analisi Chimiche / Chemical tests

C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Ca	B	C.Eq.
0,019	0,590	0,310	0,026	0,001	25,100	6,910	3,540			0,670				0,287			

Prove Meccaniche / Mechanical Tests

SNERVAMENTO Yield strength (RP)	ROTTURA Tensile Strength (RM)	ALLUNGAMENTO A%-ELONG	STRIZIONE Z%-REDUCT	TIPO TYPE	TEMP.C°	TEST 1	TEST 2	TEST 3	MEDIA AVERAGE	DUREZZA HARDNESS HB

Note PREN: 41,37
W=0,58
SEE ATTACHED TEST N. 1252/20

VERIFIED TRUE COPY OF ORIGINAL

Item 0020 Commessa 20C0321 Ordine/Order PH018999 AMENDMENT 1 Item Cli./Cust.Item 200 Tag 1: H060WN1004

COLATA/HEAT	MATERIALE/MATERIAL	ACCIAIERIA/STEEL PLANT	N/QTY	DESCRIZIONE/DESCRIPTION	TT/HT
E161501	A/SA 182 F55	OUTOKUMPU	2	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2

Analisi Chimiche / Chemical tests

C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Ca	B	C.Eq.
0,012	0,570	0,290	0,026	0,001	25,430	6,830	3,640			0,590				0,279			

Prove Meccaniche / Mechanical Tests

SNERVAMENTO Yield strength (RP)	ROTTURA Tensile Strength (RM)	ALLUNGAMENTO A%-ELONG	STRIZIONE Z%-REDUCT	TIPO TYPE	TEMP.C°	TEST 1	TEST 2	TEST 3	MEDIA AVERAGE	DUREZZA HARDNESS HB

Note PREN: 41,90
W=0,63
SEE ATTACHED TEST N. 1320/20

Item 0020.A Commessa 20C0321 Ordine/Order PH018999 AMENDMENT 1 Item Cli./Cust.Item 201 Tag 1: H020BL1000

COLATA/HEAT	MATERIALE/MATERIAL	ACCIAIERIA/STEEL PLANT	N/QTY	DESCRIZIONE/DESCRIPTION	TT/HT
E130620	A/SA 182 F55	OUTOKUMPU	8	ASME B16.5 A/SA 182 F55 150 BL RF 2"	2

Analisi Chimiche / Chemical tests

C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Ca	B	C.Eq.
0,018	0,590	0,340	0,023	0,001	25,550	7,150	3,810			0,590				0,280			

Prove Meccaniche / Mechanical Tests

SNERVAMENTO Yield strength (RP)	ROTTURA Tensile Strength (RM)	ALLUNGAMENTO A%-ELONG	STRIZIONE Z%-REDUCT	TIPO TYPE	TEMP.C°	TEST 1	TEST 2	TEST 3	MEDIA AVERAGE	DUREZZA HARDNESS HB
562,0	853,0	27,6	51,2	KV(J)	-50	141,00	147,00	152,00	146,667	236 241

Note PREN: 42,60
W=0,51
SEE ATTACHED TEST N. 1273/20

ALL MATERIAL DELIVERED AS PER ABOVE PO IS IN ACCORDANCE WITH THE RELATIVE SPECIFICATIONS.

a) **Trattamento termico / Heat treatment**
1) Normalizzato a 920°C e raffreddato in aria calma
Normalized at 920°C and cooled in still air
2) Solubilizzato / *Solution treated and quenched*
3) Bonificato / *Quenched and tempered*
4) Normalizzato e rinvenuto / *Normalized and tempered*
5) Vedi descrizione / *See description*

b) I valori delle analisi chimiche sono ricavati dal certificato di Acciaieria
Chemical analisys values are taken from base certificate
c) C. E. = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15
d) Prove secondo ASTM A 370 / *Test conforming to ASTM A 370*
e) Diametro provino 12,5 mm. / *Specimen diameter 12,5 mm.*
Lunghezza provino 50 mm / *Specimen length 50 mm*
Reduced specimens may be used when necessary
f) Dimensioni del provino 10x10x55 mm.
Specimen dimensions 10x10x55 mm.

Controllo visivo e dimensionale soddisfacente / *Satisfactory visual and dimensional check*
Acciaio elaborato al forno elettrico e calmato / *Killed steel made by electric furnace*

TRADE MARK	REDATTO DA / PRINTED BY	APPROVATO DA / APPROVED BY	ENTE COLLAUDATORE / INSPECTING AGENCY
SF	QC M. BENEDETTI	QUALITY MANAGER M. SACCHI	

OFFICINE SANTAFEDE s.r.l.
CAP SOC. € 156.000 I.V. VERS
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 - TEL. +39 0341 988411
FAX +39 0341 979919
www.officinesantafede.com
info@officinesantafede.com
info@pec.officinesantafede.com

CERTIFICATO DI COLLAUDO/TEST CERT. EN 10204/3.1		Cliente/Customer
N.	DATA/DATE	
D030203	14/07/2020	

DESCRIZIONE/DESCRIPTION

MATERIAL CONFORMING TO ASME SECTION II PART A ED. 2017 AND TO NACE MR0175/ISO 15156 -2015 & NACE MR0103-2016

PMI 100%CHECK PASSED

MATERIAL MANUFACTURED WITH AOD PROCESS

HEAT TREATMENT: SOLUTION TREATED TEMP 1050°C-10/+30°c
QUENCHING TEMP. BELOW 260°C
QUENCHING TRANSFER TIME: 60 SEC MAX
SOAKING TIME: 2min/1mm thh.
HOLDING TIME: SOAKING TIME + 2 hours
FOR F55
HEAT TREATMENT: SOLUTION TREATED TEMP 1120°C-10/+30°c
QUENCHING TEMP. BELOW 260°C
QUENCHING TRANSFER TIME: 60 SEC MAX
SOAKING TIME: 2min/1mm thh.
HOLDING TIME: SOAKING TIME + 2 hours

BASE+FINAL PRODUCT IS FROM WEST -EUROPA
FORGING RATIO: 4:1 MIN

FOR F51 QTR 01
FOR F55 QTR 03

MANUFACTURER APPROVED PED 2014/68/EU SECTION 4.3

ALL MATERIAL DELIVERED AS PER ABOVE PO IS IN ACCORDANCE WITH THE RELATIVE SPECIFICATIONS.

a) Trattamento termico / *Heat trestment*
1) Normalizzato a 920°C e raffreddato in aria calma
Normalized at 920° C and cooled in still air
2) Solubilizzato / *Solution treated and quenched*
3) Bonificato / *Quenched and tempered*
4) Normalizzato e rinvenuto / *Normalized and tempered*
5) Vedi descrizione / *See description*

b) I valori delle analisi chimiche sono ricavati dal certificato di Acciaio a
Chemical analsys values are taken from base corldicate
c) C. E. = C + Mn/6 - (Cr + Mo + V)/5 - (Ni + Cu)/15
d) Prove secondo ASTM A 370 / *Test conforming to ASTM A 370*
e) Diametro provino 12,5 mm. / *Specimen diameter 12,5 mm.*
Lunghezza provino 50 mm / *Specimen lengt) 50 mm*
Reduced specimens may be used when necessary
f) Dimensioni del provino 10x10x55 mm.
Specimen dimensions 10x10x55 mm.

Controllo visivo e dimensionale soddisfacente / *Satisfactory visual and dimensional check*
Acciaio elaborato al forno elettrico e calmato / *Killed steel made by electric furnace*

TRADE MARK	REDATTO DA / PRINTED BY	APPROVATO DA / APPROVED BY	ENTE COLLAUDATORE / INSPECTING AGENCY
SF	QC M. BENEDETTI	QA/QC MANAGER M. SACCHI	

OFFLINE

SANTAFEDE s.r.l.

PRODUCT ANALYSIS CERTIFICATE

Customer	Order	Certificate	Date
	PH018999 AMENDMENT 1	D030203	14/07/2020

Equipment	Description	Frequency
Laboratory	CHECK ANALYSIS	1 test each heat

Chemical tests **Analysis %**

Heat	Material	C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Fe	W	Ta	Co	Ca	B	Sb	As	Pb	Ceq	PREN
735109	A/SA 182 F51	0,017	1,511	0,265	0,025	0,000	22,572	5,402	3,069							0,178					0,000	0,0000					35,548
844301	A/SA 182 F51	0,020	1,594	0,511	0,019	0,000	22,556	5,558	3,139	0,006	0,003	0,393	0,009		0,181	0,155					0,000	0,0000					35,395
E140647	A/SA 182 F51	0,024	1,245	0,478	0,020	0,001	22,377	5,553	3,279							0,178											36,046
E142031	A/SA 182 F51	0,018	1,144	0,380	0,019	0,001	22,183	5,616	3,265							0,184											35,902
E150009	A/SA 182 F51	0,018	1,229	0,477	0,024	0,001	22,561	5,487	3,313							0,186											36,470
E151766	A/SA 182 F51	0,018	1,180	0,434	0,026	0,001	22,546	5,492	3,203							0,179											35,980
E170383	A/SA 182 F51	0,021	1,296	0,506	0,020	0,001	22,175	5,611	3,113							0,170											35,168
E181981	A/SA 182 F51	0,018	1,296	0,453	0,023	0,001	22,522	5,531	3,299							0,186											36,385
E182198	A/SA 182 F51	0,020	1,228	0,430	0,025	0,001	22,209	5,663	3,258							0,177											35,792
E182255	A/SA 182 F51	0,022	1,441	0,507	0,022	0,001	22,168	5,650	3,301							0,179											35,925
E190132	A/SA 182 F51	0,021	1,178	0,526	0,023	0,001	22,098	5,461	3,289							0,194											36,056
E190587	A/SA 182 F51	0,021	1,199	0,521	0,023	0,001	22,845	5,619	3,229							0,186											36,477
E191174	A/SA 182 F51	0,018	1,249	0,516	0,023	0,001	22,295	5,603	3,264							0,177											35,896
E191217	A/SA 182 F51	0,020	1,202	0,460	0,023	0,001	22,352	5,470	3,308							0,195											36,388
E191543	A/SA 182 F51	0,019	1,260	0,528	0,025	0,001	22,662	5,682	3,329							0,190											36,686
E200025	A/SA 182 F51	0,020	1,120	0,566	0,023	0,001	22,116	5,679	3,277							0,187											35,922
05040	A/SA 182 F55	0,020	0,501	0,526	0,022	0,000	25,769	6,980	3,672			0,565				0,269		0,684									42,191
185029	A/SA 182 F55	0,013	0,550	0,351	0,020	0,000	24,678	6,869	3,777			0,642				0,258		0,570									41,270
242086	A/SA 182 F55	0,020	0,628	0,591	0,028	0,001	25,552	7,046	3,548			0,590				0,246		0,606			0,000	0,0000					41,196
52391	A/SA 182 F55	0,022	0,563	0,436	0,017	0,000	24,853	7,615	3,537			0,629				0,241		0,630									40,381
57530	A/SA 182 F55	0,016	0,610	0,436	0,022	0,000	24,603	7,293	3,738			0,585				0,245		0,664									40,858
94114	A/SA 182 F55	0,018	0,677	0,512	0,030	0,001	25,534	6,531	3,763	0,003	0,064	0,524	0,012		0,016	0,250		0,569			0,001	0,0030					41,952
E121404	A/SA 182 F55	0,018	0,586	0,360	0,025	0,001	24,935	6,905	3,588			0,659				0,282		0,672									41,287
E121750	A/SA 182 F55	0,015	0,687	0,329	0,024	0,001	24,827	7,057	3,528			0,689				0,292		0,560									41,141
E130620	A/SA 182 F55	0,019	0,609	0,340	0,023	0,001	25,108	7,280	3,821			0,598				0,280		0,517									42,197
E141482	A/SA 182 F55	0,020	0,609	0,315	0,026	0,001	25,822	6,909	3,560			0,663				0,294		0,580									42,274
E142078	A/SA 182 F55	0,015	0,732	0,281	0,026	0,001	25,694	6,678	3,518			0,594				0,288		0,579									41,911
E161501	A/SA 182 F55	0,013	0,566	0,294	0,027	0,001	25,437	6,943	3,613			0,579				0,288		0,527									41,968

OFFICINE SANTAFEDE s.r.l.

PRODUCT ANALYSIS CERTIFICATE

E181G50	A/SA 182 F55	0,015	0,635	0,371	0,023	0,001	25,668	6,761	3,529			0,548				0,275		0,500								41,714

IT. 60 (H. [illegible]) – 120 (H. EK1478) – 130 (H. [illegible]) – 140 (H. [illegible])
IT. 160 (H EK1483) – 170 (H. EK1482) – 200 (H. EK1482)



OFF. SANTAFEDE s.r.l.
CORTABBIO DI PRIMALUNA (LC)

OFFICINE SANTAFEDE S.R.L.
23819 CORTABBIO DI PRIMALUNA (LECCO)
www.officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregere 1 23819 Cortabbio di Primaluna LC

Materiale *Material#* ASME SA/ASTM A182-20 F55 | Colata *Heat#* E141482 | Descrizione *Description#* | Rapporto Nr. *Report Nr.* 1252/20

PROVA DI TRAZIONE — *TENSILE TEST*

Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodo prova *Test Method*	Dimensioni *Dimensions* Ø [mm]	Lo [mm]	Posizione *Position*	Temp. *Temp.* [°C]	Snervamento *Yield Strength offset method* Rp0,2% [MPa]		Rottura *Tensile Strength* Rm [MPa]		Allungam. *Elongation after fracture* A [%]		Strizione *Area Reduc.* Z [%]		Ratio Rp/Rm	Risultato *Result*
20TS0942	2668	ASTM A370-19e1	6,25	25,04	T	23,4	(≥ 550)	568,4	(750 ÷ 895)	795,9	(≥ 25)	40,0	(≥ 45)	77	0,71	COMPLIANT
20TS0942	2668															COMPLIANT
20TS0942	2668															COMPLIANT

PROVA DI DUREZZA — *HARDNESS TEST*

Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodo prova *Test Method*	Tipo *Type*	Durezza *Hardness* Valore Singolo *Single Value*		Media *Average*		Risultato *Result*
20TS0942	2668	ASTM E10-18	HBW 2,5/187,5 (≤ 301)	250	246	244	246,7	COMPLIANT
20TS0942	2668	ASTM E18-20	ROCKWELL HRC (≤ 32)	22,2	22,3	22,6	22,4	COMPLIANT

PROVA DI RESILIENZA — *IMPACT TEST* — *Capacity* 450 J — *Striker radius* 8 mm

Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodo di prova *Test Method*	Dimensioni *Dimensions* SxWxL [mm]	Posizione *Position*	Temp. *Temp.* [°C]	Tipo *Type*	Energia Assorbita [J] *Valore Singolo Single Value*				*Abs. Energy* Media *Average*		Area Duttile [%] *Valore Singolo Single Value*				*Shear Area* Media *Average*		Esp. Laterale [mm] *Valore Singolo Single Value*				*Lateral Exp.* Media *Average*		Risultato *Result*
20TS0942	2669	ASTM E23-18	10x10x55	1/2 thk L	-51	KV	249,9	249,6	250,1	(≥ 50)	249,9	(≥ 65)	100	100	100	(info)	100,0	(info)	2,31	2,30	2,33	(≥ 0,38)	2,31	(info)	COMPLIANT
20TS0942	2670	ASTM E23-18	10x10x55	1/2 thk T	-51	KV	218,1	240,2	222,4	(≥ 35)	226,9	(≥ 45)	100	100	100	(info)	100,0	(info)	2,11	2,20	2,15	(≥ 0,38)	2,15	(info)	COMPLIANT

Tra parentesi i criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04, giudizio di conformità espresso senza considerare l'incertezza di misura / *in brackets acceptance criteria requested by customer in accordance to COLL03 rev.04, statement of conformity without consider the measurement uncertainty*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020				

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

° Dati forniti dal cliente / Campionamento eseguito a cura del cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
° Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.R.L.

23835 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA 1 - TEL. +39 0341 685111 - FAX +39 0341 374913
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1668 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*	Rapporto Nr. *Report Nr.* 1253/20

PROVA DI "PITTING" IN FERRO CLORURO *FERRIC CHLORIDE PITTING TEST* ASTM G48 Met. A

Dati Iniziali *Initial Data*

Prova Nr. *Test Nr.*	Provino *Specimen* ID	Metodo di prova *Test Method* ASTM	Posizione *Position*	Lunghezza *Length* [mm]	Larghezza *Width* [mm]	Spessore *Thickness* [mm]	Area *Area* [cm^2]	Decapaggio *Pickling*
20TS0942	2671	G48-11(2015) Met. A	T	50,02	25,06	10,09	40,22	20% HNO_3 + 5% HF, 60°C for 5 minutes

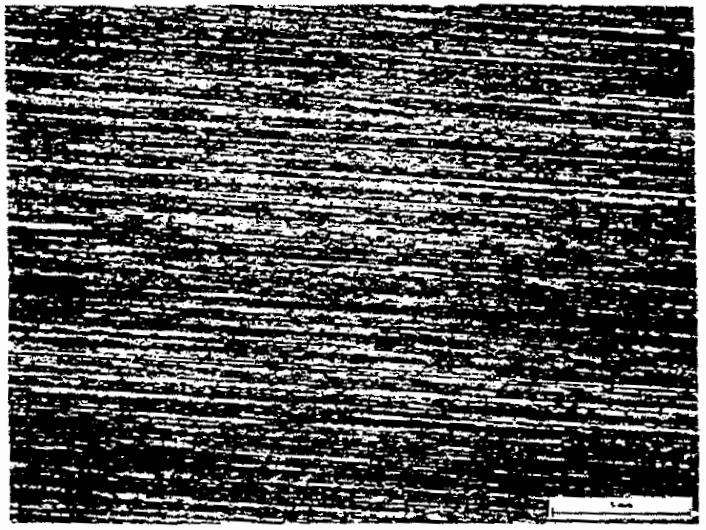
Condizioni Prova *Test Conditions*

Temperatura *Temperature* (°C)	Durata Prova *Test Period* [h]	Soluzione *Solution*	Finitura Superficiale *Surface finish* [grit]
50 ± 0,5	24	100 g of reagent grade ferric chloride, $FeCl_3 \cdot 6H_2O$, in 900 ml of Type IV reagent water (about 6 % $FeCl_3$ by mass)	120

Risultati Prova *Test Results*

Peso iniziale *Initial weight* [g]	Peso finale *Final weight* [g]	Perdita di peso *Weight loss* [g]	Velocità di corrosione *Corrosion rate* [g/m^2]	
98,5609	98,5608	0,0001	≤ 1	0,0

Esame visivo a 20X
Visual examination at 20X



Esame Pits
Pits examination
No pit riscontrati nel campione a 20X
No pits found in the specimen at 20X

Profondità media pits [µm]
Average pits depth [µm]
None

Massima profondità pits [µm]
Maximum pits depth [µm]
None

Densità dei pits [pit/cm^2]
Pits density [pit/cm^2]
None

Risultati
Results
COMPLIANT

Criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04, giudizio di conformità espresso senza considerare l'incertezza di misura / *Acceptance criteria requested by customer in accordance to COLL03 rev.04, statement of conformity without consider the measurement uncertainty*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H – Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*
25/05/2020	08/06/2020 ÷ 09/06/2020	09/06/2020			

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
 # Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.r.l.
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA 1 - TEL. +39 0341 995111 - FAX +39 0341 995199
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*		Rapporto Nr. *Report Nr.*	1256/20

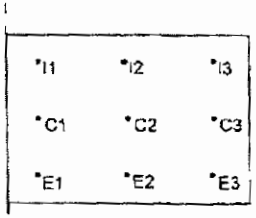
PROVA DI DUREZZA SU SEZIONE MACRO / HARDNESS TEST ON MACRO SECTION

	Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodi di Prova *Test Methods ASTM*	Tipo di Durezza *Hardness Type*
Dati Iniziali *Initial Data*	20TS0942	2673	E18-20	ROCKWELL HRC

Section A

Risultati Prova *Test Results*

INT 1 mm		*1/2 thk*		*EXT* 1 mm	
I1	23,1	C1	22,2	E1	23,4
I2	23,6	C2	22,6	E2	23,6
I3	23,9	C3	22,9	E3	23,3



Requisito Durezza *Hardness required*	≤ 32	ROCKWELL HRC	Risultati *Results*	COMPLIANT

Criteri di accettabilità richiesti dal cliente in accordo a COL03 rev.06, giudizio di conformità espresso senza considerare l'incertezza di misura / Acceptance criteria requested by customer in accordance to COL03 rev 04, statement of conformity without consider the measurement uncertainty

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk – Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020				

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

#Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
#Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.R.L.
23819 CORTABBIO DI PRIMALUNA (LECCO)
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*		Rapporto Nr. *Report Nr.*	1254/20

ESAME METALLOGRAFICO E DETERMINAZIONE DELLA FRAZIONE DI VOLUME TRAMITE CONTEGGIO MANUALE SISTEMATICO DEI PUNTI — ASTM E562

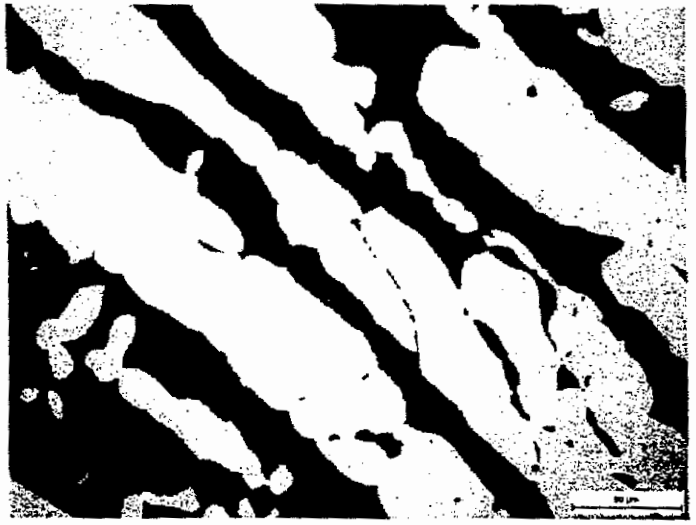
METALLOGRAPHIC EXAMINATION AND DETERMINING VOLUME FRACTION BY SYSTEMATIC MANUAL POINT COUNT

	Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodi di Prova *Test Methods* ASTM	Posizione *Position*
Dati Iniziali *Initial Data*	20TS0942	2672	E562-19, E3-11(2017) + E407-07(2015)e1	T

	Descrizione griglia *Grid description*	Numero campi *Number of fields*	Spaziatura Campi *Fields spacing*	Numero sezioni *Number of sections*
Condizioni Prova *Test Conditions*	25 points	30	Random	1 (20x20 mm)

Esame al microscopio a 400X *Microscope examination at 400X* — Attacco *Etching*: Electrolytic with 40 g of reagent grade NaOH to 100 g of distilled water (40% NaOH) — ASTM E407 Etchant nr. 220

Risultati Prova *Test Results*				
Frazione volume della Ferrite *Ferrite volume fraction*	49,4	%	(40 55%) *Required*
Deviazione Standard *Standard Deviation (s)*	4,1	%	
Intervallo di Confidenza *Confidence interval (95% CI)*	1,5	%	
Accuratezza Relativa *Relative Accuracy (% RA)*	3,1	%	
Struttura *Structure*	Austenite e Ferrite *Austenite and Ferrite*		
Risultati *Results*	COMPLIANT		



RAW DATA (%)	
52	48
53	47
54	50
46	46
48	42
51	52
49	48
56	56
54	55
47	51
44	42
48	46
46	54
42	54
50	50

Tra parentesi i criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04, giudizio di conformità espresso senza considerare l'incertezza di misura / *in brackets acceptance criteria requested by customer in accordance to COLL03 rev.04, statement of conformity without consider the measurement uncertainty*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020			

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presentati sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
 # Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.r.l.
23815 CORTABBIO DI PRIMALUNA (LECCO)
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*		Rapporto Nr. *Report Nr.*	1255/20

ESAME METALLOGRAFICO — *METALLOGRAPHIC EXAMINATION*

	Prova Nr. *Test Nr.*	Provino *Specimen ID*	Posizione *Position*	Metodi di Prova *Test Methods* ASTM
Dati Iniziali *Initial Data*	20TS0942	26/2	T	E3-11(2017) + E407-07(2015)e1

Condizioni Prova *Test Conditions*

Numero sezioni *Number of sections*: 1 (20x20 mm)

Esame al microscopio a 400X *Microscope examination at 400X* — Attacco *Etching*: Electrolytic with Oxalic Acid 10% + Electrolytic with 20 g of reagent grade NaOH to 100 g of distilled water (NaOH 20%) — ASTM E407 Etchant nr. 13 (a) + 220

Risultati Prova *Test Results*

Struttura *Structure*: Austenite e Ferrite

Precipitati assenti, Carburi assenti, Fasi intermetalliche assenti, Nitruri assenti

Austenite and Ferrite

Precipitates absence, Carbides absence, Intermetallic phases absence, Nitrides absence



Risultati *Results*: COMPLIANT

Criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04 / *Acceptance criteria requested by customer in accordance to COLL03 rev.04*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020				

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

* Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
* *Data provided by the customer / Sampling performed by customer / Test results only rojers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory*

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

% FERRITE CONTENT REPORT

Nr. D03020:

CUSTOMER	ORDER	JOB
	PH018999 AMENDMENT 1	20C0321

SURFACE	INSTRUMENT	CALIBRATION	DESCRIPTION METHOD
MACHINED	Ferritoscope Fisher FMP30	Daily	4 READING EACH PIECE

PRODUCT

Item	Description	Q.ty	N Heat	Ferrite %
0001	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	5	E142078	51
0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	E141482	49
0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	8	E142078	48
0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	185029	50
0003	ASME B16.5 A/SA 182 F55 300 BL RF 1"	5	94114	50
0004	ASME B16.5 A/SA 182 F55 600 BL RF 1"	5	52391	47
0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	9	E181650	48
0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	6	E130620	53
0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	2	185029	51
0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	13	57530	47
0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	2	E130620	48
0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	3	94114	45
0009	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	5	E121404	51
0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	3	E121750	47
0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	2	05040	44
0012	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	30	E142078	46
0013	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	20	E142078	51
0014	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	10	E142078	50
0015	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	20	E181650	50
0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	1	E141482	48
0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	19	E181650	49
0017	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	10	E141482	45
0018	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	10	E181650	49
0019	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	10	E161501	51
0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	8	E141482	43
0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2	E161501	49
0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	4	242086	52
0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E130620	47
0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E141482	45
0023	ASME B16.5 A/SA 182 F51 150 BL RF 3/4"	20	E190132	49
0024	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1"	20	E182198	50
0025	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1" 1/2	5	735109	52
0026	ASME B16.5 A/SA 182 F51 150 BL RF 2"	40	E190132	48
0027	ASME B16.5 A/SA 182 F51 300 BL RF 2"	20	E191543	47
0028	ASME B16.5 A/SA 182 F51 150 BL RF 4"	15	E151766	49
0030	ASME B16.5 A/SA 182 F51 300 BL RF 6"	5	E182255	49
0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	1	E142031	52
0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	4	E170383	53
0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E140947	47
0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E150009	45
0034	ASME B16.5 A/SA 182 F51 2500 BL RTJ 1"	5	E191543	43
0035	ASME B16.5 A/SA 182 F51 300 WN RF 1/2" SCH 80S	10	844301	49
0036	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 40S	20	E181981	51
0037	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 80S	10	E181981	50
0038	ASME B16.5 A/SA 182 F51 600 WN RF 2" SCH 40S	20	E182198	50
0039	ASME B16.5 A/SA 182 F51 300 WN RF 3" SCH 10S	15	E191217	49
0040	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 10S	20	E190587	50
0041	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 40S	5	E190587	47
0042	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 80S	10	E190587	52

0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	4	E200025	51
0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	6	E191174	49

Pozzoli Michele		Invernizzi Irene	14/07/2020

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 986411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

POSITIVE MATERIAL IDENTIFICATION

Nr. D030203/2

CUSTOMER:
ORDER: PH018999 AMENDMENT 1
EQUIPMENT: NITON XL800 S

SAMPLING: Test All Forgings
DATE OF TEST: 14/07/2020

Test according to: PMI PROCEDURE COLL. 06

Item	Description	Heat	Material	Qtà
10	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	E142078	A/SA 182 F55	5
Tag	Tag 1: H005BL3000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
24,467	25,852	6,692	6,854	3,517	3,613	0,573	0,584										5	//

Item	Description	Heat	Material	Qtà
20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	185029	A/SA 182 F55	1
Tag	Tag 1: H010BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
25,925	25,925	6,921	6,921	3,781	3,781	0,572	0,572										1	//

Item	Description	Heat	Material	Qtà
20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E141482	A/SA 182 F55	1
Tag	Tag 1: H010BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
24,718	24,718	6,847	6,847	3,563	3,563	0,580	0,580										1	//

Item	Description	Heat	Material	Qtà
20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E142078	A/SA 182 F55	8
Tag	Tag 1: H010BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
24,467	25,993	6,659	6,872	3,517	3,613	0,573	0,584										8	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
30	ASME B16.5 A/SA 182 F55 300 BL RF 1"	94114	A/SA 182 F55	5
Tag	Tag 1: H010BL3000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,004	25,378	6,426	6,557	3,733	3,797	0,571	0,590											5	//

Item	Description	Heat	Material	Qtà
40	ASME B16.5 A/SA 182 F55 600 BL RF 1"	52391	A/SA 182 F55	5
Tag	Tag 1: H010BL6000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,184	25,684	7,367	7,611	3,523	3,569	0,617	0,632											5	//

Item	Description	Heat	Material	Qtà
50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E130620	A/SA 182 F55	6
Tag	Tag 1: H030BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,779	25,818	7,056	7,180	3,780	3,847	0,501	0,515											6	//

Item	Description	Heat	Material	Qtà
50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E181650	A/SA 182 F55	9
Tag	Tag 1: H030BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,151	25,159	6,717	6,881	3,498	3,573	0,581	0,598											9	//

Item	Description	Heat	Material	Qtà
60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	185029	A/SA 182 F55	2
Tag	Tag 1: H040BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
25,628	25,925	6,779	6,921	3,781	3,791	0,572	0,572											2	//

Item	Description	Heat	Material	Qtà
60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	57530	A/SA 182 F55	13
Tag	Tag 1: H040BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,525	25,956	7,232	7,502	3,644	3,750	0,645	0,664											13	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	94114	A/SA 182 F55	3
Tag	Tag 1: H080BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,772	25,606	6,516	6,656	3,760	3,822	0,571	0,579											3	//

Item	Description	Heat	Material	Qtà
80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	E130620	A/SA 182 F55	2
Tag	Tag 1: H080BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,576	25,741	7,094	7,170	3,804	3,865	0,502	0,512											2	//

Item	Description	Heat	Material	Qtà
90	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	E121404	A/SA 182 F55	5
Tag	Tag 1: H020BL15J0			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,466	25,135	6,699	6,903	3,566	3,642	0,649	0,670											5	//

Item	Description	Heat	Material	Qtà
110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	05040	A/SA 182 F55	2
Tag	Tag 1: H010WN3004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,895	25,449	6,948	7,069	3,643	3,688	0,688	0,690											2	//

Item	Description	Heat	Material	Qtà
110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	E121750	A/SA 182 F55	3
Tag	Tag 1: H010WN3004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,394	25,550	6,801	6,949	3,514	3,588	0,541	0,557											3	//

Item	Description	Heat	Material	Qtà
120	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	E142078	A/SA 182 F55	30
Tag	Tag 1: H020WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,155	25,935	6,567	6,909	3,519	3,621	0,572	0,590											30	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 9884 1
FAX +39 0341 979919

Item	Description	Heat	Material	Qtà
130	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	E142078	A/SA 182 F55	20
Tag	Tag 1: H020WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,331	26,000	6,692	6,914	3,517	3,614	0,571	0,591									20	//

Item	Description	Heat	Material	Qtà
140	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	E142078	A/SA 182 F55	10
Tag	Tag 1: H020WN1008			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,171	25,993	6,659	6,872	3,517	3,613	0,572	0,584									10	//

Item	Description	Heat	Material	Qtà
150	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	E181650	A/SA 182 F55	20
Tag	Tag 1: H030WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,137	25,975	6,684	6,920	3,495	3,592	0,579	0,601									20	//

Item	Description	Heat	Material	Qtà
160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E141482	A/SA 182 F55	1
Tag	Tag 1: H040WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
25,811	25,811	6,888	6,888	3,603	3,603	0,571	0,571									1	//

Item	Description	Heat	Material	Qtà
160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E181650	A/SA 182 F55	19
Tag	Tag 1: H040WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,095	25,985	6,683	6,946	3,496	3,587	0,579	0,601									19	//

Item	Description	Heat	Material	Qtà
170	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	E141482	A/SA 182 F55	10
Tag	Tag 1: H040WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,180	25,688	6,815	6,982	3,507	3,583	0,571	0,588									10	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
180	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	E181650	A/SA 182 F55	10
Tag	Tag 1: H040WN3001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,269	25,975	6,684	6,917	3,498	3,592	0,579	0,596											10	//

Item	Description	Heat	Material	Qtà
190	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	E161501	A/SA 182 F55	10
Tag	Tag 1: H060WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,510	25,886	6,703	6,937	3,607	3,701	0,522	0,540											10	//

Item	Description	Heat	Material	Qtà
200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E141482	A/SA 182 F55	8
Tag	Tag 1: H060WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,180	25,189	6,815	6,952	3,507	3,583	0,571	0,588											8	//

Item	Description	Heat	Material	Qtà
200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E161501	A/SA 182 F55	2
Tag	Tag 1: H060WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,686	24,756	6,703	6,925	3,680	3,700	0,524	0,535											2	//

Item	Description	Heat	Material	Qtà
201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	242086	A/SA 182 F55	4
Tag	Tag 1: H020BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,915	25,512	7,096	7,220	3,542	3,605	0,608	0,616											4	//

Item	Description	Heat	Material	Qtà
201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E130620	A/SA 182 F55	8
Tag	Tag 1: H020BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,866	25,952	7,012	7,272	3,775	3,834	0,504	0,512											8	//

OFFICINE
SANTAFEDE s.r.l

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E141482	A/SA 182 F55	8
Tag	Tag 1: H020BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,180	25,189	6,815	6,952	3,507	3,583	0,571	0,588											8	//

PERFORMED	INSPECTOR	APPROVED	DATE
Pozzoli Michele		Invernizzi Irene	14/07/2020

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

ULTRASONIC EXAMINATION REPORT

UT N° UT703/2020

CUSTOMER	P.O.	JOB
1	PH018999 AMENDMENT 1	20C0321
SPECIFICATION	**PROCEDURE**	
ASTM A388 (ES 247 Tab.2)		
APPARATUS	**SURFACE CONDITION**	
Olympus EPOCH 650	Machined	
COUPLANT	**SENSITIVITY**	
FYp	DAC +6dB	
REFERENCE BLOCK	**NOTE**	
BCDS		

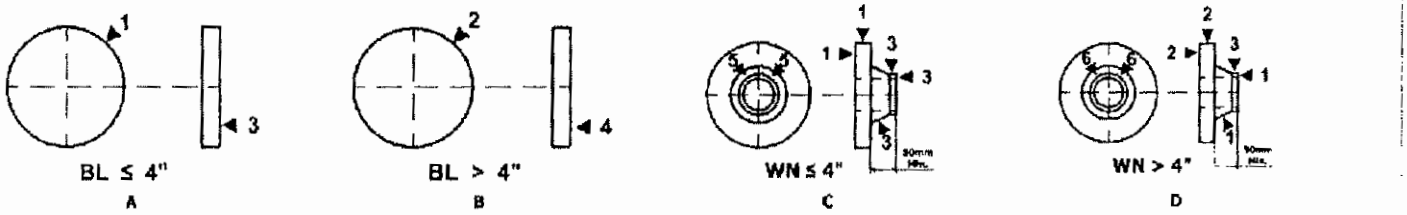
TRANSDUCERS

Position	Transducer Type	MHz	Straight	Angle	Dimension	Element	Serial	Trade
1	PF2 R-10	2	0°		Dia.10	Single		Panametrics
2	PF2 R-24	2	0°		Dia.24	Single		Panametrics
3	DL4R 3.5x10	4	0°		3,5x10	Double		Panametrics
4	DL4R 6x20	4	0°		6x20	Double		Panametrics
5	AM4R	4		45°	8x9	Single		Panametrics
6	AM2R	2		45°	20x22	Single		Panametrics

CALIBRATIONS

Calibration Type	Calibration Description
DAC-NOTCH	60Deg V-Notch, Depth <3%T mm
ECHO	Reference Echo

SCAN PLANS



ITEMS

Q.ty	Item	Object	Heat	Tag	Scanning
5	0001	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	E142078	H005BL3000	A
8	0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E142078	H010BL1000	A
1	0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E141482	H010BL1000	A
1	0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	185029	H010BL1000	A
5	0003	ASME B16.5 A/SA 182 F55 300 BL RF 1"	94114	H010BL3000	A
5	0004	ASME B16.5 A/SA 182 F55 600 BL RF 1"	52391	H010BL6000	A
9	0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E181650	H030BL1000	A
6	0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E130620	H030BL1000	A
2	0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	185029	H040BL1000	A
13	0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	57530	H040BL1000	A
2	0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	E130620	H080BL1000	B
3	0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	94114	H080BL1000	B
5	0009	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	E121404	H020BL15J0	A
2	0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	05040	H010WN3004	C
3	0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	E121750	H010WN3004	C
30	0012	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	E142078	H020WN1001	C

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

ULTRASONIC EXAMINATION REPORT — UT N° UT703/2020

ITEMS

Q.ty	Item	Object	Heat	Tag	Scanning
20	0013	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	E142078	H020WN1004	C
10	0014	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	E142078	H020WN1008	C
20	0015	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	E181650	H030WN1001	C
1	0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E141482	H040WN1001	C
19	0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E181650	H040WN1001	C
10	0017	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	E141482	H040WN1004	C
10	0018	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	E181650	H040WN3001	C
10	0019	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	E161501	H060WN1001	D
8	0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E141482	H060WN1004	D
2	0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E161501	H060WN1004	D
8	0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E130620	H020BL1000	A
8	0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E141482	H020BL1000	A
4	0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	242086	H020BL1000	A
20	0023	ASME B16.5 A/SA 182 F51 150 BL RF 3/4"	E190132	J007BL1000	A
20	0024	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1"	E182198	J010BL15J0	A
5	0025	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1" 1/2	735109	J015BL15J00	A
40	0026	ASME B16.5 A/SA 182 F51 150 BL RF 2"	E190132	J020BL1000	A
20	0027	ASME B16.5 A/SA 182 F51 300 BL RF 2"	E191543	J020BL3000	A
15	0028	ASME B16.5 A/SA 182 F51 150 BL RF 4"	F151766	J040BL1000	A
5	0030	ASME B16.5 A/SA 182 F51 300 BL RF 6"	E182255	J060BL3000	B
1	0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	E142031	J080BL3000	B
1	0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	E170383	J080BL3000	B
1	0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	E150009	J120BL3000	B
1	0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	E140947	J120BL3000	B
5	0034	ASME B16.5 A/SA 182 F51 2500 BL RTJ 1"	E191543	J010BL25J0	A
10	0035	ASME B16.5 A/SA 182 F51 300 WN RF 1/2" SCH 80S	844301	J005WN3008	C
20	0036	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 40S	E181981	J015WN3004	C
10	0037	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 80S	E181981	J015WN3008	C
20	0038	ASME B16.5 A/SA 182 F51 600 WN RF 2" SCH 40S	E182198	J020WN6004	C
15	0039	ASME B16.5 A/SA 182 F51 300 WN RF 3" SCH 10S	E191217	J030WN3001	C
20	0040	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 10S	E190587	J040WN3001	C
5	0041	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 40S	E190587	J040WN3004	C
10	0042	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 80S	E190587	J040WN3008	C
4	0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	E200025	J080WN3004	D
6	0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	E191174	J080WN3004	D

ACCEPTABLE		REPORTABLE INDICATIONS
■ YES	☐ NO	No reportable indications

OPERATOR	INSPECTOR	APPROVED	DATE
Panepinto Samuele SNT/ACCTA Level II; EN ISO 9712 Level 2			14/07/2020 0.00.00

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

CERTIFICATO DI ESAME LIQUIDI PENETRANTI

DYE PENETRANT EXAMINATION CERTIFICATE

LP n° D030203/1

Mod. COLL PC 13 rev. 2

CLIENTE/Customer	ORDINE/Order	COMMESSA/Job
	PH018999 AMENDMENT 1	20C0321

SPECIFICA/Specification	PROCEDURA/Procedure
ASME VIII DIV:1 App.8	Off.Santafede Coll 09

CONDIZIONI SUPERFICIALI/Surface Condition	SUPERFICI ESAMINATE/Examinated Surface
Lavorata/Machined	100% superfici accessibili/accessibile surface

METODO/Method	
Contrasto Di Colore/Color Contrast	Lavabili con acqua/Water washable
SGRASSATORE/Cleaner	PENETRANTE/Penetrant
Acetone o equivalente/ Aceton or equivalent	DeltaFlux - RED PENETRANT HD
PULITORE/Remover	RILEVATORE/Developer
Acqua/Water	DeltaFlux - WHITE DEVELOPER HD

MINIMO TEMPO DI PENETRAZIONE/Minimum Penetration Time	TEMPO DI SVILUPPO/Developing Time
Minuti/Minute 10	Min 10 Max 30 Minuti/Minute

PRODOTTO/Product

CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0001	10	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	5	E142078
Tag	Tag 1: H005BL3000				
Conform	0002	20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	8	E142078
Tag	Tag 1: H010BL1000				
Conform	0002	20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	E141482
Tag	Tag 1: H010BL1000				
Conform	0002	20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	185029
Tag	Tag 1: H010BL1000				
Conform	0003	30	ASME B16.5 A/SA 182 F55 300 BL RF 1"	5	94114
Tag	Tag 1: H010BL3000				
Conform	0004	40	ASME B16.5 A/SA 182 F55 600 BL RF 1"	5	52391
Tag	Tag 1: H010BL6000				
Conform	0005	50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	9	E181650
Tag	Tag 1: H030BL1000				
Conform	0005	50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	6	E130620
Tag	Tag 1: H030BL1000				
Conform	0006	60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	13	57530
Tag	Tag 1: H040BL1000				

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Date
Pozzoli Michele, SNT TC 1A Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

PRODOTTO/Product					
CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0006	60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	2	185029
Tag	Tag 1: H040BL1000				
Conform	0008	80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	3	94114
Tag	Tag 1: H080BL1000				
Conform	0008	80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	2	E130620
Tag	Tag 1: H080BL1000				
Conform	0009	90	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	5	E121404
Tag	Tag 1: H020BL1500				
Conform	0011	110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	2	05040
Tag	Tag 1: H010WN3004				
Conform	0011	110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	3	E121750
Tag	Tag 1: H010WN3004				
Conform	0012	120	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	30	E142078
Tag	Tag 1: H020WN1001				
Conform	0013	130	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	20	E142078
Tag	Tag 1: H020WN1004				
Conform	0014	140	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	10	E142078
Tag	Tag 1: H020WN1008				
Conform	0015	150	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	20	E181650
Tag	Tag 1: H030WN1001				
Conform	0016	160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	19	E181650
Tag	Tag 1: H040WN1001				
Conform	0016	160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	1	E141482
Tag	Tag 1: H040WN1001				
Conform	0017	170	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	10	E141482
Tag	Tag 1: H040WN1004				
Conform	0018	180	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	10	E181650
Tag	Tag 1: H040WN3001				
Conform	0019	190	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	10	E161501
Tag	Tag 1: H060WN1001				
Conform	0020	200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2	E161501
Tag	Tag 1: H060WN1004				
Conform	0020	200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	8	E141482
Tag	Tag 1: H060WN1004				

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Date
Pozzoli Michele, SNT TC 1A Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

OFFICINE SANTAFEDE S.r.l.
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

CERTIFICATO DI ESAME LIQUIDI PENETRANTI

DYE PENETRANT EXAMINATION CERTIFICATE

LP n° D030203/1

Mod. COLL PC 13 rev. 2

PRODOTTO/Product					
CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0020.A	201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	4	242086
Tag	Tag 1: H020BL1000				
Conform	0020.A	201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E130620
Tag	Tag 1: H020BL1000				
Conform	0020.A	201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E141482
Tag	Tag 1: H020BL1000				
Conform	0023	230	ASME B16.5 A/SA 182 F51 150 BL RF 3/4"	20	E190132
Tag	Tag 1: J007BL1000				
Conform	0024	240	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1"	20	E182198
Tag	Tag 1: J010BL15J0				
Conform	0025	250	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1" 1/2	5	735109
Tag	Tag 1: J015BL15J00				
Conform	0026	260	ASME B16.5 A/SA 182 F51 150 BL RF 2"	40	E190132
Tag	Tag 1: J020BL1000				
Conform	0027	270	ASME B16.5 A/SA 182 F51 300 BL RF 2"	20	E191543
Tag	Tag 1: J020BL3000				
Conform	0028	280	ASME B16.5 A/SA 182 F51 150 BL RF 4"	15	E151766
Tag	Tag 1: J040BL1000				
Conform	0030	300	ASME B16.5 A/SA 182 F51 300 BL RF 6"	5	E182255
Tag	Tag 1: J060BL3000				
Conform	0032	320	ASME B16.5 A/SA 182 F51 300 BL RF 8"	1	E142031
Tag	Tag 1: J080BL3000				
Conform	0032	320	ASME B16.5 A/SA 182 F51 300 BL RF 8"	4	E170383
Tag	Tag 1: J080BL3000				
Conform	0033	330	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E140947
Tag	Tag 1: J120BL3000				
Conform	0033	330	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E150009
Tag	Tag 1: J120BL3000				
Conform	0034	340	ASME B16.5 A/SA 182 F51 2500 BL RTJ 1"	5	E191543
Tag	Tag 1: J010BL25J0				
Conform	0035	350	ASME B16.5 A/SA 182 F51 300 WN RF 1/2" SCH 80S	10	844301
Tag	Tag 1: J005WN3808				
Conform	0036	360	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 40S	20	E181981
Tag	Tag 1: J015WN300M				

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Date
Pozzoli Michele, SNT TC 1A Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

OFFICINE SANTAFEDE s.r.l.
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

CERTIFICATO DI ESAME LIQUIDI PENETRANTI

DYE PENETRANT EXAMINATION CERTIFICATE

LP n° D030203/1

Mod. COLL PC 13 rev. 2

PRODOTTO/Product					
CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0037	370	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 80S	10	E181981
Tag	Tag 1: J015WN3008				
Conform	0038	380	ASME B16.5 A/SA 182 F51 600 WN RF 2" SCH 40S	20	E182198
Tag	Tag 1: J020WN6004				
Conform	0039	390	ASME B16.5 A/SA 182 F51 300 WN RF 3" SCH 10S	15	E191217
Tag	Tag 1: J030WN3001				
Conform	0040	400	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 10S	20	E190587
Tag	Tag 1: J040WN3001				
Conform	0041	410	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 40S	5	E190587
Tag	Tag 1: J040WN3004				
Conform	0042	411	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 80S	10	E190587
Tag	Tag 1: J040WN3008				
Conform	0044	430	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	4	E200025
Tag	Tag 1: J080WN3004				
Conform	0044	430	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	6	E191174
Tag	Tag 1: J080WN3004				

NOTE/Notes
Nessuna indicazione registrabile/No registrable indication

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Data
Pozzoli Michele, SNT TC 1A/ Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

A108075

officine alberoglio
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.98341
Fax 0341.983498 - 983497
lino.uberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
INSPECTION CERTIFICATE
CERTIFICAT D'ESSAIS

N. 166072 | DATA / DATE 17/06/21 | SHEET / 1/3

EN 10204 3.1

ORDINE / ORDER / C.DE: PH021077

DATA / DATE: 13/01/21 | COMMESSA: 68053

N. RIF.	ITEM	N / QUANTITY	DESCRIZIONE / DESCRIPTION / DÉSIGNATION	NOTE
SI 266	1530	5	A182F55 10" WN 150 RF SCH 10S	125-250AARH P331 QTR Nr. 3 / MDS D54 / MS11
SI198	1550	5	A182F55 12" WN 300 RF SCH 10S	125-250AARH P369 QTR Nr. 3 / MDS D54 / MS12
SI247	1400	15	A182F55 4" WN 300 RF SCH 10S	125-250AARH P71 QTR Nr. 3 / MDS D54 / MS11
SI247	1440	20	A182F55 6" WN 150 RF SCH 10S	125-250AARH P71 QTR Nr. 3 / MDS D54 / MS11
SI247	1450	30	A182F55 6" WN 150 RF STD/40S	125-250AARH P71 QTR Nr. 3 / MDS D54 / MS11
SI251	1230	25	A182F55 1 1/2" WN 150 RF STD/40S	125-250AARH P1465 QTR Nr. 3 / MDS D54 / MS11
SI253	1330	10	A182F55 3" WN 300 RF SCH 10S	125-250AARH P278 QTR Nr. 3 / MDS D54 / MS11
SI253	1340	20	A182F55 3" WN 300 RF STD/40S	125-250AARH P278 QTR Nr. 3 / MDS D54 / MS11
SI253	1380	20	A182F55 4" WN 150 RF STD/40S	125-250AARH P278 QTR Nr. 3 / MDS D54 / MS11
SI253	1480	25	A182F55 8" WN 150 RF SCH 10S	125-250AARH P489 QTR Nr. 3 / MDS D54 / MS11
SI258	1300	20	A182F55 3" WN 150 RF SCH 10S	125-250AARH P1756 QTR Nr. 3 / MDS D54 / MS11

N.	MATERIALE / MATERIAL / MATÉRIEL	HEAT / COULÉE	ACCIAIERIA / STEEL PLANT / ACIÉRIE	ORIGIN. CENT. / CENT. D'ORIGIN
SI 266	ASTM A182 F55	537832	SANDVIK	A/16-551986
SI198	ASTM A182 F55	543526	SANDVIK Refining method A.O.D.	A/15-527141
SI247	ASTM A182 F55	555083	SANDVIK Refining method A.O.D.	A/19-803842
SI251	ASTM A182 F55	557008	SANDVIK Refining method A.O.D.	A/19-844100
SI253	ASTM A182 F55	557009	SANDVIK Refining method A.O.D.	A/19-844101
SI258	ASTM A182 F55	557529	SANDVIK Refining method A.O.D.	A/19-855827
	ASME SA182F55			

ANALISI CHIMICA / CHEMICAL ANALYSIS / COMPOSITION CHIMIQUE

N. RIF.	C	Mn	Si	S	P	Cr	Ni	Mo	N	W	Cu			PRE
Min						24,000	6,000	3,000	0,200	0,500	0,500			40,000
Max	0,030	1,000	1,000	0,010	0,030	26,000	8,000	4,000	0,300	1,000	1,000			
SI 266Lad	0,016	0,560	0,280	0,000	0,022	25,170	6,760	3,760	0,258	0,590	0,540			41,706
SI 266Che	0,015	0,547	0,267	0,000	0,021	25,110	6,700	3,730	0,257	0,584	0,534			41,530
SI198Ladl	0,013	0,590	0,340	0,000	0,017	25,230	6,760	3,850	0,253	0,600	0,630			41,983
SI198Chec	0,023	0,603	0,353	0,000	0,017	25,300	6,830	3,880	0,254	0,607	0,637			42,170
SI247Ladl	0,016	0,640	0,240	0,000	0,022	25,360	6,780	3,750	0,255	0,570	0,580			41,815
SI247Chec	0,016	0,651	0,251	0,000	0,022	25,410	6,830	3,780	0,256	0,575	0,585			41,980
SI251Ladl	0,016	0,550	0,360	0,000	0,022	25,290	6,800	3,770	0,255	0,580	0,600			41,811
SI251Chec	0,015	0,548	0,358	0,000	0,021	25,280	6,790	3,770	0,255	0,579	0,599			41,800
SI253Ladl	0,016	0,590	0,300	0,000	0,024	25,250	6,820	3,740	0,259	0,620	0,560			41,736
SI253Chec	0,016	0,602	0,312	0,000	0,024	25,310	6,880	3,770	0,260	0,626	0,566			41,910
SI258Ladl	0,015	0,590	0,350	0,000	0,022	25,280	6,790	3,760	0,260	0,580	0,610			41,848
SI258Chec	0,014	0,577	0,337	0,000	0,021	25,220	6,730	3,730	0,259	0,574	0,604			41,670

PROVE MECCANICHE / MECHANICAL TESTS / ESSAIS MECANIQUES

N. RIF.	a mm.	SO mm.2	LU mm.	RE.-YIELD LIMITE	R.-TENSILE RUPTURE	A. %-ELONG. ALLONGEM.	C. %-REDUCT. STRICTION	RESILIENZA / IMPACT TEST / RESILIENCE MEDIO / AVERAGE MOYEN	MINIMO MINIMUM	TIPO TYPE	TEMP.	HARDNESS / DURETÉ
				MPA	MPA			Joule	Joule			H R C
				550,00	750-895	25,00	45,00	65	50		°C	max. 32
P331	12,50	122,65	50,00	591,00	805,00	30,10	63,46					22/24/24
LONG T/2								127	171	227	KV	- 51	24/25/25
L.E								1,2	1,4	1,5	mm		23/24/25
TRAN T/2								103	169	152	KV	- 51	
L.E								1,0	1,4	1,3	mm		

TRADE MARK | P. OFF. A. MELESI & C. | COLLAUDATORE / INSPECTOR / INSPECTEUR: Uberti p.i. Lino | ENTE COLLAUDATORE / INSPECTION AGENCY / AUTHORITÉE DE RECEYTE

officine artigiane
melesi
23813 Cortenova (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.98341
Fax 0341.983496 - 983497
lino.uberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
INSPECTION CERTIFICATE
CERTIFICAT D'ESSAIS

N. 166072 | DATA / DATE 17/06/21 | SHEET / 2/3

EN 10204 3.1

ORDINE / ORDER / C.DE PH021077

DATA / DATE 13/01/21 | COMMESSA 68053

P369	12,50	122,65	50,00	598,00	825,00	37,20	65,64						25/26/24
LONG T/2								145	196	249	KV	- 51	24/26/26
L.E								1,2	1,4	1,6	mm		25/24/25
TRAN T/2								103	157	195	KV	- 51	
L.E								0,9	1,1	1,3	mm		
LONG T/4								153	185	203	KV	- 51	
L.E								1,2	1,3	1,6	mm		
TRAN T/4								128	160	203	KV	- 51	
L.E								1,1	1,3	1,4	mm		
P71	12,50	122,65	50,00	574,00	792,00	30,27	59,68						22/23/24
LONG T/2								157	196	266	KV	- 51	23/22/23
L.E								1,3	1,4	1,6	mm		22/24/24
TRAN T/2								103	167	162	KV	- 51	
L.E								1,0	1,2	1,2	mm		
LONG T/4								134	249	214	KV	- 51	
L.E								1,2	1,5	1,5	mm		
TRAN T/4								111	189	159	KV	- 51	
L.E								1,0	1,3	1,2	mm		
P1465	12,50	122,65	50,00	651,00	824,00	33,92	66,85						23/25/25
LONG T/2								113	158	180	KV	- 51	24/23/26
L.E								1,2	1,3	1,4	mm		23/24/24
TRAN T/2								109	142	165	KV	- 51	
L.E								1,1	1,2	1,3	mm		
P278	12,50	122,65	50,00	582,00	823,00	32,85	66,36						23/24/22
LONG T/2								157	249	255	KV	- 51	22/24/25
L.E								1,3	1,5	1,6	mm		25/23/24
TRAN T/2								143	189	203	KV	- 51	
L.E								1,3	1,4	1,4	mm		
P489	12,50	122,65	50,00	567,00	783,00	31,00	72,44						23/22/24
LONG T/2								127	168	230	KV	- 51	25/25/23
L.E.								1,2	0,8	0,9	mm		24/23/25
TRAN T/2								144	191	278	KV	- 51	
L.E.								1,3	1,1	1,0	mm		
P1756	12,50	122,65	50,00	628,00	808,00	41,89	67,27						24/26/25
LONG								145	208	176	KV	- 51	23/25/25
L.E								1,3	1,5	1,4	mm		24/23/24
TRAN								118	179	150	KV	- 51	
L.E								1,1	1,4	1,3	mm		

N. RIF.	TRATTAMENTI TERMICI / *HEAT TREATMENTS / TRAITEMENTS THERMIQUES*
P331	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes
P369	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,23) hours,minutes
P71	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,01) hours,minutes
P1465	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,41) hours,minutes
P278	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes
P489	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes
P1756	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes

EN 10204 3.1
Surface and dimensional check according to ASME B16.5 2017.
Steel made by electric furnace.
Corrosion test carried out acc. to ASTM G48 method "A" at 50°C exposure time 24 hours.
Results: see attached Laboratory report.
Intergranular corrosion test acc. to ASTM A262 practice "E" with satisfactory results.
P.M.I. test performed with satisfactory results.

TRADE MARK	P. OFF. A. MELESI S.r.l.	COLLAUDATORE / *INSPECTOR / INSPECTEUR*	ENTE COLLAUDATORE / *INSPECTION AGENCY AUTHORITEE DE RECETTE*
		Uberti p.i. Lino	

officine meccaniche
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.98341
Fax 0341.983498 - 983497
lino.uberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
INSPECTION CERTIFICATE
CERTIFICAT D'ESSAIS

N.	DATA / *DATE*	SHEET /
166072	17/06/21	3/3

EN 10204 3.1

ORDINE / *ORDER* / *C.DE*: PH021077

DATA / *DATE*	COMMESSA
13/01/21	68053

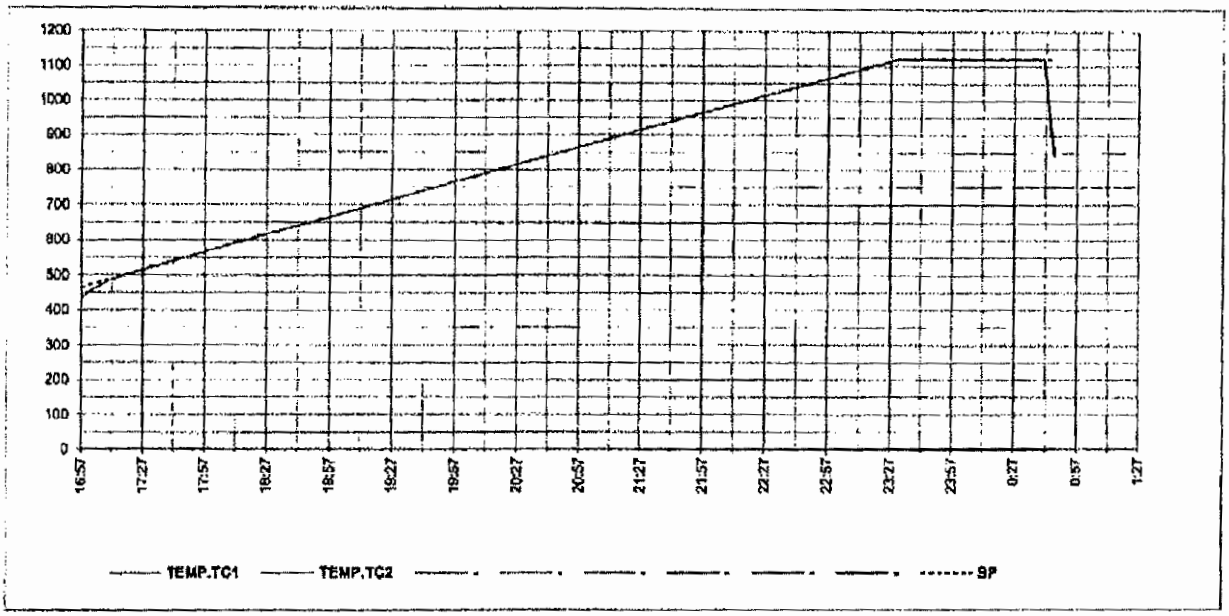
Material acc. to NACE MR 01-75 / ISO 15156 ed. 2015.
Material acc. to ASME SA182F55 ASME section II part A ed. 2019.
All surfaces are pickled and passivated as per P.O. requirements.
Reduction ratio > 4:1
The works operate a quality management system acc. to annex I, section 4.3 of the pressure equipment directive (PED) 2014/68/EU certificate by TUV certificate nr 58/2002/MUC.
Mechanical tests according to ASTM A370
Test specimen orientation: tensile transversal
Impact test specimen size 10 x 10 x 55 mm

ESITO DELLE PROVE / *TEST ISSUE* / *RESULTS DES ESSAIS*: FAVOREVOLE SATISFACTORY SATISFAISANT

TRADE MARK	P. OFF. A. MELESI S.p.A.	COLLAUDATORE / *INSPECTOR* / *INSPECTEUR*	ENTE COLLAUDATORE / *INSPECTION AGENCY* *AUTHORITÉE DE REGETTE*
		Uberti p.i. Lino	

RAPPORTO TRATTAMENTO TERMICO
HT REPORT

	FORNO *Furnace*				TEMPERATURA ACQUA *Water temperature*
	F6				27 °C



COMMESSA *Job*	RIGA *Row*	PO Item *PO Item*	QUANTITA' *Quantity*	LOTTO *Lot*	DESCRIZIONE *Description*	
68053	1450	1360	20	P71	A182F55 4" BL 300 RF	125-250AARH
68053	1490	1400	15	P71	A182F55 4" WN 300 RF SCH 10S	125-250AARH
68053	1500	1410	20	P71	A182F55 4" WN 300 RF STD/40S	125-250AARH
68053	1510	1420	40	P71	A182F55 6" BL 150 RF	125-250AARH
68053	1530	1440	20	P71	A182F55 6" WN 150 RF SCH 10S	125-250AARH
68053	1540	1450	30	P71	A182F55 6" WN 150 RF STD/40S	125-250AARH

Officine AMBROGIO MELESI & C. S.r.l.
23813 CORTENOVA

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.

POSITIVE MATERIAL IDENTIFICATION REPORT

FABRICATOR	PROJECT TITLE	MATERIAL GRADE	TIMING OF PMI EXECUTION	PROCEDURE	REPORT REF.
Officine Ambrogio Melesi & C.S.r.l.		ASTM A182 F55	After final marking	MELESI QC 037	PMI 166072
MELESI REF. N°	**PURCHASE ORDER**	**MATERIAL COLOR CODING**	**ANALYZER**	**CALIBRATION DATE**	**DATE OF TEST**
68053	PH021077		X-Ray Spectro	17/06/2021	17/06/2021

ITEM NO.	MATERIAL DESCRIPTION	PIECES TESTED	HEAT	MTC CERTIFICATE NO.	MTC DATE	ANALYSIS Cr Max (%)	Cr Min (%)	Ni Max (%)	Ni Min (%)	Mo Max (%)	Mo Min (%)	RESULTS ACCEPTED	REJECTED
						25,00	24,00	6,50	5,50	4,00	3,00		
1200	A182F55 1 1/2" WN 150 RF STD/40S 125-250AARH	25	557008	166072	17/06/2021	25,32	25,06	6,84	6,70	3,82	3,72	X	
1300	A182F55 3" WN 150 RF SCH 10S 125-250AARH	20	557529	166072	17/06/2021	25,36	25,18	6,94	6,60	3,89	3,75	X	
1330	A182F55 3" WN 300 RF SCH 10S 125-250AARH	10	557039	166072	17/06/2021	25,43	25,08	7,00	6,69	3,79	3,68	X	
1340	A182F55 3" WN 300 RF STD/40S 125-250AARH	20	557039	166072	17/06/2021	25,25	25,08	6,96	6,75	3,81	3,82	X	
1360	A182F55 4" WN 150 RF STD/40S 125-250AARH	20	557039	166072	17/06/2021	25,36	25,05	6,96	6,81	3,87	3,69	X	
1530	A182F55 10" WN 150 RF SCH 10S 125-250AARH	5	537632	166072	17/06/2021	25,34	25,04	6,84	6,72	3,81	3,71	X	
1550	A182F55 12" WN 300 RF SCH 10S 125-250AARH	5	543626	166072	17/06/2021	25,41	25,15	6,85	6,62	3,97	3,71	X	
1400	A182F55 8" WN 150 RF SCH 10S 125-250AARH	25	557039	166072	17/06/2021	25,35	25,13	6,82	6,81	3,86	3,61	X	
1420	A182F55 6" WN 300 RF SCH 10S 125-250AARH	15	555083	166072	17/06/2021	25,53	25,22	6,89	6,58	3,78	3,66	X	
1440	A182F55 6" WN 150 RF SCH 10S 125-250AARH	20	555083	166072	17/06/2021	25,37	25,26	6,81	6,64	3,90	3,74	X	

NOTE(s): PAGE 1 OF 2

SIGNATURES

OPERATOR	QUALITY CONTROL SUP.	CLIENT(S) INSPECTOR(S)
Gianni Buttara Level II	Lino Uberti Level III Officine AMBROGIO MELESI & C. s.r.l. 20813 CORNOVA	

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.

POSITIVE MATERIAL IDENTIFICATION REPORT

FABRICATOR Officine Ambrogio Melesi & C.S.r.l.	PROJECT TITLE	MATERIAL GRADE ASTM A182 F55	TIMING OF PMI EXECUTION After final marking	PROCEDURE MELESI QC 017	REPORT REF. PMI 166072
MELESI REF. N° 68053	PURCHASE ORDER PH021077	MATERIAL COLOR CODING	ANALYZER X-Ray Spectro	CALIBRATION DATE 17/06/2021	DATE OF TEST 17/06/2021

ITEM NO.	MATERIAL DESCRIPTION	PIECES TESTED	HEAT	MTC CERTIFICATE NO.	MTC DATE	ANALYSIS Cr Max (%)	Cr Min (%)	Ni Max (%)	Ni Min (%)	Mo Max (%)	Mo Min (%)					RESULTS ACCEPTED	REJECTED
						28,00	24,00	8,00	6,00	4,00	3,00						
1459	A182F55 8" WN 150 RF STD/40S 125-250AARH	30	503083	166872	17/06/2021	25,44	25,28	8,04	6,77	3,85	3,72					X	

NOTE(s): PAGE 2 OF 2

SIGNATURES

OPERATOR	QUALITY CONTROL SUP.	CLIENT(s) INSPECTOR(s)
Gionni Bittara Level II	Lino Uberti Level III Officine AMBROGIO MELESI & C. s.r.l. 23813 ERENOVA	

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.
Largo De Vecchi 11
23813 Cortenova (LC)
Italy
Phone: +39.0341.98341
Fax: +39.0341.983498 / 7
E-mail: info@melesi.it
Web site: www.melesi.it
Cap.Soc/Share Cap. 6500.000 Lv.
P.IVA - C.F. - R.I. Lecco
IT 02231830138
R.E.A. n. LC-106835
N.Meccan./Export n. LC005080

17 June 2021

Certificate Nr. M895

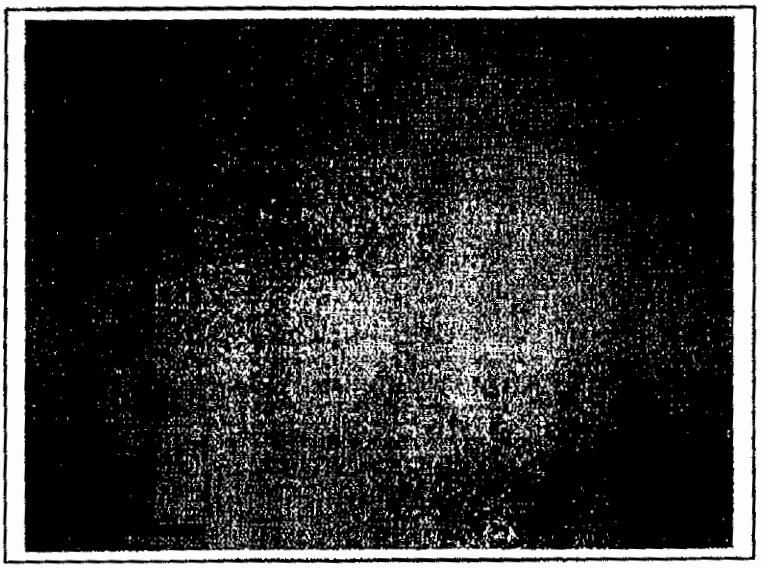
MICROSTRUCTURE

SAMPLE OF ASTM A182 F55 HEAT 555083 P71

THE RESULTS OF METALLOGRAPHIC EXAMINATION SHOW A REGULAR STRUCTURE FREE FROM INTERMETALLIC PHASES AND PRECIPITATES AS SHOWN ON BELOW PHOTO.

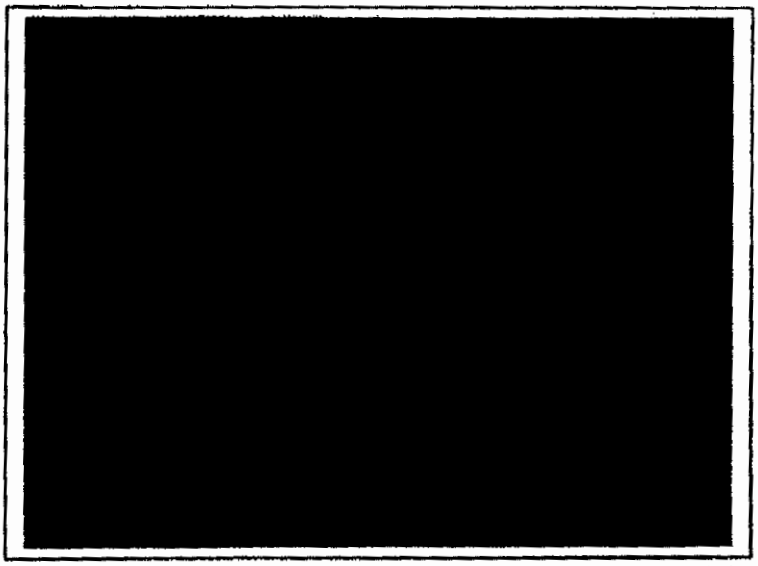
FERRITE CONTENT ACC. TO ASTM E562 = 49%
TEST PERFORMED ON ONE SECTION ETCHED 10% OXALIC ACID ELECTROLYTIC AND 20% NAOH ELECTROLYTIC ACCORDING TO ASTM E407
30 FIELDS EXAMINED, 16 POINTS (4x4 SQUARE GRID, 40x40mm) PER FIELD
TEST ACCORDING TO ISO 17781

MAGNIFICATION : 500X



ETCHING: 10% OXALIC ACID ELECTROLYTIC

Q. C.



Q. C.

ETCHING: 10% OXALIC ACID ELECTROLYTIC+ 20% NAOH ELECTROLYTIC

officine ambrogio melesi
25813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
Tel. +39.0341.98341
Fax +39.0341.983496/7
info@melesi.it
FLANGE E FORGIATI
FLANGES AND FORGINGS

PROVA CORROSIONE
CORROSION TEST

NR.	R2787	DATA DATE	
PAG. SHEET	1/1	OAM JOB COMMESSA	68053
ORDINE ORDER	PH021077	CLIENTE CUSTOMER	

SPECIFICA SPECIFICATION: ASTM G48 METHOD A

NOTE NOTES: LOCATION: TRASV T/2

POS. ITEM	Q.TA' Q.TY	DESCRIZIONE DESCRIPTION	COLATA HEAT	NOTE REMARKS
1306	20	A182 F55 4" BL 300 RF	555083	P71
1400	15	A182 F55 4" WN 300 RF SCH 10S	555083	P71
1410	20	A182 F55 4" WN 300 RF STD/40S	555083	P71
1420	40	A182 F55 6" BL 150 RF	555083	P71
1440	20	A182 F55 6" WN 150 RF SCH 10S	555083	P71
1450	30	A182 F55 6" WN 150 RF STD/40S	555083	P71

DIMENSIONI CAMPIONE START SPECIMEN DIMENSION		CONDIZIONI PROVA TEST CONDITIONS	
LUNGHEZZA LENGHT	49,95	TEMP. DI PROVA TEST TEMPERATURE	50°C
LARGHEZZA WIDTH	24,88	DURATA PROVA (H) PERIOD (H)	24
SPESSORE THICKNESS	9,90	ANGOLO / MANDRINO ANGLE / JIG	
SEZIONE (mm^2) SECTION	3.967	SOLUZIONE TEST SOLUTION	900ml whater tipo IV (H_2O) + 100g ferric chloride ($FeCl_3 \cdot 6H_2O$)
PESO INIZIALE (g) INITIAL WEIGHT	98,384		

RISULTATO DELLA PROVA
TEST RESULT

PESO FINALE (g) FINAL WEIGHT		PERDITA PESO (g) WEIGHT LOSS		CORROSIONE (g/m^2) CORROSION	
	98,384		0,000		0,03

ESITO ESAME AL MICROSCOPIO A 20 X OPTICAL MICROSCOPE EXAMINATION AT 20 X RESULTS			
	ASSENZA DI CORROSIONE PUNTIFORME NO PITTING ATTACK	< 1 g/m2	CONFORME CONFORM

NOTE REMARKS: Pickling on specimen for 5 minutes at 60 ° C in 20% HNO3 + 5% HF solution

QUALITY CONTROL	INSPECTOR	CUSTOMER
T.S. - Officine Ambrogio Melesi		

officine alfieri maggio
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
P.o. box 11
Tel 0341 98.341 ris.aut.
Fax 0341 90.15.06 - 90.14.88
FLANGE E FORGIATI

RAPPORTO ESAME ULTRASUONI
ULTRASONIC TEST REPORT

Nr.	Data / Date	Pag / Sheet	Commessa / Job
15050	17/06/21	1 / 1	66053
Ordine / Order		Cliente / Customer	
PH021077		"	

Specifica / Specification
ASTM A388

Criteri di accettazione / Acceptance criteria
ASME VIII, Div 1, Appendix 12

Procedura / Procedure
UT02 REV 2 ED 1

Stadio di controllo / Inspection phase
After final h.t. machined before drilling

Pos Item	Q.tà Quantity	Descrizione Description		Colata Heat	Cond. Superficiali Surface status
1230	25	A182F55 1 1/2" WN 150 RF STD/40S	125-250AARH	557008	LAVORATO/MACHINED
1300	20	A182F55 3" WN 150 RF SCH 10S	125-250AARH	557529	LAVORATO/MACHINED
1330	10	A182F55 3" WN 300 RF SCH 10S	125-250AARH	557009	LAVORATO/MACHINED
1340	20	A182F55 3" WN 300 RF STD/40S	125-250AARH	557009	LAVORATO/MACHINED
1380	20	A182F55 4" WN 150 RF STD/40S	125-250AARH	557009	LAVORATO/MACHINED
1400	15	A182F55 4" WN 300 RF SCH 10S	125-250AARH	555083	LAVORATO/MACHINED
1440	20	A182F55 6" WN 150 RF SCH 10S	125-250AARH	555083	LAVORATO/MACHINED
1450	30	A182F55 6" WN 150 RF STD/40S	125-250AARH	555083	LAVORATO/MACHINED
1480	25	A182F55 8" WN 150 RF SCH 10S	125-250AARH	557009	LAVORATO/MACHINED
1530	5	A182F55 10" WN 150 RF SCH 10S	125-250AARH	537832	LAVORATO/MACHINED
1550	5	A182F55 12" WN 300 RF SCH 10S	125-250AARH	543526	LAVORATO/MACHINED

APPARECCHIO / INSTRUMENT

Tipo / Type	Matricola / Serial Number	Costruita da / Manufactured by
USN 60	01H3B6	GE

SONDE / PROBES - Amplificazione durante esame / Amplification during examination +6 dB

Tipo Type	Costruita da Manufactured by	Matricola S.N.	Misura Size	Angolo Angle	Frequenza Frequency	Ampl. di regolazione Setting ampl.
B2 S EN	GE Sensing&Inspection Technologies	500036-60948	Diam. 24 mm		2 MHz	
SEB2 E	GE Sensing&Inspection Technologies	57487-50712	6 X 20 mm		2 MHz	
MWB45-2E	GE Sensing&Inspection Technologies	56921-500041	8 X 9 mm	45°	2 MHz	
MSEB2 E	GE Sensing&Inspection Technologies	57481-500083	3.5 x 10 mm		2 MHz	

CAVI / CABLES

Tipo Type	Lunghezza Lenght
RG 174 D	2 mt

CALIBRAZIONE / CALIBRATION

- [X] DGS Diagramma / DGS Diagram
- [ ] DAC
- [X] Eco di riferimento / Reference point echo + 6 db
- [X] Blocchi di calibrazione / Calibration blocks — Notch V 60° - Depth < 3% T
- [ ] Blocco di riferimento V2 / Reference block V2
- [ ] Blocco di riferimento V1 / Reference block V1

Riflettore di riferimento / Reference reflector
DGS Deq 3-6 mm notch< 3% T

Segnale di riferimento / Reference amplitude
DGS Deq 3-6 mm notch< 3% T

Accoppiante / Coupling
Olio / Oil

NOTE / NOTES
Conform to acceptance criteria

RISULTATI / RESULTS
Conforme

FIRME / SIGNATURES

OPERATORI / OPERATORS	SUPERVISORE C.Q. / QUALITY CONTROL SUP.
CALIZZI GIORGIO Lev. II	UBERTI LINO Lev. II
ENTE COLLAUDATORE / INSPECTION AUTHORITIES	ISPETTORE CLIENTE / CUSTOMER INSPECTOR

officine meccaniche
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
P.o. box 11
Tel 0341 98.341 rie.aut.
Fax 0341 90.15.06 - 90.14.88
FLANGE E FORGIATI

CERTIFICATO CONTROLLO CON LIQUIDI PENETRANTI
LIQUID PENETRANT TEST

Nr.	Data / Date	Pag / Sheet	Commessa / Job
15048	17/08/21	1 / 1	68083
Ordine / Order		Cliente / Customer	
PH021077			

Specifica / Specification
ASTM A961/E165 ASME V Art.6

Criteri di accettazione / Acceptance criteria
ASME VIII Div.1, Appendix 8

Procedura / Procedure
PT 01 - Rev. 1 Ed. 2

Stadio di controllo / Inspection phase
After final h.t. machined before drilling

Pos Item	Q.tà Quantity	Descrizione Description		Colata Heat	Cond. Superficiali Surface status
1300	20	A182F55 3" WN 150 RF SCH 10S	125-250AARH	557529	FINITO/FINISHED
1330	10	A182F55 3" WN 300 RF SCH 10S	125-250AARH	557009	FINITO/FINISHED
1340	20	A182F55 3" WN 300 RF STD/40S	125-250AARH	557009	FINITO/FINISHED
1380	20	A182F55 4" WN 150 RF STD/40S	125-250AARH	557009	FINITO/FINISHED
1400	15	A182F55 4" WN 300 RF SCH 10S	125-250AARH	555083	FINITO/FINISHED
1440	20	A182F55 6" WN 150 RF SCH 10S	125-250AARH	555083	FINITO/FINISHED
1450	30	A182F55 6" WN 150 RF STD/40S	125-250AARH	555083	FINITO/FINISHED
1480	25	A182F55 8" WN 150 RF SCH 10S	125-250AARH	557009	FINITO/FINISHED
1530	5	A182F55 10" WN 150 RF SCH 10S	125-250AARH	537832	FINITO/FINISHED
1550	5	A182F55 12" WN 300 RF SCH 10S	125-250AARH	543526	FINITO/FINISHED

TECNICA D'ESAME / EXAMINATION TECHNIQUE

- [ ] Fluorescente / Fluorescent
- [x] Contrasto colore / Color constract
- [ ]
- [x] Lavabile con acqua / Water washable
- [ ] Rimovibile con solvente / Solvent removable
- [ ]

FASI / STEPS	PRODOTTI / PRODUCTS - TIPO / TYPE FABBRICANTE / MANUFACTURER	LOTTO N. / BATCH NR.
Pulizia / Cleaning	Solvente/Cleaner CGM (R2.60 velnet solnet)	
Applicazione penetrante / Penetrant application	CGM (R2.71 RED "WW")	20/324
Rimozione eccesso penetrante / Excess penetrant removal	Acqua/Water Pressione/Pressure <275 kPa (40psi) Temperature/Temperature <40°C	
Asciugatura / Drying	Asciugatura con stracci / Wiping	
Applicazione rilevatore / Developer application	CGM (R.82 ROTRIVEL "U" / white)	21/131

TECNICA D'ESAME / EXAMINATION TECHNIQUE

Tempo di penetrazione / Penetrant dwell time	20 min
Tempo di sviluppo / Developer dwell time	12 min

ATTREZZATURA DI ILLUMINAZIONE / LIGHTING EQUIPMENT

>1076 Lux

NOTE / NOTES

No defects
Examination performed on 10% of pieces

RISULTATI / RESULTS

Conforme

FIRME / SIGNATURES	
OPERATORI / OPERATORS	SUPERVISORE C.Q. / QUALITY CONTROL SUP.
CAMINADA VALERIO Lev. II	UBERTI LINO Lev. II
ENTE COLLAUDATORE / INSPECTION AUTHORITIES	ISPETTORE CLIENTE / CUSTOMER INSPECTOR

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

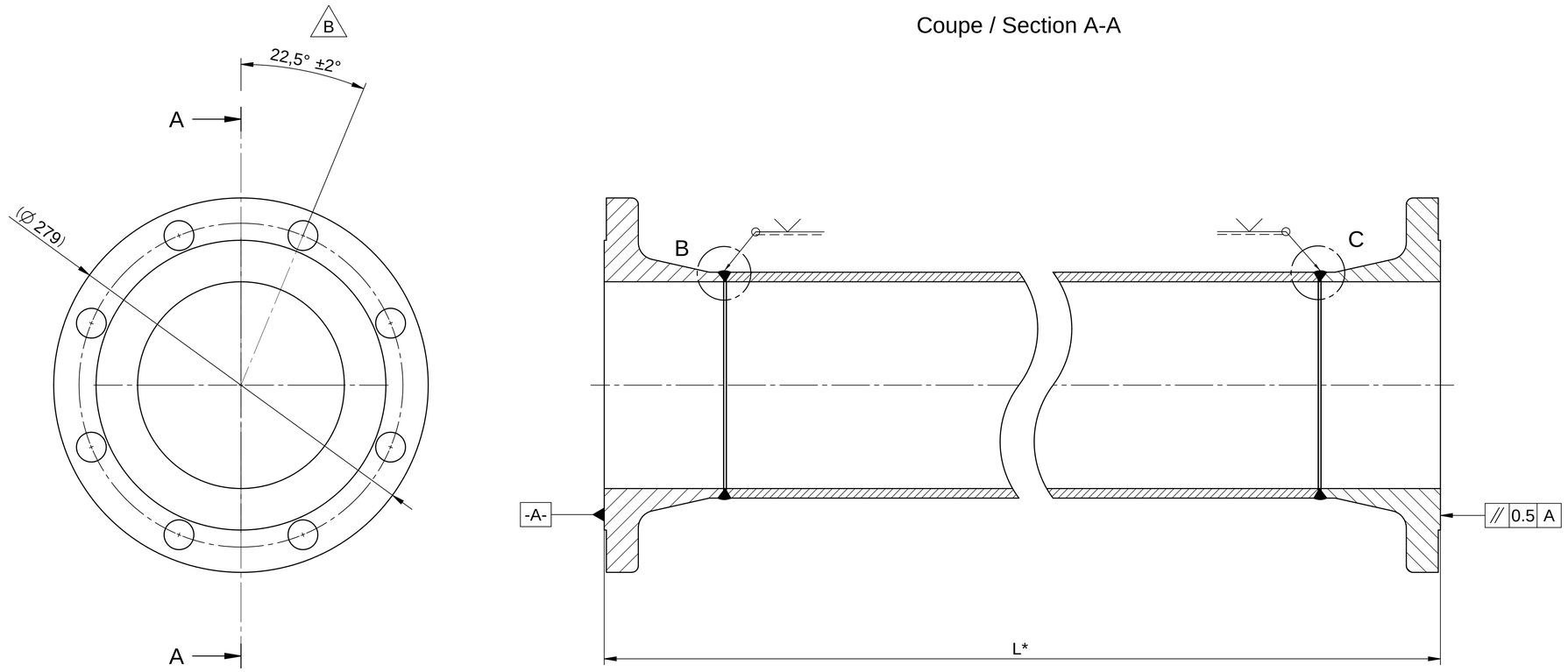
A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

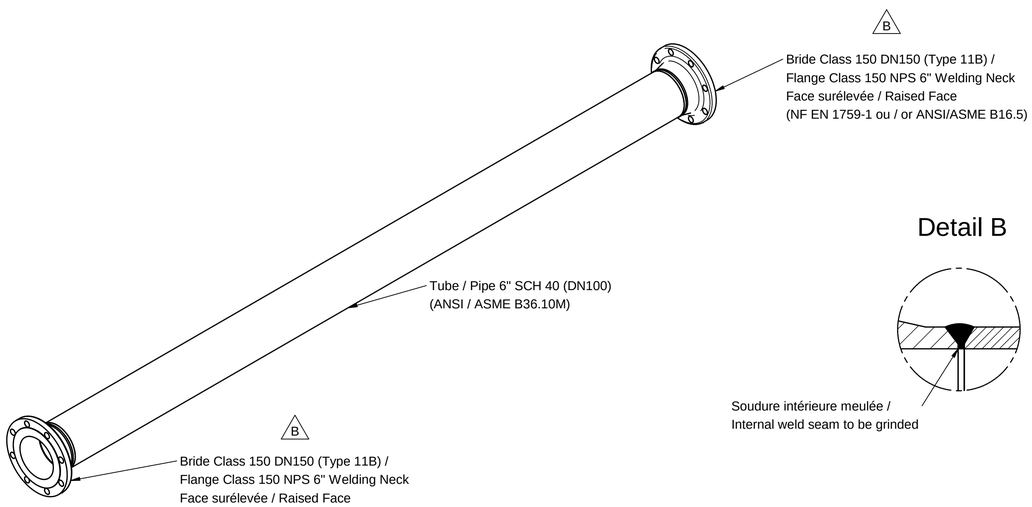
Item
#50B
Description
EXTENSION BODY 6IN AV7
PCM Reference
W-004942300257WP

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

SRCI & P2MI	**Traçabilité Matière -** *Material Traceability* ***Affaire PO070-24-07599***			**Ref SRCI :** **24121-01**
PLAN **DRAWING**	**DESIGNATION**	**MATIERE** **MATERIAL**	**N° COULEE** **HEAT N°**	**REP**
W-004942-B	Flange 6" 150# WN RF - SCH40S	SUPERDUPLEX	E161501 / E141482 555083	**1** **2**
W-004942-B	Pipe 6" SCH40S	SUPERDUPLEX	60418	**3**
W-004942-B	Pipe 6" SCH40S	SUPERDUPLEX	60418	**3**

Coupe / Section A-A

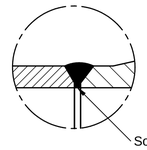




Detail B

Soudure intérieure meulée /
Internal weld seam to be grinded

Detail C



Soudure intérieure meulée /
Internal weld seam to be grinded

* : Pour la longueur L se référer au code article :
W-004942**XXX*** où **XXX** est la longueur en cm
Exemple : L = 900 donc XXX = 090 / L = 1500 donc XXX = 150
** : For length L refer to part code :*
*W-004942**XXX**** *where **XXX** is the length in cm*
Example : L = 900 so XXX = 090 / L = 1500 so XXX = 150
Tolerance L :
L < 500 = ± 0.2
500 ≤ **L** < 1000 = ± 0.3
1000 ≤ **L** < 1500 = ± 0.5
L ≥ 1500 = ± 1

Casser les arêtes vives / *Smooth sharp angles*

B	THOMAS	Voir / See : item B			CHABERT	07/01/2019	
Rev.	Par / By	Objet / Subject		FNC / NCR	Vérifié par / Checked by	Le / On	

PCM keep it moving

Rue René Moineau
49 123 Champtocé/Loire
FRANCE
Phone : +33 (0)1.77.68.31.00
www.pcm.eu

RALLONGE 6"

EXTENSION 6"

Type	AV7							
Masse / *Weight*	101.25 kg / 223.20 lbs	Tol.	ISO 2768-mH	√	Ra 3.2	Mat.	Voir Ordre Fabrication / Achat *See Manufacturing / Purchasing Order*	
Par / *By*	THOMAS	Le / *On*	01/10/2018	Feuille *Sheet*	Format	N°	W-004942	Rev. B
				1 / 1	A1			

Tous droits réservés, diffusion ou reproduction interdite sans autorisation écrite de PCM.
All rights reserved, reproduction or distribution prohibited without written permission from PCM.

OFFICINE SANTAFEDE s.r.l.
CAP SOC. € 156.000 INT. VERS
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 - TEL. +39 0341 988411
FAX +39 0341 979919
www.officinesantafede.com
info@officinesantafede.com
info@pec.officinesantafede.com

A104995

CERTIFICATO DI COLLAUDO/TEST CERT. EN 10204/3.1		Cliente/Customer
N.	DATA/DATE	--
D030203	14/07/2020	

DESCRIZIONE/DESCRIPTION

MATERIAL CONFORMING TO ASME SECTION II PART A ED. 2017 AND TO NACE MR0175/ISO 15156 -2015 & NACE MR0103-2016

Item 0020 Commessa 20C0321 Ordine/Order PH018999 AMENDMENT 1 Item Cli./Cust.Item 200 Tag 1: H060WN1004

COLATA/HEAT	MATERIALE/MATERIAL	ACCIAIERIA/STEEL PLANT	N/QTY	DESCRIZIONE/DESCRIPTION	TT/HT
E141482	A/SA 182 F55	OUTOKUMPU	8	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2

Analisi Chimiche / Chemical tests

C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Ca	B	C.Eq.
0,019	0,590	0,310	0,026	0,001	25,100	6,910	3,540			0,670				0,287			

Prove Meccaniche / Mechanical Tests

SNERVAMENTO Yield strength (RP)	ROTTURA Tensile Strength (RM)	ALLUNGAMENTO A%-ELONG	STRIZIONE Z%-REDUCT	TIPO TYPE	TEMP.C°	TEST 1	TEST 2	TEST 3	MEDIA AVERAGE	DUREZZA HARDNESS HB

Note PREN: 41,37
W=0,58
SEE ATTACHED TEST N. 1252/20

VERIFIED TRUE COPY OF ORIGINAL

Item 0020 Commessa 20C0321 Ordine/Order PH018999 AMENDMENT 1 Item Cli./Cust.Item 200 Tag 1: H060WN1004

COLATA/HEAT	MATERIALE/MATERIAL	ACCIAIERIA/STEEL PLANT	N/QTY	DESCRIZIONE/DESCRIPTION	TT/HT
E161501	A/SA 182 F55	OUTOKUMPU	2	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2

Analisi Chimiche / Chemical tests

C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Ca	B	C.Eq.
0,012	0,570	0,290	0,026	0,001	25,430	6,830	3,640			0,590				0,279			

Prove Meccaniche / Mechanical Tests

SNERVAMENTO Yield strength (RP)	ROTTURA Tensile Strength (RM)	ALLUNGAMENTO A%-ELONG	STRIZIONE Z%-REDUCT	TIPO TYPE	TEMP.C°	TEST 1	TEST 2	TEST 3	MEDIA AVERAGE	DUREZZA HARDNESS HB

Note PREN: 41,90
W=0,63
SEE ATTACHED TEST N. 1320/20

Item 0020.A Commessa 20C0321 Ordine/Order PH018999 AMENDMENT 1 Item Cli./Cust.Item 201 Tag 1: H020BL1000

COLATA/HEAT	MATERIALE/MATERIAL	ACCIAIERIA/STEEL PLANT	N/QTY	DESCRIZIONE/DESCRIPTION	TT/HT
E130620	A/SA 182 F55	OUTOKUMPU	8	ASME B16.5 A/SA 182 F55 150 BL RF 2"	2

Analisi Chimiche / Chemical tests

C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Ca	B	C.Eq.
0,018	0,590	0,340	0,023	0,001	25,550	7,150	3,810			0,590				0,280			

Prove Meccaniche / Mechanical Tests

SNERVAMENTO Yield strength (RP)	ROTTURA Tensile Strength (RM)	ALLUNGAMENTO A%-ELONG	STRIZIONE Z%-REDUCT	TIPO TYPE	TEMP.C°	TEST 1	TEST 2	TEST 3	MEDIA AVERAGE	DUREZZA HARDNESS HB
562,0	853,0	27,6	51,2	KV(J)	-50	141,00	147,00	152,00	146,667	236 241

Note PREN: 42,60
W=0,51
SEE ATTACHED TEST N. 1273/20

ALL MATERIAL DELIVERED AS PER ABOVE PO IS IN ACCORDANCE WITH THE RELATIVE SPECIFICATIONS.

a) **Trattamento termico / Heat treatment**
1) Normalizzato a 920°C e raffreddato in aria calma
Normalized at 920°C and cooled in still air
2) Solubilizzato / *Solution treated and quenched*
3) Bonificato / *Quenched and tempered*
4) Normalizzato e rinvenuto / *Normalized and tempered*
5) Vedi descrizione / *See description*

b) I valori delle analisi chimiche sono ricavati dal certificato di Acciaieria
Chemical analisys values are taken from base certificate
c) C. E. = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15
d) Prove secondo ASTM A 370 / *Test conforming to ASTM A 370*
e) Diametro provino 12,5 mm. / *Specimen diameter 12,5 mm.*
Lunghezza provino 50 mm / *Specimen length 50 mm*
Reduced specimens may be used when necessary
f) Dimensioni del provino 10x10x55 mm.
Specimen dimensions 10x10x55 mm.

Controllo visivo e dimensionale soddisfacente / *Satisfactory visual and dimensional check*
Acciaio elaborato al forno elettrico e calmato / *Killed steel made by electric furnace*

TRADE MARK	REDATTO DA / PRINTED BY	APPROVATO DA / APPROVED BY	ENTE COLLAUDATORE / INSPECTING AGENCY
SF	QC M. BENEDETTI	QUALITY MANAGER M. SACCHI	

OFFICINE SANTAFEDE s.r.l.
CAP SOC. € 156.000 I.V. VERS
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 - TEL. +39 0341 988411
FAX +39 0341 979919
www.officinesantafede.com
info@officinesantafede.com
info@pec.officinesantafede.com

CERTIFICATO DI COLLAUDO/TEST CERT. EN 10204/3.1		Cliente/Customer
N.	DATA/DATE	
D030203	14/07/2020	

DESCRIZIONE/DESCRIPTION

MATERIAL CONFORMING TO ASME SECTION II PART A ED. 2017 AND TO NACE MR0175/ISO 15156 -2015 & NACE MR0103-2016

PMI 100%CHECK PASSED

MATERIAL MANUFACTURED WITH AOD PROCESS

HEAT TREATMENT: SOLUTION TREATED TEMP 1050°C-10/+30°c
QUENCHING TEMP. BELOW 260°C
QUENCHING TRANSFER TIME: 60 SEC MAX
SOAKING TIME: 2min/1mm thh.
HOLDING TIME: SOAKING TIME + 2 hours
FOR F55
HEAT TREATMENT: SOLUTION TREATED TEMP 1120°C-10/+30°c
QUENCHING TEMP. BELOW 260°C
QUENCHING TRANSFER TIME: 60 SEC MAX
SOAKING TIME: 2min/1mm thh.
HOLDING TIME: SOAKING TIME + 2 hours

BASE+FINAL PRODUCT IS FROM WEST -EUROPA
FORGING RATIO: 4:1 MIN

FOR F51 QTR 01
FOR F55 QTR 03

MANUFACTURER APPROVED PED 2014/68/EU SECTION 4.3

ALL MATERIAL DELIVERED AS PER ABOVE PO IS IN ACCORDANCE WITH THE RELATIVE SPECIFICATIONS.

a) Trattamento termico / *Heat trestment*
1) Normalizzato a 920°C e raffreddato in aria calma
Normalized at 920° C and cooled in still air
2) Solubilizzato / *Solution treated and quenched*
3) Bonificato / *Quenched and tempered*
4) Normalizzato e rinvenuto / *Normalized and tempered*
5) Vedi descrizione / *See description*

b) I valori delle analisi chimiche sono ricavati dal certificato di Acciaio a
Chemical analsys values are taken from base corldicate
c) C. E. = C + Mn/6 - (Cr + Mo + V)/5 - (Ni + Cu)/15
d) Prove secondo ASTM A 370 / *Test conforming to ASTM A 370*
e) Diametro provino 12,5 mm. / *Specimen diameter 12,5 mm.*
Lunghezza provino 50 mm / *Specimen lengt) 50 mm*
Reduced specimens may be used when necessary
f) Dimensioni del provino 10x10x55 mm.
Specimen dimensions 10x10x55 mm.

Controllo visivo e dimensionale soddisfacente / *Satisfactory visual and dimensional check*
Acciaio elaborato al forno elettrico e calmato / *Killed steel made by electric furnace*

TRADE MARK	REDATTO DA / PRINTED BY	APPROVATO DA / APPROVED BY	ENTE COLLAUDATORE / INSPECTING AGENCY
SF	QC M. BENEDETTI	QA/QC MANAGER M. SACCHI	

OFFLINE

SANTAFEDE s.r.l.

PRODUCT ANALYSIS CERTIFICATE

Customer	Order	Certificate	Date
	PH018999 AMENDMENT 1	D030203	14/07/2020

Equipment	Description	Frequency
Laboratory	CHECK ANALYSIS	1 test each heat

Chemical tests **Analysis %**

Heat	Material	C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Fe	W	Ta	Co	Ca	B	Sb	As	Pb	Ceq	PREN
735109	A/SA 182 F51	0,017	1,511	0,265	0,025	0,000	22,572	5,402	3,069							0,178					0,000	0,0000					35,548
844301	A/SA 182 F51	0,020	1,594	0,511	0,019	0,000	22,556	5,558	3,139	0,006	0,003	0,393	0,009		0,181	0,155					0,000	0,0000					35,395
E140647	A/SA 182 F51	0,024	1,245	0,478	0,020	0,001	22,377	5,553	3,279							0,178											36,046
E142031	A/SA 182 F51	0,018	1,144	0,380	0,019	0,001	22,183	5,616	3,265							0,184											35,902
E150009	A/SA 182 F51	0,018	1,229	0,477	0,024	0,001	22,561	5,487	3,313							0,186											36,470
E151766	A/SA 182 F51	0,018	1,180	0,434	0,026	0,001	22,546	5,492	3,203							0,179											35,980
E170383	A/SA 182 F51	0,021	1,296	0,506	0,020	0,001	22,175	5,611	3,113							0,170											35,168
E181981	A/SA 182 F51	0,018	1,296	0,453	0,023	0,001	22,522	5,531	3,299							0,186											36,385
E182198	A/SA 182 F51	0,020	1,228	0,430	0,025	0,001	22,209	5,663	3,258							0,177											35,792
E182255	A/SA 182 F51	0,022	1,441	0,507	0,022	0,001	22,168	5,650	3,301							0,179											35,925
E190132	A/SA 182 F51	0,021	1,178	0,526	0,023	0,001	22,098	5,461	3,289							0,194											36,056
E190587	A/SA 182 F51	0,021	1,199	0,521	0,023	0,001	22,845	5,619	3,229							0,186											36,477
E191174	A/SA 182 F51	0,018	1,249	0,516	0,023	0,001	22,295	5,603	3,264							0,177											35,896
E191217	A/SA 182 F51	0,020	1,202	0,460	0,023	0,001	22,352	5,470	3,308							0,195											36,388
E191543	A/SA 182 F51	0,019	1,260	0,528	0,025	0,001	22,662	5,682	3,329							0,190											36,686
E200025	A/SA 182 F51	0,020	1,120	0,566	0,023	0,001	22,116	5,679	3,277							0,187											35,922
05040	A/SA 182 F55	0,020	0,501	0,526	0,022	0,000	25,769	6,980	3,672			0,565				0,269		0,684									42,191
185029	A/SA 182 F55	0,013	0,550	0,351	0,020	0,000	24,678	6,869	3,777			0,642				0,258		0,570									41,270
242086	A/SA 182 F55	0,020	0,628	0,591	0,028	0,001	25,552	7,046	3,548			0,590				0,246		0,606			0,000	0,0000					41,196
52391	A/SA 182 F55	0,022	0,563	0,436	0,017	0,000	24,853	7,615	3,537			0,629				0,241		0,630									40,381
57530	A/SA 182 F55	0,016	0,610	0,436	0,022	0,000	24,603	7,293	3,738			0,585				0,245		0,664									40,858
94114	A/SA 182 F55	0,018	0,677	0,512	0,030	0,001	25,534	6,531	3,763	0,003	0,064	0,524	0,012		0,016	0,250		0,569			0,001	0,0030					41,952
E121404	A/SA 182 F55	0,018	0,586	0,360	0,025	0,001	24,935	6,905	3,588			0,659				0,282		0,672									41,287
E121750	A/SA 182 F55	0,015	0,687	0,329	0,024	0,001	24,827	7,057	3,528			0,689				0,292		0,560									41,141
E130620	A/SA 182 F55	0,019	0,609	0,340	0,023	0,001	25,108	7,280	3,821			0,598				0,280		0,517									42,197
E141482	A/SA 182 F55	0,020	0,609	0,315	0,026	0,001	25,822	6,909	3,560			0,663				0,294		0,580									42,274
E142078	A/SA 182 F55	0,015	0,732	0,281	0,026	0,001	25,694	6,678	3,518			0,594				0,288		0,579									41,911
E161501	A/SA 182 F55	0,013	0,566	0,294	0,027	0,001	25,437	6,943	3,613			0,579				0,288		0,527									41,968

OFFICINE SANTAFEDE s.r.l.

PRODUCT ANALYSIS CERTIFICATE

E181G50	A/SA 182 F55	0,015	0,635	0,371	0,023	0,001	25,668	6,761	3,529			0,548				0,275		0,500								41,714

IT. 60 (H. [illegible]) – 120 (H. EK1478) – 130 (H. [illegible]) – 140 (H. [illegible])
IT. 160 (H EK1483) – 170 (H. EK1482) – 200 (H. EK1482)



OFF. SANTAFEDE s.r.l.
CORTABBIO DI PRIMALUNA (LC)

OFFICINE SANTAFEDE S.R.L.
23819 CORTABBIO DI PRIMALUNA (LECCO)
www.officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregere 1 23819 Cortabbio di Primaluna LC

Materiale *Material#* ASME SA/ASTM A182-20 F55 | Colata *Heat#* E141482 | Descrizione *Description#* | Rapporto Nr. *Report Nr.* 1252/20

PROVA DI TRAZIONE — *TENSILE TEST*

Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodo prova *Test Method*	Dimensioni *Dimensions* Ø [mm]	Lo [mm]	Posizione *Position*	Temp. *Temp.* [°C]	Snervamento *Yield Strength offset method* Rp0,2% [MPa]		Rottura *Tensile Strength* Rm [MPa]		Allungam. *Elongation after fracture* A [%]		Strizione *Area Reduc.* Z [%]		Ratio Rp/Rm	Risultato *Result*
20TS0942	2668	ASTM A370-19e1	6,25	25,04	T	23,4	(≥ 550)	568,4	(750 ÷ 895)	795,9	(≥ 25)	40,0	(≥ 45)	77	0,71	COMPLIANT
20TS0942	2668															COMPLIANT
20TS0942	2668															COMPLIANT

PROVA DI DUREZZA — *HARDNESS TEST*

Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodo prova *Test Method*	Tipo *Type*	Durezza *Hardness* Valore Singolo *Single Value*		Media *Average*		Risultato *Result*
20TS0942	2668	ASTM E10-18	HBW 2,5/187,5 (≤ 301)	250	246	244	246,7	COMPLIANT
20TS0942	2668	ASTM E18-20	ROCKWELL HRC (≤ 32)	22,2	22,3	22,6	22,4	COMPLIANT

PROVA DI RESILIENZA — *IMPACT TEST* — *Capacity* 450 J — *Striker radius* 8 mm

Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodo di prova *Test Method*	Dimensioni *Dimensions* SxWxL [mm]	Posizione *Position*	Temp. *Temp.* [°C]	Tipo *Type*	Energia Assorbita [J] *Valore Singolo Single Value*				*Abs. Energy* Media *Average*		Area Duttile [%] *Valore Singolo Single Value*				*Shear Area* Media *Average*		Esp. Laterale [mm] *Valore Singolo Single Value*				*Lateral Exp.* Media *Average*		Risultato *Result*
20TS0942	2669	ASTM E23-18	10x10x55	1/2 thk L	-51	KV	249,9	249,6	250,1	(≥ 50)	249,9	(≥ 65)	100	100	100	(info)	100,0	(info)	2,31	2,30	2,33	(≥ 0,38)	2,31	(info)	COMPLIANT
20TS0942	2670	ASTM E23-18	10x10x55	1/2 thk T	-51	KV	218,1	240,2	222,4	(≥ 35)	226,9	(≥ 45)	100	100	100	(info)	100,0	(info)	2,11	2,20	2,15	(≥ 0,38)	2,15	(info)	COMPLIANT

Tra parentesi i criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04, giudizio di conformità espresso senza considerare l'incertezza di misura / *in brackets acceptance criteria requested by customer in accordance to COLL03 rev.04, statement of conformity without consider the measurement uncertainty*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020				

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

° Dati forniti dal cliente / Campionamento eseguito a cura del cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
° Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.R.L.

23835 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA 1 - TEL. +39 0341 685111 - FAX +39 0341 374913
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1668 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*	Rapporto Nr. *Report Nr.* 1253/20

PROVA DI "PITTING" IN FERRO CLORURO *FERRIC CHLORIDE PITTING TEST* ASTM G48 Met. A

Dati Iniziali *Initial Data*

Prova Nr. *Test Nr.*	Provino *Specimen* ID	Metodo di prova *Test Method* ASTM	Posizione *Position*	Lunghezza *Length* [mm]	Larghezza *Width* [mm]	Spessore *Thickness* [mm]	Area *Area* [cm^2]	Decapaggio *Pickling*
20TS0942	2671	G48-11(2015) Met. A	T	50,02	25,06	10,09	40,22	20% HNO_3 + 5% HF, 60°C for 5 minutes

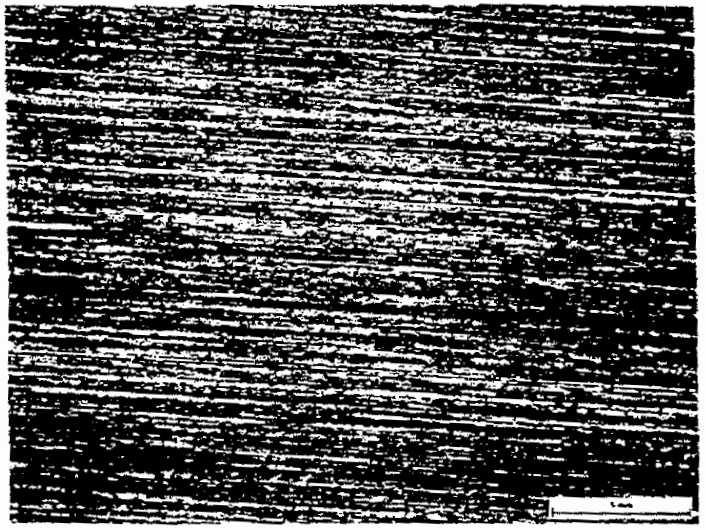
Condizioni Prova *Test Conditions*

Temperatura *Temperature* (°C)	Durata Prova *Test Period* [h]	Soluzione *Solution*	Finitura Superficiale *Surface finish* [grit]
50 ± 0,5	24	100 g of reagent grade ferric chloride, $FeCl_3 \cdot 6H_2O$, in 900 ml of Type IV reagent water (about 6 % $FeCl_3$ by mass)	120

Risultati Prova *Test Results*

Peso iniziale *Initial weight* [g]	Peso finale *Final weight* [g]	Perdita di peso *Weight loss* [g]	Velocità di corrosione *Corrosion rate* [g/m^2]	
98,5609	98,5608	0,0001	≤ 1	0,0

Esame visivo a 20X
Visual examination at 20X



Esame Pits
Pits examination
No pit riscontrati nel campione a 20X
No pits found in the specimen at 20X

Profondità media pits [µm]
Average pits depth [µm]
None

Massima profondità pits [µm]
Maximum pits depth [µm]
None

Densità dei pits [pit/cm^2]
Pits density [pit/cm^2]
None

Risultati
Results
COMPLIANT

Criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04, giudizio di conformità espresso senza considerare l'incertezza di misura / *Acceptance criteria requested by customer in accordance to COLL03 rev.04, statement of conformity without consider the measurement uncertainty*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H – Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*
25/05/2020	08/06/2020 ÷ 09/06/2020	09/06/2020			

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
 # Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.r.l.
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA 1 - TEL. +39 0341 995111 - FAX +39 0341 995199
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*		Rapporto Nr. *Report Nr.*	1256/20

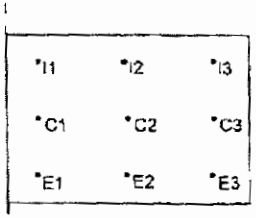
PROVA DI DUREZZA SU SEZIONE MACRO / HARDNESS TEST ON MACRO SECTION

	Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodi di Prova *Test Methods ASTM*	Tipo di Durezza *Hardness Type*
Dati Iniziali *Initial Data*	20TS0942	2673	E18-20	ROCKWELL HRC

Section A

Risultati Prova *Test Results*

INT 1 mm		*1/2 thk*		*EXT* 1 mm	
I1	23,1	C1	22,2	E1	23,4
I2	23,6	C2	22,6	E2	23,6
I3	23,9	C3	22,9	E3	23,3



Requisito Durezza *Hardness required*	≤ 32	ROCKWELL HRC	Risultati *Results*	COMPLIANT

Criteri di accettabilità richiesti dal cliente in accordo a COL03 rev.06, giudizio di conformità espresso senza considerare l'incertezza di misura / Acceptance criteria requested by customer in accordance to COL03 rev 04, statement of conformity without consider the measurement uncertainty

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk – Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020				

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

#Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
#Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.R.L.
23819 CORTABBIO DI PRIMALUNA (LECCO)
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*		Rapporto Nr. *Report Nr.*	1254/20

ESAME METALLOGRAFICO E DETERMINAZIONE DELLA FRAZIONE DI VOLUME TRAMITE CONTEGGIO MANUALE SISTEMATICO DEI PUNTI — ASTM E562

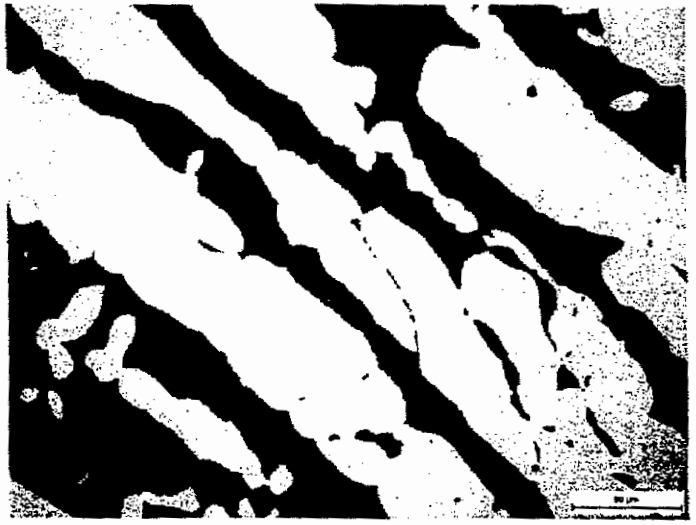
METALLOGRAPHIC EXAMINATION AND DETERMINING VOLUME FRACTION BY SYSTEMATIC MANUAL POINT COUNT

	Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodi di Prova *Test Methods* ASTM	Posizione *Position*
Dati Iniziali *Initial Data*	20TS0942	2672	E562-19, E3-11(2017) + E407-07(2015)e1	T

	Descrizione griglia *Grid description*	Numero campi *Number of fields*	Spaziatura Campi *Fields spacing*	Numero sezioni *Number of sections*
Condizioni Prova *Test Conditions*	25 points	30	Random	1 (20x20 mm)

Esame al microscopio a 400X *Microscope examination at 400X* — Attacco *Etching*: Electrolytic with 40 g of reagent grade NaOH to 100 g of distilled water (40% NaOH) — ASTM E407 Etchant nr. 220

Risultati Prova *Test Results*				
Frazione volume della Ferrite *Ferrite volume fraction*	49,4	%	(40 55%) *Required*
Deviazione Standard *Standard Deviation (s)*	4,1	%	
Intervallo di Confidenza *Confidence interval (95% CI)*	1,5	%	
Accuratezza Relativa *Relative Accuracy (% RA)*	3,1	%	
Struttura *Structure*	Austenite e Ferrite *Austenite and Ferrite*		
Risultati *Results*	COMPLIANT		



RAW DATA (%)	
52	48
53	47
54	50
46	46
48	42
51	52
49	48
56	56
54	55
47	51
44	42
48	46
46	54
42	54
50	50

Tra parentesi i criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04, giudizio di conformità espresso senza considerare l'incertezza di misura / *in brackets acceptance criteria requested by customer in accordance to COLL03 rev.04, statement of conformity without consider the measurement uncertainty*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020			

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presentati sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
 # Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.r.l.
23815 CORTABBIO DI PRIMALUNA (LECCO)
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*		Rapporto Nr. *Report Nr.*	1255/20

ESAME METALLOGRAFICO — *METALLOGRAPHIC EXAMINATION*

	Prova Nr. *Test Nr.*	Provino *Specimen ID*	Posizione *Position*	Metodi di Prova *Test Methods* ASTM
Dati Iniziali *Initial Data*	20TS0942	26/2	T	E3-11(2017) + E407-07(2015)e1

Condizioni Prova *Test Conditions*

Numero sezioni *Number of sections*: 1 (20x20 mm)

Esame al microscopio a 400X *Microscope examination at 400X* — Attacco *Etching*: Electrolytic with Oxalic Acid 10% + Electrolytic with 20 g of reagent grade NaOH to 100 g of distilled water (NaOH 20%) — ASTM E407 Etchant nr. 13 (a) + 220

Risultati Prova *Test Results*

Struttura *Structure*: Austenite e Ferrite

Precipitati assenti, Carburi assenti, Fasi intermetalliche assenti, Nitruri assenti

Austenite and Ferrite

Precipitates absence, Carbides absence, Intermetallic phases absence, Nitrides absence



Risultati *Results*: COMPLIANT

Criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04 / *Acceptance criteria requested by customer in accordance to COLL03 rev.04*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020				

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

* Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
* *Data provided by the customer / Sampling performed by customer / Test results only rojers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory*

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

% FERRITE CONTENT REPORT

Nr. D03020:

CUSTOMER	ORDER	JOB
	PH018999 AMENDMENT 1	20C0321

SURFACE	INSTRUMENT	CALIBRATION	DESCRIPTION METHOD
MACHINED	Ferritoscope Fisher FMP30	Daily	4 READING EACH PIECE

PRODUCT

Item	Description	Q.ty	N Heat	Ferrite %
0001	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	5	E142078	51
0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	E141482	49
0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	8	E142078	48
0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	185029	50
0003	ASME B16.5 A/SA 182 F55 300 BL RF 1"	5	94114	50
0004	ASME B16.5 A/SA 182 F55 600 BL RF 1"	5	52391	47
0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	9	E181650	48
0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	6	E130620	53
0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	2	185029	51
0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	13	57530	47
0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	2	E130620	48
0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	3	94114	45
0009	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	5	E121404	51
0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	3	E121750	47
0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	2	05040	44
0012	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	30	E142078	46
0013	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	20	E142078	51
0014	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	10	E142078	50
0015	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	20	E181650	50
0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	1	E141482	48
0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	19	E181650	49
0017	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	10	E141482	45
0018	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	10	E181650	49
0019	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	10	E161501	51
0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	8	E141482	43
0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2	E161501	49
0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	4	242086	52
0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E130620	47
0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E141482	45
0023	ASME B16.5 A/SA 182 F51 150 BL RF 3/4"	20	E190132	49
0024	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1"	20	E182198	50
0025	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1" 1/2	5	735109	52
0026	ASME B16.5 A/SA 182 F51 150 BL RF 2"	40	E190132	48
0027	ASME B16.5 A/SA 182 F51 300 BL RF 2"	20	E191543	47
0028	ASME B16.5 A/SA 182 F51 150 BL RF 4"	15	E151766	49
0030	ASME B16.5 A/SA 182 F51 300 BL RF 6"	5	E182255	49
0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	1	E142031	52
0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	4	E170383	53
0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E140947	47
0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E150009	45
0034	ASME B16.5 A/SA 182 F51 2500 BL RTJ 1"	5	E191543	43
0035	ASME B16.5 A/SA 182 F51 300 WN RF 1/2" SCH 80S	10	844301	49
0036	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 40S	20	E181981	51
0037	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 80S	10	E181981	50
0038	ASME B16.5 A/SA 182 F51 600 WN RF 2" SCH 40S	20	E182198	50
0039	ASME B16.5 A/SA 182 F51 300 WN RF 3" SCH 10S	15	E191217	49
0040	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 10S	20	E190587	50
0041	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 40S	5	E190587	47
0042	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 80S	10	E190587	52

0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	4	E200025	51
0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	6	E191174	49

Pozzoli Michele		Invernizzi Irene	14/07/2020

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 986411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

POSITIVE MATERIAL IDENTIFICATION

Nr. D030203/2

CUSTOMER:
ORDER: PH018999 AMENDMENT 1
EQUIPMENT: NITON XL800 S

SAMPLING: Test All Forgings
DATE OF TEST: 14/07/2020

Test according to: PMI PROCEDURE COLL. 06

Item	Description	Heat	Material	Qtà
10	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	E142078	A/SA 182 F55	5
Tag	Tag 1: H005BL3000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
24,467	25,852	6,692	6,854	3,517	3,613	0,573	0,584										5	//

Item	Description	Heat	Material	Qtà
20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	185029	A/SA 182 F55	1
Tag	Tag 1: H010BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
25,925	25,925	6,921	6,921	3,781	3,781	0,572	0,572										1	//

Item	Description	Heat	Material	Qtà
20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E141482	A/SA 182 F55	1
Tag	Tag 1: H010BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
24,718	24,718	6,847	6,847	3,563	3,563	0,580	0,580										1	//

Item	Description	Heat	Material	Qtà
20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E142078	A/SA 182 F55	8
Tag	Tag 1: H010BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
24,467	25,993	6,659	6,872	3,517	3,613	0,573	0,584										8	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
30	ASME B16.5 A/SA 182 F55 300 BL RF 1"	94114	A/SA 182 F55	5
Tag	Tag 1: H010BL3000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,004	25,378	6,426	6,557	3,733	3,797	0,571	0,590											5	//

Item	Description	Heat	Material	Qtà
40	ASME B16.5 A/SA 182 F55 600 BL RF 1"	52391	A/SA 182 F55	5
Tag	Tag 1: H010BL6000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,184	25,684	7,367	7,611	3,523	3,569	0,617	0,632											5	//

Item	Description	Heat	Material	Qtà
50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E130620	A/SA 182 F55	6
Tag	Tag 1: H030BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,779	25,818	7,056	7,180	3,780	3,847	0,501	0,515											6	//

Item	Description	Heat	Material	Qtà
50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E181650	A/SA 182 F55	9
Tag	Tag 1: H030BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,151	25,159	6,717	6,881	3,498	3,573	0,581	0,598											9	//

Item	Description	Heat	Material	Qtà
60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	185029	A/SA 182 F55	2
Tag	Tag 1: H040BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
25,628	25,925	6,779	6,921	3,781	3,791	0,572	0,572											2	//

Item	Description	Heat	Material	Qtà
60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	57530	A/SA 182 F55	13
Tag	Tag 1: H040BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,525	25,956	7,232	7,502	3,644	3,750	0,645	0,664											13	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	94114	A/SA 182 F55	3
Tag	Tag 1: H080BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,772	25,606	6,516	6,656	3,760	3,822	0,571	0,579											3	//

Item	Description	Heat	Material	Qtà
80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	E130620	A/SA 182 F55	2
Tag	Tag 1: H080BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,576	25,741	7,094	7,170	3,804	3,865	0,502	0,512											2	//

Item	Description	Heat	Material	Qtà
90	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	E121404	A/SA 182 F55	5
Tag	Tag 1: H020BL15J0			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,466	25,135	6,699	6,903	3,566	3,642	0,649	0,670											5	//

Item	Description	Heat	Material	Qtà
110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	05040	A/SA 182 F55	2
Tag	Tag 1: H010WN3004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,895	25,449	6,948	7,069	3,643	3,688	0,688	0,690											2	//

Item	Description	Heat	Material	Qtà
110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	E121750	A/SA 182 F55	3
Tag	Tag 1: H010WN3004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,394	25,550	6,801	6,949	3,514	3,588	0,541	0,557											3	//

Item	Description	Heat	Material	Qtà
120	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	E142078	A/SA 182 F55	30
Tag	Tag 1: H020WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,155	25,935	6,567	6,909	3,519	3,621	0,572	0,590											30	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 9884 1
FAX +39 0341 979919

Item	Description	Heat	Material	Qtà
130	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	E142078	A/SA 182 F55	20
Tag	Tag 1: H020WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,331	26,000	6,692	6,914	3,517	3,614	0,571	0,591									20	//

Item	Description	Heat	Material	Qtà
140	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	E142078	A/SA 182 F55	10
Tag	Tag 1: H020WN1008			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,171	25,993	6,659	6,872	3,517	3,613	0,572	0,584									10	//

Item	Description	Heat	Material	Qtà
150	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	E181650	A/SA 182 F55	20
Tag	Tag 1: H030WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,137	25,975	6,684	6,920	3,495	3,592	0,579	0,601									20	//

Item	Description	Heat	Material	Qtà
160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E141482	A/SA 182 F55	1
Tag	Tag 1: H040WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
25,811	25,811	6,888	6,888	3,603	3,603	0,571	0,571									1	//

Item	Description	Heat	Material	Qtà
160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E181650	A/SA 182 F55	19
Tag	Tag 1: H040WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,095	25,985	6,683	6,946	3,496	3,587	0,579	0,601									19	//

Item	Description	Heat	Material	Qtà
170	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	E141482	A/SA 182 F55	10
Tag	Tag 1: H040WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,180	25,688	6,815	6,982	3,507	3,583	0,571	0,588									10	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
180	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	E181650	A/SA 182 F55	10
Tag	Tag 1: H040WN3001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,269	25,975	6,684	6,917	3,498	3,592	0,579	0,596											10	//

Item	Description	Heat	Material	Qtà
190	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	E161501	A/SA 182 F55	10
Tag	Tag 1: H060WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,510	25,886	6,703	6,937	3,607	3,701	0,522	0,540											10	//

Item	Description	Heat	Material	Qtà
200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E141482	A/SA 182 F55	8
Tag	Tag 1: H060WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,180	25,189	6,815	6,952	3,507	3,583	0,571	0,588											8	//

Item	Description	Heat	Material	Qtà
200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E161501	A/SA 182 F55	2
Tag	Tag 1: H060WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,686	24,756	6,703	6,925	3,680	3,700	0,524	0,535											2	//

Item	Description	Heat	Material	Qtà
201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	242086	A/SA 182 F55	4
Tag	Tag 1: H020BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,915	25,512	7,096	7,220	3,542	3,605	0,608	0,616											4	//

Item	Description	Heat	Material	Qtà
201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E130620	A/SA 182 F55	8
Tag	Tag 1: H020BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,866	25,952	7,012	7,272	3,775	3,834	0,504	0,512											8	//

OFFICINE
SANTAFEDE s.r.l

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E141482	A/SA 182 F55	8
Tag	Tag 1: H020BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,180	25,189	6,815	6,952	3,507	3,583	0,571	0,588											8	//

PERFORMED	INSPECTOR	APPROVED	DATE
Pozzoli Michele		Invernizzi Irene	14/07/2020

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

ULTRASONIC EXAMINATION REPORT

UT N° UT703/2020

CUSTOMER	P.O.	JOB
1	PH018999 AMENDMENT 1	20C0321
SPECIFICATION	**PROCEDURE**	
ASTM A388 (ES 247 Tab.2)		
APPARATUS	**SURFACE CONDITION**	
Olympus EPOCH 650	Machined	
COUPLANT	**SENSITIVITY**	
FYp	DAC +6dB	
REFERENCE BLOCK	**NOTE**	
BCDS		

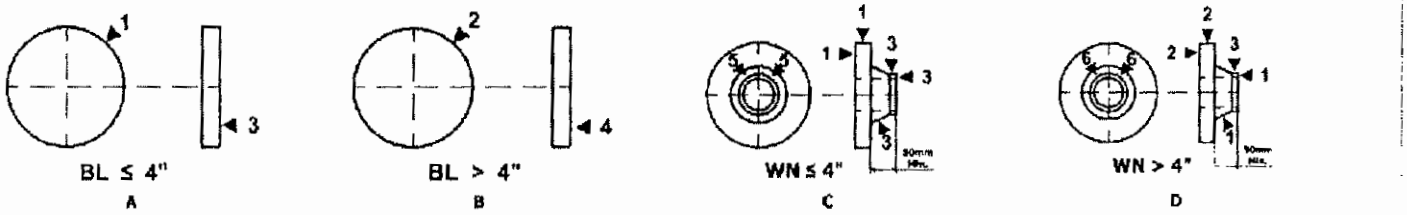
TRANSDUCERS

Position	Transducer Type	MHz	Straight	Angle	Dimension	Element	Serial	Trade
1	PF2 R-10	2	0°		Dia.10	Single		Panametrics
2	PF2 R-24	2	0°		Dia.24	Single		Panametrics
3	DL4R 3.5x10	4	0°		3,5x10	Double		Panametrics
4	DL4R 6x20	4	0°		6x20	Double		Panametrics
5	AM4R	4		45°	8x9	Single		Panametrics
6	AM2R	2		45°	20x22	Single		Panametrics

CALIBRATIONS

Calibration Type	Calibration Description
DAC-NOTCH	60Deg V-Notch, Depth <3%T mm
ECHO	Reference Echo

SCAN PLANS



ITEMS

Q.ty	Item	Object	Heat	Tag	Scanning
5	0001	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	E142078	H005BL3000	A
8	0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E142078	H010BL1000	A
1	0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E141482	H010BL1000	A
1	0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	185029	H010BL1000	A
5	0003	ASME B16.5 A/SA 182 F55 300 BL RF 1"	94114	H010BL3000	A
5	0004	ASME B16.5 A/SA 182 F55 600 BL RF 1"	52391	H010BL6000	A
9	0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E181650	H030BL1000	A
6	0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E130620	H030BL1000	A
2	0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	185029	H040BL1000	A
13	0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	57530	H040BL1000	A
2	0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	E130620	H080BL1000	B
3	0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	94114	H080BL1000	B
5	0009	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	E121404	H020BL15J0	A
2	0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	05040	H010WN3004	C
3	0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	E121750	H010WN3004	C
30	0012	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	E142078	H020WN1001	C

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

ULTRASONIC EXAMINATION REPORT — UT N° UT703/2020

ITEMS

Q.ty	Item	Object	Heat	Tag	Scanning
20	0013	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	E142078	H020WN1004	C
10	0014	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	E142078	H020WN1008	C
20	0015	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	E181650	H030WN1001	C
1	0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E141482	H040WN1001	C
19	0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E181650	H040WN1001	C
10	0017	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	E141482	H040WN1004	C
10	0018	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	E181650	H040WN3001	C
10	0019	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	E161501	H060WN1001	D
8	0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E141482	H060WN1004	D
2	0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E161501	H060WN1004	D
8	0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E130620	H020BL1000	A
8	0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E141482	H020BL1000	A
4	0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	242086	H020BL1000	A
20	0023	ASME B16.5 A/SA 182 F51 150 BL RF 3/4"	E190132	J007BL1000	A
20	0024	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1"	E182198	J010BL15J0	A
5	0025	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1" 1/2	735109	J015BL15J00	A
40	0026	ASME B16.5 A/SA 182 F51 150 BL RF 2"	E190132	J020BL1000	A
20	0027	ASME B16.5 A/SA 182 F51 300 BL RF 2"	E191543	J020BL3000	A
15	0028	ASME B16.5 A/SA 182 F51 150 BL RF 4"	F151766	J040BL1000	A
5	0030	ASME B16.5 A/SA 182 F51 300 BL RF 6"	E182255	J060BL3000	B
1	0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	E142031	J080BL3000	B
1	0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	E170383	J080BL3000	B
1	0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	E150009	J120BL3000	B
1	0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	E140947	J120BL3000	B
5	0034	ASME B16.5 A/SA 182 F51 2500 BL RTJ 1"	E191543	J010BL25J0	A
10	0035	ASME B16.5 A/SA 182 F51 300 WN RF 1/2" SCH 80S	844301	J005WN3008	C
20	0036	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 40S	E181981	J015WN3004	C
10	0037	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 80S	E181981	J015WN3008	C
20	0038	ASME B16.5 A/SA 182 F51 600 WN RF 2" SCH 40S	E182198	J020WN6004	C
15	0039	ASME B16.5 A/SA 182 F51 300 WN RF 3" SCH 10S	E191217	J030WN3001	C
20	0040	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 10S	E190587	J040WN3001	C
5	0041	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 40S	E190587	J040WN3004	C
10	0042	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 80S	E190587	J040WN3008	C
4	0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	E200025	J080WN3004	D
6	0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	E191174	J080WN3004	D

ACCEPTABLE		REPORTABLE INDICATIONS
■ YES	☐ NO	No reportable indications

OPERATOR	INSPECTOR	APPROVED	DATE
Panepinto Samuele SNT/ACCTA Level II; EN ISO 9712 Level 2			14/07/2020 0.00.00

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

CERTIFICATO DI ESAME LIQUIDI PENETRANTI

DYE PENETRANT EXAMINATION CERTIFICATE

LP n° D030203/1

Mod. COLL PC 13 rev. 2

CLIENTE/Customer	ORDINE/Order	COMMESSA/Job
	PH018999 AMENDMENT 1	20C0321

SPECIFICA/Specification	PROCEDURA/Procedure
ASME VIII DIV:1 App.8	Off.Santafede Coll 09

CONDIZIONI SUPERFICIALI/Surface Condition	SUPERFICI ESAMINATE/Examinated Surface
Lavorata/Machined	100% superfici accessibili/accessibile surface

METODO/Method	
Contrasto Di Colore/Color Contrast	Lavabili con acqua/Water washable
SGRASSATORE/Cleaner	PENETRANTE/Penetrant
Acetone o equivalente/ Aceton or equivalent	DeltaFlux - RED PENETRANT HD
PULITORE/Remover	RILEVATORE/Developer
Acqua/Water	DeltaFlux - WHITE DEVELOPER HD

MINIMO TEMPO DI PENETRAZIONE/Minimum Penetration Time	TEMPO DI SVILUPPO/Developing Time
Minuti/Minute 10	Min 10 Max 30 Minuti/Minute

PRODOTTO/Product

CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0001	10	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	5	E142078
Tag	Tag 1: H005BL3000				
Conform	0002	20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	8	E142078
Tag	Tag 1: H010BL1000				
Conform	0002	20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	E141482
Tag	Tag 1: H010BL1000				
Conform	0002	20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	185029
Tag	Tag 1: H010BL1000				
Conform	0003	30	ASME B16.5 A/SA 182 F55 300 BL RF 1"	5	94114
Tag	Tag 1: H010BL3000				
Conform	0004	40	ASME B16.5 A/SA 182 F55 600 BL RF 1"	5	52391
Tag	Tag 1: H010BL6000				
Conform	0005	50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	9	E181650
Tag	Tag 1: H030BL1000				
Conform	0005	50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	6	E130620
Tag	Tag 1: H030BL1000				
Conform	0006	60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	13	57530
Tag	Tag 1: H040BL1000				

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Date
Pozzoli Michele, SNT TC 1A Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

PRODOTTO/Product					
CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0006	60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	2	185029
Tag	Tag 1: H040BL1000				
Conform	0008	80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	3	94114
Tag	Tag 1: H080BL1000				
Conform	0008	80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	2	E130620
Tag	Tag 1: H080BL1000				
Conform	0009	90	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	5	E121404
Tag	Tag 1: H020BL1500				
Conform	0011	110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	2	05040
Tag	Tag 1: H010WN3004				
Conform	0011	110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	3	E121750
Tag	Tag 1: H010WN3004				
Conform	0012	120	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	30	E142078
Tag	Tag 1: H020WN1001				
Conform	0013	130	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	20	E142078
Tag	Tag 1: H020WN1004				
Conform	0014	140	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	10	E142078
Tag	Tag 1: H020WN1008				
Conform	0015	150	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	20	E181650
Tag	Tag 1: H030WN1001				
Conform	0016	160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	19	E181650
Tag	Tag 1: H040WN1001				
Conform	0016	160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	1	E141482
Tag	Tag 1: H040WN1001				
Conform	0017	170	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	10	E141482
Tag	Tag 1: H040WN1004				
Conform	0018	180	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	10	E181650
Tag	Tag 1: H040WN3001				
Conform	0019	190	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	10	E161501
Tag	Tag 1: H060WN1001				
Conform	0020	200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2	E161501
Tag	Tag 1: H060WN1004				
Conform	0020	200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	8	E141482
Tag	Tag 1: H060WN1004				

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Date
Pozzoli Michele, SNT TC 1A Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

OFFICINE SANTAFEDE S.r.l.
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

CERTIFICATO DI ESAME LIQUIDI PENETRANTI

DYE PENETRANT EXAMINATION CERTIFICATE

LP n° D030203/1

Mod. COLL PC 13 rev. 2

PRODOTTO/Product					
CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0020.A	201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	4	242086
Tag	Tag 1: H020BL1000				
Conform	0020.A	201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E130620
Tag	Tag 1: H020BL1000				
Conform	0020.A	201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E141482
Tag	Tag 1: H020BL1000				
Conform	0023	230	ASME B16.5 A/SA 182 F51 150 BL RF 3/4"	20	E190132
Tag	Tag 1: J007BL1000				
Conform	0024	240	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1"	20	E182198
Tag	Tag 1: J010BL15J0				
Conform	0025	250	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1" 1/2	5	735109
Tag	Tag 1: J015BL15J00				
Conform	0026	260	ASME B16.5 A/SA 182 F51 150 BL RF 2"	40	E190132
Tag	Tag 1: J020BL1000				
Conform	0027	270	ASME B16.5 A/SA 182 F51 300 BL RF 2"	20	E191543
Tag	Tag 1: J020BL3000				
Conform	0028	280	ASME B16.5 A/SA 182 F51 150 BL RF 4"	15	E151766
Tag	Tag 1: J040BL1000				
Conform	0030	300	ASME B16.5 A/SA 182 F51 300 BL RF 6"	5	E182255
Tag	Tag 1: J060BL3000				
Conform	0032	320	ASME B16.5 A/SA 182 F51 300 BL RF 8"	1	E142031
Tag	Tag 1: J080BL3000				
Conform	0032	320	ASME B16.5 A/SA 182 F51 300 BL RF 8"	4	E170383
Tag	Tag 1: J080BL3000				
Conform	0033	330	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E140947
Tag	Tag 1: J120BL3000				
Conform	0033	330	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E150009
Tag	Tag 1: J120BL3000				
Conform	0034	340	ASME B16.5 A/SA 182 F51 2500 BL RTJ 1"	5	E191543
Tag	Tag 1: J010BL25J0				
Conform	0035	350	ASME B16.5 A/SA 182 F51 300 WN RF 1/2" SCH 80S	10	844301
Tag	Tag 1: J005WN3808				
Conform	0036	360	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 40S	20	E181981
Tag	Tag 1: J015WN300M				

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Date
Pozzoli Michele, SNT TC 1A Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

OFFICINE SANTAFEDE s.r.l.
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

CERTIFICATO DI ESAME LIQUIDI PENETRANTI

DYE PENETRANT EXAMINATION CERTIFICATE

LP n° D030203/1

Mod. COLL PC 13 rev. 2

PRODOTTO/Product					
CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0037	370	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 80S	10	E181981
Tag	Tag 1: J015WN3008				
Conform	0038	380	ASME B16.5 A/SA 182 F51 600 WN RF 2" SCH 40S	20	E182198
Tag	Tag 1: J020WN6004				
Conform	0039	390	ASME B16.5 A/SA 182 F51 300 WN RF 3" SCH 10S	15	E191217
Tag	Tag 1: J030WN3001				
Conform	0040	400	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 10S	20	E190587
Tag	Tag 1: J040WN3001				
Conform	0041	410	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 40S	5	E190587
Tag	Tag 1: J040WN3004				
Conform	0042	411	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 80S	10	E190587
Tag	Tag 1: J040WN3008				
Conform	0044	430	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	4	E200025
Tag	Tag 1: J080WN3004				
Conform	0044	430	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	6	E191174
Tag	Tag 1: J080WN3004				

NOTE/Notes
Nessuna indicazione registrabile/No registrable indication

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Data
Pozzoli Michele, SNT TC 1A/ Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

A108075

officine alberoglio
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.98341
Fax 0341.983498 - 983497
lino.uberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
INSPECTION CERTIFICATE
CERTIFICAT D'ESSAIS

N. 166072 | DATA / DATE 17/06/21 | SHEET / 1/3

EN 10204 3.1

ORDINE / ORDER / C.DE: PH021077

DATA / DATE: 13/01/21 | COMMESSA: 68053

N. RIF.	ITEM	N / QUANTITY	DESCRIZIONE / DESCRIPTION / DÉSIGNATION	NOTE
SI 266	1530	5	A182F55 10" WN 150 RF SCH 10S	125-250AARH P331 QTR Nr. 3 / MDS D54 / MS11
SI198	1550	5	A182F55 12" WN 300 RF SCH 10S	125-250AARH P369 QTR Nr. 3 / MDS D54 / MS12
SI247	1400	15	A182F55 4" WN 300 RF SCH 10S	125-250AARH P71 QTR Nr. 3 / MDS D54 / MS11
SI247	1440	20	A182F55 6" WN 150 RF SCH 10S	125-250AARH P71 QTR Nr. 3 / MDS D54 / MS11
SI247	1450	30	A182F55 6" WN 150 RF STD/40S	125-250AARH P71 QTR Nr. 3 / MDS D54 / MS11
SI251	1230	25	A182F55 1 1/2" WN 150 RF STD/40S	125-250AARH P1465 QTR Nr. 3 / MDS D54 / MS11
SI253	1330	10	A182F55 3" WN 300 RF SCH 10S	125-250AARH P278 QTR Nr. 3 / MDS D54 / MS11
SI253	1340	20	A182F55 3" WN 300 RF STD/40S	125-250AARH P278 QTR Nr. 3 / MDS D54 / MS11
SI253	1380	20	A182F55 4" WN 150 RF STD/40S	125-250AARH P278 QTR Nr. 3 / MDS D54 / MS11
SI253	1480	25	A182F55 8" WN 150 RF SCH 10S	125-250AARH P489 QTR Nr. 3 / MDS D54 / MS11
SI258	1300	20	A182F55 3" WN 150 RF SCH 10S	125-250AARH P1756 QTR Nr. 3 / MDS D54 / MS11

N.	MATERIALE / MATERIAL / MATÉRIEL	HEAT / COULÉE	ACCIAIERIA / STEEL PLANT / ACIÉRIE	ORIGIN. CENT. / CENT. D'ORIGIN
SI 266	ASTM A182 F55	537832	SANDVIK	A/16-551986
SI198	ASTM A182 F55	543526	SANDVIK Refining method A.O.D.	A/15-527141
SI247	ASTM A182 F55	555083	SANDVIK Refining method A.O.D.	A/19-803842
SI251	ASTM A182 F55	557008	SANDVIK Refining method A.O.D.	A/19-844100
SI253	ASTM A182 F55	557009	SANDVIK Refining method A.O.D.	A/19-844101
SI258	ASTM A182 F55	557529	SANDVIK Refining method A.O.D.	A/19-855827
	ASME SA182F55			

ANALISI CHIMICA / CHEMICAL ANALYSIS / COMPOSITION CHIMIQUE

N. RIF.	C	Mn	Si	S	P	Cr	Ni	Mo	N	W	Cu			PRE
Min						24,000	6,000	3,000	0,200	0,500	0,500			40,000
Max	0,030	1,000	1,000	0,010	0,030	26,000	8,000	4,000	0,300	1,000	1,000			
SI 266Lad	0,016	0,560	0,280	0,000	0,022	25,170	6,760	3,760	0,258	0,590	0,540			41,706
SI 266Che	0,015	0,547	0,267	0,000	0,021	25,110	6,700	3,730	0,257	0,584	0,534			41,530
SI198Ladl	0,013	0,590	0,340	0,000	0,017	25,230	6,760	3,850	0,253	0,600	0,630			41,983
SI198Chec	0,023	0,603	0,353	0,000	0,017	25,300	6,830	3,880	0,254	0,607	0,637			42,170
SI247Ladl	0,016	0,640	0,240	0,000	0,022	25,360	6,780	3,750	0,255	0,570	0,580			41,815
SI247Chec	0,016	0,651	0,251	0,000	0,022	25,410	6,830	3,780	0,256	0,575	0,585			41,980
SI251Ladl	0,016	0,550	0,360	0,000	0,022	25,290	6,800	3,770	0,255	0,580	0,600			41,811
SI251Chec	0,015	0,548	0,358	0,000	0,021	25,280	6,790	3,770	0,255	0,579	0,599			41,800
SI253Ladl	0,016	0,590	0,300	0,000	0,024	25,250	6,820	3,740	0,259	0,620	0,560			41,736
SI253Chec	0,016	0,602	0,312	0,000	0,024	25,310	6,880	3,770	0,260	0,626	0,566			41,910
SI258Ladl	0,015	0,590	0,350	0,000	0,022	25,280	6,790	3,760	0,260	0,580	0,610			41,848
SI258Chec	0,014	0,577	0,337	0,000	0,021	25,220	6,730	3,730	0,259	0,574	0,604			41,670

PROVE MECCANICHE / MECHANICAL TESTS / ESSAIS MECANIQUES

N. RIF.	a mm.	SO mm.2	LU mm.	RE.-YIELD LIMITE	R.-TENSILE RUPTURE	A. %-ELONG. ALLONGEM.	C. %-REDUCT. STRICTION	RESILIENZA / IMPACT TEST / RESILIENCE MEDIO / AVERAGE MOYEN	MINIMO MINIMUM	TIPO TYPE	TEMP.	HARDNESS / DURETÉ
				MPA	MPA			Joule	Joule			H R C
				550,00	750-895	25,00	45,00	65	50		°C	max. 32
P331	12,50	122,65	50,00	591,00	805,00	30,10	63,46					22/24/24
LONG T/2								127	171	227	KV	- 51	24/25/25
L.E								1,2	1,4	1,5	mm		23/24/25
TRAN T/2								103	169	152	KV	- 51	
L.E								1,0	1,4	1,3	mm		

TRADE MARK | P. OFF. A. MELESI & C. | COLLAUDATORE / INSPECTOR / INSPECTEUR: Uberti p.i. Lino | ENTE COLLAUDATORE / INSPECTION AGENCY / AUTHORITÉE DE RECEYTE

officine artigiane
melesi
23813 Cortenova (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.98341
Fax 0341.983496 - 983497
lino.uberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
INSPECTION CERTIFICATE
CERTIFICAT D'ESSAIS

N. 166072 | DATA / DATE 17/06/21 | SHEET / 2/3

EN 10204 3.1

ORDINE / ORDER / C.DE PH021077

DATA / DATE 13/01/21 | COMMESSA 68053

P369	12,50	122,65	50,00	598,00	825,00	37,20	65,64						25/26/24
LONG T/2								145	196	249	KV	- 51	24/26/26
L.E								1,2	1,4	1,6	mm		25/24/25
TRAN T/2								103	157	195	KV	- 51	
L.E								0,9	1,1	1,3	mm		
LONG T/4								153	185	203	KV	- 51	
L.E								1,2	1,3	1,6	mm		
TRAN T/4								128	160	203	KV	- 51	
L.E								1,1	1,3	1,4	mm		
P71	12,50	122,65	50,00	574,00	792,00	30,27	59,68						22/23/24
LONG T/2								157	196	266	KV	- 51	23/22/23
L.E								1,3	1,4	1,6	mm		22/24/24
TRAN T/2								103	167	162	KV	- 51	
L.E								1,0	1,2	1,2	mm		
LONG T/4								134	249	214	KV	- 51	
L.E								1,2	1,5	1,5	mm		
TRAN T/4								111	189	159	KV	- 51	
L.E								1,0	1,3	1,2	mm		
P1465	12,50	122,65	50,00	651,00	824,00	33,92	66,85						23/25/25
LONG T/2								113	158	180	KV	- 51	24/23/26
L.E								1,2	1,3	1,4	mm		23/24/24
TRAN T/2								109	142	165	KV	- 51	
L.E								1,1	1,2	1,3	mm		
P278	12,50	122,65	50,00	582,00	823,00	32,85	66,36						23/24/22
LONG T/2								157	249	255	KV	- 51	22/24/25
L.E								1,3	1,5	1,6	mm		25/23/24
TRAN T/2								143	189	203	KV	- 51	
L.E								1,3	1,4	1,4	mm		
P489	12,50	122,65	50,00	567,00	783,00	31,00	72,44						23/22/24
LONG T/2								127	168	230	KV	- 51	25/25/23
L.E.								1,2	0,8	0,9	mm		24/23/25
TRAN T/2								144	191	278	KV	- 51	
L.E.								1,3	1,1	1,0	mm		
P1756	12,50	122,65	50,00	628,00	808,00	41,89	67,27						24/26/25
LONG								145	208	176	KV	- 51	23/25/25
L.E								1,3	1,5	1,4	mm		24/23/24
TRAN								118	179	150	KV	- 51	
L.E								1,1	1,4	1,3	mm		

N. RIF.	TRATTAMENTI TERMICI / *HEAT TREATMENTS / TRAITEMENTS THERMIQUES*
P331	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes
P369	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,23) hours,minutes
P71	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,01) hours,minutes
P1465	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,41) hours,minutes
P278	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes
P489	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes
P1756	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes

EN 10204 3.1
Surface and dimensional check according to ASME B16.5 2017.
Steel made by electric furnace.
Corrosion test carried out acc. to ASTM G48 method "A" at 50°C exposure time 24 hours.
Results: see attached Laboratory report.
Intergranular corrosion test acc. to ASTM A262 practice "E" with satisfactory results.
P.M.I. test performed with satisfactory results.

TRADE MARK	P. OFF. A. MELESI S.r.l.	COLLAUDATORE / *INSPECTOR / INSPECTEUR*	ENTE COLLAUDATORE / *INSPECTION AGENCY AUTHORITEE DE RECETTE*
		Uberti p.i. Lino	

officine meccaniche
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.98341
Fax 0341.983498 - 983497
lino.uberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
INSPECTION CERTIFICATE
CERTIFICAT D'ESSAIS

N.	DATA / *DATE*	SHEET /
166072	17/06/21	3/3

EN 10204 3.1

ORDINE / *ORDER* / *C.DE*: PH021077

DATA / *DATE*	COMMESSA
13/01/21	68053

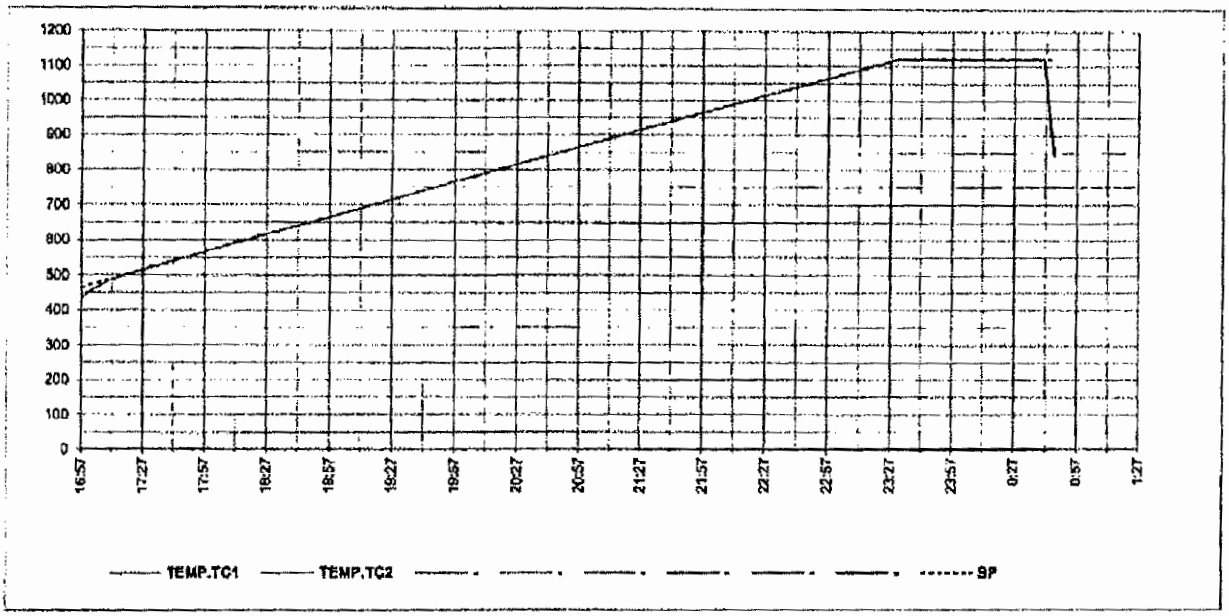
Material acc. to NACE MR 01-75 / ISO 15156 ed. 2015.
Material acc. to ASME SA182F55 ASME section II part A ed. 2019.
All surfaces are pickled and passivated as per P.O. requirements.
Reduction ratio > 4:1
The works operate a quality management system acc. to annex I, section 4.3 of the pressure equipment directive (PED) 2014/68/EU certificate by TUV certificate nr 58/2002/MUC.
Mechanical tests according to ASTM A370
Test specimen orientation: tensile transversal
Impact test specimen size 10 x 10 x 55 mm

ESITO DELLE PROVE / *TEST ISSUE* / *RESULTS DES ESSAIS*: FAVOREVOLE SATISFACTORY SATISFAISANT

TRADE MARK	P. OFF. A. MELESI S.p.A.	COLLAUDATORE / *INSPECTOR* / *INSPECTEUR*	ENTE COLLAUDATORE / *INSPECTION AGENCY* *AUTHORITÉE DE REGETTE*
		Uberti p.i. Lino	

RAPPORTO TRATTAMENTO TERMICO
HT REPORT

	FORNO *Furnace*				TEMPERATURA ACQUA *Water temperature*
	F6				27 °C



COMMESSA *Job*	RIGA *Row*	PO Item *PO Item*	QUANTITA' *Quantity*	LOTTO *Lot*	DESCRIZIONE *Description*	
68053	1450	1360	20	P71	A182F55 4" BL 300 RF	125-250AARH
68053	1490	1400	15	P71	A182F55 4" WN 300 RF SCH 10S	125-250AARH
68053	1500	1410	20	P71	A182F55 4" WN 300 RF STD/40S	125-250AARH
68053	1510	1420	40	P71	A182F55 6" BL 150 RF	125-250AARH
68053	1530	1440	20	P71	A182F55 6" WN 150 RF SCH 10S	125-250AARH
68053	1540	1450	30	P71	A182F55 6" WN 150 RF STD/40S	125-250AARH

Officine AMBROGIO MELESI & C. S.r.l.
23813 CORTENOVA

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.

POSITIVE MATERIAL IDENTIFICATION REPORT

FABRICATOR	PROJECT TITLE	MATERIAL GRADE	TIMING OF PMI EXECUTION	PROCEDURE	REPORT REF.
Officine Ambrogio Melesi & C.S.r.l.		ASTM A182 F55	After final marking	MELESI QC 037	PMI 166072
MELESI REF. N°	**PURCHASE ORDER**	**MATERIAL COLOR CODING**	**ANALYZER**	**CALIBRATION DATE**	**DATE OF TEST**
68053	PH021077		X-Ray Spectro	17/06/2021	17/06/2021

ITEM NO.	MATERIAL DESCRIPTION	PIECES TESTED	HEAT	MTC CERTIFICATE NO.	MTC DATE	ANALYSIS Cr Max (%)	Cr Min (%)	Ni Max (%)	Ni Min (%)	Mo Max (%)	Mo Min (%)	RESULTS ACCEPTED	REJECTED
						25,00	24,00	6,50	5,50	4,00	3,00		
1200	A182F55 1 1/2" WN 150 RF STD/40S 125-250AARH	25	557008	166072	17/06/2021	25,32	25,06	6,84	6,70	3,82	3,72	X	
1300	A182F55 3" WN 150 RF SCH 10S 125-250AARH	20	557529	166072	17/06/2021	25,36	25,18	6,94	6,60	3,89	3,75	X	
1330	A182F55 3" WN 300 RF SCH 10S 125-250AARH	10	557039	166072	17/06/2021	25,43	25,08	7,00	6,69	3,79	3,68	X	
1340	A182F55 3" WN 300 RF STD/40S 125-250AARH	20	557039	166072	17/06/2021	25,25	25,08	6,96	6,75	3,81	3,82	X	
1360	A182F55 4" WN 150 RF STD/40S 125-250AARH	20	557039	166072	17/06/2021	25,36	25,05	6,96	6,81	3,87	3,69	X	
1530	A182F55 10" WN 150 RF SCH 10S 125-250AARH	5	537632	166072	17/06/2021	25,34	25,04	6,84	6,72	3,81	3,71	X	
1550	A182F55 12" WN 300 RF SCH 10S 125-250AARH	5	543626	166072	17/06/2021	25,41	25,15	6,85	6,62	3,97	3,71	X	
1400	A182F55 8" WN 150 RF SCH 10S 125-250AARH	25	557039	166072	17/06/2021	25,35	25,13	6,82	6,81	3,86	3,61	X	
1420	A182F55 6" WN 300 RF SCH 10S 125-250AARH	15	555083	166072	17/06/2021	25,53	25,22	6,89	6,58	3,78	3,66	X	
1440	A182F55 6" WN 150 RF SCH 10S 125-250AARH	20	555083	166072	17/06/2021	25,37	25,26	6,81	6,64	3,90	3,74	X	

NOTE(s): PAGE 1 OF 2

SIGNATURES

OPERATOR	QUALITY CONTROL SUP.	CLIENT(S) INSPECTOR(S)
Gianni Buttara Level II	Lino Uberti Level III Officine AMBROGIO MELESI & C. s.r.l. 20813 CORNOVA	

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.

POSITIVE MATERIAL IDENTIFICATION REPORT

FABRICATOR Officine Ambrogio Melesi & C.S.r.l.	PROJECT TITLE	MATERIAL GRADE ASTM A182 F55	TIMING OF PMI EXECUTION After final marking	PROCEDURE MELESI QC 017	REPORT REF. PMI 166072
MELESI REF. N° 68053	PURCHASE ORDER PH021077	MATERIAL COLOR CODING	ANALYZER X-Ray Spectro	CALIBRATION DATE 17/06/2021	DATE OF TEST 17/06/2021

ITEM NO.	MATERIAL DESCRIPTION	PIECES TESTED	HEAT	MTC CERTIFICATE NO.	MTC DATE	ANALYSIS Cr Max (%)	Cr Min (%)	Ni Max (%)	Ni Min (%)	Mo Max (%)	Mo Min (%)					RESULTS ACCEPTED	REJECTED
						28,00	24,00	8,00	6,00	4,00	3,00						
1459	A182F55 8" WN 150 RF STD/40S 125-250AARH	30	503083	166872	17/06/2021	25,44	25,28	8,04	6,77	3,85	3,72					X	

NOTE(s): PAGE 2 OF 2

SIGNATURES

OPERATOR	QUALITY CONTROL SUP.	CLIENT(s) INSPECTOR(s)
Gionni Bittara Level II	Lino Uberti Level III Officine AMBROGIO MELESI & C. s.r.l. 23813 ERENOVA	

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.
Largo De Vecchi 11
23813 Cortenova (LC)
Italy
Phone: +39.0341.98341
Fax: +39.0341.983498 / 7
E-mail: info@melesi.it
Web site: www.melesi.it
Cap.Soc/Share Cap. 6500.000 Lv.
P.IVA - C.F. - R.I. Lecco
IT 02231830138
R.E.A. n. LC-106835
N.Meccan./Export n. LC005080

17 June 2021

Certificate Nr. M895

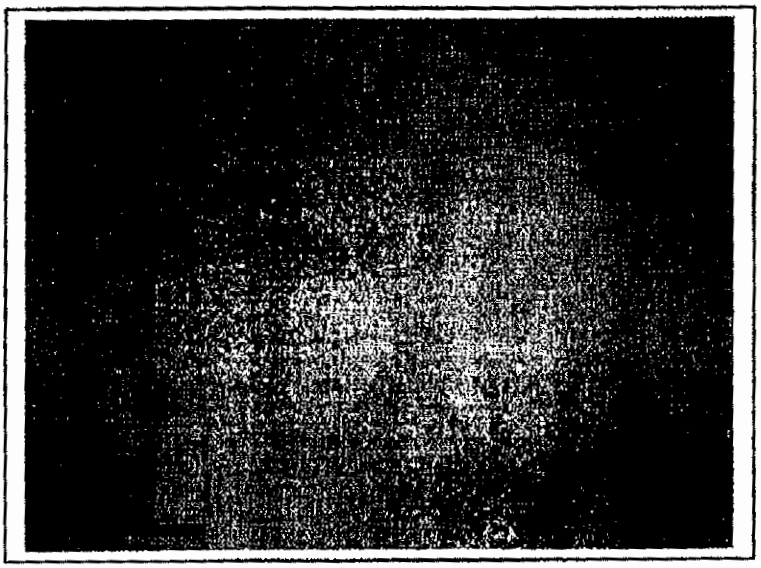
MICROSTRUCTURE

SAMPLE OF ASTM A182 F55 HEAT 555083 P71

THE RESULTS OF METALLOGRAPHIC EXAMINATION SHOW A REGULAR STRUCTURE FREE FROM INTERMETALLIC PHASES AND PRECIPITATES AS SHOWN ON BELOW PHOTO.

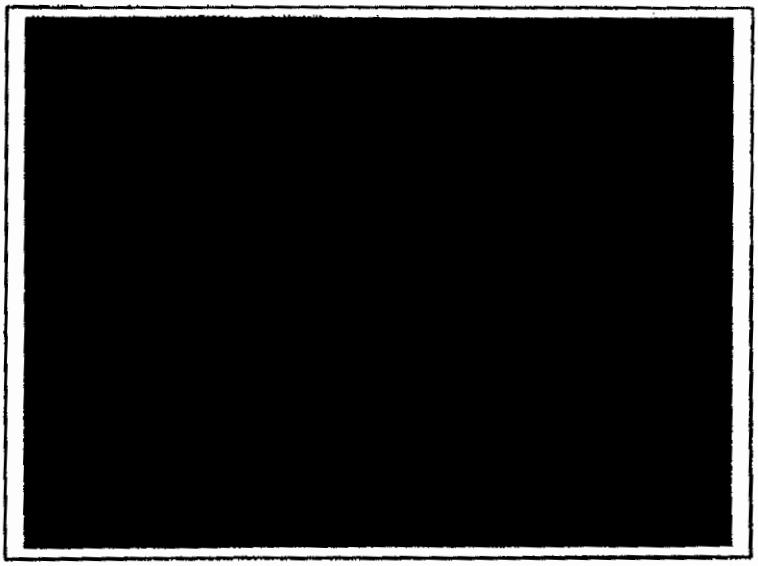
FERRITE CONTENT ACC. TO ASTM E562 = 49%
TEST PERFORMED ON ONE SECTION ETCHED 10% OXALIC ACID ELECTROLYTIC AND 20% NAOH ELECTROLYTIC ACCORDING TO ASTM E407
30 FIELDS EXAMINED, 16 POINTS (4x4 SQUARE GRID, 40x40mm) PER FIELD
TEST ACCORDING TO ISO 17781

MAGNIFICATION : 500X



ETCHING: 10% OXALIC ACID ELECTROLYTIC

Q. C.



Q. C.

ETCHING: 10% OXALIC ACID ELECTROLYTIC+ 20% NAOH ELECTROLYTIC

officine ambrogio melesi
25813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
Tel. +39.0341.98341
Fax +39.0341.983496/7
info@melesi.it
FLANGE E FORGIATI
FLANGES AND FORGINGS

PROVA CORROSIONE
CORROSION TEST

NR.	R2787	DATA DATE	
PAG. SHEET	1/1	OAM JOB COMMESSA	68053
ORDINE ORDER	PH021077	CLIENTE CUSTOMER	

SPECIFICA SPECIFICATION: ASTM G48 METHOD A

NOTE NOTES: LOCATION: TRASV T/2

POS. ITEM	Q.TA' Q.TY	DESCRIZIONE DESCRIPTION	COLATA HEAT	NOTE REMARKS
1306	20	A182 F55 4" BL 300 RF	555083	P71
1400	15	A182 F55 4" WN 300 RF SCH 10S	555083	P71
1410	20	A182 F55 4" WN 300 RF STD/40S	555083	P71
1420	40	A182 F55 6" BL 150 RF	555083	P71
1440	20	A182 F55 6" WN 150 RF SCH 10S	555083	P71
1450	30	A182 F55 6" WN 150 RF STD/40S	555083	P71

DIMENSIONI CAMPIONE START SPECIMEN DIMENSION		CONDIZIONI PROVA TEST CONDITIONS	
LUNGHEZZA LENGHT	49,95	TEMP. DI PROVA TEST TEMPERATURE	50°C
LARGHEZZA WIDTH	24,88	DURATA PROVA (H) PERIOD (H)	24
SPESSORE THICKNESS	9,90	ANGOLO / MANDRINO ANGLE / JIG	
SEZIONE (mm^2) SECTION	3.967	SOLUZIONE TEST SOLUTION	900ml whater tipo IV (H_2O) + 100g ferric chloride ($FeCl_3 \cdot 6H_2O$)
PESO INIZIALE (g) INITIAL WEIGHT	98,384		

RISULTATO DELLA PROVA
TEST RESULT

PESO FINALE (g) FINAL WEIGHT		PERDITA PESO (g) WEIGHT LOSS		CORROSIONE (g/m^2) CORROSION	
	98,384		0,000		0,03

ESITO ESAME AL MICROSCOPIO A 20 X OPTICAL MICROSCOPE EXAMINATION AT 20 X RESULTS			
	ASSENZA DI CORROSIONE PUNTIFORME NO PITTING ATTACK	< 1 g/m2	CONFORME CONFORM

NOTE REMARKS: Pickling on specimen for 5 minutes at 60 ° C in 20% HNO3 + 5% HF solution

QUALITY CONTROL	INSPECTOR	CUSTOMER
T.S. - Officine Ambrogio Melesi		

officine alfieri maggio
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
P.o. box 11
Tel 0341 98.341 ris.aut.
Fax 0341 90.15.06 - 90.14.88
FLANGE E FORGIATI

RAPPORTO ESAME ULTRASUONI
ULTRASONIC TEST REPORT

Nr.	Data / Date	Pag / Sheet	Commessa / Job
15050	17/06/21	1 / 1	66053
Ordine / Order		Cliente / Customer	
PH021077		"	

Specifica / Specification
ASTM A388

Criteri di accettazione / Acceptance criteria
ASME VIII, Div 1, Appendix 12

Procedura / Procedure
UT02 REV 2 ED 1

Stadio di controllo / Inspection phase
After final h.t. machined before drilling

Pos Item	Q.tà Quantity	Descrizione Description		Colata Heat	Cond. Superficiali Surface status
1230	25	A182F55 1 1/2" WN 150 RF STD/40S	125-250AARH	557008	LAVORATO/MACHINED
1300	20	A182F55 3" WN 150 RF SCH 10S	125-250AARH	557529	LAVORATO/MACHINED
1330	10	A182F55 3" WN 300 RF SCH 10S	125-250AARH	557009	LAVORATO/MACHINED
1340	20	A182F55 3" WN 300 RF STD/40S	125-250AARH	557009	LAVORATO/MACHINED
1380	20	A182F55 4" WN 150 RF STD/40S	125-250AARH	557009	LAVORATO/MACHINED
1400	15	A182F55 4" WN 300 RF SCH 10S	125-250AARH	555083	LAVORATO/MACHINED
1440	20	A182F55 6" WN 150 RF SCH 10S	125-250AARH	555083	LAVORATO/MACHINED
1450	30	A182F55 6" WN 150 RF STD/40S	125-250AARH	555083	LAVORATO/MACHINED
1480	25	A182F55 8" WN 150 RF SCH 10S	125-250AARH	557009	LAVORATO/MACHINED
1530	5	A182F55 10" WN 150 RF SCH 10S	125-250AARH	537832	LAVORATO/MACHINED
1550	5	A182F55 12" WN 300 RF SCH 10S	125-250AARH	543526	LAVORATO/MACHINED

APPARECCHIO / INSTRUMENT

Tipo / Type	Matricola / Serial Number	Costruita da / Manufactured by
USN 60	01H3B6	GE

SONDE / PROBES - Amplificazione durante esame / Amplification during examination +6 dB

Tipo Type	Costruita da Manufactured by	Matricola S.N.	Misura Size	Angolo Angle	Frequenza Frequency	Ampl. di regolazione Setting ampl.
B2 S EN	GE Sensing&Inspection Technologies	500036-60948	Diam. 24 mm		2 MHz	
SEB2 E	GE Sensing&Inspection Technologies	57487-50712	6 X 20 mm		2 MHz	
MWB45-2E	GE Sensing&Inspection Technologies	56921-500041	8 X 9 mm	45°	2 MHz	
MSEB2 E	GE Sensing&Inspection Technologies	57481-500083	3.5 x 10 mm		2 MHz	

CAVI / CABLES

Tipo Type	Lunghezza Lenght
RG 174 D	2 mt

CALIBRAZIONE / CALIBRATION

- [X] DGS Diagramma / DGS Diagram
- [ ] DAC
- [X] Eco di riferimento / Reference point echo + 6 db
- [X] Blocchi di calibrazione / Calibration blocks — Notch V 60° - Depth < 3% T
- [ ] Blocco di riferimento V2 / Reference block V2
- [ ] Blocco di riferimento V1 / Reference block V1

Riflettore di riferimento / Reference reflector
DGS Deq 3-6 mm notch< 3% T

Segnale di riferimento / Reference amplitude
DGS Deq 3-6 mm notch< 3% T

Accoppiante / Coupling
Olio / Oil

NOTE / NOTES
Conform to acceptance criteria

RISULTATI / RESULTS
Conforme

FIRME / SIGNATURES

OPERATORI / OPERATORS	SUPERVISORE C.Q. / QUALITY CONTROL SUP.
CALIZZI GIORGIO Lev. II	UBERTI LINO Lev. II
ENTE COLLAUDATORE / INSPECTION AUTHORITIES	ISPETTORE CLIENTE / CUSTOMER INSPECTOR

officine meccaniche
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
P.o. box 11
Tel 0341 98.341 rie.aut.
Fax 0341 90.15.06 - 90.14.88
FLANGE E FORGIATI

CERTIFICATO CONTROLLO CON LIQUIDI PENETRANTI
LIQUID PENETRANT TEST

Nr.	Data / Date	Pag / Sheet	Commessa / Job
15048	17/08/21	1 / 1	68083
Ordine / Order		Cliente / Customer	
PH021077			

Specifica / Specification
ASTM A961/E165 ASME V Art.6

Criteri di accettazione / Acceptance criteria
ASME VIII Div.1, Appendix 8

Procedura / Procedure
PT 01 - Rev. 1 Ed. 2

Stadio di controllo / Inspection phase
After final h.t. machined before drilling

Pos Item	Q.tà Quantity	Descrizione Description		Colata Heat	Cond. Superficiali Surface status
1300	20	A182F55 3" WN 150 RF SCH 10S	125-250AARH	557529	FINITO/FINISHED
1330	10	A182F55 3" WN 300 RF SCH 10S	125-250AARH	557009	FINITO/FINISHED
1340	20	A182F55 3" WN 300 RF STD/40S	125-250AARH	557009	FINITO/FINISHED
1380	20	A182F55 4" WN 150 RF STD/40S	125-250AARH	557009	FINITO/FINISHED
1400	15	A182F55 4" WN 300 RF SCH 10S	125-250AARH	555083	FINITO/FINISHED
1440	20	A182F55 6" WN 150 RF SCH 10S	125-250AARH	555083	FINITO/FINISHED
1450	30	A182F55 6" WN 150 RF STD/40S	125-250AARH	555083	FINITO/FINISHED
1480	25	A182F55 8" WN 150 RF SCH 10S	125-250AARH	557009	FINITO/FINISHED
1530	5	A182F55 10" WN 150 RF SCH 10S	125-250AARH	537832	FINITO/FINISHED
1550	5	A182F55 12" WN 300 RF SCH 10S	125-250AARH	543526	FINITO/FINISHED

TECNICA D'ESAME / EXAMINATION TECHNIQUE

- [ ] Fluorescente / Fluorescent
- [x] Contrasto colore / Color constract
- [ ]
- [x] Lavabile con acqua / Water washable
- [ ] Rimovibile con solvente / Solvent removable
- [ ]

FASI / STEPS	PRODOTTI / PRODUCTS - TIPO / TYPE FABBRICANTE / MANUFACTURER	LOTTO N. / BATCH NR.
Pulizia / Cleaning	Solvente/Cleaner CGM (R2.60 velnet solnet)	
Applicazione penetrante / Penetrant application	CGM (R2.71 RED "WW")	20/324
Rimozione eccesso penetrante / Excess penetrant removal	Acqua/Water Pressione/Pressure <275 kPa (40psi) Temperature/Temperature <40°C	
Asciugatura / Drying	Asciugatura con stracci / Wiping	
Applicazione rilevatore / Developer application	CGM (R.82 ROTRIVEL "U" / white)	21/131

TECNICA D'ESAME / EXAMINATION TECHNIQUE

Tempo di penetrazione / Penetrant dwell time	20 min
Tempo di sviluppo / Developer dwell time	12 min

ATTREZZATURA DI ILLUMINAZIONE / LIGHTING EQUIPMENT

>1076 Lux

NOTE / NOTES

No defects
Examination performed on 10% of pieces

RISULTATI / RESULTS

Conforme

FIRME / SIGNATURES	
OPERATORI / OPERATORS	SUPERVISORE C.Q. / QUALITY CONTROL SUP.
CAMINADA VALERIO Lev. II	UBERTI LINO Lev. II
ENTE COLLAUDATORE / INSPECTION AUTHORITIES	ISPETTORE CLIENTE / CUSTOMER INSPECTOR

Heat code	QTY	Description
60418	60,89	PIPE -SMLS 6" SCH-40S STANDARD ASTM A790_UNS S32750 ASME B36.10/19

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RECEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 1 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

TTI - TUBACEX TUBOS INOXIDABLES

Registro Mercantil de Alava, Tomo 587, Folio 189, Hoja VI 2885 - N.I.F. A-01140227

Tres cruces, 8
01400 Llodio (Alava)
SPAIN

TL: 946721350
FAX: 946725062
E-MAIL:

CUSTOMER DESCRIPTION/DESCRIPCIÓN DEL CLIENTE/KUNDENBEZEICHNUNG/COMMETTANT

CLIENT SOLD TO/SOLICITANTE/AUFTRAGGEBER/COMMETTANT

TSS
TUBACEX SERVICE SOLUTIONS, S.A.U
POLIGONO INDUSTRIAL SARATXO
01470 AMURRIO

SOLD TO:WITTE TUBE & PIPE SYSTEMS GMBH
SOLD P.O. REF.:EB0010676
SOLD ORDER REF.:391923
COPY NUMBER: 001

CLIENT ORDER/PEDIDO CLIENTE/KUNDEN AUFTRAGSNUMMER/NO.DE COMMANDE: I011212
SALES ORDER/PEDIDO VENTAS/AUFTRAGSNUMMER/NO.DE COMMANDE D'USINE:

AENOR Empresa Registrada UNE EN ISO 9001

AENOR Gestión Ambiental UNE EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 2 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

MATERIAL:SEAML. STAINL. STEEL TUBES/PIPES/TUBOS INOXIDABLES SIN SOLDADURA/TUBES INOX SANS SOUDURE/NAHTLOSE EDELSTAHLROHRE
HEAT-TREATED, PICKLED / TRATADO, DECAPADO / HYPERTREMPE, DECAPE / WÄRMEBEHANDELT, GEBEIZT, PASSIVATED AS PER ASTM A380 / PASIVADO SEGUN ASTM A380 / PASSIVÉ (ASTM A380) / PASSIVIERT (ASTM A380)
GRADE / ACERO / GRADE / WERKSTOFF: S32750,1.4410,
STANDARD / NORMA / STANDARD / LIEFERUNG NACH: ASME SECT.II PART.A SA790/SA790M-2021 ED.
ASTM A790/A790M-23
EN 10216-5:2021 TC2
EN 10297-2:2005
NORSOK M650 QTR N.4
NORSOK M630:2020 MDS D51 REV.6
CHECK ANALYSIS
CORROSION TESTED ACC. TO ASTM A262 PRACTICE E
CORROSION TESTED ACC. TO ASTM A923-22 TEST METHOD C
CORROSION TESTED ACC. TO ASTM G48 TEST METHOD A
CORROSION TESTED ACC. TO EN ISO 3651-2 PRACTICE B
SHELL ES/247 REV.2 EXCEPT DPI (TABLE 1) AND SURFACE REQUIREMENTS (POINT 9.1)
HYDROTEST
ANSI/NACE MR0103/ISO 17945:2015
ANSI/NACE MR0175/ISO15156-3:2020
QAD 68 REV.0
RTX_D51S REV.6
SHELL MESC SPE 74/014 FEBRUARY 2021 EXCEPT:
NO LIQUID PENETRANT TEST (POINT 14.12.1),
TENSILE TEST ONLY IN LONGITUDINAL DIRECTION.
ULTRASONIC TEST ONLY FOR LONGITUDINAL DEFECTS.
IMPACT TEST (if applicable): Lateral expansion 0.38 mm. minimum.
ULTRASONIC TEST ACC. TO ASTM A999/A999M / ASTM E213
TOLERANCES / TOLERANCIAS / TOLERANCES / TOLERANZEN NACH: ASME SECT.II PART.A SA999/SA999M-2021 ED.
ASTM A999/A999M-18
EN ISO 1127/03.2019 D2/T2
RANDOM LENGTHS / LARGOS VARIABLES / LONGUEUR COURANTE / EINGEENGTE LÄNGE 6.000/7.000 MM
PLAIN ENDS / LISOS / EXTRÉMITÉ D'EQUERRE / GLATTE ENDEN,
DIMENSIONS/DIMENSIONES/DIMENSIONS/DIMENSIONS: 168,28 X 7,11 MM - 6" SCH 40S
HOT FINISHED/ACABADOS EN CALIENTE/WARMGEFORMT/FINIS A CHAUD

Sales Item Pos Ped. AuftrgPos Usine Pos	Client Item Pos Clnt Kunde Pos Com. Pos	Delivery No Nº Entrega Lieferung Avis. d'exp	Lot No. Nº lote Los Nr. Lot d`inspection	Heat No Colada Schmelze Coulée	Pieces Piezas Stück Pcs	Weight Peso Gewicht Poids	Tot Lgth Long. Tot Gesamtlänge Tolength	Un Lgth Long. Un Längentyp Long. Un
20		8110078629	P2305144	60418	15	3.013 KG	100,39 M	6000-7000 MM

RAW MATERIAL/DATOS MATERIAL/VORMATERIAL/MATIERE PREMIERE

Heat Nr:	Supplier	Method
60418	ACERALAVA (SPAIN)	Electric furnace+AOD

AENOR ER Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 3 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

CHEMICAL COMPOSITION (%)/COMPOSICIÓN QUÍMICA (%)/CHEMISCHE ZUSAMMENSETZUNG (%)/COMPOSITION CHIMIQUE(%)

*L: Ladle C:Products

*	Heat	Seq	C	Mn	Si	P	S	Ni	Cr	Mo	Al	Cu
L	60418	1	0,013	0,73	0,410	0,025	0,0006	7,25	25,50	3,57	0,011	0,11
C	60418	2	0,013	0,72	0,410	0,024	0,0006	7,26	25,42	3,63	0,010	0,11
C	60418	3	0,013	0,72	0,410	0,025	0,0006	7,31	25,44	3,61	0,011	0,11

*	Heat	Seq	V	Nb	W	Co	N	Pren
L	60418	1	0,074	0,003	0,050	0,075	0,2765	41,7050
C	60418	2	0,072	0,002	0,048	0,077	0,2765	41,8230
C	60418	3	0,074	0,002	0,048	0,076	0,2765	41,7770

HEAT TREATMENT/TRATAMIENTO TÉRMICO/WÄRMEBEHANDLUNG/TRAITEMENT THERMIQUE

HIPERTEMPLADOS A 1100 °C , 12 min , Agua
SOLUTION ANNEALED AT 1100 °C , 12 min , WATER
HYPERTREMPES 1100 °C , 12 min , L' EAU
LOESUNGSGEGLUEHT 1100 °C , 12 min , Wasser

TENSILE TEST/TEST DE TENSIÓN/ESSAI TRACTION/ZUGVERSUCH

Lot No.	Sample	T	Rp0.2	Rp1.0	Rm	A2"	A5	Type	Spc.Type	Spc.Dim
		°C	*MPa*	*MPa*	*MPa*	*%*	*%*			*mm*
P2305144	1	20	600	684	827	43	41	L	S	20,25
	2	20	600	683	827	44	42	L	S	20,09

IMPACT TEST/TEST DE IMPACTO/RESILIENCE/KERBSCHLAGVERSUCH

Lot No.	Sample	T	Wspec	Ecv 1	Ecv 2	Ecv 3	Ecv AVG	Type	Le1	Le2	Le3	Shear 1	Shear 2	Shear 3
		°C	*mm*	*J*	*J*	*J*	*J*		*mm*	*mm*	*mm*	*%*	*%*	*%*
P2305144	1	-51	5,00	117	116	113	115	L	1,25	1,12	1,20	70	60	70

CORROSION ACCORDING TO ASTM A923 C/CORROSION DE ACUERDO ASTM A923 C/CORROSION SUIVANT ASTM A923 C/CORROSION ACCORDING TO ASTM A923 C

Lot No.	Sample	T	Pits-20x	Wloss	time
		°C		*MDD*	*Horas*
P2305144	1	50	N	2,6620	24,0

Corrosion test ASTM G48 practice A/Corrosión ASTM G48 práctica A/TEST DE CORROSION ASTM G48 practice A/LOCHFRASSTEST ASTM G 48 PR.A

Lot No.	Sample	T	Pits-20x	W.loss	time
		°C		*g/m2*	*Horas*
P2305144	1	50	N	0,2662	24,0

HARDNESS TEST/TEST DE DUREZA/DUREE/HÄRTEPRÜFUNG

Lot No.	Sample	0ºExt1	0ºExt2	0ºExt3	0ºInt1	0ºInt2	0ºInt3	90ºExt1	90ºExt2	90ºExt3	90ºInt1	90ºInt2	90ºInt3	180ºExt1
		HRC	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*
P2305144	1	20,9	23,8	23,0	18,4	19,8	15,6	23,8	20,4	21,3	20,5	21,6	23,4	24,6

Lot No.	Sample	180ºExt2	180ºExt3	180ºInt1	180ºInt2	180ºInt3	270ºExt1	270ºExt2	270ºExt3	270ºInt1	270ºInt2	270ºInt3
		HRC	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*
P2305144	1	22,9	23,0	21,6	23,0	21,3	15,2	23,2	20,5	20,3	22,5	19,7

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 4 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

FERRITE ACCORDING TO ASTM E 562/Contenido de Ferrita según ASTM E562/FERRITE SUIVANT ASTM E562/FERRIT ENTSPRECHEND ASTM E562

Lot No.	Sample	%Fer	Dev.Ferr
		%	%
P2305144	1	46,61	2,04

METALURGICAL TESTS/ENSAYOS METALÚRGICOS/METALLURGISCHE PRÜFUNGEN/ESSAIS METALLURGIQUES

ETCH STRUCTURE ACC. ASTM A923 MET.A: UNAFFECTED STRUCTURE. MATERIAL FREE FROM INTERMETALLIC PHASES AND PRECIPITATES. UNIFORM STRUCTURE ACROSS FULL WALL THICKNESS
EXAMEN DE MICROESTRUCUTRA DE ACUERDO A ASTM A923 MET.A: ESTRUCTURA NO AFECTADA. MATERIAL LIBRE DE FASES INTERMETALICAS Y PRECIPITADOS. ESTRUCTURA UNIFORME A TRAVES DEL ESPESOR.
ETCH STRUCTURE ACC. ASTM A923 MET.A: UNAFFECTED STRUCTURE. MATERIAL FREE FROM INTERMETALLIC PHASES AND PRECIPITATES. UNIFORM STRUCTURE ACROSS FULL WALL THICKNESS

INTERGRANULAR CORROSION TEST ACC. TO ASTM A262 PRACT."E": SATISFACTORY
ENSAYO DE CORROSION INTERGRANULAR DE ACUERDO A ASTM A262 PRACT.E: SATISFACTORIO
BESTÄNDIGKEIT GEGEN INTERKRISTALLINE KORROSION ENTSPRECHEND ASTM A262 PRACT.E: IN ORDNUNG
ESSAI DE CORR. INTERGR. SELON ASTM A262 PRACT.E:SATISFAISANT
INTERGRANULAR CORROSION TEST ACC.TO DIN EN ISO 3651-2 MET.B: SATISFACTORY
ENSAYO DE CORROSION INTERGRANULAR DE ACUERDO A ISO 3651-2 MET.B: SATISFACTORIO
BESTÄNDIGKEIT GEGEN INTERKRISTALLINE KORROSION ENTSPRECHEND ISO 3651-2 MET."B": IN ORDNUNG
ESSAI DE CORR. INTERGR. SELON ASTM ISO 3651-2 MET."B":SATISFAISANT

NON-DESTRUCTIVE TESTS/ENSAYOS NO DESTRUCTIVOS/ZERSTÖRUNGSFREIE PRÜFUNGEN/ESSAIS NON DESTRUCTIFS

FERRITE CONTENT DETERMINED BY FISCHER FERRITOSCOPE TO 100% OF PRODUCTS
CONTENIDO EN FERRITA MEDIDO CON FERRITOSCOPIO SOBRE EL 100% DEL MATERIAL.
Ferritescope-Test auf 100% des Materials.

100% ULTRASONIC TEST ACC. TO ASTM A999 / E213: SATISFACTORY
100% ENSAYO DE ULTRASONIDOS DE ACUERDO A ASTM A999 / E213: SATISFACTORIO
100% ULTRASCHALLPRÜFUNG NACH ASTM A999 / E.213:IN ORDNUNG
100% ESSAI D´ULTRASON D'ACCORD A ASTM A999 / E.213: SATISFAISANTE

100% ULTRASONIC TEST ACC. TO EN 10246-7, U2C: SATISFACTORY
100% ENSAYO DE ULTRASONIDOS DE ACUERDO A EN 10246-7, U2C: SATISFACTORIO
100% ULTRASCHALLPRÜFUNG NACH EN 10246-7, U2C:

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 5 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

IN ORDNUNG
100% ESSAI D´ULTRASON D'ACCORD A EN 10246-7, U2C: SATISFAISANTE
POSITIVE MATERIAL IDENTIFICATION TEST ON EACH TUBE/PIPE BY
"X-RAY-FLUORESCENCE-ANALYZER": SATISFACTORY
VERIFICACION DEL GRADO DE ACERO EN CADA TUBO MEDIANTE "ANALIZADOR DE
FLUORESCENCIA DE RAYOS X": SATISFACTORIO
VERWECHSLUNGSPRUEFUNG AN JEDEM ROHR MIT
"RÖNTGEN-FLUORESZENZ-ANALYSATOR": IN ORDNUNG
VERIFICATION DE LA NUANCE SUR CHAQUE TUBE PAR
"X-RAY-FLUORESCENCE-ANALYZER": SATISFAISANT

HYDROSTATIC PRESSURE TESTED AT 190 bar, 2800 PSI DURING 5 SEC ON EACH
TUBE/PIPE: SATISFACTORY
ENSAYO HIDROSTÁTICO A 190 bar, 2800 PSI DURANTE 5 SEC EN CADA TUBO:
SATISFACTORIO
WASSERDRUCKPRÜFUNG BEI 190 bar, 2800 PSI HALTEZEIT 5 SEC JE ROHR: IN
ORDNUNG
ESSAI DE PRESSION HYDROSTATIQUE À 190 bar, 2800 PSI PENDANT 5 SEC SUR
CHAQUE TUBE: SATISFAISANT

DIMENSIONAL CHECKING ON EACH TUBE: SATISFACTORY
INSPECCION DIMENSIONAL AL 100% DE LOS TUBOS SATISFACTORIA
100% MASSKONTROLLE: O.B.
VERIFICATION DIMENTIONNELLE AU 100% DES TUBES, SATISFAISANTE

VISUAL INSPECTION ON EACH TUBE: SATISFACTORY
INSPECCION VISUAL AL 100% DE LOS TUBOS, SATISFACTORIA
100% BESIGCHTIGUNG: O.B.
EXAMEN VISUEL AU 100% DES TUBES, SATISFAISANT

TECHNOLOGICAL TESTS/ENSAYOS TECNOLÓGICOS/TECHNOLOGISCHE PRÜFUNGEN/TECHNOLOGICAL TESTS

FLATTENING TEST: SATISFACTORY
APLASTADO S.NORMA: SATISFACTORIO
RINGFALTVERSUCH: IN ORDNUNG
ESSAI D'APLATISSEMENT: SATISFAISANT

RING TENSILE TEST: SATISFACTORY

TRACCION DE ANILLO: SATISFACTORIO
RINGZUGVERSUCH: IN ORDNUNG
ESSAI DE TRACTION A L'ANNEAU: SATISFAISANT

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI
TUBACEX
GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 6 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

MARKING/ETIQUETADO/KENNZEICHNUNG/MARKSTEXT

TX2 TX1 TUBACEX 168,28 X 7,11 MM - 6" SCH 40S ASME SA790 ASTM A790 EN 10216-5 TC2 EN 10297-2 S32750 1.4410 HFD HF SMLS HEAT/ PMI-AV LOT NO/MADE IN SPAIN

REMARKS/OBSERVACIONES/ANMERKUNG/REMARQUES

NO MERCURY, MERCURY COMPOUNDS OR MERCURY BEARING INSTRUMENTS AND/OR EQUIPMENT HAVE BEEN USED ALONG MANUFACTURING AND INSPECTION PROCESS.
DURANTE LOS PROCESOS DE FABRICACIÓN E INSPECCIÓN NO SE HA USADO MERCURIO NI INSTRUMENTOS Y/O EQUIPOS CONTENIENDO MERCURIO O CON COMPONENTES DE MERCURIO.
KEINE QUEKSILBER, BZW. QUECKSILBERVERUNREINIGTES KOMPONENTEN ODER KUGELLAGERINSTRUMENTE UND/ODER GERÄTE SIND BENUTZT WORDEN PRODUKTIONS UND BESICHTIGUNGSPROZESS.
IL N'A PAS ÉTÉ FAIT USAGE DE MERCURE, DE COMPOSÉS CONTENANT DU MERCURE OU DE MATÉRIAUX ET/OU D'INSTRUMENT CONTENANT DU MERCURE TOUT AU LONG DES ÉTAPES DE FABRICATION ET DU PROCESSUS D'INSPECTION ET DE CONTRÔLE.

NO WELDING OR WELD REPAIRS WERE MADE
SIN REPARACION POR SOLDADURA
KEINE SCHWEISSBEARBEITUNG WURDE VORGENOMMEN
SANS RÉPARATION AVEC SOUDURE
MATERIAL MANUFACTURER APPROVED BY TÜV SÜD Industrie Service GmbH
(NOTIFIED BODY 036)TO ISSUE CERTIFICATES OF SPECIFIC PRODUCT CONTROL IN
ACCORDING TO PRESSURE EQUIPMENT DIRECTIVE 2014/68/EU ANNEX 1 POINT 4.3.
FABRICANTE DE MATERIALES APROBADO POR TÜV SÜD Industrie Service GmbH (ORGANISMO NOTIFICADO 0036) PARA LA EMISION DE CERTIFICADOS ESPECIFICOS DE CONTROL DE PRODUCTO DE ACUERDO AL ANEXO 1, PUNTO 4.3 DE LA DIRECTIVADE EQUIPOS A PRESION 2014/68/EU.
WERKSTOFFHERSTELLER MIT BERECHTIUNG ZUR AUSSTELLUNG VON BESCHEINIGUNGEN ÜBER SPEZIFISCHE PRÜFUNGEN AN DEN WERKSTOFFEN IM GELTUNGSBEREICH DER ZERTIFIZIERUNG UND IN ÜBEREINSTINSTIMMUNG MIT DER DRUCKGERÄTERICHTLINIE 2014/68/EU UND DEN ZUGRUNDE LIEGENDEN SPEZIFIKATIONEN ENTSPR. DER BENANNTEN STELLE NR.0036, TÜV SÜD Industrie Service GmbH
PRODUCTEUR DU MATERIEL APPROUVE PAR TÜV SÜD Industrie Service GmbH N.B. 0036) POUR EMISSION DES CERTIFICATS SPECIFIQUE DE CONTROLE DE PRODUIT SELON LA DIRECTIVE DES EQUIPES A PRESION 2014/68/EU ANNEXE 1 POINT 4.3.

MATERIAL CHARACTERISTICS COMPLY WITH POINT 7.5 OF ANNEX I TO PED BY HAVING AN ELONGATION AFTER RUPTURE AT TENSILE TEST NO LESS THAN 14% AND A BENDING RUPTURE ENERGY AT IMPACT TEST NO LESS THAN 27J AT 20ºC.
LAS CARACTERISTICAS DEL MATERIAL CUMPLEN CON LOS REQUISITOS DEL PUNTO 7.5 DE LA DIRECTIVA PED POR TENER UN ALARGAMIENTO TRAS ROTURA EN EL ENSAYO DE TRACCION NO INFERIOR AL 14% Y PO DE TRACCION NO INFERIOR AL 14% Y POR TENER UNA RESISTENCIA AL IMPACTO NO INFERIOR A 27 J A 20º C.
DIE WERKSTOFF-WERTE ENTSPRECHEN PUNKT 7.5. DER DGRL, ANHANG 1, MIT EINERBRUCHDEHNUNG = 14% IM NORMGEMÄSS DURCHGEFÜHRTEN ZUGVERSUCH UND DER KERBSCHLAGARBEIT = 27J AN EINER ISO - v PRO PROBE BEI EINER TEMPERATUR VON HÖCHSTENS 20ºC
LES CARACTERISTIQUES DU MATERIEL, AYANT UN ALLONGEMENT APRES RUPTURE A L'ESSAI DE TRACTION NON INFERIEUR DU 14% ET UNE RESISTENCE A LA FLEXION PAR CHOC A 20ºC NON INFERIEUR A 27J, SONT CONFORMES AUX PRESCIPTIONS DU PONT 7.5 DE L'ANNEXE I DE PED.

MATERIAL IS FREE OF RADIATION CONTAMINATION
EL MATERIAL ESTA LIBRE DE CONTAMINACION POR RADIACIONES
MATERIAL IS FREI VON RADIOAKTIVITÄT
MATÉRIEL LIBRE DE POLUTION RADIOACTIVE

AENOR ER Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TUBACEX GROUP

STRUCTURE EXAMINATION

MTC / Certificate
748412

MATERIAL IDENTIFICATION / IDENTIFICACIÓN DEL MATERIAL

Lot No. / Num Lote	**P2305144**	**Dimension** / Dimensión	168,28 x 7,11 mm - 6'SCH 40
Heat / Colada	60418	**Grado de acero /** Steel grade	S32750

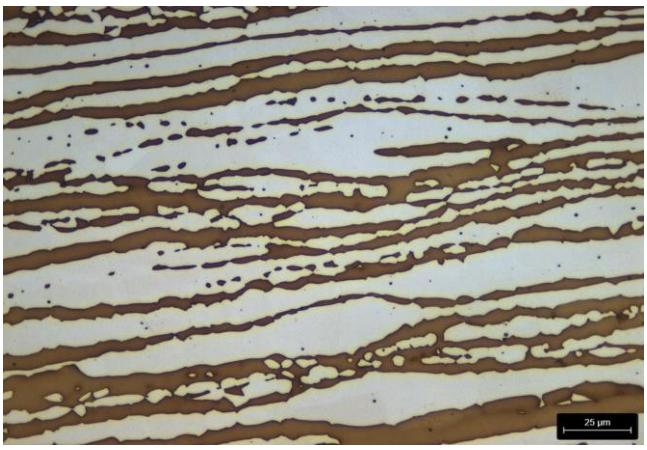
Type Of test / Tipo de Ensayo:	**MICROSTRUCTURE EVALUATION**

RESULTS / RESULTADO

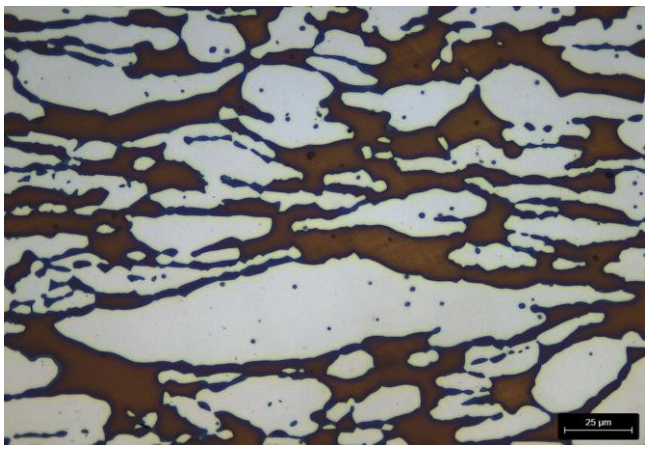
Result: The microestructure is formed by austenite and ferrite. The presence of intermetallic phases or precipitates is not observed. Uniform structure across full wall thickness Etching method according to ASTM E-407.

Resultado: la microestructura está compuesta por austenita y ferrita. No se observa la presencia de fases intermetálicas y precipitados. Estructura uniforme a través de todo el espesor. Método de ataque según ASTM E-407.

GRAPHICS RECORDS / REGISTROS FOTOGRÁFICOS:



Dir: LONGITUDINAL / MAG: 500X /



Dir: TRANSVERSAL / MAG: 500X /

Irene Castro
Responsable del Laboratorio
Laboratory Manager

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

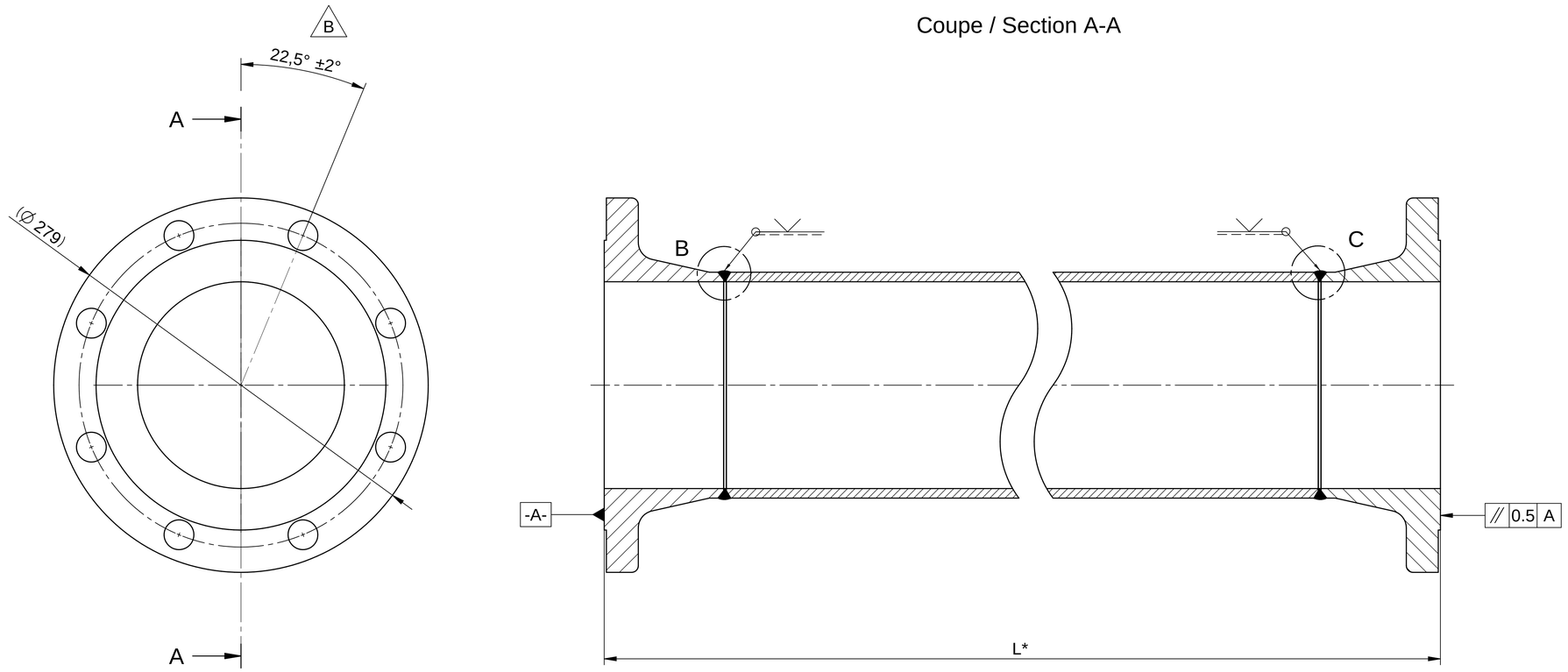
A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

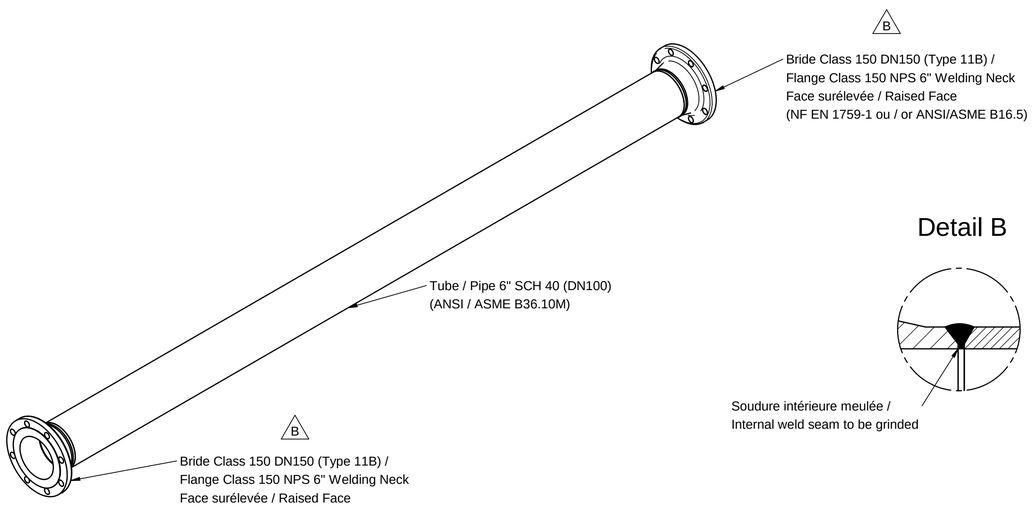
Item
#50C
Description
EXTENSION BODY 6IN AV7
PCM Reference
W-004942060257WP

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

SRCI & P2MI	**Traçabilité Matière -** *Material Traceability* ***Affaire PO070-24-07599***			**Ref SRCI :** **24121-01**
PLAN **DRAWING**	**DESIGNATION**	**MATIERE** **MATERIAL**	**N° COULEE** **HEAT N°**	**REP**
W-004942-B	Flange 6" 150# WN RF - SCH40S	SUPERDUPLEX	E161501 / E141482 555083	**1** **2**
W-004942-B	Pipe 6" SCH40S	SUPERDUPLEX	60418	**3**
W-004942-B	Pipe 6" SCH40S	SUPERDUPLEX	60418	**3**

Coupe / Section A-A

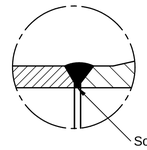




Detail B

Soudure intérieure meulée /
Internal weld seam to be grinded

Detail C



Soudure intérieure meulée /
Internal weld seam to be grinded

* : Pour la longueur L se référer au code article :
W-004942**XXX*** où **XXX** est la longueur en cm
Exemple : L = 900 donc XXX = 090 / L = 1500 donc XXX = 150
** : For length L refer to part code :*
*W-004942**XXX**** *where **XXX** is the length in cm*
Example : L = 900 so XXX = 090 / L = 1500 so XXX = 150
Tolerance L :
L < 500 = ± 0.2
500 ≤ **L** < 1000 = ± 0.3
1000 ≤ **L** < 1500 = ± 0.5
L ≥ 1500 = ± 1

Casser les arêtes vives / *Smooth sharp angles*

B	THOMAS	Voir / See : item B			CHABERT	07/01/2019	
Rev.	Par / By	Objet / Subject		FNC / NCR	Vérifié par / Checked by	Le / On	

PCM keep it moving

Rue René Moineau
49 123 Champtocé/Loire
FRANCE
Phone : +33 (0)1.77.68.31.00
www.pcm.eu

RALLONGE 6"

EXTENSION 6"

Type	AV7							
Masse / *Weight*	101.25 kg / 223.20 lbs	Tol.	ISO 2768-mH	√	Ra 3.2	Mat.	Voir Ordre Fabrication / Achat *See Manufacturing / Purchasing Order*	
Par / *By*	THOMAS	Le / *On*	01/10/2018	Feuille *Sheet*	Format	N°	W-004942	Rev. B
				1 / 1	A1			

Tous droits réservés, diffusion ou reproduction interdite sans autorisation écrite de PCM.
All rights reserved, reproduction or distribution prohibited without written permission from PCM.

OFFICINE SANTAFEDE s.r.l.
CAP SOC. € 156.000 INT. VERS
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 - TEL. +39 0341 988411
FAX +39 0341 979919
www.officinesantafede.com
info@officinesantafede.com
info@pec.officinesantafede.com

A104995

CERTIFICATO DI COLLAUDO/TEST CERT. EN 10204/3.1		Cliente/Customer
N.	DATA/DATE	--
D030203	14/07/2020	

DESCRIZIONE/DESCRIPTION

MATERIAL CONFORMING TO ASME SECTION II PART A ED. 2017 AND TO NACE MR0175/ISO 15156 -2015 & NACE MR0103-2016

Item 0020 Commessa 20C0321 Ordine/Order PH018999 AMENDMENT 1 Item Cli./Cust.Item 200 Tag 1: H060WN1004

COLATA/HEAT	MATERIALE/MATERIAL	ACCIAIERIA/STEEL PLANT	N/QTY	DESCRIZIONE/DESCRIPTION	TT/HT
E141482	A/SA 182 F55	OUTOKUMPU	8	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2

Analisi Chimiche / Chemical tests

C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Ca	B	C.Eq.
0,019	0,590	0,310	0,026	0,001	25,100	6,910	3,540			0,670				0,287			

Prove Meccaniche / Mechanical Tests

SNERVAMENTO Yield strength (RP)	ROTTURA Tensile Strength (RM)	ALLUNGAMENTO A%-ELONG	STRIZIONE Z%-REDUCT	TIPO TYPE	TEMP.C°	TEST 1	TEST 2	TEST 3	MEDIA AVERAGE	DUREZZA HARDNESS HB

Note PREN: 41,37
W=0,58
SEE ATTACHED TEST N. 1252/20

VERIFIED TRUE COPY OF ORIGINAL

Item 0020 Commessa 20C0321 Ordine/Order PH018999 AMENDMENT 1 Item Cli./Cust.Item 200 Tag 1: H060WN1004

COLATA/HEAT	MATERIALE/MATERIAL	ACCIAIERIA/STEEL PLANT	N/QTY	DESCRIZIONE/DESCRIPTION	TT/HT
E161501	A/SA 182 F55	OUTOKUMPU	2	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2

Analisi Chimiche / Chemical tests

C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Ca	B	C.Eq.
0,012	0,570	0,290	0,026	0,001	25,430	6,830	3,640			0,590				0,279			

Prove Meccaniche / Mechanical Tests

SNERVAMENTO Yield strength (RP)	ROTTURA Tensile Strength (RM)	ALLUNGAMENTO A%-ELONG	STRIZIONE Z%-REDUCT	TIPO TYPE	TEMP.C°	TEST 1	TEST 2	TEST 3	MEDIA AVERAGE	DUREZZA HARDNESS HB

Note PREN: 41,90
W=0,63
SEE ATTACHED TEST N. 1320/20

Item 0020.A Commessa 20C0321 Ordine/Order PH018999 AMENDMENT 1 Item Cli./Cust.Item 201 Tag 1: H020BL1000

COLATA/HEAT	MATERIALE/MATERIAL	ACCIAIERIA/STEEL PLANT	N/QTY	DESCRIZIONE/DESCRIPTION	TT/HT
E130620	A/SA 182 F55	OUTOKUMPU	8	ASME B16.5 A/SA 182 F55 150 BL RF 2"	2

Analisi Chimiche / Chemical tests

C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Ca	B	C.Eq.
0,018	0,590	0,340	0,023	0,001	25,550	7,150	3,810			0,590				0,280			

Prove Meccaniche / Mechanical Tests

SNERVAMENTO Yield strength (RP)	ROTTURA Tensile Strength (RM)	ALLUNGAMENTO A%-ELONG	STRIZIONE Z%-REDUCT	TIPO TYPE	TEMP.C°	TEST 1	TEST 2	TEST 3	MEDIA AVERAGE	DUREZZA HARDNESS HB
562,0	853,0	27,6	51,2	KV(J)	-50	141,00	147,00	152,00	146,667	236 241

Note PREN: 42,60
W=0,51
SEE ATTACHED TEST N. 1273/20

ALL MATERIAL DELIVERED AS PER ABOVE PO IS IN ACCORDANCE WITH THE RELATIVE SPECIFICATIONS.

a) **Trattamento termico / Heat treatment**
1) Normalizzato a 920°C e raffreddato in aria calma
Normalized at 920°C and cooled in still air
2) Solubilizzato / *Solution treated and quenched*
3) Bonificato / *Quenched and tempered*
4) Normalizzato e rinvenuto / *Normalized and tempered*
5) Vedi descrizione / *See description*

b) I valori delle analisi chimiche sono ricavati dal certificato di Acciaieria
Chemical analisys values are taken from base certificate
c) C. E. = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15
d) Prove secondo ASTM A 370 / *Test conforming to ASTM A 370*
e) Diametro provino 12,5 mm. / *Specimen diameter 12,5 mm.*
Lunghezza provino 50 mm / *Specimen length 50 mm*
Reduced specimens may be used when necessary
f) Dimensioni del provino 10x10x55 mm.
Specimen dimensions 10x10x55 mm.

Controllo visivo e dimensionale soddisfacente / *Satisfactory visual and dimensional check*
Acciaio elaborato al forno elettrico e calmato / *Killed steel made by electric furnace*

TRADE MARK	REDATTO DA / PRINTED BY	APPROVATO DA / APPROVED BY	ENTE COLLAUDATORE / INSPECTING AGENCY
SF	QC M. BENEDETTI	QUALITY MANAGER M. SACCHI	

OFFICINE SANTAFEDE s.r.l.
CAP SOC. € 156.000 I.V. VERS
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 - TEL. +39 0341 988411
FAX +39 0341 979919
www.officinesantafede.com
info@officinesantafede.com
info@pec.officinesantafede.com

CERTIFICATO DI COLLAUDO/TEST CERT. EN 10204/3.1		Cliente/Customer
N.	DATA/DATE	
D030203	14/07/2020	

DESCRIZIONE/DESCRIPTION

MATERIAL CONFORMING TO ASME SECTION II PART A ED. 2017 AND TO NACE MR0175/ISO 15156 -2015 & NACE MR0103-2016

PMI 100%CHECK PASSED

MATERIAL MANUFACTURED WITH AOD PROCESS

HEAT TREATMENT: SOLUTION TREATED TEMP 1050°C-10/+30°c
QUENCHING TEMP. BELOW 260°C
QUENCHING TRANSFER TIME: 60 SEC MAX
SOAKING TIME: 2min/1mm thh.
HOLDING TIME: SOAKING TIME + 2 hours
FOR F55
HEAT TREATMENT: SOLUTION TREATED TEMP 1120°C-10/+30°c
QUENCHING TEMP. BELOW 260°C
QUENCHING TRANSFER TIME: 60 SEC MAX
SOAKING TIME: 2min/1mm thh.
HOLDING TIME: SOAKING TIME + 2 hours

BASE+FINAL PRODUCT IS FROM WEST -EUROPA
FORGING RATIO: 4:1 MIN

FOR F51 QTR 01
FOR F55 QTR 03

MANUFACTURER APPROVED PED 2014/68/EU SECTION 4.3

ALL MATERIAL DELIVERED AS PER ABOVE PO IS IN ACCORDANCE WITH THE RELATIVE SPECIFICATIONS.

a) Trattamento termico / *Heat trestment*
1) Normalizzato a 920°C e raffreddato in aria calma
Normalized at 920° C and cooled in still air
2) Solubilizzato / *Solution treated and quenched*
3) Bonificato / *Quenched and tempered*
4) Normalizzato e rinvenuto / *Normalized and tempered*
5) Vedi descrizione / *See description*

b) I valori delle analisi chimiche sono ricavati dal certificato di Acciaio a
Chemical analsys values are taken from base corldicate
c) C. E. = C + Mn/6 - (Cr + Mo + V)/5 - (Ni + Cu)/15
d) Prove secondo ASTM A 370 / *Test conforming to ASTM A 370*
e) Diametro provino 12,5 mm. / *Specimen diameter 12,5 mm.*
Lunghezza provino 50 mm / *Specimen lengt) 50 mm*
Reduced specimens may be used when necessary
f) Dimensioni del provino 10x10x55 mm.
Specimen dimensions 10x10x55 mm.

Controllo visivo e dimensionale soddisfacente / *Satisfactory visual and dimensional check*
Acciaio elaborato al forno elettrico e calmato / *Killed steel made by electric furnace*

TRADE MARK	REDATTO DA / PRINTED BY	APPROVATO DA / APPROVED BY	ENTE COLLAUDATORE / INSPECTING AGENCY
SF	QC M. BENEDETTI	QA/QC MANAGER M. SACCHI	

OFFLINE

SANTAFEDE s.r.l.

PRODUCT ANALYSIS CERTIFICATE

Customer	Order	Certificate	Date
	PH018999 AMENDMENT 1	D030203	14/07/2020

Equipment	Description	Frequency
Laboratory	CHECK ANALYSIS	1 test each heat

Chemical tests **Analysis %**

Heat	Material	C	Mn	Si	P	S	Cr	Ni	Mo	Ti	V	Cu	Al	Sn	Nb	N	Fe	W	Ta	Co	Ca	B	Sb	As	Pb	Ceq	PREN
735109	A/SA 182 F51	0,017	1,511	0,265	0,025	0,000	22,572	5,402	3,069							0,178					0,000	0,0000					35,548
844301	A/SA 182 F51	0,020	1,594	0,511	0,019	0,000	22,556	5,558	3,139	0,006	0,003	0,393	0,009		0,181	0,155					0,000	0,0000					35,395
E140647	A/SA 182 F51	0,024	1,245	0,478	0,020	0,001	22,377	5,553	3,279							0,178											36,046
E142031	A/SA 182 F51	0,018	1,144	0,380	0,019	0,001	22,183	5,616	3,265							0,184											35,902
E150009	A/SA 182 F51	0,018	1,229	0,477	0,024	0,001	22,561	5,487	3,313							0,186											36,470
E151766	A/SA 182 F51	0,018	1,180	0,434	0,026	0,001	22,546	5,492	3,203							0,179											35,980
E170383	A/SA 182 F51	0,021	1,296	0,506	0,020	0,001	22,175	5,611	3,113							0,170											35,168
E181981	A/SA 182 F51	0,018	1,296	0,453	0,023	0,001	22,522	5,531	3,299							0,186											36,385
E182198	A/SA 182 F51	0,020	1,228	0,430	0,025	0,001	22,209	5,663	3,258							0,177											35,792
E182255	A/SA 182 F51	0,022	1,441	0,507	0,022	0,001	22,168	5,650	3,301							0,179											35,925
E190132	A/SA 182 F51	0,021	1,178	0,526	0,023	0,001	22,098	5,461	3,289							0,194											36,056
E190587	A/SA 182 F51	0,021	1,199	0,521	0,023	0,001	22,845	5,619	3,229							0,186											36,477
E191174	A/SA 182 F51	0,018	1,249	0,516	0,023	0,001	22,295	5,603	3,264							0,177											35,896
E191217	A/SA 182 F51	0,020	1,202	0,460	0,023	0,001	22,352	5,470	3,308							0,195											36,388
E191543	A/SA 182 F51	0,019	1,260	0,528	0,025	0,001	22,662	5,682	3,329							0,190											36,686
E200025	A/SA 182 F51	0,020	1,120	0,566	0,023	0,001	22,116	5,679	3,277							0,187											35,922
05040	A/SA 182 F55	0,020	0,501	0,526	0,022	0,000	25,769	6,980	3,672			0,565				0,269		0,684									42,191
185029	A/SA 182 F55	0,013	0,550	0,351	0,020	0,000	24,678	6,869	3,777			0,642				0,258		0,570									41,270
242086	A/SA 182 F55	0,020	0,628	0,591	0,028	0,001	25,552	7,046	3,548			0,590				0,246		0,606			0,000	0,0000					41,196
52391	A/SA 182 F55	0,022	0,563	0,436	0,017	0,000	24,853	7,615	3,537			0,629				0,241		0,630									40,381
57530	A/SA 182 F55	0,016	0,610	0,436	0,022	0,000	24,603	7,293	3,738			0,585				0,245		0,664									40,858
94114	A/SA 182 F55	0,018	0,677	0,512	0,030	0,001	25,534	6,531	3,763	0,003	0,064	0,524	0,012		0,016	0,250		0,569			0,001	0,0030					41,952
E121404	A/SA 182 F55	0,018	0,586	0,360	0,025	0,001	24,935	6,905	3,588			0,659				0,282		0,672									41,287
E121750	A/SA 182 F55	0,015	0,687	0,329	0,024	0,001	24,827	7,057	3,528			0,689				0,292		0,560									41,141
E130620	A/SA 182 F55	0,019	0,609	0,340	0,023	0,001	25,108	7,280	3,821			0,598				0,280		0,517									42,197
E141482	A/SA 182 F55	0,020	0,609	0,315	0,026	0,001	25,822	6,909	3,560			0,663				0,294		0,580									42,274
E142078	A/SA 182 F55	0,015	0,732	0,281	0,026	0,001	25,694	6,678	3,518			0,594				0,288		0,579									41,911
E161501	A/SA 182 F55	0,013	0,566	0,294	0,027	0,001	25,437	6,943	3,613			0,579				0,288		0,527									41,968

OFFICINE SANTAFEDE s.r.l.

PRODUCT ANALYSIS CERTIFICATE

E181G50	A/SA 182 F55	0,015	0,635	0,371	0,023	0,001	25,668	6,761	3,529			0,548				0,275		0,500								41,714

IT. 60 (H. [illegible]) – 120 (H. EK1478) – 130 (H. [illegible]) – 140 (H. [illegible])
IT. 160 (H EK1483) – 170 (H. EK1482) – 200 (H. EK1482)



OFF. SANTAFEDE s.r.l.
CORTABBIO DI PRIMALUNA (LC)

OFFICINE SANTAFEDE S.R.L.
23819 CORTABBIO DI PRIMALUNA (LECCO)
www.officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregere 1 23819 Cortabbio di Primaluna LC

Materiale *Material#* ASME SA/ASTM A182-20 F55 | Colata *Heat#* E141482 | Descrizione *Description#* | Rapporto Nr. *Report Nr.* 1252/20

PROVA DI TRAZIONE — *TENSILE TEST*

Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodo prova *Test Method*	Dimensioni *Dimensions* Ø [mm]	Lo [mm]	Posizione *Position*	Temp. *Temp.* [°C]	Snervamento *Yield Strength offset method* Rp0,2% [MPa]		Rottura *Tensile Strength* Rm [MPa]		Allungam. *Elongation after fracture* A [%]		Strizione *Area Reduc.* Z [%]		Ratio Rp/Rm	Risultato *Result*
20TS0942	2668	ASTM A370-19e1	6,25	25,04	T	23,4	(≥ 550)	568,4	(750 ÷ 895)	795,9	(≥ 25)	40,0	(≥ 45)	77	0,71	COMPLIANT
20TS0942	2668															COMPLIANT
20TS0942	2668															COMPLIANT

PROVA DI DUREZZA — *HARDNESS TEST*

Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodo prova *Test Method*	Tipo *Type*	Durezza *Hardness* Valore Singolo *Single Value*		Media *Average*		Risultato *Result*
20TS0942	2668	ASTM E10-18	HBW 2,5/187,5 (≤ 301)	250	246	244	246,7	COMPLIANT
20TS0942	2668	ASTM E18-20	ROCKWELL HRC (≤ 32)	22,2	22,3	22,6	22,4	COMPLIANT

PROVA DI RESILIENZA — *IMPACT TEST* — *Capacity* 450 J — *Striker radius* 8 mm

Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodo di prova *Test Method*	Dimensioni *Dimensions* SxWxL [mm]	Posizione *Position*	Temp. *Temp.* [°C]	Tipo *Type*	Energia Assorbita [J] *Valore Singolo Single Value*				*Abs. Energy* Media *Average*		Area Duttile [%] *Valore Singolo Single Value*				*Shear Area* Media *Average*		Esp. Laterale [mm] *Valore Singolo Single Value*				*Lateral Exp.* Media *Average*		Risultato *Result*
20TS0942	2669	ASTM E23-18	10x10x55	1/2 thk L	-51	KV	249,9	249,6	250,1	(≥ 50)	249,9	(≥ 65)	100	100	100	(info)	100,0	(info)	2,31	2,30	2,33	(≥ 0,38)	2,31	(info)	COMPLIANT
20TS0942	2670	ASTM E23-18	10x10x55	1/2 thk T	-51	KV	218,1	240,2	222,4	(≥ 35)	226,9	(≥ 45)	100	100	100	(info)	100,0	(info)	2,11	2,20	2,15	(≥ 0,38)	2,15	(info)	COMPLIANT

Tra parentesi i criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04, giudizio di conformità espresso senza considerare l'incertezza di misura / *in brackets acceptance criteria requested by customer in accordance to COLL03 rev.04, statement of conformity without consider the measurement uncertainty*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020				

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

° Dati forniti dal cliente / Campionamento eseguito a cura del cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
° Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.R.L.

23835 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA 1 - TEL. +39 0341 685111 - FAX +39 0341 374913
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1668 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*	Rapporto Nr. *Report Nr.* 1253/20

PROVA DI "PITTING" IN FERRO CLORURO *FERRIC CHLORIDE PITTING TEST* ASTM G48 Met. A

Dati Iniziali *Initial Data*

Prova Nr. *Test Nr.*	Provino *Specimen* ID	Metodo di prova *Test Method* ASTM	Posizione *Position*	Lunghezza *Length* [mm]	Larghezza *Width* [mm]	Spessore *Thickness* [mm]	Area *Area* [cm^2]	Decapaggio *Pickling*
20TS0942	2671	G48-11(2015) Met. A	T	50,02	25,06	10,09	40,22	20% HNO_3 + 5% HF, 60°C for 5 minutes

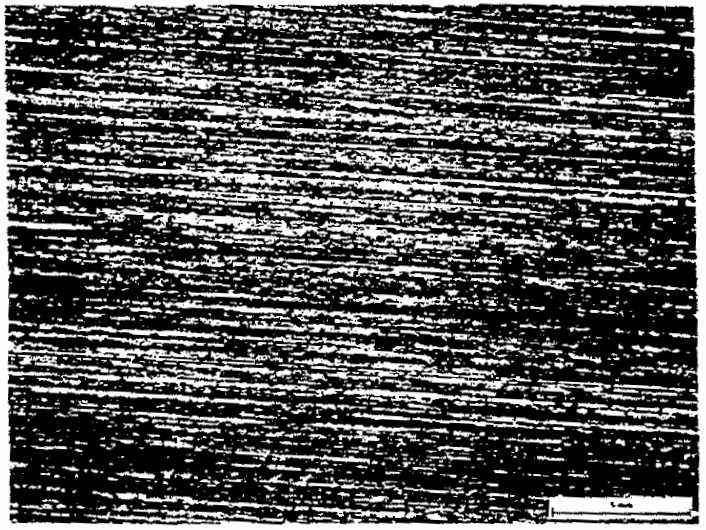
Condizioni Prova *Test Conditions*

Temperatura *Temperature* (°C)	Durata Prova *Test Period* [h]	Soluzione *Solution*	Finitura Superficiale *Surface finish* [grit]
50 ± 0,5	24	100 g of reagent grade ferric chloride, $FeCl_3 \cdot 6H_2O$, in 900 ml of Type IV reagent water (about 6 % $FeCl_3$ by mass)	120

Risultati Prova *Test Results*

Peso iniziale *Initial weight* [g]	Peso finale *Final weight* [g]	Perdita di peso *Weight loss* [g]	Velocità di corrosione *Corrosion rate* [g/m^2]	
98,5609	98,5608	0,0001	≤ 1	0,0

Esame visivo a 20X
Visual examination at 20X



Esame Pits
Pits examination
No pit riscontrati nel campione a 20X
No pits found in the specimen at 20X

Profondità media pits [µm]
Average pits depth [µm]
None

Massima profondità pits [µm]
Maximum pits depth [µm]
None

Densità dei pits [pit/cm^2]
Pits density [pit/cm^2]
None

Risultati
Results
COMPLIANT

Criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04, giudizio di conformità espresso senza considerare l'incertezza di misura / *Acceptance criteria requested by customer in accordance to COLL03 rev.04, statement of conformity without consider the measurement uncertainty*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H – Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*
25/05/2020	08/06/2020 ÷ 09/06/2020	09/06/2020			

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
 # Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.r.l.
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA 1 - TEL. +39 0341 995111 - FAX +39 0341 995199
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*		Rapporto Nr. *Report Nr.*	1256/20

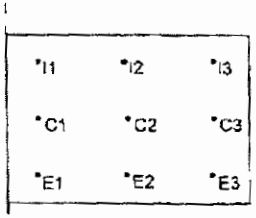
PROVA DI DUREZZA SU SEZIONE MACRO / HARDNESS TEST ON MACRO SECTION

	Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodi di Prova *Test Methods ASTM*	Tipo di Durezza *Hardness Type*
Dati Iniziali *Initial Data*	20TS0942	2673	E18-20	ROCKWELL HRC

Section A

Risultati Prova *Test Results*

INT 1 mm		*1/2 thk*		*EXT* 1 mm	
I1	23,1	C1	22,2	E1	23,4
I2	23,6	C2	22,6	E2	23,6
I3	23,9	C3	22,9	E3	23,3



Requisito Durezza *Hardness required*	≤ 32	ROCKWELL HRC	Risultati *Results*	COMPLIANT

Criteri di accettabilità richiesti dal cliente in accordo a COL03 rev.06, giudizio di conformità espresso senza considerare l'incertezza di misura / Acceptance criteria requested by customer in accordance to COL03 rev 04, statement of conformity without consider the measurement uncertainty

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk – Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020				

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

#Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
#Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.R.L.
23819 CORTABBIO DI PRIMALUNA (LECCO)
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*		Rapporto Nr. *Report Nr.*	1254/20

ESAME METALLOGRAFICO E DETERMINAZIONE DELLA FRAZIONE DI VOLUME TRAMITE CONTEGGIO MANUALE SISTEMATICO DEI PUNTI — ASTM E562

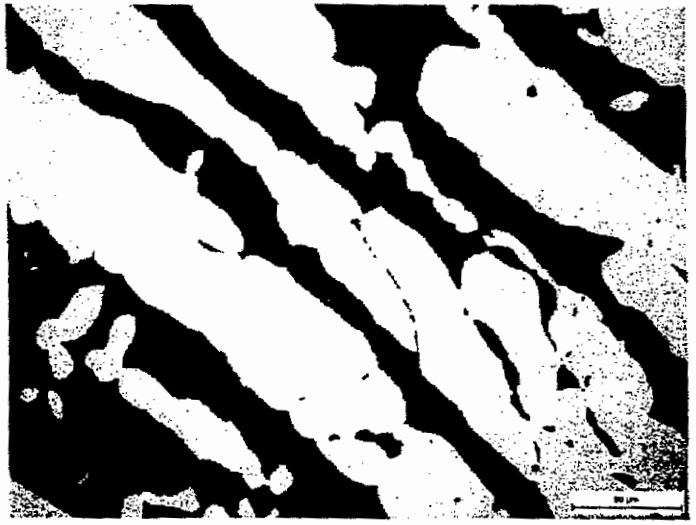
METALLOGRAPHIC EXAMINATION AND DETERMINING VOLUME FRACTION BY SYSTEMATIC MANUAL POINT COUNT

	Prova Nr. *Test Nr.*	Provino *Specimen ID*	Metodi di Prova *Test Methods* ASTM	Posizione *Position*
Dati Iniziali *Initial Data*	20TS0942	2672	E562-19, E3-11(2017) + E407-07(2015)e1	T

	Descrizione griglia *Grid description*	Numero campi *Number of fields*	Spaziatura Campi *Fields spacing*	Numero sezioni *Number of sections*
Condizioni Prova *Test Conditions*	25 points	30	Random	1 (20x20 mm)

Esame al microscopio a 400X *Microscope examination at 400X* — Attacco *Etching*: Electrolytic with 40 g of reagent grade NaOH to 100 g of distilled water (40% NaOH) — ASTM E407 Etchant nr. 220

Risultati Prova *Test Results*				
Frazione volume della Ferrite *Ferrite volume fraction*	49,4	%	(40 55%) *Required*
Deviazione Standard *Standard Deviation (s)*	4,1	%	
Intervallo di Confidenza *Confidence interval (95% CI)*	1,5	%	
Accuratezza Relativa *Relative Accuracy (% RA)*	3,1	%	
Struttura *Structure*	Austenite e Ferrite *Austenite and Ferrite*		
Risultati *Results*	COMPLIANT		



RAW DATA (%)	
52	48
53	47
54	50
46	46
48	42
51	52
49	48
56	56
54	55
47	51
44	42
48	46
46	54
42	54
50	50

Tra parentesi i criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04, giudizio di conformità espresso senza considerare l'incertezza di misura / *in brackets acceptance criteria requested by customer in accordance to COLL03 rev.04, statement of conformity without consider the measurement uncertainty*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020			

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presentati sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
 # Data provided by the customer / Sampling performed by customer / Test results only refers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory

OFFICINE SANTAFEDE S.r.l.
23815 CORTABBIO DI PRIMALUNA (LECCO)
www.officinesantafede.com - info@officinesantafede.com

RAPPORTO DI PROVA

TEST REPORT

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
LAB N° 1688 L

Cliente/Customer OFFICINE SANTAFEDE Srl Via Fregera 1 23819 Cortabbio di Primaluna LC

Materiale *Material#*	ASME SA/ASTM A182-20 F55	Colata *Heat#*	E141482	Descrizione *Description#*		Rapporto Nr. *Report Nr.*	1255/20

ESAME METALLOGRAFICO — *METALLOGRAPHIC EXAMINATION*

	Prova Nr. *Test Nr.*	Provino *Specimen ID*	Posizione *Position*	Metodi di Prova *Test Methods* ASTM
Dati Iniziali *Initial Data*	20TS0942	26/2	T	E3-11(2017) + E407-07(2015)e1

Condizioni Prova *Test Conditions*

Numero sezioni *Number of sections*: 1 (20x20 mm)

Esame al microscopio a 400X *Microscope examination at 400X* — Attacco *Etching*: Electrolytic with Oxalic Acid 10% + Electrolytic with 20 g of reagent grade NaOH to 100 g of distilled water (NaOH 20%) — ASTM E407 Etchant nr. 13 (a) + 220

Risultati Prova *Test Results*

Struttura *Structure*: Austenite e Ferrite

Precipitati assenti, Carburi assenti, Fasi intermetalliche assenti, Nitruri assenti

Austenite and Ferrite

Precipitates absence, Carbides absence, Intermetallic phases absence, Nitrides absence



Risultati *Results*: COMPLIANT

Criteri di accettabilità richiesti dal cliente in accordo a COLL03 rev.04 / *Acceptance criteria requested by customer in accordance to COLL03 rev.04*

Legenda T = Trasversale L = Longitudinale Rd = Radiale B = Base H = Collare thk = Spessore | *Legend T = Transversal L = Longitudinal Rd = Radial B = Base H = Hub thk = Thickness*

Materiale ricevuto *Material received*	Data Esecuzione Prova *Test Execution Date*	Data Rapporto *Report Date*	Ispettore *Inspector*	Ispettore *Inspector*	Cliente finale *End Customer*	Cliente finale *End Customer*
25/05/2020	09/06/2020	09/06/2020				

Responsabile Laboratorio
Laboratory Manager
ANDREA GALBUSERA

* Dati forniti dal cliente / Campionamento eseguito a cura del Cliente / I risultati presenti sono relativi ai soli campioni testati, come ricevuti / Il presente rapporto di prova non può essere riprodotto parzialmente senza l'approvazione scritta del laboratorio
* *Data provided by the customer / Sampling performed by customer / Test results only rojers to samples tested, as received / The present test report cannot be partially reproduced without the written approbation by the laboratory*

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

% FERRITE CONTENT REPORT

Nr. D03020:

CUSTOMER	ORDER	JOB
	PH018999 AMENDMENT 1	20C0321

SURFACE	INSTRUMENT	CALIBRATION	DESCRIPTION METHOD
MACHINED	Ferritoscope Fisher FMP30	Daily	4 READING EACH PIECE

PRODUCT

Item	Description	Q.ty	N Heat	Ferrite %
0001	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	5	E142078	51
0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	E141482	49
0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	8	E142078	48
0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	185029	50
0003	ASME B16.5 A/SA 182 F55 300 BL RF 1"	5	94114	50
0004	ASME B16.5 A/SA 182 F55 600 BL RF 1"	5	52391	47
0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	9	E181650	48
0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	6	E130620	53
0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	2	185029	51
0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	13	57530	47
0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	2	E130620	48
0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	3	94114	45
0009	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	5	E121404	51
0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	3	E121750	47
0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	2	05040	44
0012	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	30	E142078	46
0013	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	20	E142078	51
0014	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	10	E142078	50
0015	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	20	E181650	50
0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	1	E141482	48
0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	19	E181650	49
0017	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	10	E141482	45
0018	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	10	E181650	49
0019	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	10	E161501	51
0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	8	E141482	43
0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2	E161501	49
0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	4	242086	52
0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E130620	47
0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E141482	45
0023	ASME B16.5 A/SA 182 F51 150 BL RF 3/4"	20	E190132	49
0024	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1"	20	E182198	50
0025	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1" 1/2	5	735109	52
0026	ASME B16.5 A/SA 182 F51 150 BL RF 2"	40	E190132	48
0027	ASME B16.5 A/SA 182 F51 300 BL RF 2"	20	E191543	47
0028	ASME B16.5 A/SA 182 F51 150 BL RF 4"	15	E151766	49
0030	ASME B16.5 A/SA 182 F51 300 BL RF 6"	5	E182255	49
0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	1	E142031	52
0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	4	E170383	53
0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E140947	47
0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E150009	45
0034	ASME B16.5 A/SA 182 F51 2500 BL RTJ 1"	5	E191543	43
0035	ASME B16.5 A/SA 182 F51 300 WN RF 1/2" SCH 80S	10	844301	49
0036	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 40S	20	E181981	51
0037	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 80S	10	E181981	50
0038	ASME B16.5 A/SA 182 F51 600 WN RF 2" SCH 40S	20	E182198	50
0039	ASME B16.5 A/SA 182 F51 300 WN RF 3" SCH 10S	15	E191217	49
0040	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 10S	20	E190587	50
0041	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 40S	5	E190587	47
0042	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 80S	10	E190587	52

0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	4	E200025	51
0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	6	E191174	49

Pozzoli Michele		Invernizzi Irene	14/07/2020

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 986411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

POSITIVE MATERIAL IDENTIFICATION

Nr. D030203/2

CUSTOMER:
ORDER: PH018999 AMENDMENT 1
EQUIPMENT: NITON XL800 S

SAMPLING: Test All Forgings
DATE OF TEST: 14/07/2020

Test according to: PMI PROCEDURE COLL. 06

Item	Description	Heat	Material	Qtà
10	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	E142078	A/SA 182 F55	5
Tag	Tag 1: H005BL3000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
24,467	25,852	6,692	6,854	3,517	3,613	0,573	0,584										5	//

Item	Description	Heat	Material	Qtà
20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	185029	A/SA 182 F55	1
Tag	Tag 1: H010BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
25,925	25,925	6,921	6,921	3,781	3,781	0,572	0,572										1	//

Item	Description	Heat	Material	Qtà
20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E141482	A/SA 182 F55	1
Tag	Tag 1: H010BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
24,718	24,718	6,847	6,847	3,563	3,563	0,580	0,580										1	//

Item	Description	Heat	Material	Qtà
20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E142078	A/SA 182 F55	8
Tag	Tag 1: H010BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max										Accept	Reject
24,467	25,993	6,659	6,872	3,517	3,613	0,573	0,584										8	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
30	ASME B16.5 A/SA 182 F55 300 BL RF 1"	94114	A/SA 182 F55	5
Tag	Tag 1: H010BL3000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,004	25,378	6,426	6,557	3,733	3,797	0,571	0,590											5	//

Item	Description	Heat	Material	Qtà
40	ASME B16.5 A/SA 182 F55 600 BL RF 1"	52391	A/SA 182 F55	5
Tag	Tag 1: H010BL6000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,184	25,684	7,367	7,611	3,523	3,569	0,617	0,632											5	//

Item	Description	Heat	Material	Qtà
50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E130620	A/SA 182 F55	6
Tag	Tag 1: H030BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,779	25,818	7,056	7,180	3,780	3,847	0,501	0,515											6	//

Item	Description	Heat	Material	Qtà
50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E181650	A/SA 182 F55	9
Tag	Tag 1: H030BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,151	25,159	6,717	6,881	3,498	3,573	0,581	0,598											9	//

Item	Description	Heat	Material	Qtà
60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	185029	A/SA 182 F55	2
Tag	Tag 1: H040BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
25,628	25,925	6,779	6,921	3,781	3,791	0,572	0,572											2	//

Item	Description	Heat	Material	Qtà
60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	57530	A/SA 182 F55	13
Tag	Tag 1: H040BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,525	25,956	7,232	7,502	3,644	3,750	0,645	0,664											13	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	94114	A/SA 182 F55	3
Tag	Tag 1: H080BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,772	25,606	6,516	6,656	3,760	3,822	0,571	0,579											3	//

Item	Description	Heat	Material	Qtà
80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	E130620	A/SA 182 F55	2
Tag	Tag 1: H080BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,576	25,741	7,094	7,170	3,804	3,865	0,502	0,512											2	//

Item	Description	Heat	Material	Qtà
90	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	E121404	A/SA 182 F55	5
Tag	Tag 1: H020BL15J0			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,466	25,135	6,699	6,903	3,566	3,642	0,649	0,670											5	//

Item	Description	Heat	Material	Qtà
110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	05040	A/SA 182 F55	2
Tag	Tag 1: H010WN3004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,895	25,449	6,948	7,069	3,643	3,688	0,688	0,690											2	//

Item	Description	Heat	Material	Qtà
110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	E121750	A/SA 182 F55	3
Tag	Tag 1: H010WN3004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,394	25,550	6,801	6,949	3,514	3,588	0,541	0,557											3	//

Item	Description	Heat	Material	Qtà
120	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	E142078	A/SA 182 F55	30
Tag	Tag 1: H020WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,155	25,935	6,567	6,909	3,519	3,621	0,572	0,590											30	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 9884 1
FAX +39 0341 979919

Item	Description	Heat	Material	Qtà
130	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	E142078	A/SA 182 F55	20
Tag	Tag 1: H020WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,331	26,000	6,692	6,914	3,517	3,614	0,571	0,591									20	//

Item	Description	Heat	Material	Qtà
140	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	E142078	A/SA 182 F55	10
Tag	Tag 1: H020WN1008			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,171	25,993	6,659	6,872	3,517	3,613	0,572	0,584									10	//

Item	Description	Heat	Material	Qtà
150	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	E181650	A/SA 182 F55	20
Tag	Tag 1: H030WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,137	25,975	6,684	6,920	3,495	3,592	0,579	0,601									20	//

Item	Description	Heat	Material	Qtà
160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E141482	A/SA 182 F55	1
Tag	Tag 1: H040WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
25,811	25,811	6,888	6,888	3,603	3,603	0,571	0,571									1	//

Item	Description	Heat	Material	Qtà
160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E181650	A/SA 182 F55	19
Tag	Tag 1: H040WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,095	25,985	6,683	6,946	3,496	3,587	0,579	0,601									19	//

Item	Description	Heat	Material	Qtà
170	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	E141482	A/SA 182 F55	10
Tag	Tag 1: H040WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max									Accept	Reject
24,180	25,688	6,815	6,982	3,507	3,583	0,571	0,588									10	//

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
180	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	E181650	A/SA 182 F55	10
Tag	Tag 1: H040WN3001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,269	25,975	6,684	6,917	3,498	3,592	0,579	0,596											10	//

Item	Description	Heat	Material	Qtà
190	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	E161501	A/SA 182 F55	10
Tag	Tag 1: H060WN1001			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,510	25,886	6,703	6,937	3,607	3,701	0,522	0,540											10	//

Item	Description	Heat	Material	Qtà
200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E141482	A/SA 182 F55	8
Tag	Tag 1: H060WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,180	25,189	6,815	6,952	3,507	3,583	0,571	0,588											8	//

Item	Description	Heat	Material	Qtà
200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E161501	A/SA 182 F55	2
Tag	Tag 1: H060WN1004			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,686	24,756	6,703	6,925	3,680	3,700	0,524	0,535											2	//

Item	Description	Heat	Material	Qtà
201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	242086	A/SA 182 F55	4
Tag	Tag 1: H020BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,915	25,512	7,096	7,220	3,542	3,605	0,608	0,616											4	//

Item	Description	Heat	Material	Qtà
201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E130620	A/SA 182 F55	8
Tag	Tag 1: H020BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,866	25,952	7,012	7,272	3,775	3,834	0,504	0,512											8	//

OFFICINE
SANTAFEDE s.r.l

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

Item	Description	Heat	Material	Qtà
201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E141482	A/SA 182 F55	8
Tag	Tag 1: H020BL1000			

ALLOY CONTENT, WEIGHT PERCENT

Cr Min	Cr Max	Ni Min	Ni Max	Mo Min	Mo Max	W Min	W Max											Accept	Reject
24,180	25,189	6,815	6,952	3,507	3,583	0,571	0,588											8	//

PERFORMED	INSPECTOR	APPROVED	DATE
Pozzoli Michele		Invernizzi Irene	14/07/2020

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

ULTRASONIC EXAMINATION REPORT

UT N° UT703/2020

CUSTOMER	P.O.	JOB
1	PH018999 AMENDMENT 1	20C0321
SPECIFICATION	**PROCEDURE**	
ASTM A388 (ES 247 Tab.2)		
APPARATUS	**SURFACE CONDITION**	
Olympus EPOCH 650	Machined	
COUPLANT	**SENSITIVITY**	
FYp	DAC +6dB	
REFERENCE BLOCK	**NOTE**	
BCDS		

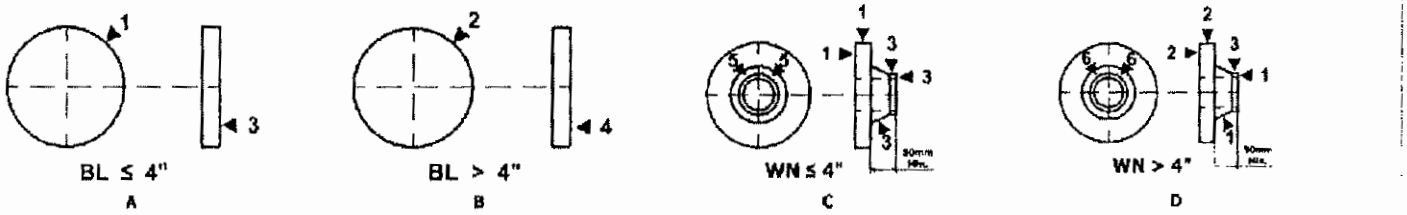
TRANSDUCERS

Position	Transducer Type	MHz	Straight	Angle	Dimension	Element	Serial	Trade
1	PF2 R-10	2	0°		Dia.10	Single		Panametrics
2	PF2 R-24	2	0°		Dia.24	Single		Panametrics
3	DL4R 3.5x10	4	0°		3,5x10	Double		Panametrics
4	DL4R 6x20	4	0°		6x20	Double		Panametrics
5	AM4R	4		45°	8x9	Single		Panametrics
6	AM2R	2		45°	20x22	Single		Panametrics

CALIBRATIONS

Calibration Type	Calibration Description
DAC-NOTCH	60Deg V-Notch, Depth <3%T mm
ECHO	Reference Echo

SCAN PLANS



ITEMS

Q.ty	Item	Object	Heat	Tag	Scanning
5	0001	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	E142078	H005BL3000	A
8	0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E142078	H010BL1000	A
1	0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	E141482	H010BL1000	A
1	0002	ASME B16.5 A/SA 182 F55 150 BL RF 1"	185029	H010BL1000	A
5	0003	ASME B16.5 A/SA 182 F55 300 BL RF 1"	94114	H010BL3000	A
5	0004	ASME B16.5 A/SA 182 F55 600 BL RF 1"	52391	H010BL6000	A
9	0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E181650	H030BL1000	A
6	0005	ASME B16.5 A/SA 182 F55 150 BL RF 3"	E130620	H030BL1000	A
2	0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	185029	H040BL1000	A
13	0006	ASME B16.5 A/SA 182 F55 150 BL RF 4"	57530	H040BL1000	A
2	0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	E130620	H080BL1000	B
3	0008	ASME B16.5 A/SA 182 F55 150 BL RF 8"	94114	H080BL1000	B
5	0009	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	E121404	H020BL15J0	A
2	0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	05040	H010WN3004	C
3	0011	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	E121750	H010WN3004	C
30	0012	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	E142078	H020WN1001	C

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)
VIA FREGERA, 1 – TEL. +39 0341 988411
FAX +39 0341 979919

Company with Quality System certified ISO 9001-2015 by IGQ

ULTRASONIC EXAMINATION REPORT — UT N° UT703/2020

ITEMS

Q.ty	Item	Object	Heat	Tag	Scanning
20	0013	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	E142078	H020WN1004	C
10	0014	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	E142078	H020WN1008	C
20	0015	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	E181650	H030WN1001	C
1	0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E141482	H040WN1001	C
19	0016	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	E181650	H040WN1001	C
10	0017	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	E141482	H040WN1004	C
10	0018	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	E181650	H040WN3001	C
10	0019	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	E161501	H060WN1001	D
8	0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E141482	H060WN1004	D
2	0020	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	E161501	H060WN1004	D
8	0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E130620	H020BL1000	A
8	0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	E141482	H020BL1000	A
4	0020.A	ASME B16.5 A/SA 182 F55 150 BL RF 2"	242086	H020BL1000	A
20	0023	ASME B16.5 A/SA 182 F51 150 BL RF 3/4"	E190132	J007BL1000	A
20	0024	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1"	E182198	J010BL15J0	A
5	0025	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1" 1/2	735109	J015BL15J00	A
40	0026	ASME B16.5 A/SA 182 F51 150 BL RF 2"	E190132	J020BL1000	A
20	0027	ASME B16.5 A/SA 182 F51 300 BL RF 2"	E191543	J020BL3000	A
15	0028	ASME B16.5 A/SA 182 F51 150 BL RF 4"	F151766	J040BL1000	A
5	0030	ASME B16.5 A/SA 182 F51 300 BL RF 6"	E182255	J060BL3000	B
1	0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	E142031	J080BL3000	B
1	0032	ASME B16.5 A/SA 182 F51 300 BL RF 8"	E170383	J080BL3000	B
1	0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	E150009	J120BL3000	B
1	0033	ASME B16.5 A/SA 182 F51 300 BL RF 12"	E140947	J120BL3000	B
5	0034	ASME B16.5 A/SA 182 F51 2500 BL RTJ 1"	E191543	J010BL25J0	A
10	0035	ASME B16.5 A/SA 182 F51 300 WN RF 1/2" SCH 80S	844301	J005WN3008	C
20	0036	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 40S	E181981	J015WN3004	C
10	0037	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 80S	E181981	J015WN3008	C
20	0038	ASME B16.5 A/SA 182 F51 600 WN RF 2" SCH 40S	E182198	J020WN6004	C
15	0039	ASME B16.5 A/SA 182 F51 300 WN RF 3" SCH 10S	E191217	J030WN3001	C
20	0040	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 10S	E190587	J040WN3001	C
5	0041	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 40S	E190587	J040WN3004	C
10	0042	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 80S	E190587	J040WN3008	C
4	0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	E200025	J080WN3004	D
6	0044	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	E191174	J080WN3004	D

ACCEPTABLE		REPORTABLE INDICATIONS
■ YES	☐ NO	No reportable indications

OPERATOR	INSPECTOR	APPROVED	DATE
Panepinto Samuele SNT/ACCTA Level II; EN ISO 9712 Level 2			14/07/2020 0.00.00

OFFICINE SANTAFEDE s.r.l.

FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

CERTIFICATO DI ESAME LIQUIDI PENETRANTI

DYE PENETRANT EXAMINATION CERTIFICATE

LP n° D030203/1

Mod. COLL PC 13 rev. 2

CLIENTE/Customer	ORDINE/Order	COMMESSA/Job
	PH018999 AMENDMENT 1	20C0321

SPECIFICA/Specification	PROCEDURA/Procedure
ASME VIII DIV:1 App.8	Off.Santafede Coll 09

CONDIZIONI SUPERFICIALI/Surface Condition	SUPERFICI ESAMINATE/Examinated Surface
Lavorata/Machined	100% superfici accessibili/accessibile surface

METODO/Method	
Contrasto Di Colore/Color Contrast	Lavabili con acqua/Water washable
SGRASSATORE/Cleaner	PENETRANTE/Penetrant
Acetone o equivalente/ Aceton or equivalent	DeltaFlux - RED PENETRANT HD
PULITORE/Remover	RILEVATORE/Developer
Acqua/Water	DeltaFlux - WHITE DEVELOPER HD

MINIMO TEMPO DI PENETRAZIONE/Minimum Penetration Time	TEMPO DI SVILUPPO/Developing Time
Minuti/Minute 10	Min 10 Max 30 Minuti/Minute

PRODOTTO/Product

CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0001	10	ASME B16.5 A/SA 182 F55 300 BL RF 1/2"	5	E142078
Tag	Tag 1: H005BL3000				
Conform	0002	20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	8	E142078
Tag	Tag 1: H010BL1000				
Conform	0002	20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	E141482
Tag	Tag 1: H010BL1000				
Conform	0002	20	ASME B16.5 A/SA 182 F55 150 BL RF 1"	1	185029
Tag	Tag 1: H010BL1000				
Conform	0003	30	ASME B16.5 A/SA 182 F55 300 BL RF 1"	5	94114
Tag	Tag 1: H010BL3000				
Conform	0004	40	ASME B16.5 A/SA 182 F55 600 BL RF 1"	5	52391
Tag	Tag 1: H010BL6000				
Conform	0005	50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	9	E181650
Tag	Tag 1: H030BL1000				
Conform	0005	50	ASME B16.5 A/SA 182 F55 150 BL RF 3"	6	E130620
Tag	Tag 1: H030BL1000				
Conform	0006	60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	13	57530
Tag	Tag 1: H040BL1000				

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Date
Pozzoli Michele, SNT TC 1A Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

PRODOTTO/Product					
CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0006	60	ASME B16.5 A/SA 182 F55 150 BL RF 4"	2	185029
Tag	Tag 1: H040BL1000				
Conform	0008	80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	3	94114
Tag	Tag 1: H080BL1000				
Conform	0008	80	ASME B16.5 A/SA 182 F55 150 BL RF 8"	2	E130620
Tag	Tag 1: H080BL1000				
Conform	0009	90	ASME B16.5 A/SA 182 F55 1500 BL RTJ 2"	5	E121404
Tag	Tag 1: H020BL1500				
Conform	0011	110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	2	05040
Tag	Tag 1: H010WN3004				
Conform	0011	110	ASME B16.5 A/SA 182 F55 300 WN RF 1" SCH 40S	3	E121750
Tag	Tag 1: H010WN3004				
Conform	0012	120	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 10S	30	E142078
Tag	Tag 1: H020WN1001				
Conform	0013	130	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 40S	20	E142078
Tag	Tag 1: H020WN1004				
Conform	0014	140	ASME B16.5 A/SA 182 F55 150 WN RF 2" SCH 80S	10	E142078
Tag	Tag 1: H020WN1008				
Conform	0015	150	ASME B16.5 A/SA 182 F55 150 WN RF 3" SCH 10S	20	E181650
Tag	Tag 1: H030WN1001				
Conform	0016	160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	19	E181650
Tag	Tag 1: H040WN1001				
Conform	0016	160	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 10S	1	E141482
Tag	Tag 1: H040WN1001				
Conform	0017	170	ASME B16.5 A/SA 182 F55 150 WN RF 4" SCH 40S	10	E141482
Tag	Tag 1: H040WN1004				
Conform	0018	180	ASME B16.5 A/SA 182 F55 300 WN RF 4" SCH 10S	10	E181650
Tag	Tag 1: H040WN3001				
Conform	0019	190	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 10S	10	E161501
Tag	Tag 1: H060WN1001				
Conform	0020	200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	2	E161501
Tag	Tag 1: H060WN1004				
Conform	0020	200	ASME B16.5 A/SA 182 F55 150 WN RF 6" SCH 40S	8	E141482
Tag	Tag 1: H060WN1004				

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Date
Pozzoli Michele, SNT TC 1A Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

OFFICINE SANTAFEDE S.r.l.
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

CERTIFICATO DI ESAME LIQUIDI PENETRANTI

DYE PENETRANT EXAMINATION CERTIFICATE

LP n° D030203/1

Mod. COLL PC 13 rev. 2

PRODOTTO/Product					
CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0020.A	201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	4	242086
Tag	Tag 1: H020BL1000				
Conform	0020.A	201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E130620
Tag	Tag 1: H020BL1000				
Conform	0020.A	201	ASME B16.5 A/SA 182 F55 150 BL RF 2"	8	E141482
Tag	Tag 1: H020BL1000				
Conform	0023	230	ASME B16.5 A/SA 182 F51 150 BL RF 3/4"	20	E190132
Tag	Tag 1: J007BL1000				
Conform	0024	240	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1"	20	E182198
Tag	Tag 1: J010BL15J0				
Conform	0025	250	ASME B16.5 A/SA 182 F51 1500 BL RTJ 1" 1/2	5	735109
Tag	Tag 1: J015BL15J00				
Conform	0026	260	ASME B16.5 A/SA 182 F51 150 BL RF 2"	40	E190132
Tag	Tag 1: J020BL1000				
Conform	0027	270	ASME B16.5 A/SA 182 F51 300 BL RF 2"	20	E191543
Tag	Tag 1: J020BL3000				
Conform	0028	280	ASME B16.5 A/SA 182 F51 150 BL RF 4"	15	E151766
Tag	Tag 1: J040BL1000				
Conform	0030	300	ASME B16.5 A/SA 182 F51 300 BL RF 6"	5	E182255
Tag	Tag 1: J060BL3000				
Conform	0032	320	ASME B16.5 A/SA 182 F51 300 BL RF 8"	1	E142031
Tag	Tag 1: J080BL3000				
Conform	0032	320	ASME B16.5 A/SA 182 F51 300 BL RF 8"	4	E170383
Tag	Tag 1: J080BL3000				
Conform	0033	330	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E140947
Tag	Tag 1: J120BL3000				
Conform	0033	330	ASME B16.5 A/SA 182 F51 300 BL RF 12"	1	E150009
Tag	Tag 1: J120BL3000				
Conform	0034	340	ASME B16.5 A/SA 182 F51 2500 BL RTJ 1"	5	E191543
Tag	Tag 1: J010BL25J0				
Conform	0035	350	ASME B16.5 A/SA 182 F51 300 WN RF 1/2" SCH 80S	10	844301
Tag	Tag 1: J005WN3808				
Conform	0036	360	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 40S	20	E181981
Tag	Tag 1: J015WN300M				

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Date
Pozzoli Michele, SNT TC 1A Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

OFFICINE SANTAFEDE s.r.l.
FLANGES MADE IN ITALY
23819 CORTABBIO DI PRIMALUNA (LECCO)

CERTIFICATO DI ESAME LIQUIDI PENETRANTI

DYE PENETRANT EXAMINATION CERTIFICATE

LP n° D030203/1

Mod. COLL PC 13 rev. 2

PRODOTTO/Product					
CONFORMITA'/ Conform	ITEM	ITEM CLI. / Cust. Item	DESCRIZIONE/Description	NCONTROLLI/ NTested	N COLATA/Heat n.
Conform	0037	370	ASME B16.5 A/SA 182 F51 300 WN RF 1" 1/2 SCH 80S	10	E181981
Tag	Tag 1: J015WN3008				
Conform	0038	380	ASME B16.5 A/SA 182 F51 600 WN RF 2" SCH 40S	20	E182198
Tag	Tag 1: J020WN6004				
Conform	0039	390	ASME B16.5 A/SA 182 F51 300 WN RF 3" SCH 10S	15	E191217
Tag	Tag 1: J030WN3001				
Conform	0040	400	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 10S	20	E190587
Tag	Tag 1: J040WN3001				
Conform	0041	410	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 40S	5	E190587
Tag	Tag 1: J040WN3004				
Conform	0042	411	ASME B16.5 A/SA 182 F51 300 WN RF 4" SCH 80S	10	E190587
Tag	Tag 1: J040WN3008				
Conform	0044	430	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	4	E200025
Tag	Tag 1: J080WN3004				
Conform	0044	430	ASME B16.5 A/SA 182 F51 300 WN RF 8" SCH 40S	6	E191174
Tag	Tag 1: J080WN3004				

NOTE/Notes
Nessuna indicazione registrabile/No registrable indication

ESEGUITO/Performed	ISPETTORE/Inspector	APPROVATO/Approved	DATA/Data
Pozzoli Michele, SNT TC 1A/ Level II UNI EN ISO 9712 Level 2		Valsecchi Enrico, SNT TC 1A Level II UNI EN ISO 9712 Level 2	14/07/2020

A108075

officine alberoglio
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.98341
Fax 0341.983498 - 983497
lino.uberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
INSPECTION CERTIFICATE
CERTIFICAT D'ESSAIS

N. 166072 | DATA / DATE 17/06/21 | SHEET / 1/3

EN 10204 3.1

ORDINE / ORDER / C.DE: PH021077

DATA / DATE: 13/01/21 | COMMESSA: 68053

N. RIF.	ITEM	N / QUANTITY	DESCRIZIONE / DESCRIPTION / DÉSIGNATION	NOTE
SI 266	1530	5	A182F55 10" WN 150 RF SCH 10S	125-250AARH P331 QTR Nr. 3 / MDS D54 / MS11
SI198	1550	5	A182F55 12" WN 300 RF SCH 10S	125-250AARH P369 QTR Nr. 3 / MDS D54 / MS12
SI247	1400	15	A182F55 4" WN 300 RF SCH 10S	125-250AARH P71 QTR Nr. 3 / MDS D54 / MS11
SI247	1440	20	A182F55 6" WN 150 RF SCH 10S	125-250AARH P71 QTR Nr. 3 / MDS D54 / MS11
SI247	1450	30	A182F55 6" WN 150 RF STD/40S	125-250AARH P71 QTR Nr. 3 / MDS D54 / MS11
SI251	1230	25	A182F55 1 1/2" WN 150 RF STD/40S	125-250AARH P1465 QTR Nr. 3 / MDS D54 / MS11
SI253	1330	10	A182F55 3" WN 300 RF SCH 10S	125-250AARH P278 QTR Nr. 3 / MDS D54 / MS11
SI253	1340	20	A182F55 3" WN 300 RF STD/40S	125-250AARH P278 QTR Nr. 3 / MDS D54 / MS11
SI253	1380	20	A182F55 4" WN 150 RF STD/40S	125-250AARH P278 QTR Nr. 3 / MDS D54 / MS11
SI253	1480	25	A182F55 8" WN 150 RF SCH 10S	125-250AARH P489 QTR Nr. 3 / MDS D54 / MS11
SI258	1300	20	A182F55 3" WN 150 RF SCH 10S	125-250AARH P1756 QTR Nr. 3 / MDS D54 / MS11

N.	MATERIALE / MATERIAL / MATÉRIEL	HEAT / COULÉE	ACCIAIERIA / STEEL PLANT / ACIÉRIE	ORIGIN. CENT. / CENT. D'ORIGIN
SI 266	ASTM A182 F55	537832	SANDVIK	A/16-551986
SI198	ASTM A182 F55	543526	SANDVIK Refining method A.O.D.	A/15-527141
SI247	ASTM A182 F55	555083	SANDVIK Refining method A.O.D.	A/19-803842
SI251	ASTM A182 F55	557008	SANDVIK Refining method A.O.D.	A/19-844100
SI253	ASTM A182 F55	557009	SANDVIK Refining method A.O.D.	A/19-844101
SI258	ASTM A182 F55	557529	SANDVIK Refining method A.O.D.	A/19-855827
	ASME SA182F55			

ANALISI CHIMICA / CHEMICAL ANALYSIS / COMPOSITION CHIMIQUE

N. RIF.	C	Mn	Si	S	P	Cr	Ni	Mo	N	W	Cu			PRE
Min						24,000	6,000	3,000	0,200	0,500	0,500			40,000
Max	0,030	1,000	1,000	0,010	0,030	26,000	8,000	4,000	0,300	1,000	1,000			
SI 266Lad	0,016	0,560	0,280	0,000	0,022	25,170	6,760	3,760	0,258	0,590	0,540			41,706
SI 266Che	0,015	0,547	0,267	0,000	0,021	25,110	6,700	3,730	0,257	0,584	0,534			41,530
SI198Ladl	0,013	0,590	0,340	0,000	0,017	25,230	6,760	3,850	0,253	0,600	0,630			41,983
SI198Chec	0,023	0,603	0,353	0,000	0,017	25,300	6,830	3,880	0,254	0,607	0,637			42,170
SI247Ladl	0,016	0,640	0,240	0,000	0,022	25,360	6,780	3,750	0,255	0,570	0,580			41,815
SI247Chec	0,016	0,651	0,251	0,000	0,022	25,410	6,830	3,780	0,256	0,575	0,585			41,980
SI251Ladl	0,016	0,550	0,360	0,000	0,022	25,290	6,800	3,770	0,255	0,580	0,600			41,811
SI251Chec	0,015	0,548	0,358	0,000	0,021	25,280	6,790	3,770	0,255	0,579	0,599			41,800
SI253Ladl	0,016	0,590	0,300	0,000	0,024	25,250	6,820	3,740	0,259	0,620	0,560			41,736
SI253Chec	0,016	0,602	0,312	0,000	0,024	25,310	6,880	3,770	0,260	0,626	0,566			41,910
SI258Ladl	0,015	0,590	0,350	0,000	0,022	25,280	6,790	3,760	0,260	0,580	0,610			41,848
SI258Chec	0,014	0,577	0,337	0,000	0,021	25,220	6,730	3,730	0,259	0,574	0,604			41,670

PROVE MECCANICHE / MECHANICAL TESTS / ESSAIS MECANIQUES

N. RIF.	a mm.	SO mm.2	LU mm.	RE.-YIELD LIMITE	R.-TENSILE RUPTURE	A. %-ELONG. ALLONGEM.	C. %-REDUCT. STRICTION	RESILIENZA / IMPACT TEST / RESILIENCE MEDIO / AVERAGE MOYEN	MINIMO MINIMUM	TIPO TYPE	TEMP.	HARDNESS / DURETÉ
				MPA	MPA			Joule	Joule			H R C
				550,00	750-895	25,00	45,00	65	50		°C	max. 32
P331	12,50	122,65	50,00	591,00	805,00	30,10	63,46					22/24/24
LONG T/2								127	171	227	KV	- 51	24/25/25
L.E								1,2	1,4	1,5	mm		23/24/25
TRAN T/2								103	169	152	KV	- 51	
L.E								1,0	1,4	1,3	mm		

TRADE MARK | P. OFF. A. MELESI & C. | COLLAUDATORE / INSPECTOR / INSPECTEUR: Uberti p.i. Lino | ENTE COLLAUDATORE / INSPECTION AGENCY / AUTHORITÉE DE RECEYTE

officine artigiane
melesi
23813 Cortenova (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.98341
Fax 0341.983496 - 983497
lino.uberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
INSPECTION CERTIFICATE
CERTIFICAT D'ESSAIS

N. 166072 | DATA / DATE 17/06/21 | SHEET / 2/3

EN 10204 3.1

ORDINE / ORDER / C.DE PH021077

DATA / DATE 13/01/21 | COMMESSA 68053

P369	12,50	122,65	50,00	598,00	825,00	37,20	65,64						25/26/24
LONG T/2								145	196	249	KV	- 51	24/26/26
L.E								1,2	1,4	1,6	mm		25/24/25
TRAN T/2								103	157	195	KV	- 51	
L.E								0,9	1,1	1,3	mm		
LONG T/4								153	185	203	KV	- 51	
L.E								1,2	1,3	1,6	mm		
TRAN T/4								128	160	203	KV	- 51	
L.E								1,1	1,3	1,4	mm		
P71	12,50	122,65	50,00	574,00	792,00	30,27	59,68						22/23/24
LONG T/2								157	196	266	KV	- 51	23/22/23
L.E								1,3	1,4	1,6	mm		22/24/24
TRAN T/2								103	167	162	KV	- 51	
L.E								1,0	1,2	1,2	mm		
LONG T/4								134	249	214	KV	- 51	
L.E								1,2	1,5	1,5	mm		
TRAN T/4								111	189	159	KV	- 51	
L.E								1,0	1,3	1,2	mm		
P1465	12,50	122,65	50,00	651,00	824,00	33,92	66,85						23/25/25
LONG T/2								113	158	180	KV	- 51	24/23/26
L.E								1,2	1,3	1,4	mm		23/24/24
TRAN T/2								109	142	165	KV	- 51	
L.E								1,1	1,2	1,3	mm		
P278	12,50	122,65	50,00	582,00	823,00	32,85	66,36						23/24/22
LONG T/2								157	249	255	KV	- 51	22/24/25
L.E								1,3	1,5	1,6	mm		25/23/24
TRAN T/2								143	189	203	KV	- 51	
L.E								1,3	1,4	1,4	mm		
P489	12,50	122,65	50,00	567,00	783,00	31,00	72,44						23/22/24
LONG T/2								127	168	230	KV	- 51	25/25/23
L.E.								1,2	0,8	0,9	mm		24/23/25
TRAN T/2								144	191	278	KV	- 51	
L.E.								1,3	1,1	1,0	mm		
P1756	12,50	122,65	50,00	628,00	808,00	41,89	67,27						24/26/25
LONG								145	208	176	KV	- 51	23/25/25
L.E								1,3	1,5	1,4	mm		24/23/24
TRAN								118	179	150	KV	- 51	
L.E								1,1	1,4	1,3	mm		

N. RIF.	TRATTAMENTI TERMICI / *HEAT TREATMENTS / TRAITEMENTS THERMIQUES*
P331	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes
P369	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,23) hours,minutes
P71	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,01) hours,minutes
P1465	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,41) hours,minutes
P278	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes
P489	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes
P1756	Solubilizzazione/Solution Annealed at 1120°C for min 1/2 h/inch quenched water Holding time: minimum (1,00) hours,minutes

EN 10204 3.1
Surface and dimensional check according to ASME B16.5 2017.
Steel made by electric furnace.
Corrosion test carried out acc. to ASTM G48 method "A" at 50°C exposure time 24 hours.
Results: see attached Laboratory report.
Intergranular corrosion test acc. to ASTM A262 practice "E" with satisfactory results.
P.M.I. test performed with satisfactory results.

TRADE MARK	P. OFF. A. MELESI S.r.l.	COLLAUDATORE / *INSPECTOR / INSPECTEUR*	ENTE COLLAUDATORE / *INSPECTION AGENCY AUTHORITEE DE RECETTE*
		Uberti p.i. Lino	

officine meccaniche
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi 11
P.o. box 11
Tel. 0341.98341
Fax 0341.983498 - 983497
lino.uberti@melesi.it

FLANGE E FORGIATI

CERTIFICATO DI COLLAUDO
INSPECTION CERTIFICATE
CERTIFICAT D'ESSAIS

N.	DATA / *DATE*	SHEET /
166072	17/06/21	3/3

EN 10204 3.1

ORDINE / *ORDER* / *C.DE*: PH021077

DATA / *DATE*	COMMESSA
13/01/21	68053

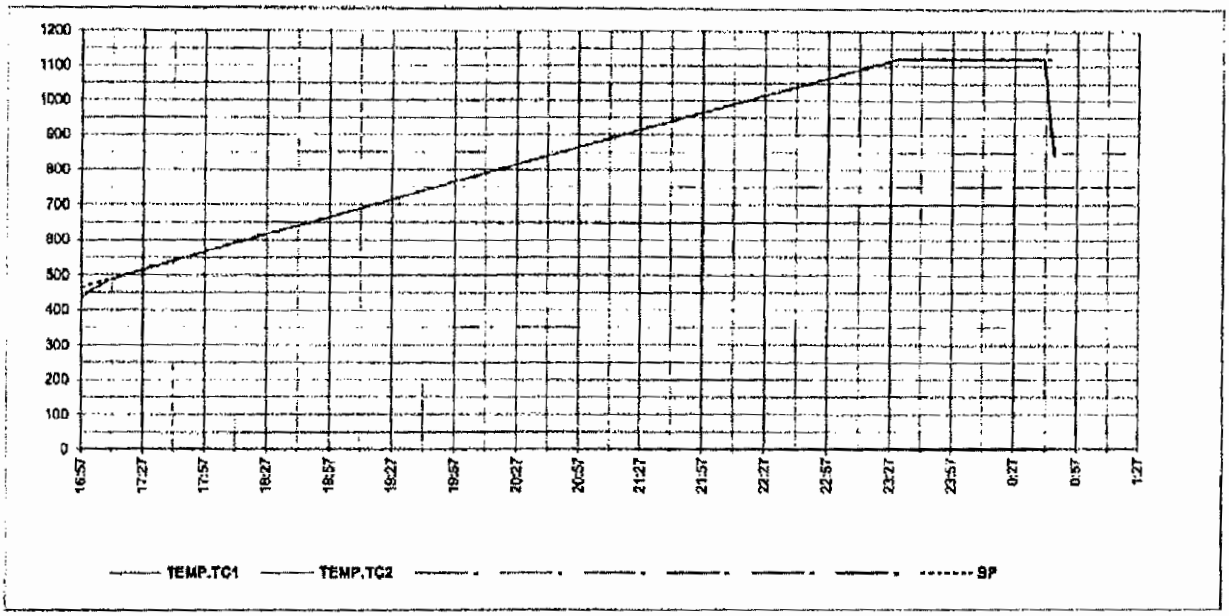
Material acc. to NACE MR 01-75 / ISO 15156 ed. 2015.
Material acc. to ASME SA182F55 ASME section II part A ed. 2019.
All surfaces are pickled and passivated as per P.O. requirements.
Reduction ratio > 4:1
The works operate a quality management system acc. to annex I, section 4.3 of the pressure equipment directive (PED) 2014/68/EU certificate by TUV certificate nr 58/2002/MUC.
Mechanical tests according to ASTM A370
Test specimen orientation: tensile transversal
Impact test specimen size 10 x 10 x 55 mm

ESITO DELLE PROVE / *TEST ISSUE* / *RESULTS DES ESSAIS*: FAVOREVOLE SATISFACTORY SATISFAISANT

TRADE MARK	P. OFF. A. MELESI S.p.A.	COLLAUDATORE / *INSPECTOR* / *INSPECTEUR*	ENTE COLLAUDATORE / *INSPECTION AGENCY* *AUTHORITÉE DE REGETTE*
		Uberti p.i. Lino	

RAPPORTO TRATTAMENTO TERMICO
HT REPORT

	FORNO *Furnace*				TEMPERATURA ACQUA *Water temperature*
	F6				27 °C



COMMESSA *Job*	RIGA *Row*	PO Item *PO Item*	QUANTITA' *Quantity*	LOTTO *Lot*	DESCRIZIONE *Description*	
68053	1450	1360	20	P71	A182F55 4" BL 300 RF	125-250AARH
68053	1490	1400	15	P71	A182F55 4" WN 300 RF SCH 10S	125-250AARH
68053	1500	1410	20	P71	A182F55 4" WN 300 RF STD/40S	125-250AARH
68053	1510	1420	40	P71	A182F55 6" BL 150 RF	125-250AARH
68053	1530	1440	20	P71	A182F55 6" WN 150 RF SCH 10S	125-250AARH
68053	1540	1450	30	P71	A182F55 6" WN 150 RF STD/40S	125-250AARH

Officine AMBROGIO MELESI & C. S.r.l.
23813 CORTENOVA

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.

POSITIVE MATERIAL IDENTIFICATION REPORT

FABRICATOR	PROJECT TITLE	MATERIAL GRADE	TIMING OF PMI EXECUTION	PROCEDURE	REPORT REF.
Officine Ambrogio Melesi & C.S.r.l.		ASTM A182 F55	After final marking	MELESI QC 037	PMI 166072
MELESI REF. N°	**PURCHASE ORDER**	**MATERIAL COLOR CODING**	**ANALYZER**	**CALIBRATION DATE**	**DATE OF TEST**
68053	PH021077		X-Ray Spectro	17/06/2021	17/06/2021

ITEM NO.	MATERIAL DESCRIPTION	PIECES TESTED	HEAT	MTC CERTIFICATE NO.	MTC DATE	ANALYSIS Cr Max (%)	Cr Min (%)	Ni Max (%)	Ni Min (%)	Mo Max (%)	Mo Min (%)	RESULTS ACCEPTED	REJECTED
						25,00	24,00	6,50	5,50	4,00	3,00		
1200	A182F55 1 1/2" WN 150 RF STD/40S 125-250AARH	25	557008	166072	17/06/2021	25,32	25,06	6,84	6,70	3,82	3,72	X	
1300	A182F55 3" WN 150 RF SCH 10S 125-250AARH	20	557529	166072	17/06/2021	25,36	25,18	6,94	6,60	3,89	3,75	X	
1330	A182F55 3" WN 300 RF SCH 10S 125-250AARH	10	557039	166072	17/06/2021	25,43	25,08	7,00	6,69	3,79	3,68	X	
1340	A182F55 3" WN 300 RF STD/40S 125-250AARH	20	557039	166072	17/06/2021	25,25	25,08	6,96	6,75	3,81	3,82	X	
1360	A182F55 4" WN 150 RF STD/40S 125-250AARH	20	557039	166072	17/06/2021	25,36	25,05	6,96	6,81	3,87	3,69	X	
1530	A182F55 10" WN 150 RF SCH 10S 125-250AARH	5	537632	166072	17/06/2021	25,34	25,04	6,84	6,72	3,81	3,71	X	
1550	A182F55 12" WN 300 RF SCH 10S 125-250AARH	5	543626	166072	17/06/2021	25,41	25,15	6,85	6,62	3,97	3,71	X	
1400	A182F55 8" WN 150 RF SCH 10S 125-250AARH	25	557039	166072	17/06/2021	25,35	25,13	6,82	6,81	3,86	3,61	X	
1420	A182F55 6" WN 300 RF SCH 10S 125-250AARH	15	555083	166072	17/06/2021	25,53	25,22	6,89	6,58	3,78	3,66	X	
1440	A182F55 6" WN 150 RF SCH 10S 125-250AARH	20	555083	166072	17/06/2021	25,37	25,26	6,81	6,64	3,90	3,74	X	

NOTE(s): PAGE 1 OF 2

SIGNATURES

OPERATOR	QUALITY CONTROL SUP.	CLIENT(S) INSPECTOR(S)
Gianni Buttara Level II	Lino Uberti Level III Officine AMBROGIO MELESI & C. s.r.l. 20813 CORNOVA	

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.

POSITIVE MATERIAL IDENTIFICATION REPORT

FABRICATOR Officine Ambrogio Melesi & C.S.r.l.	PROJECT TITLE	MATERIAL GRADE ASTM A182 F55	TIMING OF PMI EXECUTION After final marking	PROCEDURE MELESI QC 017	REPORT REF. PMI 166072
MELESI REF. N° 68053	PURCHASE ORDER PH021077	MATERIAL COLOR CODING	ANALYZER X-Ray Spectro	CALIBRATION DATE 17/06/2021	DATE OF TEST 17/06/2021

ITEM NO.	MATERIAL DESCRIPTION	PIECES TESTED	HEAT	MTC CERTIFICATE NO.	MTC DATE	ANALYSIS Cr Max (%)	Cr Min (%)	Ni Max (%)	Ni Min (%)	Mo Max (%)	Mo Min (%)					RESULTS ACCEPTED	REJECTED
						28,00	24,00	8,00	6,00	4,00	3,00						
1459	A182F55 8" WN 150 RF STD/40S 125-250AARH	30	503083	166872	17/06/2021	25,44	25,28	8,04	6,77	3,85	3,72					X	

NOTE(s): PAGE 2 OF 2

SIGNATURES

OPERATOR	QUALITY CONTROL SUP.	CLIENT(s) INSPECTOR(s)
Gionni Bittara Level II	Lino Uberti Level III Officine AMBROGIO MELESI & C. s.r.l. 23813 ERENOVA	

officine ambrogio melesi

OFFICINE AMBROGIO MELESI & C. S.R.L.
Largo De Vecchi 11
23813 Cortenova (LC)
Italy
Phone: +39.0341.98341
Fax: +39.0341.983498 / 7
E-mail: info@melesi.it
Web site: www.melesi.it
Cap.Soc/Share Cap. 6500.000 Lv.
P.IVA - C.F. - R.I. Lecco
IT 02231830138
R.E.A. n. LC-106835
N.Meccan./Export n. LC005080

17 June 2021

Certificate Nr. M895

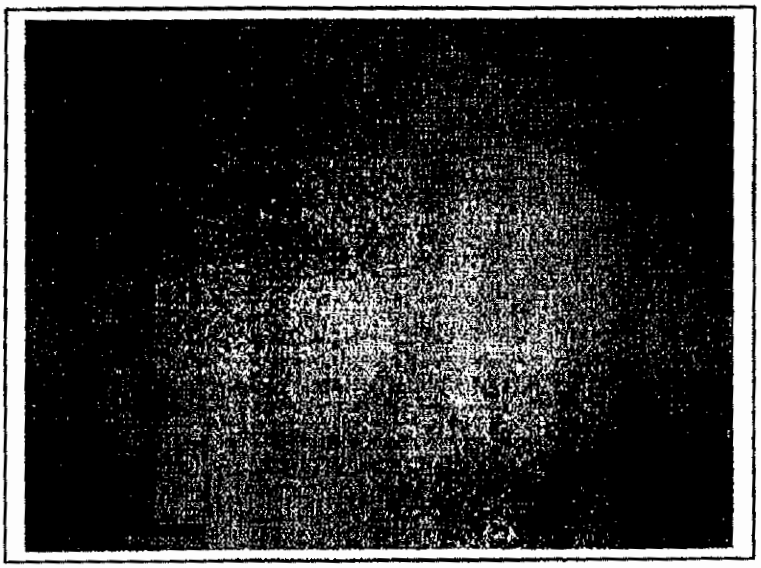
MICROSTRUCTURE

SAMPLE OF ASTM A182 F55 HEAT 555083 P71

THE RESULTS OF METALLOGRAPHIC EXAMINATION SHOW A REGULAR STRUCTURE FREE FROM INTERMETALLIC PHASES AND PRECIPITATES AS SHOWN ON BELOW PHOTO.

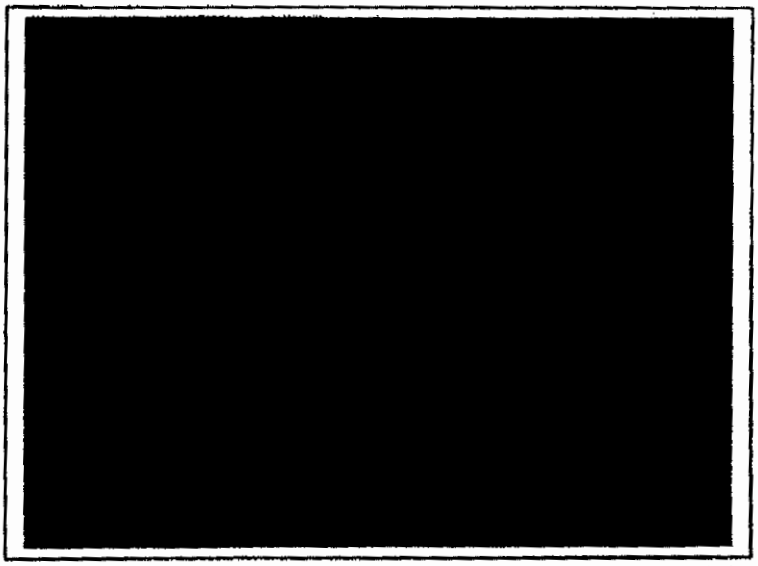
FERRITE CONTENT ACC. TO ASTM E562 = 49%
TEST PERFORMED ON ONE SECTION ETCHED 10% OXALIC ACID ELECTROLYTIC AND 20% NAOH ELECTROLYTIC ACCORDING TO ASTM E407
30 FIELDS EXAMINED, 16 POINTS (4x4 SQUARE GRID, 40x40mm) PER FIELD
TEST ACCORDING TO ISO 17781

MAGNIFICATION : 500X



ETCHING: 10% OXALIC ACID ELECTROLYTIC

Q. C.



Q. C.

ETCHING: 10% OXALIC ACID ELECTROLYTIC+ 20% NAOH ELECTROLYTIC

officine ambrogio melesi
25813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
Tel. +39.0341.98341
Fax +39.0341.983496/7
info@melesi.it
FLANGE E FORGIATI
FLANGES AND FORGINGS

PROVA CORROSIONE
CORROSION TEST

NR.	R2787	DATA DATE	
PAG. SHEET	1/1	OAM JOB COMMESSA	68053
ORDINE ORDER	PH021077	CLIENTE CUSTOMER	

SPECIFICA SPECIFICATION: ASTM G48 METHOD A

NOTE NOTES: LOCATION: TRASV T/2

POS. ITEM	Q.TA' Q.TY	DESCRIZIONE DESCRIPTION	COLATA HEAT	NOTE REMARKS
1306	20	A182 F55 4" BL 300 RF	555083	P71
1400	15	A182 F55 4" WN 300 RF SCH 10S	555083	P71
1410	20	A182 F55 4" WN 300 RF STD/40S	555083	P71
1420	40	A182 F55 6" BL 150 RF	555083	P71
1440	20	A182 F55 6" WN 150 RF SCH 10S	555083	P71
1450	30	A182 F55 6" WN 150 RF STD/40S	555083	P71

DIMENSIONI CAMPIONE START SPECIMEN DIMENSION		CONDIZIONI PROVA TEST CONDITIONS	
LUNGHEZZA LENGHT	49,95	TEMP. DI PROVA TEST TEMPERATURE	50°C
LARGHEZZA WIDTH	24,88	DURATA PROVA (H) PERIOD (H)	24
SPESSORE THICKNESS	9,90	ANGOLO / MANDRINO ANGLE / JIG	
SEZIONE (mm^2) SECTION	3.967	SOLUZIONE TEST SOLUTION	900ml whater tipo IV (H_2O) + 100g ferric chloride ($FeCl_3 \cdot 6H_2O$)
PESO INIZIALE (g) INITIAL WEIGHT	98,384		

RISULTATO DELLA PROVA
TEST RESULT

PESO FINALE (g) FINAL WEIGHT		PERDITA PESO (g) WEIGHT LOSS		CORROSIONE (g/m^2) CORROSION	
	98,384		0,000		0,03

ESITO ESAME AL MICROSCOPIO A 20 X OPTICAL MICROSCOPE EXAMINATION AT 20 X RESULTS			
	ASSENZA DI CORROSIONE PUNTIFORME NO PITTING ATTACK	< 1 g/m2	CONFORME CONFORM

NOTE REMARKS: Pickling on specimen for 5 minutes at 60 ° C in 20% HNO3 + 5% HF solution

QUALITY CONTROL	INSPECTOR	CUSTOMER
T.S. - Officine Ambrogio Melesi		

officine alfieri maggio
melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
P.o. box 11
Tel 0341 98.341 ris.aut.
Fax 0341 90.15.06 - 90.14.88
FLANGE E FORGIATI

RAPPORTO ESAME ULTRASUONI
ULTRASONIC TEST REPORT

Nr.	Data / Date	Pag / Sheet	Commessa / Job
15050	17/06/21	1 / 1	66053
Ordine / Order		Cliente / Customer	
PH021077		"	

Specifica / Specification
ASTM A388

Criteri di accettazione / Acceptance criteria
ASME VIII, Div 1, Appendix 12

Procedura / Procedure
UT02 REV 2 ED 1

Stadio di controllo / Inspection phase
After final h.t. machined before drilling

Pos Item	Q.tà Quantity	Descrizione Description		Colata Heat	Cond. Superficiali Surface status
1230	25	A182F55 1 1/2" WN 150 RF STD/40S	125-250AARH	557008	LAVORATO/MACHINED
1300	20	A182F55 3" WN 150 RF SCH 10S	125-250AARH	557529	LAVORATO/MACHINED
1330	10	A182F55 3" WN 300 RF SCH 10S	125-250AARH	557009	LAVORATO/MACHINED
1340	20	A182F55 3" WN 300 RF STD/40S	125-250AARH	557009	LAVORATO/MACHINED
1380	20	A182F55 4" WN 150 RF STD/40S	125-250AARH	557009	LAVORATO/MACHINED
1400	15	A182F55 4" WN 300 RF SCH 10S	125-250AARH	555083	LAVORATO/MACHINED
1440	20	A182F55 6" WN 150 RF SCH 10S	125-250AARH	555083	LAVORATO/MACHINED
1450	30	A182F55 6" WN 150 RF STD/40S	125-250AARH	555083	LAVORATO/MACHINED
1480	25	A182F55 8" WN 150 RF SCH 10S	125-250AARH	557009	LAVORATO/MACHINED
1530	5	A182F55 10" WN 150 RF SCH 10S	125-250AARH	537832	LAVORATO/MACHINED
1550	5	A182F55 12" WN 300 RF SCH 10S	125-250AARH	543526	LAVORATO/MACHINED

APPARECCHIO / INSTRUMENT

Tipo / Type	Matricola / Serial Number	Costruita da / Manufactured by
USN 60	01H3B6	GE

SONDE / PROBES - Amplificazione durante esame / Amplification during examination +6 dB

Tipo Type	Costruita da Manufactured by	Matricola S.N.	Misura Size	Angolo Angle	Frequenza Frequency	Ampl. di regolazione Setting ampl.
B2 S EN	GE Sensing&Inspection Technologies	500036-60948	Diam. 24 mm		2 MHz	
SEB2 E	GE Sensing&Inspection Technologies	57487-50712	6 X 20 mm		2 MHz	
MWB45-2E	GE Sensing&Inspection Technologies	56921-500041	8 X 9 mm	45°	2 MHz	
MSEB2 E	GE Sensing&Inspection Technologies	57481-500083	3.5 x 10 mm		2 MHz	

CAVI / CABLES

Tipo Type	Lunghezza Lenght
RG 174 D	2 mt

CALIBRAZIONE / CALIBRATION

- [X] DGS Diagramma / DGS Diagram
- [ ] DAC
- [X] Eco di riferimento / Reference point echo + 6 db
- [X] Blocchi di calibrazione / Calibration blocks — Notch V 60° - Depth < 3% T
- [ ] Blocco di riferimento V2 / Reference block V2
- [ ] Blocco di riferimento V1 / Reference block V1

Riflettore di riferimento / Reference reflector
DGS Deq 3-6 mm notch< 3% T

Segnale di riferimento / Reference amplitude
DGS Deq 3-6 mm notch< 3% T

Accoppiante / Coupling
Olio / Oil

NOTE / NOTES
Conform to acceptance criteria

RISULTATI / RESULTS
Conforme

FIRME / SIGNATURES

OPERATORI / OPERATORS	SUPERVISORE C.Q. / QUALITY CONTROL SUP.
CALIZZI GIORGIO Lev. II	UBERTI LINO Lev. II
ENTE COLLAUDATORE / INSPECTION AUTHORITIES	ISPETTORE CLIENTE / CUSTOMER INSPECTOR

officine meccaniche melesi

23813 Cortenova (Lecco)
ITALY
Largo De Vecchi, 11
P.o. box 11
Tel 0341 98.341 rie.aut.
Fax 0341 90.15.06 - 90.14.88
FLANGE E FORGIATI

CERTIFICATO CONTROLLO CON LIQUIDI PENETRANTI
LIQUID PENETRANT TEST

Nr.	Data / Date	Pag / Sheet	Commessa / Job
15048	17/08/21	1 / 1	68083

Ordine / Order	Cliente / Customer
PH021077	

Specifica / Specification
ASTM A961/E165 ASME V Art.6

Criteri di accettazione / Acceptance criteria
ASME VIII Div.1, Appendix 8

Procedura / Procedure
PT 01 - Rev. 1 Ed. 2

Stadio di controllo / Inspection phase
After final h.t. machined before drilling

Pos Item	Q.tà Quantity	Descrizione Description		Colata Heat	Cond. Superficiali Surface status
1300	20	A182F55 3" WN 150 RF SCH 10S	125-250AARH	557529	FINITO/FINISHED
1330	10	A182F55 3" WN 300 RF SCH 10S	125-250AARH	557009	FINITO/FINISHED
1340	20	A182F55 3" WN 300 RF STD/40S	125-250AARH	557009	FINITO/FINISHED
1380	20	A182F55 4" WN 150 RF STD/40S	125-250AARH	557009	FINITO/FINISHED
1400	15	A182F55 4" WN 300 RF SCH 10S	125-250AARH	555083	FINITO/FINISHED
1440	20	A182F55 6" WN 150 RF SCH 10S	125-250AARH	555083	FINITO/FINISHED
1450	30	A182F55 6" WN 150 RF STD/40S	125-250AARH	555083	FINITO/FINISHED
1480	25	A182F55 8" WN 150 RF SCH 10S	125-250AARH	557009	FINITO/FINISHED
1530	5	A182F55 10" WN 150 RF SCH 10S	125-250AARH	537832	FINITO/FINISHED
1550	5	A182F55 12" WN 300 RF SCH 10S	125-250AARH	543526	FINITO/FINISHED

TECNICA D'ESAME / EXAMINATION TECHNIQUE

- [ ] Fluorescente / Fluorescent
- [x] Contrasto colore / Color constract
- [ ]
- [x] Lavabile con acqua / Water washable
- [ ] Rimovibile con solvente / Solvent removable
- [ ]

FASI / STEPS	PRODOTTI / PRODUCTS - TIPO / TYPE FABBRICANTE / MANUFACTURER	LOTTO N. / BATCH NR.
Pulizia / Cleaning	Solvente/Cleaner CGM (R2.60 velnet solnet)	
Applicazione penetrante / Penetrant application	CGM (R2.71 RED "WW")	20/324
Rimozione eccesso penetrante / Excess penetrant removal	Acqua/Water Pressione/Pressure <275 kPa (40psi) Temperature/Temperature <40°C	
Asciugatura / Drying	Asciugatura con stracci / Wiping	
Applicazione rilevatore / Developer application	CGM (R.82 ROTRIVEL "U" / white)	21/131

TECNICA D'ESAME / EXAMINATION TECHNIQUE

Tempo di penetrazione / Penetrant dwell time	20 min
Tempo di sviluppo / Developer dwell time	12 min

ATTREZZATURA DI ILLUMINAZIONE / LIGHTING EQUIPMENT

>1076 Lux

NOTE / NOTES

No defects
Examination performed on 10% of pieces

RISULTATI / RESULTS

Conforme

FIRME / SIGNATURES	
OPERATORI / OPERATORS	SUPERVISORE C.Q. / QUALITY CONTROL SUP.
CAMINADA VALERIO Lev. II	UBERTI LINO Lev. II
ENTE COLLAUDATORE / INSPECTION AUTHORITIES	ISPETTORE CLIENTE / CUSTOMER INSPECTOR

Heat code	QTY	Description
60418	60,89	PIPE -SMLS 6" SCH-40S STANDARD ASTM A790_UNS S32750 ASME B36.10/19

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RECEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 1 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

TTI - TUBACEX TUBOS INOXIDABLES

Registro Mercantil de Alava, Tomo 587, Folio 189, Hoja VI 2885 - N.I.F. A-01140227

Tres cruces, 8
01400 Llodio (Alava)
SPAIN

TL: 946721350
FAX: 946725062
E-MAIL:

CUSTOMER DESCRIPTION/DESCRIPCIÓN DEL CLIENTE/KUNDENBEZEICHNUNG/COMMETTANT

CLIENT SOLD TO/SOLICITANTE/AUFTRAGGEBER/COMMETTANT

TSS
TUBACEX SERVICE SOLUTIONS, S.A.U
POLIGONO INDUSTRIAL SARATXO
01470 AMURRIO

SOLD TO:WITTE TUBE & PIPE SYSTEMS GMBH
SOLD P.O. REF.:EB0010676
SOLD ORDER REF.:391923
COPY NUMBER: 001

CLIENT ORDER/PEDIDO CLIENTE/KUNDEN AUFTRAGSNUMMER/NO.DE COMMANDE: I011212
SALES ORDER/PEDIDO VENTAS/AUFTRAGSNUMMER/NO.DE COMMANDE D'USINE:

AENOR Empresa Registrada UNE EN ISO 9001

AENOR Gestión Ambiental UNE EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 2 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

MATERIAL:SEAML. STAINL. STEEL TUBES/PIPES/TUBOS INOXIDABLES SIN SOLDADURA/TUBES INOX SANS SOUDURE/NAHTLOSE EDELSTAHLROHRE
HEAT-TREATED, PICKLED / TRATADO, DECAPADO / HYPERTREMPE, DECAPE / WÄRMEBEHANDELT, GEBEIZT, PASSIVATED AS PER ASTM A380 / PASIVADO SEGUN ASTM A380 / PASSIVÉ (ASTM A380) / PASSIVIERT (ASTM A380)
GRADE / ACERO / GRADE / WERKSTOFF: S32750,1.4410,
STANDARD / NORMA / STANDARD / LIEFERUNG NACH: ASME SECT.II PART.A SA790/SA790M-2021 ED.
ASTM A790/A790M-23
EN 10216-5:2021 TC2
EN 10297-2:2005
NORSOK M650 QTR N.4
NORSOK M630:2020 MDS D51 REV.6
CHECK ANALYSIS
CORROSION TESTED ACC. TO ASTM A262 PRACTICE E
CORROSION TESTED ACC. TO ASTM A923-22 TEST METHOD C
CORROSION TESTED ACC. TO ASTM G48 TEST METHOD A
CORROSION TESTED ACC. TO EN ISO 3651-2 PRACTICE B
SHELL ES/247 REV.2 EXCEPT DPI (TABLE 1) AND SURFACE REQUIREMENTS (POINT 9.1)
HYDROTEST
ANSI/NACE MR0103/ISO 17945:2015
ANSI/NACE MR0175/ISO15156-3:2020
QAD 68 REV.0
RTX_D51S REV.6
SHELL MESC SPE 74/014 FEBRUARY 2021 EXCEPT:
NO LIQUID PENETRANT TEST (POINT 14.12.1),
TENSILE TEST ONLY IN LONGITUDINAL DIRECTION.
ULTRASONIC TEST ONLY FOR LONGITUDINAL DEFECTS.
IMPACT TEST (if applicable): Lateral expansion 0.38 mm. minimum.
ULTRASONIC TEST ACC. TO ASTM A999/A999M / ASTM E213
TOLERANCES / TOLERANCIAS / TOLERANCES / TOLERANZEN NACH: ASME SECT.II PART.A SA999/SA999M-2021 ED.
ASTM A999/A999M-18
EN ISO 1127/03.2019 D2/T2
RANDOM LENGTHS / LARGOS VARIABLES / LONGUEUR COURANTE / EINGEENGTE LÄNGE 6.000/7.000 MM
PLAIN ENDS / LISOS / EXTRÉMITÉ D'EQUERRE / GLATTE ENDEN,
DIMENSIONS/DIMENSIONES/DIMENSIONS/DIMENSIONS: 168,28 X 7,11 MM - 6" SCH 40S
HOT FINISHED/ACABADOS EN CALIENTE/WARMGEFORMT/FINIS A CHAUD

Sales Item Pos Ped. AuftrgPos Usine Pos	Client Item Pos Clnt Kunde Pos Com. Pos	Delivery No Nº Entrega Lieferung Avis. d'exp	Lot No. Nº lote Los Nr. Lot d`inspection	Heat No Colada Schmelze Coulée	Pieces Piezas Stück Pcs	Weight Peso Gewicht Poids	Tot Lgth Long. Tot Gesamtlänge Tolength	Un Lgth Long. Un Längentyp Long. Un
20		8110078629	P2305144	60418	15	3.013 KG	100,39 M	6000-7000 MM

RAW MATERIAL/DATOS MATERIAL/VORMATERIAL/MATIERE PREMIERE

Heat Nr:	Supplier	Method
60418	ACERALAVA (SPAIN)	Electric furnace+AOD

AENOR ER Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 3 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

CHEMICAL COMPOSITION (%)/COMPOSICIÓN QUÍMICA (%)/CHEMISCHE ZUSAMMENSETZUNG (%)/COMPOSITION CHIMIQUE(%)

*L: Ladle C:Products

*	Heat	Seq	C	Mn	Si	P	S	Ni	Cr	Mo	Al	Cu
L	60418	1	0,013	0,73	0,410	0,025	0,0006	7,25	25,50	3,57	0,011	0,11
C	60418	2	0,013	0,72	0,410	0,024	0,0006	7,26	25,42	3,63	0,010	0,11
C	60418	3	0,013	0,72	0,410	0,025	0,0006	7,31	25,44	3,61	0,011	0,11

*	Heat	Seq	V	Nb	W	Co	N	Pren
L	60418	1	0,074	0,003	0,050	0,075	0,2765	41,7050
C	60418	2	0,072	0,002	0,048	0,077	0,2765	41,8230
C	60418	3	0,074	0,002	0,048	0,076	0,2765	41,7770

HEAT TREATMENT/TRATAMIENTO TÉRMICO/WÄRMEBEHANDLUNG/TRAITEMENT THERMIQUE

HIPERTEMPLADOS A 1100 °C , 12 min , Agua
SOLUTION ANNEALED AT 1100 °C , 12 min , WATER
HYPERTREMPES 1100 °C , 12 min , L' EAU
LOESUNGSGEGLUEHT 1100 °C , 12 min , Wasser

TENSILE TEST/TEST DE TENSIÓN/ESSAI TRACTION/ZUGVERSUCH

Lot No.	Sample	T	Rp0.2	Rp1.0	Rm	A2"	A5	Type	Spc.Type	Spc.Dim
		°C	*MPa*	*MPa*	*MPa*	*%*	*%*			*mm*
P2305144	1	20	600	684	827	43	41	L	S	20,25
	2	20	600	683	827	44	42	L	S	20,09

IMPACT TEST/TEST DE IMPACTO/RESILIENCE/KERBSCHLAGVERSUCH

Lot No.	Sample	T	Wspec	Ecv 1	Ecv 2	Ecv 3	Ecv AVG	Type	Le1	Le2	Le3	Shear 1	Shear 2	Shear 3
		°C	*mm*	*J*	*J*	*J*	*J*		*mm*	*mm*	*mm*	*%*	*%*	*%*
P2305144	1	-51	5,00	117	116	113	115	L	1,25	1,12	1,20	70	60	70

CORROSION ACCORDING TO ASTM A923 C/CORROSION DE ACUERDO ASTM A923 C/CORROSION SUIVANT ASTM A923 C/CORROSION ACCORDING TO ASTM A923 C

Lot No.	Sample	T	Pits-20x	Wloss	time
		°C		*MDD*	*Horas*
P2305144	1	50	N	2,6620	24,0

Corrosion test ASTM G48 practice A/Corrosión ASTM G48 práctica A/TEST DE CORROSION ASTM G48 practice A/LOCHFRASSTEST ASTM G 48 PR.A

Lot No.	Sample	T	Pits-20x	W.loss	time
		°C		*g/m2*	*Horas*
P2305144	1	50	N	0,2662	24,0

HARDNESS TEST/TEST DE DUREZA/DUREE/HÄRTEPRÜFUNG

Lot No.	Sample	0ºExt1	0ºExt2	0ºExt3	0ºInt1	0ºInt2	0ºInt3	90ºExt1	90ºExt2	90ºExt3	90ºInt1	90ºInt2	90ºInt3	180ºExt1
		HRC	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*
P2305144	1	20,9	23,8	23,0	18,4	19,8	15,6	23,8	20,4	21,3	20,5	21,6	23,4	24,6

Lot No.	Sample	180ºExt2	180ºExt3	180ºInt1	180ºInt2	180ºInt3	270ºExt1	270ºExt2	270ºExt3	270ºInt1	270ºInt2	270ºInt3
		HRC	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*
P2305144	1	22,9	23,0	21,6	23,0	21,3	15,2	23,2	20,5	20,3	22,5	19,7

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 4 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

FERRITE ACCORDING TO ASTM E 562/Contenido de Ferrita según ASTM E562/FERRITE SUIVANT ASTM E562/FERRIT ENTSPRECHEND ASTM E562

Lot No.	Sample	%Fer	Dev.Ferr
		%	%
P2305144	1	46,61	2,04

METALURGICAL TESTS/ENSAYOS METALÚRGICOS/METALLURGISCHE PRÜFUNGEN/ESSAIS METALLURGIQUES

ETCH STRUCTURE ACC. ASTM A923 MET.A: UNAFFECTED STRUCTURE. MATERIAL FREE FROM INTERMETALLIC PHASES AND PRECIPITATES. UNIFORM STRUCTURE ACROSS FULL WALL THICKNESS
EXAMEN DE MICROESTRUCUTRA DE ACUERDO A ASTM A923 MET.A: ESTRUCTURA NO AFECTADA. MATERIAL LIBRE DE FASES INTERMETALICAS Y PRECIPITADOS. ESTRUCTURA UNIFORME A TRAVES DEL ESPESOR.
ETCH STRUCTURE ACC. ASTM A923 MET.A: UNAFFECTED STRUCTURE. MATERIAL FREE FROM INTERMETALLIC PHASES AND PRECIPITATES. UNIFORM STRUCTURE ACROSS FULL WALL THICKNESS

INTERGRANULAR CORROSION TEST ACC. TO ASTM A262 PRACT."E": SATISFACTORY
ENSAYO DE CORROSION INTERGRANULAR DE ACUERDO A ASTM A262 PRACT.E: SATISFACTORIO
BESTÄNDIGKEIT GEGEN INTERKRISTALLINE KORROSION ENTSPRECHEND ASTM A262 PRACT.E: IN ORDNUNG
ESSAI DE CORR. INTERGR. SELON ASTM A262 PRACT.E:SATISFAISANT
INTERGRANULAR CORROSION TEST ACC.TO DIN EN ISO 3651-2 MET.B: SATISFACTORY
ENSAYO DE CORROSION INTERGRANULAR DE ACUERDO A ISO 3651-2 MET.B: SATISFACTORIO
BESTÄNDIGKEIT GEGEN INTERKRISTALLINE KORROSION ENTSPRECHEND ISO 3651-2 MET."B": IN ORDNUNG
ESSAI DE CORR. INTERGR. SELON ASTM ISO 3651-2 MET."B":SATISFAISANT

NON-DESTRUCTIVE TESTS/ENSAYOS NO DESTRUCTIVOS/ZERSTÖRUNGSFREIE PRÜFUNGEN/ESSAIS NON DESTRUCTIFS

FERRITE CONTENT DETERMINED BY FISCHER FERRITOSCOPE TO 100% OF PRODUCTS
CONTENIDO EN FERRITA MEDIDO CON FERRITOSCOPIO SOBRE EL 100% DEL MATERIAL.
Ferritescope-Test auf 100% des Materials.

100% ULTRASONIC TEST ACC. TO ASTM A999 / E213: SATISFACTORY
100% ENSAYO DE ULTRASONIDOS DE ACUERDO A ASTM A999 / E213: SATISFACTORIO
100% ULTRASCHALLPRÜFUNG NACH ASTM A999 / E.213:IN ORDNUNG
100% ESSAI D´ULTRASON D'ACCORD A ASTM A999 / E.213: SATISFAISANTE

100% ULTRASONIC TEST ACC. TO EN 10246-7, U2C: SATISFACTORY
100% ENSAYO DE ULTRASONIDOS DE ACUERDO A EN 10246-7, U2C: SATISFACTORIO
100% ULTRASCHALLPRÜFUNG NACH EN 10246-7, U2C:

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 5 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

IN ORDNUNG
100% ESSAI D´ULTRASON D'ACCORD A EN 10246-7, U2C: SATISFAISANTE
POSITIVE MATERIAL IDENTIFICATION TEST ON EACH TUBE/PIPE BY
"X-RAY-FLUORESCENCE-ANALYZER": SATISFACTORY
VERIFICACION DEL GRADO DE ACERO EN CADA TUBO MEDIANTE "ANALIZADOR DE
FLUORESCENCIA DE RAYOS X": SATISFACTORIO
VERWECHSLUNGSPRUEFUNG AN JEDEM ROHR MIT
"RÖNTGEN-FLUORESZENZ-ANALYSATOR": IN ORDNUNG
VERIFICATION DE LA NUANCE SUR CHAQUE TUBE PAR
"X-RAY-FLUORESCENCE-ANALYZER": SATISFAISANT

HYDROSTATIC PRESSURE TESTED AT 190 bar, 2800 PSI DURING 5 SEC ON EACH
TUBE/PIPE: SATISFACTORY
ENSAYO HIDROSTÁTICO A 190 bar, 2800 PSI DURANTE 5 SEC EN CADA TUBO:
SATISFACTORIO
WASSERDRUCKPRÜFUNG BEI 190 bar, 2800 PSI HALTEZEIT 5 SEC JE ROHR: IN
ORDNUNG
ESSAI DE PRESSION HYDROSTATIQUE À 190 bar, 2800 PSI PENDANT 5 SEC SUR
CHAQUE TUBE: SATISFAISANT

DIMENSIONAL CHECKING ON EACH TUBE: SATISFACTORY
INSPECCION DIMENSIONAL AL 100% DE LOS TUBOS SATISFACTORIA
100% MASSKONTROLLE: O.B.
VERIFICATION DIMENTIONNELLE AU 100% DES TUBES, SATISFAISANTE

VISUAL INSPECTION ON EACH TUBE: SATISFACTORY
INSPECCION VISUAL AL 100% DE LOS TUBOS, SATISFACTORIA
100% BESIGCHTIGUNG: O.B.
EXAMEN VISUEL AU 100% DES TUBES, SATISFAISANT

TECHNOLOGICAL TESTS/ENSAYOS TECNOLÓGICOS/TECHNOLOGISCHE PRÜFUNGEN/TECHNOLOGICAL TESTS

FLATTENING TEST: SATISFACTORY
APLASTADO S.NORMA: SATISFACTORIO
RINGFALTVERSUCH: IN ORDNUNG
ESSAI D'APLATISSEMENT: SATISFAISANT

RING TENSILE TEST: SATISFACTORY

TRACCION DE ANILLO: SATISFACTORIO
RINGZUGVERSUCH: IN ORDNUNG
ESSAI DE TRACTION A L'ANNEAU: SATISFAISANT

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI
TUBACEX
GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 6 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

MARKING/ETIQUETADO/KENNZEICHNUNG/MARKSTEXT

TX2 TX1 TUBACEX 168,28 X 7,11 MM - 6" SCH 40S ASME SA790 ASTM A790 EN 10216-5 TC2 EN 10297-2 S32750 1.4410 HFD HF SMLS HEAT/ PMI-AV LOT NO/MADE IN SPAIN

REMARKS/OBSERVACIONES/ANMERKUNG/REMARQUES

NO MERCURY, MERCURY COMPOUNDS OR MERCURY BEARING INSTRUMENTS AND/OR EQUIPMENT HAVE BEEN USED ALONG MANUFACTURING AND INSPECTION PROCESS.
DURANTE LOS PROCESOS DE FABRICACIÓN E INSPECCIÓN NO SE HA USADO MERCURIO NI INSTRUMENTOS Y/O EQUIPOS CONTENIENDO MERCURIO O CON COMPONENTES DE MERCURIO.
KEINE QUEKSILBER, BZW. QUECKSILBERVERUNREINIGTES KOMPONENTEN ODER KUGELLAGERINSTRUMENTE UND/ODER GERÄTE SIND BENUTZT WORDEN PRODUKTIONS UND BESICHTIGUNGSPROZESS.
IL N'A PAS ÉTÉ FAIT USAGE DE MERCURE, DE COMPOSÉS CONTENANT DU MERCURE OU DE MATÉRIAUX ET/OU D'INSTRUMENT CONTENANT DU MERCURE TOUT AU LONG DES ÉTAPES DE FABRICATION ET DU PROCESSUS D'INSPECTION ET DE CONTRÔLE.

NO WELDING OR WELD REPAIRS WERE MADE
SIN REPARACION POR SOLDADURA
KEINE SCHWEISSBEARBEITUNG WURDE VORGENOMMEN
SANS RÉPARATION AVEC SOUDURE
MATERIAL MANUFACTURER APPROVED BY TÜV SÜD Industrie Service GmbH
(NOTIFIED BODY 036)TO ISSUE CERTIFICATES OF SPECIFIC PRODUCT CONTROL IN
ACCORDING TO PRESSURE EQUIPMENT DIRECTIVE 2014/68/EU ANNEX 1 POINT 4.3.
FABRICANTE DE MATERIALES APROBADO POR TÜV SÜD Industrie Service GmbH (ORGANISMO NOTIFICADO 0036) PARA LA EMISION DE CERTIFICADOS ESPECIFICOS DE CONTROL DE PRODUCTO DE ACUERDO AL ANEXO 1, PUNTO 4.3 DE LA DIRECTIVADE EQUIPOS A PRESION 2014/68/EU.
WERKSTOFFHERSTELLER MIT BERECHTIUNG ZUR AUSSTELLUNG VON BESCHEINIGUNGEN ÜBER SPEZIFISCHE PRÜFUNGEN AN DEN WERKSTOFFEN IM GELTUNGSBEREICH DER ZERTIFIZIERUNG UND IN ÜBEREINSTINSTIMMUNG MIT DER DRUCKGERÄTERICHTLINIE 2014/68/EU UND DEN ZUGRUNDE LIEGENDEN SPEZIFIKATIONEN ENTSPR. DER BENANNTEN STELLE NR.0036, TÜV SÜD Industrie Service GmbH
PRODUCTEUR DU MATERIEL APPROUVE PAR TÜV SÜD Industrie Service GmbH N.B. 0036) POUR EMISSION DES CERTIFICATS SPECIFIQUE DE CONTROLE DE PRODUIT SELON LA DIRECTIVE DES EQUIPES A PRESION 2014/68/EU ANNEXE 1 POINT 4.3.

MATERIAL CHARACTERISTICS COMPLY WITH POINT 7.5 OF ANNEX I TO PED BY HAVING AN ELONGATION AFTER RUPTURE AT TENSILE TEST NO LESS THAN 14% AND A BENDING RUPTURE ENERGY AT IMPACT TEST NO LESS THAN 27J AT 20ºC.
LAS CARACTERISTICAS DEL MATERIAL CUMPLEN CON LOS REQUISITOS DEL PUNTO 7.5 DE LA DIRECTIVA PED POR TENER UN ALARGAMIENTO TRAS ROTURA EN EL ENSAYO DE TRACCION NO INFERIOR AL 14% Y PO DE TRACCION NO INFERIOR AL 14% Y POR TENER UNA RESISTENCIA AL IMPACTO NO INFERIOR A 27 J A 20º C.
DIE WERKSTOFF-WERTE ENTSPRECHEN PUNKT 7.5. DER DGRL, ANHANG 1, MIT EINERBRUCHDEHNUNG = 14% IM NORMGEMÄSS DURCHGEFÜHRTEN ZUGVERSUCH UND DER KERBSCHLAGARBEIT = 27J AN EINER ISO - v PRO PROBE BEI EINER TEMPERATUR VON HÖCHSTENS 20ºC
LES CARACTERISTIQUES DU MATERIEL, AYANT UN ALLONGEMENT APRES RUPTURE A L'ESSAI DE TRACTION NON INFERIEUR DU 14% ET UNE RESISTENCE A LA FLEXION PAR CHOC A 20ºC NON INFERIEUR A 27J, SONT CONFORMES AUX PRESCIPTIONS DU PONT 7.5 DE L'ANNEXE I DE PED.

MATERIAL IS FREE OF RADIATION CONTAMINATION
EL MATERIAL ESTA LIBRE DE CONTAMINACION POR RADIACIONES
MATERIAL IS FREI VON RADIOAKTIVITÄT
MATÉRIEL LIBRE DE POLUTION RADIOACTIVE

AENOR ER Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TUBACEX GROUP

STRUCTURE EXAMINATION

MTC / Certificate
748412

MATERIAL IDENTIFICATION / IDENTIFICACIÓN DEL MATERIAL

Lot No. / Num Lote	**P2305144**	**Dimension** / Dimensión	168,28 x 7,11 mm - 6'SCH 40
Heat / Colada	60418	**Grado de acero /** Steel grade	S32750

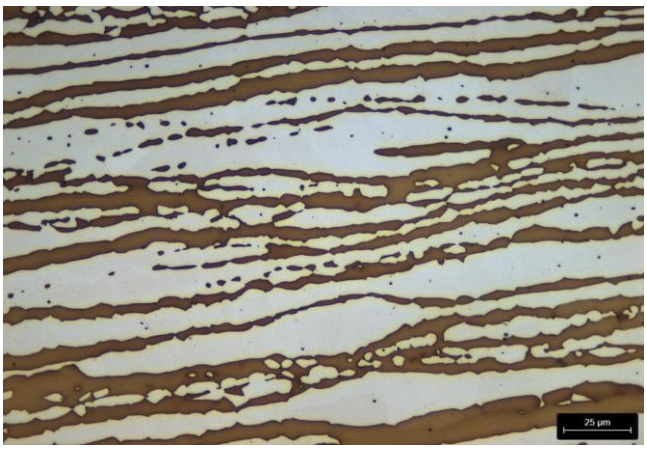
Type Of test / Tipo de Ensayo:	**MICROSTRUCTURE EVALUATION**

RESULTS / RESULTADO

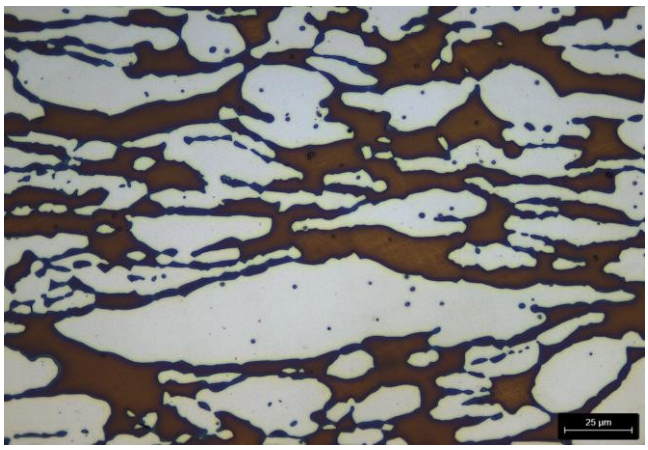
Result: The microestructure is formed by austenite and ferrite. The presence of intermetallic phases or precipitates is not observed. Uniform structure across full wall thickness Etching method according to ASTM E-407.

Resultado: la microestructura está compuesta por austenita y ferrita. No se observa la presencia de fases intermetálicas y precipitados. Estructura uniforme a través de todo el espesor. Método de ataque según ASTM E-407.

GRAPHICS RECORDS / REGISTROS FOTOGRÁFICOS:



Dir: LONGITUDINAL / MAG: 500X /



Dir: TRANSVERSAL / MAG: 500X /

Irene Castro
Responsable del Laboratorio
Laboratory Manager

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

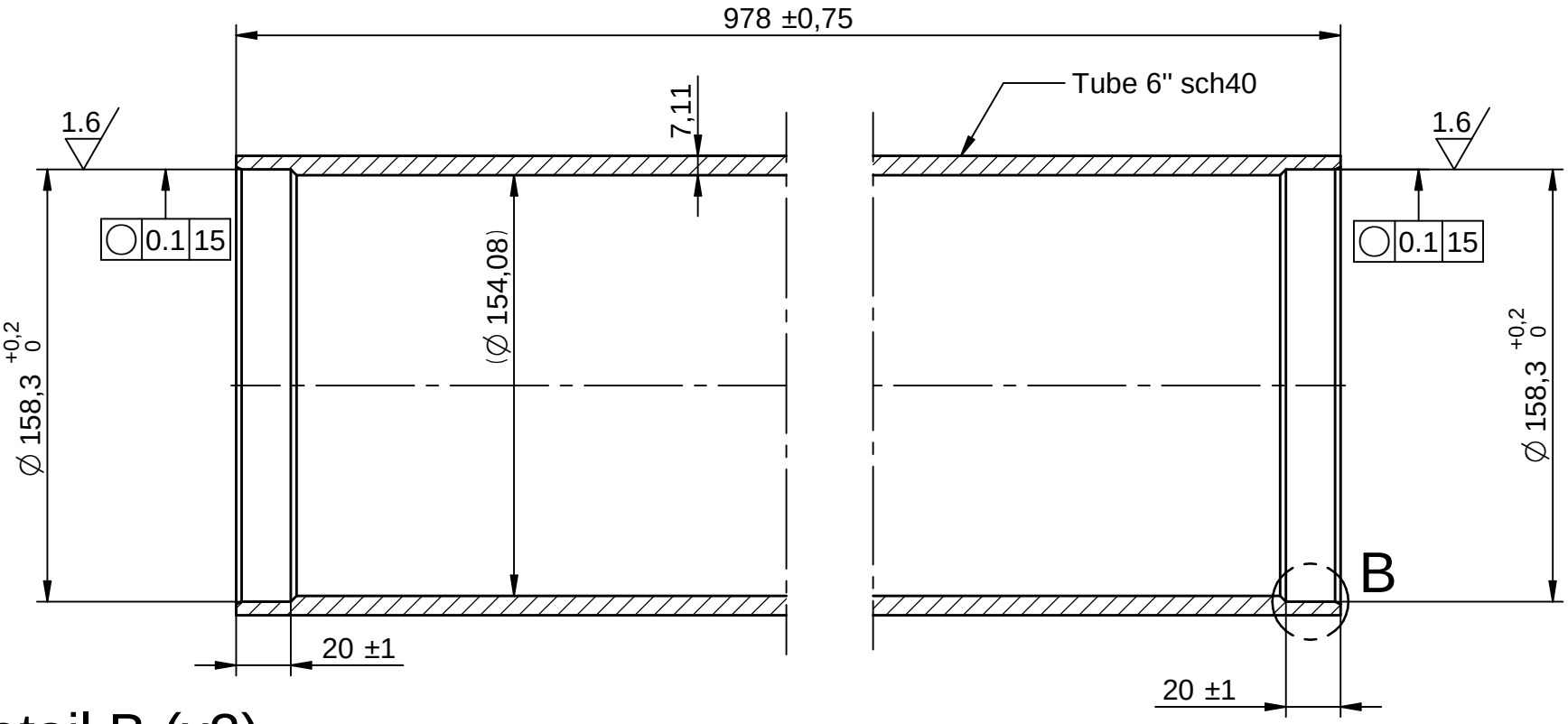
A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#51
Description
STATOR CASING 25AV24
PCM Reference
W-008200257

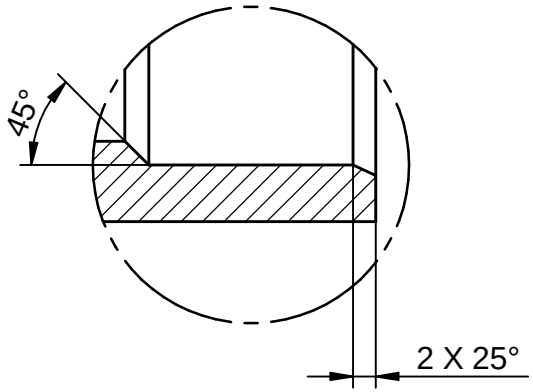
PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

SRCI & P2MI	**Traçabilité Matière -** *Material Traceability* ***Affaire PO070-24-07599***			**Ref SRCI : 24121-04**
PLAN DRAWING	**DESIGNATION**	**MATIERE MATERIAL**	**N° COULEE HEAT N°**	**REP**
W-008200-A	Pipe 6" SCH40S	316L	60418	**3**

Coupe / Section A-A



Detail B (x2)



Rev.	Par / *By*	Objet / *Subject*	FNC / *NCR*	Vérifié par / *Checked by*	Le / *On*
A	A.POUPLARD	Première révision / First revision	-	NTT	13/06/2024

PCM keep it moving

Rue René Moineau
49 123 Champtocé/Loire
FRANCE
Phone : +33 (0)1.77.68.31.00
www.pcm.eu

ENVELOPPE STATOR 25AV24

STATOR CASING 25AV24

Type	25AV24							
Masse / *Weight*	27.81 kg / 61.3 lbs	Tol.	ISO 2768-mH	✓	Ra 3.2	Mat.	Voir Ordre Fabrication / Achat *See Manufacturing / Purchasing Order*	
Par / *By*	A.POUPLARD	Le / *On*	13/06/2024	Feuille *Sheet* 1 / 1	Format A4	N°	W-008200	Rev. A

Tous droits réservés, diffusion ou reproduction interdite sans autorisation écrite de PCM.
All rights reserved, reproduction or distribution prohibited without written permission from PCM.

Heat code	QTY	Description
60418	60,89	PIPE -SMLS 6" SCH-40S STANDARD ASTM A790_UNS S32750 ASME B36.10/19

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RECEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 1 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

TTI - TUBACEX TUBOS INOXIDABLES

Registro Mercantil de Alava, Tomo 587, Folio 189, Hoja VI 2885 - N.I.F. A-01140227

Tres cruces, 8
01400 Llodio (Alava)
SPAIN

TL: 946721350
FAX: 946725062
E-MAIL:

CUSTOMER DESCRIPTION/DESCRIPCIÓN DEL CLIENTE/KUNDENBEZEICHNUNG/COMMETTANT

CLIENT SOLD TO/SOLICITANTE/AUFTRAGGEBER/COMMETTANT

TSS
TUBACEX SERVICE SOLUTIONS, S.A.U
POLIGONO INDUSTRIAL SARATXO
01470 AMURRIO

SOLD TO:WITTE TUBE & PIPE SYSTEMS GMBH
SOLD P.O. REF.:EB0010676
SOLD ORDER REF.:391923
COPY NUMBER: 001

CLIENT ORDER/PEDIDO CLIENTE/KUNDEN AUFTRAGSNUMMER/NO.DE COMMANDE: I011212
SALES ORDER/PEDIDO VENTAS/AUFTRAGSNUMMER/NO.DE COMMANDE D'USINE:

AENOR Empresa Registrada UNE EN ISO 9001

AENOR Gestión Ambiental UNE EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 2 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

MATERIAL:SEAML. STAINL. STEEL TUBES/PIPES/TUBOS INOXIDABLES SIN SOLDADURA/TUBES INOX SANS SOUDURE/NAHTLOSE EDELSTAHLROHRE
HEAT-TREATED, PICKLED / TRATADO, DECAPADO / HYPERTREMPE, DECAPE / WÄRMEBEHANDELT, GEBEIZT, PASSIVATED AS PER ASTM A380 / PASIVADO SEGUN ASTM A380 / PASSIVÉ (ASTM A380) / PASSIVIERT (ASTM A380)
GRADE / ACERO / GRADE / WERKSTOFF: S32750,1.4410,
STANDARD / NORMA / STANDARD / LIEFERUNG NACH: ASME SECT.II PART.A SA790/SA790M-2021 ED.
ASTM A790/A790M-23
EN 10216-5:2021 TC2
EN 10297-2:2005
NORSOK M650 QTR N.4
NORSOK M630:2020 MDS D51 REV.6
CHECK ANALYSIS
CORROSION TESTED ACC. TO ASTM A262 PRACTICE E
CORROSION TESTED ACC. TO ASTM A923-22 TEST METHOD C
CORROSION TESTED ACC. TO ASTM G48 TEST METHOD A
CORROSION TESTED ACC. TO EN ISO 3651-2 PRACTICE B
SHELL ES/247 REV.2 EXCEPT DPI (TABLE 1) AND SURFACE REQUIREMENTS (POINT 9.1)
HYDROTEST
ANSI/NACE MR0103/ISO 17945:2015
ANSI/NACE MR0175/ISO15156-3:2020
QAD 68 REV.0
RTX_D51S REV.6
SHELL MESC SPE 74/014 FEBRUARY 2021 EXCEPT:
NO LIQUID PENETRANT TEST (POINT 14.12.1),
TENSILE TEST ONLY IN LONGITUDINAL DIRECTION.
ULTRASONIC TEST ONLY FOR LONGITUDINAL DEFECTS.
IMPACT TEST (if applicable): Lateral expansion 0.38 mm. minimum.
ULTRASONIC TEST ACC. TO ASTM A999/A999M / ASTM E213
TOLERANCES / TOLERANCIAS / TOLERANCES / TOLERANZEN NACH: ASME SECT.II PART.A SA999/SA999M-2021 ED.
ASTM A999/A999M-18
EN ISO 1127/03.2019 D2/T2
RANDOM LENGTHS / LARGOS VARIABLES / LONGUEUR COURANTE / EINGEENGTE LÄNGE 6.000/7.000 MM
PLAIN ENDS / LISOS / EXTRÉMITÉ D'EQUERRE / GLATTE ENDEN,
DIMENSIONS/DIMENSIONES/DIMENSIONS/DIMENSIONS: 168,28 X 7,11 MM - 6" SCH 40S
HOT FINISHED/ACABADOS EN CALIENTE/WARMGEFORMT/FINIS A CHAUD

Sales Item Pos Ped. AuftrgPos Usine Pos	Client Item Pos Clnt Kunde Pos Com. Pos	Delivery No Nº Entrega Lieferung Avis. d'exp	Lot No. Nº lote Los Nr. Lot d`inspection	Heat No Colada Schmelze Coulée	Pieces Piezas Stück Pcs	Weight Peso Gewicht Poids	Tot Lgth Long. Tot Gesamtlänge Tolength	Un Lgth Long. Un Längentyp Long. Un
20		8110078629	P2305144	60418	15	3.013 KG	100,39 M	6000-7000 MM

RAW MATERIAL/DATOS MATERIAL/VORMATERIAL/MATIERE PREMIERE

Heat Nr:	Supplier	Method
60418	ACERALAVA (SPAIN)	Electric furnace+AOD

AENOR ER Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 3 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

CHEMICAL COMPOSITION (%)/COMPOSICIÓN QUÍMICA (%)/CHEMISCHE ZUSAMMENSETZUNG (%)/COMPOSITION CHIMIQUE(%)

*L: Ladle C:Products

*	Heat	Seq	C	Mn	Si	P	S	Ni	Cr	Mo	Al	Cu
L	60418	1	0,013	0,73	0,410	0,025	0,0006	7,25	25,50	3,57	0,011	0,11
C	60418	2	0,013	0,72	0,410	0,024	0,0006	7,26	25,42	3,63	0,010	0,11
C	60418	3	0,013	0,72	0,410	0,025	0,0006	7,31	25,44	3,61	0,011	0,11

*	Heat	Seq	V	Nb	W	Co	N	Pren
L	60418	1	0,074	0,003	0,050	0,075	0,2765	41,7050
C	60418	2	0,072	0,002	0,048	0,077	0,2765	41,8230
C	60418	3	0,074	0,002	0,048	0,076	0,2765	41,7770

HEAT TREATMENT/TRATAMIENTO TÉRMICO/WÄRMEBEHANDLUNG/TRAITEMENT THERMIQUE

HIPERTEMPLADOS A 1100 °C , 12 min , Agua
SOLUTION ANNEALED AT 1100 °C , 12 min , WATER
HYPERTREMPES 1100 °C , 12 min , L' EAU
LOESUNGSGEGLUEHT 1100 °C , 12 min , Wasser

TENSILE TEST/TEST DE TENSIÓN/ESSAI TRACTION/ZUGVERSUCH

Lot No.	Sample	T	Rp0.2	Rp1.0	Rm	A2"	A5	Type	Spc.Type	Spc.Dim
		°C	*MPa*	*MPa*	*MPa*	*%*	*%*			*mm*
P2305144	1	20	600	684	827	43	41	L	S	20,25
	2	20	600	683	827	44	42	L	S	20,09

IMPACT TEST/TEST DE IMPACTO/RESILIENCE/KERBSCHLAGVERSUCH

Lot No.	Sample	T	Wspec	Ecv 1	Ecv 2	Ecv 3	Ecv AVG	Type	Le1	Le2	Le3	Shear 1	Shear 2	Shear 3
		°C	*mm*	*J*	*J*	*J*	*J*		*mm*	*mm*	*mm*	*%*	*%*	*%*
P2305144	1	-51	5,00	117	116	113	115	L	1,25	1,12	1,20	70	60	70

CORROSION ACCORDING TO ASTM A923 C/CORROSION DE ACUERDO ASTM A923 C/CORROSION SUIVANT ASTM A923 C/CORROSION ACCORDING TO ASTM A923 C

Lot No.	Sample	T	Pits-20x	Wloss	time
		°C		*MDD*	*Horas*
P2305144	1	50	N	2,6620	24,0

Corrosion test ASTM G48 practice A/Corrosión ASTM G48 práctica A/TEST DE CORROSION ASTM G48 practice A/LOCHFRASSTEST ASTM G 48 PR.A

Lot No.	Sample	T	Pits-20x	W.loss	time
		°C		*g/m2*	*Horas*
P2305144	1	50	N	0,2662	24,0

HARDNESS TEST/TEST DE DUREZA/DUREE/HÄRTEPRÜFUNG

Lot No.	Sample	0ºExt1	0ºExt2	0ºExt3	0ºInt1	0ºInt2	0ºInt3	90ºExt1	90ºExt2	90ºExt3	90ºInt1	90ºInt2	90ºInt3	180ºExt1
		HRC	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*
P2305144	1	20,9	23,8	23,0	18,4	19,8	15,6	23,8	20,4	21,3	20,5	21,6	23,4	24,6

Lot No.	Sample	180ºExt2	180ºExt3	180ºInt1	180ºInt2	180ºInt3	270ºExt1	270ºExt2	270ºExt3	270ºInt1	270ºInt2	270ºInt3
		HRC	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*	*HRC*
P2305144	1	22,9	23,0	21,6	23,0	21,3	15,2	23,2	20,5	20,3	22,5	19,7

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 4 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

FERRITE ACCORDING TO ASTM E 562/Contenido de Ferrita según ASTM E562/FERRITE SUIVANT ASTM E562/FERRIT ENTSPRECHEND ASTM E562

Lot No.	Sample	%Fer	Dev.Ferr
		%	%
P2305144	1	46,61	2,04

METALURGICAL TESTS/ENSAYOS METALÚRGICOS/METALLURGISCHE PRÜFUNGEN/ESSAIS METALLURGIQUES

ETCH STRUCTURE ACC. ASTM A923 MET.A: UNAFFECTED STRUCTURE. MATERIAL FREE FROM INTERMETALLIC PHASES AND PRECIPITATES. UNIFORM STRUCTURE ACROSS FULL WALL THICKNESS
EXAMEN DE MICROESTRUCUTRA DE ACUERDO A ASTM A923 MET.A: ESTRUCTURA NO AFECTADA. MATERIAL LIBRE DE FASES INTERMETALICAS Y PRECIPITADOS. ESTRUCTURA UNIFORME A TRAVES DEL ESPESOR.
ETCH STRUCTURE ACC. ASTM A923 MET.A: UNAFFECTED STRUCTURE. MATERIAL FREE FROM INTERMETALLIC PHASES AND PRECIPITATES. UNIFORM STRUCTURE ACROSS FULL WALL THICKNESS

INTERGRANULAR CORROSION TEST ACC. TO ASTM A262 PRACT."E": SATISFACTORY
ENSAYO DE CORROSION INTERGRANULAR DE ACUERDO A ASTM A262 PRACT.E: SATISFACTORIO
BESTÄNDIGKEIT GEGEN INTERKRISTALLINE KORROSION ENTSPRECHEND ASTM A262 PRACT.E: IN ORDNUNG
ESSAI DE CORR. INTERGR. SELON ASTM A262 PRACT.E:SATISFAISANT
INTERGRANULAR CORROSION TEST ACC.TO DIN EN ISO 3651-2 MET.B: SATISFACTORY
ENSAYO DE CORROSION INTERGRANULAR DE ACUERDO A ISO 3651-2 MET.B: SATISFACTORIO
BESTÄNDIGKEIT GEGEN INTERKRISTALLINE KORROSION ENTSPRECHEND ISO 3651-2 MET."B": IN ORDNUNG
ESSAI DE CORR. INTERGR. SELON ASTM ISO 3651-2 MET."B":SATISFAISANT

NON-DESTRUCTIVE TESTS/ENSAYOS NO DESTRUCTIVOS/ZERSTÖRUNGSFREIE PRÜFUNGEN/ESSAIS NON DESTRUCTIFS

FERRITE CONTENT DETERMINED BY FISCHER FERRITOSCOPE TO 100% OF PRODUCTS
CONTENIDO EN FERRITA MEDIDO CON FERRITOSCOPIO SOBRE EL 100% DEL MATERIAL.
Ferritescope-Test auf 100% des Materials.

100% ULTRASONIC TEST ACC. TO ASTM A999 / E213: SATISFACTORY
100% ENSAYO DE ULTRASONIDOS DE ACUERDO A ASTM A999 / E213: SATISFACTORIO
100% ULTRASCHALLPRÜFUNG NACH ASTM A999 / E.213:IN ORDNUNG
100% ESSAI D´ULTRASON D'ACCORD A ASTM A999 / E.213: SATISFAISANTE

100% ULTRASONIC TEST ACC. TO EN 10246-7, U2C: SATISFACTORY
100% ENSAYO DE ULTRASONIDOS DE ACUERDO A EN 10246-7, U2C: SATISFACTORIO
100% ULTRASCHALLPRÜFUNG NACH EN 10246-7, U2C:

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI TUBACEX GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 5 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

IN ORDNUNG
100% ESSAI D´ULTRASON D'ACCORD A EN 10246-7, U2C: SATISFAISANTE
POSITIVE MATERIAL IDENTIFICATION TEST ON EACH TUBE/PIPE BY
"X-RAY-FLUORESCENCE-ANALYZER": SATISFACTORY
VERIFICACION DEL GRADO DE ACERO EN CADA TUBO MEDIANTE "ANALIZADOR DE
FLUORESCENCIA DE RAYOS X": SATISFACTORIO
VERWECHSLUNGSPRUEFUNG AN JEDEM ROHR MIT
"RÖNTGEN-FLUORESZENZ-ANALYSATOR": IN ORDNUNG
VERIFICATION DE LA NUANCE SUR CHAQUE TUBE PAR
"X-RAY-FLUORESCENCE-ANALYZER": SATISFAISANT

HYDROSTATIC PRESSURE TESTED AT 190 bar, 2800 PSI DURING 5 SEC ON EACH
TUBE/PIPE: SATISFACTORY
ENSAYO HIDROSTÁTICO A 190 bar, 2800 PSI DURANTE 5 SEC EN CADA TUBO:
SATISFACTORIO
WASSERDRUCKPRÜFUNG BEI 190 bar, 2800 PSI HALTEZEIT 5 SEC JE ROHR: IN
ORDNUNG
ESSAI DE PRESSION HYDROSTATIQUE À 190 bar, 2800 PSI PENDANT 5 SEC SUR
CHAQUE TUBE: SATISFAISANT

DIMENSIONAL CHECKING ON EACH TUBE: SATISFACTORY
INSPECCION DIMENSIONAL AL 100% DE LOS TUBOS SATISFACTORIA
100% MASSKONTROLLE: O.B.
VERIFICATION DIMENTIONNELLE AU 100% DES TUBES, SATISFAISANTE

VISUAL INSPECTION ON EACH TUBE: SATISFACTORY
INSPECCION VISUAL AL 100% DE LOS TUBOS, SATISFACTORIA
100% BESIGCHTIGUNG: O.B.
EXAMEN VISUEL AU 100% DES TUBES, SATISFAISANT

TECHNOLOGICAL TESTS/ENSAYOS TECNOLÓGICOS/TECHNOLOGISCHE PRÜFUNGEN/TECHNOLOGICAL TESTS

FLATTENING TEST: SATISFACTORY
APLASTADO S.NORMA: SATISFACTORIO
RINGFALTVERSUCH: IN ORDNUNG
ESSAI D'APLATISSEMENT: SATISFAISANT

RING TENSILE TEST: SATISFACTORY

TRACCION DE ANILLO: SATISFACTORIO
RINGZUGVERSUCH: IN ORDNUNG
ESSAI DE TRACTION A L'ANNEAU: SATISFAISANT

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TTI
TUBACEX
GROUP

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RÉCEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 748412 Page: 6 / 6	Rev: 00
Created on: Date: 06.11.2023	Modified on: 28.12.2023

MARKING/ETIQUETADO/KENNZEICHNUNG/MARKSTEXT

TX2 TX1 TUBACEX 168,28 X 7,11 MM - 6" SCH 40S ASME SA790 ASTM A790 EN 10216-5 TC2 EN 10297-2 S32750 1.4410 HFD HF SMLS HEAT/ PMI-AV LOT NO/MADE IN SPAIN

REMARKS/OBSERVACIONES/ANMERKUNG/REMARQUES

NO MERCURY, MERCURY COMPOUNDS OR MERCURY BEARING INSTRUMENTS AND/OR EQUIPMENT HAVE BEEN USED ALONG MANUFACTURING AND INSPECTION PROCESS.
DURANTE LOS PROCESOS DE FABRICACIÓN E INSPECCIÓN NO SE HA USADO MERCURIO NI INSTRUMENTOS Y/O EQUIPOS CONTENIENDO MERCURIO O CON COMPONENTES DE MERCURIO.
KEINE QUEKSILBER, BZW. QUECKSILBERVERUNREINIGTES KOMPONENTEN ODER KUGELLAGERINSTRUMENTE UND/ODER GERÄTE SIND BENUTZT WORDEN PRODUKTIONS UND BESICHTIGUNGSPROZESS.
IL N'A PAS ÉTÉ FAIT USAGE DE MERCURE, DE COMPOSÉS CONTENANT DU MERCURE OU DE MATÉRIAUX ET/OU D'INSTRUMENT CONTENANT DU MERCURE TOUT AU LONG DES ÉTAPES DE FABRICATION ET DU PROCESSUS D'INSPECTION ET DE CONTRÔLE.

NO WELDING OR WELD REPAIRS WERE MADE
SIN REPARACION POR SOLDADURA
KEINE SCHWEISSBEARBEITUNG WURDE VORGENOMMEN
SANS RÉPARATION AVEC SOUDURE
MATERIAL MANUFACTURER APPROVED BY TÜV SÜD Industrie Service GmbH
(NOTIFIED BODY 036)TO ISSUE CERTIFICATES OF SPECIFIC PRODUCT CONTROL IN
ACCORDING TO PRESSURE EQUIPMENT DIRECTIVE 2014/68/EU ANNEX 1 POINT 4.3.
FABRICANTE DE MATERIALES APROBADO POR TÜV SÜD Industrie Service GmbH (ORGANISMO NOTIFICADO 0036) PARA LA EMISION DE CERTIFICADOS ESPECIFICOS DE CONTROL DE PRODUCTO DE ACUERDO AL ANEXO 1, PUNTO 4.3 DE LA DIRECTIVADE EQUIPOS A PRESION 2014/68/EU.
WERKSTOFFHERSTELLER MIT BERECHTIUNG ZUR AUSSTELLUNG VON BESCHEINIGUNGEN ÜBER SPEZIFISCHE PRÜFUNGEN AN DEN WERKSTOFFEN IM GELTUNGSBEREICH DER ZERTIFIZIERUNG UND IN ÜBEREINSTINSTIMMUNG MIT DER DRUCKGERÄTERICHTLINIE 2014/68/EU UND DEN ZUGRUNDE LIEGENDEN SPEZIFIKATIONEN ENTSPR. DER BENANNTEN STELLE NR.0036, TÜV SÜD Industrie Service GmbH
PRODUCTEUR DU MATERIEL APPROUVE PAR TÜV SÜD Industrie Service GmbH N.B. 0036) POUR EMISSION DES CERTIFICATS SPECIFIQUE DE CONTROLE DE PRODUIT SELON LA DIRECTIVE DES EQUIPES A PRESION 2014/68/EU ANNEXE 1 POINT 4.3.

MATERIAL CHARACTERISTICS COMPLY WITH POINT 7.5 OF ANNEX I TO PED BY HAVING AN ELONGATION AFTER RUPTURE AT TENSILE TEST NO LESS THAN 14% AND A BENDING RUPTURE ENERGY AT IMPACT TEST NO LESS THAN 27J AT 20ºC.
LAS CARACTERISTICAS DEL MATERIAL CUMPLEN CON LOS REQUISITOS DEL PUNTO 7.5 DE LA DIRECTIVA PED POR TENER UN ALARGAMIENTO TRAS ROTURA EN EL ENSAYO DE TRACCION NO INFERIOR AL 14% Y PO DE TRACCION NO INFERIOR AL 14% Y POR TENER UNA RESISTENCIA AL IMPACTO NO INFERIOR A 27 J A 20º C.
DIE WERKSTOFF-WERTE ENTSPRECHEN PUNKT 7.5. DER DGRL, ANHANG 1, MIT EINERBRUCHDEHNUNG = 14% IM NORMGEMÄSS DURCHGEFÜHRTEN ZUGVERSUCH UND DER KERBSCHLAGARBEIT = 27J AN EINER ISO - v PRO PROBE BEI EINER TEMPERATUR VON HÖCHSTENS 20ºC
LES CARACTERISTIQUES DU MATERIEL, AYANT UN ALLONGEMENT APRES RUPTURE A L'ESSAI DE TRACTION NON INFERIEUR DU 14% ET UNE RESISTENCE A LA FLEXION PAR CHOC A 20ºC NON INFERIEUR A 27J, SONT CONFORMES AUX PRESCIPTIONS DU PONT 7.5 DE L'ANNEXE I DE PED.

MATERIAL IS FREE OF RADIATION CONTAMINATION
EL MATERIAL ESTA LIBRE DE CONTAMINACION POR RADIACIONES
MATERIAL IS FREI VON RADIOAKTIVITÄT
MATÉRIEL LIBRE DE POLUTION RADIOACTIVE

AENOR ER Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

TUBACEX TUBOS INOXIDABLES S.A.U.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order#s requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TSS S.A.U as commercial operation intermediary certifies that this certificate is a true copy of the manufacturer original certificate. TSS S.A.U makes a copy of the original certificate without changing the properties specified in the original purchase order and the product specification referenced.

TUBACEX GROUP

STRUCTURE EXAMINATION

MTC / Certificate
748412

MATERIAL IDENTIFICATION / IDENTIFICACIÓN DEL MATERIAL

Lot No. / Num Lote	**P2305144**	**Dimension** / Dimensión	168,28 x 7,11 mm - 6'SCH 40
Heat / Colada	60418	**Grado de acero /** Steel grade	S32750

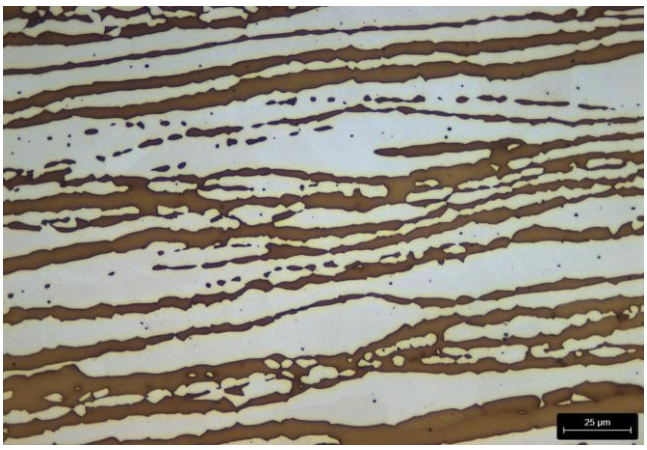
Type Of test / Tipo de Ensayo:	**MICROSTRUCTURE EVALUATION**

RESULTS / RESULTADO

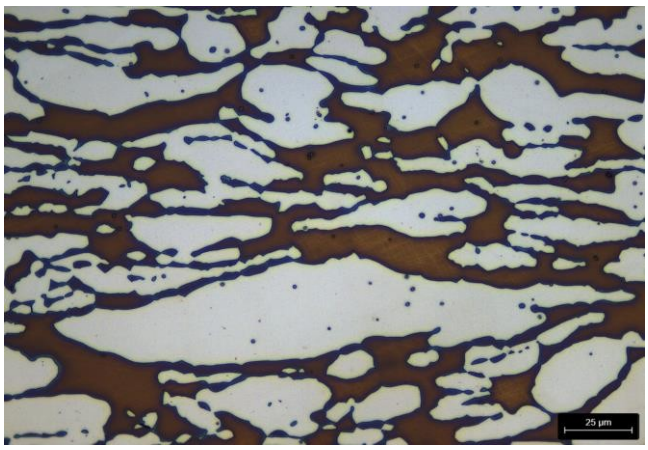
Result: The microestructure is formed by austenite and ferrite. The presence of intermetallic phases or precipitates is not observed. Uniform structure across full wall thickness Etching method according to ASTM E-407.

Resultado: la microestructura está compuesta por austenita y ferrita. No se observa la presencia de fases intermetálicas y precipitados. Estructura uniforme a través de todo el espesor. Método de ataque según ASTM E-407.

GRAPHICS RECORDS / REGISTROS FOTOGRÁFICOS:



Dir: LONGITUDINAL / MAG: 500X /



Dir: TRANSVERSAL / MAG: 500X /

Irene Castro
Responsable del Laboratorio
Laboratory Manager

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#54
Description
PIPE STATOR 25AV24
PCM Reference
W-008198257

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

P0070-24-07808/W-00819825?/PIPESTATOR ESAV24/C24-06-142

ITALFOND
STAINLESS STEEL AND SUPERALLOYS
A GIVA GROUP

Tel. (+39).(030).6829911
Fax. (39).(030).6820616
Via Industriale, 1 - 25021 BAGNOLO MELLA (BS) ITALY

BESCHEINIGUNG ÜBER QUALITÄT UND WERKSTOFFPRÜFUNGEN

CERTIFICATE OF QUALITY AND MATERIAL TESTING

ABNAHMEPRÜFZEUGNIS-Nr. AC/ **2723** **DATUM : 30/08/2024**
Certficate-No. Date :

nach EN 10204.3.1 - according to EN 10204.3.1

BESTELLER: **STAPPERT DEUTSCHLAND GMBH**
Customer

BESTELL-Nr.: **105052/W** **AUFTRAGBESTÄTIGUNG :** **212904**
Order-No. Order confirmation :

Schmelze-Nr. *Heat-No.*	Stücke *Pieces*	MATERIAL-BEZEICHNUNG *Material description*	WERKSTOFF-Nr. *Material grade*
73236	**1**	FORGED ROUND PEELED BARS Ø350mm Geschmiedeter Geschälter stab Ø350mm	**W.nr.1.4501** **TL119 Ed. 07/2019** **DIN EN 10272** **DIN EN 10088-3** **UNS S32760**
	7323601000	4222kg x 5550mm length	**ASTM A479** **ASTM A276** **ASTM A484** **ASME SA276 Sec. II Part A Ed.2023** **ASME SA479 Sec. II Part A Ed.2023** **ASME SA484 Sec. II Part A Ed.2023** **NACE MR0175:2021 / ISO15156-3:2020** **NACE MR0103 / ISO 17945**

Zeichen des Lieferwerkes *Trade mark*		*Stempel des Werkssachverständigen* *Inspector's stamp*	

Wärmebehandlungszustand: **Lösungsgeglüht 1120°C (13h) in Wasser abgeschreckt**
Condition of heat treatment: Solution annealed 1120°C (13h) + water quenched

Schmelzanalyse / Heat analysis

C	Mn	Si	P	S	Cr	Ni	Mo	Cu	Sn
0,017	0,62	0,40	0,025	0,0008	24,99	7,02	3,56	0,598	
Ca	**N**	**V**	**Ti**	**W**	**Ta**	**PRE**	**PREW2**	**Grain Size ASTM E112**	
	0,264			0,639		40,96	42,02	4	

PRÜFERGEBNISSE - TEST RESULTS ON ACTUAL BAR PROLONGATION

Temp. [°C]	Norm Direction	$Rp_{0,2}$ [MPa]	Rp_1 [MPa]	Rm [MPa]	A [%]	Z [%]	KV_2 (10x10mm) [J]	Hardness
RT	**EN/T**	542		773	34,3	54,2		**HRc:** <22
20	**EN/L**						121 - 119 - 122	**HB:**
RT	**ASTM/L**	592		765	40,0	66,7		242-242-243

Erschmelzung E.A.F. + A.O.D. / Steelmaking process E.A.F. + A.O.D. refining
Material ohne Quecksilberverunreinigungen / Material free from Mercury contamination
Material durch Gammaspektrometer überprüft und ohne radioactive Verunreinigung über die nach EU-Radiation Protection 122-part 1, festgestellten Grenzwerte, wenn zugehörig / Material inspected with a gamma spectrometer and with no radioactive contamination beyond the limits provided for by the EU-Radiation Protection 122-part 1, when relevant.
Material ohne Schweißen / No welding perfomed on material
Verformungsgrad / Forging Ratio 5,2:1
Gefügeart: superduplex / Microstructure: superduplex
Mechanische Prüfungen gem./Mechanical tests performed acc.to UNI EN ISO 6892-1 (Probe/tensile Ø10mmx50mm) + ASTM A370 (Ø12,5mm-50mm length) + UNI EN ISO 6506-1/ASTM E 10+ UNI EN ISO 6508-1/ASTM E18 + UNI EN ISO 148-1. Bei Raumtemperature / At room temperature.
Werkstoff nach DIN EN ISO 3651-2 Verfahren C, ASTM A262 Pr.E interkristallinische Korrosion beständig / Material resistant to intercrystalline corrosion according to DIN EN ISO 3651-2 Method C and ASTM A262 Pr.E
Chemische Zusammensetzung und mechanische Prüfungen nach ASTM A182 and ASME Code Sec.II Part.A SA182 (F55) / Chemical analysis and mechanical properties according to ASTM A182 and ASME Code Sec.II Part.A SA182 (F55)
PRE= Cr + 3,3*Mo + 16*N
PREW2= Cr + 3,3*(Mo+0,5*W) + 16*N
Art der Verwechslungsprüfung: spektralanalytisch / PMI performed with a x-ray spectrometer
Augestellt in Einvernehmen mit dem TÜV Süd (März 1995) / Issued in agreement with TÜV Süd Industrie Service GmbH (March 1995)
QMS nach DGRL 2014/68/EU, Anhang I, Absatz 4.3 die Notifizierte Stelle - Kennnummer 0036 / (Zertifikat Nr. DGR-0036-QS-W 55/2002/MUC)
QMS approved according to PED 2014/68/EU, Annex I, Para. 4.3 by Notified Body 0036 / (Certification no. DGR-0036-QS-W 55/2002/MUC)
Ursprungsland / Country of origin: Italy
Country of melt and manufacture: Italy / Erschmelzungs- und Produktionsland: Italien
Geliefertes Material in Übereinstimmung mit Bestellnormen, -spezifikationen u. -anforderungen
The delivered products comply with the standards, specifications and requirements of the order

DER SACHVERSTÄNDIGE *Surveyors*	DER KUNDENSACHVERSTÄNDIGE *Customer Inspector*	ITALFOND S.p.A. *Der Qualitätsleiter*
		ITALFOND GARANZIA QUALITA' DELLA QUALITA'

ITALFOND
STAINLESS STEEL AND SUPERALLOYS
A GIUSTI GROUP

Tel. (+39).(030).6829911
Fax. (39).(030).6820616
Via Industriale, 1 - 25021 BAGNOLO MELLA (BS) ITALY

BESCHEINIGUNG ÜBER QUALITÄT UND WERKSTOFFPRÜFUNGEN

CERTIFICATE OF QUALITY AND MATERIAL TESTING

ULTRASCHALLPRÜFUNG / *ULTRASONIC TEST*

ABNAHMEPRÜFZEUGNIS-Nr. UT/ **2723** **DATUM : 30/08/2024**
Certficate-No. Date :

nach EN 10204.3.1 - according to EN 10204.3.1

BESTELLER: **STAPPERT DEUTSCHLAND GMBH**
Customer

BESTELL-Nr.: **105052/W** **AUFTRAGBESTÄTIGUNG : 212904**
Order-No. Order confirmation :

Schmelze-Nr. *Heat-No.*	Stücke *Pieces*	MATERIAL-BEZEICHNUNG *Material description*	WERKSTOFF-Nr. *Material grade*
73236	**1**	FORGED ROUND PEELED BARS Ø350mm Geschmiedeter Geschälter stab Ø350mm	**W.nr.1.4501** **TL119 Ed. 07/2019** **DIN EN 10272** **DIN EN 10088-3** **UNS S32760** **ASTM A479** **ASTM A276** **ASTM A484** **ASME SA276 Sec. II Part A Ed.2023** **ASME SA479 Sec. II Part A Ed.2023** **ASME SA484 Sec. II Part A Ed.2023** **NACE MR0175:2021 / ISO15156-3:2020** **NACE MR0103 / ISO 17945**
	7323601000	4222kg x 5550mm length	

Wärmebehandlungszustand: **Lösungsgeglüht 1120°C (13h) in Wasser abgeschreckt**
Condition of heat treatment: Solution annealed 1120°C (13h) + water quenched

ULTRASCHALLPRÜFBERICHT - Ultrasonic test report

PRÜFGERÄT	:	**KRAUTKRAMER USM 36**
Equipment	:	
JUSTIERUNGSVERFAHREN	:	**Rückwandecho**
Calibration Method	:	Back wall echo
KOPPLUNGSMITTEL	:	**Gel**
Couplant	:	Gel
PRÜFKOPF	:	**B1S**
Kind of Probe	:	
BEARBEITUNGSZUSTAND	:	**Geschälter**
Surface Condition	:	Peeled
PRÜFUMFANG	:	**100% US-Prüfung**
Inspection scope	:	100% UT-inspected
PRÜFVERFAHREN	:	**DIN EN 10228-4**
Testing procedure	:	
ZULÄSSIGKEITSGRENZE	:	**Quality Class 2**
Acceptance Criteria	:	
PRÜFERGEBNIS	:	**Keine registrierpflichtigen Anzeigen**
Test result	:	No recordable indications found

DER SACHVERSTÄNDIGE *Surveyors*	DER KUNDENSACHVERSTÄNDIGE *Customer Inspector*	ITALFOND S.p.A. *NDE Inspector*
		ISO 9712 - UT PT Lev. 2 SNT-TC 2A - UT PT Lev. II MOHAMMED MAJOUBI

ITALFOND
STAINLESS STEEL AND SUPERALLOYS
© CIVA GROUP

Tel. (+39).(030).6829911
Fax. (39).(030).6820616
Via Industriale, 1 - 25021 BAGNOLO MELLA (BS) ITALY

BESCHEINIGUNG ÜBER QUALITÄT UND WERKSTOFFPRÜFUNGEN

CERTIFICATE OF QUALITY AND MATERIAL TESTING

MIKROGRAPHISCHE PRÜFUNG / *MICROGRAPHIC EXAMINATION*

ABNAHMEPRÜFZEUGNIS-Nr. ME/ **2723** **DATUM : 30/08/2024**
Certficate-No. Date :

nach EN 10204.3.1 - according to EN 10204.3.1

BESTELLER: **STAPPERT DEUTSCHLAND GMBH**
Customer

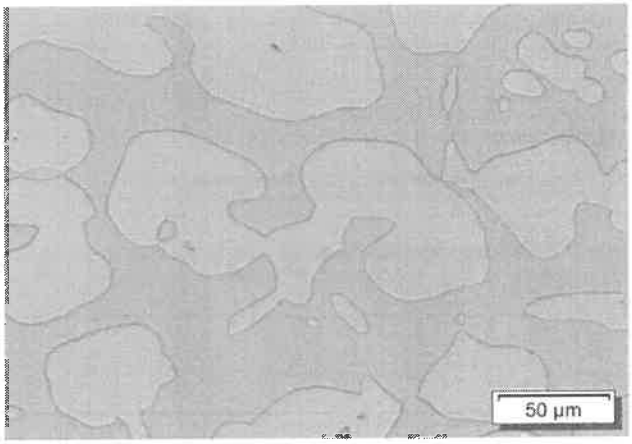
BESTELL-Nr.: **105052/W** **AUFTRAGBESTÄTIGUNG : 212904**
Order-No. Order confirmation :

Schmelze-Nr. *Heat-No.*	Stücke *Pieces*	MATERIAL-BEZEICHNUNG *Material description*	WERKSTOFF-Nr. *Material grade*
73236	**1**	FORGED ROUND PEELED BARS Ø350mm Geschmiedeter Geschälter stab Ø350mm	**W.nr.1.4501** **TL119 Ed. 07/2019** **DIN EN 10272** **DIN EN 10088-3** **UNS S32760**
	7323601000	4222kg x 5550mm length	**ASTM A479** **ASTM A276** **ASTM A484** **ASME SA276 Sec. II Part A Ed.2023** **ASME SA479 Sec. II Part A Ed.2023** **ASME SA484 Sec. II Part A Ed.2023** **NACE MR0175:2021 / ISO15156-3:2020** **NACE MR0103 / ISO 17945**

Wärmebehandlungszustand: **Lösungsgeglüht 1120°C (13h) in Wasser abgeschreckt**
Condition of heat treatment: Solution annealed 1120°C (13h) + water quenched

MIKROGRAPHISCHE PRÜFUNG - MITTE RADIUS
MICROGRAPHIC EXAMINATION - MID RADIUS

Vergrößerung : 500 x **- Magnification:** 500 x
Ätzen : elektrolytische, oxalic acid 3v 20s nach ASTM E407
Etching : eletrolitic, oxalic acid 3v 20s according to ASTM E407



ERGEBNIS : Frei von intermetallischen Phasen aund Ausscheidungen / **RESULT:** Free from intermetallic phases and precipitates
Ferrite content according to ASTM E562 Point counting 30 fields 16 points per field : **45,00 ± 2,50%**
Ferrit-Gehalt gem. ASTM E562 Punkte Berechnung 30 Felder 16 Punkte per Feld : **45,00 ± 2,50%**

DER SACHVERSTÄNDIGE *Surveyors*	DER KUNDENSACHVERSTÄNDIGE *Customer Inspector*	ITALFOND S.p.A. *Der Qualitätsleiter*
		ITALFOND GARANZIA QUALITÀ

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#54A
Description
FLAT STRAINER 25AV AV7
PCM Reference
W-008189257T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

N° FRANCE INOX 50184

outokumpu
high performance stainless steel

INSPECTION CERTIFICATE
EN 10204-3.1

Outokumpu Sales Order No.
9000078923

Certificate No.	Revision	Customer Order No.
169096	00	PO-05017

Production mill	Date	Delivery No.
Avesta Plant	07 Dec 2022	8000170186

Sold to

Sverdrup Steel As
Strandsvingen 2
4032 STAVANGER
NORWAY

Product	Grade
Stainless Steel Cold Rolled Sheet, Slit edge, Forta SDX 2507	1.4410 ISS 2507 UNS S32750
Finish 2E	

Ship to

Edelstahl Service Center Burg GmbH
Troxel 1B
39288 BURG
GERMANY

Requirements

ASME SA-240/SA-240M BPVC.II.A-2021
ASTM A240/A240M - 22
EN 10028-7:2016
EN 10088-2:2014
EN 10088-4:2009
IS 6911:2017, Amendment No. 3 December 2021
NACE MR0103/ISO 17945:2015
NACE MR0175/EN ISO 15156-1:2020 & NACE MR0175/EN ISO 15156-3:2020

ASME SA-480/SA-480M BPVC.II.A-2021
ASTM A480/A480M - 22
EN ISO 9445-2:2010

Mark of manufacturer	Process	Inspector's Stamp
outokumpu	E+AOD	AJA

Sales order Item	Dimensions	Quantity (pcs)	Weight
40	3,00 X 2000,0 X 6000 mm	7	1980 kg

Heat No.	Lot No.	Identification No. of Product	Customer's Material No.
522214	1	522214-1	

Chemical Composition

		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	N %	Cu %
Heat No. 522214	Country of Melt Sweden	0,014	0,27	0,64	0,025	0,001	24,9	6,6	3,7	0,29	0,27
Heat No. 522214	Country of Melt Sweden	PRE 16N 42									

Test Results (1=Beginning, 2=Middle, 3=End, T=Transverse, L=Longitudinal, D=Diagonal, RT=Room temperature)

		EN ISO 6892-1 / ASTM A370 (RT)				ASTM E10 / EN ISO 6506-1	FERRITESCOPE
Identification No. of Product	Sample ID	RP0.2 MPa	RM MPa	A5 %	A50 %	HARDNESS HBW	FERRITE CONTENT %
	Minimum	550	795	20	15		35,0
	Maximum		1000			310	65,0
522214-1	1 T 812189	718	928	32	30	278	50,0
522214-1	3 T 812190	740	934	31	30	275	
		PMI					
Identification No. of Product	Sample ID	PMI					
	Minimum						
	Maximum						
522214-1	1 T 812189	OK					
522214-1	3 T 812190	OK					

Country of Origin: Sweden

Solution annealed at 1080 °C/1976 °F. Rapidly cooled with water and air.

Certified acc. to PED 2014/68/EU by TÜV NORD, notified body, Reg-No. 0045

Avg.t CO2e/t: 2,25

Outokumpu Stainless AB
Business Area
Operations Avesta
SWEDEN
Tel: +46 (0)226 811 73
Regoffice: Stockholm SWEDEN,
Regno: 556001-8748
V.A.T no: SE556001874801

This material is found to comply with order requirements

Joakim Johansson
Authorized Inspector
certificates.avesta@outokumpu.com

IS6911 : 2017
CM/L-4100028768

CE
10
0045 - CPR - 0869
DoP (Declaration of Performance) on www.outokumpu.com/local-ons/avesta

This document shall not be altered or reproduced, except in full. Fraudulent, fictitious, false statements or entries may be prosecuted by law.

CREPINE PLATE 25AV AV7 _ UNS32750 _ W-008189-257

N° FRANCE INOX 50184

outokumpu
high performance stainless steel

INSPECTION CERTIFICATE
EN 10204-3.1

Outokumpu Sales Order No
9000078923

Certificate No.	Revision	Customer Order No.
169096	00	PO-05017

Production mill	Date	Delivery No.
Avesta Plant	07 Dec 2022	8000170186

Model verified. Scope 1, 2, 3 - Calculation details available on Outokumpu's website

DOPS acc. to CPR available on the web page by steel number

Marking, visual and dimensional inspection: Approved

Outokumpu Stainless AB
Business Area
Operations Avesta
SWEDEN
Tel: +46 (0)226 811 73
Regoffice: Stockholm SWEDEN,
Regno: 556001-8748
V.A.T no: SE556001874801

This material is found to comply with order requirements

Joakim Johansson
Authorized Inspector
certificates.avesta@outokumpu.com

IS6911 : 2017

CM/L-4100028768

CE
10
0045 - CPR - 0849
DoP (Declaration of Performance) on www.outokumpu.com/local-pdf/avesta

This document shall not be altered or reproduced, except in full. Fraudulent, fictitious, false statements or entries may be prosecuted by law.

N° FRANCE INOX 50184

outokumpu
high performance stainless steel

INSPECTION CERTIFICATE
EN 10204-3.1

Outokumpu Sales Order No
9000078923

Certificate No.	Revision	Customer Order No.
169096	00	PO-05017

Production mill	Date	Delivery No.
Avesta Plant	07 Dec 2022	8000170186

Packing Information

Delivery Item	Identification No. of Product	Batch No.	Quantity(pcs)	Weight	Length
30	522214-1	D036205030	7	1980 kg	

Outokumpu Stainless AB
Business Area
Operations Avesta
SWEDEN
Tel: +46 (0)226 811 73
Regoffice: Stockholm SWEDEN,
Regno: 556001-8748
V.A.T no: SE556001874801

This material is found to comply with order requirements

Joakim Johansson
Authorized Inspector
certificates.avesta@outokumpu.com

IS6911 : 2017

CM/L-4100028768

CE
10
0045 – CPR – 0869
DoP (Declaration of Performance) on www.outokumpu.com/locations/avesta

This document shall not be altered or reproduced, except in full. Fraudulent, fictitious, false statements or entries may be prosecuted by law.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#ACC
Description
API PLAN 51
PCM Reference
DI317873-02

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

LIST OF MATERIAL CERTIFICATES

Elenco certificati materiali

Customer *Cliente*	FLOWSERVE B.V.		
Customer PO number *Numero d'ordine cliente*	4500368410	Customer Item *Item cliente*	400370175-000200-001, 400370175-000200-002
Plant/Project *Impianto/Progetto*	CROSSWIND	Test Object *Oggetto del test*	PLAN 51
Drawing No. *Disegno N°*	F001615657	Serial Number *Numero di serie*	24106/1-001, 24106/1-002
Document number *Numero documento*	ML 24106/1		

Description Descrizione	Materiale Material	Colata Heat number	Supplier Fornitore	Certificate Certificato
PIPE.5S40.SL	SA312 TP316/L	20L-0563	FITTINGSERVICE SRL	237
FL.SW.1/2S80.300.RF	A182 F316/L	114646	DUEVI SRL	506
FL.BL.1/2.300.RF	A182 F316/L	23B25	FITTINGSERVICE SRL	822
PIPE.1/2S80.SL	SA312 TP316/L	47199	EUROTRADE	832
VAL.GT.1/2.800.SW	A182 F316/L+T10	B-1UR, B-1UP	LVF SPA	964
HC.1/2.3000.SW	A182 F316/L	569624	NEWMEC FITTINGS SRL	1004
ELB.1/2.3000.SW	A182 F316/L	437710	NEWMEC FITTINGS SRL	1005
CAP.4S10.BW	SA403 WP316L	MC230039	FITTINGSERVICE SRL	1041
CAP.5S40	SA403 WP316/L	KG515-1	FITTINGSERVICE SRL	1045
NUT.1/2-13UNC	SA194 GR.2H+HDG	G090009071	IPL SRL	1050
STUD.1/2-13UNC.90MM	SA193 GR.B7+HDG	R31803004VX*	IPL SRL	1051
STUD.1/2-13UNC.75MM	SA193 GR.B7+HDG	0502605*	IPL SRL	1052
ORI.1/2.600.RF.D3.2MM	SS316	472052	GRC SOLUTIONS	1053
LEVEL INDICATOR FOR 5"	SS316	292287, S-27008	GRC SOLUTIONS	1070

Quality control *Controllo qualità*	Ente collaudatore *Inspection Agency*	Cliente *Customer*	
Date/*data: 26-09-2024*	Date/*data:*	Date/*data:*	

WELSPUN SPECIALTY SOLUTIONS
Alloy & Stainless | Bars & Tubes

WELSPUN SPECIALTY SOLUTIONS LTD.

Plot No. 1, G.I.D.C Industrial Estate, Jhagadia-Valia Road, Jhagadia, Dist. -Bharuch- 393 110, Gujarat, India.
(Tel.) - +91-70690 05579, (Website) - www.welspunspecialty.com

Manufacturer of Stainless Steel Seamless Pipes , Tubes & U Tubes

Manufacturer's Mark

Client / TPI Mark

INSPECTION CERTIFICATE

FORMAT NO.- QMS-QA/QC-F-42, REV. NO. & DATE : 02, 19.08.2019

Customer	M/s-OSTP Italy S.r.l	Customer PO No	OF20000419	Date	01.09.2020
Short Address	Via Lambro, 31, 20090, OPERA-MI, Italy	SO No	4120000003	Date	-
MTC Type	EN 10204 Type 3.1 & PED 2014/68/EU & AD 2000	MTC No	WSSL/SP-316L/365/0221	Date	28.02.2021
Project Details	-				
Material Description	AUSTENITIC STAINLESS STEEL COLD FINISHED (CFD) SEAMLESS PIPES, PLAIN END	Specs & Grades	ASTM A-312 Ed-2019, ASME Sec. II Part "A" SA-312 Ed-2019, EN 10216-5 TC1 Ed. 2014, NACE MR 0175 Ed. 2015 & TP316L 1.4401/1.4404		
Heat Treatment	SOLUTION ANNEALED at 1040-1120°C TEMP. AND RAPIDLY WATER QUENCHED.	Dimensions	ASTM/ASME A/SA-312/999		
		Surface Condition	PICKLED & PASSIVATED		

Approved acc. to AD 2000 Merkblatt W0 and certified as per PED (2014/68/EU) Annex.I, Sec.4.3 by certification body for Pressure Equipment of TUV NORD Systems (Reg. No.0045)

Chemical Composition in %

Sr. No.	Heat No.	OD (mm)	Thk (mm)	Length (Mtr.)	No. of Pcs.	Total Mtrs.	LA / PA	C	Si	Mn	P	S	Cr	Ni	Mo	Ti	Cu	N	PMI & VDI Check 100%
							Min	-	-	-	-	-	16.50	10.00	2.000	-	-	-	-
							Max	0.030	1.00	2.00	0.040	0.015	18.00	13.00	2.500	-	-	0.100	-
							LA	0.025	0.250	1.550	0.039	0.006	16.760	10.180	2.020	-	-	0.0640	-
1	20L-0563	141.30	6.55	5.300-6.700	20	115.420	PA	0.025	0.244	1.559	0.038	0.005	16.751	10.192	2.032	-	-	0.0630	OK

Mandatory & Supplemantory Test Conformity

Sr. No.	Heat No.	OD (mm)	Thk (mm)	Tensile Strength MPa	Yield Strength MPa 0.2%	Yield Strength MPa 1%	Elongation (%) (Gauge Length 5.65VA)	Hardness (HRB)	Flaring Test	Flatenning Test	IGC Test as per ASTM-A-262 Practice-"E" & EN ISO 3651-2 Method-"A"	Grain Size / No	Hydro Test 100% (HOLDING TIME 10 SEC. Min.)	DP Test	Mock Up Test
				515-690	min.= 205	min.= 240	40% min.								
1	20L-0563	141.30	6.55	592.773	272.6620	288.4968	47.170	80 - 83	-	OK	OK	-	OK (Test Pressure : 1400 PSI (g))	-	-
				594.156	266.5896	280.2340	48.077								

Remark / Spl. Note	STEEL MELTING PROCESS : I.F + A.O.D .
	AS PER NACE MR0175 HARDNESS REQ.22 HRC MAX. (99 HRB Approx.) - FOUND OK .
	RM ORIGIN : INDIA
Marking	WSSL CFD PIPE ASTM-A-312 / EN 10216-5 TC-1 GRADE ..... MM OD X ..... MM THK X ..... MM LENGTH HEAT NO. ..... WSSL-01 PO NO. .....

LA - LADLE ANALYSIS P.A - PRODUCT ANALYSIS

Overall liability of WSSL is limited to the value of the defective material supplied to proven evidence of manufacturing defects only & not application failure/misuse.

Material Produced & Supplied is Free From any major Harmful Mercury or other Radioactive Contamiantion.

Duplication / Forged Photocopy / Unauthorise Usage of any documentory property of WSSL is a punishable criminal act & subject to Law of Indian Jurisdiction.

Insist on Authentically Sealed Certificate (Photocopy Invalid)

We Certify that the Material Herein Described Have Been Manufactured & Tested in accordance to the above Specifications & the Results comply in accordance to the Requisite of the Order.

Prepared By
Engineer-QA/QC

Authorized By
Head - QA/QC

GRC SOLUTIONS

GRC #237

DUEVI
FLANGES AND FITTINGS

DUEVI SRL
Via Albert Sabin, 15 20873 - CAVENAGO BRIANZA (MB)
Tel. +39 02 95335174 Fax +39 02 95335175
Registro imp. Monza C.F./Partita IVA/VAT no. IT 06473230966
E-mail info@duevifornitureindustriali.it
Web www.duevifornitureindustriali.it

SISTEMA QUALITA'
CERTIFICATO ISO 9001:2015
RINA NR. 7026/02/S

INSPECTION CERTIFICATE EN 10204 : 2004 / 3.1 | **Nr. / No. 001365** | **Data / Dated** 14/07/2023

GRC SOLUTIONS SRL

VIA PRIMO MAGGIO 22/24
24060 BOLGARE - BG
IT

DDT / Delivery note 1178
Packing List
Pag. 5
Vs.Ordine nr./Yr. P.O. no. AC ORD .N. O-23088 DEL 28.06.2023
Posizione / Item 007
Ns. rif. / Our ref.

Codice colata Heat Code	Nr. colata Heat No.	Origine Origin of Steel	Quantita' Quantity	Descrizione Description
	114646	VIRAJ	12	FL. F316L SWRF A300 1/2" 80S

Elementi /Elements	C	Si	Mn	S	P	Cr	Ni	Mo	Ti	Cu	V	Nb	N	Al
LADLE ANALYSIS	0,020	0,470	1,670	0,023	0,035	16,560	10,080	2,020	0,002				0,070	

CE LF
4,686

CE LF=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15 CE SF=C+Mn/6 F1=Cu+Ni+Cr+Mo+V F2=Cr+Mo PREN

DUREZZA HARDNESS HBW	Snervamento>0,2% Yeld Strength>0,2% MPa	Snervamento>1,0% Yeld Strength>1,0% MPa	Rottura Tensile MPa	Allungamento Elongation %	Contrazione Reduction of area %
156	314,5		593,2	61,0	69,1

Provetta Test specimen Sez/Sect mm2	L. mm	Forma Shape 1=○ - 2=□	°C	RESILIENZA / IMPACT TEST Tipo/Type	Provetta/Test Specimen	°C	1-Joule	2-Joule	3-Joule	Media/Average
							0,00	0,00	0,00	

Materiale in accordo a:
Material according to:

- ☒ ASTM/ASME A/SA182 F316/316L
- ☒ NACE MR-0175/2018 ISO 15156
- ☒ NACE MR-0103/2018
- ☒ Q.A.S.IN ACCORD.WITH PRESSURE EQUIPMENT DIRECT 2014/68/UE(PED) ANNEX I, PARAGRAPH 4.3

Trattamento termico Heat treatment	SOLUBILIZZATO Solution treatment and quenched	Produzione Acciaio Steel Production	ELABORATO AL FORNO ELETTRICO Made by electric furnace

Dimensioni in accordo a: Dimensions according to:	ASTM/ASME B 16.5 ED. 2020

Marcatura in accordo a: Marking according to:		Vis. & Dim.	CONTROLLO VISIVO E DIMENSIONALE SODDISFACENTE Satisfactory visual and dimensional test

(1) (2) (3) (4)
B D X X

Note / Notes Conforme al certificato originale rilasciato dall'acciaieria o forgiatore e relativo laboratorio di analisi e prove.
According to original certification issued by steel plant and relative analysis and tests laboratory.

Gli articoli sopra certificati sono in accordo alle norme e alle richieste dell'ordine e
sono stati prodotti secondo un sistema qualita' approvato e certificato ISO 9001:2015
The certified products comply with specifications and requirements of the order and
have been manufactured according to a quality system approved and registered by ISO 9001:2015

UFFICIO CONTROLLO QUALITA' QUALITY CONTROLDEPARTMENT	L ITA' IY	MARCHIO PRODUZIONE MANUFACTURER'S SYMBOL
DUEVI s.r.l.	GRC #506	

GRC SOLUTIONS

GRC #822

ECHJAY FORGINGS PVT. LTD.
forging relationships... worldwide

Corporate Office: 603, Raheja Chambers, 213, Backbay Reclamation, Nariman Point, Mumbai 400 021, Maharashtra, India **Tel:** +91 (22) 4077 0000 **Fax:** +91 (22) 2283 1831
Works: Pushpaman Forgings: Honad Village, Khalapur Taluka, Raigad District, Khopoli 410 203, Maharashtra, India **Tel:** +91 (2192) 267384 / 262550 **Fax:** +91 (2192) 262327
email: echjay@echjay.com **website:** www.echjay.com

"Echjay Forgings Pvt Ltd. Approved by Specific Material Assessment as per AD 2000 WO, PED 2014/68/EU Section 4.3, TUV NORD Certificate No. 07/202/1409/WZ/1312/21 & as per PESR Sch.2 4/31 (8) by TUV UK as a UK Competent Body , (Approved Body 0879)."

EN 10204 - 3.1

Inspection Certificate/Abnahmeprufzeugnis

T.C. No. EF24-INV-EX-0005-013-066
Bestller / Customer: Dacapo Stainless B.V
Bestller No. / Order No. 31133843

T.C. Date 25-Apr-2023
Date 16-Mar-2023

Zeichen des Herstellerwerkes / Manufacturer's Brand

Address Vossenbeemd 111, Helmond 5705 CL, Netherlands

Erz eugnis / Werkstoff Item Description / Material	Article No.	Schmelze Nr. Heat No.	Des Prufloses Lot No.	Stuckzahl Qty.
ANSI B16.5 BL RF 300 0.50 DIN 1.4401/1.4404/ ASTM A182 F316/316L	FB15222595	RSL-D2436	23B25	105 Nos

Anforderungem / Specifications	Heat Treatment	Stempel des Abnehmers
AD 2000, W2 - 2020, W9 - 2019, W10-2020, ASME / ANSI B16.5 - 2020 EN 10222-5-2017, ASTM A 182 - 2022, ASME SA 182 - 2021 NACE MR0175/ISO 15156 - 2015 , NACE MR0103 - 2016.(HARDNESS ONLY)	Solution Annealed	EF-1 Stamp of the testing engineer

Exigencias Sinormas / Requirements

	%C	%Mn	%Si	%S	%P	%Ni	%Cr	%Mo	%Cu	%V	%Al	%Ti	%Nb	%N	%Co	%	%	%
Min	-	-	-	-	-	10.0000	16.5000	2.0000	-	-	-	-	-	-	-	-	-	-
Max	0.0300	2.0000	1.0000	0.0300	0.0450	13.0000	18.0000	2.5000	-	-	-	-	-	0.1000	-	-	-	-

Schmelzen Analyse / Heat Analysis

	0.0140	1.4300	0.3800	0.0180	0.0390	10.0600	16.5300	2.0400	-	-	-	-	-	0.0561	-	-	-	-

Erschmelzungsart / Melting Process IF-AOD-CCM-HOT ROLLING — Hardness as per ISO 6508-1/E18

Tensile as per ISO 6892-1/A370 Test Temperature 20°C	Rch / Rp Mpa (N / mm²) / PSI		Rm Mpa	A (%)	A (%)	Z (%)	Hardness
	0.2 %	1.0 %	N / mm² / PSI	Lo = 4D	Lo = 5.65 A		HRC / HBW
Nr No. / Large Orientation	**Anforderungem / Demands**						
TANG Min	-	205/205	240/ -	510/515	30	45	- /50	
TANG Max	-	-	-	690/ -	-	-	-	22/237
Prufbergebnisse / Test Results							
TANG	-	270/271	316/-	553/550	57.68	58.82	-/69.80	< 14 /152-156

Charpy Impact Test (ISO 148-1)
Form / Forms ISO V Av / K (J)

	I	II	III	AVG.	TEMP.
Specified	-	-	-	100	+20°C
Observed	180	184	186	183.33	+20°C

Sonstiges / Other Remarks

PMI Test: 100 % No Objections
Dimension & Visual Check: 100% Satisfactory

Ergebnis - Die gestellten Anforderung sind laut Anlage 1 PED 2014/68/EU erfiillt.
Results - The requirements are fulfilled, as listed in Annex 1 PED 2014/68/EU.
Oberflachen Zustand dichtflachen / Surface condition facing : Oberflachenbeschaffeheit/Surface finish
Rauheit / Roughness Ra 3.2 6.3µ Nach tabelle 3 / according table 3
Heat treatment The individual flanges are directly quenched in water after hot working and ensuring temperature 1050°C Min.
IGC test in accordance with EN ISO 3651 - 2 Method A / ASTM A 262 Practice E : Satisfactory.
Material is free from Lead , Mercury and Radioactive contamination.
Radioactivity checked - (µR/hr) Radiation level found within limits w.r.t. natural background.
Country of Melt :- INDIA

MONOGRAM ECHJAY 1/2 300 BLRF 1.4401/1.4404 SA/A182 F316/316L B16.5 23B25 EF-1 INDIA

We confirm that the material have been manufactured,tested and examined in accordance with all the requirements of the ordered standards. We confirm that all test results are acceptable.
The above material confirms to the requirements of 2014/68/EU & PESR 2016

MANUFACTURER
Echjay Forgings Pvt. Ltd.
Checked By

S. Y. Naik

Kishore Shringarpure
President (Q.A.)
Works Authorised Inspector

702213275

TUBACEX

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCIÓN
CERTIFICAT DE RECEPTION
ABNAHMEPRUFZEUGNIS
EN 10204:2004 / 3.1

Number: 581167 Page: 1 / 5	Rev:
Created on: Date: 03.06.2013	Modified on: 10.06.2013

TTI - TUBACEX TUBOS INOXIDABLES

Registro Mercantil de Alava, Tomo 587, Folio 189, Hoja VI 2885 - N.I.F. A-01140227

Tres cruces, 8
01400 Llodio (Alava)
SPAIN

TL: +34 946719300
FAX: +34 946725062
E-MAIL: qualitytti@tubacex.es

CUSTOMER DESCRIPTION/DESCRIPCIÓN DEL CLIENTE/KUNDENBEZEICHNUNG/COMMETTANT

CLIENT SOLD TO/SOLICITANTE/AUFTRAGGEBER/COMMETTANT	CLIENT SHIP TO/DESTINAT.
COMERCIAL DE TUBOS Y ACCESORIOS ESPECIALES, S.A. POLIGONO INDUSTRIAL SARATXO 35 01470 AMURRIO	COTUBES, S.A. POLÍGONO INDUSTRIALI SARATXO 01470 AMURRIO

CLIENT ORDER/PEDIDO CLIENTE/KUNDEN AUFTRAGSNUMMER/NO.DE COMMANDE: 501271

SALES ORDER/PEDIDO VENTAS/AUFTRAGSNUMMER/NO.DE COMMANDE D'USINE: 132251

MATERIAL:SEAML. STAINL. STEEL TUBES/PIPES/TUBOS INOXIDABLES SIN SOLDADURA/TUBES INOX SANS SOUDURE/NAHTLOSE EDELSTAHLROHRE
HEAT-TREATED, PICKLED / TRATADO, DECAPADO / HYPERTREMPE, DECAPE / WÄRMEBEHANDELT, GEBEIZT, PICKLED-PASSIVATED / PASIVADO / PASSIVÉ / PASSIVIERT
GRADE / ACERO / GRADE / WERKSTOFF: TP316,TP316L,1.4401,1.4404,
STANDARD / NORMA / STANDARD / LIEFERUNG NACH: AD 2000 W2/02.2008 EINBAUROHRE
ASME SECT.II PART.A SA312/SA312M-2010 ED. 2011 ADD.
ASME SECT.II PART.A SA376/SA376M-2010 ED. 2011 ADD.
ASTM A312/A312M-12
ASTM A376/376M-12
EN 10216-5:2004 TC2
AD 2000 W10/11.2007
CHECK ANALYSIS
CORROSION TESTED ACC. TO ASTM A262 PRACTICE E
CORROSION TESTED ACC. TO EN ISO 3651-2 "A"
CORROSION TESTED ACC. TO MIL-P-24691/3(ASTM A262 PCT.E)
NACE MR0103-2010
NACE MR0175/ISO 15156-3:2009
TRD 100 MAI 1991
TOLERANCES / TOLERANCIAS / TOLERANCES / TOLERANZEN NACH: ASTM A999/A999M-12
EN ISO 1127/03.97 D3/T3
RANDOM LENGTHS / LARGOS VARIABLES / LONGUEUR COURANTE / EINGEENGTE LÄNGE 5,5 - 6,5 M
PLAIN ENDS / LISOS / EXTRÉMITÉ D'EQUERRE / GLATTE ENDEN,
DIMENSIONS/DIMENSIONES/DIMENSIONS/DIMENSIONS: 21,34 X 3,73 / 1/2" SCH 80S
COLD FINISHED/LAMINADOS EN FRIO/KALTGEFORMT/LAMINES A FROID

GRC SOLUTIONS
GRC #832

Sales Item Pos Ped. AuftrgPos Usine Pos	Client Item Pos Clnt Kunde Pos Com. Pos	Delivery No N° Entrega Lieferung Avis. d'exp	Lot No. N° lote Los Nr. Lot d'inspection	Heat No Colada Schmelze Contee	Pieces Piezas Stück Pcs	Weight Peso Gewicht Poids	Tot Lgth Long. Tot Gesamtlänge Tolength	Un Lgth Long. Un Längentyp Long. Un
20		8110026614	200101513	47199	116	1.156 KG	699,92 M	5500-6500 MM

AENOR ER Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order's requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TUBACEX TUBOS INOXIDABLES S.A.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

TUBACEX

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCION
CERTIFICAT DE RECEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 581167 Page: 2 / 5	Rev:
Created on: Date: 03.06.2013	Modified on: 10.06.2013

RAW MATERIAL/DATOS MATERIAL/VORMATERIAL/MATIERE PREMIERE

Heat Nr: 47199

Method Electric furnace+AOD

CHEMICAL COMPOSITION (%)/COMPOSICIÓN QUÍMICA (%)/CHEMISCHE ZUSAMMENSETZUNG (%)/COMPOSITION CHIMIQUE(%)

*L: Ladle C:Products

*	Heat	Seq	C	Mn	Si	P	S	Ni	Cr	Mo	N
L	47199	1	0,019	1,41	0,480	0,026	0,0010	11,30	16,85	2,26	0,0630
C	47199	4	0,019	1,41	0,430	0,025	0,0010	11,40	16,75	2,25	0,0630

HEAT TREATMENT/TRATAMIENTO TÉRMICO/WÄRMEBEHANDLUNG/TRAITEMENT THERMIQUE

HIPERTEMPLADOS A 1100 °C , 5 min , Agua
SOLUTION ANNEALED AT 1100 °C , 5 min , WATER
HYPERTREMPES 1100 °C , 5 min , L' EAU
LOESUNGSGEGLUEHT 1100 °C , 5 min , Wasser

TENSILE TEST/TEST DE TENSIÓN/ESSAI TRACTION/ZUGVERSUCH

Lot No.	Sample	T	Rp0.2	Rp1.0	Rm	A2"	A5	Type
		°C	*MPa*	*MPa*	*MPa*	*%*	*%*	
200101513	1	20	410	465	662	53	49	L
	2	20	418	474	675	58	54	L

HARDNESS TEST/TEST DE DUREZA/DUREE/HÄRTEPRÜFUNG

Lot No.	Sample	HRB1	HRB2
200101513	1	88	89
	2	88	89

METALURGICAL TESTS/ENSAYOS METALÚRGICOS/METALLURGISCHE PRÜFUNGEN/ESSAIS METALLURGIQUES

INTERGRANULAR CORROSION TEST ACC.TO DIN EN ISO 3651-2 MET.A:
SATISFACTORY
ENSAYO DE CORROSION INTERGRANULAR DE ACUERDO A ISO 3651-2 MET.A:
SATISFACTORIO
BESTÄNDIGKEIT GEGEN INTERKRISTALLINE KORROSION ENTSPRECHEND ISO 3651-2
MET."A": IN ORDNUNG
ESSAI DE CORR. INTERGR. SELON ASTM ISO 3651-2 MET."A":SATISFAISANT

INTERGRANULAR CORROSION TEST ACC. TO ASTM A262
PRACT.E/MIL-P-24691-3:SATISFACTORY
ENSAYO DE CORROSION INTERGRANULAR DE ACUERDO A ASTM A262
PRACT.E/MIL-P-24691-3: SATISFACTORIO

BESTÄNDIGKEIT GEGEN INTERKRISTALLINE KORROSION ENTSPRECHEND ASTM A262
PRACT.E/MIL-P-24691-3: IN ORDNUNG
ESSAI DE CORR. INTERGR. SELON ASTM ASTM A262 PRACT.E/MIL-P-24691-3:
SATISFAISANT

AENOR ER Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order's requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TUBACEX TUBOS INOXIDABLES S.A.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

TUBACEX

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCION
CERTIFICAT DE RECEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 581167 Page: 3 / 5	Rev:
Created on: Date: 03.06.2013	Modified on: 10.06.2013

NON-DESTRUCTIVE TESTS/ENSAYOS NO DESTRUCTIVOS/ZERSTÖRUNGSFREIE PRÜFUNGEN/ESSAIS NON DESTRUCTIFS

POSITIVE MATERIAL IDENTIFICATION TEST ON EACH TUBE/PIPE BY "X-RAY-FLUORESCENCE-ANALYZER": SATISFACTORY
VERIFICACION DEL GRADO DE ACERO EN CADA TUBO MEDIANTE "ANALIZADOR DE FLUORESCENCIA DE RAYOS X": SATISFACTORIO
VERWECHSLUNGSPRUEFUNG AN JEDEM ROHR MIT "RÖNTGEN-FLUORESZENZ-ANALYSATOR": IN ORDNUNG
VERIFICATION DE LA NUANCE SUR CHAQUE TUBE PAR "X-RAY-FLUORESCENCE-ANALYZER": SATISFAISANT

HYDROSTATIC PRESSURE TESTED AT 170 bar, 2500 PSI DURING 5 SEC ON EACH TUBE/PIPE: SATISFACTORY
ENSAYO HIDROSTÁTICO A 170 bar, 2500 PSI DURANTE 5 SEC EN CADA TUBO: SATISFACTORIO
WASSERDRUCKPRÜFUNG BEI 170 bar, 2500 PSI HALTEZEIT 5 SEC JE ROHR: IN ORDNUNG
ESSAI DE PRESSION HYDROSTATIQUE À 170 bar, 2500 PSI PENDANT 5 SEC SUR CHAQUE TUBE: SATISFAISANT

100% EDDY CURRENT TEST AT DIN EN 10246-2: SATISFACTORY
100% ENSAYO DE CORRIENTES INDUCIDAS DE ACUERDO A DIN EN 10246-2: SATISFACTORIO
100% WIRBELSTROM PRUEFUNG NACH DIN EN 10246-2: O.B.
100% CONTROLE COURANTS FOUCAULT D'APRES DIN EN 10246-2: BIEN

DIMENSIONAL CHECKING ON EACH TUBE: SATISFACTORY
INSPECCION DIMENSIONAL AL 100% DE LOS TUBOS SATISFACTORIA
100% MASSKONTROLLE: O.B.
VERIFICATION DIMENTIONNELLE AU 100% DES TUBES, SATISFAISANTE

VISUAL INSPECTION ON EACH TUBE: SATISFACTORY
INSPECCION VISUAL AL 100% DE LOS TUBOS, SATISFACTORIA
100% BESIGCHTIGUNG: O.B.
EXAMEN VISUEL AU 100% DES TUBES, SATISFAISANT

TECHNOLOGICAL TESTS/ENSAYOS TECNOLÓGICOS/TECHNOLOGISCHE PRÜFUNGEN/TECHNOLOGICAL TESTS

FLARING TEST: SATISFACTORY
ABOCARDADO S.NORMA: SATISFACTORIO
AUFWEITVERSUCH: IN ORDNUNG
ESSAI D'EVASEMENT: SATISFAISANT

FLATTENING TEST: SATISFACTORY

AENOR Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order's requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TUBACEX TUBOS INOXIDABLES S.A.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

TUBACEX

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCION
CERTIFICAT DE RECEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 581167 Page: 4 / 5	Rev:
Created on: Date: 03.06.2013	Modified on: 10.06.2013

APLASTADO S.NORMA: SATISFACTORIO
RINGFALTVERSUCH: IN ORDNUNG
ESSAI D'APLATISSEMENT: SATISFAISANT

MARKING/ETIQUETADO/KENNZEICHNUNG/MARKSTEXT

TX2 TUBACEX 21,34 X 3,73 / 1/2" SCH 80S ASME SA312 ASME SA376 ASTM A312 ASTM A376 EN 10216-5 TC2 TP316 TP316L 1.4401 1.4404 SMLS S10 ET HEAT/ PMI-AV LOT NO/ MADE IN SPAIN

REMARKS/OBSERVACIONES/ANMERKUNG/REMARQUES

NO MERCURY, MERCURY COMPOUNDS OR MERCURY BEARING INSTRUMENTS AND/OR EQUIPMENT HAVE BEEN USED ALONG MANUFACTURING AND INSPECTION PROCESS.
DURANTE LOS PROCESOS DE FABRICACIÓN E INSPECCIÓN NO SE HA USADO MERCURIO NI INSTRUMENTOS Y/O EQUIPOS CONTENIENDO MERCURIO O CON COMPONENTES DE MERCURIO.
KEINE QUEKSILBER, BZW. QUECKSILBERVERUNREINIGTES KOMPONENTEN ODER KUGELLAGERINSTRUMENTE UND/ODER GERÄTE SIND BENUTZT WORDEN PRODUKTIONS UND BESICHTIGUNGSPROZESS.
IL N'A PAS ÉTÉ FAIT USAGE DE MERCURE, DE COMPOSÉS CONTENANT DU MERCURE OU DE MATÉRIAUX ET/OU D'INSTRUMENT CONTENANT DU MERCURE TOUT AU LONG DES ÉTAPES DE FABRICATION ET DU PROCESSUS D'INSPECTION ET DE CONTRÔLE.

NO WELDING OR WELD REPAIRS WERE MADE
SIN REPARACION POR SOLDADURA
KEINE SCHWEISSBEARBEITUNG WURDE VORGENOMMEN
SANS RÉPARATION AVEC SOUDURE

MATERIAL MANUFACTURER APPROVED BY TÜV SÜD Industrie Service GmbH (NOTIFIED BODY 036)TO ISSUE CERTIFICATES OF SPECIFIC PRODUCT CONTROL IN ACCORDING TO PRESSURE EQUIPMENT DIRECTIVE 97/23/EC ANNEX 1 POINT 4.3.
FABRICANTE DE MATERIALES APROBADO POR TÜV SÜD Industrie Service GmbH (ORGANISMO NOTIFICADO 0036) PARA LA EMISION DE CERTIFICADOS ESPECIFICOS DE CONTROL DE PRODUCTO DE ACUERDO AL ANEXO 1, PUNTO 4.3 DE LA DIRECTIVA DE EQUIPOS A PRESION 97/23/EC.
WERKSTOFFHERSTELLER MIT BERECHTIUNG ZUR AUSSTELLUNG VON BESCHEINIGUNGEN ÜBER SPEZIFISCHE PRÜFUNGEN AN DEN WERKSTOFFEN IM GELTUNGSBEREICH DER ZERTIFIZIERUNG UND IN ÜBEREINSTINSTIMMUNG MIT DER DRUCKGERÄTERICHTLINIE 97/23/EC UND DEN ZUGRUNDE LIEGENDEN SPEZIFIKATIONEN ENTSPR. DER BENANNTEN STELLE NR.0036, TÜV SÜD Industrie Service GmbH
PRODUCTEUR DU MATERIEL APPROUVE PAR TÜV SÜD Industrie Service GmbH N.B. 0036) POUR EMISSION DES CERTIFICATS SPECIFIQUE DE CONTROLE DE PRODUIT SELON LA DIRECTIVE DES EQUIPES A PRESION 97/23/EC ANNEXE 1 POINT 4.3.

MATERIAL CHARACTERISTICS COMPLY WITH POINT 7.5 OF ANNEX I TO PED BY HAVING AN ELONGATION AFTER RUPTURE AT TENSILE TEST NO LESS THAN 14% AND A BENDING RUPTURE ENERGY AT IMPACT TEST NO LESS THAN 27J AT 20ºC.
LAS CARACTERISTICAS DEL MATERIAL CUMPLEN CON LOS REQUISITOS DEL PUNTO 7.5 DE LA DIRECTIVA PED POR TENER UN ALARGAMIENTO TRAS ROTURA EN EL ENSAYO DE TRACCION NO INFERIOR AL 14% Y PO DE TRACCION NO INFERIOR AL 14% Y POR TENER UNA RESISTENCIA AL IMPACTO NO INFERIOR A 27 J A 20º C.
DIE WERKSTOFF-WERTE ENTSPRECHEN PUNKT 7.5. DER DGRL, ANHANG 1, MIT EINERBRUCHDEHNUNG = 14% IM NORMGEMÄSS DURCHGEFÜHRTEN ZUGVERSUCH UND DER KERBSCHLAGARBEIT = 27J AN EINER ISO - v PRO PROBE BEI EINER TEMPERATUR VON HÖCHSTENS 20ºC
LES CARACTERISTIQUES DU MATERIEL, AYANT UN ALLONGEMENT APRES RUPTURE A L'ESSAI DE TRACTION NON INFERIEUR DU 14% ET UNE RESISTENCE A LA FLEXION PAR CHOC A 20ºC NON INFERIEUR A 27J, SONT CONFORMES AUX PRESCIPTIONS DU PONT 7.5 DE L'ANNEXE I DE PED.

AENOR ER Empresa Registrada UNE-EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order's requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TUBACEX TUBOS INOXIDABLES S.A.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

TUBACEX

INSPECTION CERTIFICATE
CERTIFICADO DE INSPECCION
CERTIFICAT DE RECEPTION
ABNAHMEPRÜFZEUGNIS
EN 10204:2004 / 3.1

Number: 581167 Page: 5 / 5	Rev:
Created on: Date: 03.06.2013	Modified on: 10.06.2013

REMARKS/OBSERVACIONES/ANMERKUNG/REMARQUES
MATERIAL IS FREE OF RADIATION CONTAMINATION
EL MATERIAL ESTA LIBRE DE CONTAMINACION POR RADIACIONES
MATERIAL IS FREI VON RADIOAKTIVITÄT
MATÉRIEL LIBRE DE POLUTION RADIOACTIVE

AENOR ER Empresa Registrada UNE EN ISO 9001

AENOR Gestión Ambiental UNE-EN ISO 14001

We hereby certify that the material herein described has been manufactured, sampled, tested, and inspected in accordance with above standards and specifications and satisfies order's requirements. This certificate is issued by a computerized system and it is valid without original signature. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall legally prosecuted.

TUBACEX TUBOS INOXIDABLES S.A.
INGENIERIA DE CALIDAD

Iñigo Arriola Alcibar

HEAD OFFICE AND PLANT
Via G.Mazzini, 6
24060 S.Paolo D'Argon (BG) - ITALY
Tel +39.035.4255211
Internet: www.lvf.it - E-mail: info@lvf.it

LVF S.p.A. - Cod.Fisc. e P.IVA 03076750169 - Cap. Soc. € 8.532.000,00 i.v.
Registro Imprese BG 03076750169 - R.E.A. 347477 - VAT Reg. Nr: IT 03076750169
Soggetta all'attività di direzione e coordinamento da parte della società ALLBEL PARTECIPAZIONI SRL Reg.Imp. BG n° 04656210160

INSPECTION CERTIFICATE according to
[X] UNI EN 10204:2005 - 3.1 [ ]

CERTIFICATE N° **C 240644-005/01**
REVISION **00**

TEST PROCEDURE & SPECIFICATION

[ ] API 6D	[ ] EN 12266-1	[ ]
[X] API 598	[ ] MSS SP.55	[ ]
[X] ASME B 16.34	[X] MSS SP.61	[ ]
		[ ]

CUSTOMER
GRC SOLUTIONS SRL UNIPERSONALE

VIA PRIMO MAGGIO 22/24
24060 BOLGARE (BG)

OUR JOB N°	POSITION	Q.TY
240644	**005**	**10**

YOUR P.O. N° : **O-24076**

PRJ:

ITEM : **5**

DESCRIPTION
GATE VALVE OS#Y BB RB 1/2" 800 LBS SW

F316DG/F316DG

BR 103 R.1 /T+sl.

LVF Ref. Number : **240644/005**

TEST PRESSURES(BAR)

HYDROSTATIC			PNEUM.
BODY & BACKSEAT	STUFFING BOX	SEAT	SEAT
200	**150**	**150**	**6**

TEST RESULT : SATISFACTORY

MAX PRESSURE AT ROOM TEMP.

TEMPERATURE	PRESSURE MAX.(BAR)
ROOM	**132,40**

VISUAL AND DIMENSIONAL TEST RESULT : SATISFACTORY

NOTES:
TEST PROCEDURE: API 598 11th
DURATION TIME: API 598 11th
ACCEPTANCE CRITERIA: API 598 11th

COMPONENT

CHEMICAL ANALYSIS

PART NAME	MATERIAL	C	Mn	Si	S	P	Cr	Mo	Ni	Ti	Cu	Fe	Material Traceability List
		Al	Co	N	V	Nb	Sn	CE	Nb+Ta	Pre	Zn	Zr	
		W	B	H	O	Pb	Pd	Mg					

MECHANICAL PROPERTIES, IMPACT TESTS

HEAT CODE	HEAT NR	TENSILE N/mm2	Yield N/mm2	ELONGATION %	RED. OF AREA %	1 JOULE	2 JOULE	3 JOULE	TEST. TEMP.	AVG. HARDNESS			
BODY	*A182 F316/F316L*	0,016	1,790	0,540	0,015	0,035	16,760	2,060	10,080				116103
				0,083						24,886			
B-1UR	*291800*	672,00	380,00	57,60	78,00					166,7 HBW			
BONNET	*A182 F316/F316L*	0,002	1,299	0,417	0,025	0,024	16,668	2,024	10,066				117640
			0,170	0,040						23,987			
B-1UP	*340025*	541,00	266,00	59,80	76,00					161,7 HBW			
WEDGE	*A182 F316/F316L*	0,017	1,790	0,330	0,027	0,029	16,750	2,060	10,120		0,430		114305
			0,180	0,078						24,796			
	273923	563,00	252,00	59,60	78,80	175,00	175,00	181,00	-196°C (L)	166 HBW			
STEM	*A479 Tp.316/Tp.316L*	0,022	1,510	0,700	0,029	0,028	16,660	2,000	10,130				111355
			0,212	0,058						24,188			
	289742	753,00	602,00	35,00	68,00	106,00	103,00	100,00	-196°C (L)	235 HBW			
SEAT	*A479 Tp.316/Tp.316L*	0,022	1,510	0,700	0,029	0,028	16,660	2,000	10,130				111355
			0,212	0,058						24,188			
	289742	753,00	602,00	35,00	68,00	106,00	103,00	100,00	-196°C (L)	235 HBW			
BOLTS	*A193 B8 Cl.1*	0,017	1,051	0,452	0,003	0,029	18,160		9,312				119452
	403056	755,00	620,00	36,50	59,80					229 HBW			

We declare that this product has been manufactured in accordance with the 'Sound Engineering Practice' as per European Directive 2014/68/EU - PED Article 4.3.

Valve's components mentioned has been manufactured, heat treated and tested in accordance with specification.

The reported values are in accordance with the original mill certificates.

GRC #964

THIRD AUTHORITY
DATE

CLIENT INSPECTION DEPT.
DATE

INSPECTION DEPT.
LVF S.p.A. Quality Control Dept
Page 41 of 81
DATE 24/07/2024

NEW MEC fittings srl

Factory certified by Bureau Veritas Cert. No. IT25953

RACCORDI IN ACCIAIO FORGIATO *FORGED STEEL FITTINGS*
VIA GOFFREDO MAMELI, 147A -21044 CAVARIA (VARESE) ITALIA
Tel. 0331 219950 Fax. 0331 219950 217214
www .newmecfittings.it e.mail : info@newmecfittings.it
Capitale Sociale Euro 90.000 I.V.

Copia confome all'originale

doc.di trasporto no. **1708** **del 02/09/2024**
delivery note no.

GRC #1004

Spett.le / Messrs
GRC SOLUTIONS SRL UNIPERSONALE
VIA PRIMO MAGGIO 22
24060 BOLGARE (BG)

Certificato di controllo No. 1708 EN 10204:2004 Tipo 3.1

Test Certificate

pagina/sheet **1/1**

rif.cliente Customer ref.	descrizione prodotto Description	quantità Qty	colata Heat	materiale Material	cert.origine Mill cert.	data date	fornitore Supplier	ns. rif. our ref.
24310	TES 3/4" X 1/2" 3000 NPT F316 L	2	438027	ASTM A182 F316/316L	7228	17/06/24	MET/VALBRUNA	93305
24150	MEZZI MANICOTTI 1/2" 6000 NPT A105	8	294430	ASTM A105	631550	20/02/23	ACC.VENETE/PAP	93514
24150	TES 3/4" 3000 NPT F316 L	10	438027	ASTM A182 F316/316L	7228	17/06/24	MET/VALBRUNA	93514
24150	MEZZI MANICOTTI 1/2" 3000 SW F316 L	7	569624	ASTM A182 F316/316L	542772	19/02/24	OLARRA/PAP	93514
24150	MEZZI MANICOTTI 1/2" 3000 SW F316 L	3	539874	ASTM A182 F316/316L	495929	15/06/22	OLARRA/PAP	93514
24150	GOMITI 90 1/2" 3000 SW F316 L	10	437710	ASTM A182 F316/316L	7166	20/02/24	MET/VALBRUNA	93514

**ANALISI CHIMICA / CHEMICAL ANALYSIS

colata/heat	C %	Mn %	Si %	P %	S %	Ni %	Cr %	Mo %	Ti %	V %	Cu%	Al %	Nb %	N %	Sn %	%	C.E. %
438027	0,011	1,500	0,630	0,026	0,025	10,270	16,730	2,010	0,000	0,000	0,000	0,000	0,000	0,066	0,000		4,69
294430	0,168	0,959	0,300	0,010	0,004	0,102	0,108	0,026	0,000	0,009	0,150	0,030	0,001	0,000	0,008		0,37
438027	0,011	1,500	0,630	0,026	0,025	10,270	16,730	2,010	0,000	0,000	0,000	0,000	0,000	0,066	0,000		4,69
569624	0,022	1,570	0,350	0,038	0,029	10,070	16,700	2,060	0,000	0,000	0,000	0,000	0,000	0,033	0,000	0,000	4,71
539874	0,023	1,560	0,400	0,042	0,029	10,100	16,550	2,030	0,000	0,000	0,000	0,000	0,000	0,030	0,000		4,67
437710	0,015	1,550	0,470	0,028	0,029	10,350	16,870	2,060	0,000	0,000	0,000	0,000	0,000	0,059	0,000		4,75

**CARATTERISTICHE MECCANICHE / MECHANICAL PROPERTIES

colata/ heat	R Tensile N/mmq	S Yeld point N/mmq	A:2" Elongation %	C Reduction of area %	Bending Test	Flattening Test	Hydraulic Test	HB Hardness Test	K Impact Test J	Temp. ° C	Tratt. termico Heat treaetment	Temp. ° C
438027	621	379	49	66				184 184	188/191/184	20	SOLUT.TR.	1040
294430	522	372	31	68				170 175	106/108/112	-46		
438027	621	379	49	66				184 184	188/191/184	20	SOLUT.TR.	1040
569624	576	295	53	73				163 163	238 235 234	20	SOLUT ANN	1060
539874	586	317	53	74				170 170	229/231/228	20	SOLUT.TR.	1060
437710	629	370	51	67				185 185	195/188/185	20	SOLUT.TR.	1050

Gomiti 45 e 90, pezzi T, Croci, Manicotti, Mezzi Manicotti,Caps,Tappi TT- Q-Esag, Rid. Esag in accordo alla specifica ASME B16.11. Outlet: ASME B31.1 e B31.3 e MSS-SP-97 - Unions BS3799 o MSS-SP-83 - Swage Nipples BS3799-74 o MSS SP95-86 e PED 2014/68/UE

Collaudi interni / Works inspection

Collaudi supplementari / Supplementary tests

MATERIAL ACC. TO ASME SA350 LF2. SA105 ,SA182 ed.2021 MATERIAL ACC. TO NACE MR 0175/150 15156 MATERIALE CONFORME A NORM. DI RIFERIMENTO DIMENSIONALE ANSI B16.11 ED 2021

Natura materiale/Kind of material

Note / Remarks

Data di emissione/ date of issue
Cavaria, 02/09/2024 15:36:12

NEWMEC

Responsabile qualità /Quality manager
Freschi Luca RCQ

NEW MEC fittings srl

Factory certified by Bureau Veritas Cert. No. IT25953

RACCORDI IN ACCIAIO FORGIATO *FORGED STEEL FITTINGS*
VIA GOFFREDO MAMELI, 147A -21044 CAVARIA (VARESE) ITALIA
Tel. 0331 219950 Fax. 0331 219950 217214
www .newmecfittings.it e.mail : info@newmecfittings.it
Capitale Sociale Euro 90.000 I.V.

Copia confome all'originale

GRC SOLUTIONS
GRC #1005

Spett.le / Messrs
GRC SOLUTIONS SRL UNIPERSONALE
VIA PRIMO MAGGIO 22
24060 BOLGARE (BG)

doc.di trasporto no. **1708** **del** **02/09/2024**
delivery note no.

Certificato di controllo No. 1708 EN 10204:2004 Tipo 3.1

Test Certificate

pagina/sheet **1/1**

rif.cliente Customer ref.	descrizione prodotto Description	quantità Qty	colata Heat	materiale Material	cert.origine Mill cert.	data date	fornitore Supplier	ns. rif. our ref.
24310	TES 3/4" X 1/2" 3000 NPT F316 L	2	438027	ASTM A182 F316/316L	7228	17/06/24	MET/VALBRUNA	93305
24150	MEZZI MANICOTTI 1/2" 6000 NPT A105	8	294430	ASTM A105	631550	20/02/23	ACC.VENETE/PAP	93514
24150	TES 3/4" 3000 NPT F316 L	10	438027	ASTM A182 F316/316L	7228	17/06/24	MET/VALBRUNA	93514
24150	MEZZI MANICOTTI 1/2" 3000 SW F316 L	7	569624	ASTM A182 F316/316L	542772	19/02/24	OLARRA/PAP	93514
24150	MEZZI MANICOTTI 1/2" 3000 SW F316 L	3	539874	ASTM A182 F316/316L	495929	15/06/22	OLARRA/PAP	93514
24150	GOMITI 90 1/2" 3000 SW F316 L	10	437710	ASTM A182 F316/316L	7166	20/02/24	MET/VALBRUNA	93514

**ANALISI CHIMICA / CHEMICAL ANALYSIS

colata/heat	C %	Mn %	Si %	P %	S %	Ni %	Cr %	Mo %	Ti %	V %	Cu%	Al %	Nb %	N %	Sn %	%	C.E. %
438027	0,011	1,500	0,630	0,026	0,025	10,270	16,730	2,010	0,000	0,000	0,000	0,000	0,000	0,066	0,000		4,69
294430	0,168	0,959	0,300	0,010	0,004	0,102	0,108	0,026	0,000	0,009	0,150	0,030	0,001	0,000	0,008		0,37
438027	0,011	1,500	0,630	0,026	0,025	10,270	16,730	2,010	0,000	0,000	0,000	0,000	0,000	0,066	0,000		4,69
569624	0,022	1,570	0,350	0,038	0,029	10,070	16,700	2,060	0,000	0,000	0,000	0,000	0,000	0,033	0,000	0,000	4,71
539874	0,023	1,560	0,400	0,042	0,029	10,100	16,550	2,030	0,000	0,000	0,000	0,000	0,000	0,030	0,000		4,67
437710	0,015	1,550	0,470	0,028	0,029	10,350	16,870	2,060	0,000	0,000	0,000	0,000	0,000	0,059	0,000		4,75

**CARATTERISTICHE MECCANICHE / MECHANICAL PROPERTIES

colata/ heat	R Tensile N/mmq	S Yeld point N/mmq	A:2" Elongation %	C Reduction of area %	Bending Test	Flattening Test	Hydraulic Test	HB Hardness Test	K Impact Test J	Temp. ° C	Tratt. termico Heat treaetment	Temp. ° C
438027	621	379	49	66				184 184	188/191/184	20	SOLUT.TR.	1040
294430	522	372	31	68				170 175	106/108/112	-46		
438027	621	379	49	66				184 184	188/191/184	20	SOLUT.TR.	1040
569624	576	295	53	73				163 163	238 235 234	20	SOLUT ANN	1060
539874	586	317	53	74				170 170	229/231/228	20	SOLUT.TR.	1060
437710	629	370	51	67				185 185	195/188/185	20	SOLUT.TR.	1050

Gomiti 45 e 90, pezzi T, Croci, Manicotti, Mezzi Manicotti,Caps,Tappi TT- Q-Esag, Rid. Esag in accordo alla specifica ASME B16.11. Outlet: ASME B31.1 e B31.3 e MSS-SP-97 - Unions BS3799 o MSS-SP-83 - Swage Nipples BS3799-74 o MSS SP95-86 e PED 2014/68/UE

Collaudi interni / Works inspection

Collaudi supplementari / Supplementary tests

MATERIAL ACC. TO ASME SA350 LF2. SA105 ,SA182 ed.2021 MATERIAL ACC. TO NACE MR 0175/150 15156 MATERIALE CONFORME A NORM. DI RIFERIMENTO DIMENSIONALE ANSI B16.11 ED 2021

Natura materiale/Kind of material

Note / Remarks

Data di emissione/ date of issue
Cavaria, 02/09/2024 15:36:12

NEWMEC

Responsabile qualità /Quality manager
Freschi Luca RCQ

V156987

GRC #1041

INSPECTION CERTIFICATE

Page (頁) : 1

Cert. to DACAPO STAINLESS B.V

S.P. UNITED INDUSTRY SDN. BHD.

(COMPANY NO. 368524 W)
P.T. 741/745, KAWASAN PERUSAHAAN NILAI,
71800 NILAI, NEGERI SEMBILAN DARUL KHUSUS, MALAYSIA.
TEL: 606-7993577, 7993676, 7993677 FAX: 606-7994366
E-mail: contactus@spunited.com.my

LRQA CERTIFIED ISO 9001
Approval No:ISO9001-0048008
FED Cert No:0343/FED/SMUN/101009/1

Order No. : 23DCP006
(注文番号)

Date (日付) : SEPTEMBER 29,2023

Certificate No. : 23-09-0178
(書類番号)

P.O. No. : 31138147

Product (形状)	Product Specification (規格)	Specification for Pipe (Raw Material) (材料規格)
STAINLESS STEEL CAP (SEAMLESS)	ASTM A403-2022 / ASME SA403-2019 ASME B16.9-2018 / MSS SP-43-2019 / ASME BPVC II PART A-2019 WP-S 316/316L (1.4401/1.4404)	ASTM A312 TP 316/316L

*	Size (寸法)	Dimension in mm (寸法) Outside Dia (外径)	Thickness (厚さ)	Lot No. (製造番号)	Quantity (数量)	Surface Inspection (外観検査)	Dimension Inspection (寸法検査)	S. P. I. Code No.	Raw Pipe Heat No. (溶解番号)
1	1"x10S	33.40	2.77	MC230067	100	GOOD	GOOD	62311000	ZB497
2	2½"x10S	73.03	3.05	MC230042	60	GOOD	GOOD	62312500	6G698
3	4"x10S	114.30	3.05	MC230039	100	GOOD	GOOD	62314000	6G698
4	5"x10S	141.30	3.40	MC230082	15	GOOD	GOOD	62315000	134603

YS=Yield Strength (0.2%), EL=Elongation, H=Hardness Test
TS= Tensile Strength, GL=Gauge Length, HT=Hydrostatic Test

Chemical Composition of Pipe (Raw Material) % (化学成分) (材料)

*	Lot No. (製造番号)	C x 100	Si x 100	Mn x 100	P x 1000	S x 1000	Ni x 100	Cr x 100	Mo x 100
1	MC230067	2.4	37	133	28	1	1004	1671	205
2	MC230042	2.0	33	135	27	2.2	1006	1666	203
3	MC230039	2.0	33	135	27	2.2	1006	1666	203
4	MC230082	2.1	47	173	38	1	1010	1690	207
Specification		MAX 3.0	MAX 100	MAX 200	MAX 45	MAX 30	1000 1400	1600 1800	200 300

Mechanical Properties of Pipe (Raw Material) (機械的性質)

Type of Specimen (試験片)	YS Mpa (耐力)	TS Mpa (引張強さ)	EL% (伸び) (GL:50mm)	EL% (伸び) Standard (規格値)	Flattening Test (へん平試験)	HT Mpa (水圧試験)	Hardness Test HRB
	340	628	49		GOOD	GOOD	81
	299	595	50		GOOD	GOOD	78
	299	595	50		GOOD	GOOD	78
	328	612	50		GOOD	GOOD	89
	MIN 205	MIN 515	MIN 28				

Remarks * Hardness acc. to NACE MR0175 / ISO 15156-3: 2015, NACE MR0103:2015
INTERGRANULAR CORROSION TEST (ASTM A262/E) - OK. PMI CHECK GOOD. ISO 9001 / EN 10204-3.1. PED 2014/68/EU ANNEX I SECTION 4.3
HEAT TREATMENT 1050 DEGREE CELCIUS QUENCHED IN WATER
MATERIAL WAS MANUFACTURED, SAMPLED, TESTED AND INSPECTED IN ACCORDANCE WITH INDICATED SPECIFICATIONS AND WAS FOUND TO MEET THE REQUIREMENTS. NO WELD REPAIR WAS PERFORMED AND ALL ITEMS SUPPLIED ARE FREE OF WELD REPAIR.
MATERIAL IS FREE OF MERCURY CONTAMINATION AND RADIOACTIVITY
We certify that the above material has been inspected and tested and complies with the order/contract.
The material is manufactured in SPI and melting country of raw material are in Malaysia or China or Taiwan origin (attached)
Material here certified does not contain any steel products originating in Russia mentioned in Annex XVII to the (EU) Regulation No COUNCIL REGULATION (EU) 2023/1214 of 23 June 2023 and amending Regulation (EU) No 833/2014 concerning restrictive measures in view of Russia's actions destabilizing the situation in Ukraine.

We herewith certify that the above products meet the requirements of the relevant standard and of the customer order.
(上記の製品は、当該規格及び、で注文の要求事項に適合するてとを証明します。)

Head of QA/QC Dept.
質量/品質管理課長

品質檢驗證書
INSPECTION CERTIFICATE

MILL CERTIFICATE

ORIGINAL

WALSIN LIHWA CORP.
總公司：11047 台北市信義區松智路1號25樓
HEAD OFFICE : 25F., No.1 Songzhi RD., Xinyi Dist., Taipei City 11047,Taiwan(R.O.C.)
製造地：43541台中市潭子區潭陸路二段37號
Production division : No.37,Jing 3rd., Nan1 Dist.,Taichung City 43541,Taiwan(R.O.C.)
TEL : 886-4-2659-5552 FAX : 886-4-2659-5550

客戶名稱 CUSTOMER	KENTEU STEEL SDN BHD	表面品級 Surface Finish	No.1	鋼種 Grade	316/316L	信用狀號 LC NO.	TS0721ILCZ007612	品質證明號碼 CERTIFICATE NO.	C2201040004
商品 COMMODITY	熱軋鋼捲 Stainless Steel Hot Rolled Coil					訂單號碼 ORDER NO.	110113065/	品質證明日 DATE OF ISSUE	2022/01/03

產品說明 Product ID							化學成分(wt%) Chemical Composition(wt%)											機械性質 Mechanical Property						
	爐號 Hept No	數量 Qty	重量 Weight (kg)	厚度 Thick (mm)	寬度 Width (mm)	長度 Length (mm)	C x1000	Si x100	Mn x100	P x1000	S x1000	Ni x100	Cr x100	Mo x100	Cu x100	N x10000				抗拉強度 TS N/mm2	降伏強度 YS N/mm2	伸長率 EL (A50) %	硬度 HRBW Head	Tail	硬度 HV Head	Tail		
規格 Spec 最小 Min												1000	1688	200						515	205	40						
規格 Spec 最大 Max							30	75	200	45	30	1400	1800	300		1000							95		200			
ZB497L01	ZB497	1	21124	3.00(2.88)	1219(1219)		24	37	133	28	1	1004	1671	205	5	370				628	340	49	81					
ZB512L02	ZB512	1	21133	3.00(2.88)	1219(1219)		25	29	132	26	1.6	1005	1675	205	5	320				613	340	49	80					
Total:		2	42257																									

Product ID in this certificate means coil No.in the tag. The inspection certificate is compliant with EN 10204:3.1
Tension specimens are in the transverse direction.
Solution-annealing temp.≥1050°C,rapidly cooled(air&water). 固溶化熱處理溫度≥1050°C,急冷(空冷與水冷)。

The specification is compliant with:ASTM A240

1.茲證明本表所列產品，均依材料規格製造及測試，並符合規定之要求。
We hereby certify that material described herein has been manufactured and tested with satisfactory results in accordance with requirement of the above material specification.
2.上述測試結果僅對於該項產品之測試。
The above testing results relate only to the items tested.
3.產品無焊補，無汞汙染及無輻射(輻騰伯字第00235號)。
No welding repaired. The material is free from mercury contamination and radiation.
(Qualification No. of Taiwan Atomic Energy Committee:235).

United Industry S.P.I. Sdn. Bhd. QA PASS

王建華

台中品保部經理

CH Wang.

Taichung Quality Assurance Department Manager

1.Quality management system approval by TUV ISO 9001:2015 Certificate NO.01100132589O PED 2014/68/EU MM+AD2000 WO Certificate NO. 01202 TWN/Q-13-0256 CPR 305/2011/EU:System 2+ Certificate NO. 0035-CPR-A236
2.Environment management system approval by TUV ISO 14001:2015 Certificate NO. 01104822132589O
3.ISO45001:2018 Certificate NO. 01113822132589O TOSHMS Certificate NO. CB07-104002-01

S.P.I HEAT NO: MC230067

品質檢驗證書
INSPECTION CERTIFICATE
MILL CERTIFICATE

WALSIN LIHWA CORP.
總公司：11047 台北市信義區松智路1號25樓
HEAD OFFICE：25F.,No.1,Songzhi RD.,Xinyi Dist.,Taipei City11047,Taiwan(R.O.C.)
廠址地：43541台中市梧棲區加工出口區經三路57號
Production division：No.57,Jing 3rd.,Wuqi Dist.,Taichung City 43541,Taiwan(R.O.C)
TEL：886-4-2659-5552 FAX：886-4-2659-5550

客戶名稱 CUSTOMER	KANZEN TETSU SEDIRIAN BERHAD	表面品級 Surface Finish	No.1	鋼種 Grade	AISI 316/316L	信用狀號 LC NO.	381LC103958	品證書號碼 CERTIFICATE NO.	C2102270083
商品 COMMODITY	熱軋鋼捲 Stainless Steel Hot Rolled Coil					訂單號碼 ORDER NO.	11001A043/	品證書產生日 DATE OF ISSUE	2021/02/26

產品號碼 Product ID							化學成分(wt%) Chemical Composition(wt%)												機械性質 Mechanical Property						
	爐號 Heat No	數量 Qty	重量 Weight (kg)	厚度 Thick (mm)	寬度 Width (mm)	長度 Length (mm)	C x1000	Si x100	Mn x100	P x1000	S x1000	Ni x100	Cr x100	Mo x100	Cu x100	N x10000			抗拉強度 TS N/mm2	降伏強度 YS N/mm2	伸長率 EL (A50) %	硬度 HRBW Head Tail	硬度 HV Head Tail		
規範 Spec 最小 Min												1000	1600	200					515	205	40				
規範 Spec 最大 Max							30	75	200	45	30	1400	1800	300		1000						95	200		
6G698403	6G698	1	16456	3.50(3.39)	1245(1249)	63FA721	19.8	33	135	27	2.2	1006	1666	203	54	314			595	299	50	78			
Total:		1	16456																						

Product ID in this certificate means coil No.in the tag. The inspection certificate is compliant with EN 10204 3.1
Tension specimens are in the transverse direction.
Solution-annealing temperature ≥1050°C. 固溶化熱處理溫度≥1050°C。

1.The specification is compliant with ASTM A240

1.茲證明本表所列產品，均依材料規格製造及測試，並符合規定之要求。
We hereby certify that material described herein has been manufactured and tested with satisfactory results in accordance with requirement of the above material specification.
2.上述測試結果僅對於該項產品之測試。
The above testing results relate only to the items tested.
3.產品無焊補，無汞汙染及無輻射(鋼輻偵字第00235號)。
No welding repaired. The material is free from mercury contamination and radiation.
(Qualification No. of Taiwan Atomic Energy Committee:235).

United Industry Sdn. Bhd. * S.P.I QA PASS

王建華

台中品保部經理

CH Wang.

Taichung Quality Assurance Department Manager

1.Quality management system approval by TUV ISO 9001:2015 Certificate NO.011001325890 PED 2014/68/EU MM+AD2000 W0 Certificate NO. 01202 TWN/Q-13-0256 CPR 305/2011/EU:System 2+ Certificate NO. 0035-CPR-A236
2.Environment management system approval by TUV ISO 14001:2015 Certificate NO. 011048221325890
3.ISO45001:2018 Certificate NO. 011138221325890 TOSHMS Certificate NO. CB07-104002-01

S.P.I HEAT NO: MC230042

品質檢驗證書
INSPECTION CERTIFICATE
MILL CERTIFICATE

WALSIN LIHWA CORP.
總公司：11047 台北市信義區松智路1號25樓
HEAD OFFICE：25F.,No.1,Songzhi RD.,Xinyi Dist.,Taipei City11047,Taiwan(R.O.C.)
製造地：43541台中市梧棲區加工出口區北三路57號
Production division：No.57,Jing 3rd.,Wuqi Dist.,Taichung City 43541,Taiwan(R.O.C)
TEL：886-4-2659-5552 FAX：886-4-2659-5550

客戶名稱 CUSTOMER	KANZEN TETSU SDIRIAN BERHAD	表面品級 Surface Finish	No.1	鋼種 Grade	AISI 316/316L	信用狀號 LC NO.	381LC103958	品證書號碼 CERTIFICATE NO.	C2102270083
商品 COMMODITY	熱軋鋼捲 Stainless Steel Hot Rolled Coil					訂單號碼 ORDER NO.	11001A043/	品證書產生日 DATE OF ISSUE	2021/02/26

產品號碼 Product ID							化學成分(wt%) Chemical Composition(wt%)												機械性質 Mechanical Property						
	爐號 Heat No	數量 Qty	重量 Weight (kg)	厚度 Thick (mm)	寬度 Width (mm)	長度 Length (mm)	C x1000	Si x100	Mn x100	P x1000	S x1000	Ni x100	Cr x100	Mo x100	Cu x100	N x10000				抗拉強度 TS N/mm2	降伏強度 YS N/mm2	伸長率 EL (A50) %	硬度 HRBW Head	Tail	硬度 HV Head	Tail		
規範 Spec 最小 Min												1000	1600	280						515	205	40						
規範 Spec 最大 Max							30	75	200	45	30	1400	1800	300		1000							95		200			
6G698403	6G698	1	16456	3.50(3.39)	1245(1249)	63FA721	19.8	33	135	27	2.2	1006	1666	203	54	314				595	299	50	78					
Total:		1	16456																									

Product ID in this certificate means coil No.in the tag. The inspection certificate is compliant with EN 10204 3.1
Tension specimens are in the transverse direction.
Solution-annealing temperature ≥1050°C. 固溶化熱處理溫度≥1050°C。

1.The specification is compliant with ASTM A240

1.茲證明本表所列產品，均依材料規格製造及測試，並符合規定之要求。
We hereby certify that material described herein has been manufactured and tested with satisfactory results in accordance with requirement of the above material specification.
2.上述測試結果僅對於該項產品之測試。
The above testing results relate only to the items tested.
3.產品無焊補，無汞汙染及無輻射(鋼輻偵字第00235號)。
No welding repaired. The material is free from mercury contamination and radiation.
(Qualification No. of Taiwan Atomic Energy Committee:235).

United Industry Supply Sdn. Bhd. QA PASS

王建華

台中品保部經理

C H Wang.

Taichung Quality Assurance Department Manager

1.Quality management system approval by TUV ISO 9001:2015 Certificate NO.011001325890 PED 2014/68/EU MM+AD2000 W0 Certificate NO. 01202 TWN/Q-13-0256 CPR 305/2011/EU:System 2+ Certificate NO. 0035-CPR-A236
2.Environment management system approval by TUV ISO 14001:2015 Certificate NO. 011048221325890
3.ISO45001:2018 Certificate NO. 011138221325890 TOSHMS Certificate NO. CB07-104002-01

S.P.I HEAT NO: MC230039

OUTOKUMPU

INSPECTION CERTIFICATE 3.1
EN 10204 3.1

Certificate No. / Zeugnis Nr. / N° du certificat: 597255/001
Page / Seite / Page: 1(01)
Date / Datum / Date: 10.02.2012

Delivery address, Empfänger, Lieu de livraison	
KENTZU STEEL SDN BHD NO. 9, JALAN 2/89B, OFF JALAN ENAM, JALAN CHAN SOW LIN 55200 KUALA LUMPUR MALAYSIA	KENTZU STEEL SDN BHD NO. 9, JALAN 2/89B, OFF JALAN ENAM, JALAN CHAN SOW LIN 55200 KUALA LUMPUR MALAYSIA

Requirements, Anforderungen, Exigences	Our Order No. / Unser Auftrag Nr. / Notre commande n°	Your order, Ihre Bestellung, Votre commande
ASTM A240/A240M-11 ASME 2011 SEC. II PART A SA-240 ASTM A240/A240M-11 ASME 2011 SEC. II PART A SA-240 EN 10028-7	0300173968	151211-KENTZU

Product, Erzeugnisform, Produit	Mark of Manufacturer / Zeichen des Lieferwerkes / Signe de producteur	Process / Erschmelzungsart / Mode de fusion	Inspect. / Samp. / Zeichen d. Sachverst. / Poinçon de l'expert
COIL , STAINLESS STEEL	OUTOKUMPU	AOD	

Grade, Werkstoff, Nuance	Tolerances Toleranzen, Tolérances
TYPE 316L TYPE 316 1.4404	ASTM A 480

Marking, Kennzeichnung, Marquage	Marks, Versandzeichen, Marques
A/SA-240 316L 2B	KENTZU STEEL

Line / Reihe / Ligne	Item / Position / Poste	Charge-test No. / Schmelze-Probe Nr. / Coulée n°	Size, Abmessungen, Dimensions	Quantity / Stückzahl / Nombre	Weight, Gewicht, Poids	Finish / Ausführung / Fini EN/ASTM
1	6	13628 1	3,0 X 1219 MM		18940 KG	2B
2	20	13460 3	4,0 X 1219 MM		20650 KG	2B

Charge no. / Schmelze Nr. / Coulée n°	Chemical composition, Chemische Zusammensetzung, Composition chimique											
	C %	Si %	Mn %	P %	S %	Cr %	Ni %	MO %	N %			
13628	0,023	0,50	1,74	0,035	<.001	17,1	10,0	2,03	0,036			
13460	0,021	0,47	1,73	0,038	0,001	16,9	10,1	2,07	0,044			

Line / Reihe / Ligne	Mechanical properties, Mechanische Eigenschaften, Caracteristiques mecaniques								
	Location / Ort / Lieu	Rp0.2 MPa	Rp1.0 MPa	Rm MPa	A5 %	A50 %	%	Hardness / Härte, Dureté HB30	
1	E	309	354	605	59	53		168	
2	E	328	373	612	53	50		180	

CERTIFIED ACCORDING TO PRESSURE EQUIPMENT DIRECTIVE 97/23/EC ANNEX 1 SEC. 4.3 BY CERTIFICATION BODY FOR PRESSURE EQUIPMENT OF TUEV NORD SYSTEMS GMBH & CO. KG; NOTIFIED BODY, REG. NO. 0045

Identity test, Verwechslungsprüfung, Controle d'identification	OK
Sizes, Abmessungen, Dimensions	OK
Surface, Oberfläche, Surface	OK
Test of intergran. corros., Prüfung auf Interkrist. Korros., Test de corros. intercrist.	ASTM A262-10 PRACTICE E : OK

A = Beginning / Anfang / Début
E = End / Ende / Fin

EN 10028-7
1.4401
SOLUTION ANNEALED
HEAT TREATMENT: 1070 C
RAPID COOLING WITH WATER AND AIR
NACE MR0103 -2010 AND MR0175 -2003
EN ISO 15156-1/15156-3 -2010
ISO 9001 CERTIFIED QUALITY SYSTEM
BY TÜV NORD CERT

United Industry Sdn. Bhd. S.P.I QA PASS

We certify that the above mentioned products comply with the terms of the order contract.
Wir bestätigen, dass die Lieferung den Vereinbarungen der Bestellannahme entspricht.
Nous certifions que les produits énumérés ci-dessus sont conformes aux prescriptions de la commande.

This test certificate is made by controlled ADP-system and is valid without signature.
Dieses Zeugnis wurde von einem überprüften Datenverarbeitungssystem erstellt und ist ohne Unterschrift gültig.
Ce certificat a été établi par un système informatique contrôlé et est valide sans signature.

Outokumpu Stainless Oy

Authorized inspector / Werksachverständiger / Inspecteur autorisé: SUSANNA SIUKONEN

FIN-95490 Tornio, Finland
Tel. +358 16 4521, Fax +358 16 452350,
www.outokumpu.com
Domicile: Tornio, Finland. Business identity Code 0823315-9

S.P.I HEAT NO: MC230082

V162937

MILL TEST CERTIFICATE

PANTECH STAINLESS & ALLOY INDUSTRIES SDN. BHD. (733428W)

(A MEMBER OF PANTECH GROUP HOLDINGS BERHAD, LISTED ON MAIN MARKET OF BURSA MALAYSIA)

PTD 204334,JALAN PLATINUM UTAMA,

KAWASAN PERINDUSTRIAN PASIR GUDANG, ZONE 12B, 81700 PASIR GUDANG

JOHOR DARUL TAKZIM, MALAYSIA

Tel: +607-2518888 Fax: +607-2519999 Website: www.pantechssalloy.com

http:// www.pantech-group.com

NSF Certified to NSF/ANSI 61

LRQA CERTIFIED ISO 9001 Approval No.: ISO9001-0047465

MATERIAL MANUFACTURER APPROVAL ACCORDING TO PED 2014/68/EU, ANNEX 1, PARA 4.3. PED CERTIFICATE NO. : 0343/PED/MUM/1110006/1

GRC SOLUTIONS

GRC #1045

INSPECTION DOCUMENT: EN 10204: 2004 Type 3.1

Customer: DACAPO STAINLESS A/S

Product: Seamless Austenitic Stainless Steel Fitting

Certificate No : PSA3-FT-48143

Date : 21 Feb 2024

PO No.	Invoice No.	Product Specification	Dimension & Inspection Specification	Delivery Condition
31143511 REV 1	E000006217	ASTM A403/A403M - 22 / ASME SA 403/SA403M - 23	ASME B16.9 - 18 / ASTM A960/A960M - 23 / ASME SA 960/SA960M - 23 / ASME SECTION II PART A-2023	Solution Treated, Pickled-Passivated

Heat No.	Product & Size			Quantity (pcs)	Material Grade	Visual / Dimension / PMI Examination	Remarks
MB161-1	2"	SCH 10s	CAP	50	WP316/316L-S	PASSED	C00082
MB016-1	4"	SCH 40s	CAP	50	WP316/316L-S	PASSED	E10141
KG515-1	5"	SCH 40s	CAP	10	WP316/316L-S	PASSED	Y211112A03-2
MB242-1	6"	SCH 10s	CAP	40	WP316/316L-S	PASSED	E08546
MG457-1	8"	SCH 10s	CAP	25	WP316/316L-S	PASSED	Y211113A07-1
MG149-1	8"	SCH 40s	CAP	15	WP316/316L-S	PASSED	Y230302A26-1
ISA367-01-113P	10"	SCH 40s	CAP	5	WP316/316L-S	PASSED	1016389
MG074-1	12"	SCH 10s	CAP	25	WP316/316L-S	PASSED	Y221004B25-2
MG155-1	12"	SCH 40s	CAP	5	WP316/316L-S	PASSED	Y230130B30-2

Specification	Chemical Composition (%)										Tensile Test *1			Hardness	Inter-granular corrosion test
	C	Si	Mn	P	S	Cr	Ni	Mo	Pb		YS (KSI / MPa)	TS (KSI / MPa)	E (%)	(HRB)	
Max															
Min	0.030	1.00	2.00	0.045	0.030	18.00	14.00	3.00	-		-	-	-	90	
Heat No.	-	-	-	-	-	16.00	10.00	2.00	-		205	515	28	-	
MB161-1	0.025	0.42	1.37	0.025	0.002	16.60	10.10	2.02	< 0.01		377	640	47	88	PASSED
MB016-1	0.022	0.48	1.33	0.030	0.002	16.80	10.00	2.04	< 0.01		314	626	45	83	PASSED
KG515-1	0.024	0.42	1.33	0.028	0.002	16.82	10.05	2.02	< 0.01		286	631	56	83	PASSED
MB242-1	0.023	0.47	1.37	0.033	0.002	16.80	10.00	2.04	< 0.01		305	610	45	81	PASSED
MG457-1	0.023	0.42	1.32	0.030	0.002	16.76	10.05	2.05	< 0.01		295	646	56	85	PASSED
MG149-1	0.021	0.45	1.03	0.036	0.002	16.73	10.05	2.03	< 0.01		280	643	57	87	PASSED
ISA367-01-113P	0.012	0.55	0.93	0.034	0.001	16.71	10.10	2.06	< 0.01		309	580	58	85	PASSED
MG074-1	0.023	0.41	1.31	0.025	0.002	16.72	10.03	2.02	< 0.01		308	621	56	87	PASSED
MG155-1	0.027	0.44	1.08	0.031	0.002	16.85	10.05	2.02	< 0.01		308	620	58	85	PASSED

WE HEREBY CERTIFY THAT THE PRODUCT DESCRIBED HEREIN HAS BEEN MANUFACTURED, SAMPLED, TESTED & INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE SPECIFICATION & PURCHASE ORDER;

AND WAS FOUND SATISFIED TO THE REQUIREMENTS. MATERIAL IS FREE FROM MERCURY & RADIOACTIVE CONTAMINATION.

TENSILE REQUIREMENT: CONFORMS TO ASTM A370-22 STANDARD, SPECIMEN GAUGE WIDTH 19.2MM FOR 3" ABOVE & 3" BELOW ZONE SIMULATION TEST FROM PIPE. LONGITUDINAL DIRECTION. GAUGE LENGTH 2" (50mm)

NOTE: MADE IN MALAYSIA STEEL MAKING PROCESS : AOD / VOD

INTERGRANULAR CORROSION TEST ACCORDING TO ASTM A262-15 PRACTICE E

HARDNESS ACCORDING TO NACE-MR0175-2015 / ISO 15156 -2015 & NACE-MR0103-2015

HEAT TREATMENT: SOLUTION TREATED AT MINIMUM 1050°C, RAPIDLY COOLED WITH WATER

CHEMICAL COMPOSITION CAPTURED FROM RAW MATERIAL'S HEAT ANALYSIS

*1: YS: YIELD STRENGTH TS: TENSILE STRENGTH E: ELONGATION

MATERIAL CONFORMS TO THE SPECIFICATION / STANDARD SHOWN

MATERIAL DOES NOT CONTAIN STEEL PRODUCTS ORIGINATING IN RUSSIA MENTIONED IN ANNEX XVII TO THE (EU) REGULATION NO 833/2014 AND FURTHER AMENDMENT

GENERAL MARKING FORMAT : NSF-61 PANTECH S.A. [PRODUCT TYPE FOR LR/SR ONLY] [SIZE]" [THICKNESS] A/SA403 [GRADE] HEAT NO. [HEAT NO.] MALAYSIA

Pantech Stainless & Alloy Industries Sdn. Bhd.
200601013677 (733428-W)
PTD 204334, Jalan Platinum Utama,
Kawasan Perindustrian Pasir Gudang, Zon 12B,
81700 Pasir Gudang, Johor.
Tel: +607-251 8888 Fax: +607-251 9999

MOD HASSANUDDIN

Head of Quality Assurance Department

BAHRU STAINLESS

INSPECTION CERTIFICATE 3.1

ISSUE DATE: 2014-08-15

ACCORDING TO EN 10204 | CERTIFICATE NO 48051 | Rev 1

MANUFACTURER'S MARK	BHS	INSPECTOR'S STAMP		MELTING PROCESS	E/AOD

CUSTOMER:

ORDER No.	ITEM No.	DELIVERY NOTE No.
BN00829	14	DEL014175

CUSTOMER ORDER No.: PO/161401

REQUIREMENTS

SPECIFICATIONS	MATERIAL CODE
ASTM A240 / A240M-13A	316L
ASME BPVC-IIA SA240 / SA240M-2013	316L

CASE

BPC1D29371 (2336 kg)
BPC1D29376 (1628 kg)

MB161

TOLERANCE: ASTMA480

KURZNAME:

PRODUCT: No 1 Finish,Hot rolled annealed and pickled

HEAT No.: C00082

DIMENSIONS: 3 mm X 1524 mm X 6096 mm | QUANTITY 17 | MASS 3964 Kg | MATERIAL No.: C0014137

CHEMICAL COMPOSITION (%)

	C	S	P	Mn	Si	Cr	Ni	Mo	N				
Min						16.0	10.0	2.00					
Max	0.030	0.030	0.045	2.00	0.75	18.0	14.0	3.00	0.10				
Actual	0.025	0.002	0.025	1.37	0.42	16.6	10.1	2.02	0.05				

MECHANICAL PROPERTIES

TEMPERATURE	DIRECTION	POSITION	Rm MPa	Rp0.2 MPa	A50 %	HRBW HRBW					
Ambient	Transverse	Requirement Min	485	170	40						
		Max				95					
Ambient	Transverse	Head	640	377	47	88					
		Tail				88					

INTERGRANULAR CORROSION

SPECIFICATION	RESULT

This material is free from mercury contamination.
The radiation level exhibited by this material is not greater than the normal background level.
This document is issued without alteration or erasure and may only be reproduced in full.

Tests to verify batch and quality have been made. Verwechslungsprüfung wurde durchgeführt
Visual and dimensional control: no exceptions. Besichtigungen und Abmessung: ohne Beanstandung
The delivery is in accordance with the order. Die Lieferung entspricht den Bestellbedingungen.
This material meets the Hardness requirement of Nace MR-0175
Material has been PMI Tested

BAHRU STAINLESS SDN BHD IS MEMBER OF ACERINOX GROUP

HEAT TREATMENT (SOLUTION ANNEALED)

Anneal °C	Quench
1000 - 1100	AIR/SPRAY

BAHRU STAINLESS
PTD 4069 (PLO 108), Jalan Rumbia 3
Tanjung Langsat Industrial Complex
81700 Pasir Gudang, Johor, Malaysia

Lim Chin Hui
QC ENGINEER

BAHRU STAINLESS

INSPECTION CERTIFICATE 3.1

ACCORDING TO EN 10204

CERTIFICATE NO	Rev	ISSUE DATE
329047	1	2022-09-12

MANUFACTURER'S MARK	BHS	INSPECTOR'S STAMP		MELTING PROCESS	EAF, AOD

CUSTOMER

SUPREME STEELMAKERS SDN BHD
LOT 5176 JALAN PERINDUSTRIAN BALAKONG,
KAWASAN PERINDUSTRIAN BALAKONG JAYA, 43300 SERI KEMBANGAN, SELANGOR
SERI KEMBANGAN
Malaysia

ORDER No.	ITEM No.	DELIVERY NOTE No.
BN05638	7	DEL097682

CUSTOMER ORDER No. PO18201

REQUIREMENTS

SPECIFICATIONS	MATERIAL GRADE
ASTM A240 / A240M-20a	316L / 316
ASME BPVC-IIA SA240 / SA240M-2021	316L / 316
EN 10088-2-2014	1.4404 / 1.4401
EN 10028-7-2016	1.4404 / 1.4401

CASE	MATERIAL	MASS
BPSIL24438	EI0141	10180 Kg

MB016

TOLERANCE ASTM A480/A480M and ASME SA480/SA480M

NO1 : 1D

PRODUCT Hot rolled, annealed & descaled

HEAT No. EI0141 **TYPE**

QUANTITY 1 **TOTAL MASS** 10180 Kg

DIMENSIONS 6 mm x 1524 mm x COIL

CHEMICAL COMPOSITION(%)

	C	S	P	Mn	Si	Cr	Ni	Mo	N
Min						16.5	10.0	2.00	
Max	0.030	0.015	0.045	2.00	0.75	18.0	13.0	2.50	0.10
Heat	0.022	0.002	0.030	1.33	0.48	16.8	10.0	2.04	0.04

MECHANICAL PROPERTIES

TEMPERATURE	DIRECTION	POSITION	Rm MPa	Rp0.2 MPa	Rp1.0 MPa	A50 %	A5 %	HRBW HRBW
Ambient	Transverse	Requirement Min	530	220	260	40	40	
		Max	680					95
Ambient	Transverse	Head	626	314	384	45	45	83
		Tail						83

INTERGRANULAR CORROSION

TEST	RESULT
ASTM A262 Practice E	PASS

HEAT TREATMENT (SOLUTION ANNEALED)

Anneal °C	Quench
1050 – 1100	AIR/SPRAY

Bahru Stainless Sdn. Bhd certifies that the analysis and material on this certification is correct and meets the specifications stated.
This document is issued without alteration or erasure and may only be reproduced in full.
The radiation level exhibited by this material is not greater than the normal background level
This material is free from mercury contamination. This Material is PMI Tested
D.o.P: https://www.bahrustainless.com/en/download/certifications/
Visual and dimensional control: no exceptions. The delivery is in accordance with the order.
Test to verify batch and quality have been made.
This material meets the Hardness requirement of NACE MR0175 / ISO 15156-3 : 2015 & NACE MR0103 / ISO 17945 : 2015
Bahru Stainless Sdn. Bhd is ISO 9001:2015, ISO 14001:2015 & ISO 45001:2018 Certified
Material not weld repaired
BAHRU STAINLESS SDN. BHD IS MEMBER OF ACERINOX GROUP
Test Name Legend:
Rm - Tensile strength (UTS)
Rp0.2 - Yield/proof strength at 0.2% strain
Rp1.0 - Yield/proof strength at 1.0% strain
A5 - Elongation with gauge length = 5.65*Sq(cross-sectional area)
A50 - Elongation with gauge length = 50mm
A80 - Elongation with gauge length = 80mm

BAHRU STAINLESS SDN. BHD
PTD 41869 (PLO 10K), Jalan Rumbia 4, Tanjung Langsat Industrial Complex
81700 Pasir Gudang, Johor, Malaysia

QC ENGINEER

MANUFACTURER: PT. INDONESIA TSINGSHAN STAINLESS STEEL

MILL TEST CERTIFICATE

(PRODUCT QUALITY CERTIFICATE / INSPECTION CERTIFICATE)

EN 10204/3.1

ADD: PT IMIP. Desa Fatufia, Kecamatan Bahodopi, Kabupaten Morowali, Provinsi Sulawesi Tengah, Indonesia
Tel : +6282296751870
E-mail: liuy@tsingshan.com

Purchaser	PANTECH STAINLESS AND ALLOY INDUSTRIES SDN BHD	Contract No	ET21/WCF0905-PSA	Product standard and Steel grade	ASTM A240 316/316L NO.1	Certificate No.	20211209020
Product Name	HOT ROLLED STAINLESS STEEL COIL ASTM A 240 NO. 1 FINISH, MILL EDGE AS PER PO/P000026030	Surface Finish	No. 1			Condition of delivery	Solution Annealed + Pickling

No.	Heat No.	Coil No.	Size (mm)	QTY	Weight (Mt)	Chemical Composition (%)										Tensile Test				Hardness		Impact Test (-196℃), J		
						C	Si	Mn	P	S	Cr	Ni	N	Mo	Cu	Rm (MPa)	$Rp_{0.2}$ (MPa)	$Rp_{1.0}$ (MPa)	El A50	HRB		KV_2 (Tr.1)	KV_2 (Tr.2)	KV_2 (Tr.3)
KG509 — 16	Y211112B09-1	N2111190344	3.50*1524*C	1	21.745	0.023	0.44	1.40	0.030	0.002	16.70	10.05	0.036	2.06	0.06	620.5	300.3	/	56.6	82.9	83.4	/	/	/
KG511 — 17	Y211112A05-7	N2111190347	3.50*1524*C	1	21.225	0.020	0.44	1.32	0.027	0.001	16.90	10.03	0.045	2.03	0.06	634.2	305.8	/	57.6	86.6	86.7	/	/	/
KG496 — 18	Y211112A09-1	N2111190455	3.50*1524*C	1	21.530	0.023	0.54	1.36	0.033	0.002	16.67	10.05	0.037	2.04	0.06	632.3	302.5	/	58.4	84.0	84.3	/	/	/
KG514 — 19	Y211112A03-3	N2111190403	5.05*1524*C	1	21.080	0.024	0.42	1.33	0.028	0.002	16.82	10.05	0.040	2.02	0.06	634.3	294.6	/	56.8	86.3	86.6	/	/	/
KG512 — 20	Y211112A05-3	N2111190328	8.53*1524*C	1	21.330	0.020	0.44	1.32	0.027	0.001	16.90	10.03	0.045	2.03	0.06	621.8	292.4	/	56.4	84.2	84.7	/	/	/
KG513 — 21	Y211112A05-5	N2111190330	9.40*1524*C	1	21.320	0.020	0.44	1.32	0.027	0.001	16.90	10.03	0.045	2.03	0.06	657.9	285.6	/	58.1	86.0	86.5	/	/	/
KG507 — 22	Y211112B06-2	N2111190329	9.40*1524*C	1	21.320	0.022	0.45	1.33	0.025	0.002	16.77	10.05	0.047	2.05	0.06	654.6	301.8	/	57.8	83.7	84.4	/	/	/
KG516 — 23	Y211112B04-4	N2111190349	3.85-1550*C	1	21.055	0.024	0.45	1.32	0.028	0.002	16.69	10.05	0.037	2.04	0.07	633.6	291.5	/	58.6	85.5	85.8	/	/	/
KG510 — 24	Y211112B09-6	N2111190343	3.85-1550*C	1	21.570	0.023	0.44	1.40	0.030	0.002	16.70	10.05	0.036	2.06	0.06	641.5	280.7	/	56.2	84	84.4	/	/	/
KG515 — 25	Y211112A03-2	N2111190315	6.54*1550*C	1	21.050	0.024	0.42	1.33	0.028	0.002	16.82	10.05	0.040	2.02	0.06	630.7	286.1	/	56	83.1	83.5	/	/	/
26	Y211112B04-5	N2111190318	7.53*1550*C	1	20.985	0.024	0.45	1.32	0.028	0.002	16.69	10.05	0.037	2.04	0.07	646.4	305.8	/	57.1	83.4	83.7	/	/	/
KG517 — 27	Y211112B04-2	N2111190319	7.53*1550*C	1	21.075	0.024	0.45	1.32	0.028	0.002	16.69	10.05	0.037	2.04	0.07	648.4	309.5	/	58.6	85.7	86.5	/	/	/
28	Y211112B04-6	N2111190317	7.53*1550*C	1	21.110	0.024	0.45	1.32	0.028	0.002	16.69	10.05	0.037	2.04	0.07	635.1	304.2	/	58.8	85.6	86.1	/	/	/
Total				13	276.395																			

1.Surface Quality ok 2.Shape、Dimension ok 3. Free of mercury 4. Free from radiation contamination 5. Product marking: steel grade, heat No. coil No. size. 6.Origin: Indonesia

Melting Furnace: RKEF→AOD→LF→CCM	Dimension of tensile test pieces: transverse,rectangular specimen with parallel width 12.5mm ,original gauge length ,Lo=50mm	Intergranular corrosion: ASTM A262 , Practice E

- We here certify that the material herein described has been manufactured,sampled,tested and inspected in accordance with the requirements of above specifications.
- ISO 9001:2015 Quality management system identified by ZJQC.
- We declare that our testing center has passed ISO/IEC17025: 2017 accreditation review, accreditation body: CNAS, accreditation capability range: Spectral analysis and tensile testing, certificate number: CNAS L12639.
- Issued in agreement with TÜV SÜD Industrie Service GmbH (April 2018).QMS approved acc. to PED&AD2000, Annex I, Para. 4.3 by Notified Body 0036(Certification no. DGR-0036-QS-W 913/2020/MUC-001).
- Approved acc. to CPR 305/2011 with certification no. 0036 - CPR - M - 119 - 2020.
- Product heat treatment temperature: 1100℃ .
- The certificate should be sealed by quality control department dedicate inspection stamp or authorized official stamp of sales.

QC PASS

TYPED BY	徐红叶
QUALITY MANAGER	刘光
DATE	2021/12/9

Department of Quality Assurance
Special Seal (Stamp)

BAHRU STAINLESS

INSPECTION CERTIFICATE 3.1

ACCORDING TO EN 10204

CERTIFICATE NO	Rev	ISSUE DATE
317283	1	2022-02-26

MANUFACTURER'S MARK	BHS	INSPECTOR'S STAMP		MELTING PROCESS	EAF, AOD

CUSTOMER

SUPREME STEELMAKERS SDN BHD
LOT 5176 JALAN PERINDUSTRIAN BALAKONG,
KAWSAN PERINDUSTRIAN BALAKONG JAYA, 43300 SERI KEMBANGAN, SELANGOR
SERI KEMBANGAN
Malaysia

ORDER No.	ITEM No.	DELIVERY NOTE No.
BN05505	8	DEL094167

CUSTOMER ORDER No. PO17760

REQUIREMENTS

SPECIFICATIONS	MATERIAL GRADE
ASTM A240 / A240M-20a	316l / 316
ASME BPVC-IIA SA240 / SA240M-2021	316L / 316
EN 10088-2-2014	1.4404 / 1.4401
EN 10028-7-2016	1.4404 / 1.4401

CASE	MATERIAL	MASS
BPSU,05068	E0889521D	10610 Kg

MB242

TOLERANCE	ASTM A480/A480M and ASME SA480/SA480M	HEAT No.	E08546	TYPE
PRODUCT	NO1 ; 1D Hot rolled, annealed & descaled	QUANTITY	1	TOTAL MASS 10610 Kg
		DIMENSIONS	4 mm x 1219 mm x COIL	

CHEMICAL COMPOSITION(%)

	C	S	P	Mn	Si	Cr	Ni	Mo	N
Min						16.5	10.0	2.00	
Max	0.030	0.015	0.045	2.00	0.75	18.0	13.0	2.50	0.10
Heat	0.023	0.002	0.033	1.37	0.47	16.8	10.0	2.04	0.04

MECHANICAL PROPERTIES

TEMPERATURE	DIRECTION	POSITION	Rm MPa	Rp0.2 MPa	Rp1.0 MPa	A50 %	A5 %	HRBW HRBW
Ambient	Transverse	Requirement Min	530	220	260	40	40	
		Max	680					95
Ambient	Transverse	Head	610	305	379	45	48	81
		Tail						63

INTERGRANULAR CORROSION

TEST	RESULT
ASTM A262 Practice E	PASS

HEAT TREATMENT (SOLUTION ANNEALED)

Anneal °C	Quench
1050 - 1100	AIR/SPRAY

Bahru Stainless Sdn. Bhd certifies that the analysis and material on this certification is correct and meets the specifications stated
This document is issued without alteration or erasure and may only be reproduced in full.
The radiation level exhibited by this material is not greater than the normal background level
This material is free from mercury contamination. This Material is PMI Tested.
Q.R #: https://www.bahrustainless.com/en/download/verification/
Visual and dimensional control, no exceptions. The delivery is in accordance with the order
Test to verify batch and quality have been made
This material meets the Hardness requirement of NACE MR0175 / ISO 15156-3 : 2015 & NACE MR0103 / ISO 17945 : 2015
Bahru Stainless Sdn. Bhd is ISO 9001:2015, ISO 14001:2015 & ISO 45001:2018 Certified
Material not weld repaired
BAHRU STAINLESS SDN. BHD IS MEMBER OF ACERINOX GROUP
Test Name Legend:
Rm - Tensile strength (UTS)
Rp0.2 - Yield proof strength at 0.2% strain
Rp1.0 - Yield proof strength at 1.0% strain
A5 - Elongation with gauge length = 5.65*Sqrt(cross-sectional area)
A50 - Elongation with gauge length = 50mm
A80 - Elongation with gauge length = 80mm

BAHRU STAINLESS SDN. BHD
PTD 4069 (PLO 104), Jalan Rumbia 4, Tanjung Langsat Industrial Complex
81700 Pasir Gudang, Johor, Malaysia

QC ENGINEER

MANUFACTURER: PT. INDONESIA TSINGSHAN STAINLESS STEEL

MILL TEST CERTIFICATE

(PRODUCT QUALITY CERTIFICATE / INSPECTION CERTIFICATE)

EN 10204/3.1

ADD: PT IMIP. Desa Fatufia, Kecamatan Bahodopi, Kabupaten Morowali, Provinsi Sulawesi Tengah, Indonesia
Tel : +6282296751870
E-mail: liuy@etsingshan.com

Purchaser	CENTURY STEEL PTE LTD	Contract No	ET21/RCF0708-CSP	Product standard and Steel grade	EN 10088-2 / EN 10028-7 1.4401/1.4404; ASTM A240 / ASME SA240 / ASME SA480/ SA480M 316/316L	Certificate No.	20211216012
Product Name	HOT ROLLED STAINLESS STEEL COILS	Surface Finish	No. 1			Condition of delivery	Solution Annealed + Pickling

No.	Heat No.	Coil No.	Size (mm)	QTY	Weight (Mt)	Chemical Composition (%)										Tensile Test				Hardness		Impact Test (-196℃), J		
						C	Si	Mn	P	S	Cr	Ni	N	Mo	Cu			Rm (MPa)	Rp0.2 (MPa)	Rp1.0 (MPa)	El A50	HRB		KV_1 (Tr.1)	KV_2 (Tr.2)	KV_3 (Tr.3)
1	Y211114B05-1	N2111180707-A	2.85*1219*C	1	7.125	0.021	0.48	1.32	0.029	0.002	16.69	10.05	0.037	2.02	0.05			651.5	281.4	/	59.1	84.0	84.3	/	/	/
2	Y211114B05-1	N2111180707-B	2.85*1219*C	1	7.175	0.021	0.48	1.32	0.029	0.002	16.69	10.05	0.037	2.02	0.05			651.5	281.4	/	59.1	84	84.3	/	/	/
3	Y211114B05-1	N2111180707-C	2.85*1219*C	1	7.180	0.021	0.48	1.32	0.029	0.002	16.69	10.05	0.037	2.02	0.05			651.5	281.4	/	59.1	84.0	84.3	/	/	/
4	Y211113B11-5	N2111180706-C	2.85*1219*C	1	7.245	0.023	0.48	1.40	0.030	0.002	16.79	10.04	0.036	2.02	0.05			627.6	309.6	/	56.4	84.1	84.9	/	/	/
5	Y211113B11-5	N2111180706-B	2.85*1219*C	1	7.205	0.023	0.48	1.40	0.030	0.002	16.79	10.04	0.036	2.02	0.05			627.6	309.6	/	56.4	84.1	84.9	/	/	/
6	Y211113B11-5	N2111180706-A	2.85*1219*C	1	7.170	0.023	0.48	1.40	0.030	0.002	16.79	10.04	0.036	2.02	0.05			627.6	309.6	/	56.4	84.1	84.9	/	/	/
7	Y211113A10-1	N2111180606-C	3.00*1219*C	1	7.035	0.023	0.44	1.41	0.030	0.002	16.68	10.03	0.036	2.02	0.05			626.6	304.4	/	55.6	86.1	86.8	/	/	/
8	Y211113A10-1	N2111180606-B	3.00*1219*C	1	7.020	0.023	0.44	1.41	0.030	0.002	16.68	10.03	0.036	2.02	0.05			626.6	304.4	/	55.6	86.1	86.8	/	/	/
9	Y211113A10-1	N2111180606-A	3.00*1219*C	1	6.870	0.023	0.44	1.41	0.030	0.002	16.68	10.03	0.036	2.02	0.05			626.6	304.4	/	55.6	86.1	86.8	/	/	/
10	Y211113A12-6	N2111180607-C	3.00*1219*C	1	6.780	0.023	0.44	1.36	0.029	0.001	16.67	10.02	0.039	2.03	0.05			644.2	281.7	/	55.9	85.1	85.3	/	/	/
11	Y211113A12-6	N2111180607-B	3.00*1219*C	1	6.765	0.023	0.44	1.36	0.029	0.001	16.67	10.02	0.039	2.03	0.05			644.2	281.7	/	55.9	85.1	85.3	/	/	/
12	Y211113A12-6	N2111180607-A	3.00*1219*C	1	6.725	0.023	0.44	1.36	0.029	0.001	16.67	10.02	0.039	2.03	0.05			644.2	281.7	/	55.9	85.1	85.3	/	/	/
13	Y211113A07-1	N2111180636-C	4.00*1219*C	1	7.080	0.023	0.42	1.32	0.030	0.002	16.76	10.05	0.044	2.05	0.05			645.7	294.6	/	56.1	85.3	85.7	/	/	/
14	Y211113A07-1	N2111180636-A	4.00*1219*C	1	6.960	0.023	0.42	1.32	0.030	0.002	16.76	10.05	0.044	2.05	0.05			645.7	294.6	/	56.1	85.3	85.7	/	/	/
15	Y211113A07-1	N2111180636-B	4.00*1219*C	1	7.050	0.023	0.42	1.32	0.030	0.002	16.76	10.05	0.044	2.05	0.05			645.7	294.6	/	56.1	85.3	85.7	/	/	/
Total				15	105.385																					

M6457

1.Surface Quality ok 2.Shape、Dimension ok 3. Free of mercury 4. Free from radiation contamination 5. Product marking: steel grade, heat No. coil No. size, 6.Origin: Indonesia

Melting Furnace: RKEF→AOD→LF→CCM	Dimension of tensile test pieces: transverse,rectangular specimen with parallel width 12.5mm ,original gauge length ,Lo=50mm	Intergranular corrosion: ASTM A262 , Practice E

- We here certify that the material herein described has been manufactured,sampled,tested and inspected in accordance with the requirements of above specifications.
- ISO 9001:2015 Quality management system identified by ZJQC.
- We declare that our testing center has passed ISO/IEC17025：2017 accreditation review, accreditation body: CNAS, accreditation capability range: Spectral analysis and tensile testing, certificate number: CNAS L12639.
- Issued in agreement with TÜV SÜD Industrie Service GmbH (April 2018).QMS approved acc. to PED&AD2000 (W0,W2,W10), Annex I, Para. 4.3 by Notified Body 0036(Certification no. DGR-0036-QS-W 913/2020/MUC-001), .Compliant with PED 2014/68/EU directive.
- Approved acc. to CPR 305/2011 with certification no. 0036 - CPR - M - 119 - 2020.
- Product heat treatment temperature：1100℃ .
- The certificate should be sealed by quality control department dedicate inspection stamp or authorized official stamp of sales.
- Thickness Tolerance according to ISO 9444-2.

TYPED BY	
QUALITY MANAGER	
DATE	2021/12/13

Department of Quality Assurance

(Stamp)

QC PASS

MANUFACTURER : PT. INDONESIA TSINGSHAN STAINLESS STEEL

MILL TEST CERTIFICATE

(PRODUCT QUALITY CERTIFICATE / INSPECTION CERTIFICATE)

EN 10204/3.1

ADD: PT IMIP, Desa Fatufia, Kecamatan Bahodopi, Kabupaten Morowali, Provinsi Sulawesi Tengah, Indonesia
Tel : +6281242280040
E-mail: chenq@tsingshan.com

PO31422

Purchaser	PANTECH STAINLESS AND ALLOY INDUSTRIES SDN BHD	Contract No	ET22/WCF1218-PSA	Product standard and Steel grade	ASTM A240/A240M-22 316/316L	Certificate No.	20230401104
Product Name	HOT ROLLED STAINLESS STEEL COIL	Surface Finish	No. 1			Condition of delivery	Solution Annealed + Pickling

	No.	Heat No.	Coil No.	Size (mm)	QTY	Weight (Mt)	Chemical Composition (%)										Tensile Test				Hardness		Impact Test (-196℃), J		
							C	Si	Mn	P	S	Cr	Ni	N	Mo	Cu	Rm (MPa)	$Rp_{0.2}$ (MPa)	$Rp_{1.0}$ (MPa)	El A50 (%)	HRB		KV_2 (Tr.1)	KV_2 (Tr.2)	KV_2 (Tr.3)
MG140	1	Y230306A30-6	N2303140217	2.81*1219*C	1	21.830	0.023	0.47	1.35	0.030	0.001	16.66	10.03	0.036	2.04	0.05	647.3	303.2	/	56.9	86.8	87.1	/	/	/
MG142	2	Y230306D24-5	N2303140216	2.81*1219*C	1	21.855	0.020	0.45	1.33	0.029	0.002	16.80	10.04	0.040	2.02	0.05	631.1	306.8	/	58.4	84.8	85.3	/	/	/
MG143	3	Y230306D24-6	N2303140323	3.13*1219*C	1	21.800	0.020	0.45	1.33	0.029	0.002	16.80	10.04	0.040	2.02	0.05	626.3	309.2	/	57.9	87.2	87.8	/	/	/
MG144	4	Y230306B25-6	N2303140328	3.13*1219*C	1	21.355	0.021	0.46	1.34	0.033	0.002	16.70	10.02	0.039	2.02	0.05	629.4	309.1	/	58.3	83.3	83.4	/	/	/
MG147	5	Y230307B20-5	N2303140322	3.13*1219*C	1	21.625	0.019	0.43	1.34	0.031	0.001	16.70	10.05	0.040	2.02	0.07	630.5	285.6	/	58.6	84.8	85.3	/	/	/
MG141	6	Y230306A30-5	N2303140236	4.20*1219*C	1	21.745	0.023	0.47	1.35	0.030	0.001	16.66	10.03	0.036	2.04	0.05	659.6	296.6	/	55.6	84.0	84.1	/	/	/
MG148	7	Y230306A29-4	N2303140237	4.20*1219*C	1	21.820	0.020	0.49	1.37	0.036	0.001	16.73	10.03	0.042	2.05	0.05	654.3	291.5	/	56.9	83.8	84.6	/	/	/
MG145	8	Y230302D25-1	N2303140522	8.53*1524*C	1	21.615	0.023	0.43	1.06	0.027	0.001	16.77	10.02	0.034	2.04	0.06	622.8	289.7	/	56.8	85.6	85.9	/	/	/
MG149	9	Y230302A26-1	N2303140521	8.53*1524*C	1	21.600	0.021	0.45	1.03	0.036	0.002	16.73	10.05	0.041	2.03	0.06	642.6	280.4	/	56.5	87.2	87.7	/	/	/
MG150	10	Y220205C28-6	N2203150228	3.85*1550*C	1	21.395	0.023	0.46	1.33	0.027	0.001	16.69	10.05	0.038	2.03	0.07	652.9	308.6	/	58.0	87.0	87.3	/	/	/
	Total				10	216.640																			

1.Surface Quality ok 2.Shape、Dimension ok 3. Free of mercury 4. Free from radiation contamination 5. Product marking: steel grade, heat No. coil No. size. 6.No weld repair 7.Origin: Indonesia

Melting Process: RKEF→AOD→LF→CCM	Dimension of tensile test pieces: transverse,rectangular specimen with parallel width 12.5mm ,original gauge length ,Lo=50mm	Intergranular corrosion: ASTM A262 , Practice E

- We here certify that the material herein described has been manufactured,sampled,tested and inspected in accordance with the requirements of above specifications.
- ISO 9001:2015 Quality management system identified by ZJQC.
- We declare that our testing center has passed ISO/IEC 17025：2017 accreditation review, accreditation body: CNAS, accreditation capability range: Spectral analysis and tensile testing, certificate number: CNAS L12639.
- Issued in agreement with TÜV SÜD Industrie Service GmbH (April 2018).QMS approved acc. to PED&AD2000 (W0,W2,W10), Annex I, Para. 4.3 by Notified Body, No. 0036 (Certificate no. DGR-0036-QS-W 838/2018/MUC-001). Compliant with PED 2014/68/EU directive.
- Approved acc. to CPR 305/2011/EU with certificate no. 0036 - CPR -M 115.2019.001.
- Product heat treatment temperature：1100℃ .
- The certificate should be sealed by quality control department dedicate inspection stamp or authorized official stamp of sales.
- PRODUCT NAME : HOT ROLLED STAINLESS STEEL COIL ASTM A 240 NO. 1 FINISH, MILL EDGE AS PER PO/P000031422.

QC PASS

TYPED BY	胡石莉
APPROVED BY	陈强
DATE	2023/3/30

INDONESIA TSINGSHAN STAINLESS STEEL Quality Assurance Stamp

ORIGINAL

FUJIAN FUXIN SPECIAL STEEL CO.,LTD.

INSPECTION CERTIFICATE

NO.1 LONGCHI BLVD, LONGCHI INDUSTRIAL AREA,
ZHANGZHOU TAIWANESE INVESTMENT ZONE,
FUJIAN PROVINCE

BUYER : TO WHOM IT MAY CONCERN

PRODUCT : Hot Rolled Stainless Steel Sheet in Coil

ISSUE DATE: 20190301

CUSTOMER : TO WHOM IT MAY CONCERN

CONTRACT NO. : F1812PT-C

CERTIFICATE NO. : 201903010000010

SPEC./TYPE : ASTM A240M 316/316L

SURFACE FINISH : No.1

LICENCE NO. :

PAGE : 1 / 1

MATERIAL NO.	HEAT NO.	EDGE	MATERIAL DESCRIPTION					CHEMICAL COMPOSITION (%)													TENSILE TEST				HARDNESS	BEND
			T	W	L	QTY	WEIGHT	C	Si	Mn	P	S	Cr	Ni	N	Mo					T.S.	0.2% Y.S.	1.0% Y.S.	EL	HRBW	
			mm				t														MPa			%		
		Min											16.00	10.00		2.00					515	205		40		
		Max						0.030	0.75	2.00	0.045	0.0300	18.00	14.00	0.100	3.00									95	
ISA367-01-113 HE1900830300	1016389	M	9.15	1275	COIL	1	17.878	0.012	0.55	0.93	0.034	0.0013	16.71	10.10	0.032	2.06					580	309		58	85	
TOTAL						1	17.878																			

REMARKS

1. EDGE:M—MILL EDGE:C—CUT EDGE.
2. THE MATERIALS ABOVE HAVE BEEN DETECTED WITH NON-RADIATION CONTAMINATION. MERCURY IS NOT ADDED IN THE PROCESS OF THIS MATERIAL.
3. FUXIN HAS OBTAINED ISO 9001 QUALITY SYSTEM CERTIFICATION ISSUED BY CHINA QUALITY CERTIFICATION CENTRE AND HAS AN INDEPENDENT QUALITY INSPECTION DEPARTMENT, THE CERTIFICATION IS EN10204 3.1.
4. SOLUTION HEAT TREATMENT 1050℃ & WATER QUENCHING.
5. THE PRODUCT ALSO MEET ASME SA-240M.
6. FUXIN HAS OBTAINED PED(2014/68/EU) CERTIFICATION ISSUED BY TÜV SÜD.
7. INTERGRANULAR CORROSION TEST:NO CRACK. TEST METHOD:ASTM A262 PRACTICE"E".

Quality Assurance Department

QUALITY MANAGER

NOTES

WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS BEEN MANUFACTURED AND TESTED WITH SATISFATORY RESULT IN ACCORDANCE WITH THE REQUIREMENT OF THE ABOVE MATERIAL SPECIFICATION.

Hsiu-Ming Shen

FXTG-SPR-A404-5
ISSUE.REV.:1.2

MANUFACTURER : PT. INDONESIA TSINGSHAN STAINLESS STEEL

MILL TEST CERTIFICATE

(PRODUCT QUALITY CERTIFICATE / INSPECTION CERTIFICATE)

EN 10204/3.1

ADD: PT IMIP. Desa Fatufia, Kecamatan Bahodopi, Kabupaten Morowali, Provinsi Sulawesi Tengah, Indonesia
Tel : +6282296751870
E-mail: liuy@etsingshan.com

Purchaser	YANKONG STAINLESS SDN BHD	Contract No	ET22/WCF0908-SCT	Product standard and Steel grade	ASTM A240/A240M-22 316L	Certificate No.	20221203011
Product Name	HOT ROLLED STAINLESS STEEL COILS	Surface Finish	No. 1			Condition of delivery	Solution Annealed + Pickling

No.	Heat No.	Coil No.	Size (mm)	QTY	Weight (Mt)	Chemical Composition (%)												Tensile Test				Hardness		Impact Test (-196℃), J		
						C	Si	Mn	P	S	Cr	Ni	N	Mo	Cu			Rm (MPa)	$R_{p0.2}$ (MPa)	$R_{p1.0}$ (MPa)	El A50 (%)	HRB		KV_2 (Tr.1)	KV_2 (Tr.2)	KV_2 (Tr.3)
1	Y221004825-2	N2210130650-B	6.00*1219*C	1	10.630	0.023	0.41	1.31	0.025	0.002	16.72	10.09	0.050	2.02	0.06			620.7	307.8	/	55.8	86.5	86.6	/	/	/
2	Y221004825-2	N2210130650-A	6.00*1219*C	1	10.305	0.023	0.41	1.31	0.025	0.002	16.72	10.09	0.050	2.02	0.06			620.7	307.8	/	55.8	86.5	86.6	/	/	/
Total				2	20.935																					

MG074

1.Surface Quality ok 2.Shape、Dimension ok 3. Free of mercury 4. Free from radiation contamination 5. Product marking: steel grade, heat No. coil No. size. 6.No weld repair 7.Origin: Indonesia

Melting Furnace: RKEF→AOD→LF→CCM | Dimension of tensile test pieces: transverse,rectangular specimen with parallel width 12.5mm ,original gauge length ,Lo=50mm | Intergranular corrosion: ASTM A262 , Practice E

- We here certify that the material herein described has been manufactured,sampled,tested and inspected in accordance with the requirements of above specifications.
- ISO 9001:2015 Quality management system Identified by ZJQC.
- We declare that our testing center has passed ISO/IEC 17025：2017 accreditation review, accreditation body: CNAS, accreditation capability range: Spectral analysis and tensile testing, certificate number: CNAS L12639.
- Issued in agreement with TÜV SÜD Industrie Service GmbH (April 2018).QMS approved acc. to PED&AD2000 (W0,W2,W10), Annex I, Para. 4.3 by Notified Body, No. 0036 (Certificate no. DGR-0036-QS-W 838/2018/MUC-001). Compliant with PED 2014/68/EU directive.,
- Approved acc. to CPR 305/2011/EU with certificate no. 0036 - CPR -M 115.2019.001.
- Product heat treatment temperature：1100℃ .
- The certificate should be sealed by quality control department dedicate inspection stamp or authorized official stamp of sales.

CERTIFIED TRUE COPY

TYPED BY	张慧玲
QUALITY MANAGER	刘龙
DATE	2022/12/4

MANUFACTURER : PT. INDONESIA TSINGSHAN STAINLESS STEEL

MILL TEST CERTIFICATE

(PRODUCT QUALITY CERTIFICATE / INSPECTION CERTIFICATE)

EN 10204/3.1

ADD: PT IMIP. Desa Fatufia, Kecamatan Bahodopi, Kabupaten Morowali, Provinsi Sulawesi Tengah, Indonesia
Tel : +6281242280040
E-mail: cheng@etsingshan.com

PO 3177 1

Purchaser	PANTECH STAINLESS & ALLOY INDUSTRIES SDN BHD	Contract No	ET22/WCF1206-PSA	Product standard and Steel grade	ASTM A240/A240M-22 316/316L	Certificate No.	20230401099
Product Name	HOT ROLLED STAINLESS STEEL COIL	Surface Finish	No. 1			Condition of delivery	Solution Annealed + Pickling

No.	Heat No.	Coil No.	Size (mm)	QTY	Weight (Mt)	Chemical Composition (%)										Tensile Test				Hardness		Impact Test (-196℃), J		
						C	Si	Mn	P	S	Cr	Ni	N	Mo	Cu	Rm (MPa)	$R_{p0.2}$ (MPa)	$R_{p1.0}$ (MPa)	El A50 (%)	HRB		KV_2 (Tr.1)	KV_2 (Tr.2)	KV_2 (Tr.3)
M6151 1	Y230130B26-2	N2303090552	3.50*1219*C	1	21.710	0.024	0.51	1.35	0.030	0.001	16.70	10.02	0.039	2.03	0.05	654.8	296.2	/	55.6	82.9	83.1	/	/	/
2	Y230130B26-3	N2303090549	3.50*1219*C	1	21.660	0.024	0.51	1.35	0.030	0.001	16.70	10.02	0.039	2.03	0.05	636.1	301.1	/	56.7	86.5	86.9	/	/	/
M6152 3	Y230130B27-2	N2303090550	3.50*1219*C	1	21.770	0.025	0.50	1.34	0.032	0.002	16.67	10.02	0.035	2.02	0.06	620.2	308.2	/	55.5	84.7	85.4	/	/	/
M6153 4	Y230130B27-1	N2303090558	4.20*1219*C	1	21.700	0.025	0.50	1.34	0.032	0.002	16.67	10.02	0.035	2.02	0.06	652.3	297.5	/	58.2	87.0	87.4	/	/	/
M6154 5	Y230130B24-3	N2303090559	4.20*1219*C	1	21.735	0.029	0.54	1.30	0.030	0.002	16.60	10.02	0.040	2.04	0.05	652.8	294.5	/	56.7	86.3	86.4	/	/	/
M6155 6	Y230130B30-6	N2303090577	9.15*1219*C	1	21.790	0.027	0.44	1.08	0.031	0.002	16.85	10.05	0.036	2.02	0.05	622.7	291.9	/	58.0	84.0	84.1	/	/	/
7	Y230130B30-2	N2303090576	9.15*1219*C	1	21.755	0.027	0.44	1.08	0.031	0.002	16.85	10.05	0.036	2.02	0.05	620.2	308.1	/	57.9	85.2	85.5	/	/	/
M6146 8	Y230131B25-1	N2303090451	4.40*1524*C	1	19.070	0.025	0.49	1.36	0.030	0.001	16.90	10.02	0.035	2.06	0.05	654.2	304.2	/	56.3	86.3	87.1	/	/	/
Total				8	171.190																			

1.Surface Quality ok 2.Shape、Dimension ok 3. Free of mercury 4. Free from radiation contamination 5. Product marking: steel grade, heat No. coil No. size. 6.No weld repair 7.Origin: Indonesia

Melting Process: RKEF→AOD→LF→CCM | **Dimension of tensile test pieces: transverse,rectangular specimen with parallel width 12.5mm ,original gauge length ,Lo=50mm** | **Intergranular corrosion: ASTM A262 , Practice E**

- We here certify that the material herein described has been manufactured,sampled,tested and inspected in accordance with the requirements of above specifications.
- ISO 9001:2015 Quality management system identified by ZJQC.
- We declare that our testing center has passed ISO/IEC 17025: 2017 accreditation review, accreditation body: CNAS, accreditation capability range: Spectral analysis and tensile testing, certificate number: CNAS L12639.
- Issued in agreement with TÜV SÜD Industrie Service GmbH (April 2018),QMS approved acc. to PED&AD2000 (W0,W2,W10), Annex I, Para. 4.3 by Notified Body, No. 0036 (Certificate no. DGR-0036-QS-W 838/2018/MUC-001). Compliant with PED 2014/68/EU directive.
- Approved acc. to CPR 305/2011/EU with certificate no. 0036 - CPR -M 115.2019.001.
- Product heat treatment temperature: 1100℃ .
- The certificate should be sealed by quality control department dedicate inspection stamp or authorized official stamp of sales.

QC PASS

TYPED BY	胡石莉
APPROVED BY	陈强
DATE	2023/3/30

PT. INDONESIA TSINGSHAN STAINLESS STEEL
Quality Assurance Stamp

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

GRC #1050

Customer: **GRC SOLUTIONS S.R.L.**
VIA PRIMO MAGGIO, 22/24
24060 BOLGARE (BG)

Date, 25-09-24 **Our Ref.** DDT 3391 / OC 1936 **of** 25-09-24 **Your Ref.** O-24153 23-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402638

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
55872H012P0MF	HEAVY HEX NUT TAB.10 ANSI B18.2.2 - A/SA194 2H D. 1/2" - 13UNC H.D.G. OS. *2 - 24106-1*	128,00	quenched tempered @ 560°C	HOT DIP GALVANIZED ASTM A153 Cl. "C" / F2329	732374	G090009071*

MECHANICAL PROPERTIES

values	HB (min-max)	HB after 24 hrs	PROOF LOAD	HRc (min-max)	HRc after 24 hrs
required	248 - 327	179 min.		24 - 35	89 HRb min.
actual		205	OK @ 110,4 KN	27 - 29	

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)
required	0,400 min	1,000 max	0,400 max	0,040 max	0,050 max
actual	0,44	0,67	0,22	0,011	0,001

remarks: nuts hardness test after 24 HRS tempering at 540°C. According to ASME II part. A ed. 2021. Macroetch test according to ASTM E381 result: S1 R1 C1. chemical and mechanical values, at delivery condition, are quoted by the relevant steel work certificate. VISUAL AND DIMENSIONAL TEST SATISFACTORY

If not mentioned the above test are performed at room temperature.
We certify that the fasteners were manufactured, sampled, tested and inspected in accordance with the specification and are consistent with order prescriptions.
Quality assurance system in accordance to European Directive 2014/68/EU annex I par. 4.3 (PED) and AD 2000 Merkblatt W0.
Certificates 0045/202/WZ1921/23 and TN/AD2000-W0/1921/23 TÜV NORD Systems GmbH & Co. KG.

IPL S.R.L.
RSQ A. Grisetti

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

GRC #1051

Customer: **GRC SOLUTIONS S.R.L.**
VIA PRIMO MAGGIO, 22/24
24060 BOLGARE (BG)

Date, 25-09-24 **Our Ref.** DDT 3391 / OC 1936 **of** 25-09-24 **Your Ref.** O-24153 23-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402638

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TIRPB7012090F	STUDBOLT ANSI B16.5/B1.1 2A - A/SA193 B7 D. 1/2"-13UNCx 90 H.D.G. O.S. *1 - 24106-1*	48,00	quenched tempered	HOT DIP GALVANIZED ASTM A153 Cl. "C" / F2329	585849	R31803004VX*

MECHANICAL PROPERTIES

values	Rm (MPa)	Rp 0,2 (MPa)	A4 (%)	Z (%)	HB (min-max)
required	860 min	720 min	16 min.	50 min.	321 max
actual	979	875	19,5	59,0	279 - 290

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)	Al (%)
required	0,380 - 0,480	0,750 - 1,000	0,150 - 0,350	0,035 max	0,040 max	0,800 - 1,100	0,150 - 0,250	
actual	0,42	0,78	0,26	0,008	0,003	0,980	0,190	

remarks: chemical and mechanical values, at delivery condition, are quoted by the relevant steel work certificate. VISUAL AND DIMENSIONAL TEST SATISFACTORY
According to ASME II part. A ed. 2021. Macroetch test according to ASTM E381 result: S1 R1 C1.

If not mentioned the above test are performed at room temperature.
We certify that the fasteners were manufactured, sampled, tested and inspected in accordance with the specification and are consistent with order prescriptions.
Quality assurance system in accordance to European Directive 2014/68/EU annex I par. 4.3 (PED) and AD 2000 Merkblatt W0.
Certificates 0045/202/WZ1921/23 and TN/AD2000-W0/1921/23 TÜV NORD Systems GmbH & Co. KG.

IPL S.R.L.
RSQ A. Grisetti

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

GRC #1052

Customer: **GRC SOLUTIONS S.R.L.**
VIA PRIMO MAGGIO, 22/24
24060 BOLGARE (BG)

Date, 25-09-24 **Our Ref.** DDT 3391 / OC 1936 **of** 25-09-24 **Your Ref.** O-24153 23-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402638

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TIRPB7012075F	STUDBOLT ANSI B16.5/B1.1 2A - A/SA193 B7 D. 1/2"-13UNCx 75 H.D.G. OS. *3 - 24106-1*	16,00	quenched tempered	HOT DIP GALVANIZED ASTM A153 Cl. "C" / F2329	670832	0502605*

MECHANICAL PROPERTIES

values	Rm (MPa)	Rp 0,2 (MPa)	A4 (%)	Z (%)	HB (min-max)
required	860 min	720 min	16 min.	50 min.	321 max
actual	965	869	18,0	56,0	279 - 288

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)	Al (%)
required	0,380 - 0,480	0,750 - 1,000	0,150 - 0,350	0,035 max	0,040 max	0,800 - 1,100	0,150 - 0,250	
actual	0,41	0,81	0,22	0,016	0,004	0,930	0,183	

remarks: chemical and mechanical values, at delivery condition, are quoted by the relevant steel work certificate. VISUAL AND DIMENSIONAL TEST SATISFACTORY
According to ASME II part. A ed. 2019. Macroetch test according to ASTM E381 result: S1 R1 C1.

If not mentioned the above test are performed at room temperature.
We certify that the fasteners were manufactured, sampled, tested and inspected in accordance with the specification and are consistent with order prescriptions.
Quality assurance system in accordance to European Directive 2014/68/EU annex I par. 4.3 (PED) and AD 2000 Merkblatt W0.
Certificates 0045/202/WZ1921/23 and TN/AD2000-W0/1921/23 TÜV NORD Systems GmbH & Co. KG.

IPL S.R.L.
RSQ A. Grisetti

COGNE ACCIAI SPECIALI S.p.a.

ITALY - 11100 AOSTA - VIA PARAVERA, 16
TEL +39.0165.3021 - FAX +39.0165.302296
CAP. SOC. 405.563.167,00 EUR INT. VERS.
C.F. 02187360967
VAT: IT00571320076 - R.E.A. n. AO-50474

Azienda con Sistemi di Gestione certificati secondo ISO 9001, IATF 16949, EN 9100, ISO 14001 e ISO 45001

CERTIFICATO DI COLLAUDO 3.1 (EN 10204:2004)
NUMERO DEL DOCUMENTO 2024011265

GRC #1053

COMMITTENTE:	SAMAX S.R.L.		
ORDINE DEL CLIENTE:	Ordine Mail		
STABILIMENTO PRODUTTORE:	AOSTA, VIA PARAVERA 16 - ITALIA		
REDATTORE DEL DOCUMENTO:	SERVIZIO QUALITA'		
CONFERMA D'ORDINE DEL PRODUTTORE:	0001139394 / 000010		
SIGLA STABILIMENTO PRODUTTORE:	**COGNE**		
AVVISO DI SPEDIZIONE:	0081598792 / 000010 PESO: 466 KG / 1027 LB		
SPECIFICA INTERNA:	AD2000MERKBLATTW10	REGOLA TECNICA:	AD2000
PRODOTTO:	PEL Pelati TONDI TOLLERANZA: ISOK11		
FINITURA SUPERFICIALE:	2B		
STATO DI FORNITURA:	RS Ricotto Solubilizzato		
DIMENSIONI DEL PRODOTTO (MM):	55,000 (2,165 in)	LUNGH. (MM):	06000 06200 (00236 00244 in)
QUALITA' ACCIAIO:	316L-S31600/31603-1.4404/4401	MARCA INTERNA:	F316L IMCO
IDENTIFICAZIONE N. DI COLATA:	472052	IDENTIFICAZIONE N. DI SCHEDA:	337460
MARCATURA DEL PRODOTTO:	1.4404	MARCATURA PROVINI:	746

AISI 316/316L - UNS S31600/S31603 - 1.4404/1.4401
FABBRICAZIONE AL FORNO ELETTRICO + AOD + COLATA CONTINUA
RIFERIMENTO PER GLI STANDARD ASME APPLICABILI : SEZIONE II PARTE A ED 2015-2017-2019-2021
IL MATERIALE E' STATO PRODOTTO SECONDO LE SPECIFICHE AD2000-MERKBLATT W0/W2/W10
DOCUMENTO EMESSO IN ACCORDO CON TUEV BAYERN (11.1972) NON SOGGETTO A CONTROFIRMA (VEDI LETTERA TUEV BAYERN 17.01.80).
NORME DI RIFERIMENTO: EN 10088-3 (14), EN 10272 (16), ASTM A276-r17/ASME SA276-21, ASTM A479/A479M-r21, ASTM A193-23 B8MCLASSE 1D, ASME SA276/SA276M-21,ASME SA479/SA479M-21, AMS 5653J, AMS 5648N, ISO15156-3/NACE MR0175 (15), NACE MR0103/ISO 17945 (15), NORSOK M630 MDSS01 REV5.
NORME DI RIFERIMENTO PER ANALISI CHIMICA E PROPRIETA'MECCANICHE: ASTM A182-23/ ASME SA182-21.
NORME DI RIFERIMENTO SOLO PER ANALISI CHIMICA: EN 10222-5 (17),ASTM A403-22b, ASTM A484-22, ASTM A314-23, AMS-QQ-S-763D.
ASME SECT.II PART A EDITION 2015-2017-2019-2021.
MATERIALE IN ACCORDO A NACE MR0103/ISO 17945
LAMINATO A CALDO
RAPPORTO DI RIDUZIONE 9,9

ANALISI CHIMICA DI COLATA SECONDO ASTM A751 - EN ISO 14284
Lotto controllo - Peso:020000992095 - 77.779 KG - 171.470 LB

ELEMENTI	C	Si	Mn	P	S	N	Cr	Mo	Ni	Cu
UNITA' DI MISURA	% w/w	% w/w	% w/w	% w/w	% w/w	% w/w	% w/w	% w/w	% w/w	% w/w
OTTENUTO	0,015	0,33	1,77	0,028	0,025	0,079	16,81	2,09	10,22	0,43

ELEMENTI	Co
UNITA' DI MISURA	% w/w
OTTENUTO	0,18

PROVA DI DUREZZA ALLO STATO DI FORNITURA
Lotto controllo - Peso:020000992535 - 16.449 KG - 36.263 LB

NORMA		PROVA DI DUREZZA	HB
OTTENUTO	155		

DATA 30.01.2024 BARBARA VIETTI MV(ESPERTO DI STABILIMENTO) - CERTIFICATO GENERATO ELETTRONICAMENTE -**Cogne**

COGNE ACCIAI SPECIALI S.p.a.

ITALY - 11100 AOSTA - VIA PARAVERA, 16
TEL +39.0165.3021 - FAX +39.0165.302296
CAP. SOC. 405.563.167,00 EUR INT. VERS.
C.F. 02187360967
VAT: IT00571320076 - R.E.A. n. AO-50474

Azienda con Sistemi di Gestione certificati secondo ISO 9001, IATF 16949, EN 9100, ISO 14001 e ISO 45001

PROVA DI RESILIENZA ALLO STATO DI FORNITURA
Lotto controllo - Peso:020000992535 - 16.449 KG - 36.263 LB
NORMA EN ISO 148-1-KV2 ORIENTAMENTO DELLE PROVETTE: L
TIPO DI PROVETTA KV
TEMPERATURA DI PROVA °C 20
UNITA' DI MISURA J

OTTENUTO	425	431	432	435	428	432	429	425	426	427
	426	433								

PROVA DI TRAZIONE ALLO STATO DI FORNITURA
Lotto controllo - Peso:020000992535 - 16.449 KG - 36.263 LB
NORMA EN-ISO6892-1 ORIENTAMENTO DELLE PROVETTE: L

	RM	RP02	A5	Z	RP1
UNITA' DI MISURA	MPA	MPA	% 5.0 D	%	NMM
OTTENUTO	616	277	47,1	74,4	324
	595	264	55,7	78,4	316
	612	281	48,9	73,0	319
	614	285	51,2	74,5	329

DIMENSIONE GRANO
--
Lotto controllo - Peso:020000992535 - 16.449 KG - 36.263 LB
NORMA ASTME112 --
OTTENUTO 6

PROVA DI CORROSIONE SECONDO ASTM A262 METODO E EN ISO 3651-2 METODO A: CONFORME.
MATERIALE IN ACCORDO A ASME SEC. II Ed. 2015
PROVA DI RESILIENZA
Lotto controllo - Peso:020000992535 - 16.449 KG - 36.263 LB
NORMA EN ISO 148-1 ORIENTAMENTO DELLE PROVETTE: L
TIPO DI PROVETTA KV
TEMPERATURA DI PROVA °C 196-
UNITA' DI MISURA J

OTTENUTO	188	179	183	187	177	181	197	195	186	177
	185	183								

COGNE ACCIAI SPECIALI S.p.a.

ITALY - 11100 AOSTA - VIA PARAVERA, 16
TEL +39.0165.3021 - FAX +39.0165.302296
CAP. SOC. 405.563.167,00 EUR INT. VERS.
C.F. 02187360967
VAT: IT00571320076 - R.E.A. n. AO-50474

Azienda con Sistemi di Gestione certificati secondo ISO 9001, IATF 16949, EN 9100, ISO 14001 e ISO 45001

PROVA DI TRAZIONE
Lotto controllo - Peso:020000992535 - 16.449 KG - 36.263 LB
NORMA ASTMA370-E8-0.5"SPEC ORIENTAMENTO DELLE PROVETTE: L

	RMB	RP02B	ZB	AL2B
UNITA' DI MISURA	KSI	KSI	%	%
				4,0 D
OTTENUTO	89	39	71,8	51,4
	87	39	75,8	60,9
	89	39	74,5	54,2
	87	40	71,1	58,6

I prodotti consegnati sono conformi alla EN10088-5 e riportano la marcatura CE, sulla base dei risultati di prova qui riportati e la sorveglianza continua, la verifica e la approvazione di MPA NRW (certificato n. 0432-CPR-00166-01)
Materiale prodotto secondo il sistema #Regulation 305/2011/EU of the European Parliament and of the Council of 9 March 2011
PROVA AD UTRASUONI SECONDO EN 10308 CLASSE 3.: CONFORME
COLLAUDO SUPERFICIALE CON CORRENTI INDOTTE IN ACCORDO A EN 10277 CL.4.
COLLAUDO DIMENSIONALE IN ACCORDO A EN 10278: CONFORME.
NON è STATA ESEGUITA ALCUNA RIPARAZIONE DEL MATERIALE MEDIANTE
SALDATURA.
CONTROLLO ANTIMESCOLAMENTO CON SPETTROMETRO PORTATILE: CONFORME
MARCATURA: MARCHIO PRODUTTORE, N. WERKSTOFF, N. COLATA, N. PROVA/LOTTO PUNZONE DELL'ESPERTO
Paese di origine: Italia, il materiale è conforme alle normative FAR DFARS 252.225-7009 ALT 1.
IL MATERIALE è CONFORME ALLE DIRETTIVE: 2015/863/UE(ROHS3) - 2011/65/UE (ROHS2) - 2000/53/UE - 2002/95/UE(RoHS) - 2003/11/UE - 2005/618/UE e PED 2014/68/UE.
DOVE NON SPECIFICATO TUTTE LE NORME CITATE SI INTENDONO NELLA LORO ULTIMA REVISIONE IN VIGORE.
MATERIALE IN ACCORDO A NACE MR0103/ISO 17945
PUNZONE DELL'ESPERTO LF
MATERIALE PRODOTTO IN UN SISTEMA DI GESTIONE QUALITA' IN ACCORDO ALLE NORME UNI EN ISO 9001:2015 E IATF 16949:2016 (QUEST'ULTIMA SOLO PER VERGELLA E FILO, BARRE LAMINATE-PELATE-RETTIFICATE IN ACCIAIO) CERTIFICATO DA KIWA CERMET.
IL MATERIALE E' PRIVO DI MERCURIO E SUOI COMPOSTI ED ESENTE DA CONTAMINAZIONE DA SOSTANZE RADIOATTIVE AL MOMENTO DELLA SPEDIZIONE ED E' STATO PRODOTTO SENZA L'UTILIZZO DI SOSTANZE LESIVE DELL'OZONO DI CLASSE I E II.
CONTROLLO DI RADIOATTIVITA' ESEGUITO CON UNO SPETTROMETRO GAMMA: ASTM E181.
ATTIVITA' GAMMA SUI PRODOTTI AL DI SOTTO DI 0.1 BQ/G IN ACCORDO ALLA RISOLUZIONE UE 2013/59/EURATOM, IAEA RS-G-1.7 E IAEA SSG-17.

CE 0432 UKCA 0038

Acciaierie Valbruna S.p.A.
36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a: EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST116841 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
S. INOX S.P.A.
VIA SAN FRANCESCO D'ASSISI, 58/60
25039 - TRAVAGLIATO - BS

Ordine nr: VS ORDINI 3048-3049
Bestel
Your order
Commance

Conferma ordine nr: BS23002224
Werks/Our Order/Ref nr.

Avviso di Spedizione: A-BS23001510
Lieferanzeige/Packing list/B.L.

Stato di fornitura: Laminato Decapato Solubilizzato
Lieferzustand
Delivery state
Etat de livraison
Laminato

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: 1.4401/1.4404/316/316L
Werkstoff/Grade/Nuance

Marca: APML
Markenbezeichnung
Brand / Nuance

Produttore:
Hersteller/Item/Usine productrice
ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica: AV
Zeichen des Lieferwerkes
Trace marks
Sigles de l'usine productrice

Punzone del Collaudatore: MR
Stempel des Werksachv ständigen
Inspector's stamp/Poinçon de l'assayeur

Punzonatura: 1.4401/1.4404
Kennzeichnung
Marking
Marquage

SPECIFICHE:
Anforderungen / Requirements / Exigences

Note:
Anzeichnungen / Notes / Notes

VAL STOCK W2 A/1 1.4404/316L A
MDS S01 5 316 A (0)
MDS S17 1 316 A (1)
(0)Norsok-standard M-630 Edition 6, October 2013
(1)Norsok-standard M-630: 2020 (2020-09-30)

AD 2000-M. W 2 01/20 1.4401 A (2)
AD 2000-M. W 2 01/20 1.4404 A (3)
AISI . 316/316L
(2)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(3)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020

ASME SA182 2021 S31600/03 A (4)
ASME SA193 2021 B8M CLASS 1D (5)
ASME SA276 2021 S31600/03 A (6)
(4)Section II Part A 2021 EDITION For products machined directly from bar refer to ASME SA479.
(5)Section II Part A 2021 EDITION
(6)Section II Part A 2021 EDITION

ASME SA320 2021 B8M CLASS 1 (7)
ASME SA479 2021 S31600/03 A (8)
ASTM A182 2023 S31600/03 A (9)
(7)Section II Part A 2021 EDITION
(8)Section II Part A 2021 EDITION
(9)For products machined directly from bar refer also to ASTM A479.

ASTM A193 2023 B8M CLASS 1D
ASTM A262 PR. E 2015 316/316L (A)
ASTM A276 2017 S31600/03 A
(A)Reapproved 2021

ASTM A320 2022 B8M CLASS 1 CLASS1
ASTM A370 2022 .
ASTM A479 2021 S31600/03 A
ASTM E10 2018 .
ASTM E8 2022 .
EN 10088 PART 3 2014 1.4401 A
EN 10088 PART 3 2014 1.4404 A
EN 10272 2016. 1.4401 A
EN 10272 2016. 1.4404 A
ISO 148-1 2016 .
ISO 3651-2 98 METHOD A T1
ISO 6506-1 2014 .
ISO 6892-1 2019 .

NACE MR0103 2015 S31600/03 A (B)
NACE MR0175 2015 S31600/03 A (C)
(B)ANSI/NACE MR0103/ISO 17945 November 23, 2015
(C)ANSI/NACE MR0175/ISO 15156-3, third edition November 23,2015

ACH CO . .
KV L -196C . ISO 148-1

GRC SOLUTIONS
GRC #1070

Tolleranza: EN 10058
Toleranz/Allowance/Tolerance

Pos. nr.	Oggetto	Dimensioni - mm	Lunghezza - mm	Colata	Pezzi	Peso - KG	Lotto nr.
Pos. nr. Item Nr de poste	Gegenstand Product description Descript. du produit	Abmessungen Dimension Dimension	Länge Length Longueur	Schmelze Heat Coulée	Stück/Nr Pieces Pièces	Gewicht Weight Poids	Los nr. Lot nr Lot nr
0030	Piatto	70,000 x 30,000	6000/ 6200	292287		207,0	312210010

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER ACCORDING TO ISO 9001 : 2015, IATF 16949 : 2016, AS 9100D

Vicenza, 21/09/2023
VCQ052 - MEST116841

Direzione Qualità
Qualitätsmanagement/Quality Management/Gestion Qualité
R.BERTELLI

Direzione Prodotto
Produktmanagement/Product Management/Direction Produit
P.MESSORI

Pagina 1 di 4

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a: EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST116841 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
S. INOX S.P.A.
VIA SAN FRANCESCO D'ASSISI, 58/60
25039 - TRAVAGLIATO - BS

Stato di fornitura: Laminato Decapato Solubilizzato
Laminato
Lieferzustand / Delivery state / Etat de livraison

Produttore: ACCIAIERIE VALBRUNA S.P.A.
Hersteller/Manufacturer/Usine productrice

Tipo di Elaborazione: E+AOD
Erschmelzungsart / Melting process / Mode d'elaboration

Marchi di Fabbrica:
Zeichen des Lieferwerkes / Trace marks / Sigles de l'usine productrice

Ordine nr: VS ORDINI 3048-3049
Bestell / Your order / Commande

Qualità: 1.4401/1.4404/316/316L
Werkstoff/Grade/Nuance

Punzone del Collaudatore: MR
Stempel des Werksachverständigen / Inspector's stamp / Poinçon de l'assayeur

Conferma ordine nr: BS23002224
Werks/Our Order/Ref nr.

Avviso di Spedizione: A-BS23001510
Lieferanzeige/Packing list/B.L.

Marca: APML
Markenbezeichnung / Brand / Nuance

Punzonatura: 1.4401/1.4404
Kennzeichnung / Marking / Marquage

TEST ALLO STATO DI FORNITURA
Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, O=Tangenziale/tangential

TEST	Provetta/Probestab Specimen/Eprouvette Larg. diam. Spess. / Breite Diam. Dicke / Width Diam. Thickness / Larg. diam. spess. mm	°C	Posiz. Saggio Position Lage Posizione °	Snervamento Streckgrenze Yield Stress Limite elastique Rp 0,2% N/mm2	Snervamento Streckgrenze Yield Stress Limite elastique Rp 1% N/mm2	Resistenza Zugfestigkeit Tensile strength Resistance à traction Rm N/mm2	Allungamento Bruchdehnung Elongation Allongement A5 %		Strizione Einschnürung Reduction of area Striction Z %		Resilienza Kerbschlagarbeit Impact Value Resilience		Durezza Härte Hardness Dureté HB		
Valori richiesti / Anforderungen / Required values / Valeurs demandées		min		200	235	500	40	-	-	-	-		-		
		max				700							215		
A	10	20	L	305	350	598	50		68				184		
G	10	20	L	309	353	603	49		68				189		

TEST ALLO STATO DI FORNITURA
Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	Dimensioni grano x ASTM E112			6

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, O=Tangenziale/tangential

TEST	Provetta/Probestab Specimen/Eprouvette Larg. diam. Spess. / Breite Diam. Dicke / Width Diam. Thickness / Larg. diam. spess. mm	°C	Posiz. Saggio Position Lage Posizione °	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 J			Espansione laterale Lateral Expansion Lateral ex mm			Shear Shear % Shear %		
Valori richiesti / Anforderungen / Required values / Valeurs demandées		min		-	-	-	-	-	-	-	-	-
		max										
B	10X10	-196	L	185	180	180	1,485	1,300	1,370	62	58	62

Test allo stato di fornitura per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, O=Tangenziale/tangential

TEST	Provetta/Probestab Specimen/Eprouvette Larg. diam. Spess. / Breite Diam. Dicke / Width Diam. Thickness / Larg. diam. spess. mm	°C	Posiz. Saggio Position Lage Posizione °	Snervamento Streckgrenze Yield Stress Limite elastique Rp 0,2% N/mm2	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance à traction Rm N/mm2	Allungamento Bruchdehnung Elongation Allongement E 4d %		Strizione Einschnürung Reduction of area Striction RA %		Resilienza Kerbschlagarbeit Impact Value Resilience		Durezza Härte Hardness Dureté HB		
Valori richiesti / Anforderungen / Required values / Valeurs demandées		min		205	-	515	-	40	-	50	-		-		
		max											223		
C	12,5	20	L	295		597		54		68			178		

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER ACCORDING TO ISO 9001 : 2015, IATF 16949 : 2016, AS 9100D

Vicenza, 21/09/2023
VCQ052 - MEST116841

Direzione Qualità
Qualitätsmanagement/Quality Management/Gestion Qualité
R.BERTELLI

Direzione Prodotto
Produktmanagement/Product Management/Direction Produit
P.MESSORI

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a: EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST116841 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
S. INOX S.P.A.
VIA SAN FRANCESCO D'ASSISI, 58/60
25039 - TRAVAGLIATO - BS

Ordine nr: VS ORDINI 3048-3049
Bestel
Your order
Commande

Conferma ordine nr: BS23002224
Werks/Our Order/Ref nr.

Avviso di Spedizione: A-BS23001510
Lieferanzeige/Packing list/B.L.

Stato di fornitura: Laminato Decapato Solubilizzato
Lieferzustand
Delivery state
Etat de livraison
Laminato

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: 1.4401/1.4404/316/316L
Werkstoff/Grade/Nuance

Marca: APML
Markenbezeichnung
Brand / Nuance

Produttore:
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Lieferwerkes
Trace marks
Sigles de l'usine productrice

Punzone del Collaudatore: MR
Stempel des Werksachverständigen
Inspector's stamp/Poinçon de l'assayeur

Punzonatura: 1.4401/1.4404
Kennzeichnung
Marking
Marquage

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, O=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Lung.diam. Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°C	Posiz. Saggio Position Lage Posizione	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 J			Espansione laterale Lateral Expansion -			Shear Shear -		
Valori richiesti Anforderungen/Required values Valeurs demandées		min max		100	100	100	-	-	-	-	-	-
F	10X10	20	L	252	247	241						
J	10X10	20	L	256	240	241						

Tensile testing according to ISO 6892-1
Impact testing according to ISO 148-1
Mechanical properties according to ASTM A370.
Brinnell hardness according to ASTM E10
Tensile testing according to ASTM E8
Brinnell hardness according to ISO 6506-1

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée	min - max	- 0,030	- 1,00	- 2,00	16,50 18,00	2,00 2,50	10,00 13,00	-	- 0,045	- 0,030	- 0,100	-	-	-	-	-
	C %	Si %	Mn %	Cr %	Mo %	Ni %	Co %	P %	S %	N %						
292287	0,021	0,45	1,40	16,59	2,05	10,04	0,122	0,032	0,028	0,065						

Corrosion test in 16% sulfuric acid and copper sulfate solutions
Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	SATISFACTORY

Corrosion test in 16% sulfuric acid and copper sulfate solutions
Test standard: ASTM A262-Practice E

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitization	15	boil	180	5	Absence of cracks	SATISFACTORY

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a: EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST116841 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
S. INOX S.P.A.
VIA SAN FRANCESCO D'ASSISI, 58/60
25039 - TRAVAGLIATO - BS

Ordine nr: VS ORDINI 3048-3049
Bestel
Your order
Commande

Conferma ordine nr: BS23002224
Werks/Our Order/Ref nr.

Avviso di Spedizione: A-BS23001510
Lieferanzeige/Packing list/B.L.

Stato di fornitura: Laminato Decapato Solubilizzato
Lieferzustand
Delivery state
Etat de livraison
Laminato

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: 1.4401/1.4404/316/316L
Werkstoff/Grade/Nuance

Marca: APML
Markenbezeichnung
Brand / Nuance

Produttore:
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Lieferwerkes
Trace marks
Sigles de l'usine productrice

Punzone del Collaudatore: MR
Stempel des Werkssachverständigen
Inspector's stamp/Poinçon de l'assayeur

Punzonatura: 1.4401/1.4404
Kennzeichnung
Marking
Marquage

Solution annealing by process annealing 1040°C min /
/ cooling rapidly
Controlled rolled
Reduction ratio = 15,4 : 1
"Issued in agreement with TÜV SÜD Industrie Service GMBH
(07/1972)"
"Qs approved according to PED, Annex I, Para. 4.3 by
Notified Body 0036"
"(Certification no. DGR-0036-QS-W 23/2002/MUC)"

Sono state soddisfatte tutte le condizioni richieste Die gestellten Anforderungen sind it. Anlage erfüllt The material has been furnished in accordance with the requirements Le matériel à été fourni conforme aux exigences	Controllo antimescolanza con tecnica XRF/OES portatile : OK Verwechslungprüfung: durch XRF/OES Gerat gefuhrt : OK Antimixing testing performed with XRF/OES portable : OK Contrôle antimélange svt technique XRF/OES portable : OK	Controllo visivo e dimensionale: soddisfa le esigenze Besichtigung und Ausmessung: ohne Beanstandung Visual inspection and dimensional checks:satisfactory Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according to Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD'S
The Quality Management System is also Certified according to PER 2016/1105, Schedule 2, Part 4, Para 31 (8) by Competent Body TÜV SUD BABT Unlimited.
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.
Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.
The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER ACCORDING TO ISO 9001 : 2015, IATF 16949 : 2016, AS 9100D

Vicenza, 21/09/2023 VCQ052 - MEST116841	Direzione Qualità Qualitätsmanagement/Quality Management/Gestion Qualité R.BERTELLI	Direzione Prodotto Produktmanagement/Product Management/Direction Produit P.MESSORI	Pagina 4 di 4

AMBICA

INSPECTION CERTIFICATE

48 YEARS EXCELLENCE IN THE FIELD OF STAINLESS STEEL LONG PRODUCTS

Certificate Type : EN 10204/3.1

Our Sales OrderNo	OA-MN-FR-2223-00186	Invoice No.	EXP/BSR/2223/376	Certificate No.	TC189277
Customer Order No.	OA22-0001732	Invoice Date	02/11/2022	Date	02/11/2022

Customer: S. INOX SPA
Magazzino Centrale VIA Francesco D'assisi
58/60 25039 Travagliato
Italy

Trade Mark

Inspector's Mark :

Material Details	**Stainless Steel Flat Bar Solution Annealed HRAP**				
Steel Grade	316/1.4401/316L/1.4404	Shape	Flat Bar	Size	80 x 20 mm
Heat No.	S-27008	Tolerance	EN10058	Length Of Bars	6.00-6.10 mtr
Net Weight	0.545 MT	Number Of Bars	7	Melting Process	EF - AOD - MEMS
Bundle Nos	4FT22-03730				
Requirements	ASTM A 276:2017	ASTM A 479:2021	DIN EN 10088-3:2014		

Chemical Analysis %

Element	C	Si	Mn	P	S	Cr	Ni	Mo
Min						16.0000	10.0000	2.0000
Max	0.0300	1.0000	2.0000	0.0450	0.0300	18.0000	14.0000	3.0000
Melt	**0.0240**	**0.2800**	**1.7500**	**0.0390**	**0.0250**	**17.1400**	**10.2200**	**2.1000**

Mechanical Properties

	YS:(Rp 0.2%) (N/mm2) ASTM A 370:2016	UTS (N/mm2) ASTM A 370:2016	% Elongation 4D ASTM A 370:2016	% Reduction Area ASTM A 370:2016	Hardness (DHN) ASTM A 370:2016	Charpy Impact V Notch (Longitudinal) (Joules)				
Min.	205.00	515.00	40.00	50.00		Temp .Deg	Result			
Max.						(C)	1	2	3	Avg.
Results	**356.92**	**624.81**	**55.00**	**72.95**	175.00	**R.Temp**	**262.00**	**270.00**	**258.00**	**263.33**

Heat Treatment :
Solution Annealed @ 1050° C Soaking for 1"/ hr & Water Quenched.

Remarks

* Country Of Origin Of Goods - India
* Free from Radioactivity - verified through Gamma Ray Spectrometer
* No Mercury contamination
* Micro & Macro Test - Satisfactory
* No welding has been performed on the material
* Heat Treatment furnace calibrated as per API 6A Appendix-M
* Specimen Size for UTS - 12.50 mm / 0.50 inch dia.
* Specimen Size for Charpy Impact V Notch test - 55x10x10 mm dia.
* Visual & Dimensional Inspection - OK
* Ultrasonic Test:ASTM A 388:2016 OK

We confirm that the material is manufactured & supplied in accordance to the Purchase Order

Ambica Steels Limited

QA Head/NDT Inspector
AMBICA STEELS LIMITED

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#265 (Qty=4)
Description
MALE CONN. 3-8NPT -D1-2
PCM Reference
C14259S014T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

Swagelok Company
29500 Solon Rd
Solon, OH 44139 U.S.A.

440.349.5600

Inspection Certificate EN 10204-3.1

Distributor	Customer	Customer PO#
Paris Fluides Systèmes Technologies 24 Avenue de la Baltique 91140 Villebon-sur-Yvette France	PCM MANUFACTURING FRANCE SAS AR 2047167	PO070-24-10851

No.	Part Number	Qty	Prod ID/Batch Num	Component	Heat Code
1	SS-810-1-6	4	0004790010	Back ferrule	7CF,7BY
				Body	7YT
				Front ferrule	7AD
				Nut	7TJ

Swagelok products referenced above are manufactured from material purchased and certified as being in accordance with the specification(s) listed below.

Information contained in the above customer address column (marked as "Customer") and area marked "Reference" (when applicable) of this certification are for reference purposes only. Swagelok Company makes no stipulations, nor takes responsibility, for the accuracy or reliability of such information.

Swagelok products are manufactured under conditions which are free from mercury. No mercury bearing components have been used in the products of your order and no mercury bearing instruments or other equipment have been used in their manufacture, assembly, or testing in such a manner as might cause contamination.

No asbestos or asbestos-containing components are used in Swagelok brand products.

MATERIAL STANDARDS

Components	Material	Standards
Shaped Fittings	F316/F316L Stainless Steel Forgings	ASTM A182, ASME SA182
Straight Fittings	316/316L Stainless Steel Bar	ASTM A479, ASME SA479, ASTM A276 (exception of square and rectangular bar)

Type 316 Stainless Steel Bar material is in the Strain-Hardened Level 2 condition.

Specific chemistry obtained from analysis of product made from this material may vary from the batch values as provided with this certification.

Stainless steel material has passed the Intergranular Corrosion Test requirements of EN ISO 3651-2, Method A, and ASTM A-262 Practice E.

All parts were cleaned and packaged in accordance with Swagelok Specifications.

The Swagelok® products specified above were manufactured in accordance with Swagelok Company's Quality Manual (SQS-F latest revision, Revision O, dated February 7, 2024).

Swagelok Company's Quality System is approved to ISO:9001 (BSI Certificate # FM01729).

Annexes: Material Certificates

Certifications Supervisor
Michael J. Zickes

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001302289

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

26 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505686002	W91471		31204

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760077

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED
---------- PRECISION GROUND NUCLEAR QUAL
PART NUMBER: SSD-RB-062500-H9

SPECIFICATION: SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
----------*SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. K (03/09/23)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-20 SH LEVEL 2 STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 7 2019 EDITION
ASTM-E18-20
ASTM A370-20
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)
SWAGELOK COMPANY SQS-00021 REV O (09/11/20)
SWAGELOK COMPANY SQS-00012 REV AG (11/24/21)
SWAGELOK COMPANY SQC-00196 REV I (08/30/16)

SIZE 0.625000 IN.(15.88 MM) RD BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.022	1.17	0.62	0.028	0.025	17.66

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.27	2.07	0.43	0.42	0.03

MELT DATE: 02/02/23
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001302289

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

26 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505686002	W91471		31204

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760077

INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
INTERGRANULAR CORROSION TESTED PER ISO 3651
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.

*THE CHEMISTRY COMPLIES WITH EN 10272, AD 2000 W2, AND AD 2000 W10

MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1951F (1066C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001302289

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

26 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505686002	W91471		31204

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760077

STATISTICAL SIZE DATA

AVERAGE =	.624210	.624300	.624450	.624460
ACTUAL STANDARD DEVIATION =	.000150	.000120	.000170	.000120
PERFORMANCE INDEX - PP =	1.77	2.22	1.56	2.22
PERFORMANCE INDEX - PPK =	1.75	1.89	1.07	1.50

	.624210	.624270	.624210
	.000130	.000120	.000150
	2.05	2.22	1.77
	2.02	2.03	1.75

HARDNESS AS SHIPPED, HRBW - 96
__ _____ HRBW - 95
*-->TESTED AT READING

(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	91.0(627)	92.5(638)
YIELD STRENGTH, (1.00 %) KSI(MPA)	96.5(665)	96.5(665)
TENSILE STRENGTH, KSI(MPA)	100.0(689)	100.0(689)
ELONGATION IN 2.00", %	34.0	35.0
ELONGATION IN 2.50", %	31.0	31.0
REDUCTION OF AREA, %	73.0	74.0

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
4 (KALLINGS NO.2)
*-->TESTED AT READING

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (1G OR 2G).

ORDER LENGTH REQUIREMENT: 144"

INTERGRANULAR CORROSION TEMP(F): 1292 HR: 0 MN: 30 QUENCH: WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

*ORIGINAL CERTIFICATE OF TESTS ISSUED 06/23/2023 WAS MODIFIED TO UPDATE SPECIFICTION TO LATEST REVISION PER RECERT REQUEST#400000018483

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001302289

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

26 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505686002	W91471		31204

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760077

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751
WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001302289

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

26 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505686002	W91471		31204

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760077

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

BENJAMIN ENGLERTH /WI 26424
RAY LEININGER /WI 50099
VICTOR HERNANDEZ /WI 46576 DIGITALLY SIGNED BY EILEEN J DAVID
06/25/23 ANALYST IV - QUALITY SPECIFICATIONS
THE WORKS INSPECTOR CARPENTER TECHNOLOGY CORPORATION
MATERIAL IDENTIFIED VIA CARPENTER W91471/HEAT 760077/LOT 01,02,03,04

Eileen David

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 3/23/2023 7BY

Certification ID: 001291293

CARPENTER TECHNOLOGY CORP.
READING OPERATIONS (PA)
HARTMAN & SOFIANOS STS GATE
#6
READING PA 19601

Certificate of Tests

Ship To
SWAGELOK CO 31400 AURORA RD SOLON OH 44139

Cert To
SWAGELOK CO PO Box 31300 INDEPENDENCE OH 44131

Sales Order Information	
Sales Order/Item:	78097/10
Customer PO/Item:	4505261820

Delivery Information	
Delivery:	80241807
Picked Date:	03/23/2023
Quantity Shipped:	23,088 LB

Production Information	
Production Order:	W52320
Heat Number:	760017

The recording of false, fictitious or fraudulent statements or entries on this document may be punished as a felony under federal statues including federal law, Title 18, Chapter 47.
The values and other technical data represent the results of analyses and tests made on samples collected from the total lot. Original data records can be traced by reference to the Carpenter order number.
During the manufacturing process, this material has not come in direct contact with Mercury or any of its compounds. The material has not come in contact with any radioactive sources, Cobalt 60, Radium or Alpha-Source nor devices employing a single boundary of containment. Material is also weld free.

This document shall not be reproduced, except in full, without the written consent of Carpenter Technology Corporation.

Material has been melted in USA or qualifying country to DFARS requirements 252.225-7014 with alternate 1 for qualifying country 225.872.1, superseded by DFARS requirements DFARS 252.225-7008 and 252.225-7009.

This order was manufactured in accordance with Carpenter Specialty Alloys Operations Quality Program Manual, Revision 38 dated 08/21/2022.
Carpenter Technology Corporation is registered to Quality Management System Standards: ISO 9001, AS9120 and AS9100.
This certificate of test is Type 3.1 prepared in accordance with EN 10204 (DIN 50049).
We certify this material to have been manufactured, inspected, and tested; and found the results to conform to all drawing and/or specification requirements and order requirements as applicable.
Carpenter Technology third party accreditation certificates are available on the company website: https://www.carpentertechnology.com/quality-certifications

Decision Rule: Unless otherwise specified in a customer/industry specification, Carpenter Technology Corporation will determine acceptability of any test result by comparison of the result with the specification limits, without any additional consideration of the measurement uncertainty. When requested, Carpenter Technology Corporation will provide uncertainty budgets for any test result that is not addressed by the industry standard. When a Decision Rule is defined in a customer/industry specification it will supersede the Corporate Decision Rule.

*Ingot(s) Shipped represents the ingots that were shipped on the specified delivery. The material produced and certified may include additional ingots that were not shipped.

The certification is made to the customer printed on the form. Carpenter neither makes, nor assumes responsibility for any representation or certification to other parties.(Form E2-366)

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001291293

APPROVED BY SARA MALIK 3/23/2023 7BY

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 MAR 23

CUSTOMER / BESTELLER / CLIENT

REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR

REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W52320	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760017

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED GROUND
---------- NUCLEAR QUAL
PART NUMBER: SSD-RB-062500

SPECIFICATION: SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
---------- SWAGELOK COMPANY SQS-00020 REV M (08/25/21)
SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. I (07/28/22)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-22 (09/01/22)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 7 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)

SIZE 0.625000 IN.(15.88 MM) RD BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.016	1.16	0.57	0.032	0.025	17.66

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.12	2.05	0.42	0.33	0.03

MELT DATE: 01/23/23
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.

CONTINUED ON NEXT PAGE

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001291293

APPROVED BY SARA MALIK 3/23/2023 7BY

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 MAR 23

CUSTOMER / BESTELLER / CLIENT

REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR

REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W52320	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760017

CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
PROVISIONS OF 10 CFR PART 21 APPLY
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).
NO WELD REPAIR.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
PROVISIONS OF 10 CFR PART 21 AND 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INTERGRANULAR CORROSION TESTED PER ISO 3651
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (1G OR 2G).

ORDER LENGTH REQUIREMENT: 144"

CONTINUED ON NEXT PAGE

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001291293

APPROVED BY SARA MALIK 3/23/2023 7BY

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 MAR 23

CUSTOMER / BESTELLER / CLIENT

REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR

REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W52320	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760017

MILL HEAT TREATMENT:
TYPE SOLUTION ANNEAL
TEMP 1951F (1066C)
TIME AT TEMP CONTINUOUS FURNACE
QUENCH WATER

HARDNESS AS SHIPPED, HRC - 22
*-->TESTED AT READING

(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	93.5(645)	96.0(662)
YIELD STRENGTH, (1.00 %) KSI(MPA)	101.0(696)	103.0(710)
TENSILE STRENGTH, KSI(MPA)	105.0(724)	107.0(738)
ELONGATION IN 2.00", %	33.0	32.0
ELONGATION IN 2.50", %	29.0	28.0
REDUCTION OF AREA, %	72.0	72.0

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
*-->TESTED AT READING

CONTINUED ON NEXT PAGE

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001291293

APPROVED BY SARA MALIK 3/23/2023 7BY

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 MAR 23

CUSTOMER / BESTELLER / CLIENT

REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR

REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W52320	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760017

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS
Certification ID:001291293

ABNAHMEPRUEFZEUGNIS

CERTIFICAT DE CONTROLE

APPROVED BY SARA MALIK 3/23/2023 7BY

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 MAR 23

CUSTOMER / BESTELLER / CLIENT

REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR

REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W52320	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760017

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

JESSE KLINE /WI 46801

THE WORKS INSPECTOR

DIGITALLY SIGNED BY TERRY L GABRILL
ADMINISTRATOR - QUALITY
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W52320/HEAT 760017/LOT 01

Terry L Gabrill

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 8/23/2023 7YT

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001309797

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505295209	W53181		29710

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760677

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD
---------- DRAWN
PART NUMBER: SSD-HB-081250

SPECIFICATION: SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
---------- SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. I (07/28/22)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-22 (09/01/22)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)

SIZE 0.812500 IN.(20.64 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.022	1.18	0.61	0.037	0.026	17.56

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.10	2.05	0.35	0.50	0.03

MELT DATE: 07/19/23

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 8/23/2023 7YT

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001309797

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505295209	W53181		29710

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760677

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MELT DATE OF HEAT: 07/19/23
MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1951F (1066C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 8/23/2023 7YT

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001309797

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 3 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505295209	W53181		29710

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760677**

HARDNESS AS SHIPPED, HRC - 20

***-->TESTED AT READING**

	(T)RANSVERSE	(L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	90.0(	621)	87.5(	603)
YIELD STRENGTH, (1.00 %) KSI(MPA)	103.0(	710)	101.0(	696)
TENSILE STRENGTH, KSI(MPA)	106.0(	731)	105.0(	724)
ELONGATION IN 2.00", %	35.0		35.0	
ELONGATION IN 2.50", %	29.0		29.0	
REDUCTION OF AREA, %	82.0		73.0	

***-->TESTED AT READING**

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
***-->TESTED AT READING**

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH: 144" EXT

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 8/23/2023 7YT

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001309797

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505295209	W53181		29710

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760677

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 38 DATED 08/21/2022.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 8/23/2023 7YT

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001309797

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505295209	W53181		29710

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760677**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

JEFFREY HALE /WI 48787 DIGITALLY SIGNED BY JASON M RAYMOND
ADMINISTRATOR - QUALITY
THE WORKS INSPECTOR CARPENTER TECHNOLOGY CORPORATION
MATERIAL IDENTIFIED VIA CARPENTER W53181/HEAT 760677/LOT 01



FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

7AD APPROVED BY PARMINDER RATAUL 07/17/2023

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : Nach/According to/Selon — EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1

Certificato nr. Prüfung/Test/Essai — MEST093468 / 2023 /

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158945
Bestell
Your order
Commande

Conferma ordine nr: EI22008759
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018103
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Lieferzustand / Delivery state / Etat de livraison — Hot rolled . STRAIN-HARDENED LEVEL 2

Tipo di Elaborazione: Erschmelzungsart / Melting process / Mode d'elaboration — E+AOD

Qualità: Werkstoff/Grade/Nuance — T316L SMS-10001

Marca: Markenbezeichnung / Brand / Nuance — APMSWLC

Produttore : Hersteller/Item/Usine productrice
ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica: Zeichen des Liefernwerkes / Trade marks / Sigles de l'usine productrice — AV

Punzone del Collaudatore: Stempel des Werkssachverständigen / Inspector`s stamp/Poinçon de l`assayeur — MR

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

SPECIFICHE :
Anforderungen / Requirements / Exigences

SMS-10001 H/10 1.4404/316LRD A,CF
SQS-00012 AI .
SQS-00021 P . (0)

AD 2000-M. W 2 01/20 1.4401 A,CF (1)
AD 2000-M. W 2 01/20 1.4404 A,CF (2)
ASME SA479 2021 S31600/03 (3)

ASTM A262 PR. E 2015 316/316L (4)
ASTM A276 2017 S31600/03
ASTM A370 2021 .

ASTM A479 2021 S31600/03
ASTM A484 2021 .
ASTM E112 2013 . (5)

DIN 17440 96 1.4401
DIN 17440 96 1.4404 (6)
EN 10272 2016. 1.4401 A,CF

EN 10272 2016. 1.4404 A,CF
ISO 148-1 2016 .
ISO 6892-1 2019 .

Note:
Aufzeichnungen / Notes / Notes

(0)Material meet the requirements of ASME NCA-3861.

(1)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020

(2)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020

(3)Section II Part A 2021 EDITION

(4)Reapproved 2021

(5)Reapproved 2021

(6)Chemical analysis only.

Tolleranza: -0/+0,004"
Toleranz/Allowance/Tolerance

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - In Abmessungen Dimension Dimension	Lunghezza - In Lange Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahl Pieces Pieces	Peso - LB Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0010	Round	0,6875	143/ 144	436987		11.302	224106150

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST093468 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158945
Bestell
Your order
Commande

Conferma ordine nr: EI22008759
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018103
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

TEST ALLO STATO DI FORNITURA

Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 1%** k.s.i.	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **A5** %		Strizione Einschnürung Reduction of area Striction **Z** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete **HB**		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
A	10	68	L	95	105	110	27		65					259		
D	10	68	L	94	105	110	27		65					256		

Test On Delivering Condition

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	HRC 1/3 r	-	-	23,6
D	HRC 1/3 r	-	-	23,0

TEST ALLO STATO DI FORNITURA

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
D	Delta Ferrite			0 %
D	Grain size for ASTM E112			5

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **E 4d** %		Strizione Einschnürung Reduction of area Striction **RA** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
E	12,5	68	L	89		111		26		71						
F	12,5	68	L	90		110		27		70						

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST093468 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158945
Bestell
Your order
Commande

Conferma ordine nr: EI22008759
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018103
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV_2 ft/lbs			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-	-
G	10X10	68	L	129	124	125						
H	10X10	68	L	126	128	124						

Tensile testing according to ISO 6892-1

Impact testing according to ISO 148-1

Mechanical properties according to ASTM A370.

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée		C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	P %	S %	N %				
	min -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
436987		0,018	0,45	1,68	17,74	2,23	0,51	12,16	0,100	0,028	0,027	0,059				

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	**SATISFACTORY**

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: ASTM A262-Practice E

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitization	15	boil	180	5	Absence of cracks	**SATISFACTORY**

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST093468 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158945
Bestell
Your order
Commande

Conferma ordine nr: EI22008759
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018103
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Annealing temperature: 1950°F ± 25°F/water.
Grain size tested on sample on the cross section at one third the distance from surface to center.
Ferrite delta tested according to SMS-10001 par 8.11.
Quality System manual rev.14 dated 26 July 2021 as accepted by Swagelok Company.
10CFR50 Appendix B and 10CFR21 apply
Melt date: 09/03/2023.
ACCIAIERIE VALBRUNA is certified in accordance with AD 2000-M. W 0
This material satisfies the ASME SA-479 (Ref. 2.1.4) requirements for alloy 316/316L.
Reduction ratio = 764,6 : 1
ET ACC. TO SMS SPECIF. REQ.: PASS
UT ACC. TO SMS SPECIF. REQ.: PASS
COMPARATOR ACC. TO SMS SPECIF. REQ.:PASS
PART NO. SSD-RB-068750
PO # 4505158945 LINE 001
HEAT CODE: 7AD
Material is DFARS Compliant
"Issued in agreement with TÜV SÜD Industrie Service GMBH (07/1972)"
"Qs approved according to PED, Annex I, Para. 4.3 by Notified Body 0036"
"(Certification no. DGR-0036-QS-W 23/2002/MUC)"

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel â eté trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/OES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according to Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
The Quality Management System is also Certified according to PER 2016/1105, Schedule 2, Part 4, Para 31 (8) by Competent Body TÜV SUD BABT Unlimited.
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.
Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.
The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSP448BEF12335678ABCDEF12345778ABCE

Vicenza, 13/07/2023
VCQ012 - MEST093468

Direzione Qualità
Qualitätsmanagement/Quality Management/Gestion Qualité
Digitally signed by
R.BERTELLI

Direzione Prodotto
Produktmanagement/Product Management/Direction Produit
Digitally signed by
P.MESSORI

Approved by M Slatinsek 07/18/2023 7AD

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094681 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158945
Bestell
Your order
Commande

Conferma ordine nr: EI22008759
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018270
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

SPECIFICHE :
Anforderungen / Requirements / Exigences

SMS-10001 H/10 1.4404/316LRD A,CF
SQS-00012 AI .
SQS-00021 P . (0)

AD 2000-M. W 2 01/20 1.4401 A,CF (1)
AD 2000-M. W 2 01/20 1.4404 A,CF (2)
ASME SA479 2021 S31600/03 (3)

ASTM A262 PR. E 2015 316/316L (4)
ASTM A276 2017 S31600/03
ASTM A370 2021 .
ASTM A479 2021 S31600/03
ASTM A484 2021 .
ASTM E112 2013 . (5)

DIN 17440 96 1.4401
DIN 17440 96 1.4404 (6)
EN 10272 2016. 1.4401 A,CF
EN 10272 2016. 1.4404 A,CF
ISO 148-1 2016 .
ISO 6892-1 2019 .

Note:
Aufzeichnungen / Notes / Notes

(0)Material meet the requirements of ASME NCA-3861.

(1)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020

(2)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020

(3)Section II Part A 2021 EDITION

(4)Reapproved 2021

(5)Reapproved 2021

(6)Chemical analysis only.

		Tolleranza: -0/+0,004" Toleranz/Allowance/Tolerance					
Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - In Abmessungen Dimension Dimension	Lunghezza - In Lange Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahl Pieces Pieces	Peso - LB Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0010	Round	0,6875	143/ 144	436987		26.780	224106150

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER ACCORDING TO ISO 9001 : 2015, IATF 16949 : 2016, AS 9100D

Vicenza, 17/07/2023
VCQ012 - MEST094681

Direzione Qualità
Qualitätsmanagement/Quality Management/Gestion Qualité
Digitally signed by
R.BERTELLI

Direzione Prodotto
Produktmanagement/Product Management/Direction Produit
Digitally signed by
P.MESSORI

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094681 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158945
Bestell
Your order
Commande

Conferma ordine nr: EI22008759
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018270
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

TEST ALLO STATO DI FORNITURA

Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 1%** k.s.i.	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **A5** %		Strizione Einschnürung Reduction of area Striction **Z** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete **HB**		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
A	10	68	L	95	105	110	27		65					259		
D	10	68	L	94	105	110	27		65					256		

Test On Delivering Condition

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	HRC 1/3 r	-	-	23,6
D	HRC 1/3 r	-	-	23,0

TEST ALLO STATO DI FORNITURA

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
D	Delta Ferrite			0 %
D	Grain size for ASTM E112			5

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **E 4d** %		Strizione Einschnürung Reduction of area Striction **RA** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
E	12,5	68	L	89		111		26		71						
F	12,5	68	L	90		110		27		70						

Approved by M Slatinsek 07/18/2023 7AD

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094681 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158945
Bestell
Your order
Commande

Conferma ordine nr: EI22008759
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018270
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 ft/lbs			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-	-
G	10X10	68	L	129	124	125						
H	10X10	68	L	126	128	124						

Tensile testing according to ISO 6892-1

Impact testing according to ISO 148-1

Mechanical properties according to ASTM A370.

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée		C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	P %	S %	N %				
	min -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
436987		0,018	0,45	1,68	17,74	2,23	0,51	12,16	0,100	0,028	0,027	0,059				

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	**SATISFACTORY**

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: ASTM A262-Practice E

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitization	15	boil	180	5	Absence of cracks	**SATISFACTORY**

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094681 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158945
Bestell
Your order
Commande

Conferma ordine nr: EI22008759
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018270
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Annealing temperature: 1950°F ± 25°F/water.
Grain size tested on sample on the cross section at one third the distance from surface to center.
Ferrite delta tested according to SMS-10001 par 8.11.
Quality System manual rev.14 dated 26 July 2021 as accepted by Swagelok Company.
10CFR50 Appendix B and 10CFR21 apply
Melt date: 09/03/2023.
ACCIAIERIE VALBRUNA is certified in accordance with AD 2000-M. W 0
This material satisfies the ASME SA-479 (Ref. 2.1.4) requirements for alloy 316/316L.
Reduction ratio = 764,6 : 1
ET ACC. TO SMS SPECIF. REQ.: PASS
UT ACC. TO SMS SPECIF. REQ.: PASS
COMPARATOR ACC. TO SMS SPECIF. REQ.:PASS
PART NO. SSD-RB-068750
PO # 4505158945 LINE 002
HEAT CODE: 7AD
Material is DFARS Compliant
"Issued in agreement with TÜV SÜD Industrie Service GMBH (07/1972)"
"Qs approved according to PED, Annex I, Para. 4.3 by Notified Body 0036"
"(Certification no. DGR-0036-QS-W 23/2002/MUC)"

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel â eté trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/OES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according to Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
The Quality Management System is also Certified according to PER 2016/1105, Schedule 2, Part 4, Para 31 (8) by Competent Body TÜV SUD BABT Unlimited.
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.
Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.
The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSP6DB4CA3DEE852F6EB75A630E10DAE22F

Vicenza, 17/07/2023
VCQ012 - MEST094681

Direzione Qualità
Qualitätsmanagement/Quality Management/Gestion Qualité
Digitally signed by
R.BERTELLI

Direzione Prodotto
Produktmanagement/Product Management/Direction Produit
Digitally signed by
P.MESSORI

7AD APPROVED BY PARMINDER RATAUL 07/20/2023

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST095413 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158945
Bestell
Your order
Commande

Conferma ordine nr: EI22008759
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018467
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

SPECIFICHE :
Anforderungen / Requirements / Exigences

SMS-10001 H/10 1.4404/316LRD A,CF
SQS-00012 AI .
SQS-00021 P . (0)

AD 2000-M. W 2 01/20 1.4401 A,CF (1)
AD 2000-M. W 2 01/20 1.4404 A,CF (2)
ASME SA479 2021 S31600/03 (3)

ASTM A262 PR. E 2015 316/316L (4)
ASTM A276 2017 S31600/03
ASTM A370 2021 .
ASTM A479 2021 S31600/03
ASTM A484 2021 .
ASTM E112 2013 . (5)

DIN 17440 96 1.4401
DIN 17440 96 1.4404 (6)
EN 10272 2016. 1.4401 A,CF
EN 10272 2016. 1.4404 A,CF
ISO 148-1 2016 .
ISO 6892-1 2019 .

Note:
Aufzeichnungen / Notes / Notes

(0)Material meet the requirements of ASME NCA-3861.
(1)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(2)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(3)Section II Part A 2021 EDITION
(4)Reapproved 2021
(5)Reapproved 2021
(6)Chemical analysis only.

Tolleranza: -0/+0,004"
Toleranz/Allowance/Tolerance

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - In Abmessungen Dimension Dimension	Lunghezza - In Lange Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahl Pieces Pieces	Peso - LB Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0010	Round	0,6875	143/ 144	436987		5.520	224106150

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER ACCORDING TO ISO 9001 : 2015, IATF 16949 : 2016, AS 9100D

Vicenza, 18/07/2023
VCQ012 - MEST095413

Direzione Qualità
Qualitätsmanagement/Quality Management/Gestion Qualité
Digitally signed by
R.BERTELLI

Direzione Prodotto
Produktmanagement/Product Management/Direction Produit
Digitally signed by
P.MESSORI

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST095413 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158945
Bestell
Your order
Commande

Conferma ordine nr: EI22008759
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018467
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

TEST ALLO STATO DI FORNITURA

Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 1%** k.s.i.	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **A5** %		Strizione Einschnürung Reduction of area Striction **Z** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete **HB**		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
A	10	68	L	95	105	110	27		65					259		
D	10	68	L	94	105	110	27		65					256		

Test On Delivering Condition

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	HRC 1/3 r	-	-	23,6
D	HRC 1/3 r	-	-	23,0

TEST ALLO STATO DI FORNITURA

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
D	Delta Ferrite			0 %
D	Grain size for ASTM E112			5

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **E 4d** %		Strizione Einschnürung Reduction of area Striction **RA** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
E	12,5	68	L	89		111		26		71						
F	12,5	68	L	90		110		27		70						

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST095413 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158945
Bestell
Your order
Commande

Conferma ordine nr: EI22008759
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018467
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 ft/lbs			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-	-
G	10X10	68	L	129	124	125						
H	10X10	68	L	126	128	124						

Tensile testing according to ISO 6892-1

Impact testing according to ISO 148-1

Mechanical properties according to ASTM A370.

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée	C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	P %	S %	N %				
min -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
436987	0,018	0,45	1,68	17,74	2,23	0,51	12,16	0,100	0,028	0,027	0,059				

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	**SATISFACTORY**

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: ASTM A262-Practice E

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitization	15	boil	180	5	Absence of cracks	**SATISFACTORY**

7AD APPROVED BY PARMINDER RATAUL 07/20/2023

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST095413 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158945
Bestell
Your order
Commande

Conferma ordine nr: EI22008759
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018467
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Annealing temperature: 1950°F ± 25°F/water.
Grain size tested on sample on the cross section at one third the distance from surface to center.
Ferrite delta tested according to SMS-10001 par 8.11.
Quality System manual rev.14 dated 26 July 2021 as accepted by Swagelok Company.
10CFR50 Appendix B and 10CFR21 apply
Melt date: 09/03/2023.
ACCIAIERIE VALBRUNA is certified in accordance with AD 2000-M. W 0
This material satisfies the ASME SA-479 (Ref. 2.1.4) requirements for alloy 316/316L.
Reduction ratio = 764,6 : 1
ET ACC. TO SMS SPECIF. REQ.: PASS
UT ACC. TO SMS SPECIF. REQ.: PASS
COMPARATOR ACC. TO SMS SPECIF. REQ.:PASS
PART NO. SSD-RB-068750
PO # 4505158945 LINE 003
HEAT CODE: 7AD
Material is DFARS Compliant
"Issued in agreement with TÜV SÜD Industrie Service GMBH (07/1972)"
"Qs approved according to PED, Annex I, Para. 4.3 by Notified Body 0036"
"(Certification no. DGR-0036-QS-W 23/2002/MUC)"

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel â eté trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/OES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according to Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
The Quality Management System is also Certified according to PER 2016/1105, Schedule 2, Part 4, Para 31 (8) by Competent Body TÜV SUD BABT Unlimited.
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.
Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.
The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSP30EB72C5F93D83E70A3D73C8D26B0112

7AD APPROVED BY PARMINDER RATAUL 07/20/2023

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : Nach/According to/Selon — EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1

Certificato nr. Prüfung/Test/Essai — MEST095358 / 2023 /

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158948
Bestell
Your order
Commande

Conferma ordine nr: EI22008760
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018462
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Lieferzustand / Delivery state / Etat de livraison — Hot rolled . STRAIN-HARDENED LEVEL 2

Tipo di Elaborazione: Erschmelzungsart / Melting process / Mode d'elaboration — E+AOD

Qualità: Werkstoff/Grade/Nuance — T316L SMS-10001

Marca: Markenbezeichnung / Brand / Nuance — APMSWLC

Produttore : Hersteller/Item/Usine productrice
ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica: Zeichen des Liefernwerkes / Trade marks / Sigles de l'usine productrice — AV

Punzone del Collaudatore: Stempel des Werkssachverständigen / Inspector`s stamp/Poinçon de l`assayeur — MR

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

SPECIFICHE :
Anforderungen / Requirements / Exigences

SMS-10001 H/10 1.4404/316LRD A,CF
SQS-00012 AI .
SQS-00021 P . (0)

AD 2000-M. W 2 01/20 1.4401 A,CF (1)
AD 2000-M. W 2 01/20 1.4404 A,CF (2)
ASME SA479 2021 S31600/03 (3)

ASTM A262 PR. E 2015 316/316L (4)
ASTM A276 2017 S31600/03
ASTM A370 2021 .
ASTM A479 2021 S31600/03
ASTM A484 2021 .
ASTM E112 2013 . (5)

DIN 17440 96 1.4401
DIN 17440 96 1.4404 (6)
EN 10272 2016. 1.4401 A,CF
EN 10272 2016. 1.4404 A,CF
ISO 148-1 2016 .
ISO 6892-1 2019 .

Note:
Aufzeichnungen / Notes / Notes

(0)Material meet the requirements of ASME NCA-3861.
(1)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(2)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(3)Section II Part A 2021 EDITION
(4)Reapproved 2021
(5)Reapproved 2021
(6)Chemical analysis only.

Tolleranza: -0/+0,004"
Toleranz/Allowance/Tolerance

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - In Abmessungen Dimension Dimension	Lunghezza - In Lange Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahl Pieces Pieces	Peso - LB Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0011	Round	0,6875	143/ 144	436987		9.383	224106161

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER ACCORDING TO ISO 9001 : 2015, IATF 16949 : 2016, AS 9100D

Vicenza, 18/07/2023
VCQ012 - MEST095358

Direzione Qualità
Qualitätsmanagement/Quality Management/Gestion Qualité
Digitally signed by
R.BERTELLI

Direzione Prodotto
Produktmanagement/Product Management/Direction Produit
Digitally signed by
P.MESSORI

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST095358 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158948
Bestell
Your order
Commande

Conferma ordine nr: EI22008760
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018462
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

TEST ALLO STATO DI FORNITURA

Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 1%** k.s.i.	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **A5** %		Strizione Einschnürung Reduction of area Striction **Z** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete **HB**		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
A	10	68	L	94	105	110	27		72					257		
D	10	68	L	94	105	110	28		73					255		

Test On Delivering Condition

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	HRC 1/3 r	-	-	22,3
D	HRC 1/3 r	-	-	22,0

TEST ALLO STATO DI FORNITURA

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
D	Delta Ferrite			0 %
D	Grain size for ASTM E112			4

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **E 4d** %		Strizione Einschnürung Reduction of area Striction **RA** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
E	12,5	68	L	92		110		27		72						
F	12,5	68	L	91		110		28		73						

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST095358 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158948
Bestell
Your order
Commande

Conferma ordine nr: EI22008760
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018462
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 ft/lbs			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-	-
G	10X10	68	L	135	135	133						
H	10X10	68	L	137	135	134						

Tensile testing according to ISO 6892-1

Impact testing according to ISO 148-1

Mechanical properties according to ASTM A370.

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée	C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	P %	S %	N %				
min -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
436987	0,018	0,45	1,68	17,74	2,23	0,51	12,16	0,100	0,028	0,027	0,059				

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	**SATISFACTORY**

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: ASTM A262-Practice E

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitization	15	boil	180	5	Absence of cracks	**SATISFACTORY**

7AD APPROVED BY PARMINDER RATAUL 07/20/2023

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST095358 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158948
Bestell
Your order
Commande

Conferma ordine nr: EI22008760
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018462
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Annealing temperature: 1950°F ± 25°F/water.
Grain size tested on sample on the cross section at one third the distance from surface to center.
Ferrite delta tested according to SMS-10001 par 8.11.
Quality System manual rev.14 dated 26 July 2021 as accepted by Swagelok Company.
10CFR50 Appendix B and 10CFR21 apply
Melt date: 09/03/2023.
ACCIAIERIE VALBRUNA is certified in accordance with AD 2000-M. W 0
This material satisfies the ASME SA-479 (Ref. 2.1.4) requirements for alloy 316/316L.
Reduction ratio = 764,6 : 1
ET ACC. TO SMS SPECIF. REQ.: PASS
UT ACC. TO SMS SPECIF. REQ.: PASS
COMPARATOR ACC. TO SMS SPECIF. REQ.:PASS
PART NO. SSD-RB-068750
PO # 4505158948 LINE 003
HEAT CODE: 7AD
Material is DFARS Compliant
"Issued in agreement with TÜV SÜD Industrie Service GMBH (07/1972)"
"Qs approved according to PED, Annex I, Para. 4.3 by Notified Body 0036"
"(Certification no. DGR-0036-QS-W 23/2002/MUC)"

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel â eté trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/OES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according to Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
The Quality Management System is also Certified according to PER 2016/1105, Schedule 2, Part 4, Para 31 (8) by Competent Body TÜV SUD BABT Unlimited.
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.
Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.
The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSPF27ADF01234578ABCDF0134557789BCEF

7AD APPROVED BY PARMINDER RATAUL 07/27/2023

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : Nach/According to/Selon — EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1

Certificato nr. Prüfung/Test/Essai — MEST098971 / 2023 /

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158937
Bestell
Your order
Commande

Conferma ordine nr: EI22008757
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23019137
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Lieferzustand / Delivery state / Etat de livraison — Hot rolled . STRAIN-HARDENED LEVEL 2

Tipo di Elaborazione: Erschmelzungsart / Melting process / Mode d'elaboration — E+AOD

Qualità: Werkstoff/Grade/Nuance — T316L SMS-10001

Marca: Markenbezeichnung / Brand / Nuance — APMSWLC

Produttore : Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica: Zeichen des Liefernwerkes / Trade marks / Sigles de l'usine productrice — AV

Punzone del Collaudatore: Stempel des Werkssachverständigen / Inspector`s stamp/Poinçon de l`assayeur — MR

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

SPECIFICHE :
Anforderungen / Requirements / Exigences

SMS-10001 H/10 1.4404/316LRD A,CF
SQS-00012 AI .
SQS-00021 P . (0)

AD 2000-M. W 2 01/20 1.4401 A,CF (1)
AD 2000-M. W 2 01/20 1.4404 A,CF (2)
ASME SA479 2021 S31600/03 (3)

ASTM A262 PR. E 2015 316/316L (4)
ASTM A276 2017 S31600/03
ASTM A370 2021 .
ASTM A479 2021 S31600/03
ASTM A484 2021 .
ASTM E112 2013 . (5)

DIN 17440 96 1.4401
DIN 17440 96 1.4404 (6)
EN 10272 2016. 1.4401 A,CF
EN 10272 2016. 1.4404 A,CF
ISO 148-1 2016 .
ISO 6892-1 2019 .

Note:
Aufzeichnungen / Notes / Notes

(0)Material meet the requirements of ASME NCA-3861.

(1)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020

(2)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020

(3)Section II Part A 2021 EDITION

(4)Reapproved 2021

(5)Reapproved 2021

(6)Chemical analysis only.

Tolleranza: -0/+0,004"
Toleranz/Allowance/Tolerance

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - In Abmessungen Dimension Dimension	Lunghezza - In Lange Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahl Pieces Pieces	Peso - LB Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0010	Round	0,6875	143/ 144	436987		11.550	224106020

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST098971 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158937
Bestell
Your order
Commande

Conferma ordine nr: EI22008757
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23019137
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

TEST ALLO STATO DI FORNITURA

Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 1%** k.s.i.	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **A5** %		Strizione Einschnürung Reduction of area Striction **Z** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete **HB**		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
A	10	68	L	99	108	113	26		69					269		
D	10	68	L	100	110	114	24		63					266		

Test On Delivering Condition

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	HRC 1/3 r	-	-	24,8
D	HRC 1/3 r	-	-	24,4

TEST ALLO STATO DI FORNITURA

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
D	Delta Ferrite			0 %
D	Grain size for ASTM E112			6

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **E 4d** %		Strizione Einschnürung Reduction of area Striction **RA** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
E	12,5	68	L	97		113		27		58						
F	12,5	68	L	97		114		27		66						

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST098971 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158937
Bestell
Your order
Commande

Conferma ordine nr: EI22008757
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23019137
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 ft/lbs			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-	-
G	10X10	68	L	133	135	131						
H	10X10	68	L	132	131	135						

Tensile testing according to ISO 6892-1

Impact testing according to ISO 148-1

Mechanical properties according to ASTM A370.

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée	C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	P %	S %	N %				
min -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
436987	0,018	0,45	1,68	17,74	2,23	0,51	12,16	0,100	0,028	0,027	0,059				

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	**SATISFACTORY**

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: ASTM A262-Practice E

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitization	15	boil	180	5	Absence of cracks	**SATISFACTORY**

7AD APPROVED BY PARMINDER RATAUL 07/27/2023

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST098971 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158937
Bestell
Your order
Commande

Conferma ordine nr: EI22008757
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23019137
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Annealing temperature: 1950°F ± 25°F/water.
Grain size tested on sample on the cross section at one third the distance from surface to center.
Ferrite delta tested according to SMS-10001 par 8.11.
Quality System manual rev.14 dated 26 July 2021 as accepted by Swagelok Company.
10CFR50 Appendix B and 10CFR21 apply
Melt date: 09/03/2023.
ACCIAIERIE VALBRUNA is certified in accordance with AD 2000-M. W 0
This material satisfies the ASME SA-479 (Ref. 2.1.4) requirements for alloy 316/316L.
Reduction ratio = 764,6 : 1
ET ACC. TO SMS SPECIF. REQ.: PASS
UT ACC. TO SMS SPECIF. REQ.: PASS
COMPARATOR ACC. TO SMS SPECIF. REQ.:PASS
PART NO. SSD-RB-068750
PO # 4505158937 LINE 001
HEAT CODE: 7AD
Material is DFARS Compliant
"Issued in agreement with TÜV SÜD Industrie Service GMBH (07/1972)"
"Qs approved according to PED, Annex I, Para. 4.3 by Notified Body 0036"
"(Certification no. DGR-0036-QS-W 23/2002/MUC)"

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel â eté trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/OES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according to Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
The Quality Management System is also Certified according to PER 2016/1105, Schedule 2, Part 4, Para 31 (8) by Competent Body TÜV SUD BABT Unlimited.
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.
Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.
The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSP97EFAD223FB11781C258A6E5E1D9B35C

Acciaierie Valbruna *S.p.A.*
APPROVED BY SARA MALIK 8/3/2023 7AD

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST100365 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158937
Bestell
Your order
Commande

Conferma ordine nr: EI22008757
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23019356
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

SPECIFICHE :
Anforderungen / Requirements / Exigences

SMS-10001 H/10 1.4404/316LRD A,CF
SQS-00012 AI .
SQS-00021 P . (0)
AD 2000-M. W 2 01/20 1.4401 A,CF (1)
AD 2000-M. W 2 01/20 1.4404 A,CF (2)
ASME SA479 2021 S31600/03 (3)
ASTM A262 PR. E 2015 316/316L (4)
ASTM A276 2017 S31600/03
ASTM A370 2021 .
ASTM A479 2021 S31600/03
ASTM A484 2021 .
ASTM E112 2013 . (5)
DIN 17440 96 1.4401
DIN 17440 96 1.4404 (6)
EN 10272 2016. 1.4401 A,CF
EN 10272 2016. 1.4404 A,CF
ISO 148-1 2016 .
ISO 6892-1 2019 .

Note:
Aufzeichnungen / Notes / Notes

(0)Material meet the requirements of ASME NCA-3861.
(1)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(2)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(3)Section II Part A 2021 EDITION
(4)Reapproved 2021
(5)Reapproved 2021
(6)Chemical analysis only.

Tolleranza: -0/+0,004"
Toleranz/Allowance/Tolerance

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - In Abmessungen Dimension Dimension	Lunghezza - In Lange Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahi Pieces Pieces	Peso - LB Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0010	Round	0,6875	143/ 143	436987		1.019	224106020

Acciaierie Valbruna S.p.A.
APPROVED BY SARA MALIK 8/3/2023 7AD

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST100365 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158937
Bestell
Your order
Commande

Conferma ordine nr: EI22008757
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23019356
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

TEST ALLO STATO DI FORNITURA

Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F		Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 1%** k.s.i.	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **A5** %		Strizione Einschnürung Reduction of area Striction **Z** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete **HB**		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max			-	-	-	-	-	-	-	-			-		
A	10	68	L		99	108	113	26		69					269		
D	10	68	L		100	110	114	24		63					266		

Test On Delivering Condition

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	HRC 1/3 r	-	-	24,8
D	HRC 1/3 r	-	-	24,4

TEST ALLO STATO DI FORNITURA

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
D	Delta Ferrite			0 %
D	Grain size for ASTM E112			6

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F		Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **E 4d** %		Strizione Einschnürung Reduction of area Striction **RA** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max			-	-	-	-	-	-	-	-			-		
E	12,5	68	L		97		113		27		58						
F	12,5	68	L		97		114		27		66						

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 8/3/2023 7AD

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST100365 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158937
Bestell
Your order
Commande

Conferma ordine nr: EI22008757
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23019356
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 ft/lbs			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-	-
G	10X10	68	L	133	135	131						
H	10X10	68	L	132	131	135						

Tensile testing according to ISO 6892-1

Impact testing according to ISO 148-1

Mechanical properties according to ASTM A370.

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée		C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	P %	S %	N %				
	min -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
436987		0,018	0,45	1,68	17,74	2,23	0,51	12,16	0,100	0,028	0,027	0,059				

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	**SATISFACTORY**

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: ASTM A262-Practice E

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitization	15	boil	180	5	Absence of cracks	**SATISFACTORY**

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 8/3/2023 7AD

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST100365 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505158937
Bestell
Your order
Commande

Conferma ordine nr: EI22008757
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23019356
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Annealing temperature: 1950°F ± 25°F/water.
Grain size tested on sample on the cross section at one third the distance from surface to center.
Ferrite delta tested according to SMS-10001 par 8.11.
Quality System manual rev.14 dated 26 July 2021 as accepted by Swagelok Company.
10CFR50 Appendix B and 10CFR21 apply
Melt date: 09/03/2023.
ACCIAIERIE VALBRUNA is certified in accordance with AD 2000-M. W 0
This material satisfies the ASME SA-479 (Ref. 2.1.4) requirements for alloy 316/316L.
Reduction ratio = 764,6 : 1
ET ACC. TO SMS SPECIF. REQ.: PASS
UT ACC. TO SMS SPECIF. REQ.: PASS
COMPARATOR ACC. TO SMS SPECIF. REQ.:PASS
PART NO. SSD-RB-068750
PO # 4505158937 LINE 003
HEAT CODE: 7AD
Material is DFARS Compliant
"Issued in agreement with TÜV SÜD Industrie Service GMBH (07/1972)"
"Qs approved according to PED, Annex I, Para. 4.3 by Notified Body 0036"
"(Certification no. DGR-0036-QS-W 23/2002/MUC)"

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel â eté trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/OES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according to Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
The Quality Management System is also Certified according to PER 2016/1105, Schedule 2, Part 4, Para 31 (8) by Competent Body TÜV SUD BABT Unlimited.
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.
Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.
The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSPC32FDB852EB852FC851EB741EA730EA7

Vicenza, 01/08/2023
VCQ012 - MEST100365

Direzione Qualità
Qualitätsmanagement/Quality Management/Gestion Qualité
Digitally signed by
R.BERTELLI

Direzione Prodotto
Produktmanagement/Product Management/Direction Produit
Digitally signed by
P.MESSORI

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001304434

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 1 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505346164	W55186		26751

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760492**

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD DRAWN
PART NUMBER: SSD-HB-087500

SPECIFICATION: SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)
SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. I (07/28/22)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-22 (09/01/22)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)

SIZE 0.875000 IN.(22.23 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.023	1.15	0.59	0.029	0.026	17.64

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.13	2.05	0.40	0.41	0.03

MELT DATE: 05/30/23

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001304434

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 JUL 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 2 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505346164	W55186		26751

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760492**

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MELT DATE OF HEAT: 05/30/2023

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM E2-366

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001304434

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 3 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505346164	W55186		26751

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760492

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

MILL HEAT TREATMENT:
TYPE SOLUTION ANNEAL
TEMP 1951F (1066C)
TIME AT TEMP CONTINUOUS FURNACE
QUENCH WATER

HARDNESS AS SHIPPED, HRBW - 96

***-->TESTED AT READING**

	(T)RANSVERSE	(L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	89.5(617)	87.5(603)		
YIELD STRENGTH, (1.00 %) KSI(MPA)	101.0(696)	99.0(683)		
TENSILE STRENGTH, KSI(MPA)	105.0(724)	103.0(710)		
ELONGATION IN 2.00", %	35.0	36.0		
ELONGATION IN 2.50", %	30.0	31.0		
REDUCTION OF AREA, %	73.0	73.0		

***-->TESTED AT READING**

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
***-->TESTED AT READING**

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

INSPECTION: ACCEPTABLE

ALLOY ID: ACCEPTABLE

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001304434

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 4 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505346164	W55186		26751

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760492**

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 38 DATED 08/21/2022.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001304434

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505346164	W55186		26751

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760492**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

KIM MILLER /WI 40577
THE WORKS INSPECTOR

DIGITALLY SIGNED BY GARY BROWN
MANAGER - SPECIFICATIONS/CERTIFICATIONS
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W55186/HEAT 760492/LOT 01,02

Gary Brown

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#265 (Qty=2)
Description
MALE CONN. 3-8NPT -D1-2
PCM Reference
C14259S014T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

Swagelok Company
29500 Solon Rd
Solon, OH 44139 U.S.A.

440.349.5600

Inspection Certificate EN 10204-3.1

Distributor	Customer	Customer PO#
Paris Fluides Systèmes Technologies 24 Avenue de la Baltique 91140 Villebon-sur-Yvette France	PCM MANUFACTURING FRANCE SAS AR 2047167	PO070-24-10851

No.	Part Number	Qty	Prod ID/Batch Num	Component	Heat Code
1	SS-810-1-6	2	0004808275	Back ferrule	7UD
				Body	7YT
				Front ferrule	7ZG
				Nut	7ZL

Swagelok products referenced above are manufactured from material purchased and certified as being in accordance with the specification(s) listed below.

Information contained in the above customer address column (marked as "Customer") and area marked "Reference" (when applicable) of this certification are for reference purposes only. Swagelok Company makes no stipulations, nor takes responsibility, for the accuracy or reliability of such information.

Swagelok products are manufactured under conditions which are free from mercury. No mercury bearing components have been used in the products of your order and no mercury bearing instruments or other equipment have been used in their manufacture, assembly, or testing in such a manner as might cause contamination.

No asbestos or asbestos-containing components are used in Swagelok brand products.

MATERIAL STANDARDS

Components	Material	Standards
Shaped Fittings	F316/F316L Stainless Steel Forgings	ASTM A182, ASME SA182
Straight Fittings	316/316L Stainless Steel Bar	ASTM A479, ASME SA479, ASTM A276 (exception of square and rectangular bar)

Type 316 Stainless Steel Bar material is in the Strain-Hardened Level 2 condition.

Specific chemistry obtained from analysis of product made from this material may vary from the batch values as provided with this certification.

Stainless steel material has passed the Intergranular Corrosion Test requirements of EN ISO 3651-2, Method A, and ASTM A-262 Practice E.

All parts were cleaned and packaged in accordance with Swagelok Specifications.

The Swagelok® products specified above were manufactured in accordance with Swagelok Company's Quality Manual (SQS-F latest revision, Revision O, dated February 7, 2024).

Swagelok Company's Quality System is approved to ISO:9001 (BSI Certificate # FM01729).

Annexes: Material Certificates

Certifications Supervisor
Michael J. Zickes

APPROVED BY SARA MALIK 8/23/2023 7UD

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001305176

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 1 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149475	W48168		31140

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760430**

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED GROUND
---------- NUCLEAR QUAL
PART NUMBER: SSD-RB-062500

SPECIFICATION: SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
---------- ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 7 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)

SIZE 0.625000 IN.(15.88 MM) RD BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.019	1.13	0.63	0.031	0.024	17.57

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.12	2.05	0.52	0.38	0.03

MELT DATE: 05/11/23
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND

CONTINUED ON NEXT PAGE

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 8/23/2023 7UD

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001305176

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 2 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149475	W48168		31140

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760430

INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
PROVISIONS OF 10 CFR PART 21 APPLY
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).
NO WELD REPAIR.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INTERGRANULAR CORROSION TESTED PER ISO 3651
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
MILL HEAT TREATMENT:

	TYPE	SOLUTION ANNEAL
	TEMP	1951F (1066C)
TIME AT TEMP		CONTINUOUS FURNACE
	QUENCH	WATER

HARDNESS AS SHIPPED, HRC - 25 (LOT 1)
HARDNESS AS SHIPPED, HRC - 25 (LOT 2)

*-->TESTED AT READING

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 8/23/2023 7UD

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001305176

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 3 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149475	W48168		31140

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760430**

(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	93.0(641)	93.0(641)
YIELD STRENGTH, (1.00 %) KSI(MPA)	101.0(696)	102.0(703)
TENSILE STRENGTH, KSI(MPA)	105.0(724)	106.0(731)
ELONGATION IN 2.00", %	33.0	32.0
ELONGATION IN 2.50", %	29.0	28.0
REDUCTION OF AREA, %	73.0	73.0

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 5 (KALLINGS NO.2) (LOT 1)
GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2) (LOT 2)
*-->TESTED AT READING

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (1G OR 2G).

ORDER LENGTH REQUIREMENT: 144"

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 8/23/2023 7UD

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001305176

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149475	W48168		31140

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760430

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 38 DATED 08/21/2022.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 8/23/2023 7UD

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001305176

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149475	W48168		31140

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760430**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

JOHN LEWIS /WI 43175
JORDAN PEREZ /WI 50015 DIGITALLY SIGNED BY JASON M RAYMOND
08/18/23 ADMINISTRATOR - QUALITY
THE WORKS INSPECTOR CARPENTER TECHNOLOGY CORPORATION
MATERIAL IDENTIFIED VIA CARPENTER W48168/HEAT 760430/LOT 01,02



FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 8/23/2023 7YT

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001309797

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505295209	W53181		29710

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760677

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD
---------- DRAWN
PART NUMBER: SSD-HB-081250

SPECIFICATION: SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
---------- SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. I (07/28/22)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-22 (09/01/22)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)

SIZE 0.812500 IN.(20.64 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.022	1.18	0.61	0.037	0.026	17.56

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.10	2.05	0.35	0.50	0.03

MELT DATE: 07/19/23

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 8/23/2023 7YT

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001309797

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505295209	W53181		29710

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760677

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MELT DATE OF HEAT: 07/19/23
MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1951F (1066C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 8/23/2023 7YT

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001309797

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 3 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505295209	W53181		29710

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760677**

HARDNESS AS SHIPPED, HRC - 20

***-->TESTED AT READING**

	(T)RANSVERSE	(L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	90.0(	621)	87.5(	603)
YIELD STRENGTH, (1.00 %) KSI(MPA)	103.0(	710)	101.0(	696)
TENSILE STRENGTH, KSI(MPA)	106.0(	731)	105.0(	724)
ELONGATION IN 2.00", %	35.0		35.0	
ELONGATION IN 2.50", %	29.0		29.0	
REDUCTION OF AREA, %	82.0		73.0	

***-->TESTED AT READING**

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
***-->TESTED AT READING**

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH: 144" EXT

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 8/23/2023 7YT

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001309797

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505295209	W53181		29710

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760677

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 38 DATED 08/21/2022.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 8/23/2023 7YT

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001309797

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505295209	W53181		29710

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760677**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

JEFFREY HALE /WI 48787 DIGITALLY SIGNED BY JASON M RAYMOND
ADMINISTRATOR - QUALITY
THE WORKS INSPECTOR CARPENTER TECHNOLOGY CORPORATION
MATERIAL IDENTIFIED VIA CARPENTER W53181/HEAT 760677/LOT 01



FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 8/28/2023 7ZG

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001310242

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

25 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149503	W48170		29162

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760665

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED GROUND
---------- NUCLEAR QUAL
PART NUMBER: SSD-RB-068750

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
---------- SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 7 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.687500 IN.(17.46 MM) RD BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.021	1.20	0.55	0.026	0.027	17.59

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.08	2.04	0.55	0.50	0.03

MELT DATE: 07/17/23
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND

CONTINUED ON NEXT PAGE

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 8/28/2023 7ZG

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001310242

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

25 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149503	W48170		29162

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760665

INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
PROVISIONS OF 10 CFR PART 21 APPLY
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).
NO WELD REPAIR.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INTERGRANULAR CORROSION TESTED PER ISO 3651
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049

MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1951F (1066C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

HARDNESS AS SHIPPED, HRC - 26

*-->TESTED AT READING

CONTINUED ON NEXT PAGE

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 8/28/2023 7ZG

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001310242

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

25 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149503	W48170		29162

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760665**

(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	93.0(641)	92.5(638)
YIELD STRENGTH, (1.00 %) KSI(MPA)	98.0(676)	98.0(676)
TENSILE STRENGTH, KSI(MPA)	104.0(717)	103.0(710)
ELONGATION IN 2.00", %	36.0	36.0
ELONGATION IN 2.50", %	32.0	32.0
REDUCTION OF AREA, %	73.0	73.0

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
*-->TESTED AT READING

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (1G OR 2G)

ORDER LENGTH REQUIREMENT: 144"

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 8/28/2023 7ZG

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001310242

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

25 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 4 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149503	W48170		29162

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760665**

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 38 DATED 08/21/2022.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 8/28/2023 7ZG

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001310242

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

25 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149503	W48170		29162

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760665**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

JORDAN PEREZ /WI 50015 DIGITALLY SIGNED BY JASON M RAYMOND
ADMINISTRATOR - QUALITY
THE WORKS INSPECTOR CARPENTER TECHNOLOGY CORPORATION
MATERIAL IDENTIFIED VIA CARPENTER W48170/HEAT 760665/LOT 01



FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001310242

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 SEP 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 1 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149503	W48170		3274

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760665**

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED GROUND
---------- NUCLEAR QUAL
PART NUMBER: SSD-RB-068750

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
---------- SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 7 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.687500 IN.(17.46 MM) RD BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.021	1.20	0.55	0.026	0.027	17.59

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.08	2.04	0.55	0.50	0.03

MELT DATE: 07/17/23
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001310242

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 SEP 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 2 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149503	W48170		3274

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760665

INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
PROVISIONS OF 10 CFR PART 21 APPLY
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).
NO WELD REPAIR.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INTERGRANULAR CORROSION TESTED PER ISO 3651
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
MILL HEAT TREATMENT:
TYPE SOLUTION ANNEAL
TEMP 1951F (1066C)
TIME AT TEMP CONTINUOUS FURNACE
QUENCH WATER

HARDNESS AS SHIPPED, HRC - 26
__ ________

***-->TESTED AT READING**

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001310242

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 SEP 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 3 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149503	W48170		3274

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760665

(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	93.0(641)	92.5(638)
YIELD STRENGTH, (1.00 %) KSI(MPA)	98.0(676)	98.0(676)
TENSILE STRENGTH, KSI(MPA)	104.0(717)	103.0(710)
ELONGATION IN 2.00", %	36.0	36.0
ELONGATION IN 2.50", %	32.0	32.0
REDUCTION OF AREA, %	73.0	73.0

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
*-->TESTED AT READING

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (1G OR 2G)

ORDER LENGTH REQUIREMENT: 144"

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001310242

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 SEP 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 4 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149503	W48170		3274

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760665

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 38 DATED 08/21/2022.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001310242

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 SEP 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505149503	**W48170**		**3274**

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760665**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

JORDAN PEREZ /WI 50015 DIGITALLY SIGNED BY JASON M RAYMOND
ADMINISTRATOR - QUALITY
THE WORKS INSPECTOR CARPENTER TECHNOLOGY CORPORATION
MATERIAL IDENTIFIED VIA CARPENTER W48170/HEAT 760665/LOT 01,02



FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001310729

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

28 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 1 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505459411.	W62247		29346

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760678**

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD DRAWN
PART NUMBER: SSD-HB-087500

SPECIFICATION: SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV J (01/04/23)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-22 (09/01/22)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-22 (10/01/22)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)

SIZE 0.875000 IN.(22.23 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.021	1.15	0.62	0.033	0.027	17.47

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.22	2.10	0.46	0.38	0.03

MELT DATE: 07/19/23

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001310729

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

28 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 2 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505459411.	W62247		29346

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760678**

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MELT DATE OF HEAT: 07/19/23
MILL HEAT TREATMENT:
TYPE SOLUTION ANNEAL
TEMP 1951F (1066C)
TIME AT TEMP CONTINUOUS FURNACE
QUENCH WATER

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM E2-366

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001310729

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

28 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 3 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505459411.	W62247		29346

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760678**

HARDNESS AS SHIPPED, HRC - 20

***-->TESTED AT READING**

(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	86.0(593)	86.5(596)
YIELD STRENGTH, (1.00 %) KSI(MPA)	102.0(703)	103.0(710)
TENSILE STRENGTH, KSI(MPA)	106.0(731)	106.0(731)
ELONGATION IN 2.00", %	33.0	31.0
ELONGATION IN 2.50", %	28.0	27.0
REDUCTION OF AREA, %	71.0	73.0

***-->TESTED AT READING**

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
***-->TESTED AT READING**

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

INTERGRANULAR CORROSION TEMP (F): 1292 HR: 0 MN: 30 QUENCH: WATER
***-->TESTED AT READING**

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001310729

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

28 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 4 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505459411.	W62247		29346

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760678

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 38 DATED 08/21/2022.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001310729

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

28 AUG 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505459411.	**W62247**		**29346**

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760678**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

STEVEN HERMAN /WI 51488 DIGITALLY SIGNED BY JASON M RAYMOND
ADMINISTRATOR - QUALITY
THE WORKS INSPECTOR CARPENTER TECHNOLOGY CORPORATION
MATERIAL IDENTIFIED VIA CARPENTER W62247/HEAT 760678/LOT 01



FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#266
Description
UNION FEM. 3-8NPT -D1-2
PCM Reference
C14260S014T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

Les automatismes appliqués
Parc de Bachasson - Bâtiment C
13590 MEYREUIL
Siret : 323 180 661 00130
Tél: 04 42 12 57 57

PCM MANUFACTURING FRANCE SAS
Attention : Martin PROVOST
E-mail : mprovost@pcm.eu;certificats@pcm.eu

Meyreuil, le 09/04/2024

Bonjour,
Merci de bien vouloir trouver, ci-joint(s), le(s) certificat(s) CMTRS demandé(s).
Bonne réception.

Cordialement.

Les automatismes appliqués

CERTIFICAT 3.1 CIRCOR

Votre commande : PO070-24-02843
Notre Référence : CZ165968

Ref	Désignation	Qté	# Corps	# Ecrou
26182	8CF6316	10	PLM	PLR
26208	8CM6316	10	PKL	PKV
67922	HOKE - MTL CERTIFICAT CMTRS	1		
67922	HOKE - MTL CERTIFICAT CMTRS	1		

103BH0875 | 316 SST | PLM | Approved by ALM 1/10/2023

Manufacturer		
UGITECH ITALIA S.r.l. Via G. Di Vittorio 34/36 20068 Peschiera Borromeo Italy www.ugitech.com	INSPECTION CERTIFICATE 3.1 NF L 00-015 Certified material test report	Ugitech

Certificate :	Supplier's mark :	Inspector's stamp :
Certifications site (consultables sur www.ugitech.com) : ISO 9001 / ISO 14001 / ISO 45001 EMAS		LDF

Purchase :	Purchase order reference :	Order number :	Certificate :
35833 Integrated Precision Engineering	PO: IPET211220015	1056981 10	82103339 000010

Product :
UGIMA 4404HM bar Drawn Solut° annealed & cold worked h10 hexagonal 22,225MM LONG. 3,000M + 200,0 00MM -0,000MM
10019023

Melting process :	Batch :	Heat n° :	Weight :
EAF + AOD + CC	2210231700	236021	20130 lb / 9131 kg

Pieces Nbr :	Shape :	Dimension :	Forging ratio :
18	hexagonal	0,875" / 22,225mm	0

Standard :
ASTM A370 ASTM A484/A484M-21

Standard :
ASTM A479/A479M-21 TYPE 316L
AD 2000 W10 ED 01.2020 1.4404/4401
EN 10272 : 2016-11 1.4404/4401

Heat code: PLM

AD 2000 W2 ED 09.2016 1.4404/4401
AMS-QQ-S-763D 2015-03 316/316L

Customer's specification :	Specification issue No	Specification revision date	Acceptation date	Deviation
HMS-1 REV.Y 03-05-14 HMS-20 REV.AV 18-09-18 HOKE QQ-S-763D			28-09-18	

CHEMICAL ANALYSIS

Test n° : PPAJ

%	C	Si	Mn	Ni	Cr	Mo	Cu	S	P	N
Min				10,000	16,500	2,0000				
Max	0,0300	1,0000	2,0000	13,000	18,000	2,5000	1,0000	0,0300	0,0450	0,1000
Heat	0,0100	0,4290	1,3320	10,081	16,606	2,0240	0,5310	0,0280	0,0279	0,0410
Product										

MECHANICAL CHARACTERISTICS

Result as delivered : Solut° annealed & cold worked

Tensile test / Hardness

Test N°	T° C ° F/° C	Marker n° Direction	Type	Yield strength Rp 0,2% ksi/MPa	Yield strength Rp 1% ksi/MPa	Tensile strength RM ksi/MPa	Elongation 5D %	Elongation 4D %	Red. Area Z %	HBW 2,5/187,5 Ave	HRc Ave
		Min Max		60/415	34/235	90/621 115/792	20	30	60	180 237	22
PPAJ	68/20	1 L		82/562	96/659	102/705	35	37	71	214	20

Notch Toughness

Test N°	T° C ° F/° C	Direction	Type	Min ft/lbs /J	Individual values ft/lbs /J	Average ft/lbs /J	Lateral Expansion "/mm	Cristallinity level
PPAJ	68/20	L	KISOV	73,8/100	119,5/162 121,0/164 122,4/166	121,0/164		

ADDITIONAL INFORMATION

Others :
HOKE HMS-1 REV. Y/QQ-S-763F/ASTM A479/A479M-11/AMS-QQ-S-763B/ASME SA-479 2007 SECTION.II-2010 NO ADD /AISI 316/316L/MATERIAL IS COLD DRAWN/MATERIAL IS SOLUTION ANNEALED/ ELONGATION BASIS= 4D/ASTM A370-11 TENSILE SPECIMEN/ASTM A262-10 PRACTICE A ACCEPTABLE ASTIMEN ASTM A262-10 PRACTICE A ACCEPTABLE ASTM AVG. GRAIN SIZE NO. 5-8-FREE FROM WELDS OR WELD REPAIRS/ MERCURY CONTAMINATION/CONTINUOUS CARBIDE NETWORK QUALITY MANUAL ED. 5 REV. 01 OF 22 JAN. 09 THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND ALL TEST RESULTS AND OPERATIONS PERFORMED BY UGITECH ITALIA OR ITS SUBCONTRACTORS ARE IN COMPLIANCE WITH THE MATERIAL SPECIFICATION AND THE SPECIFIC APPLICABLE MATERIAL REQUIREMENTS OF NCA-3800.ASTM A484-11 / A484M-09 / A182-11A /

The contents of the report are accurate and all test results and operations performed by UGITECH or its subcontractors are in compliance with the material specification and the specific applicable material requirements of ASME NCA-3800.

UGITECH ITALIA S.r.l the 16.11.2022
The quality manager

L.DIFRAIA

040001602052

103BH0875 | 316 SST | PLM | Approved by ALM 1/10/2023

Manufacturer
UGITECH ITALIA S.r.l.
Via G. Di Vittorio 34/36
20068 Peschiera Borromeo
Italy
www.ugitech.com

INSPECTION CERTIFICATE 3.1
NF L 00-015 Certified material test report

Ugitech

Others :
A276-10 / A314-08/A479/A479M-11 AMS 5648L (2011) / 5653G (2011) / QQ-S-7763B
COUNTRY OF MELT SOURCE : France
INTERCRYSTALLINE CORROSION RESISTANT ACC.TO ISO 3651-2 PRACTICE A

The contents of the report are accurate and all test results and operations performed by UGITECH or its subcontractors are in compliance with the material specification and the specific applicable material requirements of ASME NCA-3800.

UGITECH ITALIA S.r.l the 16.11.2022
The quality manager

L.DIFRAIA

040001602052

103BH0875 | 316 SST | PLM | Approved by ALM 1/10/2023

Ugitech

Member of Swiss Steel Group

Ugitech SA
CS 90100 - Avenue Paul Girod - 73403 UGINE CEDEX

Alex TARTARAT
Regional Sales Manager – Asia Pacific
Tel : +33 (0) 4 79 89 31 37
Cell : +33 (0) 6 30 19 17 61
mailto:Alexandre.tartarat@ugitech.com

IPE Precision Machinery Limited
Integrated Precision Engineering (Thailand) Co. Ltd

Ugine, 2nd January 2023

Subject: Compliance to NACE MR 0175 / ISO 15156 and NACE MR 0103 / ISO 17945 for drawn bars in austenitic stainless steel.

Herewith we confirm that the grades SUS 316 and SUS 316H family corresponding to IPE specification are fulling following criteria :

- Chemical analyses conform to grade UNS S31603
- Max. hardness of 22 HRC

Ugitech performed sulfide stress corrosion test as per NACE environment specification for 316 austenitic family. We guarantee the capability of drawn bars in the delivered grades of above named to be used in conditions limit according to NACE MR 0175 / ISO 15156 and NACE MR 0103 / ISO 17945.

NACE is currently reviewing its standard to include cold worked products in the coming months. As soon as this will be effective, we will be in position to add it in our certs. In the meantime, this letter of compliance of our products could be used as a guaranty for the following deliveries.

PO.IPM	Material & Size	OA NO.	Actual Shipment (KG.)	Mill cert no.	Heat no.	Heat code
IPET211220012	SUS316 Hex dia 12.7 mm.	1056972/20	3,402.00	82102609	230008	EP
IPET210920007	SUS316 Hex dia 17.462 mm.	1043043/40	3,972.00	82103018	227014	PLL
IPET211220015	SUS316 Hex dia 22.225 mm.	1056981/10	9,131.00	82103339	236021	PLM
IPET211020002	SUS316 Hex dia 22.225 mm.	1047096/10	14,794.00	82103071	236022	PLN
IPET210920007	SUS316 Hex dia 17.462 mm.	1043043/40	966.00	82102686	228045	PLP
IPET210920008	SUS316 Hex dia 22.225 mm.	1043045/10	10,311.00	82103336	236022	PLR
IPET210920008	SUS316 Hex dia 22.225 mm.	1043045/20	4,942.00	82103085	236022	PLS
IPET211220015	SUS316 Hex dia 22.225 mm.	1056981/10	1,059.00	82103344	236022	PLT
IPET211220015	SUS316 Hex dia 28.575 mm.	1056981/30	1,858.00	82103345	235076	DBNV
IPET211220014	SUS316 Hex dia 25.4 mm.	1056977/30	935.00	82103406	235078	DBNW
IPET211220015	SUS316 Hex dia 26.988 mm.	1056981/20	2,585.00	82103407	230007	DBNY
IPET211220015	SUS316 Hex dia 28.575 mm.	1056981/30	996.00	82102779	228043	DBNZ

Best regards,

Alex Tartarat
Regional Sales Manager

UGITECH
Providing special steel solutions
Direction Commerciale
73403 UGINE CEDEX

Benoit Pollet
Metallurgy and quality department manager

103BH0875 | 316 SST | PLR | Approved by ALM 1/10/2023

Manufacturer
UGITECH ITALIA S.r.l
Via G. Di Vittorio 34/36
20068 Peschiera Borromeo
Italy
www.ugitech.com

INSPECTION CERTIFICATE 3.1
NF L 00-015 Certified material test report

Ugitech

Certificate :
Certifications site (consultables sur www.ugitech.com) :
ISO 9001 / ISO 14001 / ISO 45001
EMAS

Supplier's mark :

Inspector's stamp : LDF

Purchase :	Purchase order reference :	Order number :	Certificate :
35833 Integrated Precision Engineering	PO: IPET210920008	1043045 10	82103336 000010

Product :
UGIMA 4404HM bar Drawn Solut° annealed & cold worked h10 hexagonal 22,225MM LONG. 3,000M + 200,000MM -0,000MM
10019023

Melting process :	Batch :	Heat n° :	Weight :
EAF + AOD + CC	2210209100	236022	22731 lb / 10311 kg

Pieces Nbr :	Shape :	Dimension :	Forging ratio :
20	hexagonal	0,875" / 22,225mm	0

Standard :
ASTM A370 ASTM A484/A484M-21

Standard :
ASTM A479/A479M-21 TYPE 316L
AD 2000 W10 ED 01.2020 1.4404/4401
EN 10272 : 2016-11 1.4404/4401

Heat code: PLR

AD 2000 W2 ED 09.2016 1.4404/4401
AMS-QQ-S-763D 2015-03 316/316L

Customer's specification :	Specification issue No	Specification revision date	Acceptation date	Deviation
HMS-1 REV.Y 03-05-14 HMS-20 REV.AV 18-09-18 HOKE QQ-S-763D			28-09-18	

CHEMICAL ANALYSIS

Test n° : PLLR

%	C	Si	Mn	Ni	Cr	Mo	Cu	S	P	N
Min				10,000	16,500	2,0000				
Max	0,0300	1,0000	2,0000	13,000	18,000	2,5000	1,0000	0,0300	0,0450	0,1000
Heat Product	0,0140	0,4050	1,3720	10,075	16,665	2,0930	0,4930	0,0259	0,0290	0,0390

MECHANICAL CHARACTERISTICS

Result as delivered : Solut° annealed & cold worked

Tensile test

Test N°	T° C ° F/° C	Marker n° Direction	Type	Yield strength Rp 0,2% ksi/MPa	Yield strength Rp 1% ksi/MPa	Tensile strength RM ksi/MPa	Elongation 5D %	Elongation 4D %	Red. Area Z %	Hardness HBW 2,5/187,5 Ave	Hardness HRc Ave
		Min Max		60/415	34/235	90/621 115/792	20	30	60	180 237	22
PLLR	68/20	1 L		80/555	96/662	103/710	33	35	72	214	20

Notch Toughness

Test N°	T° C ° F/° C	Direction	Type	Min ft/lbs /J	Individual values ft/lbs /J	Average ft/lbs /J	Lateral Expansion "/mm	Cristallinity level
PLLR	68/20	L	KISOV	73,8/100	121,0/164 122,4/166 124,6/169	122,4/166		

ADDITIONAL INFORMATION

Others :
HOKE HMS-1 REV. Y/QQ-S-763F/ASTM A479/A479M-11/AMS-QQ-S-763B/ASME SA-479 2007 SECTION.II-2010 NO ADD /AISI 316/316L/MATERIAL IS COLD DRAWN/MATERIAL IS SOLUTION ANNEALED/ ELONGATION BASIS= 4D/ASTM A370-11 TENSILE SPECIMEN/ASTM A262-10 PRACTICE A ACCEPTABLE ASTIMEN ASTM A262-10 PRACTICE A ACCEPTABLE ASTM AVG. GRAIN SIZE NO. 5-8-FREE FROM WELDS OR WELD REPAIRS/ MERCURY CONTAMINATION/CONTINUOUS CARBIDE NETWORK QUALITY MANUAL ED. 5 REV. 01 OF 22 JAN. 09 THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND ALL TEST RESULTS AND OPERATIONS PERFORMED BY UGITECH ITALIA OR ITS SUBCONTRACTORS ARE IN COMPLIANCE WITH THE MATERIAL SPECIFICATION AND THE SPECIFIC APPLICABLE MATERIAL REQUIREMENTS OF NCA-3800.ASTM A484-11 / A484M-09 / A182-11A /

The contents of the report are accurate and all test results and operations performed by UGITECH or its subcontractors are in compliance with the material specification and the specific applicable material requirements of ASME NCA-3800.

UGITECH ITALIA S.r.l the 16.11.2022
The quality manager

L.DIFRAIA

040001597938

103BH0875 | 316 SST | PLR | Approved
by ALM 1/10/2023

Manufacturer
UGITECH ITALIA S.r.l.
Via G. Di Vittorio 34/36
20068 Peschiera Borromeo
Italy
www.ugitech.com

INSPECTION CERTIFICATE 3.1
NF L 00-015 Certified material test report

Ugitech

Others :
A276-10 / A314-08/A479/A479M-11 AMS 5648L (2011) / 5653G (2011) / QQ-S-7763B
COUNTRY OF MELT SOURCE : France
INTERCRYSTALLINE CORROSION RESISTANT ACC.TO ISO 3651-2 PRACTICE A

The contents of the report are accurate and all test results and operations performed by UGITECH or its subcontractors are in compliance with the material specification and the specific applicable material requirements of ASME NCA-3800.

UGITECH ITALIA S.r.l the 16.11.2022
The quality manager

L.DIFRAIA

040001597938

103BH0875 | 316 SST | PLR | Approved by ALM 1/10/2023

Ugitech

Member of Swiss Steel Group

Ugitech SA
CS 90100 - Avenue Paul Girod - 73403 UGINE CEDEX

Alex TARTARAT
Regional Sales Manager – Asia Pacific
Tel : +33 (0) 4 79 89 31 37
Cell : +33 (0) 6 30 19 17 61
mailto:Alexandre.tartarat@ugitech.com

IPE Precision Machinery Limited
Integrated Precision Engineering (Thailand) Co. Ltd

Ugine, 2nd January 2023

Subject: Compliance to NACE MR 0175 / ISO 15156 and NACE MR 0103 / ISO 17945 for drawn bars in austenitic stainless steel.

Herewith we confirm that the grades SUS 316 and SUS 316H family corresponding to IPE specification are fulling following criteria :

- Chemical analyses conform to grade UNS S31603
- Max. hardness of 22 HRC

Ugitech performed sulfide stress corrosion test as per NACE environment specification for 316 austenitic family. We guarantee the capability of drawn bars in the delivered grades of above named to be used in conditions limit according to NACE MR 0175 / ISO 15156 and NACE MR 0103 / ISO 17945.

NACE is currently reviewing its standard to include cold worked products in the coming months. As soon as this will be effective, we will be in position to add it in our certs. In the meantime, this letter of compliance of our products could be used as a guaranty for the following deliveries.

PO.IPM	Material & Size	OA NO.	Actual Shipment (KG.)	Mill cert no.	Heat no.	Heat code
IPET211220012	SUS316 Hex dia 12.7 mm.	1056972/20	3,402.00	82102609	230008	EP
IPET210920007	SUS316 Hex dia 17.462 mm.	1043043/40	3,972.00	82103018	227014	PLL
IPET211220015	SUS316 Hex dia 22.225 mm.	1056981/10	9,131.00	82103339	236021	PLM
IPET211020002	SUS316 Hex dia 22.225 mm.	1047096/10	14,794.00	82103071	236022	PLN
IPET210920007	SUS316 Hex dia 17.462 mm.	1043043/40	966.00	82102686	228045	PLP
IPET210920008	SUS316 Hex dia 22.225 mm.	1043045/10	10,311.00	82103336	236022	PLR
IPET210920008	SUS316 Hex dia 22.225 mm.	1043045/20	4,942.00	82103085	236022	PLS
IPET211220015	SUS316 Hex dia 22.225 mm.	1056981/10	1,059.00	82103344	236022	PLT
IPET211220015	SUS316 Hex dia 28.575 mm.	1056981/30	1,858.00	82103345	235076	DBNV
IPET211220014	SUS316 Hex dia 25.4 mm.	1056977/30	935.00	82103406	235078	DBNW
IPET211220015	SUS316 Hex dia 26.988 mm.	1056981/20	2,585.00	82103407	230007	DBNY
IPET211220015	SUS316 Hex dia 28.575 mm.	1056981/30	996.00	82102779	228043	DBNZ

Best regards,

Alex Tartarat
Regional Sales Manager

UGITECH
Providing special steel solutions
Direction Commerciale
73403 UGINE CEDEX

Benoit Pollet
Metallurgy and quality department manager

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#267
Description
TUBE 1-2IN OD 316L
PCM Reference
F-000335014T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

146671

KRYSTAL
"Quality First ... Customer Always"

MFG. & CORPORATE OFFICE :
Plot No. KV-2, G.I.D.C Manjusar, Taluka Savli, Vadodara - 391 775, Gujarat, INDIA. (M) - + 91 9428402803 (E) - qca@krystalgeltd.com (W) - www.krystalgeltd.com

KRYSTAL GLOBAL ENGINEERING LIMITED

Manufacturer & Exporter of Seamless Stainless Steel, Duplex, Super Duplex & Nickel Alloy Tubes, Pipes & U Tubes

As ISO 9001:2015, ISO 14001:2015, ISO 45001:2018, PED 2014/68/EU, AD 2000 Merkblatt W0 & NORSOK Approved Manufacturer

Manufacturer's Mark

SPI / TPI Mark

MILL TEST CERTIFICATE

FORMAT NO.-KGEL/QE/34 REV. 00 EFF. DATE 11.10.2022

Customer		Customer PO No	45353426	Date	24/08/2022
Short Address		OA No	E-2223 / 00029	Date	01/09/2022
MTC Type	EN 10204 Type 3.1 + AD2000-W2/W10	MTC No	KGEL/ST-316/316L/1.4401/1.4404/68b/0323	Date	20/04/2023
Project Details	-				
Material Description	CFA SEAMLESS (AUSTENITIC) STAINLESS STEEL TUBES, PLAIN END	Specs & Grades	ASTM-A-269/213 TP-316/316L ED-2018, EN-10216-5 1.4401/1.4404, TC2, NACE MR 0175 ED-2000 / NACE MR 0103 ED-2000		
Heat Treatment	BRIGHT ANNEALED AT MIN 1040°C-1120°C & RAPIDLY COOLED	Dimensions	ASTM-A-1016 Ed. 2021 & EN 10305-1, LENGTH= -0/+5mm		
Surface Condition	BRIGHT ANNEALED CONDITION	QAP Ref.	-		
		TDC No.	-		

Approved acc. to AD 2000 Merkblatt W0 and certified as per PED (2014/68/EU) Annex.I, Sec.4.3 by certification body for Pressure Equipment of TUV NORD Systems (Reg. No.0045)

Chemical Composition in %

PO Sr. No.	Item Number	Heat No.	OD	Thk (AWT)	Length (mm) (FL)	No. of Pcs.	Mtrs.	LA / PA	C	Si	Mn	P	S	Cr	Ni	Mo	N	Ti	Cu	PMI Check 100%	VDI Check 100%
								Min	-	-	-	-	-	16.50	10.00	2.00	-	-	-		
								Max	0.030	1.00	2.00	0.040	0.015	18.00	13.00	2.50	0.10	-	-		
								L.A	0.021	0.50	1.33	0.039	0.006	16.79	10.10	2.06	0.0798	-	-	OK	OK
004	3501270211	225274	1/2" (12.70 mm)	0.083" (2.11 mm)	6000	95	570	P.A	0.023	0.44	0.99	0.037	0.001	16.55	10.11	2.12	0.07	-	-	OK	OK

Mandatory & Supplemantory Test Conformity

PO Sr. No.	Item Code	Heat No.	OD	Thk (AWT)	Tensile Strength MPa	Yield Strength 0.2% MPa	Yield Strength 1% MPa	Elongation (Gauge Length = 50mm)	Hardness (HRB)	Flaring	Flattening	Micro	IGC Test (As per ASTM A 262 Pr. "E")	IGC Test (As per EN ISO 3651-2 Method -"A")	Hydro Test 100% (Holding Time 5 Sec.)	ECT 100%	ID CHECKED 100%
					515-690	min.=190	min.=240	40% min.					ASTM A 262	ISO 3651-2		ASTM E 426	
004	3501270211	225274	1/2" (12.70 mm)	0.083" (2.11 mm)	589.79 592.16	236.94 237.55	280.47 283.20	51.08% 50.98%	74,75,74 75,75,75	OK	OK		FOUND SATISFACTORY	FOUND SATISFACTORY	1000 PSI	FOUND SATISFACTORY	FOUND SATISFACTORY

Remark / Spl. Note	STEEL MELTING PROCESS: E.I.F + A.O.D AS PER NACE MR-0175/MR-0103 HARDNESS REQ 22 HRC MAX (99 HRB Approx.) - FOUND SATISFACTORY This material has been tested for radioactivity and the tests confirm that the values are within the limit of background radiation
Marking	KRYSTAL GE LTD / CFA SEAMLESS ½ (12.70 MM) OD X 0.083 (2.11 MM) THK (AW) X 6000 MM LONG / ASTM/ASME-A/SA-213, ASTM-A-269, TP-316/316L / EN 10216-5, 1.4401/1.4404 / EN 10305-1 / TC2 / NACE MR 0175 / NACE MR 0103 / HTP- 1000 PSI / HEAT NO. 225274 / KRYSTAL -E-2223/00029 / PMI TESTED / ECT TESTED / KGEL-03 / ITEM – 3501270211 / BA

L.A - LADLE ANALYSIS P.A - PRODUCT ANALYSIS , MWT - MINIMUM WALL THICKNESS AWT - AVERAGE WALL THICKNESS , RL - RANDOM LENGTH FL - FIXED LENGTH , A.O.D - ARGON OXYGEN DECARBURIZATION , E.A.F - ELECTRIC ARC FURNACE

Material manufactured & supplied against this original Mill Test Certificate (M.T.C) is warrantied towards manufacturing defects / failure for 18 months from the date of dispatch or 12 months from the date of commissioning whichever is earlier, subject to utilisation within appropriate suitable applications and in accordance to GEP.

Overall liability of KRYSTAL is limited to the value of the defective material supplied subject to proven evidence of manufacturing defects only & not application failure/misuse.

Duplication / forged photocopy / unauthorised usage of any documentary property of KRYSTAL is a punishable criminal act & subject to Law of Indian Jurisdiction.

Insist on Authentically Sealed Certificate
Photocopy Invalid

We certify that the material herein described has been manufactured & tested in accordance to the above specification & the results comply in accordance to the requisite of the order

TPIA / CLIENT	Prepared By QE EXECUTIVE	Approved By QE HOD

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#268
Description
NIPPLE 3-8 NPT
PCM Reference
W-003825014

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

	DAR-02	COMPANY WITH MANAGEMENT SYSTEM CERTIFIED BY DNV GL = ISO 9001 = = ISO 14001 = = ISO 45001 =	Ilta Inox S.p.A. Strada Statale 45 bis 26010 Robecco d'Oglio (CR) - Italia Tel + 39 0372 9801 Fax + 39 0372 921538 e-mail:sales@ilta.arvedi.it quality@ilta.arvedi.it www.arvedi.it	iltainox

TEST CERTIFICATE ACCORDING TO EN 10204(2005) 3.1

N°0000749298

Pag. 1di1

ABNAHMEPRÜFZEUGNIS - CERTIFICAT D'ESSAIS - CERTIFICATO DI COLLAUDO

Longitudinally laser welded tubes/Laser längsnahtgeschweisste rohre/Tubes soudes longitudinalement laser/Tubi saldati longitudinalmente laser

Customer: STAPPERT FRANCE S.A.S. Besteller/Client/Cliente 13,Rue Charlemagne BP 21 02201 SOISSONS CEDEX	
Customer Order N°: 77568 - Bestellung/Commande Client/Ordine Cliente	Mill's Ilta Inox N°: 0411118347 - 000040 # 0421126916 - 000190 WerksN°/N° référence Interne/Conferma ordine
Specifications: ASME SA-312/SA-312M: 2013 / /ASTM A 312 / A 312 M - 16 Anforderungen/Specifications/Specifiche	Tolerances: ASTM A999/A999M-12 Toleranzen/Tolérances/Tolleranze
Manufacturer's mark: iltainox Herstellerzeichen/Marque du fabricant/ Marchio del produttore Inspector's Stamp: M.A. Stempel des Sachverständigen/Poinçon de l'inspecteur/Punzone dell'ispettore	Marking: ASME SA312/ASTM A312 Kenzeichnung/Marquage/Marcatura

Item Pos. N°	DIMENSIONS Abmessungen Dimensions/Dimensioni	PIECES N° Stückzahl Piéces/Pezzi	METERS Meter Métres/Metri	WEIGHT(kg) Gewicht/Poids Peso	GRADE Werkstoff/Nuance Materiale	STANDARD CODE Normbezeichnung Designation/Designazione	EXECUTION Ausführung Execution/Esecuzione
40	17.20 X 2.30 X 6000 3/8" SCH.40 S	169	1014.00	816.000	TP.316L 1.4404 Z3 CND 17-12-02 UNS S31603	X2 CrNiMo 17-12-2	ER

Chemical analysis acc.to: ASTM A240/ EN 10088-2/EN 10028-7 Last Edition — Schmelzanalyse/Chimique analyse/Analisi chimica

Steel making process :E/AOD — Erschmelzungsart/Procéde d'elaboration/Procedimento di elaborazione acciaio

Item N°	Manufacturer Hersteller/Fabricant/Produttore	HEAT N° Schmelze/Coulée/Colata	% C	% Si	% S	% P	% Mn	% Cr	% Ni	% Mo	% Ti	% Co	% Cu	% N
40	.....	540412	0.024	0.340	0.0010	0.027	1.070	16.640	10.080	2.070		0.220	0.400	0.047

Mechanical test acc. to tab.: 4 - ASME SA312/ASTM A312 — Mechanische Prüfungen/Essais mécaniques/Caratteristiche meccaniche

Item Pos. N°	HEAT N° Schmelze Coulée Colata	HOMOLOG. Zulassung Omologation Omologazione	TEST Probe Eprouvette Provino n°		SPECIMEN SIZE Abmessung Probestab Dime. Eprouvette Dimensione provetta mm²	YIELD STRENGTH Streck-Dehngrenze Limite d'élasticité Limite di snervamento 0,2% N/mm² 1%		TENSILE STRENGTH Zugfestigkeit Résistance à traction Limite di rottura N/mm²	ELONGAT. Bruchdehnung Allongament Allungamento 2"%	HARDNESS Haerte Dureté Durezza HRB
REQUIREMENT Anforderungen/Exigences/Requisiti						>=170		>= 485	>= 35.0	
40	540412		01	L	107.96	362		576	53.2	
40	540412		02	L	107.87	370		582	52.4	

Test Results — Ergebnisse der Prufungen/Résultat des essais/Risultati delle prove

- Heat treatment: 1050 °C Hypertrempés décapés. — Wärmebehandlung/Traitement termique/Trattamento termico
- Tecnological test: Aplatissement: OK / ====== / ====== / ====== — Technologische Prüfung/Examen technologique/Prove tecnologiche
- Residual Corrosion Test acc.to : ================ — Korrosionsfördernde Rückstäden/Essai residues corrosif/Prova residui corrosivi
- Intergranular Corrosion Test acc.to: ASTM A262/PR.E: OK — IK Beständigkeit/Essai corr.Intergr./Prova di corrosione intergranulare
- Non Destructive Test acc. to: COURANT FOUCAULT ASTM A999 (RÉFÉRENCE ÉTALONNAGE TROUE ÉCHANTILLON)/E426: OK — Zerstörungsfreie Prüfung/Contrôle non destructif/Controllo non distruttivo
- Leak Test/Hydrostatic test to: — Dichtheitsprüfung/Essai d'étanchéité/Prova di tenuta
- Uncorrect Material Test: — Verwechlungsprüfung/Essai P.M.I./Prova antimiscuglio
- Visual and gauging control: Favorable — Besichtigung und Ausmessung/Contrôle visuel et dimensionel/Controllo visivo e dimensionale

Notes:

EUROBINOX
CONTRÔLE SONNET
DATE 16.05.24
CODE MAMELON 3/8 NPT

We certify that the delivered products comply with the specification of the order / Wir bestaetigen, dass die gelieferte Ware den Bestellvorschriften entspricht / Nous attestons que les produits livres sont conformes aux réferences de la commande / Noi attestiamo che il materiale spedito è conforme ai requisiti dell'ordine

Marco Assandri

Robecco d'Oglio, 18/02/2022
A

Mill's Inspector / Der Werksachverständige
Inspecteur de l'usine / Firma Ispettore

Arvedi

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#550A
Description
WASHER M14 200HV
PCM Reference
C06001H014T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

RONDA 4 M 14

Prüf-Zertifikat Nr.: 2024-08-19-B253226255144M14

(Inspection certifcate No.)

Nach DIN EN 10204 (according to DIN EN 10204) 2.1 ☐ 2.2 ☐ 3.1 ☒ 3.2 ☐

Besteller (Customer)	Schaefer + Peters France Z.A.C de la Croix-Bonnet 3, Rue Charlie Chaplin 78390 Bois d'Arcy Frankreich
DIN / ISO / EN (DIN / ISO / EN):	NF E 25-514
Stückzahl (quantity):	50
Kennzeichnung (marking):	-
Abmessung (dimension):	M14
Werkstoff (material):	A4
Chargen-Nr. (lot-no.):	B253226255144M14

Unsere Nr. (our no.) 430605 / BSC3354 / 255144M14 vom (of): 06.08.2024

Ihre Bestell.-Nr. (your order no.): CF18581 vom (of): 06.08.2024

☒ Lieferbedingungen und Abnahmeprüfung nach DIN-ISO 3506 (terms of delivery and inspections according to DIN-ISO 3506) ☐ AD2000-W2 // W7/2

Chemische Zusammensetzung des Werkstoffs (Analysewerte) Charge / Stückanalyse
(chemical composition of material)

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N
0,008	0,51	1,089	0,030	0,001	16,756	2,022	10,034	0,055	0,046

Mechanische Eigenschaften der Teile
(mechanical properties of the parts)

Streckgrenze (stress perman. strain) Rp 0,2 N/mm²	Zugfestigkeit (tensile strength) Rm N/mm²	Bruchdehnung (elongation) AL mm oder %	Prüfkraft (proof load) N oder kN	Härte (hardness) HB / HV / HRC	Bruchdrehmoment (breaking torque) Nm
-	-	-	-	185 HV	-

☒ Die chemische Zusammensetzung der Charge und die Ergebnisse der mechanischen Eigenschaften sind den uns vorliegenden Herstellernachweisen entnommen. (The chemical composition and the results of the mechanical properties are taken from the specifications of the manufacturer)

☐ Der Hersteller ist gemäß der Druckgeräterichtlinie (DGRL2014/68/EU) nach AD 2000-Merkblatt WO/TRD 100 zugelassen.
(The manufacturer is acc. to Pressure Equipment Directive 2014/68/EU certified by the TÜV according to AD 2000-WO/TRD 100)

☐ Bruchdehnung am Ausgangswerkstoff (Meßlänge 5d) ermittelt.
(Elongation tested with initial material of measuring length 5d)

☒ Besichtigung und Maßprüfung durchgeführt. (Visual an dimensional inspections without objections)

☐ Beständigkeit gegen interkristalline Korrosion wird bestätigt. (Resistance against intergranular corrosion is confirmed)

☒ Verwechslungsprüfung i.O. (recheck of material prior to shipment) ☐ Umgestempelt (new marking)

Bemerkungen: -

Datum (date) 19.08.2024

Schäfer + Peters GmbH . Zeilbaumweg 32 . 74613 Öhringen

Qualitätswesen Leitung	Ralf Löffler	Telefon	+49 7941 6094-232
Abnahmebeauftragter	Florian Walter	Telefon	+49 7941 6094-231
Bearbeitet von	Anke Sulzbacher	Telefon	+49 7941 6094-237

Unterschrift Abnahmebeauftragter
(authorized inspection representative)

RONDAGM 16.

Prüf-Zertifikat Nr.: 2024-01-09-B253226255144M14

(Inspection certifcate No.)

Nach DIN EN 10204 (according to DIN EN 10204) 2.1 ☐ 2.2 ☐ 3.1 ☒ 3.2 ☐

Besteller (Customer)	Schaefer + Peters France Mr. Khalil Chalabi Z.A.C de la Croix-Bonnet 3, Rue Charlie Chaplin 78390 Bois d'Arcy Frankreich
DIN / ISO / EN (DIN / ISO / EN):	NF E 25-514
Stückzahl (quantity):	50
Kennzeichnung (marking):	-
Abmessung (dimension):	M 14
Werkstoff (material):	A4
Chargen-Nr. (lot-no.):	B253226255144M14

Unsere Nr. (our no.): 416250 / BSC3354 / 0934416 vom (of): 05.01.2024

Ihre Bestell.-Nr. (your order no.): CF17001 vom (of): 05.01.2024

☒ Lieferbedingungen und Abnahmeprüfung nach DIN-ISO 3506 (terms of delivery and inspections according to DIN-ISO 3506) ☐ AD2000-W2 // W7/2

Chemische Zusammensetzung des Werkstoffs (Analysewerte) Charge / Stückanalyse

(chemical composition of material)

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N
0,008	0,51	1,089	0,03	0,001	16,756	2,022	10,034	0,055	0,046

Mechanische Eigenschaften der Teile

(mechanical properties of the parts)

Streckgrenze (stress perman. strain) Rp 0,2 N/mm²	Zugfestigkeit (tensile strength) Rm N/mm²	Bruchdehnung (elongation) AL mm oder %	Prüfkraft N oder kN (proof load N or kN)	Härte (hardness) HB / HV / HRC (HB / HV / HRC)	Bruchfestigkeit (breaking strength) N/mm²
-	-	-	-	185 HV	-

☒ Die chemische Zusammensetzung der Charge und die Ergebnisse der mechanischen Eigenschaften sind den uns vorliegenden Herstellernachweisen entnommen. (The chemical composition and the results of the mechanical properties are taken from the specifications of the manufacturer)

☐ Der Hersteller ist gemäß der Druckgeräterichtlinie (DGRL2014/68/EU) nach AD 2000-Merkblatt WO/TRD 100 zugelassen. (The manufacturer is acc. to Pressure Equipment Directive 2014/68/EU certified by the TÜV according to AD 2000-WO/TRD 100)

☐ Bruchdehnung am Ausgangswerkstoff (Meßlänge 5d) ermittelt. (Elongation tested with initial material of measuring length 5d)

☒ Besichtigung und Maßprüfung durchgeführt. (Visual an dimensional inspections without objections)

☐ Beständigkeit gegen interkristalline Korrosion wird bestätigt. (Resistance against intergranular corrosion is confirmed)

☒ Verwechslungsprüfung i.O. (recheck of material prior to shipment) ☐ Umgestempelt (new marking)

Bemerkungen:

Datum (date) 09.01.2024

Schäfer + Peters GmbH Zellbaumweg 32 74613 Öhringen

Qualitätswesen Leitung Ralf Löffler Telefon +49 7941 6094-232

Abnahmebeauftragter Manuel Kinach Telefon +49 7941 6094-231

Bearbeitet von Benjamin Ramic Telefon +49 7941 6094-240

Unterschrift Abnahmebeauftragter (authorized inspection representative)

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#551
Description
HEX NUT H M14
PCM Reference
C06002H014T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

934A4M16

SHANDONG TENGDA FASTEN TECH. CO.,LTD

NO.887 YIKANG ROAD,TENGZHOU,SHANDONG,CHINA P.O.:277500
Tel.:+86-632-5677909 Email:sunny@tdfastener.com
Fax.:+86-632-5677996 Website:http://www.tdfastener.com

INSPECTION CERTIFICATE ACC.TO EN 10204 -3.1

CUSTOMER:F. Reyher Nchfg. GmbH & Co. KG
L/C NO:
P/NO: 00934.948.0140.000
INVOICE NO.:REYHER181119
ITEM: DIN934
MARKING: TD A4-80
MFR: SHAN DONG TENGDA FASTEN TECH. CO.,LTD.
MECHANICAL PROPERTIES:ISO3506

INSPECTION NO: TD181106013
LOT NO: ZJ181027N029
P/O NO: 3311147-439
HEAT NO: YA13074
SIZE: M14-2.0
MATERIAL: 316
LOT SIZE: 12800PCS
SAMPLING PLAN: ISO3269

DIMENSION(UNIT:MM)

INSPECTION ITEMS	SAMPLING SIZE	STANDARD	ACTUAL RESULT	AC/RE
MINIMUM DIAMETER	32	11.84-12.21	12.15-12.20	32/0
THICKNESS	32	10.30-11.00	10.60-10.74	32/0
WIDTH ACROSS FLATS	32	21.67-22.00	21.71-21.75	32/0
VISUAL	80	OK	OK	80/0
GO GUAGE	32	OK	OK	32/0
NO-GO GUAGE	32	OK	OK	32/0

PHYSICAL PROPERTIES

INSPECTION ITEMS	SAMPLING SIZE	STANDARD	ACTUAL RESULT	AC/RE
PROOF LOAD(MIN)(N/MM^2)	8	800	800	8/0

CHEMICAL COMPOSITION ANALYSIS(%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu	N
.018	.38	1.03	.038	.003	10.37	16.83	2.09		

Yinnan
Q.A.MANAGER

S1703029
INSPECTOR CODE

11/27/2018
DATE

1/1
PAGE

RN2000145321

2000145321

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#-
Description
TUBE 80X80 EP3
PCM Reference
F-001117014

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

Ilta Inox S.p.A.
Strada Statale 45 bis
26010 Robecco d'Oglio (CR) - Italia

Tel + 39 0372 9801
Fax + 39 0372 921538
e-mail:sales@ilta.arvedi.it
quality@ilta.arvedi.it
www.arvedi.it

TEST CERTIFICATE ACCORDING TO EN 10204(2005) 3.1 N°0000810597

ABNAHMEPRÜFZEUGNIS - CERTIFICAT D'ESSAIS - CERTIFICATO DI COLLAUDO Pag. 1di1

ERW Longitudinally welded tubes/Längsnahtgeschweisste rohre/Tubes soudes longitudinalement/Tubi saldati longitudinalmente

Customer: STAPPERT FRANCE S.A.S. Besteller/Client/Cliente 13,Rue Charlemagne BP 21 02201 SOISSONS CEDEX	
Customer Order N°: 86246 - Bestellung/Commande Client/Ordine Cliente	**Mill's Ilta Inox N°:** 0411132989 - 000120 # 0421139994 - 000110 WerksN°/N° référence Interne/Conferma ordine
Specifications: ASTM A 554 Anforderungen/Specifications/Specifiche	**Tolerances:** EN 10219-2 Toleranzen/Tolérances/Tolleranze
Manufacturer's mark: Herstellerzeichen/Marque du fabricant/ Marchio del produttore Inspector's Stamp: M.A. Stempel des Sachverständigen/Poinçon de l'inspecteur/Punzone dell'ispettore	**Marking:** ========== Kenzeichnung/Marquage/Marcatura

Item Pos. N°	DIMENSIONS Abmessungen Dimensions/Dimensioni	PIECES N° Stückzahl Piéces/Pezzi	METERS Meter Métres/Metri	WEIGHT(kg) Gewicht/Poids Peso	GRADE Werkstoff/Nuance Materiale	STANDARD CODE Normbezeichnung Designation/Designazione	EXECUTION Ausführung Execution/Esecuzione
120	80.00X80.00 X 3.00 X 6000	24	144.00	970.000	TP.316L 1.4404 Z3 CND 17-12-02 UNS S31603	X2 CrNiMo 17-12-2	BNR - WG

Chemical analysis acc.to: ASTM A554 Schmelzanalyse/Chimique analyse/Analisi chimica
Steel making process :E/AOD Erschmelzungsart/Procéde d'elaboration/Procedimento di elaborazione acciaio

Item N°	Manufacturer Hersteller/Fabricant/Produttore	HEAT N° Schmelze/Coulée/Colata	% C	% Si	% S	% P	% Mn	% Cr	% Ni	% Mo	% Ti	% Co	% Cu	% N
120	. . . . .	468010	0.022	0.350	0.0010	0.030	1.010	16.570	10.070	2.020		0.260	0.320	0.047

Mechanical test acc. to tab.: ASTM A370 Mechanische Prüfungen/Essais mécaniques/Caratteristiche meccaniche

Item Pos. N°	HEAT N° Schmelze Coulée Colata	HOMOLOG. Zulassung Omologation Omologazione	TEST Probe Eprouvette Provino n°		SPECIMEN SIZE Abmessung Probestab Dime. Eprouvette Dimensione provetta mm²	YIELD STRENGTH Streck-Dehngrenze Limite d'élasticité Limite di snervamento 0,2% N/mm² 1%		TENSILE STRENGTH Zugfestigkeit Résistance à traction Limite di rottura N/mm²	ELONGAT. Bruchdehnung Allongament Allungamento A5%	HARDNESS Haerte Dureté Durezza HRB
REQUIREMENT Anforderungen/Exigences/Requisiti						>=170		>= 485	>= 35.0	
120	468010		01	L	12.5 X 3.00	278		747	38.5	

Test Results Ergebnisse der Prufungen/Résultat des essais/Risultati delle prove

Heat treatment:	Wärmebehandlung/Traitement termique/Trattamento termico
Tecnological test: Aplatissement: OK / ====== / Emboutiss.:OK / Pliage inverse: OK	Technologische Prüfung/Examen technologique/Prove tecnologiche
Residual Corrosion Test acc.to : ==========	Korrosionsfördernde Rückstäden/Essai residues corrosif/Prova residui corrosivi
Intergranular Corrosion Test acc.to: ASTM A262-A: OK	IK Beständigkeit/Essai corr.intergr./Prova di corrosione intergranulare
Non Destructive Test acc. to: 100% COURANTS DE FOUCAULT SELON LA NORME E426: OK	Zerstörungsfreie Prüfung/Contrôle non destructif/Controllo non distruttivo
Leak Test/Hydrostatic test to: ==========	Dichtheitsprüfung/Essai d'étanchèité/Prova di tenuta
Uncorrect Material Test: ou 100%: Favorable	Verwechlungsprüfung/Essai P.M.I./Prova antimiscuglio
Visual and gauging control: Favorable	Besichtigung und Ausmessung/Contrôle visuel et dimensionel/Controllo visivo e dimensionale

Notes:

We certify that the delivered products comply with the specification of the order / Wir bestaetigen, dass die gelieferte Ware den Bestellvorschriften entspricht / Nous attestons que les produits livres sont conformes aux références de la commande / Noi attestiamo che il materiale spedito è conforme ai requisiti dell'ordine

Marco Assandri

Robecco d'Oglio, 16/03/2023
A

Mill's Inspector / Der Werksachverständige
Inspecteur de l'usine / Firma Ispettore

Arvedi

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#-
Description
FLAT IRON 200 X 10 MM
PCM Reference
F-001118014

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

Seriale Certificato 00000000000000058620 File R:\A0001\00000000000000058620_ART_ICOL_13NA03000500093.TIF

aperam

Correspondenticadres:
Aperam Genk
Swinnenwijerweg 5, Poort Genk 7523
3600 Genk, Belgium
Tel. +32 (0)89 30 21 11

A04 A01

MILL CERTIFICATE BS EN 10204/3.1
CERTIFICAT DE RECEPTION NF EN 10204/3.1
ABNAHMEPRUEFZEUGNIS DIN EN 10204/3.1

A02

Certified acc.PED 2014/68/EU Annex I 4.3 by Certification Body 0036 of TUV SUD Industrie Service GmbH with cert.No.:314/2007/MUC.Renounced of counter signature agreed byTÜV SÜD (9/5/2007).Approved acc.AD 2000-Merkblatt W0/TRD 100 by TÜV SÜD Industrie Service GmbH.Confirmation letter from TÜVSÜD Industrie Service GmbH of 07/05/2010 about the uniformity of coils acc.AD2000 W2 4.1.1

Tech.Req.:AD 2000 W2 -- AD 2000 W10 – EN 13445-2 Z05

N-Nr-N **23K0012254-01 V01** A03

Manufacturer's works order number
N° de la commande usine productrice
Werksauftragsnummer
80824636/07-61675/001/07 A08

Surveyor's mark
Cachet de l'expert
Stempel des
Werkssachverstaendigen
GNK1 Z03

Purchaser and/or consignee
Client et/ou destinataire
Besteller und/oder Empfaenger

S.I.P.I. S.P.A.
VIA PARADIGNA 97

43122 PARMA
ITALIE
A06

Purchaser's order number
N° de commande client
Kundenbestellnummer
8 A07

Product - Produit - Erzeugnis
COIL,HOT ROLLED,ANNEALED+PICKLED,UNTRIMMED
COIL,LAMINE A CHAUD,RECUIT+DECAPE,NON REFENDU
COIL,WARMGEWALZT,GEGLUEHT+GEBEIZT,UNBESAEUMT
B01

Customer article number
N.article client
Artikelnummer des Kunden
13NA03000500093 A09

Steel designation B02
Désignation de l'acier
Stahlbezeichnung

EN 10028-7-2016 1.4404 / 1.4401
EN 10088-2-2014 1.4404 / 1.4401
ASTM A 240-2022 TYPE 316L / 316
ASME SA 240-2021 TYPE 316L / 316
EN 10088-4-2009 1.4404 / 1.4401

Finish
Présentation
Ausfuehrung

1D
1D
NO 1
NO 1
1D

Steelmaking process C70
Mode d'élaboration de l'acier - Stahlherstellungverfahren
Prod.proces: Electric arc furnace - VOD/AOD - Continuous casting
Proc.fabric.: Four à arc - VOD/AOD - Coulée continue
Fertigungsablauf: Elektro-Ofen - VOD/AOD - Stranggussanlage

Any supplementary requirements B03
Prescriptions supplémentaires - Zusätzliche Anforderungen

Product delivery condition
Etat de livraison du produit - Lieferzustand

Solution Annealing
Hypertrempe **1050 °C**
Lösungsglühen

Forced air-water/air forcé-eau
Geblaese Luft-Wasser B04

NACE MR 0175 / ISO 15156-1 / ISO 15156-3 // MATERIAL MERCURY FREE // CHEMICAL AND MECHANICAL VALUES COMPLY TO NORSOK M-630 MDS S15(316L) // ASTM A480 / A480M -- ASME CODE SECT.2 PT.A -- MAT MERCURY FREE // CORR. TEST: ASTM A262-E: OK

Z06

Identification of the product B07
Identification du produit - Identifizierung des Erzeugnisses
MELTED IN BELGIUM, MADE IN BELGIUM

Coil n.
N.Bobine - Band Nr.
30800710

Heat n.
N.Coulée - Schmelz Nr.
308007

Dimensions
Dimensions - Abmessungen

Thickness B09
Epaisseur - Staerke
10.00 mm

Width B10
Largeur - Breite
1500.00 mm

Length B11
Longueur - Laenge

Number of pieces B08
Nb de pièces - Stueckzahl
1

Net weight B13
Poids net - netto Gewicht
26410 KG

CHEMICAL ANALYSIS - ANALYSE CHIMIQUE - CHEMISCHE ZUSAMMENSETZUNG

	C	Si	Mn	Ni	Cr	Mo	Ti	N	S	P	Cu	Co				
Required -Exigé %mini				10.00	16.50	2.00										
Anforderung. %maxi	0.030	0.75	2.00	13.00	18.00	2.50		0.100	0.015	0.045						
Cast Analysis	0.021	0.49	1.23	10.05	16.55	2.03		0.026	0.001	0.035	0.34	0.264				
Analyse coulee																
Analyse Schmelze	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86

Positive material identification carried out : OK
Tests de vérification de la conformité de la nuance fournie : OK
Verwechslungpruefung wurde durchgefuehrt : OK
C04 C93 D52

Location (1)

MECHANICAL PROPERTIES - PROPRIETES MECANIQUES - MECHANISCHE WERTE EN ISO 6892-1 B / A-SA 370 C20

Room temperature - Température ambiante - Raumtemperatur | Test temperature (°C) : C03

Direction (2)		Yield or proof strength Limite d'élasticité Dehngrenze MPa		Tensile Strength Résistance à la traction Zugfestigkeit MPa	Elongation after fracture Allongement après rupt. Bruchdehnung %		Hardness Dureté Haerte	Yield or proof strength Limite d'élasticité Dehngrenze MPa		Tensile str. Résist. MPa Zugfestigkeit	Elongation % Allongement. Bruchdehnung
Required Exigé Anforderung		Rp0.2%	Rp1%	Rm	50mm	A5	HRBW	Rp0.2%	Rp1%	Rm	50mm
	mini	220	260	530	40	40					
	maxi			680			95				
1 T	Obtained Obtenu Ergebnisse	342	377	580	44	42	89				
		C11	C14	C12	C13	C15	C31	C16	C17	C18	C19

Impact strength test Essai de résilience Kerbschlagzachigkeitstest		Corrosion test Test de corrosion Korrosionstest	E0.2(T)/R(T) %						
C40	t(°c) C44	EN ISO 3651/2 - A:OK	59						
	C42	D51	C50	C51	C52	C53	C54	C55	C05

Internal cleanliness: A: B: C: D: C57

Location of the sample (1)
Emplacement de l'échantillon
Lage des Probenabschnittes
1. Front - Début - Anfang
2. Back - Fin - Ende
3. Middle - Milieu - Mitte
C01

Direction of the test pieces (2)
Orientation des éprouvettes
Probenrichtung
T. Transverse - Travers - Quer
L. Longitudinal - Long - Laengs
C02

The delivery is in accordance with the order
La fourniture est conforme aux exigences de la commande
Die lieferung entspricht den Bestellbedingungen Z01

Packing list
Avis d'expédition **2023032877-20076**
LieferscheinNummer A10

Marking, Inspection and measurement : without objection
Contrôle de marquage, d'aspect et de dimensions : satisfaisants
Pruefung der Stempelung, des Oberflaechenaspekts und der Abmessungen : ohne Beanstandung
D01

Organisation inspection
Organisme et/ou service contrôle
Ueberwachungsabteilung A05

Quality Department

31/3/2023

The inspector
Le responsable
Der Werkssachverstaendige R. Vliegen Z02

This to declare that the material as described in here as been cut to :
Piatto CES.316L F1 200,000X10,000 Lenght: 4000,000
and remarked with steelgrade, heat n°, workinspector's stamp CC

SIPI STAINLESS STEEL FLAT BAR AND PROFILE PRODUCER

Seriale Certificato 00000000000000058621 File R:\A0001\00000000000000058621_ART_ICOL_13NA03000500093.TIF

A04

aperam

Correspondenticadres:
Aperam Genk
Swinnenwijerweg 5, Poort Genk 7523
3600 Genk, Belgium
Tel. +32 (0)89 30 21 11

A01

MILL CERTIFICATE BS EN 10204/3.1
CERTIFICAT DE RECEPTION NF EN 10204/3.1
ABNAHMEPRUEFZEUGNIS DIN EN 10204/3.1

A02

Factory Production Control certified by TUV SUD Industrie Service Gmbh
with certificate nr 0036-CPR-M-043-2011.
In compliance with the Construction Product Regulation Nr 305/2011/EU.

Z05

N-Nr-N **23K0012254-CE V01** A03

Manufacturer's works order number
N° de la commande usine productrice
Werksauftragsnummer
80824636/07-61675/001/07 A08

Surveyor's mark
Cachet de l'expert
Stempel des
Werkssachverstaendigen
GNK1 Z03

Purchaser and/or consignee
Client et/ou destinataire
Besteller und/oder Empfaenger

S.I.P.I. S.P.A.
VIA PARADIGNA 97

43122 PARMA
ITALIE

A06

Purchaser's order number
N° de commande client
Kundenbestellnummer
8 A07

Product - Produit - Erzeugnis
COIL,HOT ROLLED,ANNEALED+PICKLED,UNTRIMMED
COIL,LAMINE A CHAUD,RECUIT+DECAPE,NON REFENDU
COIL,WARMGEWALZT,GEGLUEHT+GEBEIZT,UNBESAEUMT
B01

Customer article number
N.article client
Artikelnummer des Kunden
13NA03000500093 A09

Steel designation B02
Désignation de l'acier
Stahlbezeichnung
EN 10088-4-2009 1.4404/1.4401

Finish
Présentation
Ausfuehrung
1D

Steelmaking process C70
Mode d'élaboration de l'acier - Stahlherstellungverfahren
Prod.proces: Electric arc furnace - VOD/AOD - Continuous casting
Proc.fabric.: Four à arc - VOD/AOD - Coulée continue
Fertigungsablauf: Elektro-Ofen - VOD/AOD - Stranggussanlage

Any supplementary requirements B03
Prescriptions supplémentaires - Zusätzliche Anforderungen

Product delivery condition
Etat de livraison du produit - Lieferzustand

Solution Annealing
Hypertrempe **1050 °C**
Lösungsglühen

Forced air-water/air forcé-eau
Geblaese Luft-Wasser B04

Z06

Identification of the product B07
Identification du produit - Identifizierung des Erzeugnisses
MELTED IN BELGIUM, MADE IN BELGIUM

Coil n.
N.Bobine - Band Nr.
30800710

Heat n.
N.Coulée - Schmelz Nr.
308007

Dimensions
Dimensions - Abmessungen

Thickness B09
Epaisseur - Staerke
10.00 mm

Width B10
Largeur - Breite
1500.00 mm

Length B11
Longueur - Laenge

Number of pieces B08
Nb de pièces - Stueckzahl
1

Net weight B13
Poids net - netto Gewicht
26410 KG

CHEMICAL ANALYSIS - ANALYSE CHIMIQUE - CHEMISCHE ZUSAMMENSETZUNG

	C	Si	Mn	Ni	Cr	Mo	Ti	N	S	P	Cu	Co				
Required -Exigé %mini				10.00	16.50	2.00										
Anforderung. %maxi	0.030	0.75	2.00	13.00	18.00	2.50		0.100	0.015	0.045						
Cast Analysis	0.021	0.49	1.23	10.05	16.55	2.03		0.026	0.001	0.035	0.34	0.264				
Analyse coulee																
Analyse Schmelze	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86

Positive material identification carried out : OK
Tests de vérification de la conformité de la nuance fournie : OK
Verwechslungpruefung wurde durchgefuehrt : OK
C04 C93 D52

Location (1)

MECHANICAL PROPERTIES - PROPRIETES MECANIQUES - MECHANISCHE WERTE EN ISO 6892-1 B / A-SA 370 C20

Room temperature - Température ambiante - Raumtemperatur | Test temperature (°C) : C03

Direction (2)		Yield or proof strength Limite d'élasticité Dehngrenze MPa		Tensile Strength Résistance à la traction Zugfestigkeit MPa	Elongation after fracture Allongement après rupt. Bruchdehnung %		Hardness Dureté Haerte	Yield or proof strength Limite d'élasticité Dehngrenze MPa		Tensile str. Résist. MPa Zugfestigkeit	Elongation % Allongement. Bruchdehnung
		Rp0.2%	Rp1%	Rm	50mm	A5	HRBW	Rp0.2%	Rp1%	Rm	50mm
Required Exigé Anforderung mini		220	260	530	40	40					
maxi				680			95				
1	T Obtained Obtenu Ergebnisse	342 C11	377 C14	580 C12	44 C13	42 C15	89 C31	C16	C17	C18	C19

Impact strength test Essai de résilience Kerbschlagzaehigkeitstest			Corrosion test Test de corrosion Korrosionstest	E0.2(T)/R(T) %						
C40	t(°c)	C44	EN ISO 3651/2 - A:OK	59 C50	C51	C52	C53	C54	C55	C05
		C42	D51	Internal cleanliness:	A:	B:	C:	D:		C57

Location of the sample (1)
Emplacement de l'échantillon
Lage des Probenabschnittes
1. Front - Début - Anfang
2. Back - Fin - Ende
3. Middle - Milieu - Mitte
C01

Direction of the test pieces (2)
Orientation des éprouvettes
Probenrichtung
T. Transverse - Travers - Quer
L. Longitudinal - Long - Laengs
C02

The delivery is in accordance with the order
La fourniture est conforme aux exigences de la commande
Die lieferung entspricht den Bestellbedingungen Z01

Packing list
Avis d'expédition **2023032877-20076**
LieferscheinNummer A10

Marking, inspection and measurement : without objection
Contrôle de marquage, d'aspect et de dimensions : satisfaisants
Pruefung der Stempelung, des Oberflaechenaspekts und der Abmessungen : ohne Beanstandung
D01

Organisation Inspection
Organisme et/ou service contrôle
Ueberwachungsabteilung A05

Quality Department

31/3/2023

The inspector
Le responsable
Der Werkssachverstaendige
R. Vliegen Z02

This to declare that the material as described in here as been cut to :
Piatto CES.316L F1 200,000X10,000 Lenght: 4000,000
and remarked with steelgrade, heat n°, workinspector's stamp CC

SIPI
STAINLESS STEEL FLAT BAR AND PROFILE PRODUCER

aperam

Correspondance address
Adresse de correspondance - Adresse für briefwechsel

Swinnenwijerweg 5, Poort Genk 7523
3600 Genk, Belgium
CE01

Annex to certificate 23K0012254-01 V01
Annexe du CCPU
Anlage Zum Zeugnis
CE02

Certificate of Production Control Number
Numéro du certificat de contrôle de la production
Zeugnisnummer von Produktionskontrolle
0036-CPD-43-2011
CE03

Year 11
Année
Jahr
CE04

Certificate
CCPU - Zeugnis
23K0012254-CE V01
CE05

CE
0036
CE06

Manufacturer's works order number
N° de la commande usine productrice
Werksauftragsnummer

80824636/07-61675/001/07
CE07

Purchaser and/or consignee
Client et/ou destinataire
Besteller und/oder Empfaenger

S.I.P.I. S.P.A.
VIA PARADIGNA 97

43122 PARMA
ITALIE
CE08

Purchaser's order number
N° de commande client
Kundenbestellnummer
8
CE09

Customer article number
N° d'article client
Artikelnummer des Kundes
13NA03000500093
CE10

Identification of the product
Identification du produit - Identifizierung des Erzeugnisses

Coil n°
N° de bobine - Band Nr
30800710
CE11

Dimensions
Dimensions - Abmessungen

Thickness	Width	Length
Epaisseur - Dicke	Largeur - Breite	Longueur - Laenge
10.00 mm CE12	1500.00 mm CE13	CE14

Stainless steel / Acier inoxydable / Rostfreier Stahl
CE15

EN10088-4
CE16

Intended uses : building constructions or civil engineering
Usages prévus : construction immobilière ou génie civil
Vorgesehene Verwendungen : Hochbauten und Ingenieurbauwerke
CE17

Declaration of performance :
Déclaration des performances : DOP.Nr.GNK.08.01/GNK.10.01
Leistungserklärung :
DoP available on website Aperam : https://www.aperam.com/documentation
CE18

Steel
Acier 1.4404/1 4401
Werkstoff
CE19

Hot rolled
Laminé à chaud
Warmgewalzt
CE20

Coil / bobine / Band
CE21

Elongation / Allongement / Bruchdehnung
Tensile strength / Résistance à la traction / Zugfestigkeit
Yield strength / Limite d'élasticité / Dehngrenze
Impact strength / Résistance au choc / Kerbschlagzähigkeit
Weldability / Aptitude au soudage / Schweisseignung
Durability / Durabilité / Dauerhaftigkeit
Characteristics expressed as indicated in the above mentioned DOP
Tolerances on dimension and shape / Tolérances sur les dimensions et sur forme / Grenzabmasse unf Formtoleranzen : EN ISO 9444-2
CE22

Regulated substance : no performance determined
Substance réglementée : aucune performance determinée
Regulierter Stoff: keine Leistung festgestellt
CE23

This to declare that the material as described in here as been cut to :
Piatto CES.316L F1 200,000X10,000 Lenght: 4000,000
and remarked with steelgrade, heat n°, workinspector's stamp CC

SIPI
STAINLESS STEEL FLAT BAR AND PROFILE PRODUCER

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#-
Description
FLAT IRON 60 X 10 MM
PCM Reference
F-001119014

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

MARCEGAGLIA SPECIALTIES

Sede Legale e amministrativa:
Via Bresciani, 16
46040 Gazoldo degli Ippoliti
Mantova-Italy
Tel. +39 - 0376 685 1
Fax. +39 - 0376 685 600
www.marcegaglia.com

Type	Certificat de réception 3.1 EN 10204:2004
Numéro	10724507425
Emis le	25/07/2024

Client	Client Final				
STAPPERT FRANCE SAS 13 RUE CHARLEMAGNE 02201 SOISSONS FR	STAPPERT FRANCE SOISSONS ZA J. FERRY RUE J. HENRY 02200 SOISSONS FR	N° Livraison Du Nr doc. de transport	8930472786 25/07/2024 1007008669	Control de qualitè RESP. A.Venturini Usine Gazoldo	Pages 4/4

Batch	Quantitè	Coulée	C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Ni (%)	Mo (%)	N (%)	Rm [N/mm²]	Rp 0.2 [N/mm²]	RP 1 [N/mm²]	A (%)	HRB
54000955 PXP 30x5x6000 A316L EN 1.4404X2CrNiMo17-12-2. WNR1.4404. A316L / AISI316. X5CrNiMo17-12-2. WNR1.4401. A316 EN10028-7.EN10088-2.EN10088-4.ASTM A240/A240M. A480/A480M. ASME SA240/SA240M. SA480/SA480M 1191789985/130 96965 Date 24/07/2024																
24NS003638	526 KG	E231862	.019	.472	1.290	.0350	.0010	16.720	10.070	2.060	.0540	641	452	531	48.8	91
54000942 PXP 50x5x6000 A316L EN 1.4404X2CrNiMo17-12-2. WNR1.4404. A316L / AISI316. X5CrNiMo17-12-2. WNR1.4401. A316 EN10028-7.EN10088-2.EN10088-4.ASTM A240/A240M. A480/A480M. ASME SA240/SA240M. SA480/SA480M 1191789985/140 96965 Date 24/07/2024																
24NS003140	508 KG	E232229	.022	.478	1.233	.0067	.0062	16.940	10.401	2.013	.0400	646	460	498	48.5	92
54000944 PXP 50x8x6000 A316L EN 1.4404X2CrNiMo17-12-2. WNR1.4404. A316L / AISI316. X5CrNiMo17-12-2. WNR1.4401. A316 EN10028-7.EN10088-2.EN10088-4.ASTM A240/A240M. A480/A480M. ASME SA240/SA240M. SA480/SA480M 1191789985/150 96965 Date 24/07/2024																
24NT004772	515 KG	641704	.024	.549	1.331	.0070	.0126	17.037	10.522	2.015	.0513	649	464	538	48.0	93
54000949 PXP 60x10x6000 A316L EN 1.4404X2CrNiMo17-12-2. WNR1.4404. A316L / AISI316. X5CrNiMo17-12-2. WNR1.4401. A316 EN10028-7.EN10088-2.EN10088-4.ASTM A240/A240M. A480/A480M. ASME SA240/SA240M. SA480/SA480M 1191789985/160 96965 Date 24/07/2024																
24NT004676	498 KG	641701	.023	.544	1.325	.0157	.0023	17.025	10.507	2.061	.0504	656	475	547	46.8	93
54000952 PXP 80x8x6000 A316L EN 1.4404X2CrNiMo17-12-2. WNR1.4404. A316L / AISI316. X5CrNiMo17-12-2. WNR1.4401. A316 EN10028-7.EN10088-2.EN10088-4.ASTM A240/A240M. A480/A480M. ASME SA240/SA240M. SA480/SA480M 1191789985/170 96965 Date 24/07/2024																
24NT004795	534 KG	62266	.015	.315	1.022	.0266	.0045	16.722	10.127	2.123	.0122	609	402	498	52.9	85

Notes:
- Nous certifions que les produits ci-dessus ènsumerès sont conformes aux prescriptions de la commande
- Document validated acc. EN10204 par. 5
- Norms are intended in the valid edition at the time of the order
- Durability: NPD
- Regulated Substances: NPD
- Intended Uses: Building Constructions or Civil Engineering
- DoP available at http://www.marcegaglia.com/brochure/e/quality/dop.html

Mode d'elaboration de l'acier:four à arc-VOD/AOD-Coulée continue
Hypertrempe: 1050°C - Coil finish 1D
material conforming to NACE MR0175/MR0103 - ISO15156-1/ISO15156-3

UKCA 1244 22 MARCEGAGLIA SPECIALTIES v. Bresciani, 16 46040 - Gazoldo D. I. Mantova - Italy EN 10088-4:2009

CE 0474 13 MARCEGAGLIA SPECIALTIES v. Bresciani, 16 46040 - Gazoldo D. I. Mantova - Italy EN 10088-4:2009

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#-
Description
FLAT IRON 80 X 10 MM
PCM Reference
F-001120014

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

Seriale Certificato 00000000000000055789 FileR:\A0001\00000000000000055789_ART_ICOL_13NA03000500093.TIF

A04

aperam

Correspondentieadres:
Aperam Genk
Swinnenwijerweg 5, Poort Genk 7523
3600 Genk, Belgium
Tel. +32 (0)89 30 21 11

A01

MILL CERTIFICATE BS EN 10204/3.1
CERTIFICAT DE RECEPTION NF EN 10204/3.1
ABNAHMEPRUEFZEUGNIS DIN EN 10204/3.1

A02

Certified acc.PED 2014/68/EU Annex I 4.3 by Certification Body 0036 of TUV SUD Industrie Service GmbH with cert.No.:314/2007/MUC.Renounced of counter signature agreed byTÜV SÜD (9/5/2007).Approved acc.AD 2000-Merkblatt W0/TRD 100 by TÜV SÜD Industrie Service GmbH.Confirmation letter from TÜVSÜD Industrie Service GmbH of 07/05/2010 about the uniformity of coils acc.AD2000 W2 4.1.1

Tech.Req.:AD 2000 W2 -- AD 2000 W10 -- EN 13445-2 Z05

N-Nr-N **22K0027910-01 V01** A03

Manufacturer's works order number
N° de la commande usine productrice
Werksauftragsnummer
80782878/08-61675/028/08 A08

Surveyor's mark
Cachet de l'expert
Stempel des
Werkssachverstaendigen
GNK1 Z03

Purchaser and/or consignee
Client et/ou destinataire
Besteller und/oder Empfaenger

S.I.P.I. S.P.A.
VIA SCIASCIA 6/A

43100 PARMA
ITALIE A06

Purchaser's order number
N° de commande client
Kundenbestellnummer
58 A07

Product - Produit - Erzeugnis
COIL,HOT ROLLED,ANNEALED+PICKLED,UNTRIMMED
COIL,LAMINE A CHAUD,RECUIT+DECAPE,NON REFENDU
COIL,WARMGEWALZT,GEGLUEHT+GEBEIZT,UNBESAEUMT B01

Customer article number
N.article client
Artikelnummer des Kunden
13NA03000500093 A09

Steel designation B02
Désignation de l'acier
Stahlbezeichnung

EN 10028-7-2016 1.4404 / 1.4401
EN 10088-2-2014 1.4404 / 1.4401
ASTM A 240-2020 TYPE 316L / 316
ASME SA 240-2021 TYPE 316L / 316
EN 10088-4-2009 1.4404 / 1.4401

Finish
Présentation
Ausfuehrung

ID
ID
NO 1
NO 1
ID

Steelmaking process C70
Mode d'élaboration de l'acier - Stahlherstellungverfahren
Prod.proces: Electric arc furnace - VOD/AOD - Continuous casting
Proc.fabric.: Four à arc - VOD/AOD - Coulée continue
Fertigungsablauf: Elektro-Ofen - VOD/AOD - Stranggussanlage

Any supplementary requirements B03
Prescriptions supplémentaires - Zusätzliche Anforderungen

Product delivery condition
Etat de livraison du produit - Lieferzustand

Solution Annealing
Hypertrempe **1050 °C**
Lösungsglühen

Forced air-water/air forcé-eau
Geblaese Luft-Wasser B04

NACE MR 0175 / ISO 15156-1 / ISO 15156-3 // MATERIAL MERCURY FREE // CHEMICAL AND MECHANICAL VALUES COMPLY TO NORSOK M-630 MDS S15(316L) // ASTM A480 / A480M -- ASME CODE SECT.2 PT.A -- MAT MERCURY FREE // CORR. TEST: ASTM A262-E: OK

Z06

Identification of the product B07
Identification du produit - Identifizierung des Erzeugnisses
MELTED IN BELGIUM, MADE IN BELGIUM

Dimensions
Dimensions - Abmessungen

Thickness B09	Width B10	Length B11
Epaisseur - Staerke	Largeur - Breite	Longueur - Laenge
10.00 mm	1500.00 mm	

Number of pieces B08
Nb de pièces - Stueckzahl: **1**

Net weight B13
Poids net - netto Gewicht: **26630 KG**

Coil n.	Heat n.
N.Bobine - Band Nr.	N.Coulée - Schmelz Nr.
22509156	225091

CHEMICAL ANALYSIS - ANALYSE CHIMIQUE - CHEMISCHE ZUSAMMENSETZUNG

	C	Si	Mn	Ni	Cr	Mo	Ti	N	S	P	Cu	Co				
Required -Exigé %mini				10.00	16.50	2.00										
Anforderung. %maxi	0.030	0.75	2.00	13.00	18.00	2.50		0.100	0.015	0.045						
Cast Analysis	0.022	0.37	1.30	10.02	16.69	2.02		0.039	0.003	0.036	0.41	0.252				
Analyse coulee																
Analyse Schmelze	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86

Positive material identification carried out : OK
Tests de vérification de la conformité de la nuance fournie : OK
Verwechslungpruefung wurde durchgefuehrt : OK C04 C93 D52

Location (1)

MECHANICAL PROPERTIES - PROPRIETES MECANIQUES - MECHANISCHE WERTE EN ISO 6892-1 B / A-SA 370 C20

Room temperature - Température ambiante - Raumtemperatur | Test temperature (°C) : C03

	Direction (2)		Yield or proof strength Limite d'élasticité Dehngrenze MPa		Tensile Strength Résistance à la traction Zugfestigkeit MPa	Elongation after fracture Allongement après rupt. Bruchdehnung %		Hardness Dureté Haerte	Yield or proof strength Limite d'élasticité Dehngrenze MPa		Tensile str. Résist. MPa Zugfestigkeit	Elongation % Allongement. Bruchdehnung
		Required Exigé Anforderung	Rp0.2%	Rp1%	Rm	A5	50mm	HRBW	Rp0.2%	Rp1%	Rm	A5
		mini			530	40	40					
		maxi	220	260	680			95				
1	T	Obtained Obtenu	335	371	581	55	53	86				
2		Ergebnisse						85				
			C11	C14	C12	C13	C15	C31	C16	C17	C18	C19

Impact strength test Essai de résilience Kerbschlagzaehigkeitstest			Corrosion test Test de corrosion Korrosionstest							
C40	t(°c)	C44	EN ISO 3651/2 - A:OK	C50	C51	C52	C53	C54	C55	C05
		C42	D51	Internal cleanliness:		A:	B:	C:	D:	C57

Location of the sample (1)
Emplacement de l'échantillon
Lage des Probenabschnittes
1. Front - Début - Anfang
2. Back - Fin - Ende
3. Middle - Milieu - Mitte C01

Direction of the test pieces (2)
Orientation des éprouvettes
Probenrichtung
T. Transverse - Travers - Quer
L. Longitudinal - Long - Laengs C02

The delivery is in accordance with the order
La fourniture est conforme aux exigences de la commande
Die lieferung entspricht den Bestellbedingungen Z01

Packing list
Avis d'expédition **2022043099-20076**
LieferscheinNummer A10

Marking, inspection and measurement : without objection
Contrôle de marquage, d'aspect et de dimensions : satisfaisants
Pruefung der Stempelung, des Oberflaechenaspekts und der Abmessungen : ohne Beanstandung D01

Organisation inspection
Organisme et/ou service contrôle
Ueberwachungsabteilung A05

Quality Department

13/7/2022

The inspector
Le responsable
Der Werkssachverstaendige R. Vliegen Z02

This to declare that the material as described in here as been cut to :
Piatto CES.316L F1 80,000X10,000 Lenght: 6000,000
and remarked with steelgrade, heat n°, workinspector's stamp CC

SIPI
STAINLESS STEEL FLAT BAR AND PROFILE PRODUCER

Seriale Certificato 00000000000000055790 FileR:\A0001\00000000000000055790_ART_ICOL_13NA03000500093.TIF

A04

aperam

Correspondentieadres:
Aperam Genk
Swinnenwijerweg 5, Poort Genk 7523
3600 Genk, Belgium
Tel. +32 (0)89 30 21 11

A01

MILL CERTIFICATE BS EN 10204/3.1
CERTIFICAT DE RECEPTION NF EN 10204/3.1
ABNAHMEPRUEFZEUGNIS DIN EN 10204/3.1

A02

Factory Production Control certified by TUV SUD Industrie Service Gmbh
with certificate nr 0036-CPR-M-043-2011.
In compliance with the Construction Product Regulation Nr 305/2011/EU.

Z05

N-Nr-N **22K0027910-CE V01** A03

Manufacturer's works order number
N° de la commande usine productrice
Werksauftragsnummer
80782878/08-61675/028/08 A08

Surveyor's mark
Cachet de l'expert
Stempel des Werkssachverstaendigen
GNK1 Z03

Purchaser and/or consignee
Client et/ou destinataire
Besteller und/oder Empfaenger

S.I.P.I. S.P.A.
VIA SCIASCIA 6/A

43100 PARMA
ITALIE

A06

Purchaser's order number
N° de commande client
Kundenbestellnummer
58 A07

Product - Produit - Erzeugnis
COIL,HOT ROLLED,ANNEALED+PICKLED,UNTRIMMED
COIL,LAMINE A CHAUD,RECUIT+DECAPE,NON REFENDU
COIL,WARMGEWALZT,GEGLUEHT+GEBEIZT,UNBESAEUMT
B01

Customer article number
N.article client
Artikelnummer des Kunden
13NA03000500093 A09

Steel designation B02
Désignation de l'acier
Stahlbezeichnung
EN 10088-4-2009 1.4404/1.4401

Finish
Présentation
Ausfuehrung
1D

Steelmaking process C70
Mode d'élaboration de l'acier - Stahlherstellungverfahren
Prod.proces: Electric arc furnace - VOD/AOD - Continuous casting
Proc.fabric.: Four à arc - VOD/AOD - Coulée continue
Fertigungsablauf: Elektro-Ofen - VOD/AOD - Stranggussanlage

Any supplementary requirements B03
Prescriptions supplémentaires - Zusätzliche Anforderungen

Product delivery condition
Etat de livraison du produit - Lieferzustand

Solution Annealing
Hypertrempe 1050 °C
Lösungsglühen

Forced air-water/air forcé-eau
Geblaese Luft-Wasser B04

Z06

Identification of the product B07
Identification du produit - Identifizierung des Erzeugnisses
MELTED IN BELGIUM, MADE IN BELGIUM

Dimensions
Dimensions - Abmessungen

Number of pieces B08
Nb de pièces - Stueckzahl: 1

Thickness B09
Epaisseur - Staerke: 10.00 mm

Width B10
Largeur - Breite: 1500.00 mm

Length B11
Longueur - Laenge

Coil n.
N.Bobine - Band Nr.: 22509156

Heat n.
N.Coulée - Schmelz Nr.: 225091

Net weight B13
Poids net - netto Gewicht: **26630 KG**

CHEMICAL ANALYSIS - ANALYSE CHIMIQUE - CHEMISCHE ZUSAMMENSETZUNG

	C	Si	Mn	Ni	Cr	Mo	Ti	N	S	P	Cu	Co				
Required -Exigé %mini				10.00	16.50	2.00										
Anforderung. %maxi	0.030	0.75	2.00	13.00	18.00	2.50		0.100	0.015	0.045						
Cast Analysis	0.022	0.37	1.30	10.02	16.69	2.02		0.039	0.003.	0.036	0.41	0.252				
Analyse coulee																
Analyse Schmelze	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86

Positive material identification carried out : OK
Tests de vérification de la conformité de la nuance fournie : OK
Verwechslungpruefung wurde durchgefuehrt : OK
C04 C93 D52

Location (1)

MECHANICAL PROPERTIES - PROPRIETES MECANIQUES - MECHANISCHE WERTE EN ISO 6892-1 B / A-SA 370 C20

Room temperature - Température ambiante - Raumtemperatur | Test temperature (°C) : C03

	Direction (2)		Yield or proof strength Limite d'élasticité Dehngrenze MPa		Tensile Strength Résistance à la traction Zugfestigkeit MPa	Elongation after fracture Allongement après rupt. Bruchdehnung %		Hardness Dureté Haerte	Yield or proof strength Limite d'élasticité Dehngrenze MPa		Tensile str. Résist. MPa Zugfestigkeit	Elongation % Allongement. Bruchdehnung
		Required Exigé Anforderung	Rp0.2%	Rp1%	Rm	A5	50mm	HRBW	Rp0.2%	Rp1%	Rm	A5
		mini	220	260	530	40	40					
		maxi			680			95				
1	T	Obtained Obtenu	335	371	581	55	53	86				
2		Ergebnisse	C11	C14	C12	C13	C15	85 C31	C16	C17	C18	C19

Impact strength test Essai de résilience Kerbschlagzaehigkeitstest			Corrosion test Test de corrosion Korrosionstest								
C40	(°c)	C44	EN ISO 3651/2 - A:OK	C50	C51	C52	C53	C54	C55	C05
		C42	D51	Internal cleanliness:			A:	B:	C:	D:	C57

Location of the sample (1)
Emplacement de l'échantillon
Lage des Probenabschnittes
1. Front - Début - Anfang
2. Back - Fin - Ende
3. Middle - Milieu - Mitte
C01

The delivery is in accordance with the order
La fourniture est conforme aux exigences de la commande
Die lieferung entspricht den Bestellbedingungen Z01

Packing list
Avis d'expédition **2022043099-20076**
LieferscheinNummer A10

Organisation inspection
Organisme et/ou service contrôle
Ueberwachungsabteilung A05

Quality Department

13/7/2022

The inspector
Le responsable
Der Werkssachverstaendige R. Vliegen Z02

Direction of the test pieces (2)
Orientation des éprouvettes
Probenrichtung
T. Transverse - Travers - Quer
L. Longitudinal - Long - Laengs
C02

Marking, inspection and measurement : without objection
Contrôle de marquage, d'aspect et de dimensions : satisfaisants
Pruefung der Stempelung, des Oberflaechenaspekts und der Abmessungen : ohne Beanstandung
D01

This to declare that the material as described in here as been cut to :
Piatto CES.316L F1 80,000X10,000 Lenght: 6000,000
and remarked with steelgrade, heat n°, workinspector's stamp CC

SIPI
STAINLESS STEEL FLAT BAR AND PROFILE PRODUCER

aperam

Correspondance address
Adresse de correspondance - Adresse für briefwechsel

Swinnenwijerweg 5, Poort Genk 7523
3600 Genk, Belgium
CE01

Annex to certificate 22K0027910-01 V01
Annexe du CCPU
Anlage Zum Zeugnis
CE02

Certificate of Production Control Number
Numéro du certificat de contrôle de la production
Zeugnisnummer von Produktionskontrolle
0036-CPD-43-2011
CE03

Year 11
Année
Jahr
CE04

Certificate
CCPU - Zeugnis
22K0027910-CE V01
CE05

CE 0036
CE06

Manufacturer's works order number
N° de la commande usine productrice
Werksauftragsnummer
80782878/08-61675/028/08
CE07

Purchaser and/or consignee
Client et/ou destinataire
Besteller und/oder Empfaenger
S.I.P.I. S.P.A.
VIA SCIASCIA 6/A
43100 PARMA
ITALIE
CE08

Purchaser's order number
N° de commande client
Kundenbestellnummer
58
CE09

Customer article number
N° d'article client
Artikelnummer des Kundes
13NA03000500093
CE10

Identification of the product
Identification du produit - Identifizierung des Erzeugnisses

Coil n°
N° de bobine - Band Nr
22509156
CE11

Dimensions
Dimensions - Abmessungen

Thickness
Epaisseur - Dicke
10.00 mm
CE12

Width
Largeur - Breite
1500.00 mm
CE13

Length
Longueur - Laenge
CE14

Stainless steel / Acier inoxydable / Rostfreier Stahl
CE15

EN10088-4
CE16

Intended uses : building constructions or civil engineering
Usages prévus : construction immobilière ou génie civil
Vorgesehene Verwendungen : Hochbauten und Ingenieurbauwerke
CE17

Declaration of performance :
Déclaration des performances : DOP.Nr.GNK.08.01/GNK.10.01
Leistungserklärung :
DoP available on website Aperam : https://www.aperam.com/documentation
CE18

Steel
Acier 1.4404/1.4401
Werkstoff
CE19

Hot rolled
Laminé à chaud
Warmgewalzt
CE20

Coil / bobine / Band
CE21

Elongation / Allongement / Bruchdehnung
Tensile strength / Résistance à la traction / Zugfestigkeit
Yield strength / Limite d'élasticité / Dehngrenze
Impact strength / Résistance au choc / Kerbschlagzähigkeit
Weldability / Aptitude au soudage / Schweisseignung
Durability / Durabilité / Dauerhaftigkeit
Characteristics expressed as indicated in the above mentioned DOP
Tolerances on dimension and shape / Tolérances sur les dimensions et sur forme / Grenzabmasse unf Formtoleranzen : EN ISO 9444-2
CE22

Regulated substance : no performance determined
Substance réglementée : aucune performance déterminée
Regulierter Stoff: keine Leistung festgestellt
CE23

This to declare that the material as described in here as been cut to :
Piatto CES.316L F1 80,000X10,000 Lenght: 6000,000
and remarked with steelgrade, heat n°, workinspector's stamp CC

SIPI
STAINLESS STEEL FLAT BAR AND PROFILE PRODUCER

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#-
Description
TUBE D10 THCK.1
PCM Reference
45868-014T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

THE POWER OF STEEL
MAXIM
TUBES COMPANY PVT. LTD.
A NORSOK APPROVED & DNV APPROVAL OF MANUFACTURER, AN ISO 9001:2015, ISO 14001:2015,
ISO 45001:2018, PED & ADW / AD 2000 W0 CERTIFIED COMPANY
MFG. & EXPORTER OF STAINLESS STEEL SEAMLESS & WELDED PIPES I TUBES I U TUBES
GOVT. RECOGNISED EXPORT HOUSE I CIN:U27106GJ2006PTC049217

COLD FINISHED

F/QAC/12_REV.01

INSPECTION CERTIFICATE AS PER EN 10204 - 3.2

T.C.NO :-MTCPL/2023-24/0948A20
DATE :-17.02.2024

CUSTOMER NAME :- M/s STAPPERT Noxon B.V.

P.O. NO. :- 76326 — DATE :-24.05.2023

O.A.NO. :- 2023/05/16051BA/EXP — DATE :-26.05.2023

QAP.NO. :- GENERAL_2/EXP — DATE :-15.12.2015

PRODUCT :- AUSTENITIC S.S. SEAMLESS CFA TUBES (BRIGHT ANNEALED & PASSIVATED) - MELTING PROCESS - EF + AOD

MAT.SPEC. :- ASTM A 269-15a, ASTM A 213-22, TP 316/316L, ASTM A 1016-18a, SA 213 OF ASME SEC-II, PART A, EDITION 2021, EN 10216-5, TC-1, GRADE 1.4401/1.4404, NACE MR 0103/ISO 17495-1: 2016, NACE MR 0175/ISO 15156-3: 2015.

SR. NO.	HEAT NO.	DIMENSIONS	NO.OF PCS	TOTAL METER
20	RSL-E741	10.00 MM OD X 1.00 MM THK (AW) X 6000 MM LONG	248	1488.000

CHEMICAL TEST %

SR. NO.	HEAT NO.	S	C	Si	Mn	P	S	Ni	Cr	MO	N	Ti
			0.030	1.000	2.000	0.040	0.015	10.000	16.500	2.000	0.100	--
			MAX	MAX	MAX	MAX	MAX	13.000	18.000	2.500	MAX	--
20	RSL-E741	H	0.024	0.400	1.590	0.039	0.007	10.050	16.760	2.050	0.066	--
		P	0.026	0.400	1.589	0.038	0.006	10.049	16.772	2.050	0.064	--

MECHANICAL TESTS

SR. NO.	TENSILE STRENGTH Rm MPa	YIELD STRENGTH Rp 0.2% MPa	YIELD STRENGTH Rp 1.0% MPa	ELON. A%, G.L=5.65√A, G.W= FULL SPECIMEN	ELON. A%, G.L= 50MM, G.W= FULL SPECIMEN	HARDNESS TEST MAX	FLARING TEST	FLANGE TEST	RING/DRIFT EXPANSION TEST	FLATTENING TEST	RING TENSILE TEST	OTHER TEST
REQ.	515 - 690	205 MIN	240 MIN	40%(MIN)	35%(MIN)	90 HRB	--	--	--	--	--	--
20	609.58	293.42	319.18	58	59	75-78	OK	N.A	N.A	OK	N.A	N.A
	602.13	288.45	312.53	59	60							

REMARKS:-

MARKING ON PRODUCT :- MAXIM S.S. SEAMLESS CFA TUBE, SIZE, SPECN ,GRADE, HEAT NO, (O.A.No/Sr. No.) "HNP"

HEAT TREATMENT :- BRIGHT ANNEALED AT TEMP. ABOVE 1040°C AND FOLLOWED BY INDIRECT WATER QUENCHING.

HYDRO TEST PRESSURE :- 70bar(g)/1000Psi(g), (WATER USED HAVING CHLORIDE CONTENT LESS THAN 10 ppm & HOLDING TIME 10 SEC. MIN)

EDDY CURRENT TEST :- N.A

[1] I.G.C TEST ACCORDING TO **ASTM A 262 PRACTICE "E" & EN ISO 3651-2, METHOD-A** CARRIED OUT BY **MTCPL & REPORT REVIEWED BY DNV** - FOUND SATISFACTORY.

[2] MECHANICAL TEST CARRIED OUT BY **MTCPL & WITNESSED BY DNV** - FOUND SATISFACTORY.

[3] PRODUCT ANALYSIS CARRIED OUT BY **MTCPL & REPORT REVIEWED BY DNV** - FOUND SATISFACTORY.

[4] 100% HYDRO TEST CARRIED OUT BY **MTCPL & REPORT REVIEWED BY DNV** - FOUND SATISFACTORY.

[5] 100% PMI TEST CARRIED OUT BY **MTCPL & 10% WITNESSED BY DNV** - FOUND SATISFACTORY.

[6] 100% DIMENSION ACCORDING TO **EN ISO 1127 D4/T3** AND VISUAL CHECKED BY **MTCPL & 10%WITNESSED BY DNV** - FOUND SATISFACTORY.

[7] 10% WITNESSED TUBES ARE DOUBLE(ELECTRO-ETCHING METHOD)STAMPED AS " " AND OTHERS TUBES ARE SINGLE STAMPED FOR IDENTIFICATION.

[8] MATERIAL IS FREE FROM MERCURY AND RADIOACTIVE CONTAMINATION.

[9] THE MELT & MANUFACTURE OF THE BARS USED FOR THE PRODUCTION OF THIS SIZE IS **INDIAN ORIGIN. "HS CODE: 72221119"**

[10] THIS MATERIAL IS PRODUCED BY **MAXIM TUBES COMPANY PRIVATE LIMITED** AND IS OF **INDIAN ORIGIN. "HS CODE: 73044100"**

[11] THIS MATERIAL DOES NOT CONTAIN ANY STEEL PRODUCTS ORIGINATING FROM RUSSIA IN ACCORDANCE WITH ANNEX XVII TO THE **(EU) REGULATIONS NO. 833/2014** AND FURTHER AMENDMENT.

[12] APPROVED ACC. TO **AD2000-MERKBLATT W0** AND CERTIFIED ACCORDING TO **PED 2014/68/EU ANNEX-I SEC 4.3** BY CERTIFICATION BODY- FOR PRESSURE EQUIPMENT OF TUV NORD SYSTEMS (REG. NO. 0045), MTCPL CERTIFICATE NO. 07/203/1409/WP/1680/21 & 07/202/1409/WZ/1680/21.

NOTE:- S= SPECIFICATION, P= PRODUCT ANALYSIS, H= HEAT ANALYSIS, G.L.= GAUGE LENGTH, G.W= GAUGE WIDTH.

INSPECTOR'S/SURVEYOR'S SIGN	P.O. ITEM:- COMPLETE	MANAGER (Q.A.)	WORKS INSPECTOR (Q.A.)
Witnessed [ ] PI [ ] And found to comply with: Date:		MAXIM TUBES COMPANY PVT. LTD. Q.A. Manager CHHATRAL	

WE HEREBY CERTIFY THAT THE MATERIAL IS AS PER SIZE & SPECIFICATION MENTIONED IN ORDER ALL TEST RESULTS ARE ACCEPTABLE.

REGISTERED OFFICE & WORKS: SURVEY NO. 185/186 NR. 66 KV SUBSTATION, CHHATRAL, RANGAR ROAD, AHMEDABAD - MEHSANA HIGHWAY, CHHATRAL - 382729, TA. KALOL, DISTRICT GANDHINAGAR, GUJARAT, INDIA.
EXPORT PHONE: +91 99091 98877, FAX: +91 2764 234477, EXPORT@MAXIMTUBES.COM I WWW.MAXIMTUBES.COM

N° STAPPERT 61448

CTA Group	Kg 133	Mt 600	Pz No.: 100
This document is reproduced by a computerized system and is conform to the original	Heat No.: CH-14437	Cta's job: OC0003833	Date: 14/02/2022
Customer : STAPPERT FRANCE	P.O. No.: PO: 77067 DTD: 20211222		Item: 20

DIVINE TUBES PRIVATE LIMITED

CIN NO. U27109GJ2004PTC043781

Manufacturer & Exporter of Stainless Steel Seamless | Welded Tube & Pipes

ISO 9001:2015, ISO 14001:2015, BS OHSAS 18001:2007, PED 2014/68/EU and AD 2000 MERKBLATT W0 CERTIFIED COMPANY

INSPECTION CERTIFICATE AS PER EN 10204:2004-3.1

F/DTPL/QAS/001

CUSTOMER :	Certificate No.	DTPL/SMLS/2021-22/179
	Date	24.09.2021
	PRODUCT	AUSTENITIC S.S. SEAMLESS TUBE
	STANDARD	ASTM A 213/ ASTM A 269 , EN 10216-5
	PO & DATE	3408 DATED 26.07.2021

SR. NO.	WORK ORDER NO.	TYPE OF GRADE	PRODUCT SPECIFI-CATIONS	DIMENSION	FINISH	QUANTITY Nos / Mtrs
1	SMLS/179	TP 316/316L , 14401 , 1.4404	A213/269 , EN 10216-5	10 MM OD X 1 MM THK X 6000 MM LENGTH	ANNEALED & POLISHED	465 / 2790

SR. NO.	HEAT NO.	ABBREV.	CHEMICAL COMPOSITION %							
			C	MN	P	S	SI	NI	CR.	Mo.
		S	0.035 MAX	2.00 MAX	0.045 MAX	0.030 MAX	1.00 MAX	10.00-14.00	16.00-18.00	2.00-3.00
1	CH-14437	H	0.024	1.750	0.039	0.003	0.480	10.090	16.700	2.070
		P	0.026	1.745	0.033	0.004	0.448	10.047	16.658	2.043

SR. NO.	MECHANICAL TEST						HYDROSTATIC TEST
	TENSILE STRENGTH [MPA]	YIELD STENGTH [MPA]	ELONGATION [%] G.L=50 MM	FLATTENING TEST	FLARING TEST	HARDNESS TEST [HRB]	TEST PRESSURE
	515 MIN	205 MIN	35% MIN			90 MAX	[PSI]
1	627.98	303.64	58.12	OK	OK	71/78	1000 PSI

HEAT TREATMENT : SOLUTION ANNEALED AT TEMP. ABOVE 1040° C AND QUENCHED IN WATER.

100% DIMENSIONAL AND VISUAL INSPECTION DONE AS PER A 213/A 269 , EN 10216-5 AND FOUND SATISFACTORY.

100% HYDRO TEST CARRIED OUT AFTER HEAT TREATMENT AS PER A 213/A 269 , EN 10216-5 DONE AND FOUND SATISFACTORY.

CHEMICAL ANALYSIS TEST AS PER A 213/A 269 , EN 10216-5 DONE AND FOUND SATISFACTORY.

MECHANICAL TEST AS PER A 213/A 269 , EN 10216-5 DONE AND FOUND SATISFACTORY.

INTERGRANULAR CORROSION TEST DONE AS PER ASTM A 262 PRACTICE "E" AND FOUND SATISFACTORY.

MARKING ON PRODUCT : SIZE SEAMLESS TUBES (CFD) , ASTM A 269/A 213 TP 316/316L HEAT NO. (PMI TESTED)

THESE CONFIRM TO S.S. SEAMLESS TUBE TP 316/316L,1.4401,1.4404 GRADE AS PER ASTM A 213/A 269 , EN 10216-5 SPECIFICATION IN RESPECT OF TESTS CARRIED OUT.

 # NOTE : S=SPECIFICATION, H=HEAT ANALYSIS, P=PRODUCT ANALYSIS, G.L=GAUGE LENGTH

REMARKS :- WE HEREBY CERTIFY THAT THE MATERIAL IS AS PER P.O. REQUIREMENT.

For, DIVINE TUBES PVT.LTD.

DIVINE TUBES PVT. LTD. QA/QC CHHATRAL

Q. C.ENGINEER

Office / Works :
414, Phase - 1, G.I.D.C., Chhatral - 382729.
Dist. Gandhinagar, Gujarat (INDIA)

www.divinetubes.com

+91 - 2764 - 232 402
+91 - 2764 - 233 205
divine@divinetubes.com

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#54B
Description
PLAT PERCE 7MM
PCM Reference
N-108928257T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

SANDVIK

CERTIFICATE No. A/21-972413 Rev 00

Date 2021-09-17

INSPECTION CERTIFICATE acc to
EN 10204 3.1

INSPECTION STAMP
SVQ

PCM MANUFACTURING FRANCE
RUE DE L'ANCIENNE GARE
49123 CHAMPTOCE SUR LOIRE
FRANCE

Customer References

PO070-21-10581	Customer order 2021-09-17
200-00991 PCM	

Sandvik References

Order No.	Subs No.	SMT Dispatch note
575771	702317	25540/53

SMT No.	C.Code
284-44147	25

Material description
HOT WORKED BAR STEEL
ROLLED
ANNEALED & STRAIGHTENED
PEEL TURNED AND POLISHED

Metallurgical process Origin
E+AOD+LRF Sweden

Steel/material Designations

Sandvik	UNS
SAF 2507	S32750

EN no
1.4410

Technical requirements
EN 10088-3:-2014, EN10272:-2016*, EN10060:2003, EN 10221:1996
EN10222-5:-2017*, PED 2014/68/EU,
NACE MR0175/ISO 15156-3:-2015, NACE MR0103/ISO 17945-1:-2015
ASTM A-276-17,
ASTM A-479-19, ASME SA-479-ED-19 SECT II PART A,
ASTM A-484-20A, ASTM A-182-20*, ASTM A-1049-18*, ASTM A-314-19*,
NORSOK M-630 ED-6, NORSOK MDS D57 REV. 5*
*For detailed information, please see the appendix

EXTENT OF DELIVERY

It	Product designation	Heat	Lot	Pieces	Kg
01	MBR-SAF2507-60	562325	58501	2	230.0
			Total	2	230.0

Heat		Recycled material(%)
562325	Continuous casting	69.7

TEST RESULTS
Reduction ratio (times)

Lot	
58501	29.1

Chemical composition (weight%)

Heat	PRE
562325	42.0

Quality assurance - Erik Jansson/QA-manager Primary Products
MTC Service / Certificates

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
562325	0.018	0.29	0.81	0.019	<0.0005	24.91	6.92	3.79
	Cu	N						
562325	0.11	0.287						

Tensile test at room temperature acc. to ASTM A370/ISO 6892-1
Longitudinal
Location half radius

	Yield strength		Tensile strength	Elongation	
	Mpa	MPa	Mpa	%	%
Lot	Rp0.2	Rp1.0	Rm	A	2"
58501	618	674	818	43	43

Red.of Area
%
Z
77

Hardness test acc.to ASTM A-370/ISO 6506-1
Location half radius

Lot	HRC		
58501	25	25	24

Impact test, J, Longitudinal acc. to ASTM A-370/ISO 148-1
Location half radius

	Single values			Avg.	Temperature
Lot	Joule			Joule	°C
58501	344	353	322	340	-50
	335	345	340	340	20

Lateral expansion

				Temperature
Lot	mm			°C
58501	2.30	2.30	2.20	-50

Corrosion test according to ASTM G-48A, 50°C for 24 hours.
In delivery condition. No pitting corrosion found at 20x enlargement.
Test location acc to NORSOK MDS D57

	Specimen weight loss
Lot	g/m2
58501	0.22

Ferrite acc to ASTM E-562
Location half radius

Lot	%
58501	44.0
	44.3
	45.2

Following controls/tests have been satisfactorily performed:
- Positive Material Identification (PMI)
- Ultrasonic testing (*)
- Visual inspection and dimensional control.

HEAT TREATMENT:
Up to 74.9 mm: Batch furnace. Material soaking 1100°C,
min. 30 minutes. Quenched in water. Water temp. pre-quench max 38°C,
after quench max 49°C.
Transfer time furnace to quenching <150 seconds.

75 - 180mm: Continuous heat treatment furnace. Material
soaking 1090°C, min. 30 minutes. Sandvik is using a continuous water
spray quenching process. Water temp pre-quench max 38°C,
after quench max 49°C. Transfer time furnace to quenching
<60 seconds.

>180 - 250mm: Batch furnace. Material soaking 1100°C,
min. 60 minutes. Quenched in water. Water temp pre-quench max 38°C,
after quench max 49°C.
Transfer time furnace to quenching <150 seconds.

The raw material is free from radioactive contamination.

Microscopic Examination X 500 acc. to ASTM A 923 Method A/NORSOK M630
Free from grain boundary carbides and intermetallic phases.

Material free from mercury contamination.

No welding or weld repair.

NORSOK M-650 ED-4 QTR NO: 25 Cr Duplex SS

Certified acc. Pressure Equipment Directive (2014/68/EU Annex 1 para
4.3) TUEV CERT-Certification body for pressure equipment of the
TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the specifications and
requirements of the order.

The material is manufactured according to a Quality system,
approved and registered to ISO 9001:2015.

No unauthorized alterations. The contents of this Inspection
Certificate may not be modified or revised in any way without the
prior written approval of Sandvik Materials Technology.
Unauthorized alterations to the Inspection Certificate, including
introduction of false, fictitious or fraudulent statements or entries,
may be punishable by fines, imprisonment, or both. This Inspection
Certificate may be copied only in the manner and for the purposes
specified in Section 6 of EN 10204:2004. Contravention of this notice
will be prosecuted to the fullest extent of applicable law.

The certificate is produced with EDP and valid without signature.

APPENDIX

Lab accreditation
Our lab is accredited under SWEDAC Accreditation number 1636 for testing as per ISO/IEC 17025.

Applicable only to specific dimensions

20mm - 160mm: EN 10088-5 EN (Only valid for CE marked products together with Sandvik Declaration of Performance certificate).
20mm - 160mm: PED 2014/68/EU EN 10272 (Stainless steel bars for pressure purposes)
20mm - 250mm: EN 10222-5 (Chemical composition only)
20mm - 250mm: NORSOK M-630 Ed. 6 - NORSOK MDS D57 Rev.5. (for length max 7500 mm)

Suitable for manufacturing of components in acc, with *ASTM A-182 (F53), ASTM A-1049 & ASTM A-314.

Test location
Bar dim <50mm - Longitudinal test pieces in center of the bar.
Bar dim >50mm - 250 mm - Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface.
Bar dim >100mm- 250 mm - Transversal test pieces, 1/4 T and minimum 100 mm from any second surface.

One set of test samples per heat treatment lot.
Maximum lot size 15 ton.

Micro: To ensure a sound, and unaffected structure all through the material three samples are taken, one close to surface, half radius, and in the center of the bar.

Furnace calibration every third month according to API 6A
Thermocouples of S-type (+/- 5°C tolerance) are used to monitor the furnace temperature.

Ultrasonic test
Dim 29 - 74 mm: EN 10308 quality class 3
Dim 75 mm - : EN 10228-4, Tab 3 Scan coverage 1a 100%, Tab 5 Quality Class 3, ASTM A-388, API 6A PSL3/3G.

SANDVIK

Bon de livraison No: 2554053

Page: 1(1)
Date: 2021-09-17

Votre référence:	PO070-21-10581	**Shipment no:**	28035/03	**Émetteur:**	PGM
Notre référence:	284044147	**Bon de commande:**	702317	**Tél:**	
		Commande de vente	575771		

Adresse de facturation **No de client** 20000991
PCM MANUFACTURING FRANCE
RUE DE L'ANCIENNE GARE
49123 CHAMPTOCE SUR LOIRE
France
France
Portugal

Client **No de client** 00600450
SANDVIK MATERIALS TECHN. EMEA AB
C/O SANDVIK AB
2115-KCS CONEXUS
811 81 SANDVIKEN
Sweden
Sweden

Mode de transport
ROAD

Date de commande
2021-09-17

Marks and numbers
PCM MANUFACTURING FRANCE

RUE DE L'ANCIENNE GARE
49123 CHAMPTOCE SUR LOIRE

Mode de transport:
DAP CHAMPTOCE SUR L

Condition de livraison
CHAMPTOCE SUR LOIRE

2130ELISA DUCAMP

No de ligne	Produit et descriptif	Unité quantité commandée	Quantité	P/C
	BAR STEEL STAINLESS			
1	**MBR-SAF2507-60**	-	**230,00 kg**	**C**

Quantité	Pieces	Poids net	Code coulée	Code lot	No de colis
230,00 kg	2	230,00 kg	562325	58501	1306878

Résumé du paquet

No de colis	Dimension	Poids brut	Colisage
1306878	530x13x7 cm	230,00 kg	Unp. Bundle
Total:	1	230,00 kg	

Poids brut total: 230,00 kg

43222 - 257T

Signature: _____ Name: _____ Date: _____

Sandvik Materials Technology EMEA AB
Box 12
SE-164 93 KISTA, SWEDEN

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#82
Description
STUD M16 BM40-1023
PCM Reference
C06177W257T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Test Certificate to BS EN 10204 3.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 54594 **Certificate No: 54594.001**

Test Certificate to BS EN 10204 3.1 **Certificate Date: 20-Aug-2024**

Customer Order: **PO070-24-08387** **Item : 2 - 61796**

UNS S32760 SA, NACE MR0103-0175 TO DRAWING

Qty: 8 **DOUBLE ENDED STUD, M16 X 1023MM BM40, SELF COLOUR, PartNo:06177W257T, DrawingNo:C06177X, Revision/Issue:REV NG**

Mechanical:
UTS: 845 MPA **Elongation:** 39 % **Proof Load Satisfactory** ☐
Yield: 671 MPA **R of A:** 80 %
Hardness: 25 to 28HRC **Cast No:** 567778
Charpy Impact Test:
Temperature: -50 deg C **1:** 273 Joules **2:** 253 Joules **3:** 291 Joules

Heat Analysis:

Ni:	6.81	**P:**	0.021	**S:**	0.0005	**Si:**	0.27
N:	0.253	**W:**	0.54	**PRE:**	42.1	**C:**	0.012
Cr:	25.65	**Cu:**	0.53	**Mn:**	0.6	**Mo:**	3.76
PREN:	43						

Remarks:
SOLUTION ANNEALED @1100°C FOR 30 MINUTES, WATER COOLED.
DELTA FERRITE ASTM E562: RAND-NEAR SURFACE: 54.2%, D/7-MID RADIUS: 51.2%, D/2- MID THICKNESS: 54%
CORROSION TEST ASTM G48 METHOD A: @50°C FOR 24 HRS: NO PITTING OBSERVED: WEIGHT LOSS 0.00 g/m².
MICROSTRUCTURE: THE MATERIAL IS FREE FROM GRAIN BOUNDARY CARBIDES/NITRIDES AND INTERMETALLIC PHASES.
NO WELD REPAIRS CARRIED OUT.
REDUCTION RATIO 254:1
NORSOK MDS D57 REV 6
NORSOK M630: 2020
NACE MR0175/ISO 15156-3: 2015
NACE MR0103/ISO 17945-1: 2015
NACE MR0103-0175
BNML 32760

I/We hereby declare that our Iron & Steel products as defined in annex XVII of Regulation 833/2014 and amended by Regulation 2022/2474 do not contain content of Russian or Belarusian origin

Signed:

Charlotte Daly
Certification Engineer
charlotte@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

///BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Certificate of Conformity to EN 10204 2.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 54594
Customer Order: **PO070-24-08387**

Certificate No: 54594.001
Certificate Date: 20-Aug-2024

Item: 1	**UNS S32750 TO DRAWING**
Qty: 162	**HEX SOCKET SET SCREW, M12 X 16MM, SELF COLOUR, PartNo:C06125C257T, DrawingNo:C06125X**
	BAG & TAG BNML 32750
Item: 2	**UNS S32760 SA, NACE MR0103-0175 TO DRAWING**
Qty: 8	**DOUBLE ENDED STUD, M16 X 1023MM BM40, SELF COLOUR, PartNo:06177W257T, DrawingNo:C06177X, Revision/Issue:REV NG**
	NACE MR0103-0175 BNML 32760

The above item(s) conform chemically, mechanically and dimensionally to the requirements of your purchase order.

I/We hereby declare that our Iron & Steel products as defined in annex XVII of Regulation 833/2014 and amended by Regulation 2022/2474 do not contain content of Russian or Belarusian origin

Signed:

Charlotte Daly
Certification Engineer
charlotte@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#103
Description
WASHER M16 200HV
PCM Reference
C06001I257T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

CATHELAIN AU SERVICE DE L'ASSEMBLAGE	NF-EN 10204 / 3.1 **Certificat/Certificate/Zeugnis N° : 102390-001**	FO.001.A-MO-LA.019 Du : 25/04/2017 Page 1/1

Client/Customer/Kunde : 0016042 PCM MANUFACTURING France SAS
Commande/Order/Bestellung N° : PO070-21-05683

Poste/Item/Pos. : 001 Quantité/Quantity/Stückzahl : 192

Produit/Product/Produkt : Rondelle M16 Duplex UNS32760 / A182F55 NACE MR0175

N° Item : C06001I257T N° Plan/Drawing/Plan : C06001X

Marquage/Marking/Kennzeichnung : 1.4501-C

Attestation de conformité produit / Product conformity :

Nous déclarons que, sauf exception ou dérogation énumérées ci-après, la fourniture citée a été fabriquée conformément aux spécifications techniques, et que toutes opérations de contrôle et essais ont été effectués, et répond SOUS TOUS SES ASPECTS, aux spécifications particulières jointes, aux plans, ainsi qu'aux normes et réglements en vigueurs.

We certify that, subject to exceptions or concessions listed hereafter, the supplies detailed here were manufactured in accordance with the technical spécifications of the contract, and that all inspections and test having been completed, the supply IN EVERY RESPECT with the relevant particular standards and regulations in force,

Ce document est complété par le(s) certificats(s)/ This document is completed by certificate(s) /

RCR 94384

Certifié 2014/68/EU F/Q-0320146 - QM acc EN764-5 § 4.2 -AD2000 W0

Laboratoire CATHELAIN : E.CHARLET

Edition du:15/06/2021

Page

ϕ40

6 pages

BGH Edelstahl Freital GmbH Am Stahlwerk 1 01705 Freital

BGH

BGH Edelstahl Freital GmbH

Zeugnis-Nr. 485843
Certificate no.
No. de certificat

Bescheinigung über Werkstoffprüfung nach DIN EN 10204
Certificate of material tests according to DIN EN 10204 3.1
Certificat des essais des matériaux selon DIN EN 10204

Die Lieferung entspricht den vereinbarten Lieferbedingungen.
Delivery in accordance with the agreed terms of delivery.
La livraison correspond aux conditions de livraison convenues.

Zeichen des Lieferwerkes
Trade mark
Signe du fournisseur

Stempel des Werkssachverständigen
Inspector's stamp
Poinçon de l'inspecteur

BGH Q441

Kunden-Bestell-Nr. 45885/W
Customer order no.
Cde. no. du client

BGH-Auftrags-Nr. 31315201/247535
BGH works no.
BGH référence

Erzeugnisform Product	Stab, rund, geschält round bars, peeled /
Werkstoff / Quality	1.4501 X2CrNiMoCuWN25-7-4 /
Anforderungen Requirements	TL 119 / BR 4501 4/Rev. 3 10.2010 1.4501 X 2 CrNiMoCuWN 25-7-4 DIN EN 10272 10/16 1.4501 X2CrNiMoCuWN25-7-4 DIN EN 10088 -3 12/14 / UNS S32760 ASTM A 276 /A276M -17 UNS S32760 ASME BPVC II. A SA- 276 2017 UNS S32760 ASTM A 479 /A479M -18 UNS S32760 ASME BPVC II. A SA- 479 /SA-479M 2017 UNS S32760 ANSI/NACE MR 0175/ISO15156-3 2015 UNS S32760 ANSI/NACE MR 0103 /ISO17945: 2015 UNS S32760 NORSOK M 630 Edition 6 10/13 UNS S32760 NORSOK MDS - D 57 Rev. 5 10/13 F55 (UNS S32760) ASTM A182/A182M - aktuelle Ausgabe (nur Chemische Zusammensetzung und mechanische Eigenschaften) F55 (UNS S32760) ASME BPVC.II.A SA 182 /182M - aktuelle Ausgabe (nur Chemische Zusammensetzung und mechanische Eigenschaften) Gefertigt nach QTR BGH_F_E_32760 nach Norsok M-650 Edition 4 Abnahmeprüfzeugnis ausgestellt im Einvernehmen mit der TÜV SÜD Industrie Service GmbH (30.11.2009), QS entsprechend DGRL, Anhang I, Absatz 4.3 von Notified Body 0036 überprüft. Zertifikat Nr. DGR-0036-QS-W 010/2018/AN1-DRE. F55 (UNS S32760) ASTM A182/A182M - Lat. Rev. (Chemical Composition and mechanical properties only) F55 (UNS S32760) ASME BPVC.II.A SA 182 /182M - Lat. Rev. (Chemical Composition and mechanical properties only) Manufactured acc. to QTR BGH_F_E_32760 acc. to Norsok M-650 Edition 4 Inspection Certificate issued in accordance with TÜV SÜD Industrie Service GmbH (11/30/2009), QA according to PED, Annex I, Point 4.3 verified by Notified Body 0036. Certificate no. DGR-0036-QS-W 010/2018/AN1-DRE.

Besichtigung und Maßnachprüfung Inspection and dimensional control Inspection et contrôle de dimension	Erschmelzung/Nachbehandlung Melting process/secondary refining Mode d'élaboration/traitement ultérieur	Verwechslungsprüfung (spectroanalytisch) Identification test (spectral-analysis) examination d' identification(analyse spectrale)
ohne Beanstandung without objection /	E- VOD /	ohne Beanstandung without objection /

Pos. Item Poste	Anzahl Quantity Quantité	Abmessung Dimension Dimensions	Gewicht Weight Poids	Schmelz-Nr. Heat-No. No. de coulée
1	60	40,00 RD (+0,25/-0,00) DIN EN ISO 286-2/k12 /	3400 kg	401134

Schmelze Heat %	C /	Si /	Mn /	P /	S /	Cr /	Mo /	Ni /	Cu /	N /	W /	PRE
401134 /	0,020	0,25	0,54	0,024	0,0006	25,65	3,48	7,75	0,58	0,2600	0,530	41,294

Wärmebehandlungszustand Condition of heat treat	lösungsgeglüht solution annealed /

Anlagen Encl. Annexe	Freital,den Place and date Lieu et date	Abnahmebeauftragter Inspector representative Inspecteur de réception
US-Protokoll/ UT report Glühbesch./ Heat treatment cert. Gefügeaufnahme/ micrograph	03.03.2020	Kadner

Das Zeugnis wurde maschinell erstellt und ist auch ohne Unterschrift gültig.

This certificate was generated by data system and it is valid without signature as well.
Ce certificat a été établi sur système informatique et est valable sans signature aussi.

Page

BGH

BGH Edelstahl Freital GmbH

BGH Edelstahl Freital GmbH Am Stahlwerk 1 01705 Freital

Zeugnis-Nr. 485843
Certificate no.
No. de certificat

Bescheinigung über Werkstoffprüfung nach DIN EN 10204
Certificate of material tests according to DIN EN 10204 3.1
Certificat des essais des matériaux selon DIN EN 10204

Die Lieferung entspricht den vereinbarten Lieferbedingungen.
Delivery in accordance with the agreed terms of delivery.
La livraison correspond aux conditions de livraison convenues.

Zeichen des Lieferwerkes
Trade mark
Signe du fournisseur

Stempel des Werkssachverständigen
Inspector's stamp
Poincon de l'inspecteur

BGH Q441

Kunden-Bestell-Nr. 45885/W
Customer order no.
Cde. no. du client

BGH-Auftrags-Nr. 31315201/247535
BGH works no.
BGH référence

Probe-Nr. / Test-No.	Lage / loc.	Temp. °C	Rp0,2 N/mm²		Rm N/mm²	A5/A4 %	Z %	Kerbschlagarbeit Impact value J	Probenform Shape of test piece Charpy-V °C	Härte Hardness HRC/ HBW
Soll/Req.	L	RT	>=530		>=730	>=25		>=100	RT	
	L	RT			<=930				-50	<=32 <=290
	L	RT	>=550		>=750	>=25	>=45	>=45	-46	
	L	RT			<=895					
076BV1 +	L /							337 / 364 / 350 /	RT /	24 256 /
076BV1 +	L							342 346 377	-50	
076BV1 *	L							383 342 379	-46	
076BV2 +	L /							328 / 358 / 350 /	RT /	
076BV2 +	L							338 343 370	-50	
076BV3 +	L /	RT /	646 /		855 /	35/--	81			
076BV3 *	L /	RT /	645 /		854 /	--/39	80			
076BV4 +	L /	RT /	658 /		852 /	35/--	80			

\+ Erprobung nach/testing acc. to DIN EN ISO 6892-1 / DIN EN ISO 148-1
Prüfort/test location: 12,5 mm /
* Erprobung nach/testing acc. to ASTM/ASME A 370
Prüfort/test location: D/2 - radius

Umformgrad/reduction ratio: 7,9:1

Korros.-Test ASTM G48 Meth.A: 50°C/24h: kein Lochfraß/no pitting is observed /
corrosion test Meth.A: Gewichtsverlust/weight loss: 0,173 g/m²
Proben gebeizt/Samples pickles (20% HNO3 + 5% HF, 60 °C, 5 Minuten/minutes)
Beurteilung bei 20-facher Vergrößerung.
Samples were assessed for pitting at 20x magnification.

Deltaferrit/ferrite delta ASTM E 562 ; Ätzmittel/Etchant: V2A + 30 % NaOH
D/2 - radius: 51% ; relative Genauigkeit/relative accuracy: 8%
Prüfung/testing: 30 Felder/16 Punkt (30 fields of 16 points)

IK-Beständigkeit/ intercrystalline corrosion DIN EN ISO 3651-2, Prüfv./Meth. C:
ohne Beanstandung- without objection/
Sensibilisierungbehandlung/Sensibilisation treatment: 700°C 30min Wasser/water /

Material wurde nicht reparaturgeschweißt.
Material frei von Sigma- und anderen schädlichen Phasen.
Gefüge frei von Korngrenzenkarbiden, -nitriden
und anderen intermetallischen/schädlichen Phasen

Anlagen / End. / Annexe: US-Protokoll/ UT report; Glühbesch./ Heat treatment cert.; Gefügeaufnahme/ micrograph

Freital,den
Place and date
Lieu et date
03.03.2020

Abnahmebeauftragter
Inspector representative
Inspecteur de réception
Kadner

Das Zeugnis wurde maschinell erstellt und ist auch ohne Unterschrift gültig.

This certificate was generated by data system and it is valid without signature as well.
Ce certificat a été établi sur système informatique et est valable sans signature aussi.

Page

BGH

BGH Edelstahl Freital GmbH

BGH Edelstahl Freital GmbH Am Stahlwerk 1 01705 Freital

Zeugnis-Nr. 485843
Certificate no.
No. de certificat

Bescheinigung über Werkstoffprüfung nach DIN EN 10204
Certificate of material tests according to DIN EN 10204 3.1
Certificat des essais des matériaux selon DIN EN 10204

Die Lieferung entspricht den vereinbarten Lieferbedingungen.
Delivery in accordance with the agreed terms of delivery.
La livraison correspond aux conditions de livraison convenues.

Zeichen des Lieferwerkes
Trade mark
Signe du fournisseur

Stempel des Werkssachverständigen
Inspector's stamp
Poincon de l'inspecteur

BGH Q441

Kunden-Bestell-Nr. 45885/W
Customer order no.
Cde. no. du client

BGH-Auftrags-Nr. 31315201/247535
BGH works no.
BGH référence

Das Material ist frei von Quecksilber.
Stahlhersteller des Ausgangsmaterials: BGH Edelstahl Freital GmbH (Deutschland)

Material no weld repaired./
Material free from sigma and other harmful phases./
Microstructure free from grain boundary carbides nitrides /
or any intermetallic or other detrimental phases/
Material is free from mercury/
Steel manufacturer of starting material: BGH Edelstahl Freital GmbH.(Germany)

Fertigung nach QM-System ISO 9001: 2015/ QM system in effect is ISO 9001: 2015
Zertifiziert nach / certificated AD2000 W0.
Kontrolle auf Radioaktivität ohne Befund, der Messwert liegt unter der Nachweisgrenze von 0,1 Bq/g.
Radioactivity inspection without objection, the measured value is below the detection limit of 0.1 Bq/g.

Anlagen / Encl. / Annexe: US-Protokoll/ UT report Glühbesch./ Heat treatment cert. Gefügeaufnahme/ micrograph	Freital,den Place and date Lieu et date 03.03.2020	Abnahmebeauftragter Inspector representative Inspecteur de réception Kadner

Das Zeugnis wurde maschinell erstellt und ist auch ohne Unterschrift gültig.

This certificate was generated by data system and it is valid without signature as well.
Ce certificat a été établi sur système informatique et est valable sans signature aussi.

Gefügeaufnahmen zum Zertifikat Nr. / Microstructure to certificate No.: 485843

Besteller/Purchaser:

Bestell-nr./Order-No.: 45885/W

Werkstoff/Quality: 1.4501 X2CrNiMoCuWN25-7-4

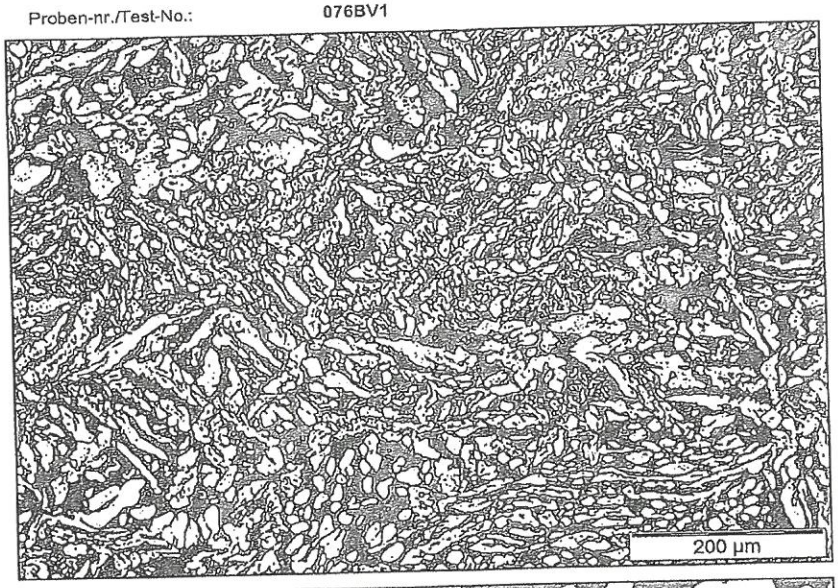
Chargen-nr./Cast-No.: 401134 /

Erzeugnisform/Product: Stab, rund, geschält / round bars, peeled

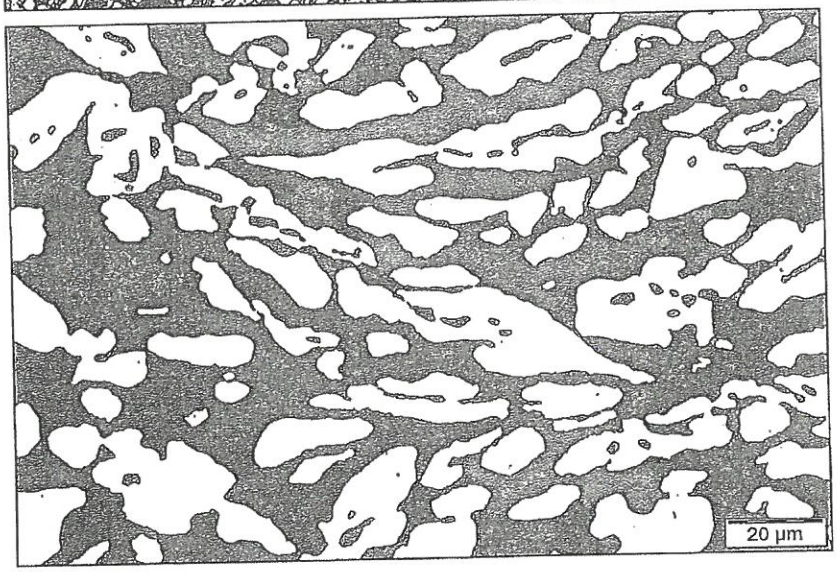
Abmessung/Dimension: 40,00 RD (+0,25/-0,00) DIN EN ISO 286-2/k12 /

Komm.-nr./Work-No.: 31315201

Proben-nr./Test-No.: 076BV1



100:1



500:1

Wärmebehandlungsbescheinigung
Heat treatment certificate
Attestation de traitement thermique

BGH

BGH Edelstahl Freital GmbH

Kunden-Bestell-Nr. / Customer order no. / Cde. no. du client: 45885/W

BGH-Auftrags-Nr. / BGH works no. / BGH référence: 31315201 /

Zeugnis-Nr. / Certificate no. / No. de certificat: 485843

Wärmebehandlungszustand: **lösungsgeglüht**
Condition of heat treatment: **solution annealed**
État de traitement thermique: **recuit de mise en solution**

Heat treated at induction line

Datum:
Date:
Date: 13.02.2020

Ofen-Nr.:
Furnace no.:
No. du four: 601

Aufheizzeit:
Heating up time:
Temps de montée en température:

Haltetemperatur:
Holding temperature: 1118 °C /
Température de maintien:

Haltezeit:
Holding time: 262 s
Temps de maintien

Abkühlmedium:
Quenching medium: Wasser / water / eau /
Moyen de refroidissement:

Datum:
Date:
Date:

Ofen-Nr.:
Furnace no.:
No. du four:

Haltezeit:
Holding time:
Temps de maintien:

Abkühlmedium:
Quenching medium:
Moyen de refroidissement:

Wärmebehandlungs-Nr.: 601/8 (076BV)
Heat treatment lot no.:
No. du lot de traitement thermique:

Diagramm: Diagram: Diagramme:	Datum: Date: 03.03.2020 Date:	Abnahmebeauftragter Inspector representative Inspecteur de réception KADNER BGH Q473

Das Zeugnis wurde maschinell erstellt und ist auch ohne Unterschrift gültig.

This certificate was generated by data system and it is valid without signature as well.
Ce certificat a été établi sur système informatique et est valable sans signature aussi.

Page

Ultraschallprüfung
Ultrasonic testing

DIN EN 10204-01/05 3.1

BGH

BGH Edelstahl Freital GmbH

Kunden-Bestell-Nr. 45885/W
Customer order no.
Cde. no. du client

BGH-Auftrags-Nr. 313152-01
BGH works no.
BGH référence

Zeugnis-Nr. 485843
Certificate no.
No. de certificat

Erzeugnisform : Stab, rund, geschält
Product : round bars, peeled

Werkstoff/Quality : 1.4501 X2CrNiMoCuWN25-7-4 Schmelze: 401134 /

Abmessung/Dimension: 40,00 RD (+0,25/-0,00) DIN EN ISO 286-2/k12 /

Anzahl/Quantity : 60 Gewicht /Weight : 3400 kg

Wärmebehandlungszustand : lösungsgeglüht
Condition of heat treat : solution annealed

Prüfrichtlinie
Specification

DIN EN 10308 03/02
Tab.1-Typ1a(vollst.)Tab.3-Qual.-kl.3 /
A388/A 388 M (latest Revision)

Bearbeitungszustand : geschält
Machining condition peeled

Prüfgerät : GE ROWA B4
Test equipment

Prüfkopf : 4 Arrays á 90° - Radius: 56 mm
20 Elemente - 5 MHz

Probe

Kopplungsmittel : Wasser /
Coupling medium water

Prüfumfang : vollständig
Extent of examination completely /

Einschallrichtung : senkrecht und in Winkeleinschallung 40°
Direction of incidence perpendicular and angle beam 40°

Registriergrenze : Prüfung und Justierung erfolgten gemäß obiger Spezifikation.
Registration level Test and adjustment according to above mentioned specification.

Befund : Keine registrierpflichtigen Anzeigen
Result no reportable indications /

Prüfdatum : 25.02.2020
Examination date

Freital,den Place and date Lieu et date 03.03.20	Prüfer Testing operator Opérateur Richter D. Stufe 2 ISO 9712 /	Abnahmebeauftragter Inspector representative Inspecteur de réception Mögel Stufe 3 ISO9712	BGH Q470	Überwacher Supervisor Surveilleur

Das Zeugnis wurde maschinell erstellt und ist auch ohne Unterschrift gültig. This certificate was generated by data system and it is valid without signature as well. Ce certificat a été établi sur système informatique et est valable sans signature aussi.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#105B
Description
SCREW HC M12-16 TR
PCM Reference
C06125C257T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

/// BOLTANDNUT

SPECIALISED BOLTING SOLUTIONS

Test Certificate to BS EN 10204 3.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 54594 **Certificate No: 54594.001**

Test Certificate to BS EN 10204 3.1 **Certificate Date: 20-Aug-2024**

Customer Order: **PO070-24-08387** **Item : 1 - 61797**

UNS S32750 TO DRAWING

Qty: 162 **HEX SOCKET SET SCREW, M12 X 16MM, SELF COLOUR, PartNo:C06125C257T, DrawingNo:C06125X**

Mechanical: **UTS:** 848 MPA **Elongation:** 46 % **Proof Load Satisfactory** ☐

Yield: 624 MPA **R of A:** 85 %

Hardness: 249 to 254HB **Cast No:** DC1354

Charpy Impact Test:

Temperature: -50 deg C **1:** 361 Joules **2:** 316 Joules **3:** 302 Joules

Heat Analysis:

N:	0.27	**PRE:**	42.21	**C:**	0.016	**Cr:**	25.51
Cu:	0.31	**Mn:**	0.53	**Mo:**	3.75	**Ni:**	6.85
P:	0.025	**S:**	0.0005	**Si:**	0.26	**PREN:**	42.39

Remarks: SOLUTION ANNEALED @1060°C FOR 30 MINUTES, WATER COOLED.
DELTA FERRITE ASTM E562: 51%.
CORROSION TEST ASTM G48 METHOD A: @50°C FOR 24 HRS: NO PITTING OBSERVED: WEIGHT LOSS 0.01 g/m².
THE MATERIAL IS FREE FROM GRAIN BOUNDARY CARBIDES/NITRIDES, CONTINUOUS GRAIN BOUNDARY PARTICLES/PRECIPITATES, AND EXCESSIVE PRECIPITATES AT ANY LOCATION. THE MATERIAL IS FREE FROM INTERMETALLIC PHASES, NITRIDES AND CARBIDES (MAX 1.0%). AND THE MATERIAL IS FREE FROM SIGMA, CHI AND LAVES PHASES AND ANY UNUSUALLY COARSE GRAINS.
NO WELD REPAIRS CARRIED OUT.
REDUCTION RATIO 581:1
NORSOK MDS D57 REV 5
NORSOK M-650 EDITION 4
NORSOK M630 EDITION 6
NACE MR0175/ISO 15156: 2015
NACE MR0103/ISO 17945: 2015
BAG & TAG BNML 32750

Signed: C Daly

Charlotte Daly
Certification Engineer
charlotte@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

///BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Certificate of Conformity to EN 10204 2.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 54594
Customer Order: **PO070-24-08387**

Certificate No: 54594.001
Certificate Date: 20-Aug-2024

Item: 1	**UNS S32750 TO DRAWING**
Qty: 162	**HEX SOCKET SET SCREW, M12 X 16MM, SELF COLOUR, PartNo:C06125C257T, DrawingNo:C06125X**
	BAG & TAG BNML 32750
Item: 2	**UNS S32760 SA, NACE MR0103-0175 TO DRAWING**
Qty: 8	**DOUBLE ENDED STUD, M16 X 1023MM BM40, SELF COLOUR, PartNo:06177W257T, DrawingNo:C06177X, Revision/Issue:REV NG**
	NACE MR0103-0175 BNML 32760

The above item(s) conform chemically, mechanically and dimensionally to the requirements of your purchase order.

I/We hereby declare that our Iron & Steel products as defined in annex XVII of Regulation 833/2014 and amended by Regulation 2022/2474 do not contain content of Russian or Belarusian origin

Signed:

Charlotte Daly
Certification Engineer
charlotte@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#107
Description
HEX NUT H M20
PCM Reference
C06002J257

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Test Certificate to BS EN 10204 3.1

PCM MANUFACTURING FRANCE SAS

Our Order No: **54576** **Certificate No: 54576.001**

Test Certificate to BS EN 10204 3.1 **Certificate Date: 21-Aug-2024**

Customer Order: **PO070-24-083616** **Item : 2 - 53962**

X2CrNiMoCuWN25-7-4 / ASTM A182 F55 UNS32760, PREN >40, NACE MR0175/ISO15156 TO DRAWING

Qty: 188 **HEX NUT, M20, SELF COLOUR, PartNo:C06002J257, DrawingNo:C06002X, Revision/Issue:REV NG**

Mechanical:
UTS: 832 MPA **Elongation:** 43 % **Proof Load Satisfactory** ☐
Yield: 568 MPA **R of A:** 81 %
Hardness: 256 HB **Cast No:** 404975
Charpy Impact Test:
Temperature: -50 deg C **1:** 297 Joules **2:** 302 Joules **3:** 315 Joules

Heat Analysis:

Ni:	7.58	**P:**	0.022	**S:**	0.0007	**Si:**	0.26
N:	0.249	**W:**	0.57	**PRE:**	41.149	**C:**	0.012
Cr:	25.45	**Cu:**	0.56	**Mn:**	0.58	**Mo:**	3.55

Remarks:
SOLUTION ANNEALED @1120°C FOR 160 MINUTES, WATER COOLED.
DELTA FERRITE ASTM E562: RAND-NEAR SURFACE: 52%, D/4 - MID RADIUS: 52%, D/2- MID THICKNESS: 51%.
CORROSION TEST ASTM G48 METHOD A: @50°C FOR 24 HRS: NO PITTING OBSERVED: WEIGHT LOSS 0.032 g/m².
NO INTERMETALLIC PHASES OR PRECIPITATES.
NO WELD REPAIRS CARRIED OUT.
REDUCTION RATIO 82:1
NORSOK MDS D57 REV 6
NORSOK M-650 EDITION 4
NORSOK M630: 2020
PREN >40, NACE MR0175/ISO15156
BNML S32760

Signed:

Claire Brindley
Certification Engineer
claire.brindley@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Certificate of Conformity to EN 10204 2.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 54576
Customer Order: **PO070-24-083616**

Certificate No: 54576.001
Certificate Date: 21-Aug-2024

Item: 1	**X2CrNiMoCuWN25-7-4 / ASTM A182 F55 UNS32760, PREN >40, NACE MR0175/ISO15156 TO DRAWING**
Qty: 376	**WASHER, M20, SELF COLOUR, PartNo:C06001J257, DrawingNo:C06001X, Revision/Issue:REV NG**
	PREN >40, NACE MR0175/ISO15156 BAG & TAG BNML S32760
Item: 2	**X2CrNiMoCuWN25-7-4 / ASTM A182 F55 UNS32760, PREN >40, NACE MR0175/ISO15156 TO DRAWING**
Qty: 188	**HEX NUT, M20, SELF COLOUR, PartNo:C06002J257, DrawingNo:C06002X, Revision/Issue:REV NG**
	PREN >40, NACE MR0175/ISO15156 BNML S32760
Item: 3	**X2CrNiMoCuWN25-7-4 (ZERON 100) / ASTM A182 F55 UNS32760, PREN >40, NACE MR0175/ISO15156 TO DRAWING**
Qty: 2	**SOCKET HEAD CAP SCREW, M12 X 20MM, SELF COLOUR, PartNo:C06016B257, DrawingNo:C06016X, Revision/Issue:REV NG**
	PREN >40, NACE MR0175/ISO15156 BNML S32760
Item: 4	**X2CrNiMoCuN25-6-3 (UR52N+)/1/4 / ASTM A182 F55 UNS32760, PREN >40, NACE MR0175/ISO15156 TO DRAWING**
Qty: 14	**SOCKET SET SCREW, M16 X 25MM, SELF COLOUR, PartNo:C06143G257, DrawingNo:C06143X, Revision/Issue:REV NG**
	PREN >40, NACE MR0175/ISO15156 BNML S32760
Item: 5	**X2CrNiMoCuWN25-7-4 (ZERON 100) / ASTM A182 F55 UNS32760, PREN >40, NACE MR0175/ISO15156 TO DRAWING**
Qty: 4	**ENGINEERING STUD, M16 X 1095MM - BM35, SELF COLOUR, PartNo:N-108753257, DrawingNo:N-108753, Revision/Issue:REV A**
	PREN >40, NACE MR0175/ISO15156 BNML S32760

Signed:

Claire Brindley
Certification Engineer
claire.brindley@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Certificate of Conformity to EN 10204 2.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 54576
Customer Order: **PO070-24-083616**

Certificate No: 54576.001
Certificate Date: 21-Aug-2024

The above item(s) conform chemically, mechanically and dimensionally to the requirements of your purchase order.

I/We hereby declare that our Iron & Steel products as defined in annex XVII of Regulation 833/2014 and amended by Regulation 2022/2474 do not contain content of Russian or Belarusian origin

Signed:

Claire Brindley
Certification Engineer
claire.brindley@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#114B
Description
SCREW CHC M12-30
PCM Reference
C06016D257TS

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Test Certificate to BS EN 10204 3.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 55388 **Certificate No: 55388.001**

Test Certificate to BS EN 10204 3.1 **Certificate Date: 21-Oct-2024**

Customer Order: **PO070-24-10400** **Item : 1 - 62783**

X2CrNiMoCuN25-6-3 TO DRAWING

Qty: 4 **SOCKET HEAD CAP SCREW, M12 X 30MM, SELF COLOUR, PartNo:C06016D257TS, DrawingNo:C06016X, Revision/Issue:REV NG**

Mechanical:
UTS: 795 MPA **Elongation:** 43 % **Proof Load Satisfactory** ☐
Yield: 589 MPA **R of A:** 85 %
Hardness: 233 HB **Cast No:** DC0474
Charpy Impact Test:
Temperature: -46 deg C **1:** 308 Joules **2:** 311 Joules **3:** 286 Joules

Heat Analysis:

C:	0.012	**Cr:**	25.83	**Cu:**	1.59	**Mn:**	0.91
Mo:	3.29	**Ni:**	6.46	**P:**	0.018	**S:**	0.0005
Si:	0.23	**N:**	0.228	**PREn:**	40.3		

Remarks:
SOLUTION ANNEALED @1060°C FOR 0.50 HOURS & WATER QUENCHED
FERRITE CONTENT ACCORDING TO ASTM E562: 54%
ULTRASONIC INSPECTION 100% SATISFACTORY, METHOD ASTM A388, ACCEPTANCE ASTM A388 S1 AND API 6A PSL3
MELT PRACTICE: ELECTRIC ARC FURNACE & REFINED BY ARGON-OXYGEN DECARBURIZATION
MICROSTRUCTURE IS FREE FROM GRAIN BOUNDARY CARBIDES, SIGMA, CHI AND LAVES PHASES ACCORDING TO ASTM A923 METHOD A. MAGNIFICATION x500.
CORROSION TESTING CARRIED OUT IN ACCORDANCE WITH ASTM G48A @50°C FOR 24 HOURS, SAMPLES PICKLED OR PASSIVATED. RESULT: NO EVIDENCE OF PITTING CORROSION (x20 MAGNIFICATION) AND WEIGHT LOSS 0.0100 g/m².
HOT ROLLED PEELED BAR
NO WELD REPAIR
NO MERCURY CONTAMINATION
FORGING RATIO 631:1
BNML X2CrNiMoCuWN25-6-3

Signed:

Claire Brindley
Certification Engineer
claire.brindley@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Certificate of Conformity to EN 10204 2.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 55388
Customer Order: **PO070-24-10400**

Certificate No: 55388.001
Certificate Date: 21-Oct-2024

Item: 1 **Qty:** 4	**X2CrNiMoCuN25-6-3 TO DRAWING** **SOCKET HEAD CAP SCREW, M12 X 30MM, SELF COLOUR, PartNo:C06016D257TS, DrawingNo:C06016X, Revision/Issue:REV NG** BNML X2CrNiMoCuWN25-6-3
Item: 2 **Qty:** 48	**X2CrNiMoCuWN25-7-4 TO DRAWING** **SOCKET HEAD CAP SCREW, M16 X 90MM - THREADED 44MM, SELF COLOUR, PartNo:C06034P257T, DrawingNo:C06034X, Revision/Issue:REV NG** BNML X2CrNiMoCuWN25-7-4
Item: 3 **Qty:** 24	**X2CrNiMoN22-5-3 TO DRAWING** **SOCKET SET SCREW, M16 X 25MM, SELF COLOUR, PartNo:C060143G020TS, DrawingNo:C06143X, Revision/Issue:REV NG** TAGGED

The above item(s) conform chemically, mechanically and dimensionally to the requirements of your purchase order.

I/We hereby declare that our Iron & Steel products as defined in annex XVII of Regulation 833/2014 and amended by Regulation 2022/2474 do not contain content of Russian or Belarusian origin

Signed: C Brindley

Claire Brindley
Certification Engineer
claire.brindley@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#114C
Description
SCREW HC M12-25 CU
PCM Reference
C06240E257

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

///BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Test Certificate to BS EN 10204 3.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 54622 **Certificate No: 54622.001**

Test Certificate to BS EN 10204 3.1 **Certificate Date: 29-Aug-2024**

Customer Order: **PO070-24-08459** **Item : 2 - 60786**

UNS 32760 ISO 4029

Qty: 6 **HEX SOCKET SCREW - CUP POINT, M12 X 25MM, SELF COLOUR, PartNo:C06240E257, DrawingNo:C06240X**

Mechanical:
UTS: 838 MPA **Elongation:** 38 % **Proof Load Satisfactory** ☐
Yield: 665 MPA **R of A:** 79 %
Hardness: 25 to 28HRC **Cast No:** 565527
Charpy Impact Test:
Temperature: -50 deg C **1:** 295 Joules **2:** 291 Joules **3:** 290 Joules

Heat Analysis:

Ni:	6.78	**P:**	0.023	**S:**	0.0005	**Si:**	0.38
N:	0.263	**W:**	0.59	**PREn:**	42	**C:**	0.017
Cr:	25.23	**Cu:**	0.57	**Mn:**	0.57	**Mo:**	3.8

Remarks:
SOLUTION ANNEALED @1100°C FOR 30 MINUTES, WATER COOLED
DELTA FERRITE ASTM E562: RAND-NEAR SURFACE: 47.3-52.2 %.
CORROSION TEST ASTM G48 METHOD A: @50°C FOR 24 HRS: NO PITTING OBSERVED: WEIGHT LOSS 0.000 g/m².
FREE FROM GRAIN BOUNDARY CARBIDES AND INTERMETALLIC PHASES.
NO WELD REPAIRS CARRIED OUT.
REDUCTION RATIO 426:1
NORSOK MDS D57 REV 6
NORSOK M-650
NORSOK M630: 2020
NACE MR0103/ISO 17945: 2015
NACE MR0175/ISO 15156-3: 2015
NACE MR0175 - ISO 15156
BAG & TAG BNML 32760

I/We hereby declare that our Iron & Steel products as defined in annex XVII of Regulation 833/2014 and amended by Regulation 2022/2474 do not contain content of Russian or Belarusian origin

Signed:

Charlotte Daly
Certification Engineer
charlotte@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Certificate of Conformity to EN 10204 2.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 54622
Customer Order: **PO070-24-08459**

Certificate No: 54622.001
Certificate Date: 29-Aug-2024

Item: 1	**ASTM A194 7M TO DRAWING**
Qty: 20	**HEX NUT, M16, ZN-NI + 1 COAT XYLAN 1070 GREEN, PartNo:C06002I046PFTS, DrawingNo:C060002X**
	ZJ 7ML
Item: 2	**UNS 32760 ISO 4029**
Qty: 6	**HEX SOCKET SCREW - CUP POINT, M12 X 25MM, SELF COLOUR, PartNo:C06240E257, DrawingNo:C06240X**
	NACE MR0175 - ISO 15156 BAG & TAG BNML 32760

The above item(s) conform chemically, mechanically and dimensionally to the requirements of your purchase order.

I/We hereby declare that our Iron & Steel products as defined in annex XVII of Regulation 833/2014 and amended by Regulation 2022/2474 do not contain content of Russian or Belarusian origin

Signed:

Charlotte Daly
Certification Engineer
charlotte@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#204
Description
WASHER M20 200HV
PCM Reference
C06001J257

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Test Certificate to BS EN 10204 3.1

PCM MANUFACTURING FRANCE SAS

Our Order No: **54576** **Certificate No: 54576.001**

Test Certificate to BS EN 10204 3.1 **Certificate Date: 21-Aug-2024**

Customer Order: **PO070-24-083616** **Item : 1 - 61788**

X2CrNiMoCuWN25-7-4 / ASTM A182 F55 UNS32760, PREN >40, NACE MR0175/ISO15156 TO DRAWING

Qty: 376 **WASHER, M20, SELF COLOUR, PartNo:C06001J257, DrawingNo:C06001X, Revision/Issue:REV NG**

Mechanical:
UTS: 912 MPA
Yield: 710 MPA
Hardness: 270 HB
Elongation: 32 %
R of A:
Cast No: 531118
Proof Load Satisfactory ☐

Heat Analysis:

C:	0.017	**Cr:**	25.2	**Cu:**	0.56	**Mn:**	0.65
Mo:	3.5	**Ni:**	6.8	**P:**	0.028	**S:**	0.001
Si:	0.28	**N:**	0.28	**W:**	0.58	**PRE:**	41
PREN:	42.19						

Remarks: SOLUTION ANNEALED @ 1110°C, RAPIDLY COOLED WITH WATER AND AIR
PREN >40, NACE MR0175/ISO15156
BAG & TAG BNML S32760

Signed:

Claire Brindley
Certification Engineer
claire.brindley@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Certificate of Conformity to EN 10204 2.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 54576
Customer Order: **PO070-24-083616**

Certificate No: 54576.001
Certificate Date: 21-Aug-2024

Item: 1	**X2CrNiMoCuWN25-7-4 / ASTM A182 F55 UNS32760, PREN >40, NACE MR0175/ISO15156 TO DRAWING**
Qty: 376	**WASHER, M20, SELF COLOUR, PartNo:C06001J257, DrawingNo:C06001X, Revision/Issue:REV NG**
	PREN >40, NACE MR0175/ISO15156 BAG & TAG BNML S32760
Item: 2	**X2CrNiMoCuWN25-7-4 / ASTM A182 F55 UNS32760, PREN >40, NACE MR0175/ISO15156 TO DRAWING**
Qty: 188	**HEX NUT, M20, SELF COLOUR, PartNo:C06002J257, DrawingNo:C06002X, Revision/Issue:REV NG**
	PREN >40, NACE MR0175/ISO15156 BNML S32760
Item: 3	**X2CrNiMoCuWN25-7-4 (ZERON 100) / ASTM A182 F55 UNS32760, PREN >40, NACE MR0175/ISO15156 TO DRAWING**
Qty: 2	**SOCKET HEAD CAP SCREW, M12 X 20MM, SELF COLOUR, PartNo:C06016B257, DrawingNo:C06016X, Revision/Issue:REV NG**
	PREN >40, NACE MR0175/ISO15156 BNML S32760
Item: 4	**X2CrNiMoCuN25-6-3 (UR52N+)/1/4 / ASTM A182 F55 UNS32760, PREN >40, NACE MR0175/ISO15156 TO DRAWING**
Qty: 14	**SOCKET SET SCREW, M16 X 25MM, SELF COLOUR, PartNo:C06143G257, DrawingNo:C06143X, Revision/Issue:REV NG**
	PREN >40, NACE MR0175/ISO15156 BNML S32760
Item: 5	**X2CrNiMoCuWN25-7-4 (ZERON 100) / ASTM A182 F55 UNS32760, PREN >40, NACE MR0175/ISO15156 TO DRAWING**
Qty: 4	**ENGINEERING STUD, M16 X 1095MM - BM35, SELF COLOUR, PartNo:N-108753257, DrawingNo:N-108753, Revision/Issue:REV A**
	PREN >40, NACE MR0175/ISO15156 BNML S32760

Signed:

Claire Brindley
Certification Engineer
claire.brindley@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Certificate of Conformity to EN 10204 2.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 54576
Customer Order: **PO070-24-083616**

Certificate No: 54576.001
Certificate Date: 21-Aug-2024

The above item(s) conform chemically, mechanically and dimensionally to the requirements of your purchase order.

I/We hereby declare that our Iron & Steel products as defined in annex XVII of Regulation 833/2014 and amended by Regulation 2022/2474 do not contain content of Russian or Belarusian origin

Signed:

Claire Brindley
Certification Engineer
claire.brindley@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#240
Description
HEX NUT H M16
PCM Reference
C06002I257T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

CATHELAIN
AU SERVICE DE L'ASSEMBLAGE

NF-EN 10204 / 3.1

Certificat/Certificate/Zeugnis N° : 35305

FO.001.A-MO-LA.019
Du : 25/04/2017

Client/Customer/Kunde : 16042 - PCM MANUFACTURING FRANCE SAS
Commande/Order/Bestellung N° : PO070-24-07880
Affaire/Affair/Affäre N°: 22421

Poste/Item/Pos. : 0010 Quantité/Quantity/Stückzahl : 12

Produit/Product/Produkt : ECROU HEX H M16
DUPLEX UNS32760

N° Item : C06002I257T N° Plan/Drawing/Plan :

Marquage/Marking/Kennzeichnung : 1.4501-C

Attestation de conformité produit / Product conformity :

Nous déclarons que, sauf exception ou dérogation énumérées ci-après, la fourniture citée a été fabriquée conformément aux spécifications techniques, et que toutes opérations de contrôle et essais ont été effectués, et répond SOUS TOUS SES ASPECTS, aux spécifications particulières jointes, aux plans, ainsi qu'aux normes et réglements en vigueurs.

We certify that, subject to exceptions or concessions listed hereafter, the supplies detailed here were manufactured in accordance with the technical spécifications of the contract, and that all inspections and test having been completed, the supply IN EVERY RESPECT with the relevant particular standards and regulations in force,

Ce document est complété par le(s) certificats(s)/ This document is completed by certificate(s) /

Lotie-I 16750

Laboratoire CATHELAIN : E.CHARLET

Langley Alloys Ltd
The Wharf
504-506 Lowfield Drive
Newcastle
Staffordshire
ST5 0UU

Tel: +44 (0)1782 610250
Email: sales@langleyalloys.com
Company No: 03059791
VAT No: GB 576 220 247

MATERIAL TEST CERTIFICATE No:DN061313-Z14013

ALLOY 32760

Customer Details	ZZ0310	Order Details	
Cathelain S A 69 Route de Saint-Omer F-59670 Bavinchove France F-59670		Date	20/07/2022
		Lot No	Z14013
		Cast / Heat No	555481
		Form	S-DUPLEX 32760 1.1/8" Dia Machined Bar

Conforming Specifications	UNS S32760, ASTM A276-17 S32760, ASTM A479-21 S32760, BS EN 10088-3:2014 1.4501, NACE MR 0175/ ISO 15156-3:2015

Works Order No.	SO163746	Cust Order No.	43303
Item 1	1 Each	LA0000603931	10.00 Kgs

Enclosures

Mill Certificate

The following results are actual values taken from tests carried out on a sample from this Lot

Chemical Analysis (WT%)

Element:	C	Si	P	S	Cr	Ni
Specification:	0.000 - 0.030	0.00 - 1.00	0.000 - 0.030	0.0000 - 0.0100	24.00 - 26.00	6.00 - 8.00
Actual:	0.014	0.34	0.024	<0.0005	25.17	6.75

Element:	Mo	W	Cu	N	Mn	Sn
Specification:	3.00 - 4.00	0.50 - 1.00	0.50 - 1.00	0.200 - 0.300	0.00 - 1.00	
Actual:	3.74	0.57	0.59	0.263	0.61	

Element:	Al	Pb	Fe	
Specification:				
Actual:			Balance	

MELTED & MANUFACTURED BY AN ISO:9001 APPROVED BODY WITHIN WESTERN EUROPE
MELTING IS CARRIED OUT BY ELECTRIC ARC FURNACE
THIS MATERIAL HAS BEEN REFINED BY ARGON-OXYGEN DECARBURIZATION
THIS MATERIAL HAS BEEN REFINED BY LADLE REFINERY FURNACE
HOT ROLLED PEELED BAR, NO WELD REPAIR, NO MERCURY CONTAMINATION
THE MATERIAL SUPPLIED IS FREE FROM RADIOACTIVE CONTAMINATION

Certified that the whole of the supplies hereon has been inspected, tested and unless otherwise stated above conforms in all respects with their requirements of the contract or order. The quality control arrangements adopted in respect of these supplies have accorded with the conditions of our BS EN ISO 9001 approval.
This test certificate is issued in accordance with EN 10204:2004 3.1.

Signed KStubbs Date 20/07/2022 LA 6

Kathy Stubbs- Quality Manager *Certificate not valid without QA stamp*

Test Certificate No: DN061313 - Z14013

Mechanical Results

Diameter / Thickness	mm	28.58	Tensile Strength Long	N/mm²	841.0
Pitting Resistance Equiv No.		41.7	Elongation 4D% (A4)	%	35.0
PREN-W		42.7	Brinell Hardness	BHN	238
0.2% Proof Stress	N/mm²	661.0	Rockwell C	HRC	22.2

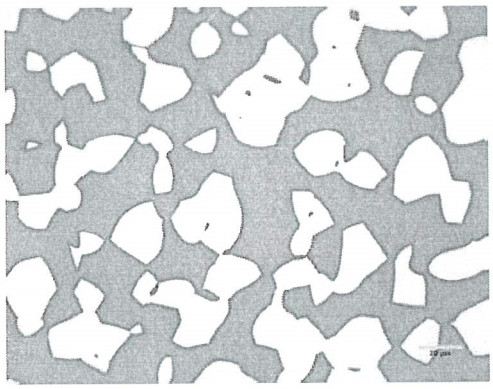
HEAT TREATMENT

Solution Treated followed by Water Quenching 1,100 °C 5.00 Hrs

ANCILLIARY TESTING

Ferrite Count ASTM E562	Ferrite content according to ASTM E562 51.90 %

PHOTOMICROGRAPH



Etched Photomicrograph
Magnification: X 500

Certified that the whole of the supplies hereon has been inspected, tested and unless otherwise stated above conforms in all respects with their requirements of the contract or order. The quality control arrangements adopted in respect of these supplies have accorded with the conditions of our BS EN ISO 9001 approval.
This test certificate is issued in accordance with EN 10204:2004 3.1.

Signed KStubbs Date 20/07/2022 LA 6

Kathy Stubbs- Quality Manager *Certificate not valid without QA stamp*

Z14013 Cte

SANDVIK

CERTIFICATE

A03/Z02
No. A/20-926010 **Rev 01**
Date 2020-11-30 Page 1/4
Rev.date 2020-12-21

A02/Z03
INSPECTION CERTIFICATE acc to
EN 10204 3.1

INSPECTION STAMP
SVQ

A06
LANGLEY ALLOYS LIMITED
THE WHARF
504-506 LOWFIELD DRIVE
ST5 0UU NEWCASTLE UNDER LYME
UNITED KINGDOM

Customer References A07
PO 179900 11/8"326
Customer order 2019-08-19
180-00991 LANGLE CON

Sandvik References A08

Order No.	Subs No.	ABSMT Dispatch note
540925	673746	30146/53

ABSMT No. 284-87214
C.Code 03

Material description B01/B04
HOT WORKED STAINLESS BAR STEEL
ROLLED
ANNEALED & STRAIGHTENED
PEEL TURNED

Metallurgical process C70
E+AOD+LRF

Origin
Sweden

Steel/material Designations B02

Sandvik	UNS
SAF 32760	S32760

EN no
1.4501

Technical requirements B03
EN 10088-3:-2014, EN10272:-2016*, EN10060:2003, EN 10221:1996
EN10222-5:-2017*, PED 2014/68/EU,
NACE MR0175/ISO 15156-3:-2015, NACE MR0103/ISO 17945-1:-2015
ASTM A-276-17, ASME SA-276-ED-19 SECT II PART A,
ASTM A-479-19, ASME SA-479-ED-19 SECT II PART A,
ASTM A-484-18A, ASTM A-182-19A*, ASTM A-1049-18*, ASTM A-314-19*,
NORSOK M-630 ED-6, NORSOK MDS D57 REV. 5*
*For detailed information, please see the appendix

EXTENT OF DELIVERY B07-B13

It	Product designation	Heat	Lot	Pieces	Kg
01	XMBR-SAF32760-11/8 SD3276D028.58MCD	555481	76871	96	2620.0
			Total	96	2620.0

TEST RESULTS
Reduction ratio (times)

Lot	
76871	120.3

Chemical composition (weight%)
PRE: CR+(3,3xMO)+16xN
PRE2: CR+(3,3xMO)+(1.65xW)+16xN

Heat	PRE	PRE2 + W
555481	41.7	42.7

Verified True Copy Z14013 Langley Alloys of Original Mill Cert

Quality assurance - Erik Jansson/QA-manager Primary Products A05/Z02
MTC Service / Certificates

SANDVIK

CERTIFICATE

No. A/20-926010 Rev 01
Date 2020-11-30 Page 2/4
Rev.date 2020-12-21

Heat	C	Si	Mn	P	S	Cr	Ni	Mo
555481	0.014	0.34	0.61	0.024	<0.0005	25.17	6.75	3.74
	W	Cu	N					
555481	0.57	0.59	0.263					

Tensile test at room temperature acc. to ASTM A370/ISO 6892-1
Longitudinal
Location radius

	Yield strength Mpa	MPa	Tensile strength Mpa	Elongation %	%
Lot	Rp0.2	Rp1.0	Rm	A	2"
76871	661	706	841	35	35

	Red.of Area %
	Z
	76

Hardness test acc.to ASTM A-370/ISO 6506-1
Location radius

Lot	HBW		
76871	238	240	235
- Surface			
Lot	HBW		
76871	229	234	230

Impact test, J, Longitudinal acc. to ASTM A-370/ISO 148-1
Location radius

	Single values			Avg.	Temperature
Lot	Joule			Joule	°C
76871	321	325	336	327	-50

Lateral expansion

				Temperature
Lot	mm			°C
76871	2.27	1.58	2.36	-50

Corrosion test according to ASTM G-48A, 50°C for 24 hours.
In delivery condition. No pitting corrosion found at 20x enlargement.
Test location acc to NORSOK MDS D57

	Specimen weight loss
Lot	g/m2
76871	0.07

Ferrite acc to ASTM E-562
16 points and 30 fields
Location radius

Lot	%
76871	51.9
- Surface	
Lot	%
76871	52.2

Following controls/tests have been satisfactorily performed:
- Positive Material Identification (PMI)
- Visual inspection and dimensional control.

SANDVIK

CERTIFICATE No. A/20-926010 Rev 01
Date 2020-11-30 Page 3/4
Rev.date 2020-12-21

HEAT TREATMENT:
20 - 70mm: Material soaking 1100°C, min. 20 minutes. Quenched in water. Water temp pre-quench max 40°C, after quench max 50°C

75 - 180mm: Material soaking 1100°C, min. 30 minutes. Quenched in water. Water temp pre-quench max 40°C, after quench max 50°C

185 - 250mm: Material soaking 1100°C, min. 60 minutes. Quenched in water. Water temp pre-quench max 40°C, after quench max 50°C

The raw material is free from radioactive contamination.

Microscopic Examination X 500 acc. to ASTM A 923 Method A/NORSOK M630
Free from grain boundary carbides and intermetallic phases.

Material free from mercury contamination.

No welding or weld repair.

NORSOK M-650 QTR NO: 25 Cr Duplex SS UNS S32760

Certified acc. Pressure Equipment Directive (2014/68/EU Annex 1 para 4.3) TUEV CERT-Certification body for pressure equipment of the TUEV NORD GRUPPE; notified body, reg.-no. 0045.

The delivered products comply with the specifications and requirements of the order.

The material is manufactured according to a Quality system, approved and registered to ISO 9001:2015.

No unauthorized alterations. The contents of this Inspection Certificate may not be modified or revised in any way without the prior written approval of AB Sandvik Materials Technology. Unauthorized alterations to the Inspection Certificate, including introduction of false, fictitious or fraudulent statements or entries, may be punishable by fines, imprisonment, or both. This Inspection Certificate may be copied only in the manner and for the purposes specified in Section 6 of EN 10204:2004. Contravention of this notice will be prosecuted to the fullest extent of applicable law.

The certificate is produced with EDP and valid without signature.

SANDVIK

CERTIFICATE No. A/20-926010 Rev 01
Date 2020-11-30 Page 4/4
Rev.date 2020-12-21

APPENDIX

Lab accreditation
Our lab is accredited under SWEDAC Accreditation number 1636 for testing as per ISO/IEC 17025

Applicable only to specific dimensions
75mm - 160mm: EN 10088-5 EN (Only valid for CE marked products together with Sandvik Declaration of Performance certificate).
75mm - 160mm: PED 2014/68/EU EN 10272 (Stainless steel bars for pressure purposes)
75mm - 250mm: EN 10222-5 (Chemical composition only)
80mm - 180mm: NORSOK M-630 Ed. 6 - NORSOK MDS D57 Rev.5, (for length up to 7500 mm)

Suitable for manufacturing of components in acc, with ASTM A-182, ASTM A-1049 & ASTM A-314.

Test location
Mechanical, ferrite testing:
Bar dim < 50 mm - Longitudinal test pieces in center of the bar.
Bar dim > 50mm & < 100 mm - Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface.
Bar dim > 100 mm & < 250 mm - Longitudinal test pieces, 1/4 T and minimum 100 mm from any second surface. Transversal test pieces, 1/4 T and minimum 100 mm from any second surface.

One set of test samples per heat treatment lot.
Maximum lot size 15 ton.

Micro: To ensure a sound, and unaffected structure all through the material three samples are taken, one close to surface, half radius, and in the center of the bar.

Furnace calibration every third month according to API 6A
Thermocouples of S-type (+/- 5°C tolerance) are used to monitor the furnace temperature.

Ultrasonic Testing:
Dim 29 - 74 mm: EN 10308 quality class 3
Dim 75 - 260 mm: EN 10228-4, Scan Coverage 1, Quality Class 3, Tab 4 and ASTM A-388, API 6A psl3/3G

Söderfors Steel AB

Heat Treatment Report

Furnace: 2
Heat treating number: 2974

Production no: Internal grade:

242648 985,2

Dimension (mm x mm):	32,0 x 0,0
Weight:	3332
Internal heat treatment recipe:	61135
Protective gas:	Manual
Customer lot no:	76871
Heat lot no:	555481
Quenching in water(transfer time):	102 s

Water temperature(start/stop of quenching):
8,0 / 16,0 °C

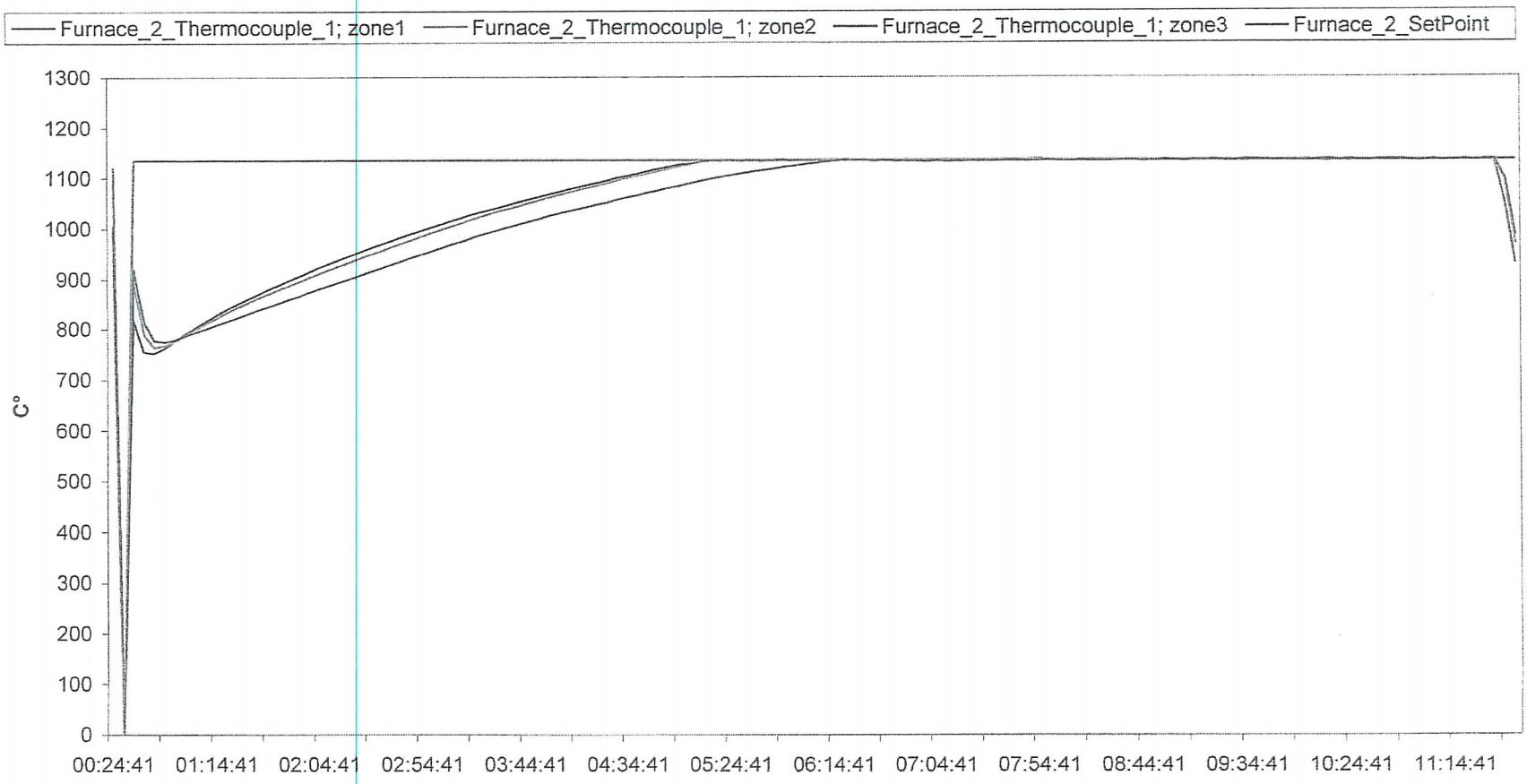
Comments:
SANDVIK TOTALTID 11H
20 KVÄVE

Start time:	2020-02-13 00:28
Calculated stoptime:	20-02-13 11:30
Actual stoptime:	2020-02-13 11:44

CATHELAIN S.A.S. Certificat/Certificate/Zeugnis N° : 35305 Lotie-I N° : 16750

Söderfors Steel AB

Heat treating number: 2974 Date: 2020-02-13 - 2020-02-13



Microstructure Examination Report

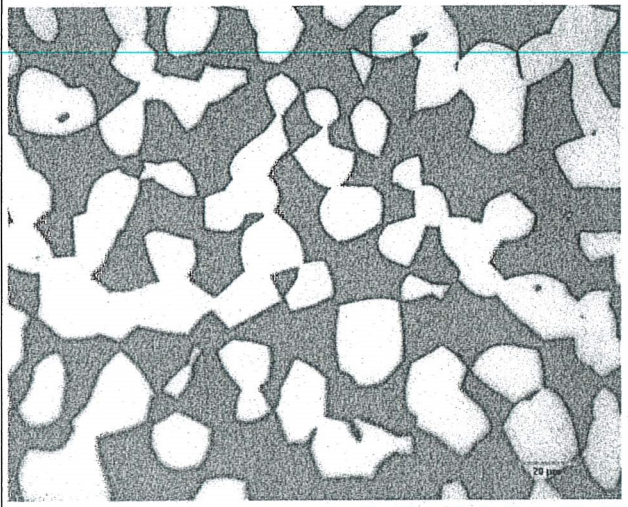
Material Information

Grade	SAF32760
Heat	555481
Lot	76871
Dim	28,58X

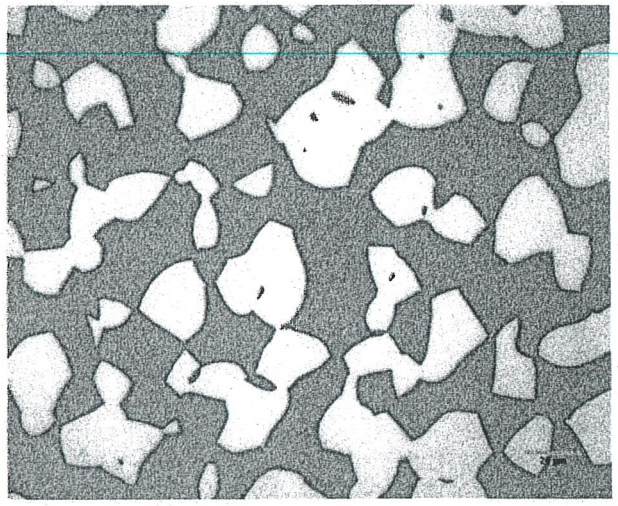
Technical Information

Certificate No.	A/20-926010
Test Date	2020-03-17
Etchant	MURAKAMI/NAOH
Test Result	OK

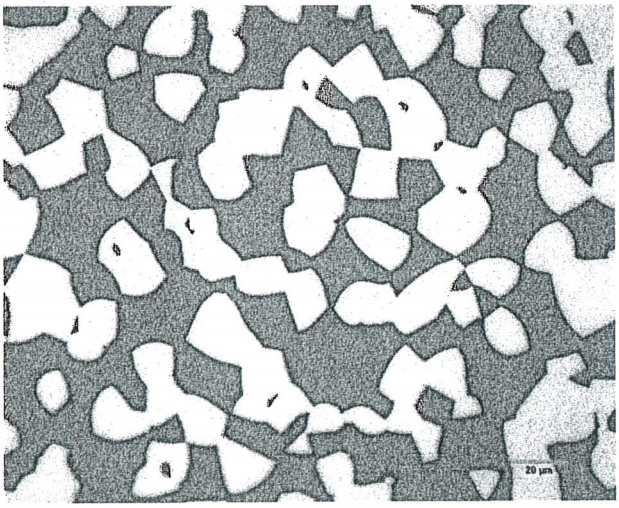
Test No: 4767	Magnification: 500x



Test No: 4768	Magnification: 500x



Test No: 4769	Magnification: 500x



STQD:Emelie Karlsson (SANDVIK\ko8819)

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#250A
Description
SCREW H M20-90
PCM Reference
C06203J257TS

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

CATHELAIN
AU SERVICE DE L'ASSEMBLAGE

NF-EN 10204 / 3.1

Certificat/Certificate/Zeugnis N° : 36801

FO.001.A-MO-LA.019
Du : 25/04/2017
Page 1/1

Client/Customer/Kunde : 16042 - PCM MANUFACTURING FRANCE SAS
Commande/Order/Bestellung N° : PO070-24-07386
Affaire/Affair/Affäre N°: 21743

Poste/Item/Pos. : 0030 Quantité/Quantity/Stückzahl : 176

Produit/Product/Produkt : Vis TH M20 x 90/90
X2CrNiMoN25-7

Traitement de Surface/Coating : DECAPAGE PASSIVATION INOX

N° Item : C06203J257TS3 N° Plan/Drawing/Plan :

Marquage/Marking/Kennzeichnung : 25.7.4-C

Attestation de conformité produit / Product conformity :

Nous déclarons que, sauf exception ou dérogation énumérées ci-après, la fourniture citée a été fabriquée conformément aux spécifications techniques, et que toutes opérations de contrôle et essais ont été effectués, et répond SOUS TOUS SES ASPECTS, aux spécifications particulières jointes, aux plans, ainsi qu'aux normes et réglements en vigueurs.

We certify that, subject to exceptions or concessions listed hereafter, the supplies detailed here were manufactured in accordance with the technical spécifications of the contract, and that all inspections and test having been completed, the supply IN EVERY RESPECT with the relevant particular standards and regulations in force,

Ce document est complété par le(s) certificats(s)/ This document is completed by certificate(s) /

Lotie-I 33680
PV N°: 12985-0 PV N°: 12998-0

Laboratoire CATHELAIN : E.CHARLET

Hersteller
Ugine
Avenue Paul Girod - CS 90100
73403 Ugine Cedex Frankreich
www.ugitech.com

ABNAHMEPRÜFZEUGNIS 3.1
EN 10204 / 3.1

Ugitech

Werkzeugnis :
Site-Zertifizierungen (einsehbar unter www.ugitech.com) :
ISO 9001 / ISO 14001 / ISO 50001
ISO/IEC 17025
NORSOK M650

Herstellerzeichen :

Prüfstempel : IQ

Besteller :	Kundenbestellnummer :	Bestellnummer:	Lieferschein Nr :
14828 Remystahl GmbH & Co. KG	BL211216	1041641 20	84446251 000010

Erzeugnisform :
UGI 4410 Stab warmgewalzt entzundert/überdreht lösungsgeglüht k12 rund 38,100MM LONG. 3,000M +1 000,000MM -0,000MM
10031681

Erschmelzungsart :	Chargen :	Schmelz Nr :	Gewicht :
EAF + AOD + CC	2222SF6700	234188	763 kg

Stueckzahl :	Profil :	Abmessung :	Verschmiedungsgrad :
27	rund	38,100 mm	33,4

Bezugsnorm :
EN 10272 : 2016-11 1.4410
ASTM A182/A182M-21 F53 (Nur für Analyse)
ASTM A479/A479M-21 S32750
NACE MR0103/ISO 17945:2015. S32750
NORSOK STANDARD M630 ED6 2013 MDS D57 S32750

EN 10088-3 ED2014 1.4410
ASTM A276/A276M-17 S32750
NACE MR0175/ISO 15156-3:2015. S32750
NORSOK STANDARD M-650 ED 2011 S32750

Kundenspezifikation :	Lastenheftänderung Nr	Lastenheftänderung Datum	Empfang Datum	Reserven
TLR 077 QTR SMQ 822824/822823	00	01.07.2021	20.08.2021	oui

CHEMISCHE ZUSAMMENSETZUNG

Probe Nr : PUHC

%	C	Si	Mn	Ni	Cr	Mo	Cu	S	P	N
Min				6,0000	24,0000	3,0000				0,2400
Max	0,0300	0,8000	1,2000	8,0000	26,0000	4,5000	0,5000	0,0150	0,0350	0,3200
Schmelzen	0,0200	0,3470	1,0950	6,9660	25,9550	3,5510	0,3260	0,0007	0,0180	0,2410
Erzeugnisform	✓	✓	✓	✓	✓	✓		✓	✓	

%	PREN
Min	41,00
Max	
Schmelzen	41,53
Erzeugnisform	

FESTIGKEITSEIGENSCHAFTEN

Lieferzustand : LÖSUNGSGEGL.1100° 30MN WASSER

				Zugfestigkeit						Härte	
Probe Nr	T°C °C	Marke n° Richtung	Form	Streckgrenze Rp 0,2% MPa	Streckgrenze Rp 1% MPa	Zugfestigkeit RM MPa	Bruchdehnung 5D %	Bruchdehnung 4D %	Einschnürung Z %	HBW 2,5/187,5 Mit	HRc Mit
		Min Max		550		800 930	25	15		290	32
PUHC	20	1 L		558	671	820	39	41	80	256	<22
		Min Max		550 ✓		800 ✓ 930	25 ✓	15			
PUHC	20	1 L		551 ✓	681	832 ✓	39 ✓	41	80		

Kerbschlagzähigkeit

Hiermit erklären wir, dass das o.g. Produkt den Anforderungen des Vertrags sowie den geltenden Normen und Vorschriften nach den durchgeführten Kontrollen und Prüfungen in jeder Hinsicht entspricht.
Die möglichen Abweichungen wurden vor der Ausstellung dieses Zertifikats vom Kunden validiert. Produkt hergestellt gemäss REACH-Verordnung.

Ugine den 09.01.2023
Qualitätsbeauftragter

B. POLLET

1
Hersteller
Ugine
Avenue Paul Girod - CS 90100
73403 Ugine Cedex Frankreich
www.ugitech.com

2
ABNAHMEPRÜFZEUGNIS 3.1
EN 10204 / 3.1

3
Ugitech

Probe Nr	T°C °C	Richtung	Form	Min J	Einzelwerte J	Mittelwerte J	Seitliche Breitung mm	Kristallinitätsgrad
PUHC	20	L	KISOV	100	345 339 330	338		
PUHC	-46	L	KISOV	45	317 320 331	323		

METALLOGRAFISCHE EIGENSCHAFTEN

400
Probe Nr : PUHC

401			404	Meth.	Min	Max :	
			Ferrit %	ASTM E562	35,0	55,0	47,4

490
FEHLENDE INTERMETALLISCHE PHASEN UND FÜR DIE ANWENDUNG SCHÄDLICHE AUSFÄLLUNGEN

ZUSATZINFORMATIONEN

700
Korrosion :
INTERKRISTALLINE KORROSION BESTÄNDIG NACH ASTM G48 METH.A (50°C/24 ST.) : KONFORM. GEWICHTVERLUST =< 4.0 G/M²
INTERKRISTALLINE KORROSION BESTÄNDIG NACH EN ISO 3651-2-VERFAHREN A : I.O LIEFERZUSTAND

701
Zerstörungsfrei Prüfungen :
VERFAHREN UND VERWECHSLUNGSPRÜFUNG MITTELS OPTISCHER EMISSIONSSPEKTROMETRIE ODER PER RÖNTGENFLUORESZENZVERFAHREN ERFOLGT : KONFORM
BESICHTIGUNG & MASSKONTROLLE : I.O.
KONTROLLE DER INNEREN GESUNDHEIT MIT ULTRASCHALL GEMÄSS EN 10308 KLASSE QUALITÄT 3 - 100% STABEN KONTROLLIERT
100% WIRBELSTROMRISSGEPRÜFT 1X UND 2H BEDINGUNGEN RUNDE PRODUKTE NACH DIN EN 10088-3

702
Sonstiges :
FREI VON RADIOAKTIVER KONTAMINIERUNG, QUECKSILBER, SCHWEIßNÄHTEN, SCHWEIßAUSBESSERUNGEN IM LIEFERZUSTAND
FERTIGUNG NACH NORSOK STD M-650. QUALIFIZIERUNGSDATEI ONLINE VERFÜGBAR UNTER WWW.UGITECH.COM
CMN1 = PREN : CR+3,3MO+16N
BEABSICHTIGTE VERWENDUNG : METALLISCHE ODER GEMISCHTE METALL-BETON KONSTRUKTIONEN
PRODUCT SSBEN10088-5 (STAINLESS STEEL BAR EN10088-5) ACCORDING TO DOP1 (SEE UGITECH WEBSITE)
MATERIAL FREE FROM WELDS OR WELD REPAIRS AT TIME OF SHIPMENT

32
Hiermit erklären wir, dass das o.g. Produkt den Anforderungen des Vertrags sowie den geltenden Normen und Vorschriften nach den durchgeführten Kontrollen und Prüfungen in jeder Hinsicht entspricht.
Die möglichen Abweichungen wurden vor der Ausstellung dieses Zertifikats vom Kunden validiert. Produkt hergestellt gemäss REACH-Verordnung.

33
Ugine den 09.01.2023
Qualitätsbeauftragter
B. POLLET

1 Manufacturer
Ugine
Avenue Paul Girod - CS 90100
73403 Ugine Cedex France
www.ugitech.com

INSPECTION CERTIFICATE 3.1
EN 10204 / 3.1

2

3 Ugitech

4 Certificate :
Site certifications (available at www.ugitech.com) :
ISO 9001 / ISO 14001 / ISO 50001
ISO/IEC 17025
NORSOK M650

7 Supplier's mark :

8 Inspector's stamp : IQ

9 Purchase :	10 Purchase order reference :	11 Order number :	12 Certificate :
14828 Remystahl GmbH & Co. KG	BL211216	1041641 20	84446251 000010

13 Product :
UGI 4410 bar Hot-Rolled Descaled solution annealed k12 round 38,100MM LONG. 3,000M +1000,000MM -0,000MM
10031681

14 Melting process :	15 Batch :	16 Heat n° :	17 Weight :
EAF + AOD + CC	2222SF6700	234188	763 kg

18 Pieces Nbr :	19 Shape :	20 Dimension :	21 Forging ratio :
27	round	38,100 mm	33,4

22

24 Standard :
EN 10272 : 2016-11 1.4410
ASTM A182/A182M-21 F53 (ANALYSIS ONLY)
ASTM A479/A479M-21 S32750
NACE MR0103/ISO 17945:2015. S32750
NORSOK STANDARD M630 ED6 2013 MDS D57 S32750
EN 10088-3 ED2014 1.4410
ASTM A276/A276M-17 S32750
NACE MR0175/ISO 15156-3:2015. S32750
NORSOK STANDARD M-650 ED 2011 S32750

25 Customer's specification :	Specification issue No	Specification revision date	Acceptation date	Deviation
TLR 077 QTR SMQ 822824/822823	00	01.07.2021	20.08.2021	oui

CHEMICAL ANALYSIS
Test n° : PUHC

27 28

%	C	Si	Mn	Ni	Cr	Mo	Cu	S	P	N
Min				6,0000	24,0000	3,0000				0,2400
Max	0,0300	0,8000	1,2000	8,0000	26,0000	4,5000	0,5000	0,0150	0,0350	0,3200
Heat Product	0,0200	0,3470	1,0950	6,9660	25,9550	3,5510	0,3260	0,0007	0,0180	0,2410

31

%	PREN
Min	41,00
Max	
Heat Product	41,53

MECHANICAL CHARACTERISTICS
Result as delivered : HT 1100°C 30Mn WATER QUENCHED 101

Tensile test 102 | Hardness 201

Test N°	T°C °C	Marker n° Direction	Type	Yield strength Rp 0,2% MPa	Yield strength Rp 1% MPa	Tensile strength RM MPa	Elongation 5D %	Elongation 4D %	Red. Area Z %	HBW 2,5/187,5 Ave	HRc Ave
		Min Max		550		800 930	25	15		290	32
PUHC	20	1 L		558	671	820	39	41	80	256	<22
		Min Max		550		800 930	25	15			
PUHC	20	1 L		551	681	832	39	41	80		

Notch Toughness 301

We declare that the mentioned product is in compliance with the requirements of the contract and that, after checks and tests, it meets in all respects the specified requirements and applicable standards and regulations. Any derogations have been validated by the client before the certificate is issued. Material manufactured in the REACH regulation respect.

32

33 Ugine the 09.01.2023
The quality manager
B. POLLET

1
Manufacturer
Ugine
Avenue Paul Girod - CS 90100
73403 Ugine Cedex France
www.ugitech.com

2
INSPECTION CERTIFICATE 3.1
EN 10204 / 3.1

3
Ugitech

Test N°	T°C °C	Direction	Type	Min J	Individual values J	Average J	Lateral Expansion mm	Cristallinity level
PUHC	20	L	KISOV	100	345 339 330	338		
PUHC	-46	L	KISOV	45	317 320 331	323		

METALLOGRAPHIC CHARACTERISTICS

400
Test n° : PUHC

401			404	Meth.	Min	Max	
			Ferrit %	ASTM E562	35,0	55,0	47,4

490
STRUCTURE FREE FROM DETRIMENTAL INTERMETALLIC PHASES AND PRECIPITATES

ADDITIONAL INFORMATION

700
Corrosion :
CORROSION ASTM G48 METH.A (50°C/24H):NO PITTING, WEIGHT LOSS =< 4.0 G/M²
INTERCRYSTALLINE CORROSION RESISTANT ACC.TO ISO 3651-2 PRACTICE A DELIVERY STATE

701
Non destructive testing :
PROCEDURE AND ANTIMIXING TEST PERFORMED BY SPECTROSCOPIC METHOD : CONFORM
SURFACE & DIMENSIONS ARE CONTROLLED
INTERNAL SOUNDNESS CHECK BY ULTRASONIC INSPECTION PERFORMED AS PER EN 10308 QUALITY CLASS 3 - 100% OF THE BARS
SURFACE CONDITION COMPLIANT WITH EN 10088-3 CONDITIONS 1X AND 2H ROUNDS PRODUCTS CHECKED BY EDDY CURRENT 100% OF THE BARS

702
Others :
MATERIAL IS FREE FROM MERCURY AND RADIOACTIVE CONTAMINATION AND WELDS OR WELD REPAIRS AT TIME OF SHIPMENT
PRODUCTION ACCORDING TO NORSOK STD M-650. QUALIFICATION FILE AVAILABLE ONLINE AT WWW.UGITECH.COM
CMN1 = PREN : CR+3,3MO+16N
USE OF THIS PRODUCT IS POSSIBLE FOR METALLIC CONSTRUCTIONS OR METAL-CONCRETE CONSTRUCTIONS
PRODUCT SSBEN10088-5 (STAINLESS STEEL BAR EN10088-5) ACCORDING TO DOP1 (SEE UGITECH WEBSITE)
MATERIAL FREE FROM WELDS OR WELD REPAIRS AT TIME OF SHIPMENT

32
We declare that the mentioned product is in compliance with the requirements of the contract and that, after checks and tests, it meets in all respects the specified requirements and applicable standards and regulations. Any derogations have been validated by the client before the certificate is issued. Material manufactured in the REACH regulation respect.

33
Ugine the 09.01.2023
The quality manager

B. POLLET

040001608350

Laboratoire d'essai mécanique
CATHELAIN
AU SERVICE DE L'ASSEMBLAGE
69 Route de St Omer
59 Bavinchove - France
☎: +33 (0) 328 429 313
www.cathelain.com

Rapport d'identification par PMI

Positive metal identification inspection report

FO.001.A-MO-LA.051
Du : 01/08/2023

N° : 12985-0
Rev 0

Client / Customer: PCM MANUFACTURING

Affaire / *Order* : 21743

Nuance/*Grade* : X2CrNiMoN25-7-4

Produit/*Product* : Vis TH M20 x90/90

Coulée / *Heat number* : 234188

N° de RCR/*RCR Number* : 33680

Identification / *Marking* : 25.7.4-C

Spécifications / *Specifications* : EN 10272

Réception éprouvette / *Sample reception* : 07/08/2024

Les informations spécifiques à l'essai sont données par le demandeur / *The test specific informations are given by the applicant*
Repérées par la couleur / *Notified by the color* : ☐

Les valeurs relevées sont : En conformité avec la nuance annoncée
The values a In accordance with the values of nuance announced

La précision des mesures est donnée en valeur d'écart (STD). La précision est de l'ordre de ± 5% pour les concentrations élevées, et de ± 10 % pour les faibles concentrations.

Une vérification de l'étalonnage a été effectuée sur échantillon Duplex 2205 / 1.4462.

La méthode d'analyse PMI, ne permet pas la détermination des teneurs en éléments légers, tel que le carbone.

The precision of the measures is given in standard deviation (STD). The precision is about of ± 5 % for high concentrations, and about ± 10 % for low concentrations.

A check of the calibration has been conducting on sample Duplex 2205 / 1.4462.

The analysis method PMI does not allow the determination of light elements content, such as carbon.

Matériel utilisé / *Equipement used :* S1 TITAN 500S - N°500N11557
Logiciel / *soft :* Ver 2.7.58.392

Report de poinçon / *Stamped mark* Oui / *Yes* ☐ Non/ *No* ☒

Essai réalisé par / *Test made by* **:** R.WAMBRE **Date d'essai** / *Test date :* 22/08/2024

Observations: Matière annoncée 1.4410/X2CrNiMoN25-7-4

Date d'édition *publishing date*	Contrôleur *Inspector*	Client *Customer*	Organisme *Inspector*
22/08/2024	R.WAMBRE		

Les résultats ne se rapportent qu'aux objets soumis à l'essai. La reproduction de ce rapport n'est autorisée que sous sa forme intégrale.
The results only relate to objects tested. Reproduction of this report is only permitted in its entirety.

Laboratoire d'essai mécanique
CATHELAIN
AU SERVICE DE L'ASSEMBLAGE
69 Route de St Omer
59 Bavinchove - France
☎ : +33 (0) 328 429 313
www.cathelain.com

Rapport d'essais de dureté
Hardness test report

FO.007.E-MO-LA.002
Du : 10/01/2024

N° : 12998
Rev 0

ACCREDITATION N° 1-6913 PORTEE DISPONIBLE SUR www.cofrac.fr
cofrac ESSAIS

Client / Customer: PCM MANUFACTURING FRANCE SAS

Commande / *Order* : 2024-2652
N° Pointage / Score *N °*: 375114

Nuance/*Grade* : 1.4410
Produit/*Product* : Vis TH M20 x 90/90

Coulée / *Heat number* : 234188

Marquage / *Marking* : 25.7.4-C

Spécifications / *Specifications* : NF EN 10272
Norme d'essai /*Test norm* : NF EN ISO 6506-1 Ed.2014
Modalité de contrôle / T*ype of inspection* : Sur pièce finie / On finished part
Réception éprouvette / *Sample reception* : 22/08/2024

Usinage des éprouvettes
Machining of the sample
Production CATHELAIN pour :
Prod Cathelain

Les informations spécifiques à l'essai sont données par le demandeur / *The test specific informations are given by the applicant*
Repérées par la couleur / *Notified by the color* :

Conditions *Conditions*	**Type** / *type*	**HBW2.5-187.5**
	Dimension du pénétrateur / penetrator *size (mm)*	**2,5**
	Charge / Load *(N)*	**1839**
	Lieu de mesure / Position of test	**Sur la tête / On the head**
	Température local / *local temperature (°C)*	**22,8**
	Mode opératoire / Operating mode	**MO-LA.002-E**

Le résultat d'essai s'applique à l'échantillon tel que reçu / *The test result applies ti the sample as recieved*
La responsabilité du laboratoire est limitée aux essais effectués / *The responsability of the laboratory is limited to the tests performed*

Imposées / *Requirements*		**Epr** /*Sample*	**Résultats** *Results* HBW2.5-187.5			**Moyenne** *Average* HBW2.5-187.5
Min	Max		V1	V2	V3	Moy
	290	25.7.4-C	**250**	**264**		**257**

Les résultats d'essais notifiés par " * " ne sont pas couverts par l'accréditation / *results notified by " * " are not covered by accreditation*

Machine de dureté / *Hardness test machine :* **INNOVATEST NEXUS 3200XL-N°320XL09146130**
Logiciel / *soft :* Impression V.1.0
Pour dureté Brinell : Mesure par syst. optique numérique (Type A - ASTM)
N° pénétrateur / *Identer N°* : 187186
For Brinell hardness : Mesurement by digital optical system (A Type - ASTM)

Essai réalisé par /*Test carried out by* **:** R.WAMBRE
Date d'essai / *Test date :* 23/08/2024

Décision finale / *Final decision* : **Conforme aux impositions / In compliance with specifications**
Pour déclarer la conformité à la spécifiction, il n'a pas été tenu compte de l'incertitude associée au résultat.
To declare the compliance with the specification, the uncertainty associated with the result has not been taken into account.

Observations:

Date d'édition *publishing date*	**Contrôleur** *Inspector*	**Vérificateur** *Checker*	**Client et/ou Organisme** *Customer and/or Inspector*
30/08/2024	R.WAMBRE	V.DANDOIS	

Les résultats ne se rapportent qu'aux objets soumis à l'essai. La reproduction de ce rapport n'est autorisée que sous sa forme intégrale.
The results only relate to objects tested. Reproduction of this report is only permitted in its entirety.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#302
Description
SETTING SHIMS AV5
PCM Reference
W-007034014T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

outokumpu
high performance stainless steel

INSPECTION CERTIFICATE
EN 10204-3.1

N° commande Outokumpu
9000099512

Certificat N°
227892

Révision
00

N° de commande client
19312

Usine de production
Avesta Plant

Date
25 janv. 2024

N° de livraison
8000232511

Vendu à	Produit	Classe
SAS Azynox Zone Industrielle De St Malo 3 Allee Marius Berliet 37320 ESVRES SUR INDRE FRANCE	Stainless Steel Cold Rolled Strip, Slit edge, Supra 316L/4404 Fini 2B	1.4401 1.4404 TYPE 316 / UNS S31600 TYPE 316L / UNS S31603

Expédié à	Exigences
SAS Azynox Zone Industrielle De St Malo 3 Allee Marius Berliet 37320 ESVRES SUR INDRE FRANCE	ASME SA-240/SA-240M BPVC.II.A-2021 EN 10028-7:2016 EN 10088-2:2014 ASME SA-480/SA-480M BPVC.II.A-2023 EN ISO 9445-2:2010

Marque du fabricant	Processus	Cachet de 'inspecteur
outokumpu	E+AOD	AJA

Ligne Comman	Dimensions	Quantité (pces)	Poids	N° de coulée	N° de série	N° d'identification du produit	N° d'article du client
40	2,00 X 2000,0 mm	1	10760 kg	533863	2	533863-2	

Composition chimique

N° de coulée	Pays d'origine de la coulée	C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	N %	
533863	Sweden	0,015	0,36	1,24	0,031	0,001	16,7	10,1	2,04	0,052	

Résultats du test (1=Début, 2=Milieu, 3=Fin, T=Transversale, L=Longitudinale, D=Diagonal, RT=tempèrature ambiante)

		EN ISO 6892-1 / ASTM A370 (RT)					ASTM E10 / EN ISO 6506-1
N° d'identification du produit	ID de l'échantillon	RP0.2 MPa	RP1.0 MPa	RM MPa	A50 %	A80 %	DURETÉ HBW
	Minimum	240	270	530	40	40	
	Maximum			680			217
533863-2	1 T 836638	303	328	629	53	53	150
533863-2	3 T 836639	326	347	638	50	50	150
		PMI					
N° d'identification du produit	ID de l'échantillon	PMI					
	Minimum						
	Maximum						
533863-2	1 T 836638	OK					
533863-2	3 T 836639	OK					

Country of Origin: Sweden

Solution annealed at 1075 °C/1967 °F. Refroidi rapidement avec de l'eau et de l'air..

Certifié conforme à la directive PED 2014/68/UE par TÜV NORD, organisme notifié, n° d'enregistrement 0045.

Moy.t CO2e/t: 1,4998

Modèle vérifié. Scope 1, 2, 3 - Les détails du calcul sont disponibles sur le site web d'Outokumpu

Marking, visual and dimensional inspection: Approved

Outokumpu Stainless AB Bergsnäsgatan 11 77441 Avesta, Sweden Tel: +46 (0)226 811 73 Regoffice: Stockholm SWEDEN, Regno: 556001-8748 VAT ID: SE556001874801	Ce matériel est conforme aux exigences de la commande. Inspecteur autorisé certificates.avesta@outokumpu.com	

Ce document ne doit pas être modifié ou reproduit, sauf dans son intégralité. Des déclarations ou des écritures frauduleuses, fictives ou fausses peuvent faire l'objet de poursuites judiciaires.

outokumpu
high performance stainless steel

INSPECTION CERTIFICATE EN 10204-3.1

N° commande Outokumpu
9000099512

Certificat N°
227892

Revision
00

N° de commande client
19312

Usine de production
Avesta Plant

Date
25 janv. 2024

N° de livraison
8000232511

Informations d'emballage

poste de livraison	N° d'identification du produit	N° du lot	Quantité (pces)	Poids	Longueur
10	533863-2	D045466030	1	10760 kg	

Outokumpu Stainless AB
Bergsnäsgatan 11
77441 Avesta, Sweden
Tel: +46 (0)226 811 73
Regoffice: Stockholm SWEDEN,
Regno: 556001-8748
VAT ID: SE556001874801

Ce matériel est conforme aux exigences de la commande.

Inspecteur autorisé
certificates.avesta@outokumpu.com

Ce document ne doit pas être modifié ou reproduit, sauf dans son intégralité. Des déclarations ou des écritures frauduleuses, fictives ou fausses peuvent faire l'objet de poursuites judiciaires.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#304
Description
STOP SETTING AV5
PCM Reference
W-007035014T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

PO 070 - 24 - 1005o

Ref : W-0070350147

COGNE ACCIAI SPECIALI S.p.a.

ITALY - 11100 AOSTA - VIA PARAVERA, 16
TEL. +39.0165.3021 - FAX +39.0165.302296
CAP. SOC. 250.000.000 EUR INT. VERS.
C.F. 02187360967
VAT: IT00571320076 - R.E.A. n. AO-50474

Entreprise avec les systèmes de gestion certifiés selon ISO 9001, IATF 16949, EN 9100, ISO 14001 et ISO 45001

CERTIFICAT DE RECEPTION 3.1 (EN 10204:2004)

NUMERO DE DOCUMENT 2023030445

CLIENT:	COGNE FRANCE S.A.		
N. DE LA COMMANDE DU CLIENT:	CDA81414		
USINE PRODUCTRICE	AOSTA, VIA PARAVERA 16 - ITALIA		
AUTEUR DU DOCUMENT:	SERVICE QUALITE		
NUMERO DE LA COMMANDE DE L'USINE:	0025299631 / 000010		
SIGLE DU PRODUCTEUR:	COGNE		
AVIS D'EXPEDITION:	0081555085 / 000010 MASSE: 1108 KG / 2443 LB		
SPECIFICATION INTERNE:	STOCKBARREW2	REGLE TECNIQUE:	AD2000
PRODUIT:	PEL Ecroué RONDS TOLLERANCE: ISOK11		
FINITION SUPERFICIELLE:	2B		
ETAT DE LIVRAISON:	RS HYPERTREMPE		
DIMENSIONS DU PRODUIT (MM):	40,000 (1,575 in)	LONGUEUR (MM):	06000 06200 (00236 00244 in)
NUANCE:	316L-S31600/31603-1.4404/4401	NUANCE INTERNE:	F316L IMCO
IDENTIFICATION N. DE COULEE:	372446	IDENTIFICATION N. DE LOT:	023670
MARQUAGE DU PRODUIT:	1.4404	MARQUAGE PIECES:	367

NORMES DE REFERENCE: EN 10088-3 (14), EN 10272 (16), ASTM A276-r17/ASME SA276-21, ASTM A479/A479M-r21, ASTM A193-23 B8MCLASSE 1D, ASME SA276/SA276M-21,ASME SA479/SA479M-21, AMS 5653J, AMS 5648N, ISO15156-3/NACE MR0175 (15), NACE MR0103/ISO 17945 (15), NORSOK M630 MDSS01 REV5.
NORMES DE REFERENCE CONCERNANT ANALYSE CHIMIQUE ET PROPRIETES MECHANIQUES: ASTM A182-23/ ASME SA182-21.
NORMES DE REFERENCE CONCERNANT SEULEMENT L'ANALYSE CHIMIQUE: EN 10222-5 (17),ASTM A403-22b, ASTM A484-22, ASTM A314-23, AMS-QQ-S-763D.
ASME SECT.II PART A EDITION 2015-2017-2019-2021.
AISI 316/316L - UNS S31600/S31603 - 1.4404/1.4401
LE PRODUIT EST CONFORME à LA SPéCIFICATION ET à LA RèGLE AD2000-MERKBLATT W0/W2.
ELABORATION AU FOUR ELECTRIQUE + AOD + COULEE CONTINUE
ASTM A484 NE S'APPLIQUE PAS POUR LES TOLERANCES DE DIAMETRE ET DE LONGUER.
ELABORATION AU FOUR ELECTRIQUE + AOD + COULEE CONTINUE
LA NORME ASME SECTION II - PARTIE A - ED. 2015-2017-2019-2021 EST APPLICABLE
LAMINE A CHAUD
TAUX DE CORROYAGE 18,5

LUSSAULT
Route de la Gaubretière
85130 TIFFAUGES
Tél. 02 51 65 75 75
Fax 02 51 65 71 90
SIRET 432 645 505 00012

ANALYSE CHIMIQUE DE COULEE SELON ASTM A751 - EN ISO 14284
Lot de control - Poids:020000959743 - 81.021 KG - 178.618 LB

ELEMENT	C	Si	Mn	P	S	N	Cr	Mo	Ni	Cu
UNITE DE MESURE	% w/w	% w/w	% w/w	% w/w	% w/w	% w/w	% w/w	% w/w	% w/w	% w/w
OBTENU	0,018	0,34	1,80	0,027	0,023	0,072	16,95	2,11	10,38	0,43

ELEMENT	Co
UNITE DE MESURE	% w/w
OBTENU	0,16

ESSAI DE DURETE AU ETAT DE FOURNITURE
Lot de control - Poids:020000960457 - 5.043 KG - 11.118 LB
SPECIFICATION ENISO6506 ESSAI DE DURETE HB MÉTHODE D'ESSAI: 10/3000
OBTENU 161

DATE 19.06.2023

MORABITO ROSA CF(ESPERT DE L'USINE) - CERTIFICAT CREE ELECTRONIQUEMENT

COGNE ACCIAI SPECIALI S.p.a.

ITALY - 11100 AOSTA - VIA PARAVERA, 16
TEL +39.0165.3021 - FAX +39.0165.302296
CAP. SOC. 250.000.000 EUR INT. VERS.
C.F. 02187360967
VAT: IT00571320076 - R.E.A. n. AO-50474

Entreprise avec les systèmes de gestion certifiés
selon ISO 9001, IATF 16949, EN 9100, ISO 14001
et ISO 45001

Pays d'origine: Italie, le matériel est conforme aux normatives FAR
DFARS 252.225-7009 ALT 1.
Les produits livrés sont conformes au EN10088-5 et ont le marquage CE grâce aux résultats des tests ci reportées et à la surveillance continue, vérification et approbation du MPA NRW (certificat no. 0432-CPR-00166-01)
Material produit selon le système #Regulation 305/2011/EU of the European Parliament and of the Council of 9 March 2011#
DOCUMENT PRODUIT EN ACCORD AVEC TUEV BAYERN (11.1972) NE FAISANT PAS L'OBJET D'UNE CONTRE-SIGNATURE(VOIRE DOCUMENT TUEV BAYERN 17.01.80).
MARQUAGE: MARQUAGE DU PRODUCTEUR, N. WERKSTOFF, N. COULEE, N. LOT POINCON DE L'EXPERT
ESSAI DE CORROSION SELON ASTM A262 METHODE E EN ISO 3651-2 METHODE A: CONFORME.
CONTROLE ANTIMELANGE AVEC SPECTROMETRE PORTABLE: CONFORME
INSPECTION DE LA SURFACE AVEC COURANTS DE FOUCAULT SUIVANT EN 10277 CL.4. CONTRÔLE DIMENSIONNEL SUIVANT LA NORME EN 10278: CONFORME.
AUCUNE RÉPARATION DE SOUDURE EXECUTÉE.
CONTROLE ULTRASONS SELON EN 10308 CLASS 3: CONFORME
MATERIEL PRODUIT DANS UN SYSTEME D'ASSURANCE QUALITE CERTIFIE'PAR KIWA CERMET EN ACCORD AVEC UNI EN ISO 9001:2015 ET IATF 16949:2016 (POUR CETTE DERNIERE SEULEMENT POUR FIL MACHINE ET BARRES EN ACIER LAMINE'-ECROU TE'-RECTIFIE')
POINCON DE L'EXPERT LF
MATÉRIEL CONFORME: 2015/863/UE (RoHS3) - 2011/65/UE (RoHS2) - 2000/53/UE - 2002/95/UE (RoHS) - 2003/11/UE - 2005/618/UE - PED 2014/68/UE e PE(S)R 2016/1105
LE MATERIEL EST SANS MERCURE ET SES COMPOSES ET LIBRE DE LA CONTAMINATION DES SUBSATNCES RADIOACTIVE A L'ETAT DE LIVRAISON ET IL A ETE PRODUIT SANS L'UTILISATION DE SUBSTANCES QUI PEUVENT ENDOMMAGER L'OZONE, DE CLASSE I ET II.
CONTRÔLE DE LA RADIOACTIVITÉ EFFECTUÉ AVEC UN SPECTROMÈTRE GAMMA: ASTM E181.
ACTIVITÉ GAMMA SUR LES PRODUITS INFÉRIEURE À 0,1 BQ / G SELON LA RÉSOLUTION UE 2013/59/EURATOM, IAEA RS-G-1.7 E IAEA SSG-17

CE 0432 UKCA 0038

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#401
Description
SCREW CHC M16-90-44
PCM Reference
C06034P257T

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Test Certificate to BS EN 10204 3.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 55388 **Certificate No: 55388.001**

Test Certificate to BS EN 10204 3.1 **Certificate Date: 21-Oct-2024**

Customer Order: **PO070-24-10400** **Item : 2 - 61251**

X2CrNiMoCuWN25-7-4 TO DRAWING

Qty: 48 **SOCKET HEAD CAP SCREW, M16 X 90MM - THREADED 44MM, SELF COLOUR, PartNo:C06034P257T, DrawingNo:C06034X, Revision/Issue:REV NG**

Mechanical:
UTS: 879 MPA **Elongation:** 37 % **Proof Load Satisfactory** ☐
Yield: 643 MPA **R of A:** 78 %
Hardness: 282 HB **Cast No:** 409716

***Charpy Impact Test:**
Temperature: -50 deg C **1:** 319 Joules **2:** 308 Joules **3:** 312 Joules

Heat Analysis:

Ni:	7.56	**P:**	0.023	**S:**	0.0005	**Si:**	0.28
N:	0.258	**W:**	0.515	**PRE:**	41.113	**C:**	0.016
Cr:	25.6	**Cu:**	0.59	**Mn:**	0.56	**Mo:**	3.45
PREN:	41.963						

Remarks: SOLUTION ANNEALED @1121°C FOR 124 SECONDS, WATER COOLED.
*ADDITIONAL CHARPY IMPACT TESTING CARRIED OUT @-101°C: 128, 131, 153 JOULES, *THE IMPACTS ARE WITHOUT SHEAR FRACTURE, LATERAL EXPANSION: FOR IMPACTS @-50°C: 1.4, 1.4, 1.6mm, FOR IMPACTS @-101°C: 2.2, 2.2, 2.2mm.
DELTA FERRITE ASTM E562: RAND-NEAR SURFACE: 49%, D/4 - MID RADIUS: 49%, D/2- MID THICKNESS: 48%.
CORROSION TEST ASTM G48 METHOD A: @50°C FOR 24 HRS: NO PITTING OBSERVED: WEIGHT LOSS 0.074 g/m².
MICROSTRUCTURE FREE FROM INTERMETALLIC OR OTHER DETRIMENTAL PHASES. MATERIAL IS FREE FROM GRAIN BOUNDARY PARTICLES AND INTERMETALLIC PHASES. ULTRASONIC EXAMINATION IN ACCORDANCE WITH API 6A 21ST EDITION, PSL 3 + 4. NO WELD REPAIRS CARRIED OUT. MELT PROCESS: E-VOD
NORSOK MDS D57 REV 6, NORSOK M-650 EDITION 4, NORSOK M630: 2020
NACE MR0175/ISO 15156-3: 2015, NACE MR0103/ISO 17945: 2015
RAW MATERIAL MANUFACTURED ACCORDING TO QTR BGH _F_E_32760 REV 3 ACCORDING TO NORSOK M-650 EDITI0N 4. STEEL PRODUCER BGH EDELSTAHL FREITAL GMBH. MELT PRACTICE E-VOD
BNML X2CrNiMoCuWN25-7-4

Signed:

Claire Brindley
Certification Engineer
claire.brindley@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

BOLTANDNUT
SPECIALISED BOLTING SOLUTIONS

Certificate of Conformity to EN 10204 2.1

PCM MANUFACTURING FRANCE SAS

Our Order No: 55388
Customer Order: **PO070-24-10400**

Certificate No: 55388.001
Certificate Date: 21-Oct-2024

Item: 1	**X2CrNiMoCuN25-6-3 TO DRAWING**
Qty: 4	**SOCKET HEAD CAP SCREW, M12 X 30MM, SELF COLOUR, PartNo:C06016D257TS, DrawingNo:C06016X, Revision/Issue:REV NG**
	BNML X2CrNiMoCuWN25-6-3
Item: 2	**X2CrNiMoCuWN25-7-4 TO DRAWING**
Qty: 48	**SOCKET HEAD CAP SCREW, M16 X 90MM - THREADED 44MM, SELF COLOUR, PartNo:C06034P257T, DrawingNo:C06034X, Revision/Issue:REV NG**
	BNML X2CrNiMoCuWN25-7-4
Item: 3	**X2CrNiMoN22-5-3 TO DRAWING**
Qty: 24	**SOCKET SET SCREW, M16 X 25MM, SELF COLOUR, PartNo:C060143G020TS, DrawingNo:C06143X, Revision/Issue:REV NG**
	TAGGED

The above item(s) conform chemically, mechanically and dimensionally to the requirements of your purchase order.

I/We hereby declare that our Iron & Steel products as defined in annex XVII of Regulation 833/2014 and amended by Regulation 2022/2474 do not contain content of Russian or Belarusian origin

Signed:

Claire Brindley
Certification Engineer
claire.brindley@bnml.co.uk

Tel: +44 (0) 1902 355 110 sales@bnml.co.uk
Cannon Business Park, Gough Road, Coseley, West Midlands, United Kingdom WV14 8XR
Bolt and Nut Manufacturing Ltd, Registered in England 06496304, Vat No: GB 940 8967 83

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	CODE :	ERWA0330	INDICE :	H

Emetteur / *Written by :*	JC Daujard	Date de création / *Date :*	18/02/2025	N° de commande / *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#556
Description
FLOW RESTRICTION 2MM
PCM Reference
W-004064014

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

ACEROS INOXIDABLES OLARRA S.A.
Cm. Larrabarri, Elotxelerri, 1
48180 Loiu, Bizkaia
España
www.olarra.com

Management Systems Certified by LRQA
ISO 9001 / SGI 6000360
ISO 14001 / SGI 1870678

11 CE 0769

ACEROS INOXIDABLES OLARRA

THYSSENKRUPP MATERIALS FRANCE S.A.S.
Z.A.DE PARIWEST 6 AV.GUTENBERG
78310 MAUREPAS CEDEX - FRANCIA

Trade Mark - Zeichen des Lieferwerkes
Anagrama del suministrador

Works Inspector Stamp - Werkssachverständiger
Sello del Inspector 3

Certificate type - APZ Nach / Certificado tipo	Certificate nº - Prüf-Nr / Certificado nº	Date - Datum - Fecha
EN 10204/3.1	499230	15 - 07 - 2022

Our order Nº / Werks - Nr / Nº de Referencia	Heat / Schmelze / Colada	Your order Nº / Bestell - Nr / Pedido Nº
774579	541961	01/0/72087

Steel Grade / Werkstoff / Calidad	According to / Entsprechend / Corresponde
X-2-CRNIMO-17-12-2 / 1.4404 MECAMAX	EN 10272-2016.

Shape and Size - Gegenstad / Perfil y dimensión	Tolerance - Toleranz / Tolerancia	Bundles / Bunde / Bultos	Bars / Stäbe / Barras	Weight / Gewitcht / Peso
ROUND 10 mm	h 9 /DIN 671 /EN 10278	2		967 Kg

Requirements - Anforderungen - Exigencias

EN 10088-3 2014.
EN 10088-5 2009.
AD-2000-W2 2022/W10 2020.
NACE MR-0175/ISO 15156-3 2015.
ASTM A479/A479M-21. ASME SA479/SA479M-21 Sect.II Part A.
ASTM A 276/A 276M-17. ASME SA 276-21.
ASTM A 182/A 182M-21. ASME SA 182/SA 182M-21 Sect.II Part A.
N° 1.4401-1.4404 TAF+AT.V1 du 10/10/2019.
1.4401-Type 316-Type 316L-F.316-F.316L.
PED 2014/68/EU, Annex I, Parag.4.3/DGR 2014/68/EU

Anhang I Absatz 4.3 Certificate/Zertifikat Nr. 348/2008/MUC
EN 10088-5. 0769-CPR-VAS-00472-2. Corrosion resistant steel bars for building construction or civil engineering.
Regulated substance: No performance determined

Melting process / Erschmelzungsart / Proceso de Fusión	Heat treatment / Wärmebehandlung / Tratamiento térmico
E.A.F. / A.O.D.	1060C 4H/Std WATER/WASSER/AGUA

Solution annealed/Abgeschreckt/Hipertemple-Cold drawn/Gezogen/Estirado-Polished/Poliert/Pulido-

Test results - Ergebnis der Prüfungen - Resultados de los ensayos

Reference standard / Bezugsnorm / Norma de referencia		Rp0,2% N/mm2 MPA	Rp 1% N/mm2 MPA	Rm N/mm2 MPA	A %L 5D	A %L 4D	Z %	Hardness Härte HBw	Impact test / Kerbschlagzaehigkeit / Resiliencia ISO V Jules
ISO6892, ASTMA370	Min.	200	235	500	20				
	Max.			900				315	
Temperature °C: 20	Spec. Nº. / Probe Nr. / Pro Nº.: 1	535	611	660	32		67	212	

	C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N	Co
Min.						16,50	2,00	10,00			
Max.	0,030	1,00	2,00	0,045	0,030	18,50	2,50	13,00		0,1000	
	0,023	0,47	1,57	0,036	0,030	16,62	2,05	10,08	0,52	0,0320	0,25

Visual and dimensional inspection / Besichtigung und Ausmessung / Control visual y dimensional	Radioactivity inspection / Radioaktivitätskontrolle / Control de Radioactividad	Antimixing test / Spektrosk Verwechslungspr / Antimezcla	Grain Size / Korngrösse / Tamaño de grano
O.K.	O.K.	O.K.	5-6 ASTM E-112-13

Remarks - Bemerkungen - Observaciones

IC test acc./IK prüfung nach ASTM A 262 E.15. OK
IC test acc./IK prüfung nach EN ISO 3651-2/98 Met.A. OK
"No Lead Addition"
Crack control/Rissgeprüft acc. EN 10277 class 2. OK
Reduction Ratio: 268 : 1
Free from mercury or radio-activity contamination.

EDV / EDP
Acc. EN 10204
Marian Tejedo
Quality Mng.

Works Inspector
Der Werkssachverständige
Inspector de fábrica

We hereby certify that material described herein complies with the requirements agreed on the order.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#557 (Qty=2)
Description
MALE CONN. 3-8NPT -D10
PCM Reference
C14259B014

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

Swagelok Company
29500 Solon Rd
Solon, OH 44139 U.S.A.

440.349.5600

Inspection Certificate EN 10204-3.1

Distributor	Customer	Customer PO#
Paris Fluides Systèmes Technologies 24 Avenue de la Baltique 91140 Villebon-sur-Yvette France	PCM MANUFACTURING FRANCE SAS 2048575	PO070-24-12399

No.	Part Number	Qty	Prod ID/Batch Num	Component	Heat Code
1	SS-10M0-1-6	7	0004846327	Back ferrule	4DX
				Body	7WD
				Front ferrule	4EP
				Nut	7KJ,7LR,7KM

Swagelok products referenced above are manufactured from material purchased and certified as being in accordance with the specification(s) listed below.

Information contained in the above customer address column (marked as "Customer") and area marked "Reference" (when applicable) of this certification are for reference purposes only. Swagelok Company makes no stipulations, nor takes responsibility, for the accuracy or reliability of such information.

Swagelok products are manufactured under conditions which are free from mercury. No mercury bearing components have been used in the products of your order and no mercury bearing instruments or other equipment have been used in their manufacture, assembly, or testing in such a manner as might cause contamination.

No asbestos or asbestos-containing components are used in Swagelok brand products.

MATERIAL STANDARDS

Components	Material	Standards
Shaped Fittings	F316/F316L Stainless Steel Forgings	ASTM A182, ASME SA182
Straight Fittings	316/316L Stainless Steel Bar	ASTM A479, ASME SA479, ASTM A276 (exception of square and rectangular bar)

Type 316 Stainless Steel Bar material is in the Strain-Hardened Level 2 condition.

Specific chemistry obtained from analysis of product made from this material may vary from the batch values as provided with this certification.

Stainless steel material has passed the Intergranular Corrosion Test requirements of EN ISO 3651-2, Method A, and ASTM A-262 Practice E.

All parts were cleaned and packaged in accordance with Swagelok Specifications.

The Swagelok® products specified above were manufactured in accordance with Swagelok Company's Quality Manual (SQS-F latest revision, Revision O, dated February 7, 2024).

Swagelok Company's Quality System is approved to ISO:9001 (BSI Certificate # FM01729).

Annexes: Material Certificates

Certifications Supervisor
Michael J. Zickes

APROVED BY SARA MALIK 8/29/2022 4DX

Certification ID: 001269034

CARPENTER TECHNOLOGY CORP.
READING OPERATIONS (PA)
HARTMAN & SOFIANOS STS GATE
#6
READING PA 19601

Certificate of Tests

Ship To
SWAGELOK CO 31400 AURORA RD SOLON OH 44139

Cert To
SWAGELOK CO PO Box 31300 INDEPENDENCE OH 44131

Sales Order Information	
Sales Order/Item:	57553/10
Customer PO/Item:	4504872697

Delivery Information	
Delivery:	80173538
Picked Date:	08/26/2022
Quantity Shipped:	31,828 LB

Production Information	
Production Order:	W97623
Heat Number:	759068

The recording of false, fictitious or fraudulent statements or entries on this document may be punished as a felony under federal statues including federal law, Title 18, Chapter 47.
The values and other technical data represent the results of analyses and tests made on samples collected from the total lot. Original data records can be traced by reference to the Carpenter order number.
During the manufacturing process, this material has not come in direct contact with Mercury or any of its compounds. The material has not come in contact with any radioactive sources, Cobalt 60, Radium or Alpha-Source nor devices employing a single boundary of containment. Material is also weld free.

This document shall not be reproduced, except in full, without the written consent of Carpenter Technology Corporation.

Material has been melted in USA or qualifying country to DFARS requirements 252.225-7014 with alternate 1 for qualifying country 225.872.1, superseded by DFARS requirements DFARS 252.225-7008 and 252.225-7009.

This order was manufactured in accordance with Carpenter Specialty Alloys Operations Quality Program Manual, Revision 37 dated 07/31/2019.
Carpenter Technology Corporation is registered to Quality Management System Standards: ISO 9001, AS9120 and AS9100.
This certificate of test is Type 3.1 prepared in accordance with EN 10204 (DIN 50049).
We certify this material to have been manufactured, inspected, and tested; and found the results to conform to all drawing and/or specification requirements and order requirements as applicable.
Carpenter Technology third party accreditation certificates are available on the company website: https://www.carpentertechnology.com/quality-certifications

Decision Rule: Unless otherwise specified in a customer/industry specification, Carpenter Technology Corporation will determine acceptability of any test result by comparison of the result with the specification limits, without any additional consideration of the measurement uncertainty. When requested, Carpenter Technology Corporation will provide uncertainty budgets for any test result that is not addressed by the industry standard. When a Decision Rule is defined in a customer/industry specification it will supersede the Corporate Decision Rule.

*Ingot(s) Shipped represents the ingots that were shipped on the specified delivery. The material produced and certified may include additional ingots that were not shipped.

CMT 10000632622 000 00

The certification is made to the customer printed on the form. Carpenter neither makes, nor assumes responsibility for any representation or certification to other parties.(Form E2-366)

APROVED BY SARA MALIK 8/29/2022 4DX

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED GROUND
---------- NUCLEAR QUAL
PART NUMBER: SSD-RB-053200

SPECIFICATION: SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
---------- SWAGELOK COMPANY SQS-00012 REV AG (11/24/21)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)
SWAGELOK COMPANY SQC-00196 REV I (08/30/16)
SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 7 2019 EDITION
ASTM-E18-20
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)

SIZE 0.532000 IN.(13.51 MM) RD BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.023	1.16	0.59	0.019	0.025	17.80

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.12	2.05	0.25	0.24	0.03

MELT DATE: 06/08/22
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APROVED BY SARA MALIK 8/29/2022 4DX

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
PROVISIONS OF 10 CFR PART 21 APPLY
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).
NO WELD REPAIR.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 37, DATED 07/31/19 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800
PROVISIONS OF 10 CFR PART 21 AND 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INTERGRANULAR CORROSION TESTED PER ISO 3651
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049

MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1951F (1066C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

HARDNESS AS SHIPPED, HRC - 22

*-->TESTED AT READING

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (1G OR 2G)

ORDER LENGTH REQUIREMENT: 144"

	(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)		91.0(627)	92.5(638)
YIELD STRENGTH, (1.00 %) KSI(MPA)		99.0(683)	101.0(696)
TENSILE STRENGTH, KSI(MPA)		104.0(717)	106.0(731)
ELONGATION IN 2.00", %		32.0	35.0
ELONGATION IN 2.50", %		29.0	31.0
REDUCTION OF AREA, %		72.0	73.0

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
*-->TESTED AT READING

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

INSPECTION: ACCEPTABLE

ALLOY ID: ACCEPTABLE

CMT 10000632622 000 00

FORM F2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APROVED BY SARA MALIK 8/29/2022 4DX

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CMT 10000632622 000 00

FORM F2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APROVED BY SARA MALIK 8/29/2022 4DX

CERTIFICATE OF TESTS
ABNAHMEPRUEFZEUGNIS
CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

RANDALL MOHN JR. /WI 26784
THE WORKS INSPECTOR

DIGITALLY SIGNED BY GARY BROWN
MANAGER - SPECIFICATIONS/CERTIFICATIONS
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W97623/HEAT 759068/LOT 01,03

Gary Brown

CMT 10000632622 000 00

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 1 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760443**

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD DRAWN
PART NUMBER: SSD-HB-070866

SPECIFICATION:
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)

SIZE 0.708660 IN.(18.00 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.029	1.16	0.59	0.027	0.023	17.49

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.16	2.10	0.46	0.46	0.02

MELT DATE 5/16/23
MELT DATE: 05/16/23

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 2 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760443**

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1951F (1066C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM E2-366

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 3 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760443**

HARDNESS AS SHIPPED, HRC - 23

***-->TESTED AT READING**

(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	90.0(621)	92.5(638)
YIELD STRENGTH, (1.00 %) KSI(MPA)	105.0(724)	102.0(703)
TENSILE STRENGTH, KSI(MPA)	109.0(752)	105.0(724)
ELONGATION IN 1.00", %	64.0	69.0
ELONGATION IN 1.25", %	55.0	59.0
REDUCTION OF AREA, %	73.0	72.0

***-->TESTED AT READING**

GRAIN SIZE PER ASTM E112: 6 (KALLINGS NO.2)
***-->TESTED AT READING**

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 4 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760443**

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 38 DATED 08/21/2022.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760443

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

JORDAN PEREZ /WI 50015 DIGITALLY SIGNED BY JASON M RAYMOND
ADMINISTRATOR - QUALITY
THE WORKS INSPECTOR CARPENTER TECHNOLOGY CORPORATION
MATERIAL IDENTIFIED VIA CARPENTER W47870/HEAT 760443/LOT 01



FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 3/5/2023 4EP

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST030695 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505053679
Bestell
Your order
Commande

Conferma ordine nr: EI22006547
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23005790
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

SPECIFICHE :
Anforderungen / Requirements / Exigences

SMS-10001 H/9 1.4404/316LRD A,CF
SQS-00012 AG .
SQS-00021 P . (0)
AD 2000-M. W 2 01/20 1.4401 A,CF (1)
AD 2000-M. W 2 01/20 1.4404 A,CF (2)
ASME SA479 2021 S31600/03 (3)
ASTM A262 PR. E 2015 316/316L (4)
ASTM A276 2017 S31600/03
ASTM A370 2021 .
ASTM A479 2021 S31600/03
ASTM A484 2021 .
ASTM E112 2013 . (5)
DIN 17440 96 1.4401
DIN 17440 96 1.4404 (6)
EN 10272 2016. 1.4401 A,CF
EN 10272 2016. 1.4404 A,CF
ISO 148-1 2016 .
ISO 6892-1 2019 .

Note:
Aufzeichnungen / Notes / Notes

(0)Material meet the requirements of ASME NCA-3861.
(1)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(2)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(3)Section II Part A 2021 EDITION
(4)Reapproved 2021
(5)Reapproved 2021
(6)Chemical analysis only.

Tolleranza: -0/+0,004"
Toleranz/Allowance/Tolerance

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - In Abmessungen Dimension Dimension	Lunghezza - In Lange Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahi Pieces Pieces	Peso - LB Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0012	Round	0,5625	143/ 144	436275		6.127	216610952

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 3/5/2023 4EP

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST030695 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505053679
Bestell
Your order
Commande

Conferma ordine nr: EI22006547
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23005790
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

TEST ALLO STATO DI FORNITURA

Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F		Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 1%** k.s.i.	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **A5** %		Strizione Einschnürung Reduction of area Striction **Z** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete **HB**		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max			-	-	-	-	-	-	-	-			-		
A	10	68	L		101	115	117	20		67					254		
H	10	68	L		101	115	117	22		67					256		

Test On Delivering Condition

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	HRC 1/3 r	-	-	24,4
H	HRC 1/3 r	-	-	24,8

TEST ALLO STATO DI FORNITURA

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
H	Delta Ferrite			0 %
H	Grain size for ASTM E112			4

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F		Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **E 4d** %		Strizione Einschnürung Reduction of area Striction **RA** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max			-	-	-	-	-	-	-	-			-		
B	12,5	68	L		100		120		25		65						
C	12,5	68	L		99		120		26		66						

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 3/5/2023 4EP

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST030695 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505053679
Bestell
Your order
Commande

Conferma ordine nr: EI22006547
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23005790
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 ft/lbs			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-	-
F	10X5	68	L	50	51	47						
G	10X5	68	L	44	46	46						

Tensile testing according to ISO 6892-1

Impact testing according to ISO 148-1

Mechanical properties according to ASTM A370.

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée		C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	P %	S %	N %				
	min -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
436275		0,018	0,52	1,68	17,77	2,14	0,58	12,30	0,108	0,029	0,021	0,054				

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	**SATISFACTORY**

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: ASTM A262-Practice E

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitization	15	boil	180	5	Absence of cracks	**SATISFACTORY**

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 3/5/2023 4EP

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST030695 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505053679
Bestell
Your order
Commande

Conferma ordine nr: EI22006547
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23005790
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Annealing temperature: 1950°F ± 25°F/water.
Grain size tested on sample on the cross section at one third the distance from surface to center.
Ferrite delta tested according to SMS-10001 par 8.11.
Quality System manual rev.14 dated 26 July 2021 as accepted by Swagelok Company.
10CFR50 Appendix B and 10CFR21 apply
Melt date: 25/08/2022.
ACCIAIERIE VALBRUNA is certified in accordance with AD 2000-M. W 0
This material satisfies the ASME SA-479 (Ref. 2.1.4) requirements for alloy 316/316L.
Reduction ratio = 1194,8 : 1
Material annealed 1940°F for 2h/water cooled.
ET ACC. TO:SMS SPECIF. REQ.: PASS
UT ACC. TO SMS SPECIF. REQ.: PASS
COMPARATOR ACC. TO SMS SPECIF. REQ.:PASS
PART NO. SSD-RB-056250
PO # 4505053679 LINE 003
HEAT CODE: 4EP
Material is DFARS Compliant
"Issued in agreement with TÜV SÜD Industrie Service GMBH (07/1972)"
"Qs approved according to PED, Annex I, Para. 4.3 by Notified Body 0036"
"(Certification no. DGR-0036-QS-W 23/2002/MUC)"

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel â eté trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/OES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.

Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.

The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSPF07ACEF1E49E38ABDEF0123457789ACD

Approved by M Slatinsek 07/18/2023 4EP

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094690 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505222922
Bestell
Your order
Commande

Conferma ordine nr: EI22009408
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018275
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

SPECIFICHE :
Anforderungen / Requirements / Exigences

SMS-10001 I 1.4404/316LRD A,CF
SQS-00012 AI .
SQS-00021 P . (0)
AD 2000-M. W 2 01/20 1.4401 A,CF (1)
AD 2000-M. W 2 01/20 1.4404 A,CF (2)
ASME SA479 2021 S31600/03 (3)
ASTM A262 PR. E 2015 316/316L (4)
ASTM A276 2017 S31600/03
ASTM A370 2022 .
ASTM A479 2021 S31600/03
ASTM A484 2021 .
ASTM A751 2021 .
ASTM E112 2013 . (5)
ASTM E18 2022 .
DIN 17440 1996 1.4401
DIN 17440 1996 1.4404 (6)
EN 10272 2016. 1.4401 A,CF
EN 10272 2016. 1.4404 A,CF
ISO 148-1 2016 .
ISO 3651-2 98 METHOD A T1
ISO 6892-1 2019 .

Note:
Aufzeichnungen / Notes / Notes

(0)Material meet the requirements of ASME NCA-3861.
(1)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(2)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(3)Section II Part A 2021 EDITION
(4)Reapproved 2021
(5)Reapproved 2021
(6)Chemical analysis only.

Tolleranza: -0/+0,004"
Toleranz/Allowance/Tolerance

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - In Abmessungen Dimension Dimension	Lunghezza - In Lange Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahl Pieces Pieces	Peso - LB Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0010	Round	0,5625	143/ 144	436275		24.451	227007630

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER ACCORDING TO ISO 9001 : 2015, IATF 16949 : 2016, AS 9100D

Vicenza, 17/07/2023
VCQ012 - MEST094690

Direzione Qualità
Qualitätsmanagement/Quality Management/Gestion Qualité
Digitally signed by
R.BERTELLI

Direzione Prodotto
Produktmanagement/Product Management/Direction Produit
Digitally signed by
P.MESSORI

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094690 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505222922
Bestell
Your order
Commande

Conferma ordine nr: EI22009408
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018275
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

TEST ALLO STATO DI FORNITURA

Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 1%** k.s.i.	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **A5** %		Strizione Einschnürung Reduction of area Striction **Z** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete **HB**		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
A	10	68	L	101	115	117	20		67					254		
H	10	68	L	101	115	117	22		67					256		

Test On Delivering Condition

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	HRC 1/3 r	-	-	24,4
H	HRC 1/3 r	-	-	24,8

TEST ALLO STATO DI FORNITURA

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
H	Delta Ferrite			0 %
H	Grain size for ASTM E112			4

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **E 4d** %		Strizione Einschnürung Reduction of area Striction **RA** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
B	12,5	68	L	100		120		25		65						
C	12,5	68	L	99		120		26		66						

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094690 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505222922
Bestell
Your order
Commande

Conferma ordine nr: EI22009408
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018275
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 ft/lbs			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-	-
F	10X5	68	L	50	51	47						
G	10X5	68	L	44	46	46						

Tensile testing according to ISO 6892-1

Impact testing according to ISO 148-1

Mechanical properties according to ASTM A370.

Rockwell hardness according to ASTM E18

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée		C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	P %	S %	N %				
	min -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
436275		0,018	0,52	1,68	17,77	2,14	0,58	12,30	0,108	0,029	0,021	0,054				

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	**SATISFACTORY**

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: ASTM A262-Practice E

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitization	15	boil	180	5	Absence of cracks	**SATISFACTORY**

Approved by M Slatinsek 07/18/2023 4EP

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094690 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505222922
Bestell
Your order
Commande

Conferma ordine nr: EI22009408
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018275
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Annealing temperature: 1950°F ± 25°F/water.
Grain size tested on sample on the cross section at one third the distance from surface to center.
Ferrite delta tested according to SMS-10001 par 8.11.
Quality System manual rev.14 dated 26 July 2021 as accepted by Swagelok Company.
10CFR50 Appendix B and 10CFR21 apply
Melt date: 25/08/2022.
Comparator testing: pass.
ACCIAIERIE VALBRUNA is certified in accordance with AD 2000-M. W 0
This material satisfies the ASME SA-479 (Ref. 2.1.4) requirements for alloy 316/316L.
Reduction ratio = 1194,8 : 1
Material annealed 1940°F for 2h/water cooled.
ET ACC. TO:SMS SPECIF. REQ.: PASS
UT ACC. TO SMS SPECIF. REQ.:PASS
PART NO. SSD-RB-056250
PO # 4505222922 LINE 001
HEAT CODE: 4EP
Material is DFARS Compliant
"Issued in agreement with TÜV SÜD Industrie Service GMBH (07/1972)"
"Qs approved according to PED, Annex I, Para. 4.3 by Notified Body 0036"
"(Certification no. DGR-0036-QS-W 23/2002/MUC)"

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel â eté trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/OES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according to Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
The Quality Management System is also Certified according to PER 2016/1105, Schedule 2, Part 4, Para 31 (8) by Competent Body TÜV SUD BABT Unlimited.
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.
Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.
The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSP499530DB730C962FB730CA63FB841D9F

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 1 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760256**

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD DRAWN
PART NUMBER: SSD-HB-075000

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.750000 IN.(19.05 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.023	1.15	0.59	0.027	0.028	17.56

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.20	2.13	0.43	0.36	0.03

MELT DATE: 03/27/23

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 2 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760256**

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MELT DATE OF HEAT: 03/27/2023

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

MILL HEAT TREATMENT:
TYPE SOLUTION ANNEAL
TEMP 1951F (1066C)
TIME AT TEMP CONTINUOUS FURNACE
QUENCH WATER

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

HARDNESS AS SHIPPED, HRC - 24
*-->TESTED AT READING

(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	93.5(645)	90.5(624)
YIELD STRENGTH, (1.00 %) KSI(MPA)	103.0(710)	102.0(703)
TENSILE STRENGTH, KSI(MPA)	106.0(731)	106.0(731)
ELONGATION IN 2.00", %	33.0	33.0
ELONGATION IN 2.50", %	28.0	28.0
REDUCTION OF AREA, %	73.0	73.0

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
*-->TESTED AT READING

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

INSPECTION: ACCEPTABLE

ALLOY ID: ACCEPTABLE

FORM F2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760256**

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760256**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

DAVID CRUZ /WI 25739
THE WORKS INSPECTOR

DIGITALLY SIGNED BY GARY BROWN
MANAGER - SPECIFICATIONS/CERTIFICATIONS
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W47149/HEAT 760256/LOT 01

Gary Brown

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001302292

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD
---------- DRAWN
PART NUMBER: SSD-HB-075000

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
---------- SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.750000 IN.(19.05 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.023	1.15	0.59	0.027	0.028	17.56

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.20	2.13	0.43	0.36	0.03

MELT DATE: 03/27/23

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001302292

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MELT DATE OF HEAT: 03/27/2023

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001302292

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

MILL HEAT TREATMENT:
TYPE SOLUTION ANNEAL
TEMP 1951F (1066C)
TIME AT TEMP CONTINUOUS FURNACE
QUENCH WATER

HARDNESS AS SHIPPED, HRC - 30

*-->TESTED AT READING

	(T)RANSVERSE	(L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)		88.5(610)	88.0(607)	
YIELD STRENGTH, (1.00 %) KSI(MPA)		101.0(696)	101.0(696)	
TENSILE STRENGTH, KSI(MPA)		104.0(717)	105.0(724)	
ELONGATION IN 2.00", %		35.0	34.0	
ELONGATION IN 2.50", %		29.0	28.0	
REDUCTION OF AREA, %		73.0	72.0	

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 5 (KALLINGS NO.2)
*-->TESTED AT ATHENS

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

INSPECTION: ACCEPTABLE

ALLOY ID: ACCEPTABLE

FORM F2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001302292

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601
ATHENS - 22110 THOMAS L HAMMONDS RD, TANNER, AL 35671

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530
29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751
WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS
Certification ID:001302292

ABNAHMEPRUEFZEUGNIS

CERTIFICAT DE CONTROLE

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

DAVID CRUZ /WI 25739
THE WORKS INSPECTOR

DIGITALLY SIGNED BY GARY BROWN
MANAGER - SPECIFICATIONS/CERTIFICATIONS
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W47154/HEAT 760256/LOT 01,02

Gary Brown

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	W46416		28409

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760337

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD
---------- DRAWN
PART NUMBER: SSD-HB-075000

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
---------- SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.750000 IN.(19.05 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.022	1.17	0.58	0.031	0.026	17.58

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.13	2.05	0.45	0.33	0.03

MELT DATE: 04/17/23

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 2 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	W46416		28409

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760337**

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MELT DATE OF HEAT: 04/17/2023

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM E2-366

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 3 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	W46416		28409

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760337**

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

MILL HEAT TREATMENT:
TYPE SOLUTION ANNEAL
TEMP 1951F (1066C)
TIME AT TEMP CONTINUOUS FURNACE
QUENCH WATER

HARDNESS AS SHIPPED, HRC - 25
***-->TESTED AT READING**

	(T)RANSVERSE	(L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	90.0(621)	90.5(624)		
YIELD STRENGTH, (1.00 %) KSI(MPA)	100.0(689)	103.0(710)		
TENSILE STRENGTH, KSI(MPA)	104.0(717)	107.0(738)		
ELONGATION IN 2.00", %	35.0	32.0		
ELONGATION IN 2.50", %	30.0	27.0		
REDUCTION OF AREA, %	72.0	73.0		

***-->TESTED AT READING**

GRAIN SIZE PER ASTM E112: 5 (KALLINGS NO.2)
***-->TESTED AT READING**

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

INSPECTION: ACCEPTABLE

ALLOY ID: ACCEPTABLE

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 4 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	**W46416**		**28409**

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760337**

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS
ABNAHMEPRUEFZEUGNIS
CERTIFICAT DE CONTROLE

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	**W46416**		**28409**

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760337**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

BENJAMIN ENGLERTH /WI 26424 DIGITALLY SIGNED BY GARY BROWN
MANAGER - SPECIFICATIONS/CERTIFICATIONS
THE WORKS INSPECTOR CARPENTER TECHNOLOGY CORPORATION
MATERIAL IDENTIFIED VIA CARPENTER W46416/HEAT 760337/LOT 01

Gary Brown

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760255

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD
---------- DRAWN
PART NUMBER: SSD-HB-075000

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
---------- SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.750000 IN.(19.05 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.024	1.17	0.57	0.028	0.026	17.51

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.16	2.06	0.32	0.31	0.03

MELT DATE: 03/28/23

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760255

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1951F (1066C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

MELT DATE 3/28/23

CONTINUED ON NEXT PAGE

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760255

HARDNESS AS SHIPPED, HRC - 27

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 3 (KALLINGS NO.2)
*-->TESTED AT READING

	(T)RANSVERSE	(L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	86.0(593)		89.5(617)	
YIELD STRENGTH, (1.00 %) KSI(MPA)	98.5(679)		99.0(683)	
TENSILE STRENGTH, KSI(MPA)	103.0(710)		103.0(710)	
ELONGATION IN 2.00", %	37.0		37.0	
ELONGATION IN 2.50", %	31.0		31.0	
REDUCTION OF AREA, %	74.0		73.0	

*-->TESTED AT READING

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760255

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760255**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

DAVID CRUZ /WI 25739
THE WORKS INSPECTOR

DIGITALLY SIGNED BY JASON M RAYMOND
ADMINISTRATOR - QUALITY
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W47152/HEAT 760255/LOT 01



FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#557 (Qty=1)
Description
MALE CONN. 3-8NPT -D10
PCM Reference
C14259B014

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

Swagelok Company
29500 Solon Rd
Solon, OH 44139 U.S.A.

440.349.5600

Inspection Certificate EN 10204-3.1

Distributor	Customer	Customer PO#
Paris Fluides Systèmes Technologies 24 Avenue de la Baltique 91140 Villebon-sur-Yvette France	PCM MANUFACTURING FRANCE SAS 2046485	PO070-24-10007

No.	Part Number	Qty	Prod ID/Batch Num	Component	Heat Code
1	SS-10M0-1-6	2	0004846327	Back ferrule	4DX
				Body	7WD
				Front ferrule	4EP
				Nut	7KJ,7LR,7KM

Swagelok products referenced above are manufactured from material purchased and certified as being in accordance with the specification(s) listed below.

Information contained in the above customer address column (marked as "Customer") and area marked "Reference" (when applicable) of this certification are for reference purposes only. Swagelok Company makes no stipulations, nor takes responsibility, for the accuracy or reliability of such information.

Swagelok products are manufactured under conditions which are free from mercury. No mercury bearing components have been used in the products of your order and no mercury bearing instruments or other equipment have been used in their manufacture, assembly, or testing in such a manner as might cause contamination.

No asbestos or asbestos-containing components are used in Swagelok brand products.

MATERIAL STANDARDS

Components	Material	Standards
Shaped Fittings	F316/F316L Stainless Steel Forgings	ASTM A182, ASME SA182
Straight Fittings	316/316L Stainless Steel Bar	ASTM A479, ASME SA479, ASTM A276 (exception of square and rectangular bar)

Type 316 Stainless Steel Bar material is in the Strain-Hardened Level 2 condition.

Specific chemistry obtained from analysis of product made from this material may vary from the batch values as provided with this certification.

Stainless steel material has passed the Intergranular Corrosion Test requirements of EN ISO 3651-2, Method A, and ASTM A-262 Practice E.

All parts were cleaned and packaged in accordance with Swagelok Specifications.

The Swagelok® products specified above were manufactured in accordance with Swagelok Company's Quality Manual (SQS-F latest revision, Revision O, dated February 7, 2024).

Swagelok Company's Quality System is approved to ISO:9001 (BSI Certificate # FM01729).

Annexes: Material Certificates

Certifications Supervisor
Michael J. Zickes

APROVED BY SARA MALIK 8/29/2022 4DX

Certification ID: 001269034

CARPENTER TECHNOLOGY CORP.
READING OPERATIONS (PA)
HARTMAN & SOFIANOS STS GATE
#6
READING PA 19601

Certificate of Tests

Ship To
SWAGELOK CO 31400 AURORA RD SOLON OH 44139

Cert To
SWAGELOK CO PO Box 31300 INDEPENDENCE OH 44131

Sales Order Information	
Sales Order/Item:	57553/10
Customer PO/Item:	4504872697

Delivery Information	
Delivery:	80173538
Picked Date:	08/26/2022
Quantity Shipped:	31,828 LB

Production Information	
Production Order:	W97623
Heat Number:	759068

Component	Heat Code
Back ferrule	4DX
Body	7WD
Front ferrule	4EP
Nut	7KJ,7LR,7KM

The recording of false, fictitious or frauduler der federal statues including federal law, Title 18, Chapter 47.
The values and other technical data represe total lot. Original data records can be traced by reference to the Carpenter order number
During the manufacturing process, this mat The material has not come in contact with any radioactive sources, Cobalt 60, Radium it. Material is also weld free.

This document shall not be reproduced, exc on.

Material has been melted in USA or qualifyi lifying country 225.872.1, superseded by DFARS requirements DFARS 252.225-7008 and 252.225-7009.

This order was manufactured in accordance with Carpenter Specialty Alloys Operations Quality Program Manual, Revision 37 dated 07/31/2019.
Carpenter Technology Corporation is registered to Quality Management System Standards: ISO 9001, AS9120 and AS9100.
This certificate of test is Type 3.1 prepared in accordance with EN 10204 (DIN 50049).
We certify this material to have been manufactured, inspected, and tested; and found the results to conform to all drawing and/or specification requirements and order requirements as applicable.
Carpenter Technology third party accreditation certificates are available on the company website: https://www.carpentertechnology.com/quality-certifications

Decision Rule: Unless otherwise specified in a customer/industry specification, Carpenter Technology Corporation will determine acceptability of any test result by comparison of the result with the specification limits, without any additional consideration of the measurement uncertainty. When requested, Carpenter Technology Corporation will provide uncertainty budgets for any test result that is not addressed by the industry standard. When a Decision Rule is defined in a customer/industry specification it will supersede the Corporate Decision Rule.

*Ingot(s) Shipped represents the ingots that were shipped on the specified delivery. The material produced and certified may include additional ingots that were not shipped.

CMT 10000632622 000 00

The certification is made to the customer printed on the form. Carpenter neither makes, nor assumes responsibility for any representation or certification to other parties.(Form E2-366)

APROVED BY SARA MALIK 8/29/2022 4DX

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED GROUND
---------- NUCLEAR QUAL
PART NUMBER: SSD-RB-053200

SPECIFICATION: SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
---------- SWAGELOK COMPANY SQS-00012 REV AG (11/24/21)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)
SWAGELOK COMPANY SQC-00196 REV I (08/30/16)
SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 7 2019 EDITION
ASTM-E18-20
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)

SIZE 0.532000 IN.(13.51 MM) RD BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.023	1.16	0.59	0.019	0.025	17.80

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.12	2.05	0.25	0.24	0.03

MELT DATE: 06/08/22
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APROVED BY SARA MALIK 8/29/2022 4DX

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
PROVISIONS OF 10 CFR PART 21 APPLY
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).
NO WELD REPAIR.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 37, DATED 07/31/19 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800
PROVISIONS OF 10 CFR PART 21 AND 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INTERGRANULAR CORROSION TESTED PER ISO 3651
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049

MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1951F (1066C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

HARDNESS AS SHIPPED, HRC - 22

*-->TESTED AT READING

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (1G OR 2G)

ORDER LENGTH REQUIREMENT: 144"

	(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)		91.0(627)	92.5(638)
YIELD STRENGTH, (1.00 %) KSI(MPA)		99.0(683)	101.0(696)
TENSILE STRENGTH, KSI(MPA)		104.0(717)	106.0(731)
ELONGATION IN 2.00", %		32.0	35.0
ELONGATION IN 2.50", %		29.0	31.0
REDUCTION OF AREA, %		72.0	73.0

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
*-->TESTED AT READING

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

INSPECTION: ACCEPTABLE

ALLOY ID: ACCEPTABLE

CMT 10000632622 000 00

FORM F2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APROVED BY SARA MALIK 8/29/2022 4DX

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CMT 10000632622 000 00

FORM F2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APROVED BY SARA MALIK 8/29/2022 4DX

CERTIFICATE OF TESTS
ABNAHMEPRUEFZEUGNIS
CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

RANDALL MOHN JR. /WI 26784
THE WORKS INSPECTOR

DIGITALLY SIGNED BY GARY BROWN
MANAGER - SPECIFICATIONS/CERTIFICATIONS
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W97623/HEAT 759068/LOT 01,03

Gary Brown

CMT 10000632622 000 00

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 1 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760443**

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD DRAWN
PART NUMBER: SSD-HB-070866

SPECIFICATION:
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)

SIZE 0.708660 IN.(18.00 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.029	1.16	0.59	0.027	0.023	17.49

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.16	2.10	0.46	0.46	0.02

MELT DATE 5/16/23
MELT DATE: 05/16/23

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 2 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760443**

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1951F (1066C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM E2-366

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 3 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760443**

HARDNESS AS SHIPPED, HRC - 23

***-->TESTED AT READING**

(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	90.0(621)	92.5(638)
YIELD STRENGTH, (1.00 %) KSI(MPA)	105.0(724)	102.0(703)
TENSILE STRENGTH, KSI(MPA)	109.0(752)	105.0(724)
ELONGATION IN 1.00", %	64.0	69.0
ELONGATION IN 1.25", %	55.0	59.0
REDUCTION OF AREA, %	73.0	72.0

***-->TESTED AT READING**

GRAIN SIZE PER ASTM E112: 6 (KALLINGS NO.2)
***-->TESTED AT READING**

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 4 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760443**

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 38 DATED 08/21/2022.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760443

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

JORDAN PEREZ /WI 50015 DIGITALLY SIGNED BY JASON M RAYMOND
ADMINISTRATOR - QUALITY
THE WORKS INSPECTOR CARPENTER TECHNOLOGY CORPORATION
MATERIAL IDENTIFIED VIA CARPENTER W47870/HEAT 760443/LOT 01



FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 3/5/2023 4EP

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST030695 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505053679
Bestell
Your order
Commande

Conferma ordine nr: EI22006547
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23005790
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

SPECIFICHE :
Anforderungen / Requirements / Exigences

SMS-10001 H/9 1.4404/316LRD A,CF
SQS-00012 AG .
SQS-00021 P . (0)
AD 2000-M. W 2 01/20 1.4401 A,CF (1)
AD 2000-M. W 2 01/20 1.4404 A,CF (2)
ASME SA479 2021 S31600/03 (3)
ASTM A262 PR. E 2015 316/316L (4)
ASTM A276 2017 S31600/03
ASTM A370 2021 .
ASTM A479 2021 S31600/03
ASTM A484 2021 .
ASTM E112 2013 . (5)
DIN 17440 96 1.4401
DIN 17440 96 1.4404 (6)
EN 10272 2016. 1.4401 A,CF
EN 10272 2016. 1.4404 A,CF
ISO 148-1 2016 .
ISO 6892-1 2019 .

Note:
Aufzeichnungen / Notes / Notes

(0)Material meet the requirements of ASME NCA-3861.
(1)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(2)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(3)Section II Part A 2021 EDITION
(4)Reapproved 2021
(5)Reapproved 2021
(6)Chemical analysis only.

Tolleranza: -0/+0,004"
Toleranz/Allowance/Tolerance

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - In Abmessungen Dimension Dimension	Lunghezza - In Lange Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahi Pieces Pieces	Peso - LB Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0012	Round	0,5625	143/ 144	436275		6.127	216610952

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 3/5/2023 4EP

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST030695 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505053679
Bestell
Your order
Commande

Conferma ordine nr: EI22006547
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23005790
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

TEST ALLO STATO DI FORNITURA

Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F		Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 1%** k.s.i.	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **A5** %		Strizione Einschnürung Reduction of area Striction **Z** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete **HB**		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max			-	-	-	-	-	-	-	-			-		
A	10	68	L		101	115	117	20		67					254		
H	10	68	L		101	115	117	22		67					256		

Test On Delivering Condition

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	HRC 1/3 r	-	-	24,4
H	HRC 1/3 r	-	-	24,8

TEST ALLO STATO DI FORNITURA

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
H	Delta Ferrite			0 %
H	Grain size for ASTM E112			4

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F		Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **E 4d** %		Strizione Einschnürung Reduction of area Striction **RA** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max			-	-	-	-	-	-	-	-			-		
B	12,5	68	L		100		120		25		65						
C	12,5	68	L		99		120		26		66						

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 3/5/2023 4EP

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST030695 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505053679
Bestell
Your order
Commande

Conferma ordine nr: EI22006547
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23005790
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 ft/lbs			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-	-
F	10X5	68	L	50	51	47						
G	10X5	68	L	44	46	46						

Tensile testing according to ISO 6892-1

Impact testing according to ISO 148-1

Mechanical properties according to ASTM A370.

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée		C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	P %	S %	N %				
	min -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
436275		0,018	0,52	1,68	17,77	2,14	0,58	12,30	0,108	0,029	0,021	0,054				

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	**SATISFACTORY**

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: ASTM A262-Practice E

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitization	15	boil	180	5	Absence of cracks	**SATISFACTORY**

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 3/5/2023 4EP

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST030695 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505053679
Bestell
Your order
Commande

Conferma ordine nr: EI22006547
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23005790
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Annealing temperature: 1950°F ± 25°F/water.
Grain size tested on sample on the cross section at one third the distance from surface to center.
Ferrite delta tested according to SMS-10001 par 8.11.
Quality System manual rev.14 dated 26 July 2021 as accepted by Swagelok Company.
10CFR50 Appendix B and 10CFR21 apply
Melt date: 25/08/2022.
ACCIAIERIE VALBRUNA is certified in accordance with AD 2000-M. W 0
This material satisfies the ASME SA-479 (Ref. 2.1.4) requirements for alloy 316/316L.
Reduction ratio = 1194,8 : 1
Material annealed 1940°F for 2h/water cooled.
ET ACC. TO:SMS SPECIF. REQ.: PASS
UT ACC. TO SMS SPECIF. REQ.: PASS
COMPARATOR ACC. TO SMS SPECIF. REQ.:PASS
PART NO. SSD-RB-056250
PO # 4505053679 LINE 003
HEAT CODE: 4EP
Material is DFARS Compliant
"Issued in agreement with TÜV SÜD Industrie Service GMBH (07/1972)"
"Qs approved according to PED, Annex I, Para. 4.3 by Notified Body 0036"
"(Certification no. DGR-0036-QS-W 23/2002/MUC)"

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel â eté trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/OES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.

Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.

The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSPF07ACEF1E49E38ABDEF0123457789ACD

Approved by M Slatinsek 07/18/2023 4EP

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094690 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505222922
Bestell
Your order
Commande

Conferma ordine nr: EI22009408
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018275
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

SPECIFICHE :
Anforderungen / Requirements / Exigences

SMS-10001 I 1.4404/316LRD A,CF
SQS-00012 AI .
SQS-00021 P . (0)
AD 2000-M. W 2 01/20 1.4401 A,CF (1)
AD 2000-M. W 2 01/20 1.4404 A,CF (2)
ASME SA479 2021 S31600/03 (3)
ASTM A262 PR. E 2015 316/316L (4)
ASTM A276 2017 S31600/03
ASTM A370 2022 .
ASTM A479 2021 S31600/03
ASTM A484 2021 .
ASTM A751 2021 .
ASTM E112 2013 . (5)
ASTM E18 2022 .
DIN 17440 1996 1.4401
DIN 17440 1996 1.4404 (6)
EN 10272 2016. 1.4401 A,CF
EN 10272 2016. 1.4404 A,CF
ISO 148-1 2016 .
ISO 3651-2 98 METHOD A T1
ISO 6892-1 2019 .

Note:
Aufzeichnungen / Notes / Notes

(0)Material meet the requirements of ASME NCA-3861.
(1)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(2)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(3)Section II Part A 2021 EDITION
(4)Reapproved 2021
(5)Reapproved 2021
(6)Chemical analysis only.

Tolleranza: -0/+0,004"
Toleranz/Allowance/Tolerance

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - In Abmessungen Dimension Dimension	Lunghezza - In Lange Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahl Pieces Pieces	Peso - LB Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0010	Round	0,5625	143/ 144	436275		24.451	227007630

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER ACCORDING TO ISO 9001 : 2015, IATF 16949 : 2016, AS 9100D

Vicenza, 17/07/2023
VCQ012 - MEST094690

Direzione Qualità
Qualitätsmanagement/Quality Management/Gestion Qualité
Digitally signed by
R.BERTELLI

Direzione Prodotto
Produktmanagement/Product Management/Direction Produit
Digitally signed by
P.MESSORI

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094690 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505222922
Bestell
Your order
Commande

Conferma ordine nr: EI22009408
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018275
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

TEST ALLO STATO DI FORNITURA

Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 1%** k.s.i.	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **A5** %		Strizione Einschnürung Reduction of area Striction **Z** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete **HB**		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
A	10	68	L	101	115	117	20		67					254		
H	10	68	L	101	115	117	22		67					256		

Test On Delivering Condition

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	HRC 1/3 r	-	-	24,4
H	HRC 1/3 r	-	-	24,8

TEST ALLO STATO DI FORNITURA

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
H	Delta Ferrite			0 %
H	Grain size for ASTM E112			4

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **E 4d** %		Strizione Einschnürung Reduction of area Striction **RA** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
B	12,5	68	L	100		120		25		65						
C	12,5	68	L	99		120		26		66						

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094690 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505222922
Bestell
Your order
Commande

Conferma ordine nr: EI22009408
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018275
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 ft/lbs			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-	-
F	10X5	68	L	50	51	47						
G	10X5	68	L	44	46	46						

Tensile testing according to ISO 6892-1

Impact testing according to ISO 148-1

Mechanical properties according to ASTM A370.

Rockwell hardness according to ASTM E18

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée		C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	P %	S %	N %				
	min -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
436275		0,018	0,52	1,68	17,77	2,14	0,58	12,30	0,108	0,029	0,021	0,054				

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	**SATISFACTORY**

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: ASTM A262-Practice E

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitization	15	boil	180	5	Absence of cracks	**SATISFACTORY**

Approved by M Slatinsek 07/18/2023 4EP

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094690 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505222922
Bestell
Your order
Commande

Conferma ordine nr: EI22009408
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018275
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Annealing temperature: 1950°F ± 25°F/water.
Grain size tested on sample on the cross section at one third the distance from surface to center.
Ferrite delta tested according to SMS-10001 par 8.11.
Quality System manual rev.14 dated 26 July 2021 as accepted by Swagelok Company.
10CFR50 Appendix B and 10CFR21 apply
Melt date: 25/08/2022.
Comparator testing: pass.
ACCIAIERIE VALBRUNA is certified in accordance with AD 2000-M. W 0
This material satisfies the ASME SA-479 (Ref. 2.1.4) requirements for alloy 316/316L.
Reduction ratio = 1194,8 : 1
Material annealed 1940°F for 2h/water cooled.
ET ACC. TO:SMS SPECIF. REQ.: PASS
UT ACC. TO SMS SPECIF. REQ.:PASS
PART NO. SSD-RB-056250
PO # 4505222922 LINE 001
HEAT CODE: 4EP
Material is DFARS Compliant
"Issued in agreement with TÜV SÜD Industrie Service GMBH (07/1972)"
"Qs approved according to PED, Annex I, Para. 4.3 by Notified Body 0036"
"(Certification no. DGR-0036-QS-W 23/2002/MUC)"

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel â eté trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/OES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according to Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
The Quality Management System is also Certified according to PER 2016/1105, Schedule 2, Part 4, Para 31 (8) by Competent Body TÜV SUD BABT Unlimited.
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.
Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.
The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSP499530DB730C962FB730CA63FB841D9F

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 1 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760256**

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD DRAWN
PART NUMBER: SSD-HB-075000

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.750000 IN.(19.05 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.023	1.15	0.59	0.027	0.028	17.56

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.20	2.13	0.43	0.36	0.03

MELT DATE: 03/27/23

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 2 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760256**

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MELT DATE OF HEAT: 03/27/2023

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

MILL HEAT TREATMENT:
TYPE SOLUTION ANNEAL
TEMP 1951F (1066C)
TIME AT TEMP CONTINUOUS FURNACE
QUENCH WATER

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

HARDNESS AS SHIPPED, HRC - 24
*-->TESTED AT READING

(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	93.5(645)	90.5(624)
YIELD STRENGTH, (1.00 %) KSI(MPA)	103.0(710)	102.0(703)
TENSILE STRENGTH, KSI(MPA)	106.0(731)	106.0(731)
ELONGATION IN 2.00", %	33.0	33.0
ELONGATION IN 2.50", %	28.0	28.0
REDUCTION OF AREA, %	73.0	73.0

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
*-->TESTED AT READING

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

INSPECTION: ACCEPTABLE

ALLOY ID: ACCEPTABLE

FORM F2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760256**

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760256**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

DAVID CRUZ /WI 25739
THE WORKS INSPECTOR

DIGITALLY SIGNED BY GARY BROWN
MANAGER - SPECIFICATIONS/CERTIFICATIONS
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W47149/HEAT 760256/LOT 01

Gary Brown

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001302292

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD
---------- DRAWN
PART NUMBER: SSD-HB-075000

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
---------- SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.750000 IN.(19.05 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.023	1.15	0.59	0.027	0.028	17.56

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.20	2.13	0.43	0.36	0.03

MELT DATE: 03/27/23

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001302292

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MELT DATE OF HEAT: 03/27/2023

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001302292

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

MILL HEAT TREATMENT:
TYPE SOLUTION ANNEAL
TEMP 1951F (1066C)
TIME AT TEMP CONTINUOUS FURNACE
QUENCH WATER

HARDNESS AS SHIPPED, HRC - 30

*-->TESTED AT READING

	(T)RANSVERSE	(L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)		88.5(610)	88.0(607)	
YIELD STRENGTH, (1.00 %) KSI(MPA)		101.0(696)	101.0(696)	
TENSILE STRENGTH, KSI(MPA)		104.0(717)	105.0(724)	
ELONGATION IN 2.00", %		35.0	34.0	
ELONGATION IN 2.50", %		29.0	28.0	
REDUCTION OF AREA, %		73.0	72.0	

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 5 (KALLINGS NO.2)
*-->TESTED AT ATHENS

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

INSPECTION: ACCEPTABLE

ALLOY ID: ACCEPTABLE

FORM F2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001302292

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601
ATHENS - 22110 THOMAS L HAMMONDS RD, TANNER, AL 35671

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530
29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751
WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS
Certification ID:001302292

ABNAHMEPRUEFZEUGNIS

CERTIFICAT DE CONTROLE

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

DAVID CRUZ /WI 25739
THE WORKS INSPECTOR

DIGITALLY SIGNED BY GARY BROWN
MANAGER - SPECIFICATIONS/CERTIFICATIONS
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W47154/HEAT 760256/LOT 01,02

Gary Brown

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	W46416		28409

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760337

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD
---------- DRAWN
PART NUMBER: SSD-HB-075000

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
---------- SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.750000 IN.(19.05 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.022	1.17	0.58	0.031	0.026	17.58

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.13	2.05	0.45	0.33	0.03

MELT DATE: 04/17/23

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 2 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	W46416		28409

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760337**

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MELT DATE OF HEAT: 04/17/2023

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM E2-366

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 3 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	W46416		28409

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760337**

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

MILL HEAT TREATMENT:
TYPE SOLUTION ANNEAL
TEMP 1951F (1066C)
TIME AT TEMP CONTINUOUS FURNACE
QUENCH WATER

HARDNESS AS SHIPPED, HRC - 25
***-->TESTED AT READING**

	(T)RANSVERSE	(L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	90.0(621)	90.5(624)		
YIELD STRENGTH, (1.00 %) KSI(MPA)	100.0(689)	103.0(710)		
TENSILE STRENGTH, KSI(MPA)	104.0(717)	107.0(738)		
ELONGATION IN 2.00", %	35.0	32.0		
ELONGATION IN 2.50", %	30.0	27.0		
REDUCTION OF AREA, %	72.0	73.0		

***-->TESTED AT READING**

GRAIN SIZE PER ASTM E112: 5 (KALLINGS NO.2)
***-->TESTED AT READING**

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

INSPECTION: ACCEPTABLE

ALLOY ID: ACCEPTABLE

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 4 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	**W46416**		**28409**

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760337**

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS
ABNAHMEPRUEFZEUGNIS
CERTIFICAT DE CONTROLE

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	**W46416**		**28409**

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760337**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

BENJAMIN ENGLERTH /WI 26424 DIGITALLY SIGNED BY GARY BROWN
MANAGER - SPECIFICATIONS/CERTIFICATIONS
THE WORKS INSPECTOR CARPENTER TECHNOLOGY CORPORATION
MATERIAL IDENTIFIED VIA CARPENTER W46416/HEAT 760337/LOT 01

Gary Brown

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760255

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD
---------- DRAWN
PART NUMBER: SSD-HB-075000

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
---------- SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.750000 IN.(19.05 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.024	1.17	0.57	0.028	0.026	17.51

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.16	2.06	0.32	0.31	0.03

MELT DATE: 03/28/23

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760255

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1951F (1066C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

MELT DATE 3/28/23

CONTINUED ON NEXT PAGE

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760255

HARDNESS AS SHIPPED, HRC - 27

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 3 (KALLINGS NO.2)
*-->TESTED AT READING

	(T)RANSVERSE	(L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	86.0(593)		89.5(617)	
YIELD STRENGTH, (1.00 %) KSI(MPA)	98.5(679)		99.0(683)	
TENSILE STRENGTH, KSI(MPA)	103.0(710)		103.0(710)	
ELONGATION IN 2.00", %	37.0		37.0	
ELONGATION IN 2.50", %	31.0		31.0	
REDUCTION OF AREA, %	74.0		73.0	

*-->TESTED AT READING

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760255

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760255**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

DAVID CRUZ /WI 25739
THE WORKS INSPECTOR

DIGITALLY SIGNED BY JASON M RAYMOND
ADMINISTRATOR - QUALITY
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W47152/HEAT 760255/LOT 01



FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#557 (Qty=1)
Description
MALE CONN. 3-8NPT -D10
PCM Reference
C14259B014

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

Swagelok Company
29500 Solon Rd
Solon, OH 44139 U.S.A.

440.349.5600

Inspection Certificate EN 10204-3.1

Distributor	Customer	Customer PO#
Paris Fluides Systèmes Technologies 24 Avenue de la Baltique 91140 Villebon-sur-Yvette France	PCM MANUFACTURING FRANCE SAS AR 2046320	PO070-24-09770

No.	Part Number	Qty	Prod ID/Batch Num	Component	Heat Code
1	SS-10M0-1-6	12	0004846327	Back ferrule	4DX
				Body	7WD
				Front ferrule	4EP
				Nut	7KJ,7LR,7KM

Swagelok products referenced above are manufactured from material purchased and certified as being in accordance with the specification(s) listed below.

Information contained in the above customer address column (marked as "Customer") and area marked "Reference" (when applicable) of this certification are for reference purposes only. Swagelok Company makes no stipulations, nor takes responsibility, for the accuracy or reliability of such information.

Swagelok products are manufactured under conditions which are free from mercury. No mercury bearing components have been used in the products of your order and no mercury bearing instruments or other equipment have been used in their manufacture, assembly, or testing in such a manner as might cause contamination.

No asbestos or asbestos-containing components are used in Swagelok brand products.

MATERIAL STANDARDS

Components	Material	Standards
Shaped Fittings	F316/F316L Stainless Steel Forgings	ASTM A182, ASME SA182
Straight Fittings	316/316L Stainless Steel Bar	ASTM A479, ASME SA479, ASTM A276 (exception of square and rectangular bar)

Type 316 Stainless Steel Bar material is in the Strain-Hardened Level 2 condition.

Specific chemistry obtained from analysis of product made from this material may vary from the batch values as provided with this certification.

Stainless steel material has passed the Intergranular Corrosion Test requirements of EN ISO 3651-2, Method A, and ASTM A-262 Practice E.

All parts were cleaned and packaged in accordance with Swagelok Specifications.

The Swagelok® products specified above were manufactured in accordance with Swagelok Company's Quality Manual (SQS-F latest revision, Revision O, dated February 7, 2024).

Swagelok Company's Quality System is approved to ISO:9001 (BSI Certificate # FM01729).

Annexes: Material Certificates

Certifications Supervisor
Michael J. Zickes

APROVED BY SARA MALIK 8/29/2022 4DX

Certification ID: 001269034

CARPENTER TECHNOLOGY CORP.
READING OPERATIONS (PA)
HARTMAN & SOFIANOS STS GATE
#6
READING PA 19601

Certificate of Tests

Ship To
SWAGELOK CO 31400 AURORA RD SOLON OH 44139

Cert To
SWAGELOK CO PO Box 31300 INDEPENDENCE OH 44131

Sales Order Information	
Sales Order/Item:	57553/10
Customer PO/Item:	4504872697

Delivery Information	
Delivery:	80173538
Picked Date:	08/26/2022
Quantity Shipped:	31,828 LB

Production Information	
Production Order:	W97623
Heat Number:	759068

The recording of false, fictitious or fraudulent statements or entries on this document may be punished as a felony under federal statues including federal law, Title 18, Chapter 47.
The values and other technical data represent the results of analyses and tests made on samples collected from the total lot. Original data records can be traced by reference to the Carpenter order number.
During the manufacturing process, this material has not come in direct contact with Mercury or any of its compounds. The material has not come in contact with any radioactive sources, Cobalt 60, Radium or Alpha-Source nor devices employing a single boundary of containment. Material is also weld free.

This document shall not be reproduced, except in full, without the written consent of Carpenter Technology Corporation.

Material has been melted in USA or qualifying country to DFARS requirements 252.225-7014 with alternate 1 for qualifying country 225.872.1, superseded by DFARS requirements DFARS 252.225-7008 and 252.225-7009.

This order was manufactured in accordance with Carpenter Specialty Alloys Operations Quality Program Manual, Revision 37 dated 07/31/2019.
Carpenter Technology Corporation is registered to Quality Management System Standards: ISO 9001, AS9120 and AS9100.
This certificate of test is Type 3.1 prepared in accordance with EN 10204 (DIN 50049).
We certify this material to have been manufactured, inspected, and tested; and found the results to conform to all drawing and/or specification requirements and order requirements as applicable.
Carpenter Technology third party accreditation certificates are available on the company website: https://www.carpentertechnology.com/quality-certifications

Decision Rule: Unless otherwise specified in a customer/industry specification, Carpenter Technology Corporation will determine acceptability of any test result by comparison of the result with the specification limits, without any additional consideration of the measurement uncertainty. When requested, Carpenter Technology Corporation will provide uncertainty budgets for any test result that is not addressed by the industry standard. When a Decision Rule is defined in a customer/industry specification it will supersede the Corporate Decision Rule.

*Ingot(s) Shipped represents the ingots that were shipped on the specified delivery. The material produced and certified may include additional ingots that were not shipped.

CMT 10000632622 000 00

The certification is made to the customer printed on the form. Carpenter neither makes, nor assumes responsibility for any representation or certification to other parties.(Form E2-366)

APROVED BY SARA MALIK 8/29/2022 4DX

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED GROUND
---------- NUCLEAR QUAL
PART NUMBER: SSD-RB-053200

SPECIFICATION: SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
---------- SWAGELOK COMPANY SQS-00012 REV AG (11/24/21)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)
SWAGELOK COMPANY SQC-00196 REV I (08/30/16)
SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 7 2019 EDITION
ASTM-E18-20
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)

SIZE 0.532000 IN.(13.51 MM) RD BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.023	1.16	0.59	0.019	0.025	17.80

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.12	2.05	0.25	0.24	0.03

MELT DATE: 06/08/22
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APROVED BY SARA MALIK 8/29/2022 4DX

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
PROVISIONS OF 10 CFR PART 21 APPLY
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).
NO WELD REPAIR.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 37, DATED 07/31/19 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800
PROVISIONS OF 10 CFR PART 21 AND 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INTERGRANULAR CORROSION TESTED PER ISO 3651
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049

MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1951F (1066C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

HARDNESS AS SHIPPED, HRC - 22

*-->TESTED AT READING

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (1G OR 2G)

ORDER LENGTH REQUIREMENT: 144"

	(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)		91.0(627)	92.5(638)
YIELD STRENGTH, (1.00 %) KSI(MPA)		99.0(683)	101.0(696)
TENSILE STRENGTH, KSI(MPA)		104.0(717)	106.0(731)
ELONGATION IN 2.00", %		32.0	35.0
ELONGATION IN 2.50", %		29.0	31.0
REDUCTION OF AREA, %		72.0	73.0

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
*-->TESTED AT READING

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

INSPECTION: ACCEPTABLE

ALLOY ID: ACCEPTABLE

CMT 10000632622 000 00

FORM F2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APROVED BY SARA MALIK 8/29/2022 4DX

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CMT 10000632622 000 00

FORM F2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APROVED BY SARA MALIK 8/29/2022 4DX

CERTIFICATE OF TESTS
ABNAHMEPRUEFZEUGNIS
CERTIFICAT DE CONTROLE

Certification ID:001269034

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

17 AUG 22

CUSTOMER / BESTELLER / CLIENT
REFER TO PAGE 1

SELLER / VERKÄUFER / VENDEUR
REFER TO PAGE 1

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
REFER TO PAGE 1	W97623	SEE PG 1	SEE PG 1

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 759068

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

RANDALL MOHN JR. /WI 26784
THE WORKS INSPECTOR

DIGITALLY SIGNED BY GARY BROWN
MANAGER - SPECIFICATIONS/CERTIFICATIONS
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W97623/HEAT 759068/LOT 01,03

Gary Brown

CMT 10000632622 000 00

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 1 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760443**

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD DRAWN
PART NUMBER: SSD-HB-070866

SPECIFICATION:
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)

SIZE 0.708660 IN.(18.00 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.029	1.16	0.59	0.027	0.023	17.49

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.16	2.10	0.46	0.46	0.02

MELT DATE 5/16/23
MELT DATE: 05/16/23

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 2 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760443**

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1951F (1066C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM E2-366

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 3 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760443**

HARDNESS AS SHIPPED, HRC - 23

***-->TESTED AT READING**

(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	90.0(621)	92.5(638)
YIELD STRENGTH, (1.00 %) KSI(MPA)	105.0(724)	102.0(703)
TENSILE STRENGTH, KSI(MPA)	109.0(752)	105.0(724)
ELONGATION IN 1.00", %	64.0	69.0
ELONGATION IN 1.25", %	55.0	59.0
REDUCTION OF AREA, %	73.0	72.0

***-->TESTED AT READING**

GRAIN SIZE PER ASTM E112: 6 (KALLINGS NO.2)
***-->TESTED AT READING**

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 4 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760443**

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 38 DATED 08/21/2022.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001307468

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

27 JUL 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505121417	W47870		26497

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760443

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

JORDAN PEREZ /WI 50015 DIGITALLY SIGNED BY JASON M RAYMOND
ADMINISTRATOR - QUALITY
THE WORKS INSPECTOR CARPENTER TECHNOLOGY CORPORATION
MATERIAL IDENTIFIED VIA CARPENTER W47870/HEAT 760443/LOT 01



FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 3/5/2023 4EP

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST030695 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505053679
Bestell
Your order
Commande

Conferma ordine nr: EI22006547
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23005790
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

SPECIFICHE :
Anforderungen / Requirements / Exigences

SMS-10001 H/9 1.4404/316LRD A,CF
SQS-00012 AG .
SQS-00021 P . (0)
AD 2000-M. W 2 01/20 1.4401 A,CF (1)
AD 2000-M. W 2 01/20 1.4404 A,CF (2)
ASME SA479 2021 S31600/03 (3)
ASTM A262 PR. E 2015 316/316L (4)
ASTM A276 2017 S31600/03
ASTM A370 2021 .
ASTM A479 2021 S31600/03
ASTM A484 2021 .
ASTM E112 2013 . (5)
DIN 17440 96 1.4401
DIN 17440 96 1.4404 (6)
EN 10272 2016. 1.4401 A,CF
EN 10272 2016. 1.4404 A,CF
ISO 148-1 2016 .
ISO 6892-1 2019 .

Note:
Aufzeichnungen / Notes / Notes

(0)Material meet the requirements of ASME NCA-3861.
(1)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(2)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(3)Section II Part A 2021 EDITION
(4)Reapproved 2021
(5)Reapproved 2021
(6)Chemical analysis only.

Tolleranza: -0/+0,004"
Toleranz/Allowance/Tolerance

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - In Abmessungen Dimension Dimension	Lunghezza - In Lange Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahi Pieces Pieces	Peso - LB Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0012	Round	0,5625	143/ 144	436275		6.127	216610952

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 3/5/2023 4EP

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST030695 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505053679
Bestell
Your order
Commande

Conferma ordine nr: EI22006547
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23005790
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

TEST ALLO STATO DI FORNITURA

Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F		Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 1%** k.s.i.	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **A5** %		Strizione Einschnürung Reduction of area Striction **Z** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete **HB**		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max			-	-	-	-	-	-	-	-			-		
A	10	68	L		101	115	117	20		67					254		
H	10	68	L		101	115	117	22		67					256		

Test On Delivering Condition

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	HRC 1/3 r	-	-	24,4
H	HRC 1/3 r	-	-	24,8

TEST ALLO STATO DI FORNITURA

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
H	Delta Ferrite			0 %
H	Grain size for ASTM E112			4

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F		Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **E 4d** %		Strizione Einschnürung Reduction of area Striction **RA** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max			-	-	-	-	-	-	-	-			-		
B	12,5	68	L		100		120		25		65						
C	12,5	68	L		99		120		26		66						

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 3/5/2023 4EP

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST030695 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505053679
Bestell
Your order
Commande

Conferma ordine nr: EI22006547
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23005790
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 ft/lbs			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-	-
F	10X5	68	L	50	51	47						
G	10X5	68	L	44	46	46						

Tensile testing according to ISO 6892-1

Impact testing according to ISO 148-1

Mechanical properties according to ASTM A370.

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée		C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	P %	S %	N %				
	min -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
436275		0,018	0,52	1,68	17,77	2,14	0,58	12,30	0,108	0,029	0,021	0,054				

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	**SATISFACTORY**

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: ASTM A262-Practice E

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitization	15	boil	180	5	Absence of cracks	**SATISFACTORY**

Acciaierie Valbruna S.p.A.

APPROVED BY SARA MALIK 3/5/2023 4EP

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST030695 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505053679
Bestell
Your order
Commande

Conferma ordine nr: EI22006547
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23005790
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Annealing temperature: 1950°F ± 25°F/water.
Grain size tested on sample on the cross section at one third the distance from surface to center.
Ferrite delta tested according to SMS-10001 par 8.11.
Quality System manual rev.14 dated 26 July 2021 as accepted by Swagelok Company.
10CFR50 Appendix B and 10CFR21 apply
Melt date: 25/08/2022.
ACCIAIERIE VALBRUNA is certified in accordance with AD 2000-M. W 0
This material satisfies the ASME SA-479 (Ref. 2.1.4) requirements for alloy 316/316L.
Reduction ratio = 1194,8 : 1
Material annealed 1940°F for 2h/water cooled.
ET ACC. TO:SMS SPECIF. REQ.: PASS
UT ACC. TO SMS SPECIF. REQ.: PASS
COMPARATOR ACC. TO SMS SPECIF. REQ.:PASS
PART NO. SSD-RB-056250
PO # 4505053679 LINE 003
HEAT CODE: 4EP
Material is DFARS Compliant
"Issued in agreement with TÜV SÜD Industrie Service GMBH (07/1972)"
"Qs approved according to PED, Annex I, Para. 4.3 by Notified Body 0036"
"(Certification no. DGR-0036-QS-W 23/2002/MUC)"

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel â eté trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/OES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.

Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.

The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSPF07ACEF1E49E38ABDEF0123457789ACD

Approved by M Slatinsek 07/18/2023 4EP

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094690 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505222922
Bestell
Your order
Commande

Conferma ordine nr: EI22009408
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018275
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

SPECIFICHE :
Anforderungen / Requirements / Exigences

SMS-10001 I 1.4404/316LRD A,CF
SQS-00012 AI .
SQS-00021 P . (0)
AD 2000-M. W 2 01/20 1.4401 A,CF (1)
AD 2000-M. W 2 01/20 1.4404 A,CF (2)
ASME SA479 2021 S31600/03 (3)
ASTM A262 PR. E 2015 316/316L (4)
ASTM A276 2017 S31600/03
ASTM A370 2022 .
ASTM A479 2021 S31600/03
ASTM A484 2021 .
ASTM A751 2021 .
ASTM E112 2013 . (5)
ASTM E18 2022 .
DIN 17440 1996 1.4401
DIN 17440 1996 1.4404 (6)
EN 10272 2016. 1.4401 A,CF
EN 10272 2016. 1.4404 A,CF
ISO 148-1 2016 .
ISO 3651-2 98 METHOD A T1
ISO 6892-1 2019 .

Note:
Aufzeichnungen / Notes / Notes

(0)Material meet the requirements of ASME NCA-3861.
(1)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(2)AD 2000-MERKBLATT W 2 edition 01.2020 AD 2000-MERKBLATT W 10 edition 01.2020
(3)Section II Part A 2021 EDITION
(4)Reapproved 2021
(5)Reapproved 2021
(6)Chemical analysis only.

Tolleranza: -0/+0,004"
Toleranz/Allowance/Tolerance

Pos. nr. Pos. nr. Item nr. Nr. de poste	Oggetto Gegenstand Product description Descrip. du produit	Dimensioni - In Abmessungen Dimension Dimension	Lunghezza - In Lange Length Longueur	Colata Schmelze Heat Coulée	Pezzi Stückzahl Pieces Pieces	Peso - LB Gewicht Weight Poids	Lotto nr. Losnr. Lot nr. Lot nr.
0010	Round	0,5625	143/ 144	436275		24.451	227007630

QUALITY MANAGEMENT SYSTEM CERTIFIED BY LLOYD'S REGISTER ACCORDING TO ISO 9001 : 2015, IATF 16949 : 2016, AS 9100D

Vicenza, 17/07/2023
VCQ012 - MEST094690

Direzione Qualità
Qualitätsmanagement/Quality Management/Gestion Qualité
Digitally signed by
R.BERTELLI

Direzione Prodotto
Produktmanagement/Product Management/Direction Produit
Digitally signed by
P.MESSORI

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094690 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505222922
Bestell
Your order
Commande

Conferma ordine nr: EI22009408
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018275
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

TEST ALLO STATO DI FORNITURA

Test on delivery condition Prüefung auf lieferbereitem produkt test a l'etat de fourniture Prueba sobre el material así come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 1%** k.s.i.	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **A5** %		Strizione Einschnürung Reduction of area Striction **Z** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete **HB**		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
A	10	68	L	101	115	117	20		67					254		
H	10	68	L	101	115	117	22		67					256		

Test On Delivering Condition

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
A	HRC 1/3 r	-	-	24,4
H	HRC 1/3 r	-	-	24,8

TEST ALLO STATO DI FORNITURA

Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material así come entregado

TEST		min	max	
H	Delta Ferrite			0 %
H	Grain size for ASTM E112			4

Test on delivery condition per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique **Rp 0,2%** k.s.i.	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance á traction **Rm** k.s.i.	Allungamento Bruchdehnung Elongation Allongement **E 4d** %		Strizione Einschnürung Reduction of area Striction **RA** %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-			-		
B	12,5	68	L	100		120		25		65						
C	12,5	68	L	99		120		26		66						

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094690 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505222922
Bestell
Your order
Commande

Conferma ordine nr: EI22009408
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018275
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Charpy per ISO 148-1

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°F	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 ft/lbs			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		-	-	-	-	-	-	-	-	-
F	10X5	68	L	50	51	47						
G	10X5	68	L	44	46	46						

Tensile testing according to ISO 6892-1

Impact testing according to ISO 148-1

Mechanical properties according to ASTM A370.

Rockwell hardness according to ASTM E18

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée		C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	P %	S %	N %				
	min -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
436275		0,018	0,52	1,68	17,77	2,14	0,58	12,30	0,108	0,029	0,021	0,054				

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: UNI EN ISO 3651-2 Method A

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitized T1	20	boil	90	5	Absence of cracks	**SATISFACTORY**

Corrosion test in 16% sulfuric acid and copper sulfate solutions

Test standard: ASTM A262-Practice E

Test	Heat treatment before test	Length of Period (h)	Test temp (°C)	Bend Angle (°)	Ø spindle (mm)	Result of visual inspection at 20 x magnification after bend test	Result
Intergranular corrosion	Sensitization	15	boil	180	5	Absence of cracks	**SATISFACTORY**

Approved by M Slatinsek 07/18/2023 4EP

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST094690 / 2023 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
SWAGELOK COMPANY
29500 SOLON ROAD
44139 - USA SOLON, OH 44139-3492 - US

Ordine nr: 4505222922
Bestell
Your order
Commande

Conferma ordine nr: EI22009408
Werks/Our Order/Ref nr.

Avviso di Spedizione: D-VI23018275
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Hot rolled . STRAIN-HARDENED LEVEL 2
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: T316L SMS-10001
Werkstoff/Grade/Nuance

Marca: APMSWLC
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Punzonatura: T316L
Kennzeichnung
Marking
Marquage

Annealing temperature: 1950°F ± 25°F/water.
Grain size tested on sample on the cross section at one third the distance from surface to center.
Ferrite delta tested according to SMS-10001 par 8.11.
Quality System manual rev.14 dated 26 July 2021 as accepted by Swagelok Company.
10CFR50 Appendix B and 10CFR21 apply
Melt date: 25/08/2022.
Comparator testing: pass.
ACCIAIERIE VALBRUNA is certified in accordance with AD 2000-M. W 0
This material satisfies the ASME SA-479 (Ref. 2.1.4) requirements for alloy 316/316L.
Reduction ratio = 1194,8 : 1
Material annealed 1940°F for 2h/water cooled.
ET ACC. TO:SMS SPECIF. REQ.: PASS
UT ACC. TO SMS SPECIF. REQ.:PASS
PART NO. SSD-RB-056250
PO # 4505222922 LINE 001
HEAT CODE: 4EP
Material is DFARS Compliant
"Issued in agreement with TÜV SÜD Industrie Service GMBH (07/1972)"
"Qs approved according to PED, Annex I, Para. 4.3 by Notified Body 0036"
"(Certification no. DGR-0036-QS-W 23/2002/MUC)"

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel â eté trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/OES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according to Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
The Quality Management System is also Certified according to PER 2016/1105, Schedule 2, Part 4, Para 31 (8) by Competent Body TÜV SUD BABT Unlimited.
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.
Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.
The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSP499530DB730C962FB730CA63FB841D9F

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 1 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760256**

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD DRAWN
PART NUMBER: SSD-HB-075000

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.750000 IN.(19.05 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.023	1.15	0.59	0.027	0.028	17.56

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.20	2.13	0.43	0.36	0.03

MELT DATE: 03/27/23

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 2 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760256**

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MELT DATE OF HEAT: 03/27/2023

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

MILL HEAT TREATMENT:
TYPE SOLUTION ANNEAL
TEMP 1951F (1066C)
TIME AT TEMP CONTINUOUS FURNACE
QUENCH WATER

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

HARDNESS AS SHIPPED, HRC - 24
*-->TESTED AT READING

(T)RANSVERSE (L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	93.5(645)	90.5(624)
YIELD STRENGTH, (1.00 %) KSI(MPA)	103.0(710)	102.0(703)
TENSILE STRENGTH, KSI(MPA)	106.0(731)	106.0(731)
ELONGATION IN 2.00", %	33.0	33.0
ELONGATION IN 2.50", %	28.0	28.0
REDUCTION OF AREA, %	73.0	73.0

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 4 (KALLINGS NO.2)
*-->TESTED AT READING

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

INSPECTION: ACCEPTABLE

ALLOY ID: ACCEPTABLE

FORM F2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760256**

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KJ

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001299763

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

22 MAY 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105294	W47149		23878

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760256**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

DAVID CRUZ /WI 25739
THE WORKS INSPECTOR

DIGITALLY SIGNED BY GARY BROWN
MANAGER - SPECIFICATIONS/CERTIFICATIONS
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W47149/HEAT 760256/LOT 01

Gary Brown

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001302292

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD
---------- DRAWN
PART NUMBER: SSD-HB-075000

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
---------- SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.750000 IN.(19.05 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.023	1.15	0.59	0.027	0.028	17.56

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.20	2.13	0.43	0.36	0.03

MELT DATE: 03/27/23

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001302292

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MELT DATE OF HEAT: 03/27/2023

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001302292

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

MILL HEAT TREATMENT:
TYPE SOLUTION ANNEAL
TEMP 1951F (1066C)
TIME AT TEMP CONTINUOUS FURNACE
QUENCH WATER

HARDNESS AS SHIPPED, HRC - 30

*-->TESTED AT READING

	(T)RANSVERSE	(L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)		88.5(610)	88.0(607)	
YIELD STRENGTH, (1.00 %) KSI(MPA)		101.0(696)	101.0(696)	
TENSILE STRENGTH, KSI(MPA)		104.0(717)	105.0(724)	
ELONGATION IN 2.00", %		35.0	34.0	
ELONGATION IN 2.50", %		29.0	28.0	
REDUCTION OF AREA, %		73.0	72.0	

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 5 (KALLINGS NO.2)
*-->TESTED AT ATHENS

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

INSPECTION: ACCEPTABLE

ALLOY ID: ACCEPTABLE

FORM F2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001302292

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601
ATHENS - 22110 THOMAS L HAMMONDS RD, TANNER, AL 35671

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530
29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751
WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 6/17/2023 7KJ

CERTIFICATE OF TESTS
Certification ID:001302292

ABNAHMEPRUEFZEUGNIS

CERTIFICAT DE CONTROLE

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

16 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105299	W47154		24382

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760256

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

DAVID CRUZ /WI 25739
THE WORKS INSPECTOR

DIGITALLY SIGNED BY GARY BROWN
MANAGER - SPECIFICATIONS/CERTIFICATIONS
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W47154/HEAT 760256/LOT 01,02

Gary Brown

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est inprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	W46416		28409

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760337

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD
---------- DRAWN
PART NUMBER: SSD-HB-075000

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
---------- SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.750000 IN.(19.05 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.022	1.17	0.58	0.031	0.026	17.58

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.13	2.05	0.45	0.33	0.03

MELT DATE: 04/17/23

CONTINUED ON NEXT PAGE

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 2 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	W46416		28409

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760337**

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MELT DATE OF HEAT: 04/17/2023

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM E2-366

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 3 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	W46416		28409

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760337**

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

MILL HEAT TREATMENT:
TYPE SOLUTION ANNEAL
TEMP 1951F (1066C)
TIME AT TEMP CONTINUOUS FURNACE
QUENCH WATER

HARDNESS AS SHIPPED, HRC - 25
***-->TESTED AT READING**

	(T)RANSVERSE	(L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	90.0(621)	90.5(624)		
YIELD STRENGTH, (1.00 %) KSI(MPA)	100.0(689)	103.0(710)		
TENSILE STRENGTH, KSI(MPA)	104.0(717)	107.0(738)		
ELONGATION IN 2.00", %	35.0	32.0		
ELONGATION IN 2.50", %	30.0	27.0		
REDUCTION OF AREA, %	72.0	73.0		

***-->TESTED AT READING**

GRAIN SIZE PER ASTM E112: 5 (KALLINGS NO.2)
***-->TESTED AT READING**

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

INSPECTION: ACCEPTABLE

ALLOY ID: ACCEPTABLE

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTROLE**

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR **PAGE 4 OF 5**

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	**W46416**		**28409**

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760337**

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

FORM E2-366

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

CERTIFICATE OF TESTS
ABNAHMEPRUEFZEUGNIS
CERTIFICAT DE CONTROLE

Certification ID:001301375

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

06 JUN 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505100477	**W46416**		**28409**

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760337**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

BENJAMIN ENGLERTH /WI 26424 DIGITALLY SIGNED BY GARY BROWN
MANAGER - SPECIFICATIONS/CERTIFICATIONS
THE WORKS INSPECTOR CARPENTER TECHNOLOGY CORPORATION
MATERIAL IDENTIFIED VIA CARPENTER W46416/HEAT 760337/LOT 01

Gary Brown

FORM E2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760255

PRUFGRUNDLAGEN/ANFORDERUNGEN - TECHNIQUES/EXIGENCES
PRODUCT DESCRIPTION: CARPENTER STAINLESS TYPE 316/316L STRAIN HARDENED COLD
---------- DRAWN
PART NUMBER: SSD-HB-075000

SPECIFICATION: SWAGELOK COMPANY SQS-00021 REV. P (12/21/21)
---------- SWAGELOK COMPANY SQC-03998 REV A (01/26/18)
SWAGELOK COMPANY SQS-00115 REV C (09/06/16)
SWAGELOK COMPANY SQS-00226 REV (08/23/17)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SMS-10001 1.4401/1.4404 REV. H (03/18/19)
ASTM-A262-15 PRACTICE E (REAPPROVED 2021)
ASTM A276/A276M-17 CONDITION S
ASTM-A479/A479M-21 SH LEVEL 2 (11/01/21) STRAIN HARDENED LEVEL 2
ASTM A484/A484M-21 (11/01/21)
ASTM-A751-21 (11/01/21)
DIN EN 10204 TYPE 3.1 (01/01/05) TYPE 3.1
ASME-SA484/SA-484M SA484 TABLE 8 2019 EDITION
ASTM-E18-22 (05/01/22)
ASTM A370-21 (11/01/21)
ISO 3651-2 2ND EDITION (05/15/98)
ASME SA-479/SA-479M LEVEL 2 316 2019 EDITION STRAIN HARDENED LEVEL 2
AD-2000 MERKBLT W2 1.4401 01.2020 EDITION
ASTM-E112-13 (REAPPROVED 2021)
AD 2000 MERKBLATT W0 (07/01/06)
EN 10002 PART 1 (03/ /90)
EN 10204 3.1 (10/01/04) TYPE 3.1
EN 10045 PART 1 (03/01/90) EXCPT LTR (11/09/15) PENDING
AD-2000 MERKBLT W10 1.4401 CHEM ONLY 01.2020 EDITION MATERIAL NO. 1.4401/1.4404
SWAGELOK COMPANY SVS-00012 (02/23/01)
BS EN 10272:2016 1.4401 MECH PROPS PER SMS-10001
ASTM-E1001-21 (11/01/21)
SWAGELOK COMPANY SQC-00196 REV J (03/21/22)
SWAGELOK COMPANY SQS-00012 REV AI (06/08/22)
SWAGELOK COMPANY SQS-00020 REV M (08/25/21)

SIZE 0.750000 IN.(19.05 MM) HEX BAR

CHEMISTRY IN PERCENT/SCHMELZENANALYSE (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN(XRF)	SI(XRF)	P (XRF)	S (COM)	CR(XRF)
0.024	1.17	0.57	0.028	0.026	17.51

NI(XRF)	MO(XRF)	CU(XRF)	CO(XRF)	N (FUS)
12.16	2.06	0.32	0.31	0.03

MELT DATE: 03/28/23

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760255

INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1.
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
CARPENTER TECHNOLOGY CORPORATION, HOLDS A CERTIFICATE ISSUED BY TÜV RHEINLAND INDUSTRIE SERVICE GMBH, NO. 01 202 USA/Q-03 8928, IN ACCORDANCE WITH PED 2014/68/EU ANNEX I PARA. 4.3 + AD 2000 W0
MATERIAL VISUAL AND DIMENSIONAL INSPECTED - ACCEPTABLE.
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 38, DATED 08/21/2022 "AS ACCEPTED BY SWAGELOK COMPANY" IN COMPLIANCE WITH ASME B & P V CODE SECTION III, DIVISION 1 SUBSECTION NCA 3800 2017 EDITION.
THE REQUIREMENTS OF EN ISO 3651-2 METHOD A AND ASTM A262 PRACTICE E HAVE BEEN SATISFIED
100% COMPARATOR TESTED TO DETECT/SORTOUT HIGH IRON/LOW ALLOY INCLUSIONS.
ULTRASONIC INSPECTED (IMMERSION) PER CTC PROCEDURE - ACCEPTABLE.
CAPABLE OF MEETING A MAXIMUM AVERAGE FERRITE VALUE OF 1.5%, WITH NO SINGLE READING OVER 2.0%
EDDY CURRENT TESTED AND APPROVED AT FINISH
IT IS HEREBY CERTIFIED THAT THE SPECIALTY METALS SUPPLIED HEREUNDER HAVE BEEN PRODUCED IN THE UNITED STATES.
NO WELD REPAIR.
THIS MATERIAL HAS BEEN SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND MEETS ALL SPECIFICATION REQUIREMENTS.
INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049
INSPECTION CERTIFICATE EN 10204 (DIN 50049) 3.1
ALLOY IDENTIFICATION HAS BEEN VERIFIED.
PROVISIONS OF 10 CFR PART 21 & 10 CFR PART 50 - APPENDIX B APPLY.
IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.
THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.
THIS MATERIAL WAS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
ALL TESTS AND INSPECTIONS PERFORMED VERIFY CONFORMANCE TO SPECIFICATION REQUIREMENTS AND THE MATERIAL COMPLIES WITH ALL REQUIREMENTS OF THE PURCHASE ORDER.
INTERGRANULAR CORROSION TESTED PER ISO 3651
MATERIAL IS COMPLIANT TO REACH; THE E.U.'S REGISTRATION, EVALUATION, AUTHORIZATION, AND REGISTRATION OF CHEMICALS LEGISLATION.
MATERIAL IS COMPLIANT TO 2015/863/EU (ROHS3) DIRECTIVE.
THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES
MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1951F (1066C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

MELT DATE 3/28/23

CONTINUED ON NEXT PAGE

FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS / ABNAHMEPRUEFZEUGNIS / CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760255

HARDNESS AS SHIPPED, HRC - 27

*-->TESTED AT READING

GRAIN SIZE PER ASTM E112: 3 (KALLINGS NO.2)
*-->TESTED AT READING

	(T)RANSVERSE	(L)ONGITUDINAL	L	L
YIELD STRENGTH, (0.20 %) KSI(MPA)	86.0(593)		89.5(617)	
YIELD STRENGTH, (1.00 %) KSI(MPA)	98.5(679)		99.0(683)	
TENSILE STRENGTH, KSI(MPA)	103.0(710)		103.0(710)	
ELONGATION IN 2.00", %	37.0		37.0	
ELONGATION IN 2.50", %	31.0		31.0	
REDUCTION OF AREA, %	74.0		73.0	

*-->TESTED AT READING

MATERIAL HAS BEEN SOLUTION ANNEALED AND WATER QUENCHED, SURFACE CONDITION PER EN 10272, TABLE 6, SYMBOL (2H).

ORDER LENGTH REQUIREMENT: 144"

INTERGRANULAR CORROSION TEMP(F)1292 HR:0 MN:30 QUENCH:WATER
SPECIMEN SENSITIZATION *-->TESTED AT READING

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

FORM F2-366

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

SELLER / VERKÄUFER / VENDEUR

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 760255

ADDRESS OF TESTING LOCATIONS:
READING - 101 WEST BERN ST, READING, PA 19601

MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3)COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4)FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6)ROCKWELL HARDNESS-ASTM E18, 7)MICRO VICKERS HARDNESS-ASTM E92, 8)KNOOP HARDNESS-ASTM E92, 9)MACRO VICKERS HARDNESS-ASTM E92, 10)STRESS RUPTURE/CREEP RUPTURE-ASTM E139, 11)STRESS RUPTURE(COMBINATION)-ASTM E292, 12)ROOM TEMPERATURE TENSILE-ASTM E8, 13)ELEVATED ROOM TEMPERATURE TENSILE-ASTM E21, 14)DECARBURIZATION-ASTM E1077 15)DELTA FERRITE AMS 2315, 16)GRAIN SIZE-ASTM E112, 17)INCLUSION CONTENT/MICROCLEANLINESS-ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19)INTERGRANULAR CORROSION-ASTM A262, 20)MACRO ETCH&TESTING - ASTM A604/E381, 21)PITTING CORROSION - ASTM A923, 22)CREVICE CORROSION-ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24)XRF-ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26)COM - ASTM E1019, 27)FUS - ASTM E1019, 28)MS - CARPENTER METHODS 206.8500/206.8530 29)CHEMISTRY RESULTS ARE ROUNDED IN ACCORDANCE WITH ASTM A751 WHICH CONFORMS TO ASTM E29 WITH ONE SPECIAL EXCEPTION
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM IS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

THE ABSENCE OF A REPORTED TEST TEMPERATURE INDICATES THAT THE TEST WAS COMPLETED AT ROOM TEMPERATURE.

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

APPROVED BY SARA MALIK 5/22/2023 7KM

CERTIFICATE OF TESTS — ABNAHMEPRUEFZEUGNIS — CERTIFICAT DE CONTROLE

Certification ID:001299325

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM, ALPHA AND GAMMA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

21 MAY 23

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR **PAGE 5 OF 5**

SWAGELOK COMPANY
P.O.BOX 0629
MEDINA ,OH 44258

RDG

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
4505105297	W47152		19829

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : **760255**

DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

DAVID CRUZ /WI 25739
THE WORKS INSPECTOR

DIGITALLY SIGNED BY JASON M RAYMOND
ADMINISTRATOR - QUALITY
CARPENTER TECHNOLOGY CORPORATION

MATERIAL IDENTIFIED VIA CARPENTER W47152/HEAT 760255/LOT 01



FORM F2-366

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.
Die vorliegende Zertifizierung ist nur für den in diesem Formular genannten Kunden gültig. Carpenter übernimmt gegenüber Dritten keinerlei Haftung für die ausgewiesenen Daten oder Zertifizierungen.
Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

keep it moving

Registre des certificats par commande / Certificates register per order

PROCESSUS :	WR2	**CODE :**	ERWA0330	**INDICE :**	H

Emetteur / *Written by :*	JC Daujard	**Date de création /** *Date :*	18/02/2025	**N° de commande /** *PCM Serial number :*	MF061995 OF0065446

A l'émission de l'enregistrement, s'assurer que le support utilisé est au dernier indice. / *Use the last version of the document before recording,*

Item
#ACC
Description
PSV 1IN 150 X 2IN 150
PCM Reference
DIGIAN-392481-05

PCM EUROPE S.A.S.
6, boulevard Bineau – 92300 Levallois Perret – France
☏ : +33 (0)1 77 68 31 00 –💻 : contact@pcm.eu - www.pcm.eu

TAI MILANO S.p.A.

Via Petrella 21 - 20124 MILANO
Tel. 02/29525941 - Fax. 02/29404417

LIST OF MATERIAL CERTIFICATES

FOR: SPRING LOADED SAFETY VALVES

CUSTOMER: ENOLIA

ORDER N: CF2406-4511

JOB N

24/2428 - CM1

N. SERIE ***SERIAL N.***	**SIGLA** ***TAG N.***	**DIMENS.** ***SIZE***	**CORPO** ***BODY*** **N. LOTTO** ***LOT N.***	**COPERCHIO** ***BONNET*** **N. LOTTO** ***LOT N.***	**BOCCAGLIO** ***NOZZLE*** **N. LOTTO** ***LOT N.***	**OTTURATORE** ***DISC*** **N. LOTTO** ***LOT N.***	***STUDS*** **TIRANTI** **N. LOTTO** ***LOT N.***	**DADI** ***NUTS*** **N. LOTTO** ***LOT N.***				
200145	---	1" D 2"	64328-2023C	61138-2022E	67147-2024	54096-2019	64665-2023	67905-2024A				
200146	---	1" D 2"	65877-2023C	61138-2022H	67147-2024	67513-2024	64665-2023	67905-2024A				

For Valves serial: 3000

Note:

ANUGRAHA VALVE CASTINGS LIMITED

391/2,S.G.PUDUR,ARASUR VILLAGE,COIMBATORE-641407,INDIA.
PH:91-422-2360124,FAX:91-422-2360026,E-Mail:SALES2@ANUGRAHAVALVE.COM

THE QUALITY MANAGEMENT SYSTEM ISO 9001:2015 IS CERTIFIED BY :

LLOYD'S, U.K., CERT. NO: 10519828
TUV NORD, GERMANY, CERTIFICATE No. 44 100 084158

Approved acc.to AD2000 Merkblatt W0 & Certified acc.to PED 2014/68/EU by certification body for Pressure Equipment of TUV Nord systems(notified body, reg.no.:0045)

INSPECTION CERTIFICATE/DOCUMENT (EN 764-5) AS PER EN10204.3.1

Foundry Identification: A	**Castings Identification :** ----	**Delivery.No:** 823000653 **DATE :** 28.04.2023	**MTC.No:** TC/11938 **DATE :** 28.04.2023
Customer:	TAI MILANO SPA	**Purchase Order No:** 2023/000072 **PO Date:** 03.02.2023 **P.O Line Item :** 7	
Material:	EN10213 1.0619/ASTM/ASMEWCB(STL-GT-1)/14		
Item	BODY XS 51A 1X2 /	**Raw Drg.No:** 325140-A1100 /A	**M/C Drg.No:** 325110-01230 /H
Quantity	50.000	**Delivery Condition** MACHINED	**Castings Processed by :** Induction Melting Process
Heat Treatment - 1	Normalising Heated to 900°C To 940°C Soaked and Cooled in Air		
Heat Treatment - 2			

CHEMICAL COMPOSITION %

Element		C	Si	Mn	S	P	Cr*	Ni*	Mo*	V*	Cu*	W	N	Nb	CE	* Total	Soaking Temp °C		Soaking time	
	Min	0.180		0.500																
	Max	0.200	0.600	1.200	0.020	0.025	0.300	0.400	0.120	0.030	0.300				0.420	1.000			Hr:Min	
Heat No	Qty																			
KG7653	2	0.193	0.39	0.98	0.010	0.021	0.128	0.161	0.003	0.001	0.008				0.394	0.301	920.4		7:00	
LE9015	22	0.191	0.35	0.93	0.010	0.018	0.041	0.020	0.006	0.001	0.009				0.358	0.077	918.2		4:30	
LE9017	24	0.194	0.38	0.94	0.009	0.021	0.039	0.020	0.004	0.001	0.009				0.361	0.073	918.2		4:30	
LE9094	2	0.189	0.40	0.95	0.010	0.021	0.039	0.031	0.003	0.001	0.008				0.359	0.082	919.8		7:00	

A
B
C
D

MECHANICAL PROPERTIES

TENSILE TEST: EN ISO 6892-1

Properties	Y.S(MPa)		T.S(MPa)		%ELONGATION					%RIA	BEND	Hardness(HBW)			Impact(J)-ISO 148-1 / SA370				Lateral Expansion
	0.2%Rp	1%Rp	RT		50mm 4d	60mm 5d	62.5mm	4d	5d			(ASTM A370)			10X10X55mm,CVN 2mm				
MIN	250.000		485.000			22.000				35.000					at -29°C , Min.Avg 27.000 J				
MAX			600.000									237.000							
HEAT NO												1	2	3	1	2	3	Avg	
KG7653	318.98		509.92			30.55				63.96		150	149	149	42	40	38	40.000	
LE9015	313.03		508.98			34.43				57.86		150	149	149	42	46	40	42.667	
LE9017	320.99		512.56			33.78				54.40		150	149	149	34	38	36	36.000	
LE9094	305.19		507.70			27.07				61.72		150	149	149	52	68	40	53.333	

REMARKS

TDC.No / STD Ref	SAM-STL-GT-01 REV.14.
VISUAL INSPECTION	CONFORMS TO MSS-SP-55.
MPI TEST	100% Magnetic particle inspection carried out as per ASME VIII Div.1 App.7. The castings conforms to ASME VIII Div.1 App.7.
DPI TEST	100% Dye penetrant inspection carried out as per ASME VIII Div.1 App.7. The casting conforms to ASME VIII Div.1 App.7.
RADIOACTIVE CONTAMINATION	Declared that the castings are free from radioactive contamination.
CHEMICAL REMARKS	CE = C+(Mn/6)+(Cr+Mo+V)/5+(Ni+Cu)/15
MECHANICAL REMARKS	Hardness value measured in Brinell test method and conforms to (22HRC) 237HBW Max ,conforms to NACE MR 0175.
GENERAL REQUIREMENT	The material was manufactured, sampled, tested and inspected in accordance with the material specification and was found to meet the requirements.
GRADE CONFIRMATION	Certified that the above material of construction conforms to EN10213 GP240GH 1.0619-07+A1:2016/ASTM A216 Gr.WCB-21/ASME SA216 Gr.WCB-21 and as per customer's requirement and specifications.
GENERAL CONFIRMATION	Tensile test carried out at Room Temperature, Mechanical properties are represented from seperately casted test bar (Keel Block) as per Fig.1 of ASTM A1067.

PT 823000653 - 1 F

MT 823000653 - 1 - 1/2/3/4

CLA I

Lot: 64328/602 3

Data 12/06/23 Contr. 60

AC22

S.PADMAVATHY
Manager-QA

WORKS INSPECTOR

ANUGRAHA VALVE CASTINGS LIMITED

391/2,S.G.PUDUR,ARASUR VILLAGE,COIMBATORE-641407,INDIA.
PH:91-422-2360124,FAX:91-422-2360026,E-Mail:SALES2@ANUGRAHAVALVE.COM

THE QUALITY MANAGEMENT SYSTEM ISO 9001:2015 IS CERTIFIED BY :	LLOYD'S, U.K., CERT. NO: 10545602 TUV NORD, GERMANY, CERTIFICATE No. 44 100 084158
	Approved acc.to AD2000 Merkblatt W0 & Certified acc.to PED 2014/68/EU by certification body for Pressure Equipment of TUV Nord systems(notified body, reg.no.:0045)

INSPECTION CERTIFICATE/DOCUMENT (EN 764-5) AS PER EN10204.3.1

Foundry Identification: A	**Castings Identification :** ---	**Delivery.No:** 823008074 **DATE :** 30.10.2023	**MTC.No:** TC/12390 **DATE :** 30.10.2023
Customer:	TAI MILANO SPA	**Purchase Order No:** 2023/000325 **PO Date:** 10.07.2023 **P.O Line Item :** 5	
Material:	EN10213 1.0619/ASTM/ASMEWCB(STL-GT-1)/14		
Item	BODY XS 51A 1X2 /	**Raw Drg.No:** 325140-A1100 /A	**M/C Drg.No:** 325110-01230 /H
Quantity	82.000 **Delivery Condition**	MACHINED	**Castings Processed by :** Induction Melting Process
Heat Treatment - 1	Normalising Heated to 900°C To 940°C Soaked and Cooled in Air		
Heat Treatment - 2			

CHEMICAL COMPOSITION %

Element		C	Si	Mn	S	P	Cr*	Ni*	Mo*	V*	Cu*	W	N	Nb	CE	* Total	Soaking Temp °C		Soaking time	
	Min	0.180		0.500																
	Max	0.200	0.600	1.200	0.020	0.025	0.300	0.400	0.120	0.030	0.300				0.420	1.000			Hr:Min	
Heat No	Qty																			
KG8868	6	0.192	0.39	0.94	0.009	0.017	0.032	0.030	0.003	0.008	0.010				0.360	0.083	917.4		4:30	
KG8871	6	0.191	0.33	0.91	0.008	0.015	0.029	0.047	0.003	0.008	0.006				0.354	0.093	917.4		4:00	
KG8881	22	0.193	0.36	0.92	0.008	0.016	0.086	0.042	0.003	0.010	0.008				0.369	0.149	917.4		4:00	
KG8908	2	0.192	0.47	0.98	0.009	0.015	0.047	0.050	0.004	0.002	0.009				0.370	0.112	916.7		7:00	
LF0394	22	0.193	0.39	0.93	0.008	0.015	0.041	0.027	0.002	0.008	0.008				0.361	0.086	917.4		4:00	
LF0396	22	0.191	0.42	0.96	0.009	0.017	0.056	0.090	0.007	0.005	0.009				0.371	0.167	917.4		4:00	
LF0406	2	0.189	0.48	0.94	0.009	0.015	0.067	0.039	0.004	0.008	0.009				0.365	0.127	917.4		4:00	

A B C D E F G

MECHANICAL PROPERTIES

TENSILE TEST: EN ISO 6892-1

Properties	Y.S(MPa)		T.S(MPa)		%ELONGATION					%RIA	BEND	Hardness(HBW)			Impact(J)-ISO 148-1 / SA370				Lateral Expansion
	0.2%Rp	1%Rp	RT		50mm 4d	60mm 5d	62.5mm	4d	5d			(ASTM A370)			10X10X55mm,CVN 2mm				
MIN	250.000		485.000			22.000				35.000					at -29°C , Min.Avg 27.000 J				
MAX			600.000									237.000							
HEAT NO												1	2	3	1	2	3	Avg	
KG8868	321.01		523.14			29.73				51.23		152	152	152	38	36	36	36.667	
KG8871	310.36		516.35			34.43				58.30		152	152	152	34	34	34	34.000	
KG8881	310.36		516.35			34.43				58.30		152	152	152	34	34	34	34.000	
KG8908	330.14		525.20			32.30				58.50		152	152	152	34	36	34	34.667	
LF0394	328.63		525.82			32.22				64.04		152	152	152	44	50	36	43.333	
LF0396	333.23		530.92			31.38				63.74		153	153	153	34	44	34	37.333	
LF0406	339.11		545.73			30.17				59.12		154	153	153	36	34	36	35.333	

REMARKS

TDC.No / STD Ref	SAM-STL-GT-01 REV.14. NORSOK MDS C02,MDS C36/C36S
VISUAL INSPECTION	CONFORMS TO MSS-SP-55.
MPI TEST	100% Magnetic particle inspection carried out as per ASME VIII Div.1 App.7. The castings conforms to ASME VIII Div.1 App.7.
DPI TEST	100% Dye penetrant inspection carried out as per ASME VIII Div.1 App.7. The casting conforms to ASME VIII Div.1 App.7.
RADIOACTIVE CONTAMINATION	Declared that the castings are free from radioactive contamination.
CHEMICAL REMARKS	CE = C+(Mn/6)+(Cr+Mo+V)/5+(Ni+Cu)/15
MECHANICAL REMARKS	Hardness value measured in Brinell test method and conforms to (22HRC) 237HBW Max ,conforms to NACE MR 0175.
GENERAL REQUIREMENT	The material was manufactured, sampled, tested and inspected in accordance with the material specification and was found to meet the requirements.
GRADE CONFIRMATION	Certified that the above material of construction conforms to EN10213 GP240GH 1.0619-07+A1:2016/ASTM A216 Gr.WCB-21/ASME SA216 Gr.WCB-23 and as per customer's requirement and specifications.
GENERAL CONFIRMATION	Tensile test carried out at Room Temperature, Mechanical properties are represented from seperately casted test bar (Keel Block) as per Fig.1 of ASTM A1067.

PT 823008074-1-1/2 F

TT 823008074-1-1/2

CIA1

Lot:65877/2023

Date:06/12/23 Contr. 60

AC22

S.PADMAVATHY
Manager-QA

WORKS INSPECTOR

ANUGRAHA VALVE CASTINGS LIMITED

391/2,S.G.PUDUR,ARASUR VILLAGE,COIMBATORE-641407,INDIA.
PH:91-422-2360124,FAX:91-422-2360026,E-Mail:SALES2@ANUGRAHAVALVE.COM

THE QUALITY MANAGEMENT SYSTEM ISO 9001:2015 IS CERTIFIED BY :	LLOYD'S, U.K., CERT. NO: 10349822 TUV NORD, GERMANY, CERTIFICATE No. 44 100 084158
	Approved acc.to AD2000 Merkblatt W0 & Certified acc.to PED 2014/68/EU by certification body for Pressure Equipment of TUV Nord systems(notified body, reg.no.:0045)

INSPECTION CERTIFICATE/DOCUMENT (EN 764-5) AS PER EN10204.3.1

Foundry Identification: A	**Castings Identification :** ---	**Delivery.No:** 822000630 **DATE :** 27.04.2022	**MTC.No:** TC/10961 **DATE :** 27.04.2022
Customer:	TAI MILANO SPA	**Purchase Order No:** 2022/000046 **PO Date:** 01.02.2022 **P.O Line Item :** 12	
Material:	EN10213 1.6220/ASTM/ASME LCC (STL-05/11)		
Item	BONNET XS /	**Raw Drg.No:** 355240-05101/B	**M/C Drg.No:** 355240-05220/H
Quantity	1.000	**Delivery Condition** MACHINED	**Castings Processed by :** Induction Melting Process
Heat Treatment - 1	Water Quenching Heated to 900°C To 940°C Soaked and Quenched in Water		
Heat Treatment - 2	Tempering Heated to 640°C To 660°C Soaked and Cooled in Air		

CHEMICAL COMPOSITION %

Element		C	Si	Mn	S	P	Cr*	Ni*	Mo*	V*	Cu*	W	N	Nb	CE	* Total	Soaking Temp °C		Soaking time	
	Min	0.170		1.000																
	Max	0.200	0.600	1.300	0.020	0.020	0.300	0.400	0.120	0.030	0.300				0.430	1.000			Hr:Min	
Heat No	Qty																			
KG4516	1	0.192	0.39	1.14	0.010	0.014	0.039	0.302	0.005	0.002	0.009				0.412	0.357	925.0	649.6	3:00	6:00

MECHANICAL PROPERTIES

TENSILE TEST: EN ISO 6892-1

Properties	Y.S(MPa)		T.S(MPa)		%ELONGATION					%RIA	BEND	Hardness(HBW)			Impact(J)-ISO 148-1 / SA370				Lateral Expansion
	0.2%Rp	1%Rp	RT		50mm 4d	60mm 5d	62.5mm	4d	5d			(ASTM A370)			10X10X55mm,CVN 2mm				
MIN	300.000		500.000			22.000				35.000					at -46°C , Min.Avg 27.000 J				
MAX			650.000									237.000							
HEAT NO												1	2	3	1	2	3	Avg	
KG4516	382.38		549.47			32.72				66.24		156	156	156	40	38	44	40.667	

REMARKS

TDC.No / STD Ref	SAM-STL-GT-05 REV.11.
VISUAL INSPECTION	CONFORMS TO MSS-SP-55
MPI TEST	100% Magnetic particle inspection carried out as per ASME VIII Div.1 App.7/ASTM E709. The castings conforms to ASME VIII Div.1 App.7/ ASME B16.34 App.II.
DPI TEST	100% Dye penetrant inspection carried out as per ASME VIII Div.1 App.7.The casting conforms to ASME VIII DIV.1 App.7.
RT	Radiographic examination was carried out in critical area as per ASME Sec.V Art.2.The castings conforms to ASME VIII Div.I App.7/ ASME B16.34 App.I. RT No : RC5641.
RADIOACTIVE CONTAMINATION	Declared that the castings are free from radioactive contamination.
CHEMICAL REMARKS	CE = C+(Mn/6)+(Cr+Mo+V)/5+(Ni+Cu)/15
MECHANICAL REMARKS	Hardness value measured in Brinell test method and conforms to (22HRC) 237HBW Max ,conforms to NACE MR 0175
GENERAL REQUIREMENT	The material was manufactured, sampled, tested and inspected in accordance with the material specification and was found to meet the requirements.
GRADE CONFIRMATION	Certified that the above material of construction conforms to EN10213 G20Mn5 1.6220-07+A1:2016/ASTM A352 Gr.LCC-21/ASME SA352 Gr.LCC-21 and as per customer's requirement and specifications.
GENERAL CONFIRMATION	Tensile test carried out at Room Temperature, Mechanical properties are represented from seperately casted test bar (Keel Block) as per Fig.1 of ASTM A1067.

PT 822000630-4F
MT 822000630-4

CLAI
Lot: 6/1138/2022
Data 12/5/22 Contr. 6
3N77

S.PADMAVATHY
Manager-QA

WORKS INSPECTOR

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST040489 / 2024 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
TAI MILANO SPA
VIA PETRELLA, 21
20124 - MILANO - MI

Stato di fornitura : Fucinato - Solubilizzato Pelato
Lieferzustand
Delivery state
Etat de livraison

Produttore :
Hersteller/Item/Usine productrice
ACCIAIERIE VALBRUNA S.P.A.

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Marchi di Fabbrica: AV
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Ordine nr: F2024/000139 REV00
Bestell
Your order
Commande

Qualità: S32760
Werkstoff/Grade/Nuance

Punzone del Collaudatore: MR
Stempel des Werkssachverständigen
Inspector`s stamp/Poinçon de l`assayeur

Conferma ordine nr: MI24002507
Werks/Our Order/Ref nr.

Avviso di Spedizione: A-MI24001925
Lieferanzeige/Packing list/B.L.

Marca: V257MWU
Markenbezeichnung
Brand / Nuance

Punzonatura: S32760
Kennzeichnung
Marking
Marquage

SPECIFICHE :
Anforderungen / Requirements / Exigences

NORSOK TRIAL 6 V257MWU A
MDS D57 6 S32760 A (0)
ASTM A182 2023 S32760 A (1)

ASTM A276 2024A S32760 A
ASTM A370 2022 .
ASTM A479 2023A S32760 A
ASTM E23 2023A .
ASTM E562 2019 . (2)
ASTM G48 2011 METHOD A (3)
ISO 17781 QL II 2017 S32760 A

Note:
Aufzeichnungen / Notes / Notes

(0)Norsok-standard M-630: 2020 (2020-09-30) Approval Norsok-standard M-650 Edition 4, September 2011 QTR N°52/A for forged bars - QTR N° 53/A for hot rolled bars
(1)For products machined directly from bar refer also to ASTM A479.

(2)19E01
(3)11R15

FXOO
Lot 67147/2024
Data 26/3/24 Contr. 6
XW ZV

Pos. nr.	Oggetto	Tolleranza: k12 Dimensioni - mm	Lunghezza - mm	Colata	Pezzi	Peso - KG	Lotto nr.
Pos. nr. Item nr. Nr. de poste	Gegenstand Product description Descrip. du produit	Toleranz/Allowance/Tolerance Abmessungen Dimension Dimension	Lange Length Longueur	Schmelze Heat Coulée	Stückzahl Pieces Pieces	Gewicht Weight Poids	Losnr. Lot nr. Lot nr.
0010	Tondo	50,800	5426/ 5647	293127	1	172,0	321303920

Test allo stato di fornitura per ASTM A370

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°C	Posiz. Saggio Probentage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique Rp 0,2% N/mm2	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance à traction Rm N/mm2	Allungamento Bruchdehnung Elongation Allongement E 4d %		Strizione Einschnürung Reduction of area Striction RA %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete HB		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		550	-	750 895	-	25	-	45	-			-		290
B	12,5	20	L	594		804		33		70				255		

Resilienze su saggio prelevato al centro

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°C	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 J			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anfonderungen/Required values Valeurs démandées		min max		85	85	85	-	-	-	-	-	-
C	10X10	-46	L	258	267	255						

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST040489 / 2024 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
TAI MILANO SPA
VIA PETRELLA, 21
20124 - MILANO - MI

Stato di fornitura : Fucinato - Solubilizzato Pelato
Lieferzustand
Delivery state
Etat de livraison

Produttore :
Hersteller/Item/Usine productrice
ACCIAIERIE VALBRUNA S.P.A.

Ordine nr: F2024/000139 REV00
Bestell
Your order
Commande

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice
AV

Conferma ordine nr: MI24002507
Werks/Our Order/Ref nr.

Qualità: S32760
Werkstoff/Grade/Nuance

Punzone del Collaudatore:
Stempel des Werkssachverständigen
Inspector's stamp/Poinçon de l'assayeur
MR

Avviso di Spedizione: A-MI24001925
Lieferanzeige/Packing list/B.L.

Marca: V257MWU
Markenbezeichnung
Brand / Nuance

Punzonatura: S32760
Kennzeichnung
Marking
Marquage

Resilienze su campione prelevato a metà raggio

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°C	Posiz. Saggio Probentage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 J			Espansione laterale - Lateral Expansion -			Shear - Shear -		
Valori richiesti Anforderungen/Required values Valeurs démandées		min max		85	85	85	-	-	-	-	-	-
D	10X10	-46	L	290	292	285						

Corrosion test per ASTM G48 "A" [50C/24h] at 1/2r

TEST		min	max	
E	Perdita in peso g/m2		1,0000	0,8621 g/m2

Corrosion test per ASTM G48 "A" [50C/24h] at core

TEST		min	max	
F	Perdita in peso g/m2		1,0000	0,8201 g/m2

Metallographic test per ISO 17781

TEST		min	max	
G	Ferrite delta %	35	60	54 %

Mechanical properties according to ASTM A370.
Impact test according to ASTM E23
Ferrite content tested according to ASTM E562.

F100
Lot. 67147/2024
Data 22/03/24 Contr. D
XW ZV

Analisi chimica

Chemische Zusammensetzung/Chemical Analysis/Analyse chimique

Colata /Heat Schmelze/Coulée															
	min CR+3,3M- max 48,0	- 0,030	- 1,00	0,40 0,60	25,10 25,30	3,50 3,70	0,50 1,00	7,20 7,40	0,50 0,60	- 0,020	- 0,010	0,20 0,22	-	-	-
	PRE	C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	W %	P %	S %	N %			
293127	40,2	0,015	0,32	0,50	25,17	3,54	0,67	7,34	0,53	0,018	0,001	0,21			

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST040489 / 2024 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
TAI MILANO SPA
VIA PETRELLA, 21
20124 - MILANO - MI

Ordine nr: F2024/000139 REV00
Bestell
Your order
Commande

Conferma ordine nr: MI24002507
Werks/Our Order/Ref nr.

Avviso di Spedizione: A-MI24001925
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Fucinato - Solubilizzato Pelato
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: S32760
Werkstoff/Grade/Nuance

Marca: V257MWU
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica:
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore: MR
Stempel des Werkssachverständigen
Inspector's stamp/Poinçon de l'assayeur

Punzonatura: S32760
Kennzeichnung
Marking
Marquage

Corrosion test per ASTM G48 PRACTICE A (25°C/24h):
no pitting at 20x magnification.
Reduction ratio = 21,1 : 1
Solution annealed 1120°C for 1,5 h / water cooled.
ET ACC. TO EN 10088-3 TAB.1 condition 1X equivalent to EN 10277-1 Cl.3
UT ACC. TO ASTM A388

Allegati / Anlagen / Enclosure / Attachments :
ME24000338

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel à eté trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/OES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtigung und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

The Quality Management System is also Certified according to Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
The Quality Management System is also Certified according to PER 2016/1105, Schedule 2, Part 4, Para 31 (8) by Competent Body TÜV SUD BABT Unlimited.
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.
Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.
The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

WSPF7638978987652FC851DA730DA62FB84

FXOD

Lot. 67147/2024
Data 26/3/24 Contr. LO

XW21

Acciaierie Valbruna S.p.A.
36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4

CERTIFICATO Certificate - Zeugnis - Certificat **N° ME24000338** |

ESAME METALLOGRAFICO

Metallographic examination - Mikroschliff Prüfung - Metallographic

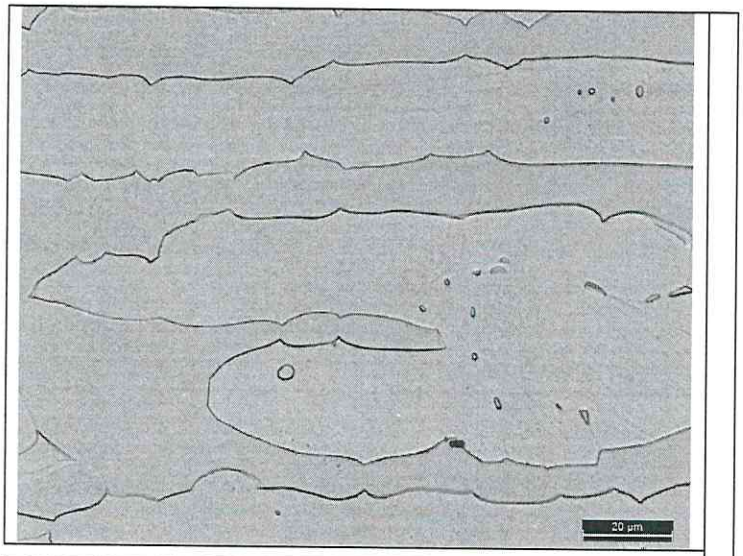
mod. ME02

MEST040489 / 2024 /

Secondo : ISO 17781
According to - Nach - Selon

Cliente : TAI MILANO SPA Customer - Besteller - Client		**Conferma : MI24002507/0010/001** Confirmation - Bestätigung - Confirmation			**Lotto nr : 321303920** Mill order - Uns.Auftr. - A/R	
MARCA Grade Qualität Nuance	**DIMENSIONI** Size Abmessungen Dimensions	**COLATA** Heat Schmelze Coulée	**BARRE** Bars Stäbe Barres	**PESO** Weight Gewicht Poids	**LUNGHEZZA** Length Länge Longueur	
V257MWU	Tondo 50,800 mm	293127	N. 1	KG : 172,0	5426	5647

T. TERMICO H.Treatement Wärmebehandlung T.Termique	**ESECUZIONE** Condition Ausführung Execution	**Condizioni Superficiali** Surface Oberfläche Surface Conditions	**TOLLERANZA** Tolerance Toleranz Tolerance
Solubilizzato	Pelato	-	k12



500x

NOTE :
Notes - Stellt fest - Notes

TX00

Lo. 67147/2024
Data 22/3/24 Contr. LO

XW2V

NOME T.Nassi Name - Nom **DATA : 12/12/23** Date - Date **FIRMA**		**COLLAUDATORE** Inspector - Abnahmesachsverst - Inspecteur

INOXFUCINE SPA
ITALY
Q.A. SECTION

CERTIFICATO DI COLLAUDO
TEST CERTIFICATE
EN 10204 3.2

INOXFUCINE SPA
Località Belgiardino
26836 Montanaso L.
(LO) ITALY

CERTIFICATO-CERTIFICATE N° **3544 /19/IF** **REV.0** **Data-Date** **26-nov-19**

Cliente-Customer : TAI MILANO S.P.A.
Ordine-Order/Data-Date: N.2019/000430 REV.00 DEL 19/09/2019
Materiale-Material : API 6A CRA 718 (120 K) *colata\heat* 421208
Metodo di fucinatura-Method of hot forging : *Hot forging / Forging ratio ≥ 1 to 4 (Forged as final shape-Single piece)*
Trattamento termico-Heat treatment : Solution Annealing + Age Hardening (VDM CERT. 168994)

Documenti applicabili-Applicable documents : API 6ACRA FIRST EDITION AUG 2015 , Errata 1 (2015), Errata 2 (2018) + ANSI/NACE MR0175/ISO 15156-1/2/3 edition 2015 + ISO 17945/NACE MR0103-2015 + SPEC. SAM-GEN-FG-10 REV.16 + SPEC. DK-TEYY-QUA-SPC-000-10000 REV.1

Commessa IF-Job IF *ORC1901632*

Pos. Item	*Descrizione-Disegno (mm) Description - Drawing (mm)*	*Quantità Quantity*	*Prova Test*
1	ROUND DIA. 20 X 3800 COD. 00920100020MKFV	2	3248

0300 18/2425
tai Lotto n°SL4096/2019
data 28/11/19 Contr. D
MKFV

☐ *Esame Visivo-Visual Examination(ASME V art.9 -MSS SP-55)*	CONFORME-CONFORM	☒ *Grezzo-Rough*	Trade Mark
☐ *Esame Dimensionale-Dimensional Check(Drawings-Size)*	CONFORME-CONFORM	☐ *Sgrossato-Premachined*	IF
☐ *Marcatura-Marking*	CONFORME-CONFORM	☐ *Finito-Finish*	

ATTACHED CERTIFICATE :
MILL CERTIFICATE 168994/0 "VDM METALS"
HEAT TREATMENT 168994/0 "VDM METALS"
MECHANICAL TEST No PM 26761/19 & DUR 26761/19 "SIDERTEST"
MICROGRAPHIC EXAMINATION FERRITE : E562 26761/19 "SIDERTEST"
MICROGRAPHIC EXAMINATION : MIC 26761/19 "SIDERTEST"
MACROGRAPHIC EXAMINATION : MAC 26761/19 "SIDERTEST"
CHEMICAL ANALYSIS ANL 26761/19 "SIDERTEST"
CORROSION TEST : 26761/19 "SIDERTEST"
FERRITE CONTENT : FER 26761/19 "SIDERTEST"

ANALISI CHIMICA DI COLATA **HEAT ANALYSIS %**

Heat N° 421208 *Acciaieria-Steel Maker* VDM METALS
Processo di elaborazione-Steel making process : VIM / VAR

C	*Mn*	*Si*	*Cr*	*Ni*	*Mo*	*P*	*S*	*N*	*V*	*Nb*
Cu	*Ti*	*W*	*Al*	*Ta*	*Pb*	*H*	*Sn*	*O*	*B*	*Co*
Fe					*Nb+Ta*	*C.Eq*	*P.R.E.* $_N$			

We herewith certify that the material supplied is in compliance with the specifications and customer's order.
Material in compliance with PED 2014/68/UE (97/23/CE) All. I point 4.3 Quality system verified by a competent body EN 764-5

INOXFUCINE SPA
Y. Baylia
Inoxfucine Spa
Quality Control

CUSTOMER

INSPECTOR
BUREAU VERITAS
ITALY
WITNESSED NOTED REVIEWED
SURVEYOR P. GUARAGNI
DATE 26 NOV 2019

VDM Metals GmbH
on behalf of VDM Metals International GmbH

VDM Metals

Inspection certificate 168994/0
DIN EN 10204/01.05 3.1

Order No. 519653 Purchase Order No. 14814

Chun & Vollerin S.r.l.

Via Albert Einstein 15
I -20090 Cusago

Trademark
VDM® Alloy 718 CTP
NICROFER 5219 CTP
2.4668

EN ISO 9001, AS 9100
LRQA Approval
KLN 4000941/E

Product
Bar, round, hot rolled, solution ann. / age hardened, machined

True copy to the original INOXFUCINE

Specification
API 6A718 Second Edition 12.2009 and Errata 1
API 6 A CRA First Edition 08.2015, Material designation 120KSI
NACE MR0175 / ISO 15156-3 2015
NACE MR0103-2012

Material
UNS N07718
UNS N07718

Item	Pcs	Wht [kg]	Dimension [mm]	Cast	Lot
8	17	520	28,60 Ø x 4000-6500	421208	104789200

Analysis (weight %)
GFAAS=graphite furnace AAS
LE=combustion analysis
OE=optical emission analysis
RF=X-ray fluorescence spectroscopy
API 6A718 Second Edition 12.2009 and Errata 1; API 6 A CRA First Edition 08.2015, Material designation 120KSI

Cast	Melting Pr.		C	S	Cr	Ni	Mn	Si	Mo	Ti	Nb	Cu	Fe
421208	VIM/VAR	top	0,010	<0,001	18,4	54,3	0,02	0,04	3,03	0,97	4,99	0,03	R17,54
		Meth	LE	LE	RF	RF	RF	RF	RF	RF	RF	RF	

Cast	Melting Pr.		P	Al	Mg	Pb	Ca	Co	B	Ta	Se	Bi	Nb+Ta
421208	VIM/VAR	top	0,005	0,50	0,0010	0,0002	<0,0010	0,05	0,0040	<0,01	<0,0003	<0,00003	<5,000
		Meth	OE	RF	OE	GFAAS	OE	RF	OE	RF	GFAAS	GFAAS	

Sample Condition
solution ann. / age hardened

Lot	Sample No.
104789200	1-A1
104789200	1-A1
104789200	1-A1

Tensile Test
1 ASTM E8/E8M - 16a / longitudinal specimen

	Temp [°C]	Yield0.2% [MPa]	Yield1.0% [MPa]	Tensile [MPa]	Elongation A	[%]	A	[%]	RoA [%]
1	RT	891		1234	4D	32,2			52

Grain Size
1 ASTM E112 - 13

	Test Location
1	No 5 surface
1	No 4.5 1/4 thickness
1	No 4.5 center

Sample Condition
solution ann. / age hardened

Lot	Sample No.
104789200	1-A1
104789200	1-A1
104789200	1-A1

Microstructure/Precipitates
1 API 6A718 Second Edition 12.2009 and Errata 1

	Test Location
1	Complying with delivery specification surface
1	Complying with delivery specification 1/4 thickness
1	Complying with delivery specification center

Item	Lot	
8	104789200	Ultrasonic Examination: see enclosure

CERTIFIED COPY
CHUN & VOLLERIN SRL

We herewith certify, that the material is in conformance with the above mentioned specifications

Mark of the Inspector: Q

E

Enclosures: 4

Tel. +49 2303 6733850
Fax
EMail daniel-nikola.schindler@vdm-metals.com

Daniel Schindler , authorized inspection representative

Date of release: 14.05.2018

168994-0-E

This certified test report shall not be reproduced except in full, without the written approval of VDM Metals. The recording of false, fictitious or fraudulent statements or entries on the certificate may be punished as a felony under federal law.

VDM Metals GmbH
Division Bar and Forgings
Plettenberger Straße 2, D-58791 Werdohl
Postfach 1520, D-58778 Werdohl
Telephone 02392 55-0, Fax: 02392 55-2217
Internet: www.vdm-metals.com

Chairman of the Supervisory Board: Dr. Thomas Ludwig
Management Board: Dr. Niclas Müller
Andrea Bauer, Ralf Schumcking
Commercial register: Iserlohn local court, #5327
Company domicile: Werdohl

BUREAU VERITAS
ITALY
WITNESSED / NOTED REVIEWED
SURVEYOR P. GUARAGNI
DATE 11 NOV 2019

Y. Bayba
Inoxfucine Spa
Quality Control

0300 18/2625

tai Lotto n° 54096/2019
data 28/11/19 Contr. D

NKFV

VDM Metals GmbH
on behalf of VDM Metals International GmbH

VDM Metals

Inspection certificate 168994/0
DIN EN 10204/01.05 3.1

Page: 2 / 2
printed: 14. MAY 2018

Order No. 519853 Purchase Order No. 14814

Heat Treatment	Lot
1032°C/1:06h/Water + 791°C/6:08h/Air	104789200

Spectrographic analytical mixup test/PMI check: without objection
Dimensional and visual inspection performed: without objection

No mercury contamination; no Radium, Luminous or Alpha source materials were used in the manufacture or testing of the items furnished.

No weld repairs performed.

Material is in accordance to the requirements of the requested specification.

Confirming minimum & maximum bar diameters in heat treatment load are within 1.5".

For dimensions greater 20mmØ we use samples for tensile testing, that are standard ASTM specimens with 12.5 mm diameter, taken from a prolongation of the bars.

For dimensions greater 16mmØ, we use samples for notched-bar impact testing, which are standard ASTM specimens with 10 mm x 10 mm square, taken from a prolongation of the bars.

MACROETCHING: conducted as per ASTM A 604, etchant 'Aqua Regia', sample taken from top and bottom of ingot after hot forming.
Rating: better or equal class A, in all 4 classes.

No topological duplex-microstructure acc. to ASTM E 1181, representative microstructure is free of Laves phases and continuous grain boundary secondary phases. Assessment of Delta phase in the representative microstructures conform to the specification, with no acicular delta phase present, other than individual, isolated grains that are not representative of the bulk of the microstructure.

All tests have been carried out by VDM Metals, Kleffstraße 23, D-58762 Altena and Formerstraße 17, D-59425 Unna / Germany.

SAMPLE LOCATION:
all samples for technological test were taken from ¼ T for >Ø 50 mm;
all samples for technological test were taken from ½ T for </=Ø 50 mm.

The pyrometry of heat treatment is in accordance with AMS 2750.

Hot forming: Reduction ratio: 215,35:1

Certified quality management system for material manufacturers according to pressure equipment directive 2014/68 / EU - TÜV NORD Systems GmbH & Co. KG, Certification Body for Pressure Equipment, Notified Body, Code no. 0045

Temperature controlled / monitored by heat sink.

Material was heat treated in furnaces to comply with API6A 20. Ed. Appendix M

Melting location: VDM Metals, Formerstraße 17, D-59425 Unna / Germany

Subcontractor :
Hot forming: Böhler / Kapfenberg (hot rolling)

True copy to the original
INOXFUCINE

0300 18/2625
tai Lotto n°5409/2019
data 25/11/19 Contr. GS
MKFJ

CERTIFIED COPY
CRUDA VOLLERO S.R.L.

BUREAU VERITAS
ITALY
WITNESSED NOTED REVIEWED
SURVEYOR P. GUARAGNI
DATE 11 NOV 2019

VDM Metals GmbH
Division Bar and Forgings
Plettenberger Straße 2, D-58791 Werdohl
Postbox 1820, D-58778 Werdohl
Telephon: 02392 55-0, Fax 02392 55-2217
Internet: www.vdm-metals.com

Chairman of the Supervisory Board: Dr. Thomas Ludwig
Management Board: Dr. Niclas Mäller
Andrea Bauer, Rolf Schencking
Commercial register: Iserlohn local court, #5327
Company domicile: Werdohl

Y. Baypa
Inoxfucine Spa
Quality Control

INOXFUCINE SPA Montanaso L. (LO) *Q.A. Section*	*Cliente-Customer* : *TAI MILANO S.P.A.* *Ordine-Order* : *N.2019/000430 REV.00 DEL 19/09/2019* *Commessa-Job* : *ORC1901632*	COPIA CONFORME ORIGINALE True copy to the original

VDM Metals GmbH
on behalf of VDM Metals International GmbH

VDM Metals

Enclosure for Inspection certificate 168994/0
DIN EN 10204/01.06 3.1
Order No. 519853 Delivery No. Purchase Order No. 14814

Enclosure: 1
Page: 1 / 1
printed: 14. MAY 2018

Hardness Test

solution ann. / age hardened ASTM E18 - 15

Lot	Sample No.	Location	Method		Values		Mean
104789200	1-A1	cross sec. edge	HRC	36,1	36,7	37,0	36,6

solution ann. / age hardened ASTM E18 - 15

Lot	Sample No.	Location	Method		Values		Mean
104789200	1-A1	1/2 radius	HRC	36,2	36,9	37,4	36,8

solution ann. / age hardened ASTM E18 - 15

Lot	Sample No.	Location	Method		Values		Mean
104789200	1-A1	center	HRC	36,3	36,8	36,6	36,6

solution ann. / age hardened ASTM E18 - 15

Lot	Sample No.	Location	Method		Values		Mean
104789200	1-A1	surface	HRC	38	38,9	38,0	38,3
104789200	2-A1	surface	HRC	38,1	38,6	38,1	38,3
104789200	3-A1	surface	HRC	37,6	38	38,1	37,9
104789200	4-A1	surface	HRC	37,8	37,8	38,4	38,0
104789200	5-A1	surface	HRC	37,6	38,6	38,6	38,3
104789200	6-A1	surface	HRC	36,9	37,2	37,6	37,3
104789200	7-A1	surface	HRC	38	38,4	39,2	38,5
104789200	8-A1	surface	HRC	37,7	37,9	38,3	38,0
104789200	9-A1	surface	HRC	37,1	37,8	38,5	37,8
104789200	10-A1	surface	HRC	38,3	38,4	37,8	38,2
104789200	11-A1	surface	HRC	36,6	38	37,8	37,5
104789200	12-A1	surface	HRC	38	37,7	37,7	37,8
104789200	13-A1	surface	HRC	38,4	38,2	38,2	38,3
104789200	14-A1	surface	HRC	37,6	37,7	37,2	37,5
104789200	15-A1	surface	HRC	38,4	38	37,8	38,1
104789200	16-A1	surface	HRC	36,7	38	37,6	37,4
104789200	17-A1	surface	HRC	38,9	38,4	38,1	37,8
104789200	18-A1	surface	HRC	38,3	38,2	38,8	38,4

True copy to the original INOXFUCINE

Notched Bar Impact Testing

solution ann. / age hardened ASTM E23 - 12c Charpy-V sample / longitudinal / L-C / KVe 450/10

Lot	Sample No.	Temp. [°C]	KV [J]			aK [J/cm²]	Lateral Expansion [mm]			Shear Fracture [%]		
104789200	1-A1	-60	111	112	109		1,12	1,09	1,2	70	70	70

VDM Metals GmbH
Division Bar and Forgings
Plettenberger Straße 2, D-58791 Werdohl
Postbox 1820, D-58778 Werdohl
Telephone 02392 55-0, Fax 02392 55-2217
Internet: www.vdm-metals.com

Chairman of the Supervisory Board: Dr. Thomas Ludwig
Management Board: Dr. Niclas Müller
Andrea Bauer, Ralf Schmecking
Commercial register: Iserlohn local court, #5327
Company domicile: Werdohl

CERTIFIED COPY
CHIM & VOLLERIN SRL

BUREAU VERITAS
ITALY
WITNESSED NOTED REVIEWED
SURVEYOR P. GUARAGNI
DATE 11 NOV 2019

Y. Bayca
Inoxfucine Spa
Quality Control

0300 18/12/19

tai Lotto n° 54096/2019
data 28/11/19 Contr. 6

MKFU

VDM Metals GmbH

VDM Metals

Enclosure 2

Ultraschallprüfbericht
Ultrasonic Examination Report
Rapport de contrôle U.S.

Besteller Purchaser / Client/ No. Cde	Bestell-Nr. P.O. No. / No. Commande	Auftrags-Nr. Order No./No. ede	Zeugnis-Nr. Certificate No	Datum Date	Seite Page	von of
Chun Vollerin S.r.l.	14814	519853	168994	09.05.18	1	1

Lieferform Product / Produit	bar
Werkstoff Material / Nuance	Nicrofer 5219 CTP / VDM® Alloy 718 CTP
Wärmebehandlung Heat Treatment / Traitment thermique	sol. ann. + age hardened
Oberfläche Surface Condition / Aspect surface	machined
Prüfspezifikation Test Specification	ASTM A 388-2016a
Prüfgerät Test Apparatus / Appareil	ROWA860 PAT
Ankopplungsmittel Couplant / Agent Couplant	water
Prüftechnik Inspection Technique / Technique	straight beam in radial direction
Prüfkopftyp/Freq./Abm. Type of Probe/Freq./ Dim. / Palpeur /Freq.	ROWA R 56-T 90 5 Mhz
Prüfumfang Scanning /% Controle	100% on all surfaces
Kalibrierung Calibration / Calibrage de la sensitivite	recording sensitivty 1,2 mm FBH
Methode Method	Test block
Prüfergebnis Test Result / Resultat	No recordable or rejectable indications, the material is in compliance with the test specification

True copy to the original INOXFUCINE

Geprüfte Menge / Quantity Inspected

Auftr.-Pos. Order Item	Menge Quantity	Abmessung [mm] Dimension	Charge Nr. Heat No. Coulée	Los-Nr. Lot No.
08	17	28,6 Ø x 4000-6500	421208	104789200

Prüfer / Inspector/ Vérificateur: VDM UT 24
Kootz, Level II
4. 5. 18

Prüfaufsicht / Supervisor: VDM UT 50
Böning, Level III
09.05.2018

Abnahmegesellschaft / Inspecting Authority

Adress: VDM Metals GmbH, Kleffstrasse 23, 58762 Altena, P.O.Box 12 51, 58742 Altena
Telefon: 02392 55-0 Telefax: 02392 55-2217 Internet: www.vdm-metals.com
Chairman of the Supervisory Board: Dr. Thomas Ludwig
Management Board: Dr. Niclas Müller, Chairman, Andrea Bauer; Ralf Schencking
Company Domicile: Werdohl Commercial register: Iserlohn local court # 5327

CERTIFIED COPY
CHUN & VOLLERIN SRL

BUREAU VERITAS
ITALY
WITNESSED NOTED REVIEWED
SURVEYOR P. GUARAGNI
DATE 11 NOV 2019

Y. Bayba
Inoxfucine Spa
Quality Control

0300 18/2625

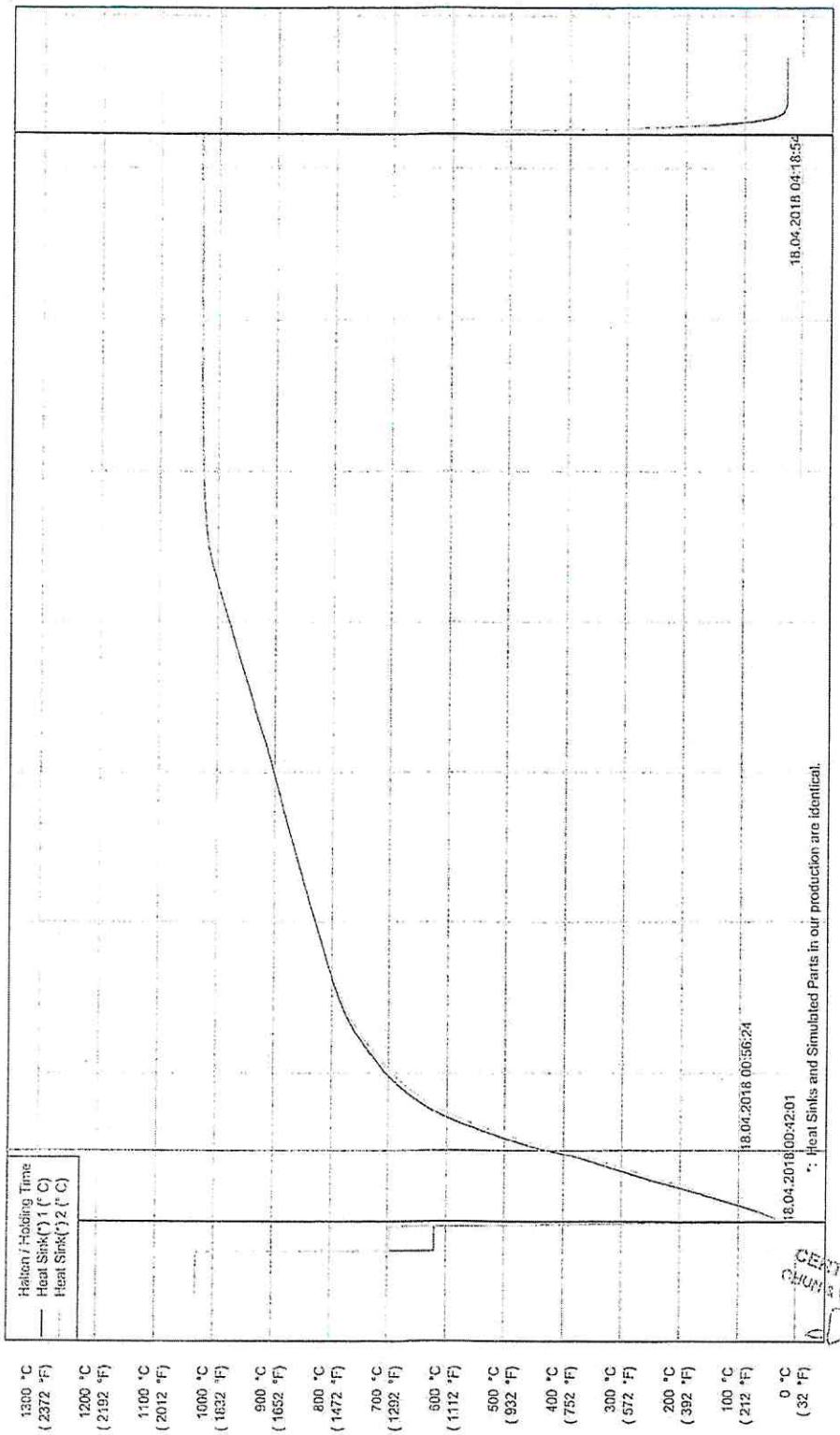
tai Lotto n° S4096/2019
Data 28/11/19 Contr. D

AKFU

INOXFUCINE SPA Montanaso L. (LO) *Q.A. Section*	*Cliente-Customer* : *TAI MILANO S.P.A.* *Ordine-Order* : *N.2019/000430 REV.00 DEL 19/09/2019* *Commessa-Job* : *ORC1901632*	COPIA CONFORME ORIGINALE True copy to the original

Herdwagenofen / Furnace : 3 – Gluehlos / Batch : 309276

Inspection Certificate-No. 166994
Enclosure: 3 / page 1 of 2



True copy to the original INOXFUCINE

CERTIFIED COPY
CHUNA VOLLERIN SRL

BUREAU VERITAS
ITALY
WITNESSED NOTED REVIEWED
SURVEYOR P. GUARAGNI
DATE 11 NOV 2019

Y. Bzyba
Inoxfucine Spa
Quality Control

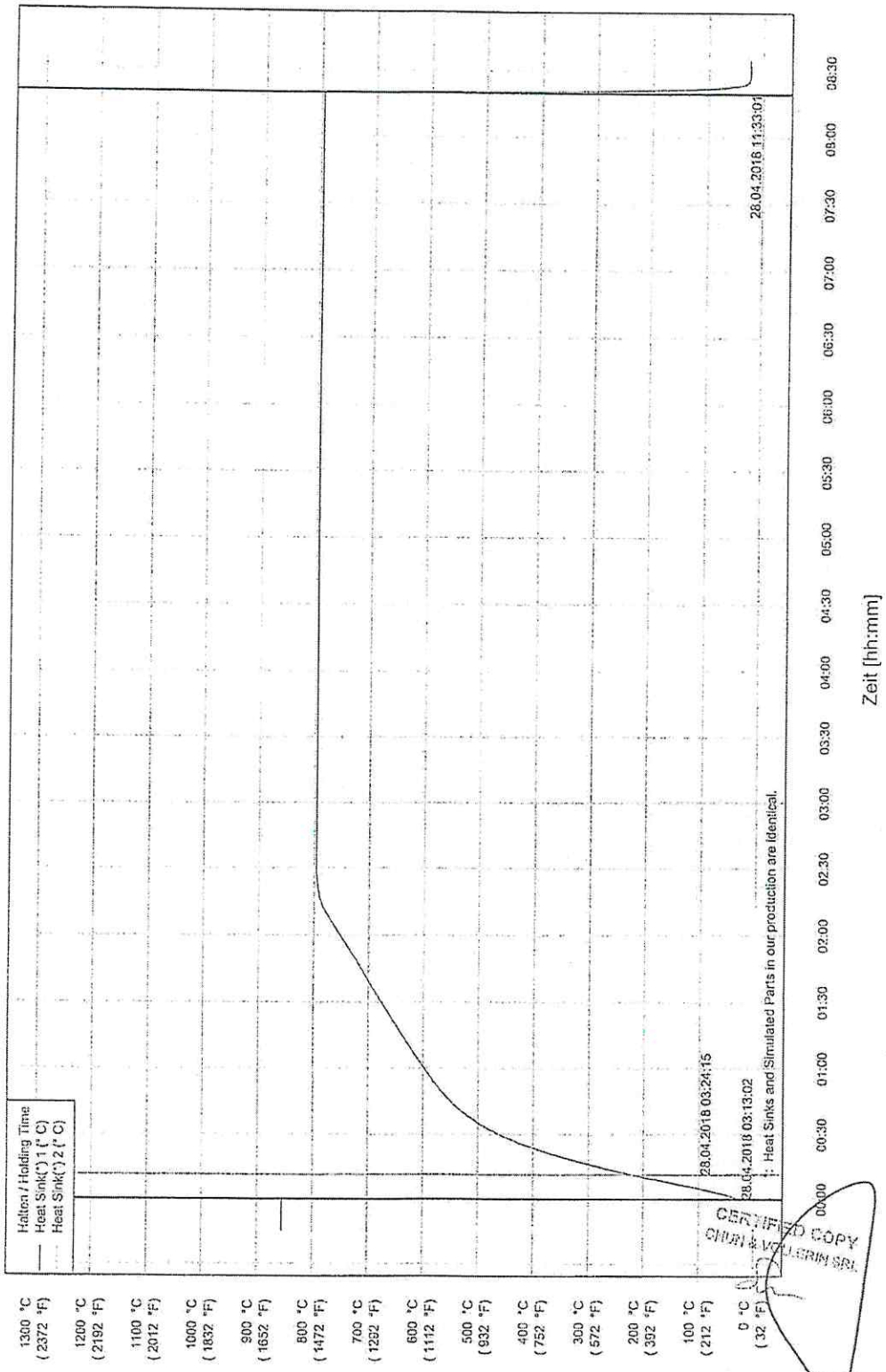
0300 18/2625

tai Lotto n° 54096/10/19
data 28/11/19 Contr.

NKFJ

Herdwagenofen / Furnace : 1 – Gluehlos / Batch : 105034

Inspection Certificate-No. 168994
Enclosure: 3 / page 2 of 2



CERTIFIED COPY
GIURI & VALERIN SRL

True copy to the original
INOXFUCINE

Y. Bajpa
Inoxfucine Spa
Quality Control

0300 18/2625

tai Lotto n°56096/2019

data 28/11/19 Contr. 6

NKFV

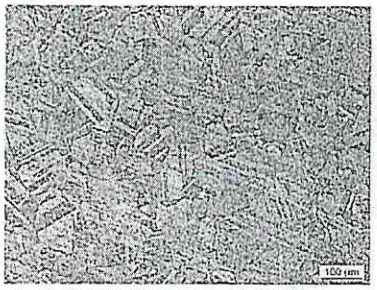
BUREAU VERITAS
ITALY
WITNESSED NOTED REVIEWED
SURVEYOR P. GUARDIGNI
DATE 11 NOV 2019

VDM Metals GmbH

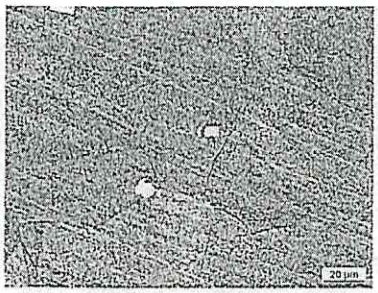
VDM Metals

Microstructure Examination
Metallography Job No.: 159063
Lot No.: 104789200
Heat: 421208

Inspection Certificate No.: 168994
Enclosure: 4
Page: 1 of 1



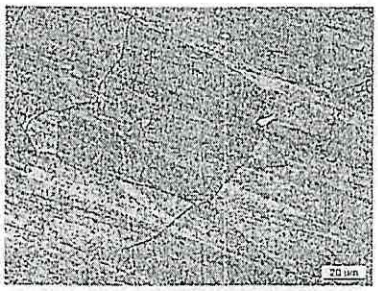
100:1 VDM® Alloy 718 / Nicrofer 5219 CTP
1A1 surface
Kallings No.2 07.05.2018 11:13:06



500:1 VDM® Alloy 718 / Nicrofer 5219 CTP
1A1 surface
Kallings No.2 07.05.2018 11:13:08



100:1 VDM® Alloy 718 / Nicrofer 5219 CTP
1A1 1/4 thickness
Kallings No.2 07.05.2018 11:13:08



500:1 VDM® Alloy 718 / Nicrofer 5219 CTP
1A1 1/4 thickness
Kallings No.2 07.05.2018 11:13:08



100:1 VDM® Alloy 718 / Nicrofer 5219 CTP
1A1 center
Kallings No.2 07.05.2018 11:13:09



500:1 VDM® Alloy 718 / Nicrofer 5219 CTP
1A1 center
Kallings No.2 07.05.2018 11:13:09

Adress: VDM Metals GmbH, Kleffstrasse 23, D-58762 Altena, P.O. Box 12 51, D-58742 Altena
Telephone: +49 2392 55-0 Fax: +49 2392 55-2217 Internet: www.vdm-metals.com
Chairman of the Supervisory Board: Dr. Thomas Ludwig
Management Board: Dr. Niclas Müller, Chairman; Andrea Bauer, Rolf Schencking
Company domicile: Werdohl Commercial register: Iserlohn local court, HRB 5327

True copy to the original INOXFUCINE

CERTIFIED COPY
CHUN & VOLLSTRIM Srl

BUREAU VERITAS
ITALY
WITNESSED NOTED REVIEWED
SURVEYOR P. GUARAGNI
DATE 11 NOV 2019

V. Bayba
Inoxfucine Spa
Quality Control

0300 18/2425
tai Lotto n° 5409622019
data 28/11/19 Contr. 5
NKFN

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST044973 / 2024 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
C.V.A. NICRORAM S.R.L.
VIA GRAMSCI, 29
20016 - PERO - MI

Stato di fornitura : Laminato - Invecchiato Pelato
Lieferzustand / Delivery state / Etat de livraison

Produttore :
Hersteller/Item/Usine productrice
ACCIAIERIE VALBRUNA S.P.A.

Tipo di Elaborazione: E+AOD+VAR+VAR
Erschmelzungsart / Melting process / Mode d'elaboration

Marchi di Fabbrica: AV
Zeichen des Lieferwerkes / Trade marks / Sigles de l'usine productrice

Ordine nr: 230173
Bestell / Your order / Commande

Qualità: N07718/2.4668
Werkstoff/Grade/Nuance

Punzone del Collaudatore: MR
Stempel des Werkssachverständigen / Inspector's stamp/Poinçon de l'assayeur

Conferma ordine nr: IT23002308
Werks/Our Order/Ref nr.

Marca: AV718CRV
Markenbezeichnung / Brand / Nuance

Punzonatura: N07718
Kennzeichnung / Marking / Marquage

Avviso di Spedizione: A-VI24007641
Lieferanzeige/Packing list/B.L.

SPECIFICHE :
Anforderungen / Requirements / Exigences

AMS 2750 G .
API 6ACRA 120K 1. N07718 PROC A
ASTM A370 2022 .
ASTM A604 2007 . (0)
ASTM B637 VAR 2016 N07718 (1)
NACE MR0103 2015 N07718 SA,AG (2)
NACE MR0175 2015 N07718 SA,AG (3)
DIN 17744 2002 2.4668 VAR

Note:
Aufzeichnungen / Notes / Notes

(0)Reapproved 2022
(1)Chemical analysis only.
(2)ANSI/NACE MR0103/ISO 17945 November 23, 2015
(3)ANSI/NACE MR0175/ISO 15156-3, third edition November 23,2015

COPIA CONFORME ALL'ORIGINALE
C.V.A. NICRORAM SRL
DDT NR. 849 DEL 15-04-2024
VS ORDINE F2024/000057
PESO 52,8 KG

Tolleranza: k12
Toleranz/Allowance/Tolerance

Pos. nr.	Oggetto	Dimensioni - mm	Lunghezza - mm	Colata	Pezzi	Peso - KG	Lotto nr.
		Abmessungen / Dimension / Dimension	Länge / Length / Longueur	Schmelze / Heat / Coulée	Stückzahl / Pieces / Piezas	Gewicht / Weight / Poids	Los nr. / Lot nr. / Lot nr.
0070	Tondo	22,220	5000/ 5500	802926	14	247,0	313906311

TEST ALLO STATO DI FORNITURA
Test on delivery condition / Prüefung auf lieferbereitem produkt / test a l'etat de fourniture / Prueba sobre el material asi come entregado

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam.Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°C	Posiz. Saggio Probenlage Location Emplacement 1)	Snervamento Streckgrenze Yield Stress Limite elastique Rp 0,2% N/mm2	Snervamento Streckgrenze Yield Stress Limite elastique	Resistenza Zugfestigkeit Tensile strength Resistance à traction Rm N/mm2	Allungamento Bruchdehnung Elongation Allongement E 4d %		Strizione Einschnürung Reduction of area Striction RA %		Resilienza Kerbschlagarbeit Impact Value Resilience			Durezza Haerte Hardness Durete HRc		
Valori richiesti / Anforderungen/Required values / Valeurs démandées		min		827	-	1034	-	20	-	35	-			32,0		
		max		1000										40,0		
A	12,5	20	L	938		1226		29		46				38,3		

TEST ALLO STATO DI FORNITURA
Test on delivery condition / Prüefung auf lieferbereitem produkt / Test a l'etat de fourniture / Prueba sobre el material asi come entregado

TEST		min	max	
A	Dimensioni grano x ASTM E112	2		3

LO 67513/2024
30/04/24 .. 60

1) L=longitudinale/längs, T=trasversale/quer, Q=Tangenziale/tangential

TEST	Provetta/ Probestab Specimen/Eprouvette Larg.diam.Spess. Breite Diam. Dicke Width Diam. Thickness Larg. diam. epais mm	°C	Posiz. Saggio Probenlage Location Emplacement 1)	Resilienza Kerbschlagarbeit Impact Value Resilience KV2 J			Espansione laterale Lateral Expansion Lateral ex mm			Shear Shear		
Valori richiesti / Anforderungen/Required values / Valeurs démandées		min		68	68	68	0,381	0,381	0,381	-	-	-
		max										
B	10X10	-60	L	97	93	93	0,861	0,872	0,812			

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a / Nach/According to/Selon: EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1

Certificato nr. / Prüfung/Test/Essai: MEST044973 / 2024 /

Cliente / Besteller/Purchaser/Client:
C.V.A. NICRORAM S.R.L.
VIA GRAMSCI, 29
20016 - PERO - MI

Ordine nr. / Bestell / Your order / Commande: 230173

Conferma ordine nr. / Werks/Our Order/Ref nr.: IT23002308

Avviso di Spedizione / Lieferanzeige/Packing list/B.L.: A-VI24007641

Stato di fornitura / Lieferzustand / Delivery state / Etat de livraison: Laminato - Invecchiato Pelato

Tipo di Elaborazione / Erschmelzungsart / Melting process / Mode d'elaboration: E+AOD+VAR+VAR

Qualità / Werkstoff/Grade/Nuance: N07718/2.4668

Marca / Markenbezeichnung / Brand / Nuance: AV718CRV

Produttore / Hersteller/Item/Usine productrice:
ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica / Zeichen des Lieferwerkes / Trade marks / Sigles de l'usine productrice: AV

Punzone del Collaudatore / Stempel des Werkssachverständigen / Inspector's stamp/Poinçon de l'assayeur: MR

Punzonatura / Kennzeichnung / Marking / Marquage: N07718

QTC is a prolongation of bar.

Mechanical properties according to ASTM A370.

Analisi chimica del prodotto

Chemical Analysis product/Chemische Zusammensetzung .... /Analyse chimique produit

Colata /Heat / Schmelze/Coulée	min REST / max -	0,020 / 0,045	- / 0,35	- / 0,35	17,00 / 21,00	2,80 / 3,30	- / 0,23	50,00 / 55,00	- / 1,00	0,80 / 1,15	0,40 / 0,60	- / 0,010	- / 0,010	- / 0,0030	- / 0,0060
802926	Fe %	C %	Si %	Mn %	Cr %	Mo %	Cu %	Ni %	Co %	Ti %	Al %	P %	S %	Ca %	B %
E	REST	0,034	0,24	0,14	19,87	2,95	0,07	52,44	0,05	0,98	0,46	0,007	0,001	0,0005	0,0028

Colata /Heat / Schmelze/Coulée	min - / max 0,0010	- / 0,0005	- / 0,0060	-	- / 0,00005	-	-	-	-	-	-	-	-	-	-
802926	Pb %	Se %	Mg %	Ta %	Bi %										
E	0,0010	0,0005	0,0001	0,0003	0,00005										

Colata /Heat / Schmelze/Coulée	min 4,870 / max 5,200	-	-	-	-	-	-	-
802926	Nb%+Ta%	Cb(Nb)%						
E	4,983	4,983						

Pyrometry in accordance with AMS 2750.
Macroetch test per ASTM A604: acceptable.
Duplex grain size: no topological duplex grain size as defined and measured per ASTM E1181.
Microstructural examination: material free from deleterious phases.
Furnace calibrated according to API 6A REV 21th ED ANNEX M.
Reduction ratio = 467,3 : 1
Material solution annealed 1052°C for 100'(t.t.)/water.
Aged 780°C for 8 h / air cooled.
(t.t.=total time)
ET ACC. TO EN 10088-3 TAB.1 condition 1X equivalent to EN 10277-1 Cl.3
UT ACC. TO ASTM A388

Lo 675/3/2024
Data 30/04/24

COPIA CONFORME ALL' ORIGINALE
C.V.A. NICRORAM SRL

DDT NR. 849 DEL 15-04-2024
VS ORDINE F2024/000057
PESO 52,8 KG

Allegati / Anlagen / Enclosure / Attachments :
UT24002092 GT24000687 ME24000456 HD24000101

Sono state soddisfatte tutte le condizioni richieste
Die gestellen Anforderungen sind it. Anlage erfüllt
The material has been furnished in accordance with the requirements
Le materiel à été trouvé conforme aux exigences

Controllo antimescolanza con tecnica XRF/OES portatile : OK
Verwechslungprüfung: durch XRF/QES Gerät geführt : OK
Antimixing testing performed with XRF/QES portable : OK
Contrôle antimélange svt technique XRF/QES portable : OK

Controllo visivo e dimensionale: soddisfa le esigenze
Besichtgurig und Ausmessung: ohne Beanstandung
Visual inspection and dimensional checks:satisfactory
Contrôle visuel et dimensions: satisfaisant

Melted, poured and manufactured in Italy No welding or weld repair Material free from Mercury contamination

We declare that the finished product is checked for radioactive contamination by the portal system when it leaves the production plant.

Acciaierie Valbruna S.p.A.

36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Telefono 0444.968211 - Fax 0444.963836
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4/37
Telefono 0471.924111 - Fax 0471.924497

CERTIFICATO DI COLLAUDO - ABNAHMEPRUEFZEUGNIS - INSPECTION CERTIFICATE - CERTIFICAT DE RECEPTION

In conformità a : EN 10204 (2004) , 3.1 / ISO 10474 (2013) , 3.1
Nach/According to/Selon

Certificato nr. MEST044973 / 2024 /
Prüfung/Test/Essai

Cliente / Besteller/Purchaser/Client
C.V.A. NICRORAM S.R.L.
VIA GRAMSCI, 29
20016 - PERO - MI

Ordine nr. 230173
Bestell
Your order
Commande

Conferma ordine nr: IT23002308
Werks/Our Order/Ref nr.

Avviso di Spedizione: A-VI24007641
Lieferanzeige/Packing list/B.L.

Stato di fornitura : Laminato - Invecchiato Pelato
Lieferzustand
Delivery state
Etat de livraison

Tipo di Elaborazione: E+AOD+VAR+VAR
Erschmelzungsart
Melting process
Mode d'elaboration

Qualità: N07718/2.4668
Werkstoff/Grade/Nuance

Marca: AV718CRV
Markenbezeichnung
Brand / Nuance

Produttore :
Hersteller/Item/Usine productrice

ACCIAIERIE VALBRUNA S.P.A.

Marchi di Fabbrica: AV
Zeichen des Liefernwerkes
Trade marks
Sigles de l'usine productrice

Punzone del Collaudatore: MR
Stempel des Werkssachverständigen
Inspector's stamp/Poinçon de l'assayeur

Punzonatura: N07718
Kennzeichnung
Marking
Marquage

The Quality Management System is also Certified according to Pressure Equipment Directive 2014/68/EU Annex 1,chapt.4.3 by TÜV and LLOYD`S
The Quality Management System is also Certified according to PER 2016/1105, Schedule 2, Part 4, Para 31 (8) by Competent Body TÜV SUD BABT Unlimited.
Any act of tampering, modification, alteration, counterfeiting and/or falsification and/or any other action which modifies the contents of this test certificate shall constitute a violation of applicable civil and criminal laws. Acciaierie Valbruna shall protect its rights and interests before any competent court, authority and jurisdiction.
Maxival and/or Valplus grades/products are manufactured with ladle techniques to control composition, distribution, size and shape of non-metallic inclusions for improved machinability.
The supplied product conforms to requirements expressly requested by the purchaser and conforms to requirements specified by certified norms and standards. Should the product be used for more severe, critical and/ or in any case different applications than those the material is generally intended for, any different and/or supplementary requirements shall be specifically demanded, at least, upon order of the Product by the Purchaser. Acciaierie Valbruna SpA shall not be responsible for any improper use of the Products.

Lo 675/13/2024
Data 3/04/24

COPIA CONFORME ALL'ORIGINALE
C.V.A. NICRORAM SRL

DDT NR. 849 DEL 15-04-2024
VS ORDINE F2024/000057
PESO 52,8 KG

Acciaierie Valbruna S.p.A.
36100 VICENZA (Italia) - Viale della scienza, 25 z.i.
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4

CERTIFICATO Certificate - Zeugnis - Certificat N° ME24000456 | Pag 4 di 10

ESAME METALLOGRAFICO

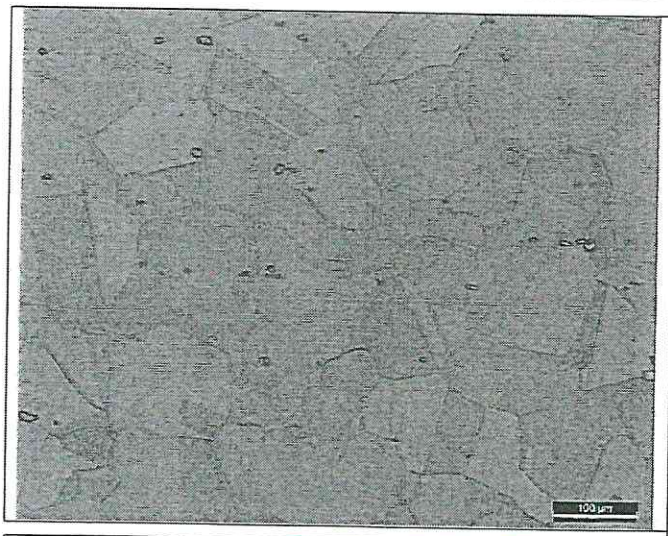
Metallographic examination - Mikroschliff Prüfung - Metallographic

mod. ME02 MEST044973 / 2024 /

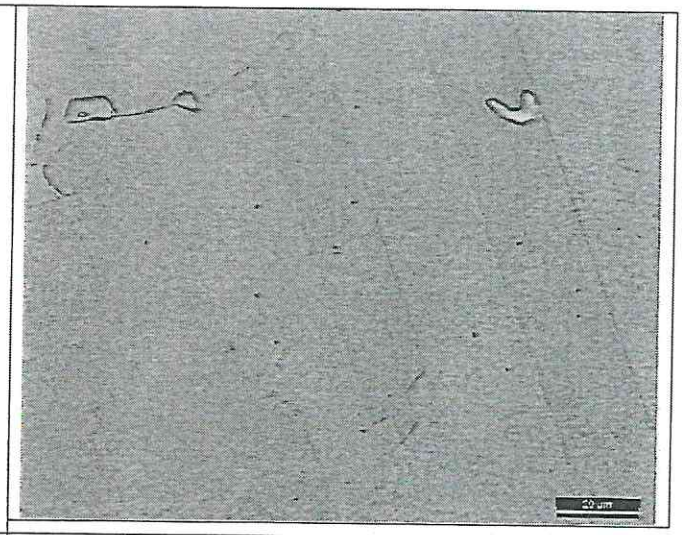
Secondo : API 6ACRA
According to - Nach - Selon

Cliente : C.V.A. NICRORAM S.R.L. Customer - Besteller - Client		Conferma : IT23002308/0070/001 Confirmation - Bestätigung - Confirmation			Lotto nr : 313906311 Mill order - Uns.Auftr. - A/R	
MARCA Grade Qualität Nuance	**DIMENSIONI** Size Abmessungen Dimensions	**COLATA** Heat Schmelze Coulée	**BARRE** Bars Stäbe Barres	**PESO** Weight Gewicht Poids	**LUNGHEZZA** Length Länge Longueur	
AV718CRV	Tondo 22,220 mm	802926	N. 14	KG : 247,0	5000	5500

T. TERMICO H.Treatement Wärmebehandlung T.Termique	ESECUZIONE Condition Ausführung Execution	Condizioni Superficiali Surface Oberfläche Surface Conditions	TOLLERANZA Tolerance Toleranz Tolerance
Invecchiato	Pelato	-	k12



Surface	100x

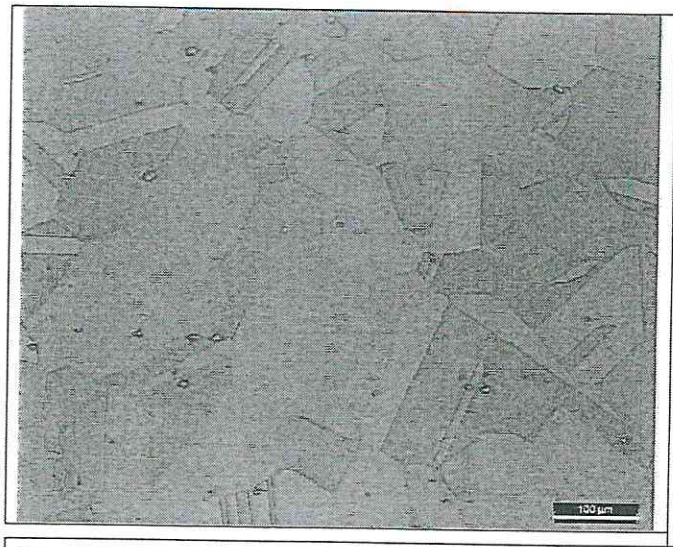


Surface	500x

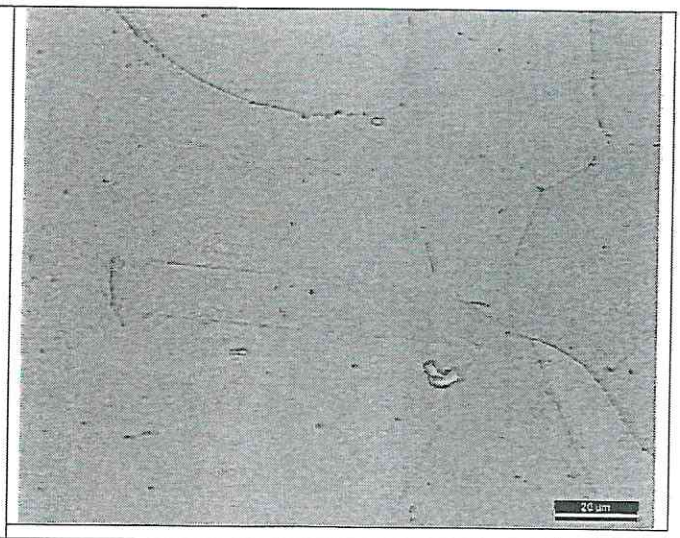
Lo 67513/2024
Data 30/04/24

COPIA CONFORME ALL'ORIGINALE
C.V.A. NICRORAM SRL
DDT NR. 849 DEL 15-04-2024
VS ORDINE F2024/000057
PESO 52,8 KG

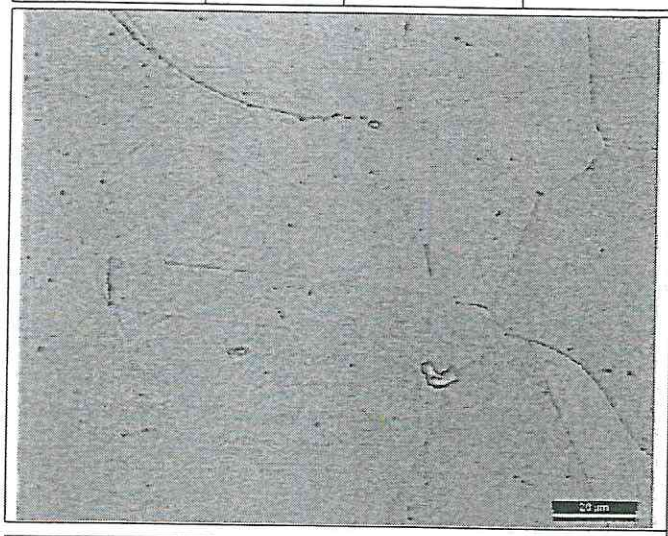
NOME T.Nassi Name - Nom DATA : 19/03/24 Date - Date FIRMA		COLLAUDATORE Inspector - Abnahmesachsverst - Inspecteur



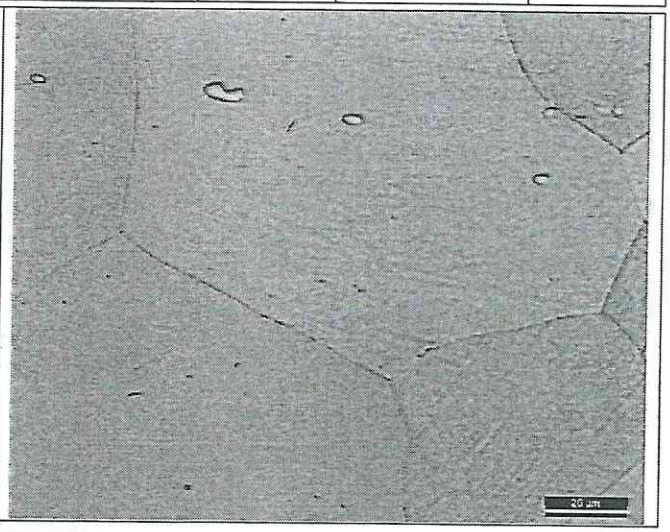
1/2 Radius	100x



1/2 Radius	500x



Center	100x



Center	500x

NOTE : Notes - Stellt fest - Notes	

Lo 67513/2024
DATA 30/04/24

COPIA CONFORME ALL'ORIGINALE
C.V.A. NICRORAM SRL
DDT NR. 849 DEL 15-04-2024
VS ORDINE I2024/000057
PESO 52,8 KG

NOME T.Nassi Name - Nom DATA : 19/03/24 Date - Date FIRMA		COLLAUDATORE Inspector - Abnahmesachsverst - Inspecteur

mod. UT02

MEST044973 / 2024 /

Cliente : C.V.A. NICRORAM S.R.L. *Customer*				Lotto nr : 313906311 *Mill order*		
MARCA *Grade*	**DIMENSIONI - mm** *Size*	**COLATA** *Heat*	**BARRE** *Bars*	**PESO** *Weight*	**LUNGHEZZA - mm** *Length*	
AV718CRV	Tondo 22,220	802926	N. 14	KG : 247,0	5000	5500

T. TERMICO *Heat Treatement*	ESECUZIONE *Condition*	RUGOSITA' *Roughness*	TOLLERANZA *Tolerance*
Invecchiato	Pelato	µm	k12

Istruzione : PROC CND 050 *Work Instruction*		Criteri Accettabilità : ASTM A388/API 6A PSL3 Acceptance Criteria

ELETTRONICA : GE ROWA *Equipment*	
ACCOPPIANTE : ACQUA *Couplant*	VEL.CONTROLLO : 51 m/min *Testing Speed*

TRASDUTTORI *Probes*	TIPO ONDA *Type of wave*	FREQUENZA (MHZ) *Frequency*	DIMENSIONI (MM) *Dimension*	ANGOLO *Angle*	TARATURA *Calibration*
PA 112EL. 10MHZ	LONGITUDINALE	10	.	0°	DAC

CONTROLLO AUTOMATICO [X] *Automatic inspection*	CONTROLLO MANUALE *Manual inspection*

NOTE :
Notes

Lo 67513/2024
Data 30/04/24 ... 10

COPIA CONFORME ALL'ORIGINALE
C.V.A. NICRORAM SRL

DDT NR. 849 DEL 15-04-2024
VS ORDINE F2024/000057
PESO 52,8 KG

CONFORME [X] *Compliant*	CONFORME IN DEROGA [ ] *See Deviation*	NON CONFORME [ ] *Not Compliant*

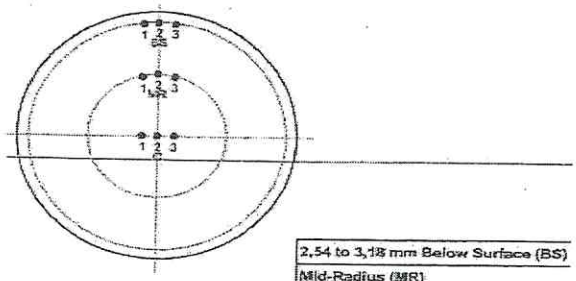
ISPEZIONATO DA Inspected by	VERIFICATO DA Verified by	APPROVATO DA Approved by	COLLAUDATORE Inspector - Abnahmesachsverst - Inspecteur
FIRMA	FIRMA	G.Parlato ISO 9712 LEV. 2 IND1901054 FIRMA	

Date - Date 18/03/2024

Operatori, strumenti e documenti di riferimento, utilizzati per il collaudo del materiale, sono identificati, controllati e/o calibrati in accordo alle norme EN, ISO e ASTM, richiamate nelle pratiche operative e istruzioni di pertinenza / *Operators, Equipment and reference documents, used for material inspection, are identified, checked and/or calibrated in accordance with EN/ISO or ASTM standards, reported in relevant documents.*

Applicabile presso		PROVA DI DUREZZA / HARDNESS TEST *ACCIAIERIE VALBRUNA S.p.A.*
Stab. di VI e/o BZ		

NUMERO PROVA (NP)	LOTTO Batch	COLATA Heat	TEST	STRUMENTO Equipment
NP24011665	313906311	802926	HRC	DUR_018 –Qness 750 cs Evo



MOD API 6ACRA

HRC				
TEST	T1	T2	T3	AVERAGE
ESTERNO	39,1	39,0	39,1	39,1
1/2 R	38,4	38,2	38,4	38,3
CENTRO	37,2	37,3	37,5	37,3

Lo 67513/2024
Data 30/04/24

COPIA CONFORME ALL' ORIGINALE
C.V.A. MICROFILM SRL

DDT NR. 849 DEL 15-04-2024
VS ORDINE F2024/000057
PESO 52,8 KG

VICENZA 19/03/24	Il Responsabile : *M.Rizzotto* Firma :	COLLAUDATORE Inspector - Abnahmesachsverst - Inspecteur

Applicabile presso Stab. di VI e/o BZ		PROVA DI DUREZZA / HARDNESS TEST *ACCIAIERIE VALBRUNA S.p.A.*

TEST		STRUMENTAZIONE/ Equipment		
HBW 187,5/2,5		DUR_018 –Qness 750 cs Evo		
Numero di Prova	LOTTO/ Batch	MATERIALE/ Grade	COLATA/ Heat	DIMENSIONE / Size
NP24022972	313906311	AV718CRV	802926	Ø 22.22
CONDIZIONE/ Condition	N° Bars/ N° of tests	LUNGHEZZA / Lenght		PESO / Weight
INVECH.	33 / 33			
TEST DUREZZA 100% OF BARS				

Barra n°	HB	Barra n°	HB
1	363	26	365
2	365	27	364
3	367	28	365
4	366	29	364
5	366	30	364
6	364	31	364
7	365	32	365
8	366	33	362
9	364	34	
10	366		
11	364		
12	362		
13	364		
14	365		
15	366		
16	365		
17	366		
18	365		
19	365		
20	364		
21	363		
22	364		
23	362		
24	365		
25	362		
26	364		
27	364		
28	363		

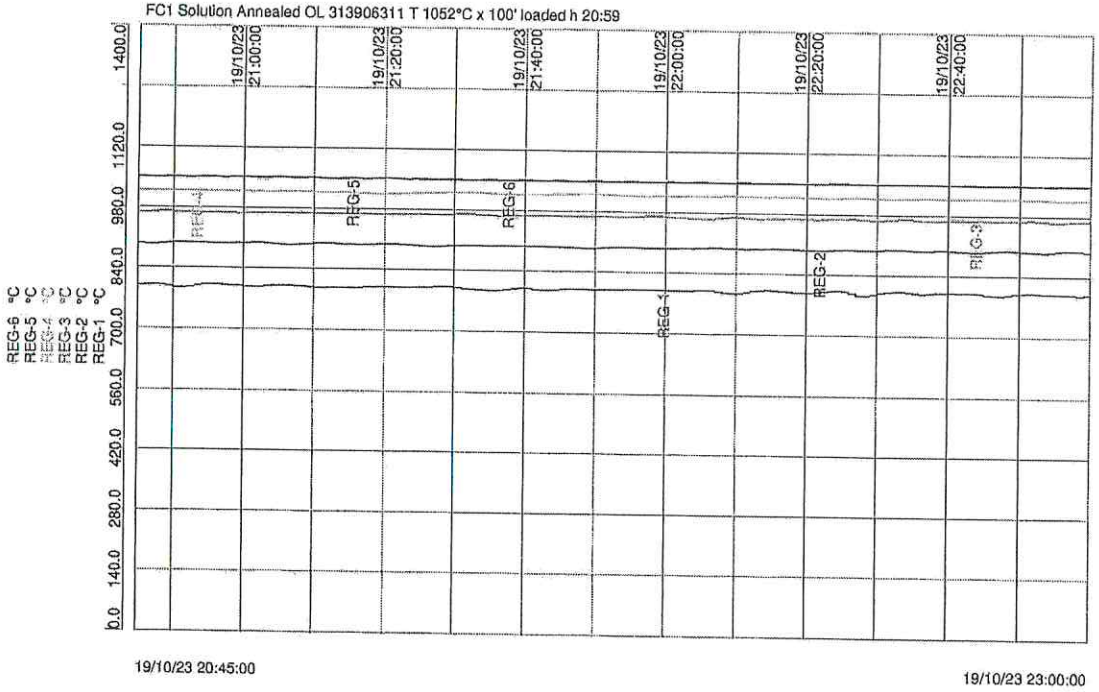
COPIA CONFORME ALL'ORIGINALE C.V.A. NICRORAM SRL	DDT NR. 849 DEL 15-04-2024 VS ORDINE F2024/000057 PESO 52,8 KG

Lo 67513/2024
Data 30/4/24

VICENZA 19/03/24	Il Responsabile : *M.Rizzotto* Firma :	COLLAUDATORE Inspector - Abnahmesachsverst - Inspecteur

N° LOTTO : 313906311 Lot Number	Note Dettaglio : Detail Notes	Note: Notes

TEMPERATURE (°C)



TIME (HOURS)

COPIA CONFORME ALL' ORIGINALE
C.V.A. NICRORAM SRL
DDT NR. 849 DEL 15-04-2024
VS ORDINE F2024/000057
PESO 52,8 KG

Approved by:

Acciaierie Valbruna S.p.A.
36100 VICENZA (Italia) - Viale della scienza, 25 z.l.
Stab.: 39100 BOLZANO (Italia) - Via A. Volta, 4

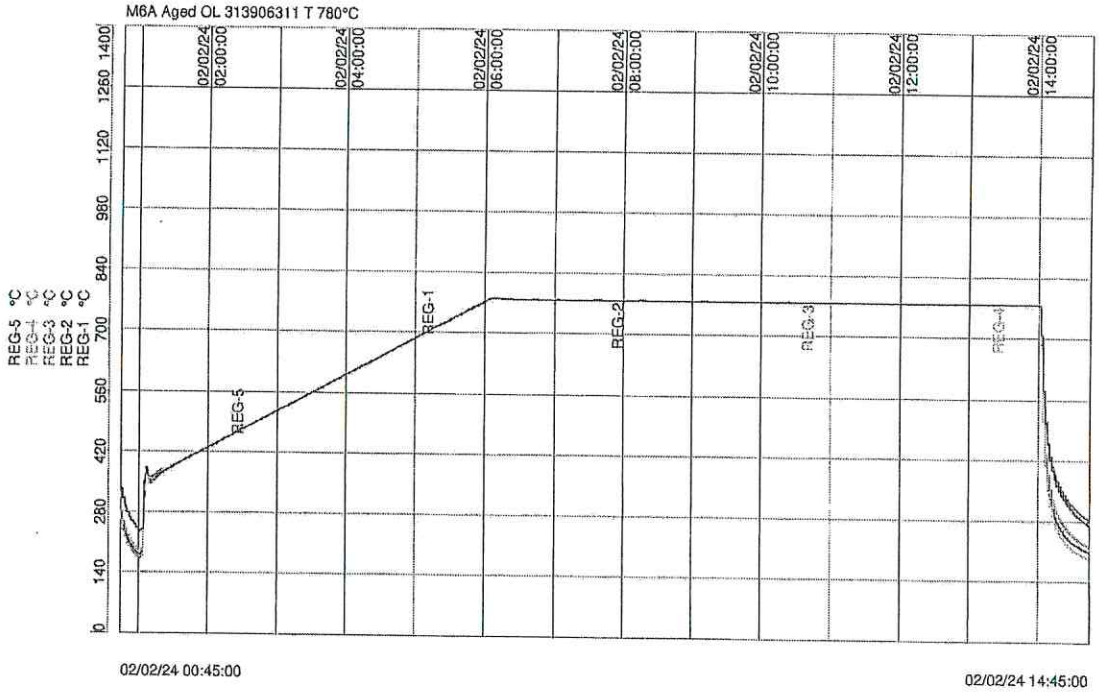
CERTIFICATO Certificate - Zeugnis - Certificat N° GT24000687

Diagrammi di trattamento termico

Heat Treatment charts - Waermebehandlungs diagramm - Diagramme de traitement thermique

MEST044973 / 2024 /

N° LOTTO : 313906311 Lot Number	Note Dettaglio : Detail Notes	Note: Notes



COPIA CONFORME ALL'ORIGINALE
C.V.A. NICRORAM SRL

DDT NR. 849 DEL 15-04-2024
VS ORDINE F2024/000057
PESO 52,8 KG

Approved by:

bsa s.r.l.
20022 CASTANO PRIMO (MI) - ITALY
TEL. 0331 888.301 (r.a.) - FAX 0331 888.330
mail@bsaita.com - www.bsaita.com

TAI MILANO S.P.A.

VIALE PETRELLA, 21
20124 MILANO
ITALIA

INSPECTION CERTIFICATE

According to EN 10204 [X] 3.1 [ ] 3.2

CERTIFICATE No. 003141 **DATE:** 02/08/2023 **ORDER No.** F 2023/000273 REV.01 **DATE:** 08/06/2023
DELIVERY NOTE No. 3141 **DATE:** 02/08/2023 **CUSTOMER No.** 108920

ITEM	ARTICLE	QTY	MATERIAL	HEAT TREATMENT	PROTECTION	HEAT NO.
26	STUDS M12X1,75X45 UNI 5909	6.027	ASTM A320 L7	QUENCHED TEMPERED	HOT DIP GALV. A153	BC2768

MECHANICAL PROPERTIES

ITEM	Values	UTS(MPa) min	YS(MPa) min	E% min	RA% min	HARDNESS (HB/HRC)	IMPACT TEST J min	PROOFLOAD Lbf/kN	H.T. Tempering	HARDNESS 24h (HB/HRC)
26	Required	860	725	16,00	50,00	321 max	27JMIN.-101°C		593°C	
	Pointed out	959	793	18,60	60,00	min 285 - 288 max	N.A.			

CHEMICAL COMPOSITION %

ITEM	Values	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Al	B	Co	Cu	H	Fe	Pb	N	O	W	Sn
26	Required min.	0,380	0,750	0,150				0,800	0,150													
	Required max.	0,480	1,000	0,350	0,035	0,040		1,100	0,250													
	Pointed out	0,420	0,810	0,240	0,008	0,025		1,020	0,160													

Remarks: Chemical and mechanical values, at delivery condition, are quoted by the relevant steel work/supplier certificate.
Visual and dimensional test satisfactory - Radioactivity inspection without objection
The Quality Management system is certified in accordance with:
- ISO 9001:2015 By RINA (Certif. N. 590/97/S) - Macroetch Test ACC.E381:S1, R1, C1 (SATISFACTORY). For Quenched Tempered materials only.
- ANNEX I-PARA 4.3 of pressure equipment directive (PED) (2014/68/UE) by TUV SUD N. DGR-0036-QS-W53/2002/MUC, TUV NORD N. 07/203/9080/WP/1319/18
We certify that material supplied complies with the requirements agreed on order.

AV
Lot 64665/2023
Data 21/08/23 Contr. D
AX 23

Quality Control Manager: S. Angelino Inspector:_____ Date:_____

bsa s.r.l.
20022 CASTANO PRIMO (MI) - ITALY
TEL. 0331 888.301 (r.a.) - FAX 0331 888.330
mail@bsaita.com - www.bsaita.com

TAI MILANO S.P.A.

VIALE PETRELLA, 21
20124 MILANO
ITALIA

INSPECTION CERTIFICATE

According to EN 10204 [X] 3.1 [ ] 3.2

CERTIFICATE No. 002692 **DATE:** 25/06/2024 **ORDER No.** F 2024/000143 REV.03 **DATE:** 15/05/2024
DELIVERY NOTE No. 2692 **DATE:** 19/06/2024 **CUSTOMER No.** 108920

ITEM	ARTICLE	QTY	MATERIAL	HEAT TREATMENT	PROTECTION	HEAT NO.
2	DADI M12X1,75 A UNI 5587 Rep. AV	5.947	ASTM A194 GR.7	QUENCHED TEMPERED	HOT DIP GALV. A153	232808
4	PRIGIONIERI M20X2,5X90 B UNI 5909 rep.00	522	ASTM A320 L7	QUENCHED TEMPERED	HOT DIP GALV. A153	124885
6	VITE 1/2" GASX88	8	ASTM A1082 UNS S32760	SOLUTION ANNEALED		406828
7	DADI M12X1,75 C UNI 6610 rep.00	14	ASTM A453 660A	SOLUTION TREAT. + HA RDENING TREAT.		455412

MECHANICAL PROPERTIES

ITEM	Values	UTS(MPa) min	YS(MPa) min	E% min	RA% min	HARDNESS (HB/HRC)	IMPACT TEST J min	PROOF LOAD Lbf/kN	H.T. Tempering	HARDNESS 24h (HB/HRC)
2	Required					min 248 - 327 max	27J min@-101°C	POSIT	595°C	min 201 -590°C
	Pointed out					min 272 - 287 max	N.A.	POSIT		min 260 - 266 max
4	Required	860	725	16,00	50,00	321 max	27JMIN.-101°C		593°C	
	Pointed out	922	796	21,40	60,10	min 279 - 288 max	44-42-39			
6	Required	750	550	25,00	30,00	290 max	45J min.@-46°C			
	Pointed out	843	619	40,00	82,00	min 263 - 277 max	309-316-336			
7	Required	895	585	15,00	18,00	min 248 - 341 max				
	Pointed out	1123	761	26,00	46,00	min 309 - 320 max				

CHEMICAL COMPOSITION %

ITEM	Values	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Al	B	Co	Cu	H	Fe	Pb	N	O	W	Sn
2	Required min.	0,380	0,750	0,150				0,800	0,150													
	Required max.	0,480	1,000	0,350	0,035	0,040		1,100	0,250													
	Pointed out	0,430	0,860	0,230	0,130	0,005		0,980	0,202													
4	Required min.	0,380	0,750	0,150				0,800	0,150													
	Required max.	0,480	1,000	0,350	0,035	0,040		1,100	0,250													
	Pointed out	0,400	0,860	0,260	0,013	0,002		1,040	0,210													
6	Required min.						6,000	24,000	3,000						0,500				0,200		0,500	
	Required max.	0,030	1,000	1,000	0,030	0,010	8,000	26,000	4,000						1,000				0,300		1,000	
	Pointed out	0,021	0,570	0,270	0,020		7,640	25,750	3,510						0,610				0,246		0,520	
7	Required min.						24,000	13,500	1,000	0,100	1,900		0,001									
	Required max.	0,080	2,000	1,000	0,040	0,030	27,000	16,000	1,500	0,500	2,350	0,350	0,010									
	Pointed out	0,040	1,450	0,270	0,018	0,000	24,280	13,780	1,090	0,107	1,905	0,210	0,005									

Remarks: Chemical and mechanical values, at delivery condition, are quoted by the relevant steel work/supplier certificate.
Visual and dimensional test satisfactory - Radioactivity inspection without objection
The Quality Management system is certified in accordance with:
- ISO 9001:2015 By RINA (Certif. N. 590/97/S) - Macroetch Test ACC.E381:S1, R1, C1 (SATISFACTORY). For Quenched Tempered materials only.
- ANNEX I-PARA 4.3 of pressure equipment directive (PED) (2014/68/UE) by TUV SUD N. DGR-0036-QS-W53/2002/MUC, TUV NORD N. 07/203/9080/WP/1319/18
We certify that material supplied complies with the requirements agreed on order.

Notes: ITEM 6 S:0,0006 PRE:41,269 PREN:42,127 - MARKING BSA 32760
ITEM 7 S:0,0005 STRESS RUPTURE 650°C STRESS 523 MPa TIME 133h ELONGATION 29% - MARKING BSA 660A

CONTROL DEPT. S.r.l.

Lo 67905/2024
Data 26/6/24

Quality Control Manager: S. Angelino Inspector:_____ Date:_____

bsa s.r.l.
20022 CASTANO PRIMO (MI) - ITALY
TEL. 0331 888.301 (r.a.) - FAX 0331 888.330
mail@bsaita.com - www.bsaita.com

TAI MILANO S.P.A.
VIALE PETRELLA, 21
20124 MILANO
ITALIA

INSPECTION CERTIFICATE

According to EN 10204 [X] 3.1 [ ] 3.2

CERTIFICATE No. 002692 DATE: 25/06/2024 ORDER No. F 2024/000143 REV.03 DATE: 15/05/2024
DELIVERY NOTE No. 2692 DATE: 19/06/2024 CUSTOMER No. 108920

ITEM	ARTICLE	QTY	MATERIAL	HEAT TREATMENT	PROTECTION	HEAT NO.
21	DADI M20X2,5 D UNI 5587 rep. FF	110	ASTM A1082 UNS S32760	SOLUTION ANNEALED		406828
22	DADI 5/8" 11UNC E ASME B18.2.2 rep. FF	64	ASTM A1082 UNS S32760	SOLUTION ANNEALED		406828
23	PRIGIONIERI M20X2,5X120 F UNI 5909 rep. FF	4	ASTM A1082 UNS S32760	SOLUTION ANNEALED		402744
24	PRIGIONIERI M12X1,75X50 G UNI 5909 rep. FF	48	ASTM A1082 UNS S32760	SOLUTION ANNEALED		402744

MECHANICAL PROPERTIES

ITEM	Values	UTS(MPa) min	YS(MPa) min	E% min	RA% min	HARDNESS (HB/HRC)	IMPACT TEST J min	PROOF LOAD Lbf/kN	H.T. Tempering	HARDNESS 24h (HB/HRC)
21	Required	750	550	25,00	30,00	290 max	45J min.@-46°C			
	Pointed out	843	619	40,00	82,00	min 263 - 277 max	309-316-336	POSIT		
22	Required	750	550	25,00	30,00	290 max	45J min.@-46°C			
	Pointed out	843	619	40,00	82,00	min 263 - 277 max	309-316-336	POSIT		
23	Required	750	550	25,00	30,00	290 max	45J min.@-46°C			
	Pointed out	874	625	40,00	78,00	min 276 - 279 max	247-260-246			
24	Required	750	550	25,00	30,00	290 max	45J min.@-46°C			
	Pointed out	874	625	40,00	78,00	min 276 - 279 max	247-260-246			

CHEMICAL COMPOSITION %

ITEM	Values	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Al	B	Co	Cu	H	Fe	Pb	N	O	W	Sn
21	Required min.						6,000	24,000	3,000						0,500				0,200		0,500	
	Required max.	0,030	1,000	1,000	0,030	0,010	8,000	26,000	4,000						1,000				0,300		1,000	
	Pointed out	0,021	0,570	0,270	0,020		7,640	25,750	3,510						0,610				0,246		0,520	
22	Required min.						6,000	24,000	3,000						0,500				0,200		0,500	
	Required max.	0,030	1,000	1,000	0,030	0,010	8,000	26,000	4,000						1,000				0,300		1,000	
	Pointed out	0,021	0,570	0,270	0,020		7,640	25,750	3,510						0,610				0,246		0,520	
23	Required min.						6,000	24,000	3,000						0,500				0,200		0,500	
	Required max.	0,030	1,000	1,000	0,030	0,010	8,000	26,000	4,000						1,000				0,300		1,000	
	Pointed out	0,015	0,580	0,300	0,024	0,001	7,670	25,600	3,500						0,590				0,252		0,520	
24	Required min.						6,000	24,000	3,000						0,500				0,200		0,500	
	Required max.	0,030	1,000	1,000	0,030	0,010	8,000	26,000	4,000						1,000				0,300		1,000	
	Pointed out	0,015	0,580	0,300	0,024	0,001	7,670	25,600	3,500						0,590				0,252		0,520	

Remarks: Chemical and mechanical values, at delivery condition, are quoted by the relevant steel work/supplier certificate.
Visual and dimensional test satisfactory - Radioactivity inspection without objection
The Quality Management system is certified in accordance with:
- ISO 9001:2015 By RINA (Certif. N. 590/97/S) - Macroetch Test ACC.E381:S1, R1, C1 (SATISFACTORY). For Quenched Tempered materials only.
- ANNEX I-PARA 4.3 of pressure equipment directive (PED) (2014/68/UE) by TUV SUD N. DGR-0036-QS-W53/2002/MUC, TUV NORD N. 07/203/9080/WP/1319/18
We certify that material supplied complies with the requirements agreed on order.

Notes: ITEM 21-22 S:0,0006 PRE:41,269 PREN:42,127 - MARKING BSA 32760
ITEM 23-24 PRE:41,182 PREN:42,04 S:0,0006 - MARKING BSA 32760 744

Lo 67905/2024
Data 26/06/24 Contr. 0

Quality Control Manager: S. Angelino Inspector:_____ Date:_____

bsa s.r.l.
20022 CASTANO PRIMO (MI) - ITALY
TEL. 0331 888.301 (r.a.) - FAX 0331 888.330
mail@bsaita.com - www.bsaita.com

TAI MILANO S.P.A.
VIALE PETRELLA, 21
20124 MILANO
ITALIA

INSPECTION CERTIFICATE

According to EN 10204 [X] 3.1 [ ] 3.2

CERTIFICATE No. 002692 DATE: 25/06/2024 ORDER No. F 2024/000143 REV.03 DATE: 15/05/2024
DELIVERY NOTE No. 2692 DATE: 19/06/2024 CUSTOMER No. 108920

ITEM	ARTICLE	QTY	MATERIAL	HEAT TREATMENT	PROTECTION	HEAT NO.
25	TIRANTI 5/8" 11UNCX110 H ASME B1.1 rep. FF	32	ASTM A1082 UNS S32760	SOLUTION ANNEALED		402744
26	DADI M16X2 I UNI 5587 rep. FF	410	ASTM A1082 UNS S32760	SOLUTION ANNEALED		406161
27	VITI-TE M6X1X30 UNI 5739	102	ASTM A1082 UNS S32760	SOLUTION ANNEALED		405718
28	DADI M12X1,75 J UNI 5587 rep. FB	68	ASTM F467 UNS N06625	ANNEALED		516887

MECHANICAL PROPERTIES

ITEM	Values	UTS(MPa) min	YS(MPa) min	E% min	RA% min	HARDNESS (HB/HRC)	IMPACT TEST J min	PROOF LOAD Lbf/kN	H.T. Tempering	HARDNESS 24h (HB/HRC)
25	Required	750	550	25,00	30,00	290 max	45J min.@-46°C			
	Pointed out	874	625	40,00	78,00	min 276 - 279 max	247-260-246			
26	Required	750	550	25,00	30,00	290 max	45J min.@-46°C			
	Pointed out	861	626	37,00	82,00	min 258 - 262 max	350-371-351			
27	Required	750	550	25,00	30,00	290 max	45J min.@-46°C			
	Pointed out	911	664	37,00	79,00	min 277 - 288 max	312-286-275			
28	Required					35 max				
	Pointed out					min 21 - 23 max		POSIT		

CHEMICAL COMPOSITION %

ITEM	Values	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Al	B	Co	Cu	H	Fe	Pb	N	O	W	Sn
25	Required min.						6,000	24,000	3,000						0,500				0,200		0,500	
	Required max.	0,030	1,000	1,000	0,030	0,010	8,000	26,000	4,000						1,000				0,300		1,000	
	Pointed out	0,015	0,580	0,300	0,024	0,001	7,670	25,600	3,500						0,590				0,252		0,520	
26	Required min.						6,000	24,000	3,000						0,500				0,200		0,500	
	Required max.	0,030	1,000	1,000	0,030	0,010	8,000	26,000	4,000						1,000				0,300		1,000	
	Pointed out	0,021	0,550	0,300	0,022		7,420	25,800	3,500						0,590				0,256		0,540	
27	Required min.						6,000	24,000	3,000						0,500				0,200		0,500	
	Required max.	0,030	1,000	1,000	0,030	0,010	8,000	26,000	4,000						1,000				0,300		1,000	
	Pointed out	0,016	0,540	0,250	0,019	0,000	7,260	25,800	3,520						0,580				0,261		0,540	
28	Required min.						58,000	20,000	8,000													
	Required max.	0,100	0,500	0,500	0,015	0,015		23,000	10,000		0,400	0,400		1,000			5,000					
	Pointed out	0,013	0,170	0,320	0,009	0,001	60,760	21,940	8,250		0,290	0,230		0,252			4,130					

Remarks: Chemical and mechanical values, at delivery condition, are quoted by the relevant steel work/supplier certificate.
Visual and dimensional test satisfactory - Radioactivity inspection without objection
The Quality Management system is certified in accordance with:
- ISO 9001:2015 By RINA (Certif. N. 590/97/S) - Macroetch Test ACC.E381:S1, R1, C1 (SATISFACTORY). For Quenched Tempered materials only.
- ANNEX I-PARA 4.3 of pressure equipment directive (PED) (2014/68/UE) by TUV SUD N. DGR-0036-QS-W53/2002/MUC, TUV NORD N. 07/203/9080/WP/1319/18
We certify that material supplied complies with the requirements agreed on order.

Notes: ITEM 25 PRE:41,182 PREN:42,04 S:0,0006 - MARKING BSA 32760 744
ITEM 26 S:0,0005% PRE:41,446 PREN:42,337 - MARKING BSA 32760 161
ITEM 27 S:0,0005 PRE:41,592 PREN:42,483 - MARKING BSA 32760 718
ITEM 28 Nb+Ta:3,488% Cb:3,476% - MARKING BSA 625 887

CONTROL DEPT.

Lo 67905/2024
Data 26/6/24 Contr. D

Quality Control Manager: S. Angelino Inspector:_____ Date:_____

bsa s.r.l.
20022 CASTANO PRIMO (MI) - ITALY
TEL. 0331 888.301 (r.a.) - FAX 0331 888.330
mail@bsaita.com - www.bsaita.com

TAI MILANO S.P.A.
VIALE PETRELLA, 21
20124 MILANO
ITALIA

INSPECTION CERTIFICATE

According to EN 10204 [X] 3.1 [ ] 3.2

CERTIFICATE No. 002692 **DATE:** 25/06/2024 **ORDER No.** F 2024/000143 REV.03 **DATE:** 15/05/2024
DELIVERY NOTE No. 2692 **DATE:** 19/06/2024 **CUSTOMER No.** 108920

ITEM	ARTICLE	QTY	MATERIAL	HEAT TREATMENT	PROTECTION	HEAT NO.
29	PRIGIONIERI M12X1,75X55 K UNI 5909 rep FB	56	ASTM F468 UNS N06625	ANNEALED		305896
30	TIRANTI M12X1,75X85 L UNI 6610 rep FB	28	ASTM F468 UNS N06625	ANNEALED		306767
31	VITI-TE M8X1,25X25 UNI 5739	72	ASTM F468 UNS N06625	ANNEALED		516887
32	VITI-TE M10X1,5X150 UNI 5737	14	ASTM F468 UNS N06625	ANNEALED		516887

MECHANICAL PROPERTIES

ITEM	Values	UTS(MPa) min	YS(MPa) min	E% min	RA% min	HARDNESS (HB/HRC)	IMPACT TEST J min	PROOF LOAD Lbf/kN	H.T. Tempering	HARDNESS 24h (HB/HRC)
29	Required	830	415	30,00		35 max				
	Pointed out	869	551	51,00	61,00	min 25 - 26 max				
30	Required	830	415	30,00		35 max				
	Pointed out	858	520	51,00		min 32 - 33 max				
31	Required	830	415	30,00		35 max				
	Pointed out	842	422	56,00		min 24 - 25 max				
32	Required	830	415	30,00		35 max				
	Pointed out	842	422	56,00		min 24 - 25 max				

CHEMICAL COMPOSITION %

ITEM	Values	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Al	B	Co	Cu	H	Fe	Pb	N	O	W	Sn
29	Required min.						58,000	20,000	8,000													
	Required max.	0,100	0,500	0,500	0,015	0,015		23,000	10,000		0,400	0,400		1,000			5,000					
	Pointed out	0,010	0,150	0,380	0,008	0,001	61,410	22,010	8,290		0,260	0,140		0,010			3,740					
30	Required min.						58,000	20,000	8,000													
	Required max.	0,100	0,500	0,500	0,015	0,015		23,000	10,000		0,400	0,400		1,000			5,000					
	Pointed out	0,010	0,110	0,280	0,010	0,001	61,340	21,600	8,230		0,280	0,200		0,019			4,340					
31	Required min.						58,000	20,000	8,000													
	Required max.	0,100	0,500	0,500	0,015	0,015		23,000	10,000		0,400	0,400		1,000			5,000					
	Pointed out	0,013	0,170	0,320	0,009	0,001	60,760	21,940	8,250		0,290	0,230		0,252			4,130					
32	Required min.						58,000	20,000	8,000													
	Required max.	0,100	0,500	0,500	0,015	0,015		23,000	10,000		0,400	0,400		1,000			5,000					
	Pointed out	0,013	0,170	0,320	0,009	0,001	60,760	21,940	8,250		0,290	0,230		0,252			4,130					

Remarks: Chemical and mechanical values, at delivery condition, are quoted by the relevant steel work/supplier certificate.
Visual and dimensional test satisfactory - Radioactivity inspection without objection
The Quality Management system is certified in accordance with:
- ISO 9001:2015 By RINA (Certif. N. 590/97/S) - Macroetch Test ACC.E381:S1, R1, C1 (SATISFACTORY). For Quenched Tempered materials only.
- ANNEX I-PARA 4.3 of pressure equipment directive (PED) (2014/68/UE) by TUV SUD N. DGR-0036-QS-W53/2002/MUC, TUV NORD N. 07/203/9080/WP/1319/18
We certify that material supplied complies with the requirements agreed on order.

Notes: ITEM 29 %Nb+Ta:3,47 - MARKING BSA 625 896
ITEM 30 Ta:0,0107% Nb+Ta:3,514% Nb:3,503 - MARKING BSA 625 767
ITEM 31-32 Nb+Ta:3,488% Cb:3,476% - MARKING BSA 625 887

CONTROL DEPT. S. ANGELINO

TAI Lo 67905/24/4
Data 26/6/24 Contr. G

Quality Control Manager: S. Angelino Inspector:_____ Date:_____

bsa s.r.l.
20022 CASTANO PRIMO (MI) - ITALY
TEL. 0331 888.301 (r.a.) - FAX 0331 888.330
mail@bsaita.com - www.bsaita.com

TAI MILANO S.P.A.

VIALE PETRELLA, 21
20124 MILANO
ITALIA

INSPECTION CERTIFICATE

According to EN 10204 [X] 3.1 [ ] 3.2

CERTIFICATE No. 002692 DATE: 25/06/2024 ORDER No. F 2024/000143 REV.03 DATE: 15/05/2024
DELIVERY NOTE No. 2692 DATE: 19/06/2024 CUSTOMER No. 108920

ITEM	ARTICLE	QTY	MATERIAL	HEAT TREATMENT	PROTECTION	HEAT NO.
33	VITI-TE M8X1,25X25 UNI 5739	35	ASTM A1082 UNS S32760	SOLUTION ANNEALED		406161

MECHANICAL PROPERTIES

ITEM	Values	UTS(MPa) min	YS(MPa) min	E% min	RA% min	HARDNESS (HB/HRC)	IMPACT TEST J min	PROOF LOAD Lbf/kN	H.T. Tempering	HARDNESS 24h (HB/HRC)
33	Required	750	550	25,00	30,00	290 max	45J min.@-46°C			
	Pointed out	861	626	37,00	82,00	min 258 - 262 max	350-371-351			

CHEMICAL COMPOSITION %

ITEM	Values	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Al	B	Co	Cu	H	Fe	Pb	N	O	W	Sn
33	Required min.						6,000	24,000	3,000						0,500				0,200		0,500	
	Required max.	0,030	1,000	1,000	0,030	0,010	8,000	26,000	4,000						1,000				0,300		1,000	
	Pointed out	0,021	0,550	0,300	0,022		7,420	25,800	3,500						0,590				0,256		0,540	

Remarks: Chemical and mechanical values, at delivery condition, are quoted by the relevant steel work/supplier certificate.
Visual and dimensional test satisfactory - Radioactivity inspection without objection
The Quality Management system is certified in accordance with:
- ISO 9001:2015 By RINA (Certif. N. 590/97/S) - Macroetch Test ACC.E381:S1, R1, C1 (SATISFACTORY). For Quenched Tempered materials only.
- ANNEX I-PARA 4.3 of pressure equipment directive (PED) (2014/68/UE) by TUV SUD N. DGR-0036-QS-W53/2002/MUC, TUV NORD N. 07/203/9080/WP/1319/18
We certify that material supplied complies with the requirements agreed on order.

Notes: ITEM 33 S:0,0005% PRE:41,446 PREN:42,337 - MARKING BSA 32760 161

Quality Control Manager: S. Angelino Inspector:_____ Date:_____

POSITIVE MATERIAL IDENTIFICATION CERTIFICATE

PMI No. 354 SHEET 01 OF 01

TAI MILANO S.p.A.
Via Petrella, 21 - 20124 MILANO
Tel. 02/29525941 - Fax. 02/29404417

CUSTOMER: ENOLIA
P.O.: CF2406-4511
TAI REF: 24/2428

Tai Pos.	Tag N°	Serial N°	Item Description	Material	%Required			%Measured			TEST RESULT	
					Cr	Ni	Mo	Cr	Ni	Mo	ACCEPTED	REJECTED
001	- - -	200145	NOZZLE	UNS S32760	24,00÷26,00	6,00÷8,00	3,00÷4,00	25,48	7,24	3,38	X	
001	- - -	200146	NOZZLE	UNS S32760	24,00÷26,00	6,00÷8,00	3,00÷4,00	25,39	7,91	3,31	X	
001	- - -	200145	DSC	UNS N07718	17.00-21.00	50.0-55.0	2.80-3.30	18,78	52,30	2,96	X	
001	- - -	200146	DSC	UNS N07718	17.00-21.00	50.0-55.0	2.80-3.30	18,76	52,35	2,94	X	

Instrument used. NITON XL2 980G GOLDD Serial N°72744

Prepared by_____ Verified by _____ Inspector _____

TAI MILANO S.p.A.
Via Petrella, 21 - 20124 MILANO
Tel. 02/29525941 - Fax. 02/29404417

CERTIFICATO ESAMI LIQUIDI PENETRANTI
LIQUID PENETRANT EXAMINATION CERTIFICATE

PT N. 291/24

FOGLIO1 di 2
SHEET OF

CLIENTE	ORDINE CLIENTE	COMMESSA
Customer **ENOLIA**	*P.O* **CF2406-4511**	*TAI Job* **24/2428**

SIGLA / *Tag N*
SERIE / *Serial N°* **SEE SHEET 2**

MODELLO
Model **SAFETY VALVES**

PARTICOLARE / *Part*
ON MACHINING SURFACES

SPECIFICA *Specification* **ASME VIII Div. 1 App. 8**

PROC. DI ESAME *Proc. Examination* **ASTM E 165**

MATERIALE *Material*
SEE SHEET 2

CONDIZIONI SUPERFICIALI *Surface Conditions*
☐ COME SALDATO *As Welded* ☒ LAV. DIMACCH. *Machined*
☐ LAPPATO *Lapped* ☐ MOLATO *Ground* ☐ GREZZO *Rough*

METODO DI ESAME / *Examination Method*

	SOLUBILE IN ACQUA *Water Washable* ☒		POST EMULSIFICANTE *Post Emulsificable* ☐		SOLUB. IN SOLVENTE *Solvent Removable* ☐	
	☒ VISIBLE	☐ FLUOR.	☐ VISIBLE	☐ FLUOR.	☐ VISIBLE	☐ FLUOR.
PULITORE *Cleaner*	**BC1**					
PENETRANTE *Penetrant*	**K71B2P**					
EMULSIFICATORE *Emulsifier*	———					
SOLVENTE *Remover*	———					
RIVELATORE *Developer*	**D112A**					
MARCA *Trade Mark*	**NDT ITALIANA**					
LUNGHEZZA ONDA LUCE *Light Wave Length*						

PROCEDURA DI ESAME / *Examination Procedure*

PULITURA *Cleaning*	**SOLVENTE / *SOLVENT***	ESSICAZIONE *Drying Process*	**AMBIENTE / *AMBIENT***
APPLICAZIONE PENETRANTE *Penetrant Application*	**PENNELLO / *BRUSH***	TEMPO MIN. DI PENETRAZ. *Penetration Minimum Time*	**10 min.**
RIMOZIONE PENETRANTE *Removal Application*	**ACQUA / *WATER***	APPLICAZ. EMULSIFICATORE *Emulsifier Application*	———
APPLICAZIONE DI SVILUPPATORE *Developer Application*	**SPRAY**	TEMPO MINIMO DI SVILUPPO *Developing Minimum Time*	**5 ÷ 10 min.**
TEMPO MASSIMO DI LETTURA *Checking time*	**30 min.**		
ANALISI ACCETTAZ. LIQUIDI *Liquid Acceptance Test*	———	PULIZIA DOPO CONTROLLO *Cleaning After Inspection*	**SOLVENTE / *SOLVENT***

RISULTATI : *Results* :
☒ CONFORME ALLA SPECIFICA *According to Specification*
☐ NON CONFORME ALLA SPECIFICA *Not According to Specification*
☐ SCARTO *Rejection*
NOTE : *Notes* :

TAI MILANO S.p.A.
AUTORITA' ISPETTIVA *Insp. Authority*

ESAME ESEGUITI DA *Examination Perfomed By*	ESAME ESEGUITI DA *Examination Perfomed By*	☐ CLIENTE *Customer*	☐ ENTE *Surveyor*
FIRMA *Signature*	FIRMA *Signature*	FIRMA *Signature*	FIRMA *Signature*
DATA *Date* Marzano Ivan PT LEVEL II° SNT-TC-1A ISO-9712	DATA *Date*	DATA *Date*	DATA *Date*

File name: 29124 242428.doc	*Model QUA:* QA - 19	*Procedure N°:* P04-15 rev.03

TAI MILANO S.p.A.

Via Petrella, 21 - 20124 MILANO
Tel. 02/29525941 - Fax. 02/29404417

CERTIFICATO ESAMI LIQUIDI PENETRANTI

LIQUID PENETRANT EXAMINATION CERTIFICATE

PT N. **291/24**

FOGLIO2 di2
SHEET OF

ITEM TAI	*TAG N° -*	*SERIAL N°*	*MATERIAL*				*RESULT*
			BOCCAGLIO **NOZZLE**	---	---	---	
001	- - -	200145	UNS S32760	---	---	---	**OK**
001	- - -	200146	UNS S32760	---	---	---	**OK**

Marzano Ivan
PT LEVEL III
SNT-TC-1A
ISO 9712

2.3.2 NDE RECORDS

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 01

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-004942-B**
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7** **1/18**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	☒	**USINÉ** *Machined*	☐	**MEULÉ** *Grinded*	☐	**AUTRE** Other ☐
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	☒			**ARTIFICIELLE** *Artificial*	☒	**Mesuré :** *Measured* 1750 Lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre* 133	**Validité :** *Validity* 10/2024			**FIBROSCOPE N°** *Fibroscope* /		**Validité :** *Validity* /

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* ☒ **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	**NOM DU TECHNICIEN** *Name of Technician*	**NIVEAU** *Level*	**VISA** *Visa*	**VISA CLIENT** *Customer visa*
30/09/2024	A. CAPRIOLI COFREND 2 BO2-025436	UT 2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 02

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	PCM
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	W-004942-B
PIÈCE : *Part*	L1 : RALLONGE CORPS 6IN AV7 2/18
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	IT_NDT_506E_rév02
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	X	**USINÉ** *Machined*		**MEULÉ** *Grinded*		**AUTRE** Other	
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	X			**ARTIFICIELLE** *Artificial*	X	**Mesuré :** *Measured*	1750 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/2024	**FIBROSCOPE N°** *Fibroscope*	/	**Validité :** *Validity*	/

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* X — **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/08/2024	A. CAPRIOLI COFREND 2 BO2-025436	VT2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 03

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-004942-B**
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7** **3/18**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	X	**USINÉ** *Machined*		**MEULÉ** *Grinded*		**AUTRE** Other	
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	X			**ARTIFICIELLE** *Artificial*	X	**Mesuré :** *Measured*	1750 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/2024	**FIBROSCOPE N°** *Fibroscope*	/	**Validité :** *Validity*	/

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* X — **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/09/2024	A. CAPRIOLI CCFREND 2 BO2-025436	VT 2		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 04

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-004942-B**
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7** **4/18**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	☒	**USINÉ** *Machined*	☐	**MEULÉ** *Grinded*	☐	**AUTRE** Other ☐
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	☒			**ARTIFICIELLE** *Artificial*	☒	**Mesuré :** *Measured* 1800 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre* 133	**Validité :** *Validity* 10/2024			**FIBROSCOPE N°** *Fibroscope* /		**Validité :** *Validity* /

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results* — **CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification* — **OUI** *Yes* ☒ — **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/09/2024	A. CAPRIOLI COFREND 2 BO2-025436	UT2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° **24121 VT 05**

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-004942-B**
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7** **5/18**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	X	**USINÉ** *Machined*		**MEULÉ** *Grinded*		**AUTRE** Other
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	X			**ARTIFICIELLE** *Artificial*	X	**Mesuré :** *Measured* 1700 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/2024	**FIBROSCOPE N°** *Fibroscope*		**Validité :** *Validity*

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* X — **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/09/2024	A. CAPRIOLI CCFREND 2 BO2-025436	VT 2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 06

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-004942-B**
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7** **6/18**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	X	**USINÉ** *Machined*		**MEULÉ** *Grinded*		**AUTRE** Other	
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	X			**ARTIFICIELLE** *Artificial*	X	**Mesuré :** *Measured*	1800 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/2024	**FIBROSCOPE N°** *Fibroscope*		**Validité :** *Validity*	

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* X — **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/09/2024	A. CAPRIOLI CCFREND 2 BO2-025436	UT2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° **24121 VT 07**

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-004942-B**
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7 7/18**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	X	**USINÉ** *Machined*		**MEULÉ** *Grinded*		**AUTRE** Other	
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	X			**ARTIFICIELLE** *Artificial*	X	**Mesuré :** *Measured*	1800 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/2024	**FIBROSCOPE N°** *Fibroscope*		**Validité :** *Validity*	

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* X — **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/09/2024	A. CORNUOLI COFREND 2 BO2-025436	VT2		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 08

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	PCM
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	W-004942-B
PIÈCE : *Part*	L1 : RALLONGE CORPS 6IN AV7 8/18
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	IT_NDT_506E_rév02
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	X	**USINÉ** *Machined*		**MEULÉ** *Grinded*		**AUTRE** Other	
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	X			**ARTIFICIELLE** *Artificial*	X	**Mesuré :** *Measured*	1700 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/2024	**FIBROSCOPE N°** *Fibroscope*	/	**Validité :** *Validity*	/

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results* — **CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification* — **OUI** *Yes* X — **NON** *No* ☐

RAS

ANNEXE ☐ *See attached* — **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/09/2024	A. CAPRIOLI CCFREND 2 BO2-025436	UT2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 09

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	PCM
PIÈCE : *Part*	L1 : RALLONGE CORPS 6IN AV7 9/18
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	W-004942-B
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	IT_NDT_506E_rév02
N° COULÉE : *Heat Nb*	/

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection* : **Après soudage contrôle visuel 100% des soudures + ZAT** / *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition* : **BRUT** *Rough* [X] **USINÉ** *Machined* [ ] **MEULÉ** *Grinded* [ ] **AUTRE** Other [ ]

LUMIERE / INTENSITE *Lighting / Intensity (Lux)* : **NATURELLE** *Natural* [X] **ARTIFICIELLE** *Artificial* [X] **Mesuré :** *Measured* 1800 lux

MATERIEL UTILISE *Material used* : **LUXMETRE N°** *Luxmètre* 133 **Validité :** *Validity* 10/2024 **FIBROSCOPE N°** *Fibroscope* **Validité :** *Validity*

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results* : **CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification* **OUI** *Yes* [X] **NON** *No* [ ]

RAS.

ANNEXE *See attached* [ ] **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/09/2024	A. CAPRIOLI CCFREND 2 BO2-025436	VT 2		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 10

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	PCM
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	W-004942-B
PIÈCE : *Part*	L1 : RALLONGE CORPS 6IN AV7 10/18
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	IT_NDT_506E_rév02
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	☒	**USINÉ** *Machined*	☐	**MEULÉ** *Grinded*	☐	**AUTRE** Other ☐
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	☒	**ARTIFICIELLE** *Artificial*	☒	**Mesuré :** *Measured*	1200 lux	
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/2024	**FIBROSCOPE N°** *Fibroscope*	/	**Validité :** *Validity* /

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* ☒ **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/04/2024	A. CAPRIOLI CCFREND 2 BO2-025436	VT 2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 11

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-004942-B**
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7** **11/18**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	☒	**USINÉ** *Machined*	☐	**MEULÉ** *Grinded*	☐	**AUTRE** Other ☐
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	☒			**ARTIFICIELLE** *Artificial*	☒	**Mesuré :** *Measured* 1800 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre* 133		**Validité :** *Validity* 10/2024		**FIBROSCOPE N°** *Fibroscope*		**Validité :** *Validity*

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* ☒ **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/09/2024	A. CAPRIOLI COFREND 2 BO2-025436	UT 2		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 12

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	PCM
N° DE COMMANDE *Order Nb SRCI*	24121
PIÈCE : *Part*	L1 : RALLONGE CORPS 6IN AV7 12/18
N° PLAN *Drawing Nb :*	W-004942-B
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	IT_NDT_506E_rév02
N° COULÉE : *Heat Nb*	/

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection* : **Après soudage contrôle visuel 100% des soudures + ZAT** / *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition* : **BRUT** *Rough* [X] **USINÉ** *Machined* [ ] **MEULÉ** *Grinded* [ ] **AUTRE** *Other* [ ]

LUMIERE / INTENSITE *Lighting / Intensity (Lux)* : **NATURELLE** *Natural* [X] **ARTIFICIELLE** *Artificial* [X] **Mesuré :** *Measured* 1800 lux

MATERIEL UTILISE *Material used* : **LUXMETRE N°** *Luxmètre* 133 **Validité :** *Validity* 10/2024 **FIBROSCOPE N°** *Fibroscope* / **Validité :** *Validity* /

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results* : **CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification* **OUI** *Yes* [X] **NON** *No* [ ]

RAS

ANNEXE *See attached* [ ] **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/09/2024	A. CAPRIOLI COFREND 2 BO2-025436	VT2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 13

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-004942-B**
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7 13/18**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	☒	**USINÉ** *Machined*	☐	**MEULÉ** *Grinded*	☐	**AUTRE** Other ☐
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	☒	**ARTIFICIELLE** *Artificial*	☒	**Mesuré :** *Measured*	1800 lux	
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/ 2024	**FIBROSCOPE N°** *Fibroscope*	/	**Validité :** *Validity* /

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* ☒ **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30 / 09/ 2024	A. CAPRIOLI CCFREND 2 BO2-025436	UT2		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 14

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	PCM
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	W-004942-B
PIÈCE : *Part*	L1 : RALLONGE CORPS 6IN AV7 14/18
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	IT_NDT_506E_rév02
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	☒	**USINÉ** *Machined*	☐	**MEULÉ** *Grinded*	☐	**AUTRE** Other ☐
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	☒	**ARTIFICIELLE** *Artificial*	☒	**Mesuré :** *Measured*	1750 lux	
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/ 2024	**FIBROSCOPE N°** *Fibroscope*	/	**Validité :** *Validity* /

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* ☒ **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/ 04/ 2024	ANTOINE L COFREND 2 BO2-025436	UT 2		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 15

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-004942-B**
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7** **15/18**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	X	**USINÉ** *Machined*		**MEULÉ** *Grinded*		**AUTRE** Other	
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	X			**ARTIFICIELLE** *Artificial*	X	**Mesuré :** *Measured*	1200 Lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/2024	**FIBROSCOPE N°** *Fibroscope*	/	**Validité :** *Validity*	/

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* X — **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	**NOM DU TECHNICIEN** *Name of Technician*	**NIVEAU** *Level*	**VISA** *Visa*	**VISA CLIENT** *Customer visa*
30/09/2024	A. CAPRIOLI CCFREND 2 BO2-025436	UT2		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 16

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-004942-B**
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7 16/18**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	X	**USINÉ** *Machined*		**MEULÉ** *Grinded*		**AUTRE** Other	
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	X			**ARTIFICIELLE** *Artificial*	X	**Mesuré :** *Measured*	1800 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/2024	**FIBROSCOPE N°** *Fibroscope*	/	**Validité :** *Validity*	/

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* X — **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/09/2024	A. CAPRIOLI CCFREND 2 BO2-025436	5T2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 17

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-004942-B**
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7 17/18**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	☒	**USINÉ** *Machined*	☐	**MEULÉ** *Grinded*	☐	**AUTRE** Other ☐
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	☒			**ARTIFICIELLE** *Artificial*	☒	**Mesuré :** *Measured* 1800 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre* 133	**Validité :** *Validity* 10/2024			**FIBROSCOPE N°** *Fibroscope*		**Validité :** *Validity*

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results* — **CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification* — **OUI** *Yes* ☒ — **NON** *No* ☐

BMS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
30/09/2024	ACARNOLI COFREND 2 BO2-025436	VT2		

SRCI & P2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT

Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 18

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-004942-B**
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7** **18/18**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	☒	**USINÉ** *Machined*	☐	**MEULÉ** *Grinded*	☐	**AUTRE** Other ☐
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	☒			**ARTIFICIELLE** *Artificial*	☒	**Mesuré :** *Measured* 1800 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre* 133	**Validité :** *Validity* 10/2024			**FIBROSCOPE N°** *Fibroscope*		**Validité :** *Validity*

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	**NOM DU TECHNICIEN** *Name of Technician*	**NIVEAU** *Level*	**VISA** *Visa*	**VISA CLIENT** *Customer visa*
30/09/2024	A. GAFRIAU CCFREND 2 BO2-025436	UT2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 19

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-008202-C**
PIÈCE : *Part*	**L2 : CORPS 6IN AV7** **1/2**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	☒	**USINÉ** *Machined*	☐	**MEULÉ** *Grinded*	☐	**AUTRE** Other ☐
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	☒			**ARTIFICIELLE** *Artificial*	☒	**Mesuré :** *Measured* 1750 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre* 133	**Validité :** *Validity* 10/2024			**FIBROSCOPE N°** *Fibroscope*		**Validité :** *Validity*

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* ☒ **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
1/10/2024	A. CAPRIOLI COFREND 2 BC2-025436	VT2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 20

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-008202-C**
PIÈCE : *Part*	**L2 : CORPS 6IN AV7** **2/2**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	X	**USINÉ** *Machined*		**MEULÉ** *Grinded*		**AUTRE** Other	
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	X			**ARTIFICIELLE** *Artificial*	X	**Mesuré :** *Measured*	1750 Lx
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/2024	**FIBROSCOPE N°** *Fibroscope*	/	**Validité :** *Validity*	/

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* X — **NON** *No* ☐

RBS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
1/10/2024	A. CAPRIOLI CCFREND 2 BO2-025436	VT 2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 21

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-004942-B**
PIÈCE : *Part*	**L3 : RALLONGE CORPS 6IN AV7** **1/2**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	X	**USINÉ** *Machined*		**MEULÉ** *Grinded*		**AUTRE** Other	
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	X			**ARTIFICIELLE** *Artificial*	X	**Mesuré :** *Measured*	1800 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/2024	**FIBROSCOPE N°** *Fibroscope*	/	**Validité :** *Validity*	/

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* X — **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
11/01/2024	A. CAPRIOLI CCFREND 2 BO2-025436	VT2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 22

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	PCM
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	W-004942-B
PIÈCE : *Part*	L3 : RALLONGE CORPS 6IN AV7 2/2
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	IT_NDT_506E_rév02
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	X	**USINÉ** *Machined*		**MEULÉ** *Grinded*		**AUTRE** Other	
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	X			**ARTIFICIELLE** *Artificial*	X	**Mesuré :** *Measured*	1800 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/2024	**FIBROSCOPE N°** *Fibroscope*	/	**Validité :** *Validity*	/

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results* — **CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification* — **OUI** *Yes* X — **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
11/10/2024	A. CAPRIOLI COFREND 2 BO2-025436	UT 2		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 23

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-008199-A**
PIÈCE : *Part*	**L4 : EMBOUT STATOR 25AV24** **1/2**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	☒	**USINÉ** *Machined*	☐	**MEULÉ** *Grinded*	☐	**AUTRE** Other ☐
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	☒			**ARTIFICIELLE** *Artificial*	☒	**Mesuré :** *Measured* 1800 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre* 133		**Validité :** *Validity* 10/2024		**FIBROSCOPE N°** *Fibroscope*		**Validité :** *Validity*

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification*

OUI *Yes* ☒ **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	**NOM DU TECHNICIEN** *Name of Technician*	**NIVEAU** *Level*	**VISA** *Visa*	**VISA CLIENT** *Customer visa*
1/10/2024	A. CAPRIOLI COFREND 2 BO2-025436	VT2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 24

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-008199-A**
PIÈCE : *Part*	**L4 : EMBOUT STATOR 25AV24** **2/2**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	☒	**USINÉ** *Machined*	☐	**MEULÉ** *Grinded*	☐	**AUTRE** Other ☐
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	☒			**ARTIFICIELLE** *Artificial*	☒	**Mesuré :** *Measured* 1800 Lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre* 133	**Validité :** *Validity* 10/2024			**FIBROSCOPE N°** *Fibroscope* /		**Validité :** *Validity* /

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* ☒ **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
1 / 10 / 2024	A. CAPRIOLI CCFREND 2 BO2-025436	UT2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° 24121 VT 25

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-008200-A**
PIÈCE : *Part*	**LS : ENVELOPP STATOR 25AV24** **1/2**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	☒	**USINÉ** *Machined*	☐	**MEULÉ** *Grinded*	☐	**AUTRE** Other ☐
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	☒			**ARTIFICIELLE** *Artificial*	☒	**Mesuré :** *Measured* 1750 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre* 133	**Validité :** *Validity* 10/2024			**FIBROSCOPE N°** *Fibroscope*		**Validité :** *Validity*

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* ☒ **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
1/10/2024	A. CAPRIOLI COFREND 2 BO2-025436	VT2		

SRCI P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT DE CONTRÔLE VISUEL & DIMENSIONNEL DES SOUDURES

VISUAL & DIMENSIONAL EXAMINATION REPORT

N° **24121 VT 26**

DS 238 rev C - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb SRCI*	24121
N° PLAN *Drawing Nb :*	**W-008200-A**
PIÈCE : *Part*	**L5 : ENVELOPP STATOR 25AV24** **2/2**
MATIÈRE *Material :*	SUPERDUPLEX
Spécification et Critère d'acceptation : *Specification & Criteria*	**IT_NDT_506E_rév02**
N° COULÉE : *Heat Nb*	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle visuel 100% des soudures + ZAT** *After welding Visual Testing check 100% of welds + ZAT*

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough*	X	**USINÉ** *Machined*		**MEULÉ** *Grinded*		**AUTRE** Other	
LUMIERE / INTENSITE *Lighting / Intensity (Lux)*	**NATURELLE** *Natural*	X			**ARTIFICIELLE** *Artificial*	X	**Mesuré :** *Measured*	1800 lux
MATERIEL UTILISE *Material used*	**LUXMETRE N°** *Luxmètre*	133	**Validité :** *Validity*	10/2024	**FIBROSCOPE N°** *Fibroscope*		**Validité :** *Validity*	

CONTRÔLE VISUEL DIRECT / *Examination Visual direct*

Zone Examinée	N° Indication	Position Orientation	*Type d'indication*	*Décision* C	*Décision* NC	*Remarques - Observations*

RÉSULTATS DU CONTRÔLE *Examination results*

CONFORME A LA SPECIFICATION INDIQUEE *Conform to the mentionned specification* — **OUI** *Yes* X — **NON** *No* ☐

RAS

ANNEXE *See attached* ☐ **NA**

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	NIVEAU *Level*	VISA *Visa*	VISA CLIENT *Customer visa*
21/01/2024	A. CAPRIOLI COFREND 2 BO2-025436	VT2		

SRCI P2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 01** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L1 : RALLONGE CORPS 6IN AV7** **1/18**
N° DE COMMANDE *Order Nb*	24121		
N° PLAN: *Drawing Nb:*	**W-004942-B**	**MATIÈRE :** *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/		
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/
Destination :	/		

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*

Après soudage contrôle ressuage coloré 100% des soudures + ZAT

After welding Penetrant Testing check 100% of welds + ZAT

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable ☐ *preleminary cleaning*	
	MARQUE *Trade mark*		bebbco	N° Lot: PL221000937	
	RÉFÉRENCE *Reference*		V120	PER: 09/2027	
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	bebbco		N° Lot: PL220100333-1	
	RÉFÉRENCE *Reference*	DP55		PER: 05/2026	
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	bebbco		N° Lot: PL220600190-1	
	RÉFÉRENCE *Reference*	D100		PER: 02/2027	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐
TEMPÉRATURE DE LA PIÈCE *Part temperature*	17°C	**THERMOMETRE :** 131		**VALIDITE :** 12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:* **Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐		**Temps de séchage :** 5 **Mn** *Drying time:*
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐	**PULVÉRISATION** Pulverization ☒		**Durée d'application :** 20 **Mn** *Application time*
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒	**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 **Mn** *Drying time:*		**Temps d'examen :** 0 à 30 **Mn** *Examination period*
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒	**ARTIFICIELLE** *Artificial* ☒		**Luminosité mesurée :** 1750 lux
		LUXMETRE N° 133		**Validité :** 10/2024 *Validity*

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	A. GARRIGUE CCFREND 2 BO2-025436		

SRCI & P2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 02** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L1 : RALLONGE CORPS 6IN AV7 2/18**
N° DE COMMANDE *Order Nb*	24121		
N° PLAN: *Drawing Nb:*	**W-004942-B**	**MATIÈRE :** *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/		
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/
Destination :	/		

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*

Après soudage contrôle ressuage coloré 100% des soudures + ZAT

After welding Penetrant Testing check 100% of welds + ZAT

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
	MARQUE *Trade mark*		bebbco	N° Lot: PL221000_937.	
	RÉFÉRENCE *Reference*		V130	PER: 09/2027.	
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	bebbco		N° Lot: PL220 100 333-1.	
	RÉFÉRENCE *Reference*	DP55		PER: 05/2026	
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	bebbco.		N° Lot: PL20 600.190.1.	
	RÉFÉRENCE *Reference*	D100.		PER: 02/2027.	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	17°C.	**THERMOMETRE :**	131	**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 Mn *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** *Pulverization* ☒	**Durée d'application :** 20 Mn *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** *Pulverization* ☒	**Temps de séchage :** 5 Mn *Drying time:*		**Temps d'examen :** 00'30 Mn *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1750lux	
			LUXMETRE N° 133	**Validité :** *Validity* 10/2024	

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	A. CARRIEL CCFREND 2 BO2-025436		

SRCIP2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 03** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L1 : RALLONGE CORPS 6IN AV7** **3/18**
N° DE COMMANDE *Order Nb*	24121		
N° PLAN: *Drawing Nb:*	**W-004942-B**	**MATIÈRE :** *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/		
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/
Destination :	/		

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*: **Après soudage contrôle ressuage coloré 100% des soudures + ZAT** *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

	NATURE *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
PRODUIT DE LAVAGE *Cleaning agent*	**MARQUE** *Trade mark*		bebbco.	N° Lot:	PL221.000_937.
	RÉFÉRENCE *Reference*		UBO	PER:	09/2027
	TYPE *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
PÉNÉTRANT *Penetrant*	**MARQUE** *Trade mark*	bebbco		N° Lot:	PL220.100 383.1.
	RÉFÉRENCE *Reference*	DP55		PER:	05/2026.
	TYPE *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
RÉVÉLATEUR *Developer*	**MARQUE** *Trade mark*	bebbco		N° Lot:	PL220.600.190.1.
	RÉFÉRENCE *Reference*	D100		PER:	02/2027.

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	17°C	**THERMOMETRE :**	131.	**VALIDITE :**	12/2024.
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** ..... 5 ..... **Mn** *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** *Pulverization* ☒	**Durée d'application :** ..... 20 ..... **Mn** *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant eliminination*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** *Pulverization* ☒	**Temps de séchage :** ..... 5 ..... **Mn** *Drying time:*		**Temps d'examen :** ..... 0630 ..... **Mn** *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 17506x	
			LUXMETRE N° 133	**Validité :** *Validity* 10/2024	

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	COFREND 2 BO2-025436		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 04**

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L1 : RALLONGE CORPS 6IN AV7 4/18**		
N° DE COMMANDE *Order Nb*	24121				
N° PLAN: *Drawing Nb:*	**W-004942-B**	**MATIÈRE :** *Material*	SUPERDUPLEX	**Lot N°** *Batch Nbr*	/
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/	**Destination :**	/

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*: **Après soudage contrôle ressuage coloré 100% des soudures + ZAT** *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

	NATURE *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
PRODUIT DE LAVAGE *Cleaning agent*	**MARQUE** *Trade mark*		bebbco	N° Lot:	PL221.000-937
	RÉFÉRENCE *Reference*		V30	PER:	09/2027
	TYPE *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
PÉNÉTRANT *Penetrant*	**MARQUE** *Trade mark*	bebbco		N° Lot:	PL220.100.333-1
	RÉFÉRENCE *Reference*	DP55		PER:	05/2026
	TYPE *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
RÉVÉLATEUR *Developer*	**MARQUE** *Trade mark*	bebbco		N° Lot:	PL220.600-190-1
	RÉFÉRENCE *Reference*	D100		PER:	02/2027

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐			
TEMPÉRATURE DE LA PIÈCE *Part temperature*	17°C	**THERMOMETRE :**	131	**VALIDITE :**	12/2024		
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 **Mn** *Drying time:*			
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** *Pulverization* ☒	**Durée d'application :** 20 **Mn** *Application time*			
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒				
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** *Pulverization* ☒	**Temps de séchage :** 5 **Mn** *Drying time:*		**Temps d'examen :** 0à30 **Mn** *Examination period*			
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1800 Lux			
				LUXMETRE N° 133	**Validité :** *Validity*	10/2024	

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS.	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	A. CAPMOLI COFREND 2 BO2-025436		

SRCIP2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 05**

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb*	24121
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7 5/18**
N° PLAN: *Drawing Nb:*	**W-004942-B**
MATIÈRE : *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/
Spécification: *Specification*	IT_NDT_302F_rév02
N° COULÉE : *Heat Nb*	/
Destination :	/

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*: **Après soudage contrôle ressuage coloré 100% des soudures + ZAT** / *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

	NATURE *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
PRODUIT DE LAVAGE *Cleaning agent*	**MARQUE** *Trade mark*		babbco	N° Lot:	PL221.000-937.
	RÉFÉRENCE *Reference*		N 130	PER:	09/2027.
	TYPE *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
PÉNÉTRANT *Penetrant*	**MARQUE** *Trade mark*	babbco		N° Lot:	PL220100 333-1.
	RÉFÉRENCE *Reference*	DP55		PER:	05/2026
	TYPE *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
RÉVÉLATEUR *Developer*	**MARQUE** *Trade mark*	babbco		N° Lot:	PL220 600-190.1
	RÉFÉRENCE *Reference*	D100		PER:	02/2027

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	17°	**THERMOMETRE :**	131.	**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 **Mn** *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** Pulverization ☒	**Durée d'application :** 20 **Mn** *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 **Mn** *Drying time:*		**Temps d'examen :** 0à30 **Mn** *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1800lux	
			LUXMETRE N° 133	**Validité :** *Validity* 10/2024	

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	A. CAPUOLI CCFREND 2 BO2-025436		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 06**

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L1 : RALLONGE CORPS 6IN AV7 6/18**
N° DE COMMANDE *Order Nb*	24121		
N° PLAN: *Drawing Nb:*	**W-004942-B**	**MATIÈRE :** *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/		
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/
Destination :	/		

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*

Après soudage contrôle ressuage coloré 100% des soudures + ZAT

After welding Penetrant Testing check 100% of welds + ZAT

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
	MARQUE *Trade mark*		babbco	N° Lot: PL221 000 937	
	RÉFÉRENCE *Reference*		UB0	PER: 09/2027.	
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: PL220100333 1.	
	RÉFÉRENCE *Reference*	DP55		PER: 05/2026.	
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: PL220 600 190 1	
	RÉFÉRENCE *Reference*	D100		PER: 02/2027.	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** Other ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	17°C	**THERMOMETRE :**	131	**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 **Mn** *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** Pulverization ☒	**Durée d'application :** 20 **Mn** *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 **Mn** *Drying time:*		**Temps d'examen :** 0030 **Mn** *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1800lux	
			LUXMETRE N° 133	**Validité :** *Validity* 10/2024	

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	A. GARNIER CGFREND 2 BO2-025436		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE

LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 07**

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb*	24121
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7** **7/18**
N° PLAN: *Drawing Nb:*	**W-004942-B**
MATIÈRE : *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/
Spécification: *Specification*	IT_NDT_302F_rév02
N° COULÉE : *Heat Nb*	/
Destination :	/
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle ressuage coloré 100% des soudures + ZAT** *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

	NATURE *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
PRODUIT DE LAVAGE *Cleaning agent*	**MARQUE** *Trade mark*		bebbco	N° Lot: PL221.000_937.	
	RÉFÉRENCE *Reference*		N130	PER: 09/2027.	
	TYPE *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
PÉNÉTRANT *Penetrant*	**MARQUE** *Trade mark*	bebbco		N° Lot: PL220 100 333-1	
	RÉFÉRENCE *Reference*	DP55		PER: 05/2026.	
	TYPE *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
RÉVÉLATEUR *Developer*	**MARQUE** *Trade mark*	bebbco		N° Lot: PL220 600_190-1.	
	RÉFÉRENCE *Reference*	D100		PER: 02/2027.	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** Other ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	17°C	**THERMOMETRE :**	131.	**VALIDITE :**	12/2024.
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 **Mn** *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** Pulverization ☒	**Durée d'application :** 20 **Mn** *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 **Mn** *Drying time:*		**Temps d'examen** 0à30 **Mn** *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1800 lux	
			LUXMETRE N° 133	**Validité :** *Validity* 1024	

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS		ANNEXE *See attached* ☐

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	A. CAPRIOLI COFREND 2 BO2-025436		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 08**

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L1 : RALLONGE CORPS 6IN AV7 8/18**		
N° DE COMMANDE *Order Nb*	24121				
N° PLAN: *Drawing Nb:*	**W-004942-B**	**MATIÈRE :** *Material*	SUPERDUPLEX	**Lot N°** *Batch Nbr*	/
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/	**Destination :**	/

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*: **Après soudage contrôle ressuage coloré 100% des soudures + ZAT** / *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
	MARQUE *Trade mark*		babbco.	N° Lot: PL221000_937.	
	RÉFÉRENCE *Reference*		N 120.	PER: 09/2027.	
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco.		N° Lot: P220100333_1.	
	RÉFÉRENCE *Reference*	DP55		PER: 05/2026.	
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco.		N° Lot: P220600_190_1	
	RÉFÉRENCE *Reference*	D100.		PER: 02/2027.	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	17°C	**THERMOMETRE :**	131.	**VALIDITE :**	12/2024.
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 ..... **Mn** *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** *Pulverization* ☒	**Durée d'application :** 20 ..... **Mn** *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimination*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** *Pulverization* ☒	**Temps de séchage :** 5 ..... **Mn** *Drying time:*		**Temps d'examen :** 0@30 ..... **Mn** *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1200 lx	
			LUXMETRE N° 133	**Validité :** *Validity* 10/2024	

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/08/2024	A. CAPPELLI COFREND 2 BO2-025436		

SRCI P2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE

LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 09** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb*	24121
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7 9/18**
N° PLAN: *Drawing Nb:*	**W-004942-B**
MATIÈRE : *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/
Spécification: *Specification*	IT_NDT_302F_rév02
N° COULÉE : *Heat Nb*	/
Destination :	/

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*

Après soudage contrôle ressuage coloré 100% des soudures + ZAT

After welding Penetrant Testing check 100% of welds + ZAT

PRODUITS UTILISÉS / *Materials used*

	NATURE *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable ☐ *preleminary cleaning*	
PRODUIT DE LAVAGE *Cleaning agent*	**MARQUE** *Trade mark*		babbco	N° Lot:	A221000_937
	RÉFÉRENCE *Reference*		U120	PER:	09/2027
	TYPE *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
PÉNÉTRANT *Penetrant*	**MARQUE** *Trade mark*	babbco		N° Lot:	A220100333.1
	RÉFÉRENCE *Reference*	DP55		PER:	05/2026
	TYPE *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
RÉVÉLATEUR *Developer*	**MARQUE** *Trade mark*	babbco		N° Lot:	A220 600_190.1
	RÉFÉRENCE *Reference*	D100		PER:	02/2027

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** Other ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	17°	**THERMOMETRE :**	131	**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** ☒ *Natural evaporation*	**AIR PULSE** ☐ *Pulsed air*	**Temps de séchage :** 5 Mn *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** ☐ *brush*		**PULVÉRISATION** ☒ Pulverization	**Durée d'application :** 20 Mn *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininationn*	**LAVAGE A L'EAU** ☒ *Water washing*		**CHIFFONS SECS PROPRES** ☒ *Lint-free rags*		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** ☒ Pulverization	**Temps de séchage :** 5 Mn *Drying time:*		**Temps d'examen :** 0030 Mn *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** ☒ *Natural*		**ARTIFICIELLE** ☒ *Artificial*	**Luminosité mesurée :** 1200 lux	
			LUXMETRE N° 133	**Validité :** *Validity* 10/2024	

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** ☒ *Yes*	**NON** ☐ *No*
Examen visuel *Visual examination*	RAS		ANNEXE ☐ *See attached*

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	A. CAPARELLI CCFREND BO2-025436		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 10**

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L1 : RALLONGE CORPS 6IN AV7 10/18**
N° DE COMMANDE *Order Nb*	24121		
N° PLAN: *Drawing Nb:*	**W-004942-B**	**MATIÈRE :** *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/		
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/
Destination :	/		

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*: **Après soudage contrôle ressuage coloré 100% des soudures + ZAT** / *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable ☐ *preleminary cleaning*	
	MARQUE *Trade mark*		babbco	N° Lot: PL221.000-937.	
	RÉFÉRENCE *Reference*		U120	PER: 09/2027.	
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: PL220.100.333-1	
	RÉFÉRENCE *Reference*	DP55		PER: 05/2026	
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: PL220 600-100-1.	
	RÉFÉRENCE *Reference*	D100		PER: 02/2027.	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	17°C	**THERMOMETRE :**	131.	**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 Mn *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** *Pulverization* ☒	**Durée d'application :** 20 Mn *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** *Pulverization* ☒	**Temps de séchage :** 5 Mn *Drying time:*		**Temps d'examen :** 0à30 Mn *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1800Lux	
			LUXMETRE N° 133	**Validité :** *Validity*	10/2024

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2023	A. CAPRIOL COFREND 2 BO2-025436		

SRCIQ P2MIQ

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° 24121 PT 11 Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L1 : RALLONGE CORPS 6IN AV7 11/18**
N° DE COMMANDE *Order Nb*	24121		
N° PLAN: *Drawing Nb:*	**W-004942-B**	**MATIÈRE :** *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/		
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/
Destination :	/		

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*: **Après soudage contrôle ressuage coloré 100% des soudures + ZAT** / *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
	MARQUE *Trade mark*		babbco	N° Lot:	PL221000937
	RÉFÉRENCE *Reference*		U120	PER:	09/2027
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco		N° Lot:	P220100333_1
	RÉFÉRENCE *Reference*	DP55		PER:	05/2026
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco		N° Lot:	P220600_1901
	RÉFÉRENCE *Reference*	D100		PER:	02/2027

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	17°C	**THERMOMETRE :**	131	**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 **Mn** *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** *Pulverization* ☒	**Durée d'application :** 20 **Mn** *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** *Pulverization* ☒	**Temps de séchage :** 5 **Mn** *Drying time:*		**Temps d'examen :** 0à30 **Mn** *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1800lux	
				LUXMETRE N° 133	**Validité :** *Validity* 10/2024

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/05/2024	ALDATRICHI COFREND 2 BO2-025436		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 12**

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**
N° DE COMMANDE *Order Nb*	24121
PIÈCE : *Part*	**L1 : RALLONGE CORPS 6IN AV7 12/18**
N° PLAN: *Drawing Nb:*	**W-004942-B**
MATIÈRE : *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/
Spécification: *Specification*	IT_NDT_302F_rév02
N° COULÉE : *Heat Nb*	/
Destination :	/

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*: **Après soudage contrôle ressuage coloré 100% des soudures + ZAT** / *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

	NATURE *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
PRODUIT DE LAVAGE *Cleaning agent*	**MARQUE** *Trade mark*		baboo	N° Lot: PL221000 937	
	RÉFÉRENCE *Reference*		U 160	PER: 09/2027	
	TYPE *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
PÉNÉTRANT *Penetrant*	**MARQUE** *Trade mark*	baboo		N° Lot: P220 100 333-1	
	RÉFÉRENCE *Reference*	DP55		PER: 05/2026	
	TYPE *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
RÉVÉLATEUR *Developer*	**MARQUE** *Trade mark*	baboo		N° Lot: P220 600-100-1	
	RÉFÉRENCE *Reference*	D100		PER: 02/2027	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** Other ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	18°C	**THERMOMETRE :** 131.		**VALIDITE :** 12/2024	
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:* **Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐		**Temps de séchage :** 5 **Mn** *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐	**PULVÉRISATION** Pulverization ☒		**Durée d'application :** 20 **Mn** *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒	**CHIFFONS SECS PROPRES** *Lint-free rags* ☒			
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 **Mn** *Drying time:*		**Temps d'examen :** 0@30 **Mn** *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒	**ARTIFICIELLE** *Artificial* ☒		**Luminosité mesurée :** 1000 lux	
			LUXMETRE N° 133	**Validité :** *Validity* 10/2024	

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS.		ANNEXE *See attached* ☐

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	A. CAPRIOLI CCFREND 2 BO2-025436		

SRCIP2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° 24121 PT 13 Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L1 : RALLONGE CORPS 6IN AV7 13/18**
N° DE COMMANDE *Order Nb*	24121		
N° PLAN: *Drawing Nb:*	**W-004942-B**	**MATIÈRE :** *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/		
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/
Destination :	/		

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*

Après soudage contrôle ressuage coloré 100% des soudures + ZAT

After welding Penetrant Testing check 100% of welds + ZAT

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
	MARQUE *Trade mark*		babbco	N° Lot:	PL221.000 037
	RÉFÉRENCE *Reference*		NB0-	PER:	09/2027
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco		N° Lot:	PL220100 333-1
	RÉFÉRENCE *Reference*	DP55		PER:	05/2026
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco		N° Lot:	PL220 600 100-1
	RÉFÉRENCE *Reference*	D100		PER:	02/2027

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	18°	**THERMOMETRE :**	131	**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 **Mn** *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** *Pulverization* ☒	**Durée d'application :** 20 **Mn** *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** *Pulverization* ☒	**Temps de séchage :** 5 **Mn** *Drying time:*		**Temps d'examen :** 0à30 **Mn** *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1700 lux	
			LUXMETRE N° 133	**Validité :** *Validity*	10/2024

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	A. CAPRON COFREND 2 BO2-025436		

SRCIQ P2MIQ

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 14** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L1 : RALLONGE CORPS 6IN AV7 14/18**
N° DE COMMANDE *Order Nb*	24121		
N° PLAN: *Drawing Nb:*	**W-004942-B**	**MATIÈRE :** *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/		
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/
Destination :	/		

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*

Après soudage contrôle ressuage coloré 100% des soudures + ZAT

After welding Penetrant Testing check 100% of welds + ZAT

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
	MARQUE *Trade mark*		babbco	N° Lot:	PL221.000.937
	RÉFÉRENCE *Reference*		U120	PER:	09/2027
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco		N° Lot:	PL220.100.333_1
	RÉFÉRENCE *Reference*	DP55		PER:	05/2026
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco		N° Lot:	PL220.600.190-1
	RÉFÉRENCE *Reference*	D100		PER:	02/2027

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** Other ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	18°C	**THERMOMETRE :**	131	**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** ..... Mn *Drying time:*	5
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** Pulverization ☒	**Durée d'application :** ..... Mn *Application time*	20
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** ..... Mn *Drying time:*	5	**Temps d'examen :** ..... Mn *Examination period*	0a30
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :**	1750lx
			LUXMETRE N° 133	**Validité :** *Validity*	10/2024

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	A. CELENTANO LI COFREND 2 BO2-025436		

SRCIC P2MIC

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 15** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L1 : RALLONGE CORPS 6IN AV7 15/18**
N° DE COMMANDE *Order Nb*	24121		
N° PLAN: *Drawing Nb:*	**W-004942-B**	**MATIÈRE :** *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/		
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/
Destination :	/		

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*

Après soudage contrôle ressuage coloré 100% des soudures + ZAT

After welding Penetrant Testing check 100% of welds + ZAT

PRODUITS UTILISÉS / *Materials used*

	NATURE *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
PRODUIT DE LAVAGE *Cleaning agent*	**MARQUE** *Trade mark*		babbco	N° Lot:	P221.000937
	RÉFÉRENCE *Reference*		U120	PER:	09/2027
	TYPE *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
PÉNÉTRANT *Penetrant*	**MARQUE** *Trade mark*	babbco		N° Lot:	P220.100333.1
	RÉFÉRENCE *Reference*	DP55		PER:	05/2026
	TYPE *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
RÉVÉLATEUR *Developer*	**MARQUE** *Trade mark*	babbco		N° Lot:	P220 600190.1
	RÉFÉRENCE *Reference*	D100		PER:	02/2027

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** Other ☐		
TEMPÉRATURE DE LA PIÈCE *Part temperature*	18°C	**THERMOMETRE :**	131	**VALIDITE :**	12/2024	
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 **Mn** *Drying time:*		
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** Pulverization ☒	**Durée d'application :** 20 **Mn** *Application time*		
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒			
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 **Mn** *Drying time:*		**Temps d'examen :** 20 **Mn** *Examination period*		
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1800 lux		
				LUXMETRE N° 133	**Validité :** *Validity*	10/2026

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS.	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	A. CAPRIOLI SOFREND 2 BO2-025436		

SRCIP2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 16** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L1 : RALLONGE CORPS 6IN AV7 16/18**
N° DE COMMANDE *Order Nb*	24121		
N° PLAN: *Drawing Nb:*	**W-004942-B**	**MATIÈRE :** *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/		
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/
Destination :	/		

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*

Après soudage contrôle ressuage coloré 100% des soudures + ZAT

After welding Penetrant Testing check 100% of welds + ZAT

PRODUITS UTILISÉS / *Materials used*

	NATURE *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
PRODUIT DE LAVAGE *Cleaning agent*	**MARQUE** *Trade mark*		babbco	N° Lot: PL221000 937	
	RÉFÉRENCE *Reference*		D80	PER: 09/2027	
	TYPE *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
PÉNÉTRANT *Penetrant*	**MARQUE** *Trade mark*	babbco		N° Lot: PL220100 333-1	
	RÉFÉRENCE *Reference*	DP55		PER: 05/2026	
	TYPE *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
RÉVÉLATEUR *Developer*	**MARQUE** *Trade mark*	babbco		N° Lot: PL220 600 100-1	
	RÉFÉRENCE *Reference*	D100		PER: 02/2027	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	18°	**THERMOMETRE :**	131.	**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 **Mn** *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** Pulverization ☒	**Durée d'application :** 20 **Mn** *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant eliminination*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 **Mn** *Drying time:*		**Temps d'examen :** 0à30 **Mn** *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1800 lux	
			LUXMETRE N° 133	**Validité :** *Validity*	10/2024

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/05/2024	A.CARVAL CCFREND 2 BO2-025436		

SRCI & P2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 17** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : PCM *Customer*	**PIÈCE :** *Part* L1 : RALLONGE CORPS 6IN AV7 17/18	
N° DE COMMANDE 24121 *Order Nb*		
N° PLAN: W-004942-B *Drawing Nb:*	**MATIÈRE :** SUPERDUPLEX *Material*	**Lot N°** / *Batch Nbr*
Spécification: IT_NDT_302F_rév02 *Specification*	**N° COULÉE :** / *Heat Nb*	**Destination :** /

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*: **Après soudage contrôle ressuage coloré 100% des soudures + ZAT** *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
	MARQUE *Trade mark*		babbco	N° Lot: PL221000937	
	RÉFÉRENCE *Reference*		V120	PER: 09/2027.	
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: P220100333-1	
	RÉFÉRENCE *Reference*	DP55		PER: 05/2026	
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: P220600190-1	
	RÉFÉRENCE *Reference*	D100		PER: 08/2027.	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐
TEMPÉRATURE DE LA PIÈCE *Part temperature*	17°C	**THERMOMETRE :** 131		**VALIDITE :** 12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 ..... **Mn** *Drying time:*
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** Pulverization ☒	**Durée d'application :** 20 ..... **Mn** *Application time*
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininationn*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒	
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 ..... **Mn** *Drying time:*		**Temps d'examen :** 0 à 30 ..... **Mn** *Examination period*
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1800 Lux
			LUXMETRE N° 133	**Validité :** *Validity* 10/2026

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS		ANNEXE ☐ *See attached*

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	A. CARROLI COFREND 2 BO2-025436		

SRCIP2MIX

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 18** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : PCM *Customer*	**PIÈCE :** *Part* **L1 : RALLONGE CORPS 6IN AV7 18/18**
N° DE COMMANDE 24121 *Order Nb*	
N° PLAN: **W-004942-B** *Drawing Nb:*	**MATIÈRE :** SUPERDUPLEX *Material* — **Lot N°** / *Batch Nbr*
Spécification: IT_NDT_302F_rév02 *Specification*	**N° COULÉE :** / *Heat Nb* — **Destination :** /

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*: **Après soudage contrôle ressuage coloré 100% des soudures + ZAT** *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
	MARQUE *Trade mark*		babbco	N° Lot:	PL221000937
	RÉFÉRENCE *Reference*		N120	PER:	09/2027
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco		N° Lot:	220100333-1
	RÉFÉRENCE *Reference*	DP55		PER:	05/2026.
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco		N° Lot:	220600100-1
	RÉFÉRENCE *Reference*	D100		PER:	02/2027

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	18°C	**THERMOMETRE :**	131	**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 **Mn** *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** Pulverization ☒	**Durée d'application :** 20 **Mn** *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininationn*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 **Mn** *Drying time:*		**Temps d'examen** 0030 **Mn** *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1800lux	
			LUXMETRE N° 133	**Validité :** *Validity* 10/2024	

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS		ANNEXE *See attached* ☐

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
30/09/2024	A. CAPRIOLI CCFREND 2 BO2-025436		

SRCI P2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE

LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 19** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L2 : CORPS 6IN AV7 1/2**		
N° DE COMMANDE *Order Nb*	24121				
N° PLAN: *Drawing Nb:*	**W-008202-C**	**MATIÈRE :** *Material*	SUPERDUPLEX	**Lot N°** *Batch Nbr*	/
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/	**Destination :**	/

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*

Après soudage contrôle ressuage coloré 100% des soudures + ZAT

After welding Penetrant Testing check 100% of welds + ZAT

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
	MARQUE *Trade mark*		babbco	N° Lot: PL221.000 937.	
	RÉFÉRENCE *Reference*		U 120	PER: 09/2027.	
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: PL220 100 333.1	
	RÉFÉRENCE *Reference*	DP55		PER: 05 / 2026.	
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: PL220600 1901	
	RÉFÉRENCE *Reference*	D 100		PER: 02/2027.	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	19°C	**THERMOMETRE :**	131	**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 **Mn** *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** Pulverization ☒	**Durée d'application :** 20 **Mn** *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 **Mn** *Drying time:*		**Temps d'examen :** 0030 **Mn** *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1750lx	
				LUXMETRE N° 133	**Validité :** 10/2024 *Validity*

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
11/01/2024	A. CAPRIOLI COFREND 2 BC2-025436		

SRCI & P2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 20** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : PCM *Customer*	**PIÈCE :** *Part* L2 : CORPS 6IN AV7 2/2	
N° DE COMMANDE 24121 *Order Nb*		
N° PLAN: W-008202-C *Drawing Nb:*	**MATIÈRE :** SUPERDUPLEX *Material*	**Lot N°** / *Batch Nbr*
Spécification: IT_NDT_302F_rév02 *Specification*	**N° COULÉE :** / *Heat Nb*	**Destination :** /

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*: **Après soudage contrôle ressuage coloré 100% des soudures + ZAT** *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable ☐ *preleminary cleaning*	
	MARQUE *Trade mark*		babbco	N° Lot: PL221000937.	
	RÉFÉRENCE *Reference*		V80	PER: 09/2027.	
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: P220 100333-1	
	RÉFÉRENCE *Reference*	DP55		PER: 05/2026.	
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: P220 600 190-1	
	RÉFÉRENCE *Reference*	D100		PER: 02/2027	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** Other ☐
TEMPÉRATURE DE LA PIÈCE *Part temperature*	19°C	**THERMOMETRE :** 131.		**VALIDITE :** 12/2024.
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:* **Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐		**Temps de séchage :** 5 ..... **Mn** *Drying time:*
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐	**PULVÉRISATION** Pulverization ☒		**Durée d'application :** 20 ..... **Mn** *Application time*
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒	**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 ..... **Mn** *Drying time:*		**Temps d'examen :** 0030 ..... **Mn** *Examination period*
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒	**ARTIFICIELLE** *Artificial* ☒		**Luminosité mesurée :** 1750 lux
			LUXMETRE N° 133	**Validité :** *Validity* 10/2024

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
1/10/2024	A.CARREAU CCFREND BO2-025438		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 21** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L3 : RALLONGE CORPS 6IN AV7 1/2**
N° DE COMMANDE *Order Nb*	24121		
N° PLAN: *Drawing Nb:*	**W-004942-B**	**MATIÈRE :** *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/		
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/
Destination :	/		

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*: **Après soudage contrôle ressuage coloré 100% des soudures + ZAT** / *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
	MARQUE *Trade mark*		babbco	N° Lot:	A2241000037
	RÉFÉRENCE *Reference*		U180	PER:	09/2027
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco		N° Lot:	P220100333-1
	RÉFÉRENCE *Reference*	DP55		PER:	05/2026
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco		N° Lot:	R220600190-1
	RÉFÉRENCE *Reference*	D100		PER:	02/2027

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** Other ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	18°C	**THERMOMETRE :**	131	**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 Mn *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** Pulverization ☒	**Durée d'application :** 20 Mn *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 Mn *Drying time:*		**Temps d'examen :** 0030 Mn *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1800 lux	
			LUXMETRE N° 133	**Validité :** *Validity* 10/2024	

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
11/01/2024	A. CAPRIOLI CCFREND 2 BO2-025436		

SRCI P2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 22** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : PCM *Customer*	**PIÈCE :** *Part* L3 : RALLONGE CORPS 6IN AV7 2/2	
N° DE COMMANDE 24121 *Order Nb*		
N° PLAN: W-004942-B *Drawing Nb:*	**MATIÈRE :** SUPERDUPLEX *Material*	**Lot N°** / *Batch Nbr*
Spécification: IT_NDT_302F_rév02 *Specification*	**N° COULÉE :** / *Heat Nb*	**Destination :** /

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*: **Après soudage contrôle ressuage coloré 100% des soudures + ZAT** *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable ☐ *preleminary cleaning*	
	MARQUE *Trade mark*		babbco	N° Lot: PL221000937	
	RÉFÉRENCE *Reference*		V130	PER: 09/2027	
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: PL220100333-1	
	RÉFÉRENCE *Reference*	DP55		PER: 05/2026	
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: PL220600190.1	
	RÉFÉRENCE *Reference*	D100		PER: 06/2027	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐
TEMPÉRATURE DE LA PIÈCE *Part temperature*	18 °C	**THERMOMETRE :** 131		**VALIDITE :** 12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 Mn *Drying time:*
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** Pulverization ☒	**Durée d'application :** 20 Mn *Application time*
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒	
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 Mn *Drying time:*		**Temps d'examen :** 0030 Mn *Examination period*
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1200 lux
			LUXMETRE N° 133	**Validité :** *Validity* 10/2024

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS		ANNEXE ☐ *See attached*

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
1 / 10 / 2024	A. CARNIOLI CCFREND 2 BO2-025436		

SRCI P2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE

LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 23** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : PCM *Customer*	**PIÈCE :** *Part* **L4 : EMBOUT STATOR 25AV24 1/2**	
N° DE COMMANDE 24121 *Order Nb*		
N° PLAN: W-008199-A *Drawing Nb:*	**MATIÈRE :** SUPERDUPLEX *Material*	**Lot N°** / *Batch Nbr*
Spécification: IT_NDT_302F_rév02 *Specification*	**N° COULÉE :** / *Heat Nb*	**Destination :** /

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*

Après soudage contrôle ressuage coloré 100% des soudures + ZAT

After welding Penetrant Testing check 100% of welds + ZAT

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
	MARQUE *Trade mark*		babbco	N° Lot:	PL221000.937.
	RÉFÉRENCE *Reference*		V120	PER:	09/2027.
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco		N° Lot:	P220100333.1
	RÉFÉRENCE *Reference*	DP55		PER:	05/2026.
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco		N° Lot:	P220 600 1490.1
	RÉFÉRENCE *Reference*	D100		PER:	02/2027

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** Other ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	18°C	**THERMOMETRE :** 131.		**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 Mn *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** Pulverization ☒	**Durée d'application :** 20 Mn *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant eliminination*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 Mn *Drying time:*		**Temps d'examen :** 0à30 Mn *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☐	**Luminosité mesurée :** 1200 Lux	
			LUXMETRE N° 133	**Validité :** *Validity*	10/2024

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
1/10/2024	A. CAPRIOLI CC FREND 2 BO2-025436		

SRCIP2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° 24121 PT 24 Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : PCM *Customer*	**PIÈCE :** *Part* L4 : EMBOUT STATOR 25AV24 2/2	
N° DE COMMANDE 24121 *Order Nb*		
N° PLAN: W-008199-A *Drawing Nb:*	**MATIÈRE :** SUPERDUPLEX *Material*	**Lot N°** / *Batch Nbr*
Spécification: IT_NDT_302F_rév02 *Specification*	**N° COULÉE :** / *Heat Nb*	**Destination :** /

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*: **Après soudage contrôle ressuage coloré 100% des soudures + ZAT** *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

PRODUIT DE LAVAGE *Cleaning agent*	**NATURE** *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
	MARQUE *Trade mark*		babbco	N° Lot: P221000937.	
	RÉFÉRENCE *Reference*		V120	PER: 09/2027	
PÉNÉTRANT *Penetrant*	**TYPE** *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: 220100333-1	
	RÉFÉRENCE *Reference*	DP55		PER: 05/2026.	
RÉVÉLATEUR *Developer*	**TYPE** *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
	MARQUE *Trade mark*	babbco		N° Lot: 220600100-1	
	RÉFÉRENCE *Reference*	D100		PER: 02/2027.	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** *Other* ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	18°C	**THERMOMETRE :** 131.		**VALIDITE :** 12/2024	
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 Mn *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** *Pulverization* ☒	**Durée d'application :** 20 Mn *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininationn*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** *Pulverization* ☒	**Temps de séchage :** 5 Mn *Drying time:*		**Temps d'examen :** 0030 Mn *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1800 lux	
			LUXMETRE N° 133	**Validité :** *Validity* 10/2024	

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
11/10/2024	A. CARNOT COFREND 2 BO2-025436		

SRCI & P2MI
ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 25** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : *Customer*	**PCM**	**PIÈCE :** *Part*	**L5 : ENVELOPP STATOR 25AV24 1/2**
N° DE COMMANDE *Order Nb*	24121		
N° PLAN: *Drawing Nb:*	**W-008200-A**	**MATIÈRE :** *Material*	SUPERDUPLEX
Lot N° *Batch Nbr*	/		
Spécification: *Specification*	IT_NDT_302F_rév02	**N° COULÉE :** *Heat Nb*	/
Destination :	/		

STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*

Après soudage contrôle ressuage coloré 100% des soudures + ZAT

After welding Penetrant Testing check 100% of welds + ZAT

PRODUITS UTILISÉS / *Materials used*

	NATURE *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
PRODUIT DE LAVAGE *Cleaning agent*	**MARQUE** *Trade mark*		babbco	N° Lot:	FL221.000937
	RÉFÉRENCE *Reference*		UB0	PER:	09/2027
	TYPE *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
PÉNÉTRANT *Penetrant*	**MARQUE** *Trade mark*	babbco		N° Lot:	P220100333-1
	RÉFÉRENCE *Reference*	DP55		PER:	05/2026
	TYPE *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
RÉVÉLATEUR *Developer*	**MARQUE** *Trade mark*	babbco		N° Lot:	P220 600 190-1
	RÉFÉRENCE *Reference*	D100		PER:	02/2027

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** Other ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	18°C	**THERMOMETRE :**	131	**VALIDITE :**	12/2024
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:*	**Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐	**Temps de séchage :** 5 Mn *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐		**PULVÉRISATION** Pulverization ☒	**Durée d'application :** 20 Mn *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒		**CHIFFONS SECS PROPRES** *Lint-free rags* ☒		
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 Mn *Drying time:*		**Temps d'examen :** 0@30 Mn *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒		**ARTIFICIELLE** *Artificial* ☒	**Luminosité mesurée :** 1750lx	
			LUXMETRE N° 133	**Validité :** *Validity*	10/2024

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS	ANNEXE *See attached* ☐	

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
11/01/2024	A. BARBOSA CCFREND 2 BO2-025436		

SRCI P2MI

ZA HARFLEUR - 4-6 ALLEES DES BRUYERES - 71200 LE CREUSOT
Tél. 03.85.77.07.80 Fax 03.85.77.07.89

RAPPORT D'EXAMEN PAR RESSUAGE
LIQUID PENETRANT EXAMINATION REPORT

N° **24121 PT 26** Page 1/1

DS 237 rev B - Edition 05/2024

CLIENT : PCM *Customer*	**PIÈCE :** *Part* **L5 : ENVELOPP STATOR 25AV24 2/2**
N° DE COMMANDE 24121 *Order Nb*	
N° PLAN: W-008200-A *Drawing Nb:*	**MATIÈRE :** SUPERDUPLEX *Material* — **Lot N°** / *Batch Nbr*
Spécification: IT_NDT_302F_rév02 *Specification*	**N° COULÉE :** / *Heat Nb* — **Destination :** /
STADE ET ÉTENDUE DU CONTRÔLE *Stage and area of inspection*	**Après soudage contrôle ressuage coloré 100% des soudures + ZAT** *After welding Penetrant Testing check 100% of welds + ZAT*

PRODUITS UTILISÉS / *Materials used*

	NATURE *Nature*	**EAU** *Water* ☐	**SOLVANT** *Solvent* ☒	nettoyage préalable *preleminary cleaning* ☐	
PRODUIT DE LAVAGE *Cleaning agent*	**MARQUE** *Trade mark*		babbco	N° Lot: PL221000937	
	RÉFÉRENCE *Reference*		N 120	PER: 09/2027	
	TYPE *Type*	**COLORÉ** *Colored* ☒	**FLUORESCENT** *Fluorescent* ☐		
PÉNÉTRANT *Penetrant*	**MARQUE** *Trade mark*	babbco		N° Lot: PL220100333 1	
	RÉFÉRENCE *Reference*	DP55		PER: 05/2026	
	TYPE *Type*	**LIQUIDE** *Liquid* ☒	**POUDRE** *Powder* ☐		
RÉVÉLATEUR *Developer*	**MARQUE** *Trade mark*	babbco		N° Lot: PL220600190 1	
	RÉFÉRENCE *Reference*	D100		PER: 02/2027	

CONDITIONS D'EXAMEN / *Examination conditions*

ÉTAT DE SURFACE *Surface condition*	**BRUT** *Rough* ☒	**USINÉ** *Machined* ☐	**MEULÉ** *Grinded* ☐	**AUTRE** Other ☐	
TEMPÉRATURE DE LA PIÈCE *Part temperature*	18°C	**THERMOMETRE :** 131.		**VALIDITE :** 12/2024	
NETTOYAGE PRÉALABLE *Preliminary cleaning*	**Séchage :** *Drying:* **Évaporation Naturelle** *Natural evaporation* ☒	**AIR PULSE** *Pulsed air* ☐		**Temps de séchage :** 5 Mn *Drying time:*	
APPLICATION DU PÉNÉTRANT *Penetrant application*	**PINCEAU** *brush* ☐	**PULVÉRISATION** Pulverization ☒		**Durée d'application :** 20 Mn *Application time*	
ÉLIMINATION DU PÉNÉTRANT *Penetrant elimininations*	**LAVAGE A L'EAU** *Water washing* ☒	**CHIFFONS SECS PROPRES** *Lint-free rags* ☒			
APPLICATION DU RÉVÉLATEUR *Developper application*	**Pulvérisation** Pulverization ☒	**Temps de séchage :** 5 Mn *Drying time:*		**Temps d'examen :** 0030 Mn *Examination period*	
ÉCLAIRAGE UTILISÉ *Lighing used*	**NATURELLE** *Natural* ☒	**ARTIFICIELLE** *Artificial* ☒		**Luminosité mesurée :** 1800 Lux	
				LUXMETRE N° 133	**Validité :** *Validity* 10/2024

RÉSULTATS DU CONTRÔLE *Examination results*	**CONFORME A LA SPECIFICATION INDIQUEE** *Conform to the mentionned specification*	**OUI** *Yes* ☒	**NON** *No* ☐
Examen visuel *Visual examination*	RAS		ANNEXE *See attached* ☐

DATE DU CONTRÔLE *Examination Date*	NOM DU TECHNICIEN *Name of Technician*	VISA CLIENT *Customer visa*	
11/01/2024	A. CAPRIOLI COFFREND 2 BO2-025436		

2.3.3 HYDROSTATIC TEST REPORT

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121- 05

N/Réf. 24121

Client *Customer* **PCM**	**Plan** *Drawing* **W-004942-B**
N° Commande Client *Order n°* **PO070-24-07599**	**Repère** *Marking* 1/18
N° Poste *Item* **1**	**Matière** *Material* **Superduplex**
Pièces *Parts* **RALLONGE CORPS 6IN AV7**	**Spécifications** *Specification* **DS 097 ind. F**

Parties examinées *Portions examined* **100% Of welds**

Nature de l'épreuve *Test nature* → **Epreuve d'étanchéité** *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression ***Pressure holding time*** →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →

Eau *Water*	☒	**Huile** *Oil*	☐
Air *Air*	☐	**Pétrole** *Lamp-oil*	☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min
Hauteur pétrole *Heigh of lamp oil* →	/

M. Sheydaee
o.bo. Rosetti Marino
witnessed
08/10/2024

Wobo Crosswind
08/10/2024

Résultats de l'épreuve - *Test results*

No leaks / pas de fuite

Date Contrôle *Examin.date* 8/10/24	**Accepté** *Accepted* OUI ☒ *Yes*	NON ☐ *No*	**Fiche d'anomalie N°** *Non conformity report*	**Voir croquis annexe** ☐ *See attached sketch*

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	8/10/24		**Resp. Qualité** *Quality*	C. Vayssade 08/10/2024		
Resp. Interpret. *Interpreter*	BONICEL	8/10/24			LE REVEL G (W)	8/10/24	

SRCI - P2MI - Service Qualité

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE

LEAKAGE TEST

N ° 24121-06

N/Réf. 24121

Client *Customer* **PCM**	Plan *Drawing* **W-004942-B**
N° Commande Client *Order n°* **PO070-24-07599**	Repère *Marking* 3118
N° Poste *Item* **1**	Matière *Material* **Superduplex**
Pièces *Parts* **RALLONGE CORPS 6IN AV7**	Spécifications *Specification* **DS 097 ind. F**

Parties examinées *Portions examined* **100% Of welds**

Nature de l'épreuve *Test nature* → Epreuve d'étanchéité *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression *Pressure holding time* →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →

Eau *Water* ☒ Huile *Oil* ☐

Air *Air* ☐ Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min
Hauteur pétrole *Heigh of lamp oil* →	/

M. Reydace
obo Rosetti Marino
witnessed
08/10/2024

Wobo crosswind
08/10/2024

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle *Examin.date* 8/10/24	Accepté *Accepted* OUI *Yes* ☒	NON *No* ☐	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	8/10/24		Resp. Qualité *Quality*	E. Vallée Lebrun	08/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	8/10/24					

LE NEVEL G (W) PCM 8/10/24

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121-07

N/Réf. 24121

Client **PCM** *Customer*	Plan **W-004942-B** *Drawing*
N° Commande Client **PO070-24-07599** *Order n°*	Repère 7/18 *Marking*
N° Poste **1** *Item*	Matière **Superduplex** *Material*
Pièces **RALLONGE CORPS 6IN AV7** *Parts*	Spécifications **DS 097 ind. F** *Specification*

Parties examinées **100% Of welds**
Portions examined

Nature de l'épreuve → Epreuve d'étanchéité
Test nature *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression ***Pressure holding time*** →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →
Eau *Water* ☑ Huile *Oil* ☐
Air *Air* ☐ Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min
Hauteur pétrole *Heigh of lamp oil* →	/

M Sheydaee obo Rosetti Marino witnessed 08/10/2024

M Sheydaee obo crosswind 08/10/2024

Résultats de l'épreuve - *Test results*

No leaks / pas de fuite

Date Contrôle *Examin.date* 8/10/24	Accepté *Accepted* OUI *Yes* ☒	NON *No* ☐	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPPIOLI	8/10/24		Resp. Qualité *Quality*	C. VOISSE	08/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	8/10/24					
	LE MEVEL G (W)	8/10/24					

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121-08

N/Réf. 24121

Client *Customer* **PCM**	Plan *Drawing* **W-004942-B**
N° Commande Client *Order n°* **PO070-24-07599**	Repère *Marking* 6/18
N° Poste *Item* **1**	Matière *Material* **Superduplex**
Pièces *Parts* **RALLONGE CORPS 6IN AV7**	Spécifications *Specification* **DS 097 ind. F**

Parties examinées *Portions examined* **100% Of welds**

Nature de l'épreuve *Test nature* → Epreuve d'étanchéité *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression *Pressure holding time* →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →	Eau *Water*	☒	Huile *Oil*	☐
	Air *Air*	☐	Pétrole *Lamp-oil*	☐

Température du fluide *Fluid temperature* →	ambiant 18° °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min
Hauteur pétrole *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / pas de fuite.

Date Contrôle *Examin.date* 8/10/2024	Accepté *Accepted* OUI *Yes* ☒	NON *No* ☐	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	8/10/2024		Resp. Qualité *Quality*	C. Vaeyse Labrude	08/10/2024	SRCI P2MI Service Qualité
Resp. Interpret. *Interpreter*	BONICEL	8/10/24					

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE

LEAKAGE TEST

N ° 24121-09

N/Réf. 24121

Client **PCM** *Customer*	Plan **W-004942-B** *Drawing*
N° Commande Client **PO070-24-07599** *Order n°*	Repère 9/18 *Marking*
N° Poste **1** *Item*	Matière **Superduplex** *Material*
Pièces **RALLONGE CORPS 6IN AV7** *Parts*	Spécifications **DS 097 ind. F** *Specification*

Parties examinées **100% Of welds**
Portions examined

Nature de l'épreuve → Epreuve d'étanchéité
Test nature *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure*	→	**30 bars**
Vitesse de montée en pression *Pressure rising speed*	→	/
Durée du maintien en pression ***Pressure holding time***	→	**30 min**
Hauteur pétrole *Heigh of lamp oil*	→	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →

Eau *Water* ☒ Huile *Oil* ☐

Air *Air* ☐ Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature*	→	ambiant 19 °C
Pression *Pressure*	→	30 bars
Vitesse de montée en pression *Pressure rising speed*	→	3 min
Durée du maintien en pression *Pressure holding time*	→	30 min
Hauteur pétrole *Heigh of lamp oil*	→	/

Résultats de l'épreuve - *Test results*

No leaks / pas de fuite

Date Contrôle *Examin.date* 8/10/2024	Accepté *Accepted* OUI ☒ *Yes* NON ☐ *No*	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	8/10/2024		Resp. Qualité *Quality*	E. VAUTRIN LABRUDE	08/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	8/10/24					

SRCI - P2MI Service Qualité

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE

LEAKAGE TEST

N ° 24121- 10

N/Réf. 24121

Client **PCM** *Customer*	Plan **W-004942-B** *Drawing*
N° Commande Client **PO070-24-07599** *Order n°*	Repère 10/18 *Marking*
N° Poste **1** *Item*	Matière **Superduplex** *Material*
Pièces **RALLONGE CORPS 6IN AV7** *Parts*	Spécifications **DS 097 ind. F** *Specification*

Parties examinées **100% Of welds**
Portions examined

Nature de l'épreuve → Epreuve d'étanchéité
Test nature *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure*	→	**30 bars**
Vitesse de montée en pression *Pressure rising speed*	→	/
Durée du maintien en pression *Pressure holding time*	→	**30 min**
Hauteur pétrole *Heigh of lamp oil*	→	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used*	→	Eau *Water* ☒	Huile *Oil* ☐	
	→	Air *Air* ☐	Pétrole *Lamp-oil* ☐	
Température du fluide *Fluid temperature*	→	ambiant 19° °C		
Pression *Pressure*	→	30 bars		
Vitesse de montée en pression *Pressure rising speed*	→	3 mn		
Durée du maintien en pression *Pressure holding time*	→	30 mn		
Hauteur pétrole *Heigh of lamp oil*	→	/		

Résultats de l'épreuve - *Test results*

No Leak / Pas de fuite

Date Contrôle *Examin.date* 8/10/2024	Accepté *Accepted* OUI ☒ *Yes* NON ☐ *No*	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe ☐ *See attached sketch*

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	8/10/2024		Resp. Qualité *Quality*	C. VAUTRIN LABUDE	08/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	8/10/24					

SRCI - P2MI Service Qualité

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121-11

N/Réf. 24121

Client **PCM** *Customer*	Plan **W-004942-B** *Drawing*
N° Commande Client **PO070-24-07599** *Order n°*	Repère 2/18 *Marking*
N° Poste **1** *Item*	Matière **Superduplex** *Material*
Pièces **RALLONGE CORPS 6IN AV7** *Parts*	Spécifications **DS 097 ind. F** *Specification*

Parties examinées **100% Of welds**
Portions examined

Nature de l'épreuve → Epreuve d'étanchéité
Test nature *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure*	→	**30 bars**
Vitesse de montée en pression *Pressure rising speed*	→	/
Durée du maintien en pression ***Pressure holding time***	→	**30 min**
Hauteur pétrole *Heigh of lamp oil*	→	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →
- Eau *Water* ☒ — Huile *Oil* ☐
- Air *Air* ☐ — Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature*	→	ambiant 19 °C
Pression *Pressure*	→	30 bars
Vitesse de montée en pression *Pressure rising speed*	→	3 min
Durée du maintien en pression *Pressure holding time*	→	30 min
Hauteur pétrole *Heigh of lamp oil*	→	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle *Examin.date* 8/10/24	Accepté *Accepted* OUI ☒ *Yes* NON ☐ *No*	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPPOLI	8/10/24		Resp. Qualité *Quality*	C. Vaysse Lahaud	08/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	8/10/24					

SRCI - P2MI - Service Qualité

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE

LEAKAGE TEST

N ° 24121- 12

N/Réf. 24121

Client *Customer* **PCM**	Plan *Drawing* **W-004942-B**
N° Commande Client *Order n°* **PO070-24-07599**	Repère *Marking* 5/18.
N° Poste *Item* **1**	Matière *Material* **Superduplex**
Pièces *Parts* **RALLONGE CORPS 6IN AV7**	Spécifications *Specification* **DS 097 ind. F**

Parties examinées *Portions examined* **100% Of welds**

Nature de l'épreuve *Test nature* → Epreuve d'étanchéité *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression *Pressure holding time* →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →

Eau *Water* ☒ Huile *Oil* ☐

Air *Air* ☐ Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars.
Vitesse de montée en pression *Pressure rising speed* →	3 min.
Durée du maintien en pression *Pressure holding time* →	30 min.
Hauteur pétrole *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / pas de fuite

Date Contrôle *Examin.date* 8/10/24.	Accepté *Accepted* OUI *Yes* ☐ NON *No* ☐	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	8/10/24		Resp. Qualité *Quality*	C. Veuffe Lebaud	08/10/2024	SRCI P2MI Service Qualité
Resp. Interpret. *Interpreter*	BONICEL	8/10/24					

SRCI P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE

LEAKAGE TEST

N ° 24121-13

N/Réf. 24121

Client *Customer* **PCM**	Plan *Drawing* **W-004942-B**
N° Commande Client *Order n°* **PO070-24-07599**	Repère *Marking* 15/18
N° Poste *Item* **1**	Matière *Material* **Superduplex**
Pièces *Parts* **RALLONGE CORPS 6IN AV7**	Spécifications *Specification* **DS 097 ind. F**

Parties examinées *Portions examined* **100% Of welds**

Nature de l'épreuve *Test nature* → Epreuve d'étanchéité *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression *Pressure holding time* →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →

Eau *Water* ☒ Huile *Oil* ☐

Air *Air* ☐ Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min.
Hauteur pétrole *Heigh of lamp oil* →	—

Résultats de l'épreuve - *Test results*

No leaks / pas de fuite

Date Contrôle *Examin.date* 8/10/24

Accepté *Accepted* OUI *Yes* ☐ NON *No* ☐

Fiche d'anomalie N° *Non conformity report*

Voir croquis annexe *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	8/10/24		Resp. Qualité *Quality*	E. Veysse Labrude	08/10/2024	SRCI - P2MI Service Qualité
Resp. Interpret. *Interpreter*	BONICEL	8/10					

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121-14

N/Réf. 24121

Client **PCM** *Customer*	Plan **W-004942-B** *Drawing*
N° Commande Client **PO070-24-07599** *Order n°*	Repère 4/18 *Marking*
N° Poste **1** *Item*	Matière **Superduplex** *Material*
Pièces **RALLONGE CORPS 6IN AV7** *Parts*	Spécifications **DS 097 ind. F** *Specification*

Parties examinées **100% Of welds**
Portions examined

Nature de l'épreuve → Epreuve d'étanchéité
Test nature *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression *Pressure holding time* →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →
- Eau *Water* ☒ — Huile *Oil* ☐
- Air *Air* ☐ — Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min
Hauteur pétrole *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle *Examin.date* 9/10/24	Accepté *Accepted* OUI ☒ *Yes* NON ☐ *No*	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe ☐ *See attached sketch*

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	9/10/24		Resp. Qualité *Quality*	C. VAYSSE LABRUDE	09/10/2024	
Resp. Interpret. *Interpreter*	BONGEL	9/10/24					

SRCI P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121-15

N/Réf. 24121

Client / *Customer* **PCM**	Plan / *Drawing* **W-004942-B**
N° Commande Client / *Order n°* **PO070-24-07599**	Repère / *Marking* 11 / 18
N° Poste / *Item* **1**	Matière / *Material* **Superduplex**
Pièces / *Parts* **RALLONGE CORPS 6IN AV7**	Spécifications / *Specification* **DS 097 ind. F**

Parties examinées / *Portions examined* **100% Of welds**

Nature de l'épreuve / *Test nature* → Epreuve d'étanchéité / *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve / *Test pressure* →	**30 bars**
Vitesse de montée en pression / *Pressure rising speed* →	/
Durée du maintien en pression / ***Pressure holding time*** →	**30 min**
Hauteur pétrole / *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé / *Fluid used* →

Eau / *Water*	☒	Huile / *Oil*	☐
Air / *Air*	☐	Pétrole / *Lamp-oil*	☐

Température du fluide / *Fluid temperature* →	ambiant 19 °C
Pression / *Pressure* →	30 bars
Vitesse de montée en pression / *Pressure rising speed* →	3 min
Durée du maintien en pression / *Pressure holding time* →	30 min
Hauteur pétrole / *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle / *Examin.date* 9/10/24	Accepté / *Accepted* OUI / *Yes* ☒	NON / *No* ☐	Fiche d'anomalie N° / *Non conformity report*	Voir croquis annexe / *See attached sketch* ☐

	Nom / *Name*	Date / *Date*	Signature / *Visa*		Nom / *Name*	Date / *Date*	Signature / *Visa*
Opérateur / *Operator*	CAPRIOLI	9/10/24		Resp. Qualité / *Quality*	C. VAUTRIN	9/10/2024	
Resp. Interpret. / *Interpreter*	BONICEL	9/10/24					

SRCI - P2MI Service Qualité

SRCI P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121-16

N/Réf. 24121

Client **PCM** *Customer*	Plan **W-004942-B** *Drawing*
N° Commande Client **PO070-24-07599** *Order n°*	Repère 14118 *Marking*
N° Poste **1** *Item*	Matière **Superduplex** *Material*
Pièces **RALLONGE CORPS 6IN AV7** *Parts*	Spécifications **DS 097 ind. F** *Specification*

Parties examinées **100% Of welds**
Portions examined

Nature de l'épreuve → Epreuve d'étanchéité
Test nature *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure*	→	**30 bars**
Vitesse de montée en pression *Pressure rising speed*	→	/
Durée du maintien en pression *Pressure holding time*	→	**30 min**
Hauteur pétrole *Heigh of lamp oil*	→	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →
- Eau *Water* ☒ — Huile *Oil* ☐
- Air *Air* ☐ — Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature*	→	ambiant 19 °C
Pression *Pressure*	→	30 bars
Vitesse de montée en pression *Pressure rising speed*	→	3 min
Durée du maintien en pression *Pressure holding time*	→	30 min
Hauteur pétrole *Heigh of lamp oil*	→	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle *Examin.date* 9/10/24	Accepté *Accepted* OUI ☒ *Yes* NON ☐ *No*	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe ☐ *See attached sketch*

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPPIOLI	9/10/24		Resp. Qualité *Quality*	C. Vaeffer Labrude	09/10/2024	SRCI P2MI Service Qualité
Resp. Interpret. *Interpreter*	BONICEL	9/10/24					

SRCI P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121-17

N/Réf. 24121

Client *Customer* **PCM**	Plan *Drawing* **W-004942-B**
N° Commande Client *Order n°* **PO070-24-07599**	Repère *Marking* 16118
N° Poste *Item* **1**	Matière *Material* **Superduplex**
Pièces *Parts* **RALLONGE CORPS 6IN AV7**	Spécifications *Specification* **DS 097 ind. F**

Parties examinées *Portions examined* **100% Of welds**

Nature de l'épreuve *Test nature* → Epreuve d'étanchéité *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure*	→	**30 bars**
Vitesse de montée en pression *Pressure rising speed*	→	/
Durée du maintien en pression *Pressure holding time*	→	**30 min**
Hauteur pétrole *Heigh of lamp oil*	→	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used*	→	Eau *Water*	☒	Huile *Oil* ☐
	→	Air *Air*	☐	Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature*	→	ambiant 19 °C
Pression *Pressure*	→	30 bars
Vitesse de montée en pression *Pressure rising speed*	→	3 min
Durée du maintien en pression *Pressure holding time*	→	30 min
Hauteur pétrole *Heigh of lamp oil*	→	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle *Examin.date* 9/10/24	Accepté *Accepted*	OUI *Yes* ☒	NON *No* ☐	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	9/10/24		Resp. Qualité *Quality*	C. Vaysse Labrude	9/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	9/10/24					

SRCI - P2MI Service Qualité

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121-18

N/Réf. 24121

Client *Customer* **PCM**	**Plan** *Drawing* **W-004942-B**
N° Commande Client *Order n°* **PO070-24-07599**	**Repère** *Marking* 17118
N° Poste *Item* **1**	**Matière** *Material* **Superduplex**
Pièces *Parts* **RALLONGE CORPS 6IN AV7**	**Spécifications** *Specification* **DS 097 ind. F**

Parties examinées *Portions examined* **100% Of welds**

Nature de l'épreuve *Test nature* → **Epreuve d'étanchéité** *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression ***Pressure holding time*** →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →

Eau *Water* ☒ **Huile** *Oil* ☐

Air *Air* ☐ **Pétrole** *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min
Hauteur pétrole *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite.

Date Contrôle *Examin.date* 9/10/24	**Accepté** *Accepted* OUI *Yes* ☒	NON *No* ☐	**Fiche d'anomalie N°** *Non conformity report*	**Voir croquis annexe** *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPMOU	9/10/24		**Resp. Qualité** *Quality*	C. Vaysse Labrude	9/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	9/10/24					

SRCI - P2MI - Service Qualité

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE

LEAKAGE TEST

N ° 24121-19

N/Réf. 24121

Client **PCM** *Customer*	Plan **W-004942-B** *Drawing*
N° Commande Client **PO070-24-07599** *Order n°*	Repère 18118 *Marking*
N° Poste **1** *Item*	Matière **Superduplex** *Material*
Pièces **RALLONGE CORPS 6IN AV7** *Parts*	Spécifications **DS 097 ind. F** *Specification*

Parties examinées **100% Of welds**
Portions examined

Nature de l'épreuve → Epreuve d'étanchéité
Test nature *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression ***Pressure holding time*** →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →

Eau *Water* ☒ Huile *Oil* ☐

Air *Air* ☐ Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min
Hauteur pétrole *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results* No leaks / Pas de fuite

Date Contrôle *Examin.date* 9/10/24	Accepté *Accepted* OUI *Yes* ☒ NON *No* ☐	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	9/10/24		Resp. Qualité *Quality*	E. VAUTIER	9/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	9/10/24					

SRCI - P2MI Service Qualité

SRCI P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121- 20

N/Réf. 24121

Client *Customer* **PCM**	**Plan** *Drawing* **W-004942-B**
N° Commande Client *Order n°* **PO070-24-07599**	**Repère** *Marking* 8118
N° Poste *Item* **1**	**Matière** *Material* **Superduplex**
Pièces *Parts* **RALLONGE CORPS 6IN AV7**	**Spécifications** *Specification* **DS 097 ind. F**

Parties examinées *Portions examined* **100% Of welds**

Nature de l'épreuve *Test nature* → **Epreuve d'étanchéité** *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression *Pressure holding time* →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →

Eau *Water*	☒	**Huile** *Oil*	☐
Air *Air*	☐	**Pétrole** *Lamp-oil*	☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min
Hauteur pétrole *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle *Examin.date* 9/10/24	**Accepté** *Accepted*	**OUI** *Yes* ☒	**NON** *No* ☐	**Fiche d'anomalie N°** *Non conformity report*	**Voir croquis annexe** *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	9/10/24		**Resp. Qualité** *Quality*	C. Vaysse Lebude	9/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	9/10/24					

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE

LEAKAGE TEST

N ° 24121-21

N/Réf. 24121

Client **PCM** *Customer*	Plan **W-004942-B** *Drawing*
N° Commande Client **PO070-24-07599** *Order n°*	Repère 12/18 *Marking*
N° Poste **1** *Item*	Matière **Superduplex** *Material*
Pièces **RALLONGE CORPS 6IN AV7** *Parts*	Spécifications **DS 097 ind. F** *Specification*

Parties examinées **100% Of welds**
Portions examined

Nature de l'épreuve → Epreuve d'étanchéité
Test nature *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression *Pressure holding time* →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →

Eau *Water* ☒ Huile *Oil* ☐

Air *Air* ☐ Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	Ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30min
Hauteur pétrole *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle *Examin.date* 9/10/24

Accepté *Accepted* OUI *Yes* ☒ NON *No* ☐

Fiche d'anomalie N° *Non conformity report*

Voir croquis annexe *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOU	9/10/24		Resp. Qualité *Quality*	C. Vasse Labrude	9/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	9/10/24					

SRCI - P2MI - Service Qualité

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121-~~22~~

N/Réf. 24121

Client **PCM** *Customer*	Plan **W-004942-B** *Drawing*
N° Commande Client **PO070-24-07599** *Order n°*	Repère 13118 *Marking*
N° Poste **1** *Item*	Matière **Superduplex** *Material*
Pièces **RALLONGE CORPS 6IN AV7** *Parts*	Spécifications **DS 097 ind. F** *Specification*

Parties examinées **100% Of welds**
Portions examined

Nature de l'épreuve → Epreuve d'étanchéité
Test nature *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression *Pressure holding time* →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →
- Eau *Water* ☒
- Huile *Oil* ☐
- Air *Air* ☐
- Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min
Hauteur pétrole *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle *Examin.date* 9/10/24	Accepté *Accepted* OUI ☒ *Yes* NON ☐ *No*	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe ☐ *See attached sketch*

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	08/10/24		Resp. Qualité *Quality*	C. Vayssé Labrude	9/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	9/10/24					

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE

LEAKAGE TEST

N ° 24121-23

N/Réf. 24121

Client **PCM** *Customer*	Plan **W-008202-C** *Drawing*
N° Commande Client **PO070-24-07599** *Order n°*	Repère 1/2 *Marking*
N° Poste **2** *Item*	Matière **Superduplex** *Material*
Pièces **CORPS 6IN AV7** *Parts*	Spécifications **DS 097 ind. F** *Specification*

Parties examinées **100% Of welds**
Portions examined

Nature de l'épreuve → Epreuve d'étanchéité
Test nature *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression ***Pressure holding time*** →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →
- Eau *Water* ☒
- Huile *Oil* ☐
- Air *Air* ☐
- Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min
Hauteur pétrole *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle *Examin.date* 10/10/24	Accepté *Accepted* OUI ☒ *Yes* NON ☐ *No*	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe ☐ *See attached sketch*

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	10/10/24		Resp. Qualité *Quality*	C. Vaysse Labrude	10/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	10/10/24					

SRCI - P2MI Service Qualité

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121-24

N/Réf. 24121

Client / *Customer* **PCM**	Plan / *Drawing* **W-008202-C**
N° Commande Client / *Order n°* **PO070-24-07599**	Repère / *Marking* 212
N° Poste / *Item* **2**	Matière / *Material* **Superduplex**
Pièces / *Parts* **CORPS 6IN AV7**	Spécifications / *Specification* **DS 097 ind. F**

Parties examinées / *Portions examined* **100% Of welds**

Nature de l'épreuve / *Test nature* → Epreuve d'étanchéité / *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve / *Test pressure* →	**30 bars**
Vitesse de montée en pression / *Pressure rising speed* →	/
Durée du maintien en pression / ***Pressure holding time*** →	**30 min**
Hauteur pétrole / *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé / *Fluid used* →

Eau / *Water*	☒	Huile / *Oil*	☐
Air / *Air*	☐	Pétrole / *Lamp-oil*	☐

Température du fluide / *Fluid temperature* →	ambiant 19 °C
Pression / *Pressure* →	30 bars
Vitesse de montée en pression / *Pressure rising speed* →	3 min
Durée du maintien en pression / *Pressure holding time* →	30 min
Hauteur pétrole / *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle / *Examin.date* 10/10/24	Accepté / *Accepted* OUI ☒ / *Yes*	NON ☐ / *No*	Fiche d'anomalie N° / *Non conformity report*

Voir croquis annexe / *See attached sketch* ☐

	Nom / *Name*	Date / *Date*	Signature / *Visa*		Nom / *Name*	Date / *Date*	Signature / *Visa*
Opérateur / *Operator*	CAPRIOLI	10/10/24		Resp. Qualité / *Quality*	C. VEUFFE LABUSSE	10/10/2024	
Resp. Interpret. / *Interpreter*	BONICEL	10/10/24					

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121-25

N/Réf. 24121

Client **PCM** *Customer*	Plan **W-004942-B** *Drawing*
N° Commande Client **PO070-24-07599** *Order n°*	Repère 112 *Marking*
N° Poste **3** *Item*	Matière **Superduplex** *Material*
Pièces **RALLONGE CORPS 6IN AV7** *Parts*	Spécifications **DS 097 ind. F** *Specification*

Parties examinées **100% Of welds**
Portions examined

Nature de l'épreuve → Epreuve d'étanchéité
Test nature *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression *Pressure holding time* →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →

Eau *Water* ☒ Huile *Oil* ☐

Air *Air* ☐ Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 bars
Hauteur pétrole *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle *Examin.date* 10/10/24

Accepté *Accepted* OUI *Yes* ☒ NON *No* ☐

Fiche d'anomalie N° *Non conformity report*

Voir croquis annexe *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	10/10/24		Resp. Qualité *Quality*	C. VAUTRIN LABADIE	10/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	10/10/24					

SRCI - P2MI Service Qualité

SRCI P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE

LEAKAGE TEST

N ° 24121-26

N/Réf. 24121

Client **PCM** *Customer*	Plan **W-004942-B** *Drawing*
N° Commande Client **PO070-24-07599** *Order n°*	Repère 212 *Marking*
N° Poste **3** *Item*	Matière **Superduplex** *Material*
Pièces **RALLONGE CORPS 6IN AV7** *Parts*	Spécifications **DS 097 ind. F** *Specification*

Parties examinées **100% Of welds**
Portions examined

Nature de l'épreuve → Epreuve d'étanchéité
Test nature *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression *Pressure holding time* →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →

Eau *Water* ☒ Huile *Oil* ☐

Air *Air* ☐ Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min
Hauteur pétrole *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle *Examin.date* 10/10/24	Accepté *Accepted* OUI ☒ *Yes* NON ☐ *No*	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe ☐ *See attached sketch*

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	10/10/24		Resp. Qualité *Quality*	C. Veysse Labrude	10/10/2024	
Resp. Interpret. *Interpreter*	BONICEL	10/10/24					

SRCI - P2MI - Service Qualité

SRCI P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE

LEAKAGE TEST

N ° 24121-28

N/Réf. 24121

Client **PCM** *Customer*	Plan **W-008199-A** *Drawing*
N° Commande Client **PO070-24-07599** *Order n°*	Repère 112 *Marking*
N° Poste **4** *Item*	Matière **Superduplex** *Material*
Pièces **EMBOUT STATOR 25AV24** *Parts*	Spécifications **DS 097 ind. F** *Specification*

Parties examinées **100% Of welds**
Portions examined

Nature de l'épreuve → Epreuve d'étanchéité
Test nature *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression ***Pressure holding time*** →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →

Eau *Water* ☒ Huile *Oil* ☐

Air *Air* ☐ Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min
Hauteur pétrole *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle *Examin.date* 14/10/24

Accepté *Accepted* OUI *Yes* ☒ NON *No* ☐

Fiche d'anomalie N° *Non conformity report*

Voir croquis annexe *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	14/10/24		Resp. Qualité *Quality*	E. Vayssé Labrude	14/10/2024	SRCI - P2MI Service Qualité
Resp. Interpret. *Interpreter*	BONICEL	14/10/24					

SRCI & P2MI

Z.A. Harfleur - 71200 LE CREUSOT
RAISON SOCIALE DU CONSTRUCTEUR
MANUFACTURER'S CORPORATE NAME

EPREUVE D'ETANCHEITE
LEAKAGE TEST

N ° 24121-27

N/Réf. 24121

Client *Customer* **PCM**	Plan *Drawing* **W-008199-A**
N° Commande Client *Order n°* **PO070-24-07599**	Repère *Marking* 212
N° Poste *Item* **4**	Matière *Material* **Superduplex**
Pièces *Parts* **EMBOUT STATOR 25AV24**	Spécifications *Specification* **DS 097 ind. F**

Parties examinées *Portions examined* **100% Of welds**

Nature de l'épreuve *Test nature* → Epreuve d'étanchéité *Leakage test*

Conditions requises - *Required conditions*

Pression d'épreuve *Test pressure* →	**30 bars**
Vitesse de montée en pression *Pressure rising speed* →	/
Durée du maintien en pression *Pressure holding time* →	**30 min**
Hauteur pétrole *Heigh of lamp oil* →	**NA**

Conditions de l'épreuve - Test conditions

Fluide utilisé *Fluid used* →
- Eau *Water* ☒
- Huile *Oil* ☐
- Air *Air* ☐
- Pétrole *Lamp-oil* ☐

Température du fluide *Fluid temperature* →	ambiant 19 °C
Pression *Pressure* →	30 bars
Vitesse de montée en pression *Pressure rising speed* →	3 min
Durée du maintien en pression *Pressure holding time* →	30 min
Hauteur pétrole *Heigh of lamp oil* →	/

Résultats de l'épreuve - *Test results*

No leaks / Pas de fuite

Date Contrôle *Examin.date* 14/10/24	Accepté *Accepted* OUI ☒ *Yes* NON ☐ *No*	Fiche d'anomalie N° *Non conformity report*	Voir croquis annexe *See attached sketch* ☐

	Nom *Name*	Date *Date*	Signature *Visa*		Nom *Name*	Date *Date*	Signature *Visa*
Opérateur *Operator*	CAPRIOLI	14/10/24		Resp. Qualité *Quality*	E. Vayssade Labrude	14/10/2024	SRCI - P2MI Service Qualité
Resp. Interpret. *Interpreter*	BONICEL	14/10/24					

8, avenue du Gué Langlois
77600 Bussy Saint Martin

Tél. : 01 60 37 45 00
www.citec.fr
e-mail: com@citec.fr

CERTIFICATE OF CALIBRATION AND VERIFICATION REPORT

N° 1 38451

Référence prestation :449006AF

Version : du 22/09/21

No. Cust. Eq. : SANS | Type : MANO INOX, A BAIN | Customer : DEXIS BFC CRISSEY

Réf Citec : 000461160 | Designation : 2101-D-63-RV-1/4-P.0+60 | No. Customer order : CAR0624-015557

No. Serial 609160529 | Measuring range : 0+60B | No. Delivery note : P0261619

Measurement conditions : 19 °C | Resolution : 1

Environment of the measure : Local | Unit : bar

Procedure used : FI0035

Class /MPE	Maximum value concerned (eq. Unit)	Unit
1,6	60,0	%

Number of standards used : 1

No. Standard	Designation	Last calibration date	No. Certificate	N°
MAT043	LEX 1 0+200BAR	16/05/2024	MAT043 2024-05-16	1

Examen visuel : RAS

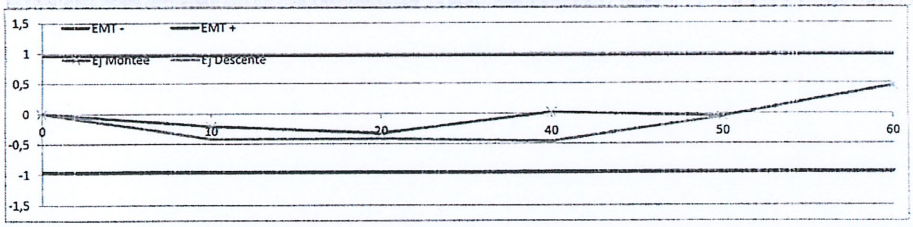
No. of measurements desired : 6

Consideration of Uncertainties | No correction of the errors of accuracy of the standards

Eq. Value	Standard Value	Bias	MPE (±)	Uncertainty (±) (k=2)	Result	Comment	No. Standard used
0	0	0,000	0,960	0,577	Compliant	Check drift between 2 calibrations	1
10	9,79	-0,210	0,960	0,578	Compliant	Check drift between 2 calibrations	1
20	19,67	-0,330	0,960	0,578	Compliant	Check drift between 2 calibrations	1
40	40,02	0,020	0,960	0,578	Compliant	Check drift between 2 calibrations	1
50	49,95	-0,050	0,960	0,578	Compliant	Check drift between 2 calibrations	1
60	60,45	0,450	0,960	0,578	Compliant	Check drift between 2 calibrations	1
50	49,94	-0,060	0,960	0,578	Compliant	Check drift between 2 calibrations	1
40	39,54	-0,460	0,960	0,578	Compliant	Check drift between 2 calibrations	1
20	19,59	-0,410	0,960	0,578	Compliant	Check drift between 2 calibrations	1
10	9,58	-0,420	0,960	0,578	Compliant	Check drift between 2 calibrations	1
0	0	0,000	0,960	0,577	Compliant	Check drift between 2 calibrations	1

Setpoint value :	60,00
No. Repet	Value
1	60,45
2	60,45
3	60,45
4	60,45
5	60,45
Standard deviation	0,0000

Graphical representation :



Commentaries:

Judgment Conforms Without adjustmei | Edited by : Séverine MOREIRA MACHADO | Date : 19/09/2024

Next calibration date : 19/09/2025

Reviewed obo Crossland 08/10/2024

A : Bussy St Martin

Visa for laboratory manager

The reproduction of this report is authorized only in the form of a complete photographic facsimile.
This document is realized according to the recommendations of the fascicules of documentation FX 07-011 and FD 07-012.
The traceability of the measurement chain is explained in the CITEC document ref. 449055.
The issuance of a calibration certificate does not necessarily mean that the deviations measured are within the accuracy class indicated on the device.
The accuracy of the standard is at least 4 times better than that of the tested device (EN 837-1,2,3).

For equipment already in use, this certificate is not an evaluation of its state of wear and tear and does not constitute a new warranty contract.
This certificate is only valid on the original and on the condition that the material is numbered.

CITEC's quality system is certified ISO 9001:2015 by INTERTEK.

ASSURANCE QUALITE

Reviewed obo Rosetti Marino 08, 10, 2024

2.3.4 MOTOR TEST REPORT

Type Test Report

Date of test: 5.10.2024
Date of Issue: 11.10.2024
Serial No.: 3G1F2433998068

Customer: PCM MANUFACTURING FRANCE

Order No.: 2498482-1
Type: M3BP 132SMF 4 IMV1/IM3011
Product Code: 3GBP132260-BDK

Ship-to party PO number: PO070-24-07792
Sold-to party PO number: W14021068

Rating:

	V		Hz	kW	r/min	A	cos φ	Duty
3~Motor	690	Y	50	5.5	1463	6.9	0.74	S1
Ins. Class F	400	D	50	5.5	1463	11.9	0.74	S1
IP 56	660	Y	50	5.5	1461	6.8	0.79	S1
81 kg	380	D	50	5.5	1461	11.7	0.79	S1
	415	D	50	5.5	1465	12	0.71	S1
	460	D	60	5.5	1767	10.4	0.73	S1

IE3-50HZ-89.6%(100%)-89.6%(75%)-88.1%(50%) / IE3-60HZ-91.7%(100%)

Winding resistance*	Measured at 20 °C	Calculated at 20 °C
U_1 - V_1	1.2091 Ω	1.2091 Ω
U_1 - W_1	1.2080 Ω	1.2080 Ω
V_1 - W_1	1.2085 Ω	1.2085 Ω

Insulation resistance after heat run at 59 °C
3000 MΩ , tested at 1000 V

Overload tests
Torque 160 % 15 s

Withstand voltage test for winding 2915 V 1 s

Performance tests*	Torque [Nm]	Line U[V]		f[Hz]	Input I[A]	P1 [kW]	Output P2 [kW]	n[r/min]	cos φ	η [%]	s [%]
No-load test		399.5	D	50	6.26	0.21			0.05		
Short circuit test		93.9	D	50	11.9	0.70			0.36		
Temp. rise test S1	35.8	400.1	D	50	11.6	6.10	5.48	1464	0.76	89.9	2.40
Partial load points:											
~75% load	26.7	400.1	D	50	9.62	4.56	4.13	1474	0.68	90.6	1.73
~50% load	17.8	400.0	D	50	7.95	3.08	2.77	1483	0.56	90.0	1.13
~25% load	8.8	400.0	D	50	6.76	1.62	1.38	1492	0.35	85.3	0.56

Temperature rise at performance tests*	[°C]	[K]	Method
Stator winding :		59	1
Frame :		23	2
Bearing D-end :		25	2
Ambient Temperature :	20		2

Measurement method
1 Resistance
2 Thermocouples
3 Thermometer

Vibration [mm/s]:		↓	→
	D-end	0.4	0.7
	N-end	0.4	0.9
	Axial	1.0	

Starting current (I_S / I_N) : 7.29
Locked rotor torque (T_L / T_N) : 2.49

Visual inspection, terminal markings and direction of rotation: OK
Surge comparison test (performed at assembly line routine test): OK

Current unbalance at full load: 0.19 %

On behalf of manufacturer
Tested by ABB Oy, IEC LV Motors, Strömbergin puistotie 5, 65320 Vaasa, Finland
The results stated in this report relate only to the item tested.

FINAS Finnish Accreditation Service T345 (EN ISO/IEC 17025)

Tommi Pantti
Test Floor Manager

Manufactured and tested acc. to IEC/EN 60034-1:2017 and IEC/EN 60034-2-1:2014 Method 2-1-1B.
Test laboratory is accredited acc. to SFS-EN ISO/IEC 17025:2017 by FINAS. Ref. T345.
*) Accredited test method

ABB Oy, IEC LV Motors
www.abb.com/motors&generators
Telephone +358 10 2211
Telefax +358 10 22 47372

ReportId: 3G1F2433998068_9A93F92E91CD4A4C94BC264330F246F5

Routine Test Report

Date of test: 01.10.2024
Date of Issue: 01.10.2024
Serial No.: 3G1F2433998068

Customer: PCM MANUFACTURING FRANCE

Order No.: 2498482-1
Type: M3BP 132SMF 4 IMV1/IM3011
Product Code: 3GBP132260-BDK

Ship-to party PO number: PO070-24-07792
Sold-to party PO number: W14021068

Rating:

	V		Hz	kW	r/min	A	cos φ	Duty
3~Motor	690	Y	50	5.5	1463	6.9	0.74	S1
Ins. Class F	400	D	50	5.5	1463	11.9	0.74	S1
IP 56	660	Y	50	5.5	1461	6.8	0.79	S1
81 kg	380	D	50	5.5	1461	11.7	0.79	S1
	415	D	50	5.5	1465	12	0.71	S1
	460	D	60	5.5	1767	10.4	0.73	S1

IE3-50HZ-89.6%(100%)-89.6%(75%)-88.1%(50%) / IE3-60HZ-91.7%(100%)

Winding resistance — Measured at 22 °C

U_1 - V_1	1.2247 Ω
U_1 - W_1	1.2262 Ω
V_1 - W_1	1.2249 Ω

Insulation resistance at 22 °C
3000 MΩ , tested at 1000 V

Withstand voltage test for winding 2915 V 1 s

Performance tests		Line U[V]		f[Hz]	Input I[A]	P1 [kW]
No-load test		398.9	D	50	6.31	0.35
Short circuit test		71.7	D	50	8.76	0.34

Vibration [mm/s]: 0.9

Visual inspection, terminal markings and direction of rotation: OK
Surge comparison test: OK

On behalf of manufacturer
Tested by ABB Oy, IEC LV Motors, Strömbergin puistotie 5, 65320 Vaasa, Finland
The results stated in this report relate only to the item tested.

Manufactured and tested acc. to IEC/EN 60034-1:2017

Tommi Pantti
Test Floor Manager

Routine Test Report

Date of test: 01.10.2024
Date of Issue: 01.10.2024
Serial No.: 3G1F2434998069

Customer: PCM MANUFACTURING FRANCE

Order No.: 2498482-2
Type: M3BP 132SMF 4 IMV1/IM3011
Product Code: 3GBP132260-BDK

Ship-to party PO number: PO070-24-07792
Sold-to party PO number: W14021068

Rating:

	V		Hz	kW	r/min	A	cos φ	Duty
3~Motor	690	Y	50	5.5	1463	6.9	0.74	S1
Ins. Class F	400	D	50	5.5	1463	11.9	0.74	S1
IP 56	660	Y	50	5.5	1461	6.8	0.79	S1
81 kg	380	D	50	5.5	1461	11.7	0.79	S1
	415	D	50	5.5	1465	12	0.71	S1
	460	D	60	5.5	1767	10.4	0.73	S1

IE3-50HZ-89.6%(100%)-89.6%(75%)-88.1%(50%) / IE3-60HZ-91.7%(100%)

Winding resistance Measured at 22 °C

U_1 - V_1	1.2231 Ω
U_1 - W_1	1.2247 Ω
V_1 - W_1	1.2234 Ω

Insulation resistance at 22 °C
3000 MΩ , tested at 1000 V

Withstand voltage test for winding 2909 V 1 s

Performance tests		Line U[V]		f[Hz]	Input I[A]	P1 [kW]
No-load test		399.5	D	50	6.29	0.36
Short circuit test		71.5	D	50	8.77	0.36

Vibration [mm/s]: 0.5

Visual inspection, terminal markings and direction of rotation: OK
Surge comparison test: OK

On behalf of manufacturer
Tested by ABB Oy, IEC LV Motors, Strömbergin puistotie 5, 65320 Vaasa, Finland
The results stated in this report relate only to the item tested.

Manufactured and tested acc. to IEC/EN 60034-1:2017

Tommi Pantti
Test Floor Manager

2.3.5 PSV TEST REPORT

TAI MILANO S.P.A.
Via Petrella, 21 - 20124 MILANO (ITALY)
Tel.: +39 02 29525941 - Fax: +39 02 29404417 - email: tai@taimilano.it
VAT Registration N. IT00753440155 - Share Capital € 516.000
Chamber of Commerce Registration N. 533341

CERTIFICATE OF IDENTITY, TEST AND CONFORMITY TO DIRECTIVE 2014/68/EU ANNEX IV SERIES 3000W SPRING LOADED SAFETY VALVE

Job	Customer	Order
24/2428	**ENOLIA**	**CF2406-4511**

YEAR:	2024	SERIAL No:	200145
SERIES:	3000W	ORIFICE AREA: mm²	78.5
INLET:	1" ASME 150 RF 125 AARH		
OUTLET:	2" ASME 150 RF 125 AARH		
COLD DIFFERENTIAL TEST PRESSURE:	bar 7.6		
SET PRESSURE:	bar 7.6		
OVERPRESSURE:	% 10	K_{dr}(*):	0.783-L
LIFT:	mm 2	T: °C	-29 ÷ 100
TAG:	---		

(*): At atmospheric backpressure

MODEL: 3111W-1D2-S

ACCESSORIES

ORIFICE DIAMETER:	10 mm
SUPERIMPOSED BACKPRESSURE:	bar
BLOWDOWN:	7 %
SUITABLE FOR:	L
SPRING COLD DIFFERENTIAL TEST PRESSURE ADJUSTMENT RANGE:	7.09 ÷ 7.68 bar

MANUFACTURED IN ACCORDANCE WITH THESE DATA:

24/2428-001A-DSE R00	320110.00000	---
MATERIALS CLASS:	S1 /11 /30 /X3 /X7 /X9 /X13	
BODY MATERIAL:	A216-WCB	

SPARE PART CODE

GASKETS:	340120.23120.PAZZ
BELLOWS:	---
SPRING:	000003.25160.XJZM
DISC:	426382.10120.MKDZ
NOZZLE:	W21140.08130.XWZZ

SATISFACTORY TEST AT TEST BENCH:

VISUAL EXAMINATION AND DIMENSIONAL CHECK

HYDROSTATIC TEST	BODY:	30 bar
	NOZZLE:	30 bar
COLD DIFFERENTIAL TEST PRESSURE (*):		7.37 bar
TIGHTNESS TEST PRESSURE	VALVE SEAT (**):	6.64 bar
	BACKPRESSURE (***):	6 bar

(*) Test medium: air; the cold differential test pressure is reduced by ~3% in order to insure the required set pressure for liquid service.
(**) Test medium: air
(***) Test medium: air

NOTES:

Cold differential test pressure is the inlet gauge pressure at which a safety valve is set to begin to open on the test bench.
This test pressure includes corrections for service condictions.
TAI Milano S.p.A. uses pressure gauges with scale in bar.
Values shown in different units have been obtained by conversion.

	TAI MILANO S.p.A. Ivan Brandinali	01 OCTOBER 2024	TAI MILANO S.p.A. Lo Presti Alessandro
INSPECTOR'S SIGNATURE	PREPARED BY	FINAL TESTS DATE	PERFORMED BY

We hereby declare that the design, manufactoring and inspection of this safety valve meet the requirement of the pressure equipement directive 2014/68/UE, Category IV. Conformity Assessment Procedures: EU type examination; Production Quality Assurance: (Modules B + D)

MODULE	CERTIFICATE No	NOTIFIED BODY Name and address	No
B	PED 008 AT 330 REV.5	ITALCERT V.le Sarca 336 - 20126 Milano - ITALY	0426
D	PED 008 AD 002 REV.42	ITALCERT V.le Sarca 336 - 20126 Milano - ITALY	0426

Tecnical Standard Used: EN/ISO 4126-1; EN 12516 part 2
ASME/ANSI B16.34

01 OCTOBER 2024	TAI MILANO S.p.A.	Fabio Corradi	TAI MILANO S.p.A. Quality Assurance Manager
DATE	STAMP	SIGNATURE	POSITION TITLE

TAI MILANO S.P.A.
Via Petrella, 21 - 20124 MILANO (ITALY)
Tel.: +39 02 29525941 - Fax: +39 02 29404417 - email: tai@taimilano.it
VAT Registration N. IT00753440155 - Share Capital € 516.000
Chamber of Commerce Registration N. 533341

CERTIFICATE OF IDENTITY, TEST AND CONFORMITY TO DIRECTIVE 2014/68/EU ANNEX IV SERIES 3000W SPRING LOADED SAFETY VALVE

Job	Customer	Order
24/2428	**ENOLIA**	**CF2406-4511**

YEAR:	2024	SERIAL No:	200146
SERIES:	3000W	ORIFICE AREA: mm²	78.5
INLET:	1" ASME 150 RF 125 AARH		
OUTLET:	2" ASME 150 RF 125 AARH		
COLD DIFFERENTIAL TEST PRESSURE:	bar 7.6		
SET PRESSURE:	bar 7.6		
OVERPRESSURE:	% 10	K_{dr}(*):	0.783-L
LIFT:	mm 2	T: °C	-29 ÷ 100
TAG:	---		

(*): At atmospheric backpressure

MODEL: 3111W-1D2-S

ACCESSORIES

ORIFICE DIAMETER:	10 mm
SUPERIMPOSED BACKPRESSURE:	bar
BLOWDOWN:	7 %
SUITABLE FOR:	L
SPRING COLD DIFFERENTIAL TEST PRESSURE ADJUSTMENT RANGE:	7.09 ÷ 7.68 bar

MANUFACTURED IN ACCORDANCE WITH THESE DATA:

24/2428-001A-DSE R00	320110.00000	---
MATERIALS CLASS:	S1 /11 /30 /X3 /X7 /X9 /X13	
BODY MATERIAL:	A216-WCB	

SPARE PART CODE

GASKETS:	340120.23120.PAZZ
BELLOWS:	---
SPRING:	000003.25160.XJZM
DISC:	426382.10120.MKDZ
NOZZLE:	W21140.08130.XWZZ

SATISFACTORY TEST AT TEST BENCH:

VISUAL EXAMINATION AND DIMENSIONAL CHECK

HYDROSTATIC TEST	BODY:	30 bar
	NOZZLE:	30 bar
COLD DIFFERENTIAL TEST PRESSURE (*):		7.37 bar
TIGHTNESS TEST PRESSURE	VALVE SEAT (**):	6.64 bar
	BACKPRESSURE (***):	6 bar

(*) Test medium: air; the cold differential test pressure is reduced by ~3% in order to insure the required set pressure for liquid service.
(**) Test medium: air
(***) Test medium: air

NOTES:

Cold differential test pressure is the inlet gauge pressure at which a safety valve is set to begin to open on the test bench.
This test pressure includes corrections for service condictions.
TAI Milano S.p.A. uses pressure gauges with scale in bar.
Values shown in different units have been obtained by conversion.

	TAI MILANO S.p.A. Ivan Brandinali	01 OCTOBER 2024	TAI MILANO S.p.A. Lo Presti Alessandro
INSPECTOR'S SIGNATURE	PREPARED BY	FINAL TESTS DATE	PERFORMED BY

We hereby declare that the design, manufactoring and inspection of this safety valve meet the requirement of the pressure equipement directive 2014/68/UE, Category IV. Conformity Assessment Procedures: EU type examination; Production Quality Assurance: (Modules B + D)

MODULE	CERTIFICATE No	NOTIFIED BODY Name and address	No
B	PED 008 AT 330 REV.5	ITALCERT V.le Sarca 336 - 20126 Milano - ITALY	0426
D	PED 008 AD 002 REV.42	ITALCERT V.le Sarca 336 - 20126 Milano - ITALY	0426

Tecnical Standard Used: EN/ISO 4126-1; EN 12516 part 2
ASME/ANSI B16.34

01 OCTOBER 2024	TAI MILANO S.p.A.	Fabio Corradi	TAI MILANO S.p.A. Quality Assurance Manager
DATE	STAMP	SIGNATURE	POSITION TITLE

2.3.6 PAINTING REPORT

N° de série ou commande
Serial number or order 317873

N° d'ordre de fabrication
Work order

PIECES EN ACIER

Pour procédé 5

Mahr
MarSurf M 300 C
Mahr GmbH
Carl-Mahr-Str. 1
D 37073 Göttingen
Tel. +49 551 7073-0

T0 Pxx-350 3504 0
Lt 5.600 mm
Ls GS 2.5 µm
Lc GS 0.800 mm
Ra 0.378 µm
Rz 46.10 µm

keep it moving

ERWA0042 FICHE DE SUIVI D'EXECUTION PEINTURE – procédé 5 PAINTING FOLLOW-UP WORKSHEET – process 5

SURFACES ACIER ET FONTES / STEEL AND CAST IRON SURFACES — PROCEDE STANDARD PCM N°5 / STANDARD PCM PROCESS N°5

N° de série ou commande *Serial number or order*: 317873

N° d'ordre de fabrication *Work order*:

Pièces *Parts*:

PREPARATION DE SURFACE / *SURFACE PREPARATION*

DECAPAGE / *BLASTING*

ABRASIF *ABRASIVE*: **Acier** *Steel*

Type *Type*: **Angulaire** *Grit*

Date	Heure *Time*	Humidité relative (%HR) *Relative Humidity*	Températures (°C)			Degré de soin *Cleanliness*		Rugosité *Roughness*		NOM OPERATEUR *OPERATOR NAME*
			Support (Ts)	Point de rosée (Td) *Dew point*	ΔT (Ts-Td)	Cible *Target*	Mesure Measurement	Cible *Target*	Mesure Measurement	
21/10/2024	10h00	72	20	15	5	Sa 2,5	Sa 2,5	Moyen *Medium*		Lhermite
		Max 85% HR			Mini +3°C	Selon / *According to* ISO 8501-1		Selon / *According to* ISO 8503-2		

MOYENS DE CONTRÔLE / *MEANS OF CONTROL*

Moyen *Mean of control*	Fabricant *Manufacturer*	Modèle *Model*	PCM Quality reference Serial number	A vérifier le *To be checked on*
Thermo-Hygromètre *Dew Point meter*	elcometer	N319TYV13175	CSS	
Comparateur Visio-tactile *Roughness comparator*				

keep it moving

ERWA0042 FICHE DE SUIVI D'EXECUTION PEINTURE – procédé 5 PAINTING FOLLOW-UP WORKSHEET – process 5

PROCESSUS :	WR4	CODE :	ERWA0042	INDICE :	C
EMIS PAR :	Guillaume GODARD	LE :	05/12/2022	PAGE :	Page 3 sur 3

SURFACES ACIER ET FONTES / STEEL AND CAST IRON SURFACES — PROCEDE STANDARD N°5 / STANDARD PROCESS N°5

N° de série ou commande *Serial number or order* : 317873

N° d'ordre de fabrication *Work order* :

Pièces *Parts* :

APPLICATION PEINTURE / ***PAINTING APPLICATION*** - **équipement** / ***equipment :*** Pistolet conventionnel / *Conventional spray gun*

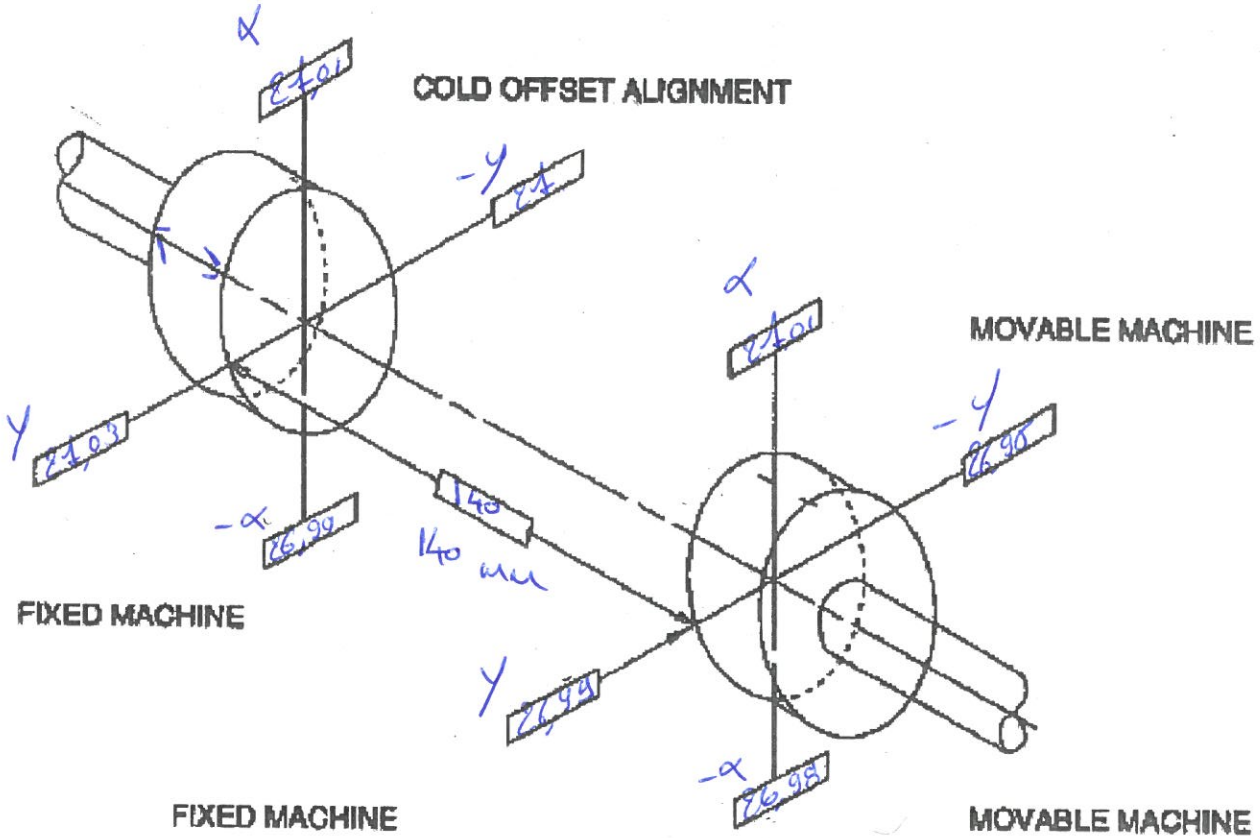
Couche n° *Layer*	Peinture *Paint*	Date	Heure *Time*	N° lot *Batch numbers*		Humidité relative (%HR) *Relative humidity*	Temperatures (°C) Support (Ts) *Substrate*	Point de rosée (Td) *Dew point*	ΔT (Ts-Td)	Mesure de l'épaisseur totale (µm) *Measurement of total Thickness (µm)* Epaisseur cible de la couche *Target thickness of the layer*	Cible (valeurs lues) *Target (read values)*	Mesures *Measurement (20 points mini)*	NOM OPERATEUR *OPERATOR NAME*
1	Interzinc 52	21/10	17h	Base	233408100A	66,1	23,6	16	7,6	60 µm	60 µm	87	BG
				Durcisseur *Curing agent*	2333332023								
2	Intergard 475 HS	22/10	16h	Base	224012008	59,1	21,9	10,6	11,3	200 µm	260 µm	301	BG
				Durcisseur *Curing agent*	233326000								
3	Interthane 990	23/10	15h	Base		60	20,2	9,5	10,7	50 µm	320 µm	392	BG
				Durcisseur *Curing agent*									
						Max 85% HR			Mini 3°C	As a minimum	As a minimum *According to ISO 19840*		

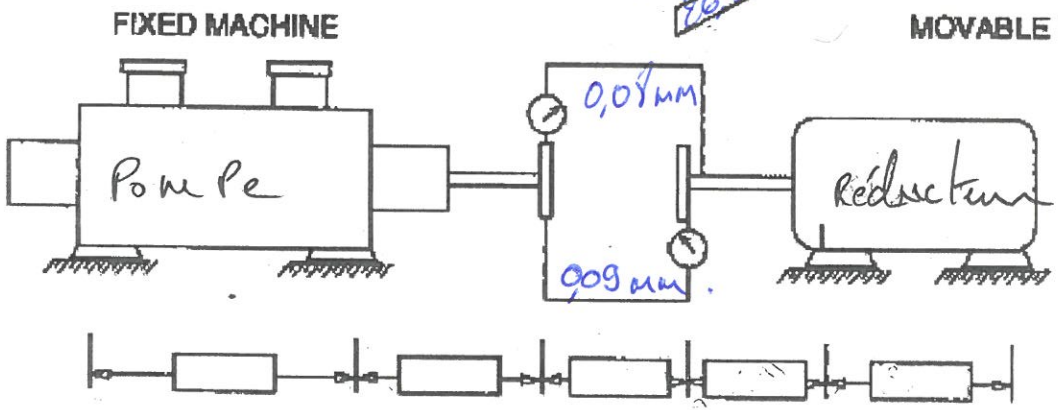
MOYENS DE CONTRÔLE / *MEANS OF CONTROL*

Moyen *Mean of control*	Fournisseur *Supplier*	Modèle *Model*	PCM Quality reference	A vérifier le *To be checked on*
Thermo-Hygromètre *Dew Point meter*	TQC	DewCheck 4	HY1	05/26
Mesureur d'épaisseur *Thickness meter*	Elcometer	☐ Elcometer 456 *Top Dual Fe/NFe*	ME 5	11/24
	Fischer	☐ Dualscope MPOR-FP	ME 4	09/25

2.3.7 FAT REPORT

Rosetti Marino – P_50001_A





keep it moving

REF. CLIENT / CLIENT REF : P-50001A

NUMERO DE SERIE / SERIAL NUMBER : 317873-1

MODELE / MODEL : 25AV24

RAPPORT ESSAI D'ENDURANCE / RUN TEST REPORT

Test Duration / Durée du test	1h

		0h	15min	30min	45min	1h	Instruments TAG	Instruments Validité / Validity
HEURE / HOUR		13h00	13h15	13h30	13h45	14h		
PRESSION DIFFERENTIELLE / DIFFERENTIAL PRESSURE	bar	6,5	6,5	6,5	6,5	6,5	MA0-10-9	01/2025
DEBIT / FLOW-RATE	m3/h	3,08	3,1	3,1	3,1	3,09	DEDN80-60-2	08/2026
VITESSE DE ROTATION / OUTPUT SPEED	rpm	118,7	118,8	118,9	118,7	118,9	TKE21	08/2025
TENSION / VOLTAGE	V	400	400	400	400	400	BANC STP	07/2026
INTENSITE / INTENSITY	A	6,72	6,72	6,72	6,68	6,68	BANC STP	07/2026
PUISSANCE ABSORBEE / NOMINAL POWER	kW	1,46	1,45	1,44	1,42	1,42	BANC STP	07/2026
VARIATION DE FREQUENCE / FREQUENCY VARIATION	Hz	50	50	50	50	50	BANC STP	07/2026
TEMPERATURE DU FLUIDE / FLUID TEMPERATURE	°C	17,2	17,2	17	16,9	16,8	AE12	03/2026
TEMPERATURE DU PALIER / BEARING TEMPERATURE	°C	20	20,2	22,7	24,4	24,8	AE12	03/2026
TEMPERATURE REDUCTEUR / GEARBOX TEMPERATURE	°C	23,6	25,1	29,1	30,6	31,8	AE12	03/2026

L'essai d'endurance est conforme en cas d'absence de fuite, de bruit anormal, d'augmentation des vibrations et d'augmentation de la temperature.
Mechanical Run test is stated as conform, in absence of leaks, abnormal noise, increased vibrations and increased temperature.

COMMENTAIRES:
COMMENTS

Résultat / *Result :*

X Accepté / *Accepted*

☐ Non accepté / *Not accepted*

PCM
Name / Sign:
Guillaume Le Mével
Date : 16 / 12 / 24
☐ R – W ☒

Date de l'essai / Test date
16/12/2024

Test effectué par / Test carried out by
Christophe Porteau

PCM EUROPE S.A.S – 6 Boulevard Bineau – 92300 Levallois-Perret
Tel. : +33 (0)1 77 68 31 00
www.pcm.eu – contact@pcm.eu

keep it moving

REF. CLIENT / CLIENT REF : P-50001A
NUMERO DE SERIE / SERIAL NUMBER : 317873-1
MODELE / MODEL : 25AV24

RAPPORT ESSAI DE PERFORMANCE / PERFORMANCE TEST REPORT

					instrument	
					TAG	Validity
PRESSION DIFFERENTIELLE DIFFERENTIAL PRESSURE	bar	0	6,5	8,8	MA0-10-9	01/2025
DEBIT FLOW-RATE	m3/h	3,35	3,09	2,95	DEDN80-60-2	08/2026
VITESSE DE ROTATION OUTPUT SPEED	rpm	119,1	118,9	118,7	TKE21	08/2025
TENSION VOLTAGE	V	400	400	400	BANC STP	07/2026
INTENSITE INTENSITY	A	6,45	6,68	6,82	BANC STP	07/2026
PUISSANCE ABSORBEE NOMINAL POWER	kW	0,92	1,42	1,63	BANC STP	07/2026
VARIATION DE FREQUENCE FREQUENCY VARIATION	Hz	50	50	50	BANC STP	07/2026
TEMPERATURE DU FLUIDE FLUID TEMPERATURE	°C	16,8	16,8	16,8	AE12	03/2026
TEMPERATURE DU PALIER BEARING TEMPERATURE	°C	24,8	24,8	24,8	AE12	03/2026
TEMPERATURE DU REDUCTEUR GEARBOX TEMPERATURE	°C	31,8	31,8	31,8	AE12	03/2026
COMMENTAIRES: COMMENTS						

Résultat / *Result :*

X Accepté / *Accepted*

☐ Non accepté / *Not accepted*

PCM
Name / Sign:
Guillaume Le Mével
Date :
16 / 12 / 24
☐ R – W ☒

Date de l'essai / Test date
16/12/2024

Test effectué par / Test carried out by
Christophe Porteau

keep it moving

Rapport d'essai vibration et bruit / Vibration and noise test report

DONNEES POMPE ET ESSAI / *PUMP & TEST DATA*

N° SERIE / *SERIAL N° / TAG N°:*	317873-1 / P-50001A
MODELE / *MODEL:*	25AV24
OPERATEUR / *OPERATOR:*	Christophe Porteau
DATE DE TEST / *TEST DATE*:	16/12/2024
VITESSE POMPE / *PUMP SPEED:*	118 rpm
PRESSION DIFFERENCIELLE / DIFFERENTIAL PRESSURE:	6.5 barg
DEBIT / FLOWRATE	3.09 m3/h
ESSAI REALISE / *TEST REALIZED :*	☒ Essai de vibration / Vibration test **Appareil d'essai / Test device** -Numéro de série / Serial number : MV4 -Certificat de calibration valide jusqu'à / Certificate of conformity valid until : 02/2025 ☒ Essai de bruit / Noise test **Appareil d'essai / Test device** -Numéro de série / Serial number : SN4 -Certificat de calibration valide jusqu'à / Certificate of conformity valid until : 11/2025

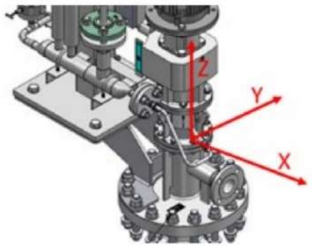
RAPPORT D'ESSAI DE VIBRATION / *VIBRATION TEST REPORT*

Critère d'acceptation / *Acceptance criteria :* ☒ Vibration ≤ 3.8mm/s RMS
☐ Vibration ≤ 7.1mm/s RMS
☐ Other : vibration ≤ …. mm/s RMS

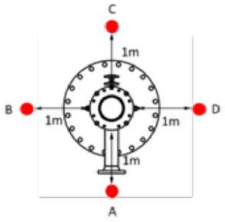
Direction / Direction	X (radial)	Y (axial)	Z (vertical)
Niveau de vibration au palier / *Vibration level on bearing* [mm/s RMS]	0.1 mm/s	0.1 mm/s	< 0.1 mm/s

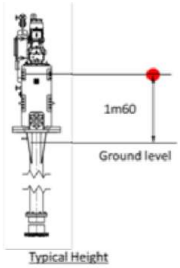
Résultat / *Result :* ☒ Accepté / *Accepted*
☐ Non accepté / *Not accepted* *

'* : see



RAPPORT D'ESSAI DE BRUIT / NOISE TEST REPORT



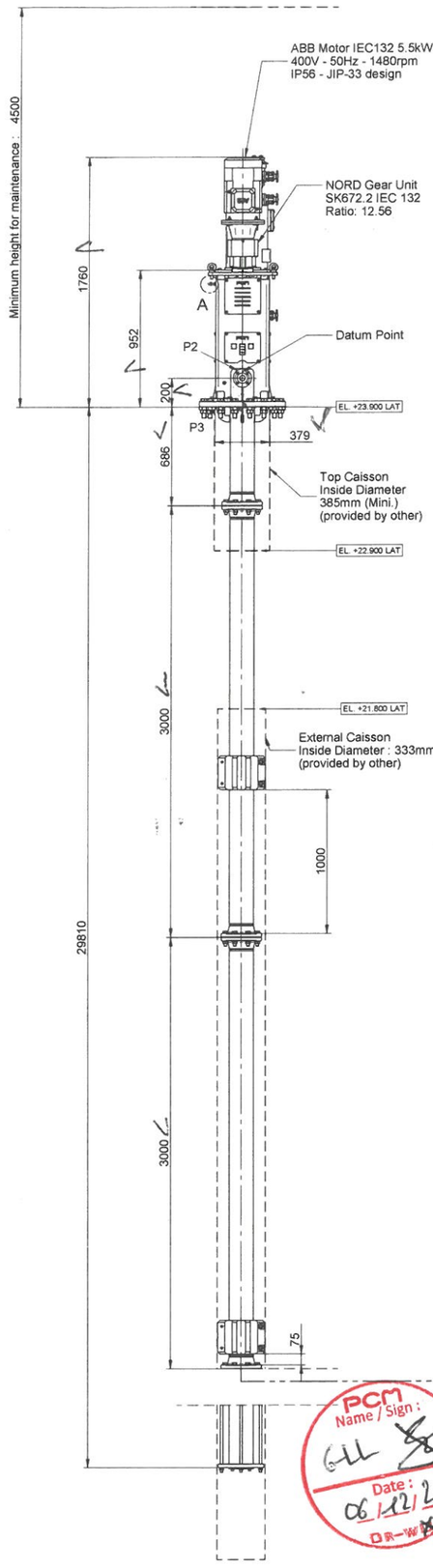


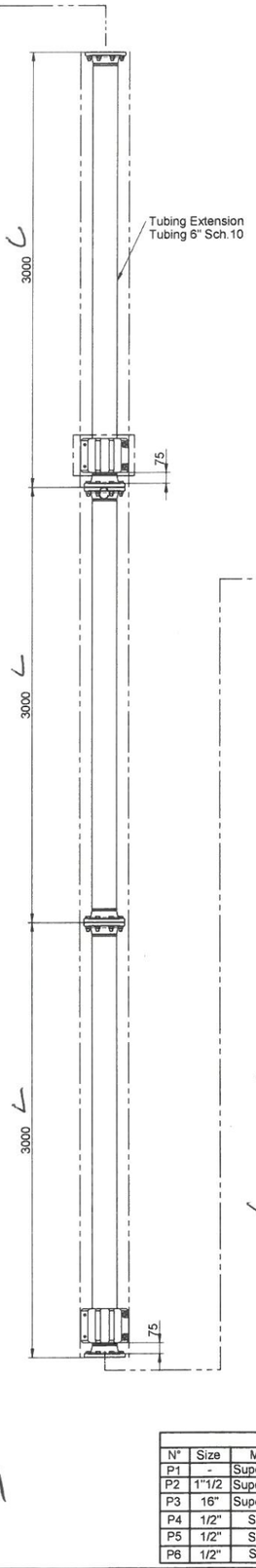
Critère d'acceptation / *Acceptance criteria :* Niveau de pression acoustique / *Sound pressure level* ≤ 85 dB(A)

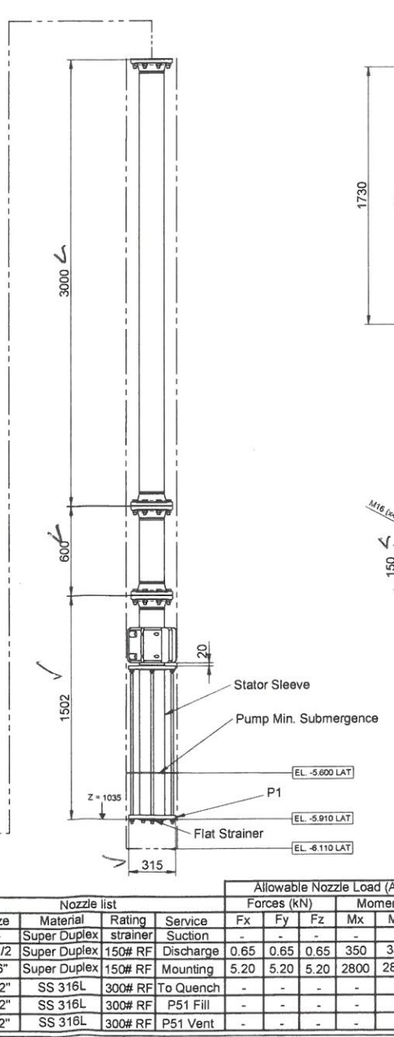
Application point	A	B	C	D
Niveau de bruit / *Noise level*	68.1 dB(A)	70.9 dB(A)	67.8 dB(A)	70.6 dB(A)

Résultat / *Result :* ☒ Accepté / *Accepted*
☐ Non accepté / *Not accepted*

PCM
Name / Sign:
Guillaume Le Mével
Date :
16 / 12 / 24
☐ R – W ☒



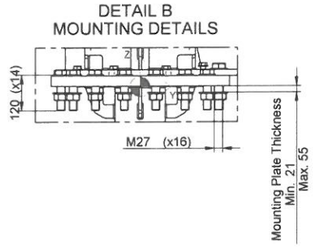


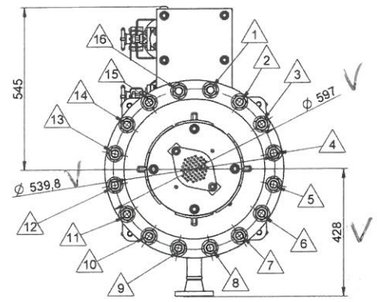




DETAIL A
(x2)
EARTHING DETAILS

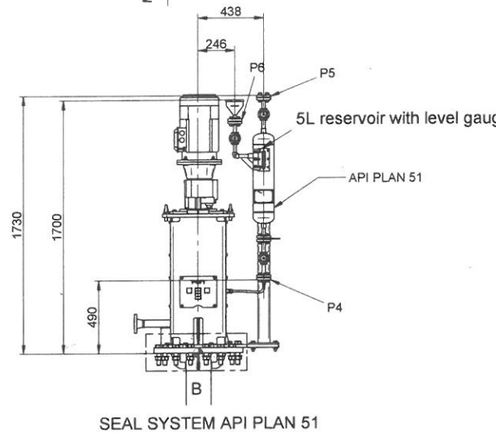




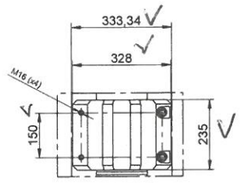


BOTTOM VIEW

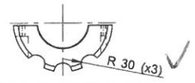
	Foundation Loads (N)
1	2510 (Compression)
2	2510 (Compression)
3	2510 (Compression)
4	2510 (Compression)
5	2510 (Compression)
6	2510 (Compression)
7	2510 (Compression)
8	2510 (Compression)
9	2510 (Compression)
10	2510 (Compression)
11	2510 (Compression)
12	2510 (Compression)
13	2510 (Compression)
14	2510 (Compression)
15	2510 (Compression)
16	2510 (Compression)



SEAL SYSTEM API PLAN 51



DETAIL C
CENTRALIZERS (x6)



Note :
Grooves to allow
byocide entry.

	C.O.G
X	7
Y	-1
Z	-12396

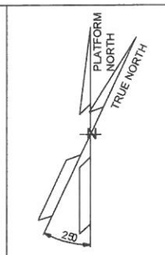
WEIGHT	
Total dry	1967 kg
Operating	4072 kg
Details for maintenance	
Pump Casing	230 kg
Pump Trunk	242 kg
Pump Extensions (x9)	130 kg
Pump Shaft Line	30 kg
Motor	81 kg
Gearbox	26 kg
Stator	33 kg
Rotor	16 kg
Coupling	25 kg
Seal System + Stand	54 kg
Centralizers (x6)	10 kg

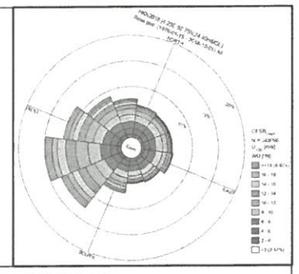
Nozzle list					Allowable Nozzle Load (API 676)					
					Forces (kN)			Moments (N.m)		
N°	Size	Material	Rating	Service	Fx	Fy	Fz	Mx	My	Mz
P1	-	Super Duplex	strainer	Suction	-	-	-	-	-	-
P2	1"1/2	Super Duplex	150# RF	Discharge	0.65	0.65	0.65	350	350	350
P3	16"	Super Duplex	150# RF	Mounting	5.20	5.20	5.20	2800	2800	2800
P4	1/2"	SS 316L	300# RF	To Quench	-	-	-	-	-	-
P5	1/2"	SS 316L	300# RF	P51 Fill	-	-	-	-	-	-
P6	1/2"	SS 316L	300# RF	P51 Vent	-	-	-	-	-	-

PCM Name / Sign : GLL Date : 06/12/24 DR-W

P-5000 1 A

PCM | keep it moving
N° [Manufacturing Unique Serial Number]
CE Made in France
Item 317873
Cyl 462 cm3 Rpm 118 Bar 5.9
Mod 25A24 2024
Ref P-5001A/B
8 boulevard Binasse - 92300 Levallois-Perret - FRANCE www.pcm.eu
Manufacturer: PCM EUROPE SAS





NOTES

Dimensions tolerances as per ISO2768 vK.

API Plan 13 is provided to vent the mechanical seal of vertical pumps. Tubing made in Stainless Steel 316L.

LEGEND

Z = Minimum distance for stator dismantling.

HOLDS

REV.	DATE	DRN	CHD	APPD	DESCRIPTION
03	17/10/24	JPS	G	J-M	ACCEPTED FOR CONSTRUCTION (AFC)
02	30/08/24	JPS	G	J-M	ISSUED FOR CLIENT REVIEW (CR)
01	19/07/24	JPS	G	J-M	ISSUED FOR CLIENT REVIEW (CR)
00	10/07/24	JPS	G	J-M	ISSUED FOR CLIENT REVIEW (CR)

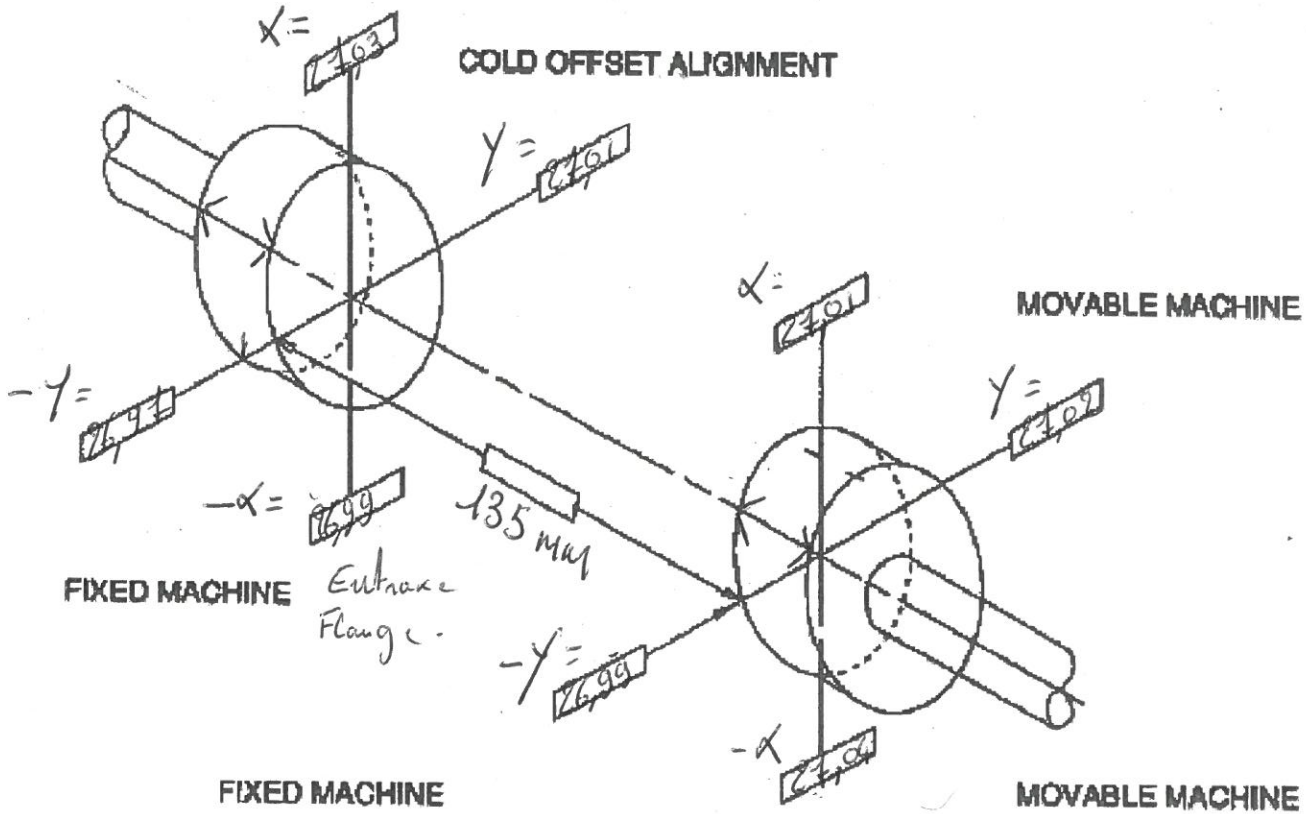
CROSSWIND | ROSETTI MARINO

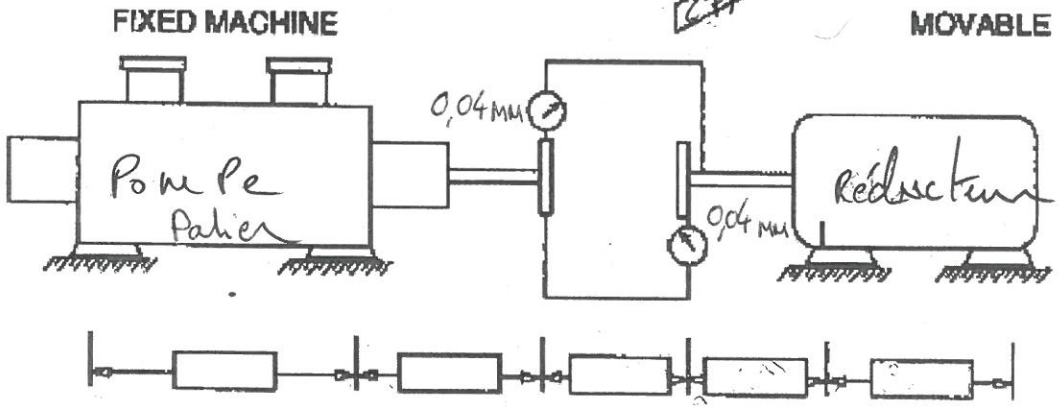
TITLE : BASE LOAD POWER HUB (BLPH)
GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWING

CONTRACT NO./ITEM : DN-PM4-BLPH-00 HOLD BOX NOT CONSIDERED IN DRAW. | SCALE 1:20
DRAWN : JPS | CHECKED : G... | APPROVED : J-M | DATE : 17/10/24
A1 | DRAWING NO. : 1724000936-MAC-DA-00004 | SHEET 03 | REV. 03

724000936-MAC-DA-00004 | 03

Rosetti MARINO - P_50001_B





keep it moving

REF. CLIENT / CLIENT REF : P-50001B

NUMERO DE SERIE / SERIAL NUMBER : 317873-2

MODELE / MODEL : 25AV24

RAPPORT ESSAI D'ENDURANCE / RUN TEST REPORT

Test Duration / Durée du test	1h

		0h	15min	30min	45min	1h	Instruments TAG	Instruments Validité / Validity
HEURE / HOUR		9h15	9h30	9h45	10h	10h15		
PRESSION DIFFERENTIELLE / DIFFERENTIAL PRESSURE	bar	6,5	6,5	6,5	6,5	6,5	MA0-10-9	01/2025
DEBIT / FLOW-RATE	m3/h	2,98	2,98	2,98	2,97	2,98	DEDN80-60-2	08/2026
VITESSE DE ROTATION / OUTPUT SPEED	rpm	119	119	118,9	118,9	118,9	TKE21	08/2025
TENSION / VOLTAGE	V	400	400	400	400	400	BANC STP	07/2026
INTENSITE / INTENSITY	A	6,6	6,6	6,6	6,6	6,6	BANC STP	07/2026
PUISSANCE ABSORBEE / NOMINAL POWER	kW	1,5	1,48	1,47	1,45	1,46	BANC STP	07/2026
VARIATION DE FREQUENCE / FREQUENCY VARIATION	Hz	50	50	50	50	50	BANC STP	07/2026
TEMPERATURE DU FLUIDE / FLUID TEMPERATURE	°C	17,8	17,9	18	18	18	AE12	03/2026
TEMPERATURE DU PALIER / BEARING TEMPERATURE	°C	19,3	21,6	22,9	23,7	23,3	AE12	03/2026
TEMPERATURE REDUCTEUR / GEARBOX TEMPERATURE	°C	29,4	31,3	32,5	34,3	33,6	AE12	03/2026

PCM Name / Sign : GLL

Date : 12/12/24

☐ R-W ☒

L'essai d'endurance est conforme en cas d'absence de fuite, de bruit anormal, d'augmentation des vibrations et d'augmentation de la temperature.
Mechanical Run test is stated as conform, in absence of leaks, abnormal noise, increased vibrations and increased temperature.

COMMENTAIRES:
COMMENTS

Résultat / *Result :*

☒ Accepté / *Accepted*

☐ Non accepté / *Not accepted*

Date de l'essai / Test date
12/12/2024

12/12/24 dso Chesnin

Frédéric CHESNIN R W

On behalf of ROSETTI MARINO

Test effectué par / Test carried out by
Christphe Porteau

PCM EUROPE S.A.S – 6 Boulevard Bineau – 92300 Levallois-Perret
Tel. : +33 (0)1 77 68 31 00
www.pcm.eu – contact@pcm.eu

PCM | keep it moving

REF. CLIENT / CLIENT REF : P-50001B
NUMERO DE SERIE / SERIAL NUMBER : 317873-2
MODELE / MODEL : 25AV24

RAPPORT ESSAI DE PERFORMANCE / PERFORMANCE TEST REPORT

					instrument	
					TAG	Validity
PRESSION DIFFERENTIELLE DIFFERENTIAL PRESSURE	bar	0	6,5	8,8	MA0-10-9	01/2025
DEBIT FLOW-RATE	m3/h	3,34	2,98	2,74	DEDN80-60-2	08/2026
VITESSE DE ROTATION OUTPUT SPEED	rpm	119,4	118,9	118,7	TKE21	08/2025
TENSION VOLTAGE	V	400	400	400	BANC STP	07/2026
INTENSITE INTENSITY	A	6,4	6,6	6,8	BANC STP	07/2026
PUISSANCE ABSORBEE NOMINAL POWER	kW	0,94	1,46	1,74	BANC STP	07/2026
VARIATION DE FREQUENCE FREQUENCY VARIATION	Hz	50	50	50	BANC STP	07/2026
TEMPERATURE DU FLUIDE FLUID TEMPERATURE	°C	18	18	18	AE12	03/2026
TEMPERATURE DU PALIER BEARING TEMPERATURE	°C	23,2	23,3	23,3	AE12	03/2026
TEMPERATURE DU REDUCTEUR GEARBOX TEMPERATURE	°C	33,4	33,6	33,5	AE12	03/2026
COMMENTAIRES: COMMENTS						

Résultat / *Result :*

X Accepté / *Accepted*

☐ Non accepté / *Not accepted*

Date de l'essai / Test date
12/12/2024

PCM Name / Sign : GL Date : 12/12/24

Test effectué par / Test carried out by

Frederic CHESNIN On behalf of ROSETTI MARINO

12/12/24 c/o Cvessin d

PCM | keep it moving

Rapport d'essai vibration et bruit / Vibration and noise test report

DONNEES POMPE ET ESSAI / *PUMP & TEST DATA*

N° SERIE / *SERIAL N° / TAG N°:*	317873-2 / P-50001B
MODELE / *MODEL:*	25AV24
OPERATEUR / *OPERATOR:*	Christophe Porteau
DATE DE TEST / *TEST DATE*:	12/12/2024
VITESSE POMPE / *PUMP SPEED:*	119 rpm
PRESSION DIFFERENCIELLE / DIFFERENTIAL PRESSURE:	6.5 barg
DEBIT / FLOWRATE	2.98 m3/h
ESSAI REALISE / *TEST REALIZED :*	☒ Essai de vibration / Vibration test **Appareil d'essai / Test device** -Numéro de série / Serial number : MV4 -Certificat de calibration valide jusqu'à / Certificate of conformity valid until : 02/2025 ☒ Essai de bruit / Noise test **Appareil d'essai / Test device** -Numéro de série / Serial number : SN4 -Certificat de calibration valide jusqu'à / Certificate of conformity valid until : 11/2025

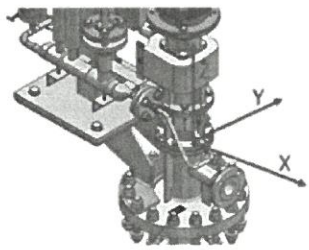
RAPPORT D'ESSAI DE VIBRATION / *VIBRATION TEST REPORT*

Critère d'acceptation / *Acceptance criteria :* ☒ Vibration ≤ 3.8mm/s RMS
☐ Vibration ≤ 7.1mm/s RMS
☐ Other : vibration ≤ …. mm/s RMS

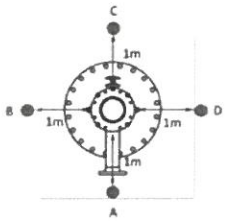
Direction / Direction	X (radial)	Y (axial)	Z (vertical)
Niveau de vibration au palier / *Vibration level on bearing* [mm/s RMS]	< 0.1 mm/s	< 0.1 mm/s	< 0.1 mm/s

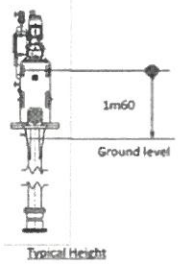
Résultat / *Result :* ☒ Accepté / *Accepted*
☐ Non accepté / *Not accepted* *

'* : see



RAPPORT D'ESSAI DE BRUIT / NOISE TEST REPORT





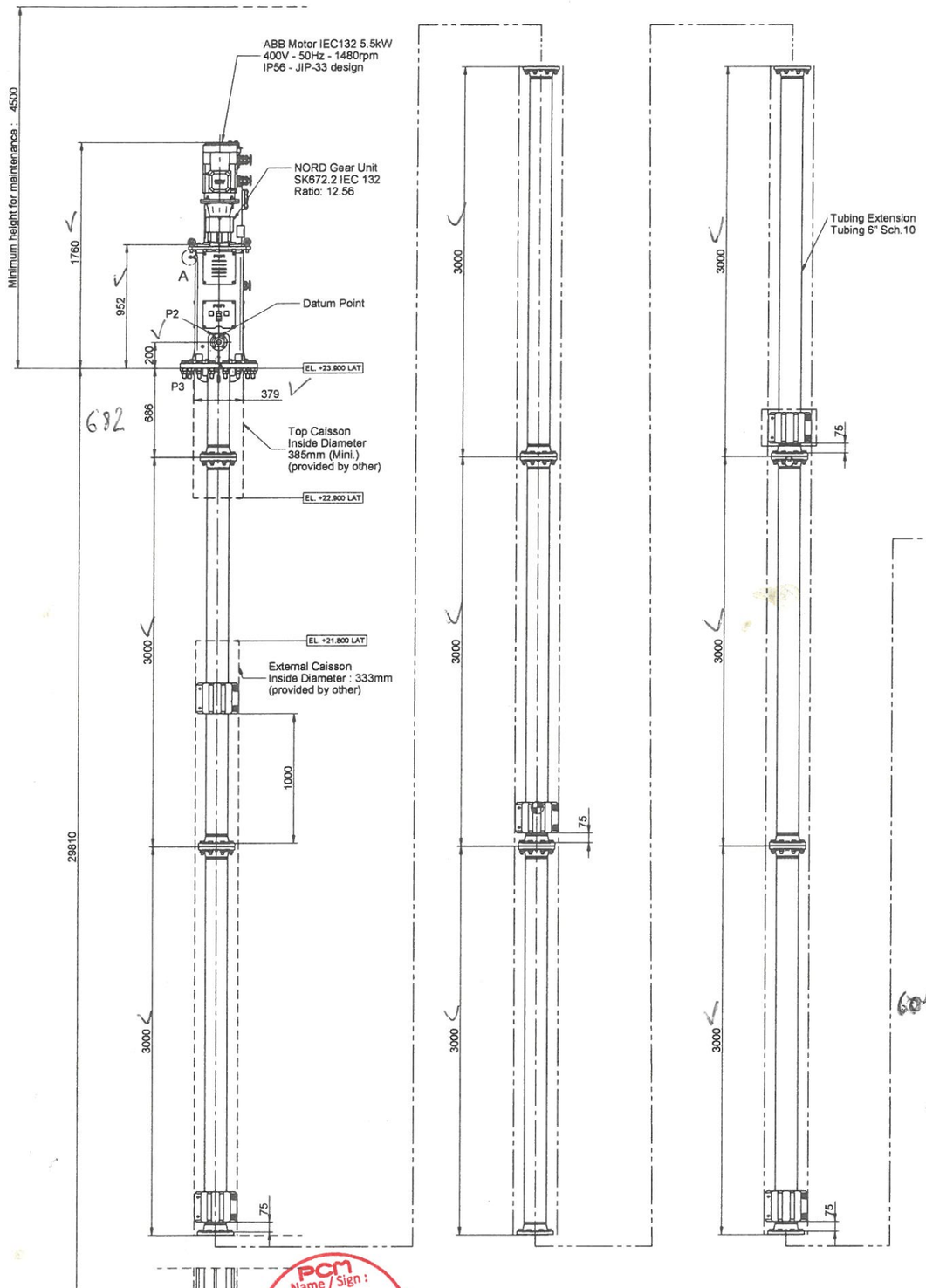
Critère d'acceptation / *Acceptance criteria :* Niveau de pression acoustique / *Sound pressure level* ≤ 85 dB(A)

Application point	A	B	C	D
Niveau de bruit / *Noise level*	72.4 dB(A)	72.5 dB(A)	69 dB(A)	73 dB(A)

Résultat / *Result :* ☒ Accepté / *Accepted*
☐ Non accepté / *Not accepted*

PCM Name / Sign : GLL / Date : 12/12/24

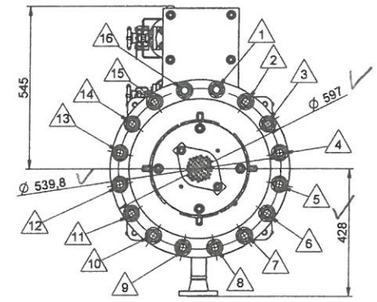
Frederic CHESNIN R&M On behalf of ROSETTI MARINO



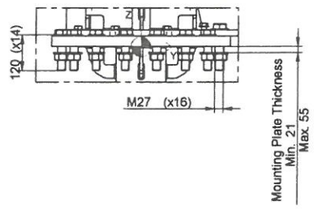


DETAIL A
(x2)
EARTHING DETAILS

NORTH

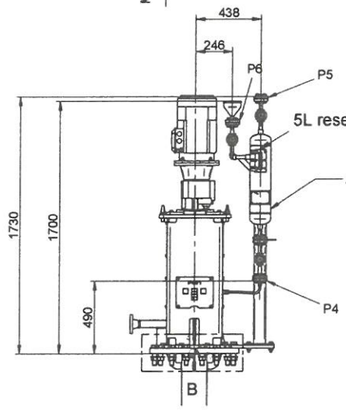


BOTTOM VIEW

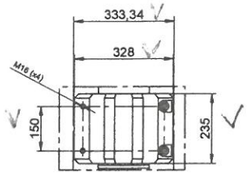


DETAIL B
MOUNTING DETAILS

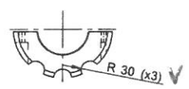
	Foundation Loads (N)
1	2510 (Compression)
2	2510 (Compression)
3	2510 (Compression)
4	2510 (Compression)
5	2510 (Compression)
6	2510 (Compression)
7	2510 (Compression)
8	2510 (Compression)
9	2510 (Compression)
10	2510 (Compression)
11	2510 (Compression)
12	2510 (Compression)
13	2510 (Compression)
14	2510 (Compression)
15	2510 (Compression)
16	2510 (Compression)



SEAL SYSTEM API PLAN 51



DETAIL C
CENTRALIZERS (x6)



Note :
Grooves to allow byocide entry.

	C.O.G
X	7
Y	-1
Z	-12366

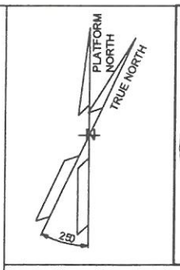
WEIGHT	
Total dry	1967 kg
Operating	4072 kg
Details for maintenance	
Pump Casing	230 kg
Pump Trunk	242 kg
Pump Extensions (x9)	130 kg
Pump Shaft Line	30 kg
Motor	81 kg
Gearbox	26 kg
Stator	33 kg
Rotor	16 kg
Coupling	25 kg
Seal System + Stand	54 kg
Centralizers (x6)	10 kg

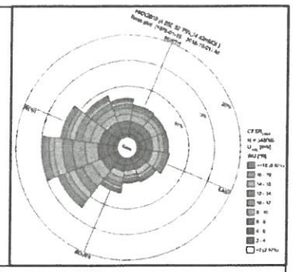
Nozzle list					Allowable Nozzle Load (API 676)					
					Forces (kN)			Moments (N.m)		
N°	Size	Material	Rating	Service	Fx	Fy	Fz	Mx	My	Mz
P1	-	Super Duplex	strainer	Suction	-	-	-	-	-	-
P2	1"1/2	Super Duplex	150# RF	Discharge	0.65	0.65	0.65	350	350	350
P3	16"	Super Duplex	150# RF	Mounting	5.20	5.20	5.20	2800	2800	2800
P4	1/2"	SS 316L	300# RF	To Quench	-	-	-	-	-	-
P5	1/2"	SS 316L	300# RF	P51 Fill	-	-	-	-	-	-
P6	1/2"	SS 316L	300# RF	P51 Vent	-	-	-	-	-	-

PCM keep it moving
N° [Manufacturing Unique Serial Number]
Made in France
Item 317873
Cyl 462 cm3 Rpm 118 Bar 5.9
Mod 25A24 2024
Ref P-5001A/B
8 boulevard Braque - 62300 Lovelons-Parrel - FRANCE
Manufacturer: PCM EUROPE SAS
www.pcm.eu

PCM Name / Sign : GLL / Date : 06/12/24 R-W

P-5001A/B





NOTES

Dimensions tolerances as per ISO2768 vK.

API Plan 13 is provided to vent the mechanical seal of vertical pumps. Tubing made in Stainless Steel 316L.

LEGEND

Z = Minimum distance for stator dismantling.

HOLDS

PCM keep it moving

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
03	12/12/24	APD	GLL	AMN	ACCEPTED FOR CONSTRUCTION (FFC)
02	26/03/24	APD	GLL	AMN	ISSUED FOR CLIENT REVIEW (CR)
01	15/07/24	APD	GLL	AMN	ISSUED FOR INTERNAL REVIEW (IR)
00	10/07/24	APD	GLL	AMN	ISSUED FOR INTERNAL REVIEW (IR)

CROSSWIND

ROSETTI MARINO

TITLE : BASE LOAD POWER HUB (BLPH)
GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWING

CONTRACT NO./TITLE : ON-HP4-2100-PROJECT OUTLINE DRAWING

SCALE 1:20

DRAWN APD | CHECKED GLL | APPROVED AMN | DATE 7/10/24

A1

DRAWING NO. : 24000836-MAC-DA-00004

SHEET 03 | REV. 03

Calibration Certificates

Measuring devices traceability list

	Calibration Certificates number (Identification PCM)	Devices Description	Devices serial number	Last Calibration Date	Calibration expiry date
Run & Performance	**AE12**	Wireless K-Type Thermometer	57030129	03/2024	03/2026
	TKE21	Tachometer	1910524	08/2023	08/2025
	BANC-STP-VF	Bench Test Cabinet	H1431763CO H1403899WU K9132….	07/2023	07/2026
	DEDN80-60-2	Flow meter	A979913	02/2024	08/2026
	MA0-10-9	Manometer	2290210056727	10/2023	10/2025
	MA25-38	Manometer	22901800787778	06/2023	06/2025
Vibration & Noise	**MV1**	Vibrometer	063126	10/2024	10/2026
	MV4	Vibrometer	303-3722	02/2023	02/2025
	SN4	Sonometer	101875	11/2024	11/2026

CRT Morlaix
Site de l'aéroport
29600 MORLAIX

Tél : 02 98 15 22 55 – Fax : 02 98 15 22 50
Email : contact@crt-morlaix.com

www.crt-morlaix.com

CERTIFICAT D'ÉTALONNAGE

CALIBRATION CERTIFICATE

N° 24-03-RD-0371

DÉLIVRÉ À :
ISSUED TO:

PCM Manufacturing France S.A.S.
Rue de l'Ancienne Gare
49123 Champtocé sur Loire

INSTRUMENT ÉTALONNÉ
CALIBRATED INSTRUMENT

Désignation :
Designation:
Chaîne de mesure de température
-200 / 1372 °C

Constructeur :
Manufacturer:
Fluke / Fluke (t3000 FC / Type K)

Type :
Type:
Thermocouple

N° de série :
Serial number:
57030129 / Sans

N° d'identification :
Identification number:
AE12

Ce document comprend 3 pages
This document includes 3 pages

Date d'émission : 20/03/2024
Date of issue:

LE RESPONSABLE TECHNIQUE
TECHNICAL MANAGER
Gwénaëlle LE CORRE

LA REPRODUCTION DE CE CERTIFICAT N'EST AUTORISÉE QUE SOUS LA FORME DE FAC-SIMILÉ PHOTOGRAPHIQUE INTÉGRAL.
CE CERTIFICAT EST CONFORME AU FASCICULE DE DOCUMENTATION FD X 07-012.
THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL BY PHOTOGRAPHIC PROCESS.

N° d'identification :	**AE12**		
Désignation :	**Chaîne de mesure de température Thermocouple -200 / 1372 °C**		
Résolution :	**0,1 °C**		
Constructeur :	**Fluke / Fluke (t3000 FC / Type K)**	Procédure interne :	PE D 19 80-5
N° de série :	**57030129 / Sans**		

Mesures effectuées le 20/03/2024 à MORLAIX par R DENIEL

Les étalons utilisés sont raccordés au système international d'unités (SI) via un laboratoire d'étalonnage accrédité Cofrac ou reconnu équivalent.
Les résultats ne se rapportent qu'aux objets reçus du client et soumis à étalonnage et tels qu'ils ont été décrits dans le présent document.
The standards used are adapted to the international system of units (SI) via a calibration laboratory accredited by Cofrac or recognized as equivalent.
Results relate only to objects received from the customer and subject to calibration and as described in this document.

1- Conditions d'environnement

Température : (21 ± 3) °C
Température de référence : 21 °C

2- Mode(s) opératoire(s) utilisé(s)

Erreur d'indication (PE D 19 80 nC)

L'étalonnage de la chaîne de mesure est effectué par comparaison à une chaîne de température étalon , immergées dans un milieu homogène.
Les moyens mis en œuvre sont les suivants :
De -30 à 165°C : Bain d'huile silicone
Supérieur à 165°C : four

3- Moyen(s) de mesure utilisé(s)

Chaîne de mesure de température identifié(e) : T003
Date d'étalonnage : 08/06/2023, N° de document : 23-J05-T199 R01, Prestataire : LNE Poitiers

4- Résultats

Erreur d'indication

Pt	Valeur étalon (°C)	Valeur lue (°C)	Correction (°C)	Incertitude (°C)
1	-15,03	-15,5	0,5	0,2
2	19,97	20,0	0,0	0,2
3	130,00	129,9	0,1	0,2

alltronic solutions électroniques

11 rue de la Croix Rouge 35770 Vern sur Seiche
Tél. 02 99 62 93 93

CONSTAT DE VERIFICATION

Etabli suivant les recommandations de la norme NFX 07-011

CVF N°: 342301

DELIVRE A: PCM MANUFACTURING
RUE DE L ANCIENNE GARE
49123 CHAMPTOCE SUR LOIRE

Instrument vérifié : N° Client : 41191018 Date de vérification : 03/08/2023

Désignation : TACHYMETRE OPTIQUE DIGITAL

Constructeur : TESTO

Type : 465

N° de série : 1910524

Réf. Client : TKE21

CETTE PRESTATION A ETE EFFECTUEE AVEC DES EQUIPEMENTS DE REFERENCE RACCORDES AUX ETALONS NATIONAUX OU INTERNATIONAUX, PAR DU PERSONNEL QUALIFIE, SUIVANT UNE PROCEDURE CONSTRUCTEUR ET DANS DES CONDITIONS D'ENVIRONNEMENT CONTROLEES.

JUGEMENT : **CONFORME**

L'appareil satisfait aux conditions définies dans la procédure P 100-k et par conséquent aux spécifications du constructeur, de la Norme ou du référentiel client.

Date d'émission du constat :	Vérifié par :	Signature du responsable
Le 03/08/2023	Bastien BASILE	Huu Thanh NGUYEN

METROLOGIE Références rattachées au COFRAC ALLTRONIC

CE DOCUMENT NE PEUT ÊTRE UTILISE EN LIEU ET EN PLACE D'UN CERTIFICAT D'ETALONNAGE. LA REPRODUCTION N'EST AUTORISEE QUE SOUS LA FORME D'UN FAC SIMILE PHOTOGRAPHIQUE INTEGRAL.
CE DOCUMENT COMPORTE 1 PAGE ET 2 ANNEXES.

COMPTE RENDU D'INTERVENTION

ANNEXE 1 AU CONSTAT DE VERIFICATION

CVF : 342301

LIEU DE L'INTERVENTION :

- ☑ Au laboratoire de métrologie AlltroniC
- ☐ Dans les locaux du Client

INTERVENTION REALISEE :

Une étiquette AlltroniC, apposée sur l'appareil, rappelle le numéro du présent constat, la date de vérification et la date au delà de laquelle ce constat n'est plus valable. La validité ne préjuge pas de l'état de l'appareil dans le futur, mais indique seulement la date limite de la prochaine vérification.

- ☑ Vérification
- ☐ Ajustage (vérification nécessitant des réglages)
- ☐ Etalonnage (relevé de mesures)
- ☐ Réparation
- ☐ Retour en l'état

COMMENTAIRES :

ETAT DE L'INSTRUMENT AVANT INTERVENTION :

- ☑ Dans les spécifications
- ☐ Hors spécifications
- ☐ En panne
- ☐ Accidenté / endommagé

ETAT DE L'INSTRUMENT EN SORTIE :

- ☑ Dans les spécifications sans dérogation
- ☐ Dans les spécifications avec dérogation
- ☐ Hors spécifications
- ☐ En panne

EQUIPEMENTS DE REFERENCE :

Les équipements utilisés sont de spécifications supérieures à celle de l'appareil vérifiés et leurs niveaux de raccordement et la validité sont conformes aux exigences de notre procédure P 100-k.

COMPTE RENDU D'INTERVENTION

ANNEXE 2 AU CONSTAT DE VERIFICATION

CVF : 342301

JUSTIFICATIONS DES RELEVES :

- ☐ Relevés de mesures suite à ajustage
- ☐ Relevés de mesures sur demande client
- ☑ Aucun relevé nécessaire : appareil conforme aux spécifications

LISTE DES ETALONS UTILISES :

TYPE	N° de SERIE	DESIGNATION	N° CERTIFICAT	FIN DE VALIDITE
5500A	7035011	CALIBRATEUR UNIVERSEL	CEC F2/17115	11-2023

RELEVES DE MESURES:

ROHDE&SCHWARZ

CONSTAT DE VERIFICATION : VARIATEURS ABB

Contexte

Client : ACTEMIUM

Site de l'intervention : PCM Manufacturing, Rue René Moineau, 49123 Champtocé-sur-Loire

Date de l'intervention : 15 juin 2023

Equipements de mesure:

- Oscilloscope portable RTH1004 :
  - S/N= 106361
  - Certificat de calibrage du RTH cf annexe
- Sonde tension RT-ZI10
- Sonde courant RT-ZC02
  - S/N :P206 / 01269/CA
  - CALIBRE 100A 510mV/A

Nom de l'élément sous test : armoire banc de test HSP T3 B4.

Objectif de la mesure :

Comparer les mesures des pockets des variateurs avec un oscilloscope étalonné.

Conclusion

Les mesures suivantes (tension, courant, puissance) réalisées avec l'oscilloscope correspondent aux valeurs transmises et affichées par les pockets des variateurs ABB installés.

Annexe 2 : Certificat de calibrage de l'oscilloscope RTH1004

ROHDE&SCHWARZ

Calibration Certificate

Kalibrierschein

Certificate Number 17-1101350-C

Zertifikatsnummer

Unit Data

Item Gegenstand: RTH1004 OSCILLOSCOPE 4CH

Manufacturer Hersteller: ROHDE & SCHWARZ

Type Typ: RTH

Material Number Materialnummer: 1317.5000K04 **Serial Number** Seriennummer: 106361

Asset Number Inventarnummer:

Order Data

Customer Auftraggeber:

Order Number Bestellnummer:

Date of Receipt Eingangsdatum: 2022-12-07

Performance

Place and Date of Calibration Ort und Datum der Kalibrierung	Vimperk, 2022-12-07
Scope of Calibration Umfang der Kalibrierung	Standard Calibration
Statement of Compliance (Incoming) Konformitätsaussage (Anlieferung)	New device
Statement of Compliance (Outgoing) Konformitätsaussage (Auslieferung)	All measured values are within the data sheet specifications.
Extent of Calibration Documents Umfang des Kalibrierdokuments	2 Pages incl. this

Ref.No. 17-1101350-C
Cal. 2022-12-07 | Custom. Due Date

This calibration certificate documents, that the named item is tested and measured against defined specifications.
Measurement results are located usually in the corresponding interval with a probability of approx. 95% (coverage factor k = 2).
Calibration is performed with test equipment and standards directly or indirectly traceable by means of approved calibration techniques to the PTB/DKD or other national / international standards, which realize the physical units of measurement according to the International System of Units (SI).
In all cases where no standards are available, measurements are referenced to standards of the R&S laboratories.
Principles and methods of calibration correspond and are conformant with EN ISO/IEC 17025, ANSI/NCSL Z540.1-1994 and ANSI/NCSL Z540.3-2006. The applied quality system is certified to EN ISO 9001.
This calibration certificate may not be reproduced other than in full.
Calibration certificates without signatures are not valid.
The user is obliged to have the object recalibrated at appropriate intervals.

Dieser Kalibrierschein dokumentiert, dass der genannte Gegenstand nach festgelegten Vorgaben geprüft und gemessen wurde. Die Messwerte lagen im Regelfall mit einer Wahrscheinlichkeit von annähernd 95% im zugeordneten Werteintervall (Erweiterte Messunsicherheit mit k = 2).
Die Kalibrierung erfolgte mit Messmitteln und Normalen, die direkt oder indirekt durch Ableitung mittels anerkannter Kalibriertechniken rückgeführt sind auf Normale der PTB/DKD oder anderer nationaler/internationaler Standards zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI). Wenn keine Normale existieren, erfolgt die Rückführung auf Bezugsnormale der R&S-Laboratorien.
Grundsätze und Verfahren der Kalibrierung beziehen sich auf und entsprechen EN ISO/IEC 17025, ANSI/NCSL Z540.1-1994 und ANSI/NCSL Z540.3-2006.
Das angewandte Qualitätsmanagement-System ist zertifiziert nach EN ISO 9001.
Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Kalibrierscheine ohne Signifizierungen sind ungültig.
Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

Rohde & Schwarz závod Vimperk, s.r.o.

Date of Issue Ausstellungsdatum	**Head of Laboratory** Laborleitung	**Person Responsible** Bearbeiter
2022-12-07	Radek Bartusek	Vaclav Muller

Page 1/2
ver9815/RSVM0608

ROHDE & SCHWARZ závod Vimperk, s.r.o. - Špidrova 49 - 38501 Vimperk, tel. 00420 388452 111, fax: 00420 388 452 113
Obchodní vedení: Ingo Herzog, jednatel
Daňové identifikační číslo (DIČ): CZ26034441 Identifikační číslo(IČ):26 03 44 41
Krajský soud v Českých Budějovicích oddíl C, vložka 9587

Material Number 1317.5000K04 **Serial Number** 106361 **Certificate Number 17-1101350-C**

Calibration Method 1317.5000.01-PB-05.11
Kalibrieranweisung

Relative Humidity 20%-60%
Relative Luftfeuchte

Ambient Temperature (23 $^{+7}_{-3}$) °C
Umgebungstemperatur

Working standards used (having a significant effect on the accuracy)
Verwendete Gebrauchsnormale (mit signifikantem Einfluss auf die Genauigkeit)

Item Gegenstand	Type Typ	Serial Number Seriennummer	Calibration Certificate Number Kalibrierscheinnummer	Cal. Due Kalibr. bis
Digital Multimeter 6 1/2 Digit	**34465A**	**MY54500465**	**17-950267**	**2023-02-28**
Calibrator	**5502A/6**	**3185803**	**50144 D-K-15115-01-00 2022-05**	**2024-05-31**

Conformity statements take the measurement uncertainties into account.
Die Konformitätsaussagen berücksichtigen die Messunsicherheiten.

Notes
Anmerkungen

If the new product is stored under the climate conditions as specified in the data sheet upon delivery, the product's accuracy is not significantly affected within 12 months after its calibration in our factory. In this case, the recommended calibration interval starts on the date when the product is actually put into operation.

Installed options are included in calibration. Depending on installed options, numbers of pages of the record are not consecutive.

Page 2/2

CONSTAT DE VERIFICATION AVEC GS 8 B

Repère DEDN80-60-2

Date 05/02/2024
Nom du contrôleur : Patry L.
-



Client (Nom et Adresse) : PCM Manufacturing France SAS
62 rue de la Gare
49123 CHAMPTOCE SUR LOIRE

Contrôle effectué en présence de :

Capteur type	n° série	GK	GKL	DN
IFM4080K/D	A979913	2.4780	-	DN 80 / 3"

Convertisseur type	n° série	Echelle maxi
IFC 090	A979913	60 m3/hr

Isolement	1.7 :	>20	MΩ
Résistance	7.8 :	103.6	Ω suivant DN
Equilibrage	entre 1.2 et 1.3 :	Correct	
Isolement :		NA	

Remarques :

Précision et Linéarité du convertisseur - Contrôle avec le simulateur type GS 8				
Position simulateur		Valeur mA théorique	Valeur mA réelle	Erreur *
0	0%	4.00	4.00	0.00
A	5%	4.80	4.83	0.67%
B	10%	5.60	5.63	0.47%
C	20%	7.20	7.23	0.46%
D	50%	12.00	12.03	0.27%
E	100%	20.00	20.01	0.06%

En appliquant la correction sur les étalons, l'incertitude d'étalonnage est de 0,25 % de la valeur mesurée.

* Valeur corrigée intégrant l'incertitude de l'étalon

Remarques :

Courant de champ (mA) :
Valeur réelle

Valeur théorique
125 mA

Valeur Maximum	Précision théorique	Type de convertisseur
+/- 0,8 %	+/- 0,3 %	IFC 020 - IFC 090 - IFC 110 - IFC 300
+/- 0,9 %	+/- 0,4 %	IFC 100
+/- 1 %	+/- 0,5 %	IFC 010 - IFC 050
+/- 1,3 %	+/- 0,8 %	IFC 080 - SC 80
+/- 1,5 %	+/- 1 %	SC 100 - T 900
+/- 2,5 %	+/- 2 %	F 200

L'ensemble ci-dessus référencé est : **CONFORME** aux spécifications d'origine du constructeur, sans tenir compte des incertitudes de mesure.

Référence des appareils de contrôle utilisés

Type	Date de contrôle	N° Appareil
Simulateur	déc-23	S.3.5.106
Multimètre	sept-23	S.2.1.26
Megohmètre	dec-23	S2.7.70
Autres	dec-23	S2.1.25

Commentaires :

CRT Morlaix
Site de l'aéroport
29600 MORLAIX

Tél : 02 98 15 22 55 – Fax : 02 98 15 22 50
Email : contact@crt-morlaix.com

www.crt-morlaix.com

CERTIFICAT D'ÉTALONNAGE

CALIBRATION CERTIFICATE

N° 23-10-EM-0100

DÉLIVRÉ À :
ISSUED TO:

PCM Manufacturing France S.A.S.
Rue de l'Ancienne Gare
49123 Champtocé sur Loire

INSTRUMENT ÉTALONNÉ
CALIBRATED INSTRUMENT

Désignation :
Designation:
Manomètre
0 / 10 bar

Constructeur :
Manufacturer:
Bourdon

Type :
Type:
A tube de Bourdon

N° de série :
Serial number:
Sans

N° d'identification :
Identification number:
MA0-10-9

Ce document comprend 3 pages
This document includes 3 pages

Date d'émission : 04/10/2023
Date of issue:

LE RESPONSABLE TECHNIQUE
TECHNICAL MANAGER
Gwénaëlle LE CORRE

LA REPRODUCTION DE CE CERTIFICAT N'EST AUTORISÉE QUE SOUS LA FORME DE FAC-SIMILÉ PHOTOGRAPHIQUE INTÉGRAL.
CE CERTIFICAT EST CONFORME AU FASCICULE DE DOCUMENTATION FD X 07-012.
THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL BY PHOTOGRAPHIC PROCESS.

N° d'identification :	**MA0-10-9**
Désignation :	**Manomètre A tube de Bourdon 0 / 10 bar**
Résolution :	**0,2 bar**
Constructeur :	**Bourdon**
N° de série :	**Sans**

Procédure interne : PE D 19 70 Ref-Mes

Mesures effectuées le 04/10/2023 à MORLAIX par E MIDY

Les étalons utilisés sont raccordés au système international d'unités (SI) via un laboratoire d'étalonnage accrédité Cofrac ou reconnu équivalent.
Les résultats ne se rapportent qu'aux objets reçus du client et soumis à étalonnage et tels qu'ils ont été décrits dans le présent document.
The standards used are adapted to the international system of units (SI) via a calibration laboratory accredited by Cofrac or recognized as equivalent.
Results relate only to objects received from the customer and subject to calibration and as described in this document.

1- Conditions d'environnement

Température : (21 ± 3) °C
Température de référence : 21 °C

2- Mode(s) opératoire(s) utilisé(s)

Erreur totale d'exactitude (PE D 19 70)

L'étalonnage est réalisé par comparaison à un étalon de pression.
Le nombre de points est réparti de façon uniforme sur la totalité de l'échelle. Chaque point est contrôlé en pression montante et descendante.
L'erreur totale d'exactitude est déterminée par l'écart maximal entre la valeur étalon et la valeur réglée sur l'instrument à étalonner.
L'hystérésis est calculée à partir de la différence de pression appliquée pour un même point d 'indication à pression montante et à pression descendante.

3- Moyen(s) de mesure utilisé(s)

Etalon de pression 0 / 100 bar identifié(e) : P009
Date d'étalonnage : 17/04/2023, N° de document : 53102, Prestataire : WIKA

4- Résultats

Erreur totale d'exactitude

Pression montante :

Pt	Valeur réglée (bar)	Valeur étalon (bar)	Ecart (bar)	EMT (bar)
1-1	2,0	1,99	0,01	± 0,10
1-2	4,0	3,95	0,05	± 0,10
1-3	6,0	5,93	0,07	± 0,10
1-4	8,0	7,93	0,07	± 0,10
1-5	10,0	9,91	0,09	± 0,10

Pression descendante :

Pt	Valeur réglée (bar)	Valeur étalon (bar)	Ecart (bar)	EMT (bar)
2-1	10,0	9,90	0,10	± 0,10
2-2	8,0	7,92	0,08	± 0,10
2-3	6,0	5,92	0,08	± 0,10
2-4	4,0	3,96	0,04	± 0,10
2-5	2,0	1,97	0,03	± 0,10

Erreur maxi : 0,10 bar Incertitude de mesure : 0,05 bar
Erreur d'hystérésis : 0,02 bar Incertitude de mesure : 0,05 bar

5- Vérification

Spécifications : NF EN 837-1 (Cl 1)

Caractéristique	Constat
Erreur totale d'exactitude	Conforme (fiabilité : 50 %)
Hystérésis	Conforme (fiabilité : 100 %)

CONSTAT : Conforme

La déclaration de la classe ou de la conformité a été prononcée sans prendre en compte l'incertitude d'étalonnage élargie.
La fiabilité de la décision (ou probabilité d'occurrence de décision correcte) a été calculée selon le fascicule FD X07-022 .
The declaration of class or conformity has been made without taking into account the extended calibration uncertainty.
The reliability of the decision (or probability of occurrence of a correct decision) was calculated according to the specification FD X 07-022.

BÉCOT

2023-53 CERTIFICAT D'ETALONNAGE / CALIBRATION REPORT
Manomètre / Pressure Gauge

Client *Customer*	**Notre Réf.** *Our Ref.*	10071939	**Votre Réf.** *Your Ref.*	PO070-23-07446

Nom *Name* PCM MANUFACTURING FRANCE SAS

Adresse *Adress* *RUE DE L'ANCIENNE GARE*
49123 CHAMPTOCE SUR LOIRE

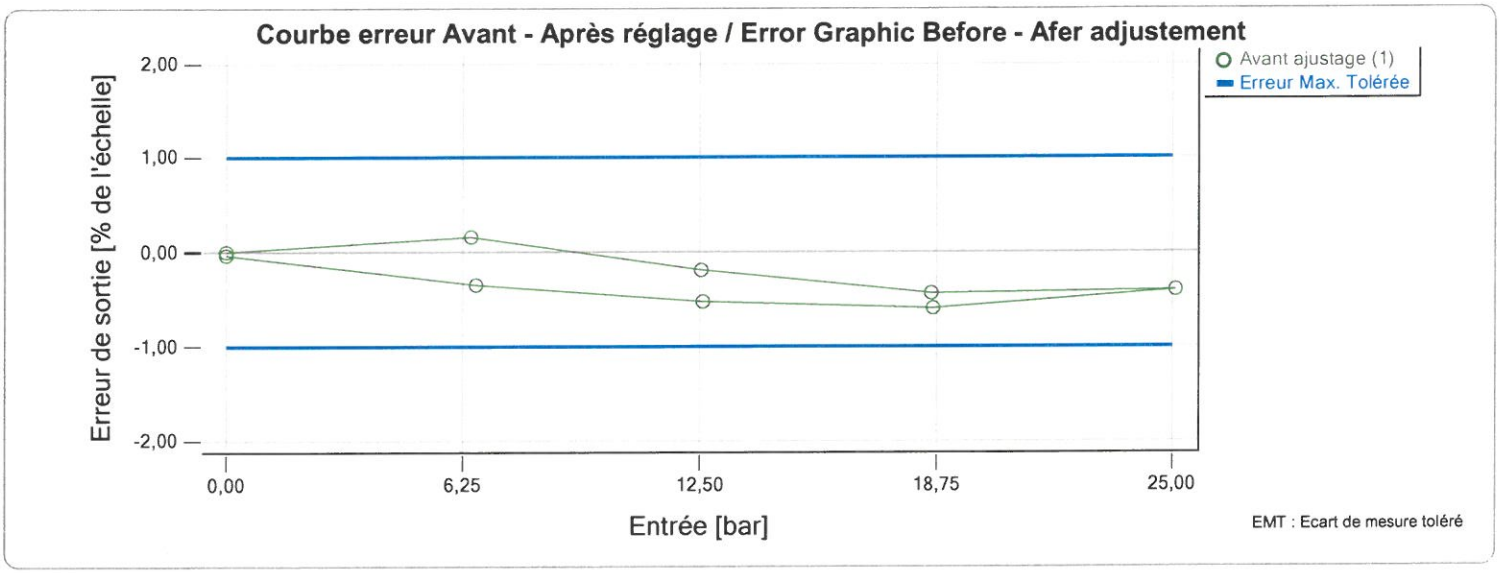
Instrument *Instrument* — **Identification Interne** *Internal ID* MA25-38

Fabricant *Brand*	BAUMER	**Modèle** *Model*	MEX5D31B26	**Numéro de Série** *Serial Number*	22901800787778	**Echelle** *Range*	0 ... 25 bar (R)

Procédure d'étalonnage *Calibration Procédure*

Identification Calibrateur *Calibrator Identification*

Date d'étalonnage *Calibration Date*	12/06/2023	**Date d'échéance** *Due Date*	12/06/2025	**Entrée Calibrateur** *Calibrator Input*	MC6 : 601588	**Identification Interne** *Internal ID*	ES032
Périodicité d'étalonnage *Calibration interval*	2 Années *2 Years*	**Opérateur** *Operator*	RINEAU ADRIEN	**Module d'entrée** *Input module*	EXT600 : 49874		
Erreur Max. Tolérée +/- *Reject if error >*	1 % de l'échelle *1 % of Range*	**Température Ambiente** *Ambient temperature*	23,57 °C				



1. Avant ajustage / Before Adjustement

CONFORME / CONFORM

Erreur maximum -0,60 % de l'échelle / Maximum error -0,60% of scale

Valeur de Référence / Reference Value [bar]	Valeur relévée / Reading value [bar]	Lu Manomètre / Read pressure gauge [bar]	Erreur / Error [%]
0,0	0,01	0,00	-0,04
6,5	6,59	6,50	-0,36
12,5	12,63	12,50	-0,52
18,5	18,65	18,50	-0,60
25,0	25,10	25,00	-0,40
18,5	18,61	18,50	-0,44
12,5	12,55	12,50	-0,20
6,5	6,46	6,50	0,16
0,0	0,00	0,00	0,00

A St Barthélémy d'Anjou, le *At St Barthélémy d'Anjou, the* 12/06/2023

Responsable de la session de mesure *Responsible for the mesurement session* **RINEAU ADRIEN**

Parc d'Activités – 24 rue du Chêne Vert CS 20012 – 49184 St-Barthélémy d'Anjou Cedex
Tél : 02.41.43.60.20 – E-mail : contact@becot-sas.fr

Semia
10, chaussée Jules César
Immeuble le Louisiane. Z.A des beaux soleils
CS 53005
95523 CERGY-PONTOISE CEDEX
Tél. : 01 30 75 15 07 Fax. : 01 30 75 13 07
BP 30199 CERGY

CONSTAT DE VERIFICATION

Constat n° : **CAL.24.383**

Délivré à : **PCM Manufacturing France SAS**
Rue de l'ancienne gare
49123 Champtocé-sur-loire

Identification du matériel vérifié :

Fabricant : CASTLE
Modèle : GA2002
Type : Machine condition advisor
Numéro de série : **MVI**
Gamme : 10.000 Hz to 1.000 KHz

Equipement de test :

Fabricant : PCB
Modèle : 301A10
Numéro de série : 3457
Dernière vérification : 12/10/2023
Pilotage : LDS Model V406 + PA 100E

Capteur associé : HS-1400105703 SN : 437500
Dernière vérification : -

Etat de l'instrument :

A réception : CONFORME aux spécifications constructeur
En sortie : CONFORME aux spécifications constructeur

Remarques / Description de la non-conformité :

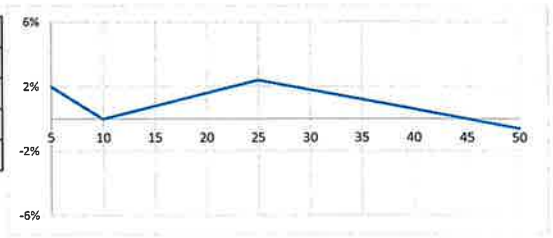
Date de vérification : 03/10/2024
Validité : 03/10/2025
Conditions d'environnement : Température : 21°C
Procédure(s) utilisée(s) : Procédure Métrologie Accéléromètrie P.MET.001 Ind. A
Spécifications : ISO 10816 / ISO 2954

Conditions de test :

Sensibilité nominale mesurée : 9,6 mm/s à 159 Hz

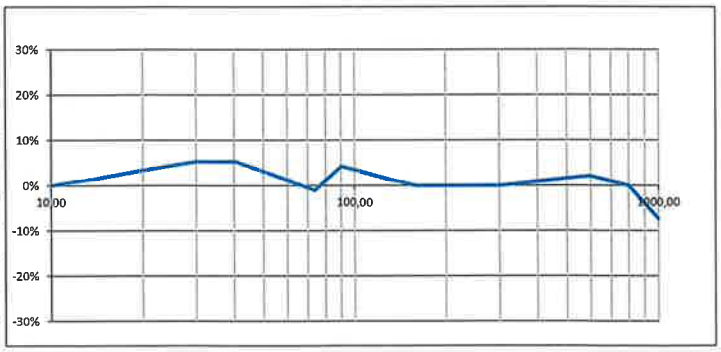
Profil de test N°1 : Amplitude step, 5-50 mm/s
VOIE A

Fréquence (Hz)	Pilotage étalon (mm/s)	Lecture (mm/s)	Erreur / sens. Nom.
159	5	4,90	2,0%
159	10	9,60	0,0%
159	25	24,60	2,4%
159	50	47,70	-0,6%



Profil de test N°2 : Frequency step, 10 à 1000 Hz @ 10 mm/s
VOIE A

Frequence (Hz)	Lecture (mm/s)	Erreur / sens. Nom.
10,00	9,60	0,0%
30,00	10,10	5,2%
40,62	10,10	5,2%
74,06	9,50	-1,0%
90,47	10,00	4,2%
159,00	9,60	0,0%
300,00	9,60	0,0%
600,00	9,80	2,1%
800,00	9,60	0,0%
1000,00	8,90	-7,3%



Opérateur : Sabri BERRABAA

Date d'émission du constat : 03/10/2024

Nom et Visa du Responsable Qualité : Pierre CHASSIN

La reproduction de ce constat n'est autorisée que sous la forme de FAC-SIMILE photographique intégral.

Ce document ne peut être utilisé en lieu et place d'un certificat d'étalonnage.
Ce document est réalisé suivant les recommandations du fascicule de documentation X 07-011 définissant le constat de vérification. Il peut être utilisé pour démontrer le raccordement du moyen de mesure aux étalons nationaux et internationaux, sous réserve qu'il réponde aux recommandations du fascicule de documentation X 07-015.

semia
57, rue Francis Combe
BP 30199 CERGY
95024 CERGY PONTOISE CEDEX
Tél. : 01 30 75 15 07 Fax. : 01 30 75 13 07

CONSTAT DE VERIFICATION

Constat n° : **CAL.23.074**

Délivré à : **PCM Manufacturing France SAS**
Rue de l'ancienne gare
49123 Champtocé-sur-loire

Identification du matériel vérifié :

Fabricant : CASTLE
Modèle : GA2002
Type : Machine condition advisor
Numéro de série : **MV4**
Gamme : 10.000 Hz to 1.000 KHz

Equipement de test :

Fabricant : PCB
Modèle : 301A10
Numéro de série : 3457
Dernière vérification : 10/09/2022
Pilotage : LDS Model V406 + PA 100E

Capteur associé : MTN/P100T-10 SN : 204854
Dernière vérification : -

Etat de l'instrument :

A réception : CONFORME aux spécifications constructeur
En sortie : CONFORME aux spécifications constructeur

Remarques / Description de la non-conformité :

Date de vérification : 02/02/2023

Validité : 02/02/2025

Conditions d'environnement : Température : 21°C

Procédure(s) utilisée(s) : Procédure Métrologie Accéléromètrie P.MET.001 Ind. A

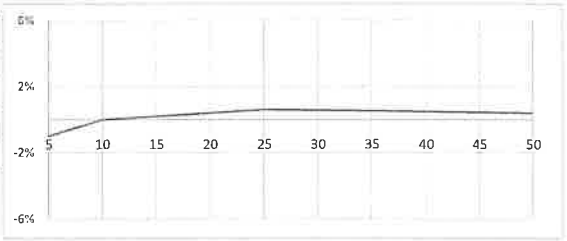
Spécifications : ISO 10816 / ISO 2954

Conditions de test :

Sensibilité nominale mesurée : 9,9 mm/s à 159 Hz

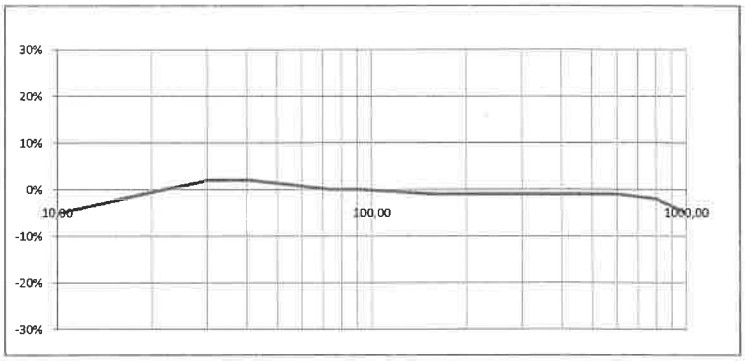
Profil de test N°1 : Amplitude step, 5-50 mm/s
VOIE A

Fréquence (Hz)	Pilotage étalon (mm/s)	Lecture (mm/s)	Erreur / sens. Nom.
159	5	4,90	-1,0%
159	10	9,90	0,0%
159	25	24,90	0,6%
159	50	49,70	0,4%



Profil de test N°2 : Frequency step, 10 à 1000 Hz @ 10 mm/s
VOIE A

Frequence (Hz)	Lecture (mm/s)	Erreur / sens. Nom.
10,00	9,40	-5,1%
30,00	10,10	2,0%
40,62	10,10	2,0%
74,06	9,90	0,0%
90,47	9,90	0,0%
159,00	9,80	-1,0%
300,00	9,80	-1,0%
600,00	9,80	-1,0%
800,00	9,70	-2,0%
1000,00	9,40	-5,1%



Opérateur : Sabri BERRABAA

Date d'émission du constat : 02/02/2023

Nom et Visa du Responsable Qualité : Pierre CHASSIN

Pierre CHASSIN
Responsable Qualité

La reproduction de ce constat n'est autorisée que sous la forme de FAC-SIMILE photographique intégral.

Ce document ne peut être utilisé en lieu et place d'un certificat d'étalonnage.
Ce document est réalisé suivant les recommandations du fascicule de documentation X 07-011 définissant le constat de vérification. Il peut être utilisé pour démontrer le raccordement du moyen de mesure aux étalons nationaux et internationaux, sous réserve qu'il réponde aux recommandations du fascicule de documentation X 07-015.

alltronic solutions electroniques

11 rue de la Croix Rouge 35770 Vern sur Seiche
Tél. 02 99 62 93 93

CONSTAT DE VERIFICATION

Etabli suivant les recommandations de la norme NFX 07-011

CVF N°: 361717

DELIVRE A: PCM MANUFACTURING
RUE DE L ANCIENNE GARE
49123 CHAMPTOCE SUR LOIRE

Instrument vérifié : N° Client : 41191018 Date de vérification : 06/11/2024

Désignation : **SONOMETRE**

Constructeur : **BRUEL & KJAER**

Type : **2245**

N° de série : **2245-101875**

Réf. Client : **SN4**

CETTE PRESTATION A ETE EFFECTUEE AVEC DES EQUIPEMENTS DE REFERENCE RACCORDES AUX ETALONS NATIONAUX OU INTERNATIONAUX, PAR DU PERSONNEL QUALIFIE, SUIVANT UNE PROCEDURE CONSTRUCTEUR ET DANS DES CONDITIONS D'ENVIRONNEMENT CONTROLEES.

JUGEMENT : **CONFORME**

L'appareil satisfait aux conditions définies dans la procédure P 100-k et par conséquent aux spécifications du constructeur, de la Norme ou du référentiel client.

Date d'émission du constat :	Vérifié par :	Signature du responsable
Le 06/11/2024	Bastien BASILE	Huu Thanh NGUYEN

METROLOGIE Références rattachées au COFRAC ALLTRONIC

CE DOCUMENT NE PEUT ÊTRE UTILISE EN LIEU ET EN PLACE D'UN CERTIFICAT D'ETALONNAGE. LA REPRODUCTION N'EST AUTORISEE QUE SOUS LA FORME D'UN FAC SIMILE PHOTOGRAPHIQUE INTEGRAL.
CE DOCUMENT COMPORTE 1 PAGE ET 2 ANNEXES.

COMPTE RENDU D'INTERVENTION

ANNEXE 1 AU CONSTAT DE VERIFICATION

CVF : 361717

LIEU DE L'INTERVENTION :

- ☑ Au laboratoire de métrologie AlltroniC
- ☐ Dans les locaux du Client

INTERVENTION REALISEE :

Une étiquette AlltroniC, apposée sur l'appareil, rappelle le numéro du présent constat, la date de vérification et la date au delà de laquelle ce constat n'est plus valable. La validité ne préjuge pas de l'état de l'appareil dans le futur, mais indique seulement la date limite de la prochaine vérification.

- ☑ Vérification
- ☐ Ajustage (vérification nécessitant des réglages)
- ☐ Etalonnage (relevé de mesures)
- ☐ Réparation
- ☐ Retour en l'état

COMMENTAIRES :

ETAT DE L'INSTRUMENT AVANT INTERVENTION :

- ☑ Dans les spécifications
- ☐ Hors spécifications
- ☐ En panne
- ☐ Accidenté / endommagé

ETAT DE L'INSTRUMENT EN SORTIE :

- ☑ Dans les spécifications sans dérogation
- ☐ Dans les spécifications avec dérogation
- ☐ Hors spécifications
- ☐ En panne

EQUIPEMENTS DE REFERENCE :

Les équipements utilisés sont de spécifications supérieures à celle de l'appareil vérifiés et leurs niveaux de raccordement et la validité sont conformes aux exigences de notre procédure P 100-k.

COMPTE RENDU D'INTERVENTION

ANNEXE 2 AU CONSTAT DE VERIFICATION

CVF : 361717

JUSTIFICATIONS DES RELEVES :

- ☐ Relevés de mesures suite à ajustage
- ☑ Relevés de mesures sur demande client
- ☐ Aucun relevé nécessaire : appareil conforme aux spécifications

LISTE DES ETALONS UTILISES :

TYPE	N° de SERIE	DESIGNATION	N° CERTIFICAT	FIN DE VALIDITE
4231	**3020278**	**CALIBRATEUR ACOUSTIQUE**	**CFR2302834**	**10-2025**

RELEVES DE MESURES:

Milieu ambiant :
Température : (22±2)°C
Humidité relative : (50±20)%HR

Valeurs étalon	Valeurs lues
94 dB	93,8 dB
114 dB	113,8 dB

INSPECTION TEST PLAN

Supplier : PCM | *Criticality rating : 2* | Prepared by : GLL | Checked by : FXB | Approved by : AHN | Rev. No. 02

Items: PROGRESSING CAVITY PUMPS - 25A24 | PO N°: 1724000936 | PCM Doc N° PCM001 | Date : 16/10/2024

Project Name 123A90A - HOLLANDSE KUST NOORD WIND PARK Project | Material Requisition : 123A90-DDL-MAC-MR-50012 | ROSETTI MARINO Doc N° 1724000936-QC-ITP-00002 | Contractor : ROSETTI MARINO

Pump Tag / Name P-50001 A/B / SEA WATER LIFT PUMPS | Final User : CROSSWIND

Activity	Scope	Inspection Process / Characteristic to be verified	Performed by	Specification and / or Reference Documents	Acceptance Criteria	Quality Record (Verifying Document)	Inspection Involvement				Remark
							Sub-Vendor	PCM	RM	CROSSWIND	
7 - PSV & Heating Jacket											
7,0	PSV (wetted parts)	Raw Material: Chemical analysis & Mechanical properties	Supplier to be defined	MTC 3.1 / EN 10204:2004	Nozzle > Super Duplex Stainless Steel (25%Cr) Body, bonnet & cap > Carbon Steel Disc > Inconel Sping > SS316	Material certificate 3.1 EN10204 EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
7,1	PSV	Functional test	Supplier to be defined	API 527	API 527 criteria	PSV test report EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
7,2	PSV	Hazardous Certification	Supplier to be defined	ATEX 94/9/CE Directive IEC 60034 / IEC 60079	II 2G IIB T3	ATEX certificates EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
7,2	Heating jacket	Hazardous Certification	Supplier to be defined	ATEX 94/9/CE Directive IEC 60034 / IEC 60079	II 2G IIB T3	ATEX certificates EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
8 - PAINTING											
8,0	LV Motor	Painting / Final DFT & Color check	ABB	COATING PROCEDURE 1724000936-MAT-PRO-00018 ABB Manufacturer standard / C5-M & ISO 12944	Color : Munsell 8B 4.5/3.25 (ABB standard) Min DFT: 240µm	ABB Manufacturer confirmation letter EQUIPMENT MRB 1724000936-QC-DB-00028	H	R	R	R	
8,1	Pump parts (Gearbox / Structural / Bearing / PSV) Carbon Steel & Cast Iron	Painting / Final DFT & Color check	PCM	COATING PROCEDURE 1724000936-MAT-PRO-00018 PCM painting Process N°5 / C5-H & ISO 12944	Color : RAL 7038 Min DFT: 320µm	Painting report EQUIPMENT MRB 1724000936-QC-DB-00028	-	H	W	W	Stainless Steel not painted To be done during FAT / No witness during painting execution
9 - COMPLETE UNIT											
9,0	Complete unit	Dimensional and visual check	PCM	General Arrangement Drawing - 1724000936-MAC-DA-00004	Compliance with General Arrangement Drawing	FAT report EQUIPMENT MRB 1724000936-QC-DB-00028	-	H			
9,1	Complete unit	Mechanical Run Test (1 hour) / Test with water	PCM	FAT Test Procedure - 1724000936-QC-PRO-00023 Pump Datasheet - 1724000936-MAC-DS-00012 API 676 & deviation/clarification list	Absence of leakage, abnormal noise, abnormal vibration abnormal temperature increase.	FAT report EQUIPMENT MRB 1724000936-QC-DB-00028	-	H		W	
9,2	Complete unit	Performance Test / Test with water	PCM	FAT Test Procedure - 1724000936-QC-PRO-00023 Pump Datasheet - 1724000936-MAC-DS-00012 API 676 & deviation/clarification list	Flowrate Tolerance Min/Norm 2,5m3/h / Max 3,4m3/h Discharge Pressure at rated pressure (5,9barg)	FAT report EQUIPMENT MRB 1724000936-QC-DB-00028	-	H		W	
9,3	Complete unit	Global Sound pressure Measurement	PCM	FAT Test Procedure - 1724000936-QC-PRO-00023 Pump Datasheet - 1724000936-MAC-DS-00012 API 676 & deviation/clarification list	Noise Level < 85 dBA @ 1m of the equipment	FAT report EQUIPMENT MRB 1724000936-QC-DB-00028	-	H		W	
9,4	Complete unit	Vibration test	PCM	FAT Test Procedure - 1724000936-QC-PRO-00023 Pump Datasheet - 1724000936-MAC-DS-00012 API 676 & deviation/clarification list	Max vibration level < 7,1mm/s at bearing housing	FAT report EQUIPMENT MRB 1724000936-QC-DB-00028	-	H		W	
9,5	Complete unit	EC Declaration of Conformity & CE Marking	PCM	EC – Directive Machinery (2006/42/EC) EC - Low-voltage directive (2014/35/EU)	Compliance to EC – Directive Machinery (2006/42/EC) EC - Low-voltage directive (2014/35/EU)	EC Declaration of Conformity & nameplate picture (CE marking) EQUIPMENT MRB 1724000936-QC-DB-00028	-	H	R	R	
9,6	Complete unit	Inspection Release Certificate	PCM	Punch list if any	Punch list clear	Inspection Release Note	-	R	W	W	
9,7	Complete unit	Packing, Preservation and Marking	IDEA	Packing & Preservation Procedure 1724000936-QC-PRO-00032	Seaworthy Packing - SEI 4C	Packing list & Preservation record	-	H	R	R	
9,8	Complete unit	Manufacturing Record Book	PCM	EQUIPMENT MRB Index 1724000936-QC-LIS-00025	Compliance	EQUIPMENT MRB 1724000936-QC-DB-00028	-	H	R	R	

Terms / Abbreviation / Definition

H : (Hold) point
The Supplier may not carry out :
- any fabrication and/or repair work, or any shipment without having received CONTRACTOR's comments,
- any controls and tests without CONTRACTOR 'S attendance, as the case may be .
In the second case, CONTRACTOR's attendance is mandatory. The Supplier must notify CONTRACTOR by fax, or mail of the inspection activity involved at least ten (15) working days in advance.
The Supplier may not depart from this rule unless specifically approved by CONTRACTOR in writing.

W : (Witness) & RW (random Witness)
CONTRACTOR 'S witnessing is not mandatory, but optional. The Supplier must notify CONTRACTOR of the dedicated inspection activity at least fifteen (15) working days in advance.
If CONTRACTOR do not elect to be present, the Supplier may proceed with his own inspection, provided controls and tests records are made available to CONTRACTOR for review.

R : (Review) - Review of Documents
The Supplier has either to submit to CONTRACTOR for comments the documents required prior to the performance of the dedicated activity or to transmit or make available for the review of CONTRACTOR the results of the controls and tests conducted, as the case may be.

A: (Approval) - Approval of documents
The Supplier has to submit to CONTRACTOR for approval the documents required prior to the performance of the dedicated activity and get approval from CONTRACTOR/COMPANY.

PCM Name / Sign : GLL Date : 12/12/24 R-W

Pump B tested
H of 9.0
Frederic CHESNIN On behalf of ROSETTI MARINO
12/12/2024 obo crosswind
W of 9.1 to 9.4

1,8

18 m 6,5 bar
0 m 8,3
6 m 7,6 barg

PCM keep it moving

REF. CLIENT / CLIENT REF : P-50001A
NUMERO DE SERIE / SERIAL NUMBER : 317873-1
MODELE / MODEL : 25AV24

RAPPORT ESSAI D'ENDURANCE / RUN TEST REPORT

Test Duration / Durée du test	1h

		0h	15min	30min	45min	1h	Instruments TAG	Instruments Validité / Validity
HEURE / HOUR		15h48	16h03	16h18	16h33	16h48		
PRESSION DIFFERENTIELLE / DIFFERENTIAL PRESSURE	bar	7,6 ~~6,5~~	7,6 ~~6,5~~	7,6 ~~6,5~~	7,6 ~~6,5~~	7,6 ~~6,5~~	MA25-38	06125
DEBIT / FLOW-RATE	m3/h	3,16	3,20	3,22	3,22	3,24	DEDN80. 60.2	08126
VITESSE DE ROTATION / OUTPUT SPEED	rpm	119	119	119	119	119	TKE21	03108125
TENSION / VOLTAGE	V	400	400	400	400	400	BANC STP VF	07126
INTENSITE / INTENSITY	A	6,7	6,7	6,7	6,7	6,7	"	"
PUISSANCE ABSORBEE / NOMINAL POWER	kW	1,5	1,5	1,5	1,5	1,5	"	"
VARIATION DE FREQUENCE / FREQUENCY VARIATION	Hz	50	50	50	50	50	"	"
TEMPERATURE DU FLUIDE / FLUID TEMPERATURE	°C	18	18	18	19	19	AE12	20103126
TEMPERATURE DU PALIER / BEARING TEMPERATURE	°C	34	33,7	35,2	36,2	36,9	"	"
TEMPERATURE REDUCTEUR / GEARBOX TEMPERATURE	°C	29,9	31	33	32,5	32,8	"	"

L'essai d'endurance est conforme en cas d'absence de fuite, de bruit anormal, d'augmentation des vibrations et d'augmentation de la temperature.
Mechanical Run test is stated as conform, in absence of leaks, abnormal noise, increased vibrations and increased temperature.

COMMENTAIRES:
COMMENTS

Résultat / *Result :*

☐ Accepté / *Accepted*

☐ Non accepté / *Not accepted*

Date de l'essai / Test date

19102125

Test effectué par / Test carried out by

Polo

PCM EUROPE S.A.S – 6 Boulevard Bineau – 92300 Levallois-Perret
Tel. : +33 (0)1 77 68 31 00
www.pcm.eu – contact@pcm.eu

PCM | keep it moving

REF. CLIENT / CLIENT REF : P-50001A
NUMERO DE SERIE / SERIAL NUMBER : 317873-1
MODELE / MODEL : 25AV24

RAPPORT ESSAI DE PERFORMANCE / PERFORMANCE TEST REPORT

					instrument	
					TAG	Validity
PRESSION DIFFERENTIELLE DIFFERENTIAL PRESSURE	bar	0	7,6 ~~8,5~~	9,8 ~~9,8~~ 8,8	MA25-38	06/25
DEBIT FLOW-RATE	m3/h	3,37	3,24	3,12	DEDN80.60.2	08126
VITESSE DE ROTATION OUTPUT SPEED	rpm	119	119	118	TKE21	03/08/25
TENSION VOLTAGE	V	400	400	400	BANC STP VF	07126
INTENSITE INTENSITY	A	6,4	6,7	6,8	"	"
PUISSANCE ABSORBEE NOMINAL POWER	kW	0,8	1,5	1,7	"	"
VARIATION DE FREQUENCE FREQUENCY VARIATION	Hz	50	50	50	"	"
TEMPERATURE DU FLUIDE FLUID TEMPERATURE	°C	20	20	20	AE12	20/03/26
TEMPERATURE DU PALIER BEARING TEMPERATURE	°C	37	36,9	36,9	"	"
TEMPERATURE DU REDUCTEUR GEARBOX TEMPERATURE	°C	33,2	32,8	32,8	"	"
COMMENTAIRES: COMMENTS						

Résultat / *Result :*

☒ Accepté / *Accepted*

☐ Non accepté / *Not accepted*

Date de l'essai / Test date

19/02/25

Test effectué par / Test carried out by

Polo

PCM | keep it moving

WW0221_Rapport d'essai vibration et bruit _Vibration and noise test report

PROCESS :	WR52	CODE :	WW0221	INDEX :	B
AUTHOR :	C. Guennec	ISSUE DATE :	2016-09-06	PAGE :	Page 1 of 2
CONFIDENTIALITY :	External				

Please make sure you use the latest version of the form when filling the record N° :

DONNEES POMPE ET ESSAI / *PUMP & TEST DATA*

NUMERO DE SERIE / *SERIAL NUMBER*	070P140016399 P-50001 A 0F0065446
MODELE / *MODEL :*	25AV24
OPERATEUR / *OPERATOR NAME :*	Pdo
DATE DE TEST / *TEST DATE* :	19/02/25
VITESSE POMPE / *PUMP SPEED :*	119 rpm
PRESSION D'ASPIRATION / *SUCTION PRESSURE :*	0 barg
PRESSION DE REFOULEMENT / *DISCHARGE PRESSURE :*	7,6 barg
ESSAI REALISE / *TEST REALIZED :*	☒ Essai de vibration / Vibration test **Appareil d'essai / Test device** -Numéro de série / Serial number : MV1 -Certificat de calibration valide jusqu'à / Certificate of conformity valid until : 03/10/26 ☒ Essai de bruit / Noise test **Appareil d'essai / Test device** -Numéro de série / Serial number : -Certificat de calibration valide jusqu'à / Certificate of conformity valid until :

RAPPORT D'ESSAI DE VIBRATION / *VIBRATION TEST REPORT*

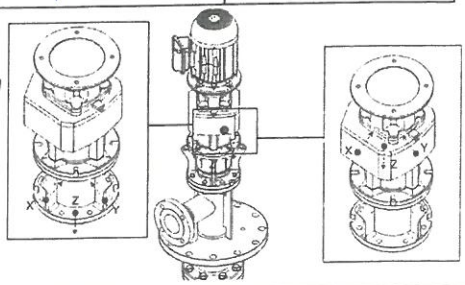
Critère d'acceptation / *Acceptance criteria :*

- ☐ Vibration ≤ 3.8mm/s RMS
- ☒ Vibration ≤ 7.1mm/s RMS
- ☐ Other : vibration ≤ …. mm/s RMS

Direction / Direction	X (radial)	Y (axial)	Z (vertical)
Niveau de vibration au palier / *Vibration level on bearing* [mm/s RMS]	0,1 mm/s	0,1 mm/s	0 mm/s

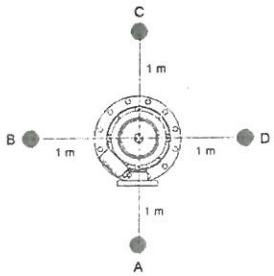
Résultat / *Result :*

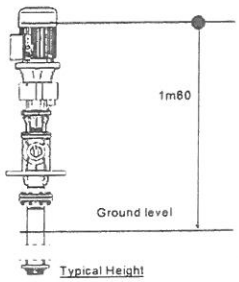
- ☒ Accepté / *Accepted*
- ☐ Accepté sous dérogation / *Accepted under derogation*
- ☐ Non accepté / *Not accepted*



RAPPORT D'ESSAI DE BRUIT / *NOISE TEST REPORT*

Critère d'acceptation / *Acceptance criteria :* Niveau de pression acoustique / *Sound pressure level* ≤ ~~80~~ 85 dB(A)





Application point	A	B	C	D
Niveau de bruit / *Noise level*	67,8 dBA	68,3 dBA	66,4 dBA	70,2 dBA

Résultat / *Result :*

- ☒ Accepté / *Accepted*
- ☐ Non accepté / *Not accepted*

2.3.8 PACKING LIST & PRESERVATION RECORD

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

PCM | keep it moving

Pre-packing list
Liste de colisage préliminaire

Issuing date 18/03/2025

Project Name:	CROSSWIND	Item Name:	P-50001 A/B - Sea Water lift Pumps	Client :	ROSETTI MARINO
PO N°:	1724000936	PCM Ref:	GIAN-392481 MF061995 / MF063102 / MF063103 / MF063104	Project Manager:	Guillaume Le Mével

DETAILED PACKING LIST - FINAL

Crate N°	Items codes		Description:	Quantity:	L (mm)	l (mm)	H (mm)	Total W (kg)	Comments
	Shipped item code	Physical parts to include							
1	**P-50001A**	**317873-1**	**CRATE N°1 of 7**	**1**	**6280**	**1380**	**960**	**1856**	**To be installed at RAVENA SITE**
ASSEMBLED	Item 50B x 2 + Kit 250A/204/107/14	W-004942300257WP	EXTENSION BODY 6IN AV7 x 2	4					
ASSEMBLED	Item 50A + 50B + 50C 2 x Kit 250A/204/107/14	W-008199257WP W-004942300257WP W-004942060257WP	STATOR PIPING 25AV24 'EXTENSION BODY 6IN AV7 'EXTENSION BODY 6IN AV7 - Short	1					
LOOSE	Item 400B	W-004957078	EXTERNAL CENTRALIZER AV7	12					
LOOSE	Item 401	C06034P257T	SCREW CHC M16-90-44	24					Bag / For Centralizer assembly as per IOM
LOOSE	Item 401A	C06001I257T	WASHER M16 200HV	24					Bag / For Centralizer assembly as per IOM
LOOSE	Item 250A	C06203J257TS	SCREW H M20-90	40					Bag / For Casing assembly as per IOM/CSD
LOOSE	Item 204	C06001J257	WASHER M20 200HV	80					Bag / For Casing assembly as per IOM/CSD
LOOSE	Item 107	C06002J257	HEX NUT H M20	40					Bag / For Casing assembly as per IOM/CSD
LOOSE	Item 14	C09002T118	FLANGE GASKET 6 CL150	5					Bag / For Casing assembly as per IOM/CSD
2	**P-50001B**	**317873-2**	**CRATE N°2 of 7**	**1**	**6280**	**1380**	**1280**	**1971**	**To be installed at RAVENA SITE**
ASSEMBLED	Item 50B x 2 + Kit 250A/204/107/14	W-004942300257WP	EXTENSION BODY 6IN AV7 x 2	4					
ASSEMBLED	Item 50A + 50B + 50C 2 x Kit 250A/204/107/14	W-008199257WP W-004942300257WP W-004942060257WP	STATOR PIPING 25AV24 'EXTENSION BODY 6IN AV7 'EXTENSION BODY 6IN AV7 - Short	1					
LOOSE	Item 400B	W-004957078	EXTERNAL CENTRALIZER AV7	12					
LOOSE	Item 401	C06034P257T	SCREW CHC M16-90-44	24					Bag / For Centralizer assembly as per IOM
LOOSE	Item 401A	C06001I257T	WASHER M16 200HV	24					Bag / For Centralizer assembly as per IOM
LOOSE	Item 250A	C06203J257TS	SCREW H M20-90	40					Bag / For Casing assembly as per IOM/CSD
LOOSE	Item 204	C06001J257	WASHER M20 200HV	80					Bag / For Casing assembly as per IOM/CSD
LOOSE	Item 107	C06002J257	HEX NUT H M20	40					Bag / For Casing assembly as per IOM/CSD
LOOSE	Item 14	C09002T118	FLANGE GASKET 6 CL150	5					Bag / For Casing assembly as per IOM/CSD
LOOSE	DIGIAN-392481-03 item	C06203H014 x 6 C06001J014 x 6 W-008278046 x 2 W-008279046 x 1	SPECIAL TOOLS FOR SITE INSTALLATION	1					
LOOSE	50-PSV-006/007	DIGIAN-392481-05	Pressure Safety Valve	2					
3	**P-50001A**	**317873-1**	**CRATE N°3 of 7**	**1**	**3580**	**1080**	**820**	**620**	**To be installed offshore**
ASSEMBLED	Item 22B + 339 + 105B x 4 + 400	See CSD	SHAFT EXTENSION	9					
ASSEMBLED	Item 20 + 22 + 22C + 105B x 4 + 400	See CSD	ROTOR, ROD & SHAFT EXTENSION	1					
ASSEMBLED	Item ACC/ACC1/560/560A/267	See CSD	API 51 + Heating jacket (including Junction box) + Support + TUBE 1-2IN OD 316L	1					
LOOSE	Item 267	F-000335014T	TUBE 1-2IN OD 316L	1					**BAG / API PLAN51 CONNECTION FOR PUMP P-50001B**
LOOSE	Item 105B	C06125C257T	SCREW HC M12-16	86					**BAGS**

keep it moving

Pre-packing list
Liste de colisage préliminaire

Issuing date 18/03/2025

Project Name:	CROSSWIND	Item Name:	P-50001 A/B - Sea Water lift Pumps	Client :	ROSETTI MARINO
PO N°:	1724000936	PCM Ref:	GIAN-392481 MF061995 / MF063102 / MF063103 / MF063104	Project Manager:	Guillaume Le Mével

DETAILED PACKING LIST - FINAL

Crate N°	Items codes		Description:	Quantity:	L (mm)	l (mm)	H (mm)	Total W (kg)	Comments
	Shipped item code	Physical parts to include							
4	**P-50001B**	**317873-2**	**CRATE N°4 of 7**	**1**	**3570**	**1080**	**820**	**500**	**To be installed offshore**
ASSEMBLED	Item 22B + 339 + 105B x 4 + 400		SHAFT EXTENSION	9					
ASSEMBLED	Item ACC/ACC1/560/560A	See CSD	API 51 + Heating jacket (including Junction box)	1					
LOOSE	Item 560	W-008269014	API PLAN 51 SUPPORT	1					**NEW**
LOOSE	Item 550/550A/551	C06095C014 x 4 C06001H014T x 8 C06002H014T x 4	M14 Screw/washer/nut for API PLAN 51 fixing	4					**NEW**
LOOSE	Item 265/266/267	F-000335014T x 1 C14259S014T x 1 C14260S014T x 1	API PLAN51 CONNECTION	1					**BAG**
5	**P-50001A**	**317873-1**	**CRATE N°5 of 7**	**1**	**2720**	**920**	**1020**	**683**	**To be installed offshore**
ASSEMBLED	Item C11/C11B/16/17/22A/36/ 50/124/300/339/515 + BOLTS	See CSD	PUMP HEAD						
LOOSE	N/A	DIGIAN-392481-04	MOUNTING FLANGE KIT (M27 bolt kit + Gasket 16in)	1					**BAGS**
LOOSE	Item 14	C09002T118	FLANGE GASKET 6 CL150	1					**BAGS**
6	**P-50001B**	**317873-12**	**CRATE N°6 of 7**	**1**	**2740**	**920**	**1020**	**815**	**To be installed offshore**
ASSEMBLED	Item C11/C11B/16/17/22A/36/ 50/124/300/339/515 + BOLTS	See CSD	PUMP HEAD	1					
LOOSE	N/A	DIGIAN-392481-04	MOUNTING FLANGE KIT (M27 bolt kit + Gasket 16in)	1					**BAGS**
LOOSE	Item 14	C09002T118	FLANGE GASKET 6 CL150	1					
LOOSE	DIGIAN-392481-03 items	C02004G014 x 1 W-007828046 x 1 W-007801046 x 1 W-007835046 x 1 W-007834046 x 1 W-008251046 x 2 C06117B010 x 2 C06001E010 x 2	SPECIAL TOOLS FOR SITE INSTALLATION	1					
LOOSE	Item 555/556/557/558	45868-014T x 1 W-004064014 x 1 C14259B014 x 1 C14260B014 x 1	PLAN 13 for Pump P-50001A	1					
7	**P-50001A/B**	**SPARE SPARES**	**CRATE N°7 of 7**	**1**	**1570**	**750**	**570**	**183**	**SPARE PARTS**
LOOSE	N/A	NM-4290-PR	Stator Seal KIT	4					
LOOSE	N/A	DIGIAN-392481-02	Static Seal kit	4					
LOOSE	N/A	STA00071	STATOR	2					
LOOSE	N/A	M-001931A257TS	ROTOR	2					
LOOSE	N/A	DIGIAN-392481-01	Mechanical Seal	2					

2.4 CERTIFICATES

2.4.1 ATEX REGISTER

2.4.2 EC DECLARATION OF CONFORMITY

2.4.3 IRN

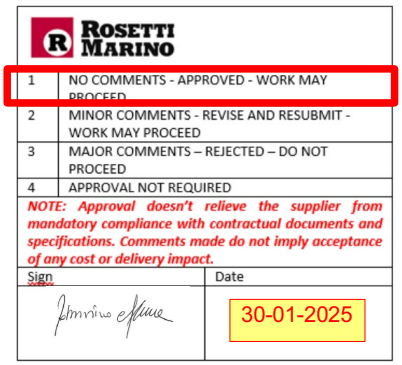
Base Load Power Hub (BLPH)

ATEX REGISTER

PROGRESSIVE CAVITY PUMPS

For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-LIS-00027


ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	30-01-2025

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
04	22/01/2025	Accepted for Construction (AFC)	APD	GLL	AHN
03	13/12/2024	Accepted for Construction (AFC)	APD	GLL	AHN
02	17/10/2024	Accepted for Construction (AFC)	APD	GLL	AHN
01	17/09/2024	Accepted for Construction (AFC)	APD	GLL	AHN
00	23/08/2024	Issue for Review (IFR)	APD	GLL	AHN

PCM keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)
03	Accepted for Construction (AFC)
04	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

No.	Revision	Tag Number	Description	Location	Manufacturer	Model Type Catalogue Number	Serial Number	ATEX Certification Marking	Reference Document	ATEX Certificate Number	Installation Zone	Notes / Comments	P.O.	Vendor	Skid / Package	Barrier Calculation Ref.	Non-Electrical Equipment	Special Conditions of safe use Applicable
1	02	H-ETE-200N1-20-L1-01A	SELF-REGULATING HEAT TRACING	P-50001A	THERMON	HTSX 15-2 OJ	N.A	II 2G Ex eb IIC T3	1724000936-MAC-DD-00011	FM 12ATEX0014X	Zone 1 IIB T3	N.A	1724000936	PCM	Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)	N.A	NO	YES
2	02	H-ETE-200N1-20-L1-01B	SELF-REGULATING HEAT TRACING	P-50001B	THERMON	HTSX 15-2 OJ	N.A	II 2G Ex eb IIC T3	1724000936-MAC-DD-00011	FM 12ATEX0014X	Zone 1 IIB T3	N.A	1724000936	PCM	Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)	N.A	NO	YES
3	02	ETB-200N1-20-L1-01A	HEATING CABLE JUNCTION BOX	P-50001A	THERMON	ZP-XP	27652-1	II 2G Ex db eb IIC T3	1724000936-MAC-DD-00011	FM 10ATEX0058X	Zone 1 IIB T3	N.A	1724000936	PCM	Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)	N.A	NO	YES
4	02	ETB-200N1-20-L1-01B	HEATING CABLE JUNCTION BOX	P-50001B	THERMON	ZP-XP	27652-2	II 2G Ex db eb IIC T3	1724000936-MAC-DD-00011	FM 10ATEX0058X	Zone 1 IIB T3	N.A	1724000936	PCM	Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)	N.A	NO	YES
5	02	50-PSV-006	PRESSURE SAFETY VALVE	P-50001A	TAI	3000W	200145	II 2G Ex h IIB T3	1724000936-MAC-DS-00034	BVI/ATEX/ITA/23/055	Zone 1 IIB T3	N.A	1724000936	PCM	Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)	N.A	YES	NO
6	02	50-PSV-007	PRESSURE SAFETY VALVE	P-50001B	TAI	3000W	200146	II 2G Ex h IIB T3	1724000936-MAC-DS-00034	BVI/ATEX/ITA/23/055	Zone 1 IIB T3	N.A	1724000936	PCM	Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)	N.A	YES	NO

1 # EU-TYPE EXAMINATION CERTIFICATE

2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU**

3 **EU-Type Examination Certificate No:** **FM12ATEX0014X**

4 **Equipment or protective system: (Type Reference and Name)** **HTSX Parallel Circuit Self-Regulating Heating Cable Systems**

5 **Name of Applicant:** **Thermon Inc**

6 **Address of Applicant:** **100 Thermon Drive**
San Marcos, Texas 78666
United States of America

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

8 FM Approvals Europe Ltd, notified body number 2809 in accordance with Article 17 of Directive 2014/34/EU of 26 February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number:

3042407 dated 29th January 2014

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN IEC 60079-0:2018, EN 60079-30-1:2017 and EN 60529:1991+A1:2000+A2:2013

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

11 This EU-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include:

II 2 G Ex 60079-30-1 IIC T* Gb
II 2 D Ex 60079-30-1 IIIC T* Db
-60˚C<Ta<+55˚C

* Temperature Classes depend on the cable model and are given on the following page.

Richard Zammitt
Certification Manager, FM Approvals Europe Ltd.

Issue date: 25th April 2019

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

SCHEDULE

to EU-Type Examination Certificate No. FM12ATEX0014X

13 **Description of Equipment or Protective System:**

HTSX Parallel Circuit Heat Trace Cable Systems are intended to heat metal or plastic piping and vessels. The products are twin-lead parallel circuit self-regulating heating cables that produce heat inversely proportional to pipe temperature. The cable is rated 3 to 20 watts per foot (10 to 66 W/m) and has temperature ratings of 150ºC for maximum maintenance, 250ºC for maximum intermittent exposure (power on) as well as maximum exposure temperature (power off). The maximum rated voltage is 277 Vac. The maximum exposure temperature is 230ºC for ET-8C, PETK-2, SCTK-2, TBX-4LC kits or 250°C for the SK-SX kit.

* Temperature Class:
Using "product classification approach"
T3 for Category 2G; T200°C for Category 2D; for HTSX 3-1, 3-2, 6-1, 6-2, 9-1, 9-2, 12-1, 12-2, 15-2
215°C (T2) for Category 2G; T215°C for Category 2D; for HTSX 15-1, 20-1
230°C (T2) for Category 2G; T230°C for Category 2D; for HTSX 20-2
Using "systems approach – stabilized and controlled design verification":
T3…T2 for Category 2G; T200ºC… T300ºC for Category 2D.

The HTSX Series cables meet the requirements for Degree of Protection IP66 in accordance with EN 60529. The final Degree of Protection of the equipment depends on the ratings of the wiring accessory kits that are separately certified.

HTSXa-b-c. Parallel Circuit Self-Regulating Heating Cable Systems
a = Output, W/ft @ 50°F (W/m @ 10°C): 3 (10), 6 (20), 9 (30), 12 (39), 15 (49), or 20 (66)
b = Voltage: 1 or 2
c = Outerjacket Material Option: OJ

14 **Specific Conditions of Use:**

Heating cable systems must be installed using the manufacturer's suitably rated accessory kits in accordance with the applicable instructions.

For insulated externally heated surfaces, lower T- class systems may be obtained by utilizing stabilized design of a trace heating system using methods described in EN 60079-30-2, using CompuTrace Electric Heat Tracing Design Software or by Thermon Engineering. The system design parameters, including the resulting T-class, shall be retained as a record of system documentation for each stabilized system design for as long as the system is in use. The parameters in the system documentation shall be checked during commissioning of the system.

15 **Essential Health and Safety Requirements:**

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

16 **Test and Assessment Procedure and Conditions:**

This EU-Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

SCHEDULE

to EU-Type Examination Certificate No. FM12ATEX0014X

Europe Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Europe Ltd's ATEX Certification Scheme.

17 **Schedule Drawings**

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by the Notified Body.

18 **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
5th February 2014	Original Issue.
29th March 2017	Supplement 1: Report Reference: RR208795 dated 27th March 2017 Description of the Change: Updating to EU-Type Examination Certificate, updating the standards used, adding the Specific Conditions of Use, and updating temperature characteristics.
19th June 2017	Supplement 2: Report Reference: 3062371 dated 16th June 2017 Description of the Change: Drawing updates and testing conducted in order to qualify reduction of conductive braid coverage from 80% to 70% and in order to clarify existing cable material descriptions given on controlled documentation.
25th April 2019	Supplement 3: Report Reference: RR217536 dated 27th March 2019 Description of the Change: Gap analysis evaluation satisfactorily conducted, marking and documentation updates made in order to demonstrate continued compliance with EN IEC 60079-0:2018 and EN 60079-30-1:2017, clarification added to temperature ratings and in order to address CE number change from 1725 to 2809 with transfer of QAN. Certificate transferred from FM Approvals Ltd., notified body no. 1725, to FM Approvals Europe Ltd., no. 2809.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

Blueprint Report

Thermon Inc (1000001137)

Class No ATEX

Original Project I.D. 3042407

Certificate I.D. FM12ATEX0014X

Drawing No.	Revision Level	Drawing Title	Last Report
A0118009	4	HTSX Heating Cable Design Specifications	3062371
OP 5.61.1	R20	HTSX / KSX Cable Marking	RR217536
PN 50207U	0319	Electrical Heat Tracing Installation Instructions	RR217536
TEP0074	0219	HTSX Product Specifications	RR217536

1 # EU-TYPE EXAMINATION CERTIFICATE

2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU**

3 **EU-Type Examination Certificate No:** **FM10ATEX0058X**

4 **Equipment or protective system: (Type Reference and Name)**

Trace Heater Terminator Connection Kits comprising of:
Za-b Terminator Series: Power, Splice, End Termination Kits.
ZP-Ambient Sensing Thermostat Connection Kit.
ZP-MI Terminator MI Kit.
ZP-PTD100 Terminator Kit.
ZT Terminator Thermostat / Power Kit.

5 **Name of Applicant:** **Thermon Inc**

6 **Address of Applicant:** **100 Thermon Drive**
San Marcos, TX 78666
United States

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

8 FM Approvals Europe Ltd, notified body number 2809 in accordance with Article 17 of Directive 2014/34/EU of 26 February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number:

3041145EC dated 8th April 2011

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN IEC 60079-0:2018, EN 60079-1:2014, EN IEC 60079-7:2015 +A1:2018, EN 60079-18:2015 +A1:2017, EN 60079-31:2014 and EN 60529:1991 +A1:2000 +A2:2013

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

11 This EU-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

Martin Crowe
Certification Manager, FM Approvals Europe Ltd.

Issue date: 14th February 2022

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals Europe Limited, One Georges Quay Plaza, Dublin. Ireland. D02 E440
T: +353 (0) 1761 4200 E-mail: atex@fmapprovals.com www.fmapprovals.com

SCHEDULE

to EU-Type Examination Certificate No. FM10ATEX0058X

12 The marking of the equipment or protective system shall include:

Za-b Terminator Series: Power, Splice, End Termination Kits
II 2 G Ex eb IIC T6…T4 Gb
II 2 D Ex tb IIIC T85°C…T135°C Db
-60°C ≤ Ta ≤ +55°C

ZP-Ambient Sensing Thermostat Connection Kit
II 2 G Ex eb mb IIC T6…T4 Gb
-50°C ≤ Ta ≤ +50°C

ZP-MI Terminator MI Kit
II 2 G Ex eb IIC T6…T4 Gb
II 2 D Ex tb IIIC T85°C…T135°C Db
-60°C ≤ Ta ≤ +55°C

ZP-PTD100 Terminator Kit
II 2 G Ex db eb IIC T6…T4 Gb
II 2 D Ex tb IIIC T85°C…T135°C Db
-48°C ≤ Ta ≤ +55°C

ZT Terminator Thermostat / Power Kit
II 2 G Ex db eb IIC T6…T5 Gb
II 2 D Ex tb IIIC T85°C…T100°C Db
T6,85°C: Ta = -60°C to +55°C, 16 Amps max
T5,100°C: Ta=-60°C to +50°C, 25 Amps max

13 **Description of Equipment or Protective System:**

The Terminator Series are electrical connection and termination kits for use with the manufacturer's IECEx certified heat trace cable systems. The kits are mounted on pipes, walls, and other surfaces of industrial applications and processes that require temperature maintenance or freeze protection. Terminators may be designated as "-XP" for pipe-mounting or as "-WP" for wall-mounting. Terminators may also be mounted on a wall or secured with a bracket to a pipe using the "WMK" Wall Mount Conversion Kit.

The Terminator Series hold a Degree of Protection IP66 in accordance with EN 60529 when properly installed using the manufacturer's suitably rated heat trace cables.

The following models are included in the Terminator Series covered by this certificate:

Za-b. Terminator Series: Power, Splice and End Termination Kits in conjunction with PETK-1, -2, -3 and/or SCTK-1, -2, -3 Sub-kits.
a = Kit Type Designation: P, S or E.
b = Trace Heater Profile Designation: Blank (For use with BSX, HTSX, KSX, RSX, TSX, VSX, HPT, and FP trace heaters), L (For use with BSX, HTSX, KSX, RSX, TSX, and VSX trace heaters), S (For use with BSX, HPT, FP, HTSX, and KSX trace heaters), M (For use with TEK and HTEK trace heaters in "ZP" Kit Type only), or MS (For use with TEK and HTEK trace heaters in "ZP" Kit Type only).
The ZP Terminator Kits are designed to fabricate power connections, inline/T-splice connections or for making end terminations for heating circuits. The ZS/ZE Terminator Kits are designed to fabricate in-line splice connections, t-splice connections and end terminations for Thermon trace heaters. Electrical connections are made using wire fasteners. The PETK sub-kits consist of RTV sealant, a molded silicone rubber boot and a molded silicone rubber end cap. The PETK-3 sub-kit also includes a molded silicone rubber grommet and Teflon tape. The SCTK sub-kits consist of RTV sealant, a molded silicone rubber splice connection boot, small crimps, a large crimp, small crimp insulators and silicone caps. The SCTK-3 sub-kit also includes a molded silicone rubber grommet.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

SCHEDULE

to EU-Type Examination Certificate No. FM10ATEX0058X

ZP-Ambient Sensing Thermostat Connection Kit.
The Terminator ZP-Ambient sensing thermostat connection kit is designed to provide ambient sensing control of electric heat tracing circuits for freeze protection of piping and vessels. This thermostat can be used to control a heating circuit or as pilot control of a contactor switching multiple heat tracing circuits.

ZP-MI. Terminator MI Kit.
The ZP-MI Terminator Kits are specifically designed for power connection terminations for use with Thermon MI (Mineral Insulated) trace heater sets.

ZP-PTD100. Terminator Kit.
The ZP-PTD-100 Terminator Kits are specifically designed for power connection terminations for use with Thermon PTD-100 temperature sensors. Electrical connections are made using terminal blocks.

ZT. Terminator Thermostat / Power Kit.
The ZT Thermostat / Power kits are designed for use as an adjustable thermostat for trace heating freeze protection and temperature maintenance applications requiring pipewall or tankwall sensing. Electrical connections are made using terminal blocks.

14 **Specific Conditions of Use:**

For the ZT Thermostat / Power Connection Kit

1. *Consult the manufacturer for dimensional information on the flameproof joints for repair.*
2. *Avoid Electrostatic Charge. Clean only with a damp cloth.*
3. *T5 and T100°C for switching amperage of thermostat limited to 25 Amps maximum.*
4. *T6 and T85°C for switching amperage of thermostat limited to 16 Amps maximum.*

For the ZP-PTD100 Terminator Kit

1. *Consult the manufacturer for dimensional information on the flameproof joints for repair.*
2. *Avoid electrostatic charge. Clean only with a damp cloth.*

For all other Terminator Series

1. *Avoid electrostatic charge. Clean only with a damp cloth.*

15 **Essential Health and Safety Requirements:**

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

16 **Test and Assessment Procedure and Conditions:**

This EU-Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Europe Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

SCHEDULE

to EU-Type Examination Certificate No. FM10ATEX0058X

This Certificate has been issued in accordance with FM Approvals Europe Ltd's ATEX Certification Scheme.

17 **Schedule Drawings**

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by the Notified Body.

18 **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
12th April 2011	Original Issue.
7th December 2012	Supplement 1: Report Reference: 3045414, 6th December 2012 Description of the Change: Add the Terminator ZT Thermostat / Power Connection Kit and update EN 60079-0 to 2012 edition.
5th July 2013	Supplement 2: Report Reference: 3041145ECrev130513, dated 21st June 2013 Description of the Change: Updated Terminator ZT Thermostat / Power Connection Kit to include 400 Vac/16 Amp option, adjust ambient ratings based on amperage levels, and update model code structure.
6th December 2013	Supplement 3: Report Reference: 3050484, 30th October 2013 Description of the Change: Update ZP Terminator to include –M / -MS version. Corrected maximum pipe temperature exposure for the pipe mounted version (–XP) kit from 232°C to 250°C. Process manufacturer's drawing changes, which also includes additional Terminator Grommets to Terminator Series Kits. Update EN 60079-0:2009 standard to the EN 60079-0:2012 standard.
22nd April 2014	Supplement 4: Report Reference: 3041145rev140102, dated 9th April 2014 Description of the Change: Corrected drawings in CDL to reflect actual drawings controlled. Corrected Za-b Model Code description in Certificate, Section 13.
14th February 2022	Supplement 5: Report Reference: RR229679 dated 11th February 2022 Description of the Change: Re-issue of the certificate by NB2809 following file transfer from FM Approvals Limited (UK). Minor revisions to labels and instructions due to transfer of manufacturer's QAN as well as updated standard requirements. Removal of ZE-B Terminator Beacon now covered under FM18ATEX0065X. Minor updates to certificate to clarify existing ratings. Continued compliance shown and standards updated: EN 60079-0:2012 to EN IEC 60079-0:2018, EN 60079-1:2007 to 2014, EN 60079-7:2007 to 2015 +A1:2018, EN 60079-18:2009 to 2015 +A1:2017, EN 60079-31:2009 to 2014, and EN 60529 to include +A2:2013.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

Blueprint Report

Thermon Inc (1000001137)

Class No ATEX

Original Project I.D. 3041145

Certificate I.D. FM10ATEX0058X

Drawing No.	Rev Lvl	Drawing Title	Last Report	Electronic
5326	1	Terminator ZP-AMB-L-WP Ambient Thermostat General Arrangement	3050484	Yes (pdf)
A0217012	3	Terminator Electrical Component List	3050484	Yes (pdf)
A0217034	0	Terminator ZP-Ambient Sub-Assembly	3050484	Yes (pdf)
A1030-02	2	Dimensions PTD-100-X	3041145	Yes (pdf)
B0208011	7	ET-8 Molded End Cap	3050484	Yes (pdf)
B0208013	5	ET-6 Molded End Cap	3050484	Yes (pdf)
B0208014	5	ET-7 Molded End Cap	3050484	Yes (pdf)
B0209001	5	Termination Boot TBX-3L	3050484	Yes (pdf)
B0209002	8	Termination Boot TBX-4L	3050484	Yes (pdf)
B0209015	6	Termination Boot TBX-5S	3050484	Yes (pdf)
B0209016	8	Termination Boot TBX-5L	3050484	Yes (pdf)
B0209017	4	Termination Boot TBX-3S	3050484	Yes (pdf)
B0209018	6	Termination Boot TBX-4S	3050484	Yes (pdf)
B0210023	0	GRW-F Grommet	3041145	Yes (pdf)
B0210024	0	GRW-G Grommet	3041145	Yes (pdf)
B0210025	0	GRW-L Grommet	3041145	Yes (pdf)
B0210026	0	GRW-T Grommet	3041145	Yes (pdf)
B0210027	1	GRW-F/TSTAT Grommet	3050484	Yes (pdf)
B0210028	1	GRW-G/TSTAT Grommet	3045414	Yes (pdf)
B0210029	1	GRW-L/TSTAT Grommet	3045414	Yes (pdf)
B0210030	1	GRW-T/TSTAT Grommet	3050484	Yes (pdf)
B0210033	0	GRW-GT2 Grommet	3050484	Yes (pdf)
B0210034	0	GRW-LT2 Grommet	3050484	Yes (pdf)
B0210036	0	GRW-FT2 Grommet	3050484	Yes (pdf)
B0217001	3	Terminator Junction Box Base	3041145	Yes (pdf)
B0217002	3	Terminator Junction Box Lid	3041145	Yes (pdf)
B0217003	2	Terminator VIL Junction Box Base	3041145	Yes (pdf)
B0217004	2	Terminator Support Base	3041145	Yes (pdf)
B0217005	2	Terminator Support Base Banding Guide	3041145	Yes (pdf)
B0217006	2	Terminator Support Cap	3041145	Yes (pdf)
B0217007	3	Terminator Splice Cap	3041145	Yes (pdf)
B0217008	1	Terminator Splice Cap Latch	3041145	Yes (pdf)
B0217009	2	Terminator Threaded Grommet Compressor	3041145	Yes (pdf)
B0217010	2	Terminator Grommet Compressor	3041145	Yes (pdf)
B0217011	2	Terminator Nut	3041145	Yes (pdf)
B0217015	0	Terminator Wall Mount Support Base	3041145	Yes (pdf)
B0308018	24	DP, DL, DE, DS, DE-B, DP-M, ZP, ZL, ZE, ZS, ZE-B, ZP-M Labels	RR229679	Yes (pdf)
B0308022	12	ZP, ZL, ZP-R, ZP-Ambient, ZP-PTD100, ECM, ZT ZS/ZE, ZE-B Kits For Thermon Europe	RR229679	Yes (pdf)
B0308027	6	DP-L, DL-L, DP-S, DL-S, ZP-L, ZL-L, ZP-S, ZL-S, DS-L/DE-L, DS-S/DE-S, ZS-L/ZE-L, ZS-S/ZE-S Labels	RR229679	Yes (pdf)
B0308032	2	ZP-L, ZL-L, ZP-S, ZL-S, ZS-L/ZE-L, ZS-S/ZE-S Kits For Thermon Europe	RR229679	Yes (pdf)
PN 50099U	1121	Terminator ZP-MS Installation Procedures	RR229679	Yes (pdf)
PN 50135U	1121	SCTK Splice Connection Termination Kit, Installation Procedures	RR229679	Yes (pdf)
PN 50136U	1121	PETK Power and End Termination Kit, Installation Procedures	RR229679	Yes (pdf)
PN 50816U	1121	In-Line Splice/End Termination Kit Installation Instructions, Terminator ZS/ZE	RR229679	Yes (pdf)
PN 50828U	1121	Terminator ZP-M Installation Procedures	RR229679	Yes (pdf)
PN 50829U	1121	Wall Mount Conversion Kit Installation Instructions, Terminator WMK	RR229679	Yes (pdf)
PN 50834U	1121	Teminator ZP-MI-WP Installation Procedures	RR229679	Yes (pdf)
PN 50835U	1121	Teminator ZP-PTD100-WP Installation Procedures	RR229679	Yes (pdf)
PN 50836U	1121	Terminator ZP-MI-WP Installation Procedures	RR229679	Yes (pdf)

PN 50837U	1121	Terminator ZP-MI-XP Power Connection Kit Installation Procedures	RR229679	Yes (pdf)
PN 50845U	1121	Terminator ZP-XP Power Connection Kit Installation Procedures	RR229679	Yes (pdf)
PN 50846U	1121	Terminator ZP-WP Power Connection Kit Installation Procedures	RR229679	Yes (pdf)
PN 50850U	1121	Terminator ZT-XP Installation Procedures	RR229679	Yes (pdf)
PN 50852U	1121	Terminator ZP-Ambient-WP Installation Procedures	RR229679	Yes (pdf)
PN 50861U	1121	Terminator ZP-Ambient-XP Installation Procedures	RR229679	Yes (pdf)
PTD-100	1	Purchase Specification	3041145	Yes (pdf)
TEP0088U	1013	Terminator Specification Sheet	3050484	Yes (pdf)
TEP0089U	0718	Terminator ZT Product Specifications	RR229679	Yes (pdf)
TEP0094U	1121	Terminator ZP-Ambient Specification Sheet	RR229679	Yes (pdf)

TAI MILANO S.p.A.
Via Petrella, 21 - 20124 MILANO
Tel. 02/29525941 - Fax. 02/29404417

DECLARATION OF CONFORMITY TO ATEX DIRECTIVE 2014/34/EU

DICHIARAZIONE DI CONFORMITA' ALLA DIRETTIVA ATEX 2014/34/UE

JOB - Commessa	CUSTOMER – Cliente	P.O. No. – Ord. No.
24/2428	ENOLIA	CF2406-4511

NAME AND ADDRESS OF MANUFACTURER: Nome e indirizzo del Costruttore	TAI MILANO S.p.A. Via Petrella, 21 20124 MILANO MI ITALY
DESCRIPTION OF THE EQUIPMENT: Descrizione dell'apparecchiatura	SAFETY VALVE CHANGEOVER VALVE BUCKLING PIN VALVE Valvola di sicurezza Valvola di scambio Valvola Buckling Pin

WE HEREBY DECLARE THAT THE DESIGN AND MANUFACTURE OF THE VALVES LISTED BELOW MEET THE REQUIREMENT OF THE ATEX DIRECTIVE 2014/34/UE.
Dichiariamo che progettazione e fabbricazione delle sottoelencate valvole sono in accordo alla Direttiva Atex 2014/34/UE

- SPRING LOADED SAFETY VALVES SERIES 3000-3000A-3000B-3000P-3000L-3000W-3000H-4000-4000W-200.
  Valvole di sicurezza a molla serie
- PILOT OPERATED SAFETY VALVES SERIES 9000/60-9000/70-9000/90
  Valvole di sicurezza comandate da pilota serie
- CHANGEOVER VALVES SERIES 1000
  Valvole di scambio serie
- BUCKLING PIN VALVES SERIES 3000H AND 3000H-PRPD
  Valvole Buckling Pin serie

CONFORMITY ASSESSMENT PROCEDURE: Annex VIII **Procedura di valutazione della conformità:**
MODULE: Internal control of production Modulo: Controllo interno di produzione
TECHNICAL FILE No. ATEX-TD-01 Rev. 1 KEPT BY BUREAU VERITAS – RECEIPT No. BVI/ATEX/ITA/23/055 Dossier Tecnico ATEX-TD-01 Rev. 1 conservato da Bureau Veritas – Ricevuta n. BVI/ATEX/ITA/23/055
MARKING Marcatura CE Ex II 2G Ex h IIB Tx Gb

HARMONIZED STANDARD USED: Norme Armonizzate applicate	EN ISO 80079-36:2016 EN ISO80079-37:2016

08/10/2024	TAI MILANO S.p.A.		TAI MILANO S.p.A on behalf of Quality Assurance Manager
DATE Data	STAMP Timbro	SIGNATURE Firma	POSITION TITLE Posizione

keep it moving

DECLARATION DE CONFORMITE UE
EU DECLARATION OF CONFORMITY
EU – KONFORMITÄTSERKLÄRUNG
DECLARACION DE CONFORMIDAD UE

PROCESS :	WR0	**CODE :**	WW0078	**INDEX :**	H
SENT BY :	RGT	**THE :**	2019-01-15	**PAGE :**	Page **1** of **1**
CONFIDENTIALITY :	External				

PCM REF */ PCM REF / PCM REF*: **SO496716** REF. CLIENT */ CUSTOMER REF / KUNDEN REFERENZ*.: **1724000936**

FOURNISSEUR – *SUPPLIER - PROVEEDOR*

Personne autorisée à constituer le dossier technique :
Person authorized to compile technical file
Bevollmächtigter für die Zusammenstellung der Technischen Unterlagen
Persona autorizada a realizar el expediente técnico

Guillaume PIETTE
Technical Team Manager

1 rue René Moineau
49123 Champtocé sur Loire
France

Fabricant :
Manufacturer :
Hersteller :
Fabricante :

PCM Manufacturing France S.A.S.

Adresse :
Address :
Adresse :
Dirección :

6, Boulevard Bineau
92300 Levallois-Perret
France
☎ +33 1 77 68 31 29

CLIENT – *CLIENT - CLIENTE*

Nom :
Name :
Name :
Nombre :

Etablissement :
Company :
Betrieb :
Compañia :

ROSETTI MARINO

Adresse :
Address :
Adresse :
Dirección :

Via Trieste, 230
48122 Ravenna (RA)
Italy

Nous déclarons que le matériel désigné ci-dessous
We herewith declare that the below mentioned equipment
Der folgende beschriebene Gegenstand der Erklärung erfüllt die einschlägigen
Declaramos que el material mencionado abajo

N° DE SERIE : **070P140016399**
070P140016400
SERIAL N°: (317873)
SERIEN Nr : **Tag n° P5000 A/B**
N° DE SERIE :

DESCRIPTION DU MATERIEL :
Product description :
Bezeischnung des Produktes :
Descripción del material :

PCM Moineau™ A progressing cavity pump, model 25AV24.
Designed for vertical installation

est conforme aux dispositions des directives suivantes :
complies with the requirements of the following directives:
erfüllt die folgenden Richtlinien :
cumple con los requisitos de las siguientes directivas

☒ Directive « Machine » (2006/42/CE) / *EC – Directive Machinery (2006/42/EC) / Maschinenrichtlinie 2006/42/EG / Directiva de Máquinas (2006/42/EC)*
☒ Directive « Basse tension » (2014/35/UE) / *Low-voltage directive (2014/35/EU) / NiederSpannungsrichlinie 2014/35/EU / Directiva de baja tensión (2014/35/EU)*
☐ Directive « Compatibilité électromagnétique » (2014/30/UE) / *Electromagnetic compatibility directive (2014/30/EU) / EMC Directive (2014/30/EU) / Directiva de compatibilidad electromagnética (2014/30/EU)*
☒ Directive « Equipements sous pression » (2014/68/UE) / *Pressure Equipment Directive (2014/68/EU)* / Druckgeräte (2014/68/EU) / *Directiva de equipos bajo presión (2014/68/EU).*

Nom et fonction :
Name and position :
Name und Funktion :
Nombre y cargo :

Olivier BUFFARD
Group Plant Manager and Qhse Manager

Date :
Date :
Daten :
Fecha :

2025-01-08

Signature :
Signature :
Unterschrift :
Firma :

PCM Manufacturing France SAS
Rue de l'ancienne gare
49123 Champtocé-sur-Loire
Tél. +33 1 77 68 31 29
Siret 803 933 399 00021 - APE 2813Z
TVA FR 66 803 933 399
S.A.S. au capital de 25 000 000 €

Nom et fonction :
Name and position :
Name und Funktion :
Nombre y cargo :

Sébastien CLOAREC
Chief Operations Officer

Date :
Date :
Daten :
Fecha :

2025-01-08

Signature :
Signature :
Unterschrift :
Firma :

PCM TECHNOLOGIES S.A.S.
Rue René Moineau - 49123 Champtocé-sur-Loire
Tél. +33 1 77 68 31 38
Siret 802 419 960 00025 - APE 7490B
TVA FR 25 802 419 960
S.A.S. au capital de 500 000 €

CE

EU Declaration Of Conformity

a degree above

Manufacturer representative:	Thermon Europe Boezemweg 25 2641 KG Pijnacker, The Netherlands

Declares in its sole responsibility that the product mentioned below

Model Designation:	HTSX Parallel Circuit Self-Regulating Heating Cable Systems

is in conformity with the essential protection requirements of the following Directive(s), Certification Scheme(s), and Standard(s).

Directives(s) / Scheme(s)	**Standard(s)** (Note 2)
2014/34/EU ATEX Directive	EN 60079-0: 2018 EN 60079-30-1: 2017 EN 62395-1: 2006 (Covers ESHR)
IEC Certification Scheme For Explosive Atmosphere	IEC 60079-0: 2017 IEC/IEEE 60079-30-1: 2015 IEC 62395-1: 2006 (Covers ESHR)

Type Examination Certificate	
ATEX	**IECEx**
FM 12ATEX0014X	IECEx FMG 12.0004X

Certification Body	
ATEX	**IECEx**
FM Approval Europe Ltd. (2809) One Georges Quay Plaza, Dublin. Ireland. D02 E440	FM Approval LLC. 1151 Boston-Providence Turnpike Norwood, MA 02062 USA

Marking (Note 1)	
ATEX	**IECEx**
II 2 G Ex 60079-30-1 IIC T* Gb II 2 D Ex 60079-30-1 IIIC T* Db	Ex 60079-30-1 IIC T* Gb Ex 60079-30-1 IIIC T* Db

*Temperature class

T3 for EPL Gb;T200 ℃ for EPL Db; for HTSX 3-1, 3-2, 6-1, 6-2, 9-1, 9-2, 12-1, 12-2, 15-2

215 ℃ (T2) for EPL Gb; T215 ℃ for EPL Db; for HTSX 15-1, 20-1

230 ℃ (T2) for EPL Gb; 230 ℃ for EPL Db; for HTSX 20-2

Note 1: Lower temperature class ratings (T3-T6) may be achieved by system approach method using controlled or stabilized design. The certification of this product includes proprietary Thermon Software; which has been reviewed and meets the requirements of the listed standards as part of the certificate. The lower T-ratings like T3, T4 T5 and T6 are calculated with the use of the parameters of the heat trace standard IEC 60079-30-1. Approved calculations are available, upon request. In case of lower temperature classes approved calculations will be delivered, these are seen as part of this declaration of conformity.

Note 2: Product remains state of the art when standards on type certificate do not appear in the Official Journal. Gap analysis has been performed.
Note 3: Rating data, characteristics and for incorporation into equipment refer Installation & operating manual.

QAN compliance has been approved (DEKRA 19ATEXQ0087) by Dekra Certification B.V.
Meander 1051, 6825 MJ, Arnhem, The Netherlands
Notified Body 0344

Signature:

Name: Leendert Bel
Designation: Sr. Certification Engineer, ATEX/Ex Authorized Person
Place and Date: Pijnacker, The Netherlands 2021 December 27

1 # EU-TYPE EXAMINATION CERTIFICATE

2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU**

3	**EU-Type Examination Certificate No:**	**FM10ATEX0058X**
4	**Equipment or protective system: (Type Reference and Name)**	**Trace Heater Terminator Connection Kits comprising of:** **Za-b Terminator Series: Power, Splice, End Termination Kits.** **ZP-Ambient Sensing Thermostat Connection Kit.** **ZP-MI Terminator MI Kit.** **ZP-PTD100 Terminator Kit.** **ZT Terminator Thermostat / Power Kit.**
5	**Name of Applicant:**	**Thermon Inc**
6	**Address of Applicant:**	**100 Thermon Drive** **San Marcos, TX 78666** **United States**

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

8 FM Approvals Europe Ltd, notified body number 2809 in accordance with Article 17 of Directive 2014/34/EU of 26 February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number:

3041145EC dated 8th April 2011

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN IEC 60079-0:2018, EN 60079-1:2014, EN IEC 60079-7:2015 +A1:2018, EN 60079-18:2015 +A1:2017, EN 60079-31:2014 and EN 60529:1991 +A1:2000 +A2:2013

10 If the sign ‘X’ is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

11 This EU-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

Martin Crowe
Certification Manager, FM Approvals Europe Ltd.

Issue date: 14th February 2022

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals Europe Limited, One Georges Quay Plaza, Dublin. Ireland. D02 E440
T: +353 (0) 1761 4200 E-mail: atex@fmapprovals.com www.fmapprovals.com

SCHEDULE

to EU-Type Examination Certificate No. FM10ATEX0058X

12 The marking of the equipment or protective system shall include:

Za-b Terminator Series: Power, Splice, End Termination Kits
II 2 G Ex eb IIC T6…T4 Gb
II 2 D Ex tb IIIC T85°C…T135°C Db
-60°C ≤ Ta ≤ +55°C

ZP-Ambient Sensing Thermostat Connection Kit
II 2 G Ex eb mb IIC T6…T4 Gb
-50°C ≤ Ta ≤ +50°C

ZP-MI Terminator MI Kit
II 2 G Ex eb IIC T6…T4 Gb
II 2 D Ex tb IIIC T85°C…T135°C Db
-60°C ≤ Ta ≤ +55°C

ZP-PTD100 Terminator Kit
II 2 G Ex db eb IIC T6…T4 Gb
II 2 D Ex tb IIIC T85°C…T135°C Db
-48°C ≤ Ta ≤ +55°C

ZT Terminator Thermostat / Power Kit
II 2 G Ex db eb IIC T6…T5 Gb
II 2 D Ex tb IIIC T85°C…T100°C Db
T6,85°C: Ta = -60°C to +55°C, 16 Amps max
T5,100°C: Ta=-60°C to +50°C, 25 Amps max

13 **Description of Equipment or Protective System:**

The Terminator Series are electrical connection and termination kits for use with the manufacturer's IECEx certified heat trace cable systems. The kits are mounted on pipes, walls, and other surfaces of industrial applications and processes that require temperature maintenance or freeze protection. Terminators may be designated as "-XP" for pipe-mounting or as "-WP" for wall-mounting. Terminators may also be mounted on a wall or secured with a bracket to a pipe using the "WMK" Wall Mount Conversion Kit.

The Terminator Series hold a Degree of Protection IP66 in accordance with EN 60529 when properly installed using the manufacturer's suitably rated heat trace cables.

The following models are included in the Terminator Series covered by this certificate:

Za-b. Terminator Series: Power, Splice and End Termination Kits in conjunction with PETK-1, -2, -3 and/or SCTK-1, -2, -3 Sub-kits.
a = Kit Type Designation: P, S or E.
b = Trace Heater Profile Designation: Blank (For use with BSX, HTSX, KSX, RSX, TSX, VSX, HPT, and FP trace heaters), L (For use with BSX, HTSX, KSX, RSX, TSX, and VSX trace heaters), S (For use with BSX, HPT, FP, HTSX, and KSX trace heaters), M (For use with TEK and HTEK trace heaters in "ZP" Kit Type only), or MS (For use with TEK and HTEK trace heaters in "ZP" Kit Type only).
The ZP Terminator Kits are designed to fabricate power connections, inline/T-splice connections or for making end terminations for heating circuits. The ZS/ZE Terminator Kits are designed to fabricate in-line splice connections, t-splice connections and end terminations for Thermon trace heaters. Electrical connections are made using wire fasteners. The PETK sub-kits consist of RTV sealant, a molded silicone rubber boot and a molded silicone rubber end cap. The PETK-3 sub-kit also includes a molded silicone rubber grommet and Teflon tape. The SCTK sub-kits consist of RTV sealant, a molded silicone rubber splice connection boot, small crimps, a large crimp, small crimp insulators and silicone caps. The SCTK-3 sub-kit also includes a molded silicone rubber grommet.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

SCHEDULE

to EU-Type Examination Certificate No. FM10ATEX0058X

ZP-Ambient Sensing Thermostat Connection Kit.
The Terminator ZP-Ambient sensing thermostat connection kit is designed to provide ambient sensing control of electric heat tracing circuits for freeze protection of piping and vessels. This thermostat can be used to control a heating circuit or as pilot control of a contactor switching multiple heat tracing circuits.

ZP-MI. Terminator MI Kit.
The ZP-MI Terminator Kits are specifically designed for power connection terminations for use with Thermon MI (Mineral Insulated) trace heater sets.

ZP-PTD100. Terminator Kit.
The ZP-PTD-100 Terminator Kits are specifically designed for power connection terminations for use with Thermon PTD-100 temperature sensors. Electrical connections are made using terminal blocks.

ZT. Terminator Thermostat / Power Kit.
The ZT Thermostat / Power kits are designed for use as an adjustable thermostat for trace heating freeze protection and temperature maintenance applications requiring pipewall or tankwall sensing. Electrical connections are made using terminal blocks.

14 **Specific Conditions of Use:**

For the ZT Thermostat / Power Connection Kit

1. *Consult the manufacturer for dimensional information on the flameproof joints for repair.*
2. *Avoid Electrostatic Charge. Clean only with a damp cloth.*
3. *T5 and T100°C for switching amperage of thermostat limited to 25 Amps maximum.*
4. *T6 and T85°C for switching amperage of thermostat limited to 16 Amps maximum.*

For the ZP-PTD100 Terminator Kit

1. *Consult the manufacturer for dimensional information on the flameproof joints for repair.*
2. *Avoid electrostatic charge. Clean only with a damp cloth.*

For all other Terminator Series

1. *Avoid electrostatic charge. Clean only with a damp cloth.*

15 **Essential Health and Safety Requirements:**

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

16 **Test and Assessment Procedure and Conditions:**

This EU-Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Europe Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

SCHEDULE

to EU-Type Examination Certificate No. FM10ATEX0058X

This Certificate has been issued in accordance with FM Approvals Europe Ltd's ATEX Certification Scheme.

17 **Schedule Drawings**

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by the Notified Body.

18 **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
12th April 2011	Original Issue.
7th December 2012	Supplement 1: Report Reference: 3045414, 6th December 2012 Description of the Change: Add the Terminator ZT Thermostat / Power Connection Kit and update EN 60079-0 to 2012 edition.
5th July 2013	Supplement 2: Report Reference: 3041145ECrev130513, dated 21st June 2013 Description of the Change: Updated Terminator ZT Thermostat / Power Connection Kit to include 400 Vac/16 Amp option, adjust ambient ratings based on amperage levels, and update model code structure.
6th December 2013	Supplement 3: Report Reference: 3050484, 30th October 2013 Description of the Change: Update ZP Terminator to include –M / -MS version. Corrected maximum pipe temperature exposure for the pipe mounted version (–XP) kit from 232°C to 250°C. Process manufacturer's drawing changes, which also includes additional Terminator Grommets to Terminator Series Kits. Update EN 60079-0:2009 standard to the EN 60079-0:2012 standard.
22nd April 2014	Supplement 4: Report Reference: 3041145rev140102, dated 9th April 2014 Description of the Change: Corrected drawings in CDL to reflect actual drawings controlled. Corrected Za-b Model Code description in Certificate, Section 13.
14th February 2022	Supplement 5: Report Reference: RR229679 dated 11th February 2022 Description of the Change: Re-issue of the certificate by NB2809 following file transfer from FM Approvals Limited (UK). Minor revisions to labels and instructions due to transfer of manufacturer's QAN as well as updated standard requirements. Removal of ZE-B Terminator Beacon now covered under FM18ATEX0065X. Minor updates to certificate to clarify existing ratings. Continued compliance shown and standards updated: EN 60079-0:2012 to EN IEC 60079-0:2018, EN 60079-1:2007 to 2014, EN 60079-7:2007 to 2015 +A1:2018, EN 60079-18:2009 to 2015 +A1:2017, EN 60079-31:2009 to 2014, and EN 60529 to include +A2:2013.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

Blueprint Report

Thermon Inc (1000001137)

Class No ATEX

Original Project I.D. 3041145

Certificate I.D. FM10ATEX0058X

Drawing No.	Rev Lvl	Drawing Title	Last Report	Electronic
5326	1	Terminator ZP-AMB-L-WP Ambient Thermostat General Arrangement	3050484	Yes (pdf)
A0217012	3	Terminator Electrical Component List	3050484	Yes (pdf)
A0217034	0	Terminator ZP-Ambient Sub-Assembly	3050484	Yes (pdf)
A1030-02	2	Dimensions PTD-100-X	3041145	Yes (pdf)
B0208011	7	ET-8 Molded End Cap	3050484	Yes (pdf)
B0208013	5	ET-6 Molded End Cap	3050484	Yes (pdf)
B0208014	5	ET-7 Molded End Cap	3050484	Yes (pdf)
B0209001	5	Termination Boot TBX-3L	3050484	Yes (pdf)
B0209002	8	Termination Boot TBX-4L	3050484	Yes (pdf)
B0209015	6	Termination Boot TBX-5S	3050484	Yes (pdf)
B0209016	8	Termination Boot TBX-5L	3050484	Yes (pdf)
B0209017	4	Termination Boot TBX-3S	3050484	Yes (pdf)
B0209018	6	Termination Boot TBX-4S	3050484	Yes (pdf)
B0210023	0	GRW-F Grommet	3041145	Yes (pdf)
B0210024	0	GRW-G Grommet	3041145	Yes (pdf)
B0210025	0	GRW-L Grommet	3041145	Yes (pdf)
B0210026	0	GRW-T Grommet	3041145	Yes (pdf)
B0210027	1	GRW-F/TSTAT Grommet	3050484	Yes (pdf)
B0210028	1	GRW-G/TSTAT Grommet	3045414	Yes (pdf)
B0210029	1	GRW-L/TSTAT Grommet	3045414	Yes (pdf)
B0210030	1	GRW-T/TSTAT Grommet	3050484	Yes (pdf)
B0210033	0	GRW-GT2 Grommet	3050484	Yes (pdf)
B0210034	0	GRW-LT2 Grommet	3050484	Yes (pdf)
B0210036	0	GRW-FT2 Grommet	3050484	Yes (pdf)
B0217001	3	Terminator Junction Box Base	3041145	Yes (pdf)
B0217002	3	Terminator Junction Box Lid	3041145	Yes (pdf)
B0217003	2	Terminator VIL Junction Box Base	3041145	Yes (pdf)
B0217004	2	Terminator Support Base	3041145	Yes (pdf)
B0217005	2	Terminator Support Base Banding Guide	3041145	Yes (pdf)
B0217006	2	Terminator Support Cap	3041145	Yes (pdf)
B0217007	3	Terminator Splice Cap	3041145	Yes (pdf)
B0217008	1	Terminator Splice Cap Latch	3041145	Yes (pdf)
B0217009	2	Terminator Threaded Grommet Compressor	3041145	Yes (pdf)
B0217010	2	Terminator Grommet Compressor	3041145	Yes (pdf)
B0217011	2	Terminator Nut	3041145	Yes (pdf)
B0217015	0	Terminator Wall Mount Support Base	3041145	Yes (pdf)
B0308018	24	DP, DL, DE, DS, DE-B, DP-M, ZP, ZL, ZE, ZS, ZE-B, ZP-M Labels	RR229679	Yes (pdf)
B0308022	12	ZP, ZL, ZP-R, ZP-Ambient, ZP-PTD100, ECM, ZT ZS/ZE, ZE-B Kits For Thermon Europe	RR229679	Yes (pdf)
B0308027	6	DP-L, DL-L, DP-S, DL-S, ZP-L, ZL-L, ZP-S, ZL-S, DS-L/DE-L, DS-S/DE-S, ZS-L/ZE-L, ZS-S/ZE-S Labels	RR229679	Yes (pdf)
B0308032	2	ZP-L, ZL-L, ZP-S, ZL-S, ZS-L/ZE-L, ZS-S/ZE-S Kits For Thermon Europe	RR229679	Yes (pdf)
PN 50099U	1121	Terminator ZP-MS Installation Procedures	RR229679	Yes (pdf)
PN 50135U	1121	SCTK Splice Connection Termination Kit, Installation Procedures	RR229679	Yes (pdf)
PN 50136U	1121	PETK Power and End Termination Kit, Installation Procedures	RR229679	Yes (pdf)
PN 50816U	1121	In-Line Splice/End Termination Kit Installation Instructions, Terminator ZS/ZE	RR229679	Yes (pdf)
PN 50828U	1121	Terminator ZP-M Installation Procedures	RR229679	Yes (pdf)
PN 50829U	1121	Wall Mount Conversion Kit Installation Instructions, Terminator WMK	RR229679	Yes (pdf)
PN 50834U	1121	Teminator ZP-MI-WP Installation Procedures	RR229679	Yes (pdf)
PN 50835U	1121	Teminator ZP-PTD100-WP Installation Procedures	RR229679	Yes (pdf)
PN 50836U	1121	Terminator ZP-MI-WP Installation Procedures	RR229679	Yes (pdf)

PN 50837U	1121	Terminator ZP-MI-XP Power Connection Kit Installation Procedures	RR229679	Yes (pdf)
PN 50845U	1121	Terminator ZP-XP Power Connection Kit Installation Procedures	RR229679	Yes (pdf)
PN 50846U	1121	Terminator ZP-WP Power Connection Kit Installation Procedures	RR229679	Yes (pdf)
PN 50850U	1121	Terminator ZT-XP Installation Procedures	RR229679	Yes (pdf)
PN 50852U	1121	Terminator ZP-Ambient-WP Installation Procedures	RR229679	Yes (pdf)
PN 50861U	1121	Terminator ZP-Ambient-XP Installation Procedures	RR229679	Yes (pdf)
PTD-100	1	Purchase Specification	3041145	Yes (pdf)
TEP0088U	1013	Terminator Specification Sheet	3050484	Yes (pdf)
TEP0089U	0718	Terminator ZT Product Specifications	RR229679	Yes (pdf)
TEP0094U	1121	Terminator ZP-Ambient Specification Sheet	RR229679	Yes (pdf)

TAI MILANO S.p.A.
Via Petrella, 21 - 20124 MILANO
Tel. 02/29525941 - Fax. 02/29404417

DECLARATION OF CONFORMITY TO ATEX DIRECTIVE 2014/34/EU

DICHIARAZIONE DI CONFORMITA' ALLA DIRETTIVA ATEX 2014/34/UE

JOB - Commessa	CUSTOMER – Cliente	P.O. No. – Ord. No.
24/2428	ENOLIA	CF2406-4511

NAME AND ADDRESS OF MANUFACTURER: Nome e indirizzo del Costruttore	TAI MILANO S.p.A. Via Petrella, 21 20124 MILANO MI ITALY
DESCRIPTION OF THE EQUIPMENT: Descrizione dell'apparecchiatura	SAFETY VALVE CHANGEOVER VALVE BUCKLING PIN VALVE Valvola di sicurezza Valvola di scambio Valvola Buckling Pin

WE HEREBY DECLARE THAT THE DESIGN AND MANUFACTURE OF THE VALVES LISTED BELOW MEET THE REQUIREMENT OF THE ATEX DIRECTIVE 2014/34/UE.
Dichiariamo che progettazione e fabbricazione delle sottoelencate valvole sono in accordo alla Direttiva Atex 2014/34/UE

- SPRING LOADED SAFETY VALVES SERIES 3000-3000A-3000B-3000P-3000L-3000W-3000H-4000-4000W-200.
  Valvole di sicurezza a molla serie
- PILOT OPERATED SAFETY VALVES SERIES 9000/60-9000/70-9000/90
  Valvole di sicurezza comandate da pilota serie
- CHANGEOVER VALVES SERIES 1000
  Valvole di scambio serie
- BUCKLING PIN VALVES SERIES 3000H AND 3000H-PRPD
  Valvole Buckling Pin serie

CONFORMITY ASSESSMENT PROCEDURE: Annex VIII **Procedura di valutazione della conformità:**
MODULE: Internal control of production Modulo: Controllo interno di produzione
TECHNICAL FILE No. ATEX-TD-01 Rev. 1 KEPT BY BUREAU VERITAS – RECEIPT No. BVI/ATEX/ITA/23/055 Dossier Tecnico ATEX-TD-01 Rev. 1 conservato da Bureau Veritas – Ricevuta n. BVI/ATEX/ITA/23/055
MARKING Marcatura CE Ex II 2G Ex h IIB Tx Gb

HARMONIZED STANDARD USED: Norme Armonizzate applicate	EN ISO 80079-36:2016 EN ISO80079-37:2016

08/10/2024	TAI MILANO S.p.A.	Italo Corradi	TAI MILANO S.p.A on behalf of Quality Assurance Manager
DATE Data	STAMP Timbro	SIGNATURE Firma	POSITION TITLE Posizione

ROSETTI MARINO	RELEASE NOTE	Nr. RN-0936-PCM-03	Sheet 1 of 1
		Date 08/01/2025	Rev. 0

PROGETTO *Project*	CLIENTE: *Client*	COMMESSA *Job*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	*123A90*

FORNITORE *Vendor*	PCM GROUP ITALIA SRL	NUMERO D' ORDINE *Purchase Order No.*	*1724000936*

Release Note	☐ FOR PAYMENT	☒ FOR SHIPMENT

RELEASE NOTE FOR PAYMENT

PO Art.	
Letter	

RELEASE NOTE FOR SHIPMENT

POS. Item	Q.TA' Quantity	DESCRIZIONE Description	Nr. TAG TAG No.	TIPO DI ISPEZIONE / Kind of Inspection	ESITO / Result
10	2	MONOSCREW PUMP SEA WATER LIFT PUMP VERTICAL SUBMERGED TYPE	P5001A/B	N/A	N/A
20	1 SET	SPARE PARTS FOR COMMISSIONING & START UP	N/A	N/A	N/A
30	1 SET	SPARE PARTS FOR TWO YEARS OPERATION	N/A	N/A	N/A
40	1 SET	SPECIAL TOOLS INSTALLATION & MAINTENANCE	N/A	N/A	N/A

Warehouse open Monday to Friday from 08.00 to12.00 and from 13.00 to 17.00.
Contact Mr Rota +39 3451608099

DOCUMENTI APPLICABILI / *APPLICABLE DOCUMENTS*

POSIZIONE *Items*	TIPO DI DOCUMENTO *Type of Document*	NUMERO DI DOCUMENTO *Document Number*	Rev.	COD. DI APPROV. *Approv. Code*
10,20,30,40	Purchase Order	1724000936	0	n/a

PUNCH LIST: ☐ SI / *YES* VEDI PUNCH LIST ALLEGATA N° / *REFER TO ATTACHED PUNCH LIST N°*
☒ NO/ *NO*

CONTROLLO VALIDITA' FIDEJUSSIONE / *PERFORMANCE or WARRANTY BOND expiration date check*
Estensione Fidejussione Richiesta *(Performance or Warranty Bond Extension of Validity required)*
☐ SI / *YES* ☒ NO/ *NO*
Acceptance Method: *Performance or Warranty Bond valid if actually delivery date it's not greater than two weeks from contractual delivery date.*

RELEASE NOTE

RISULTATO / *RESULT*	FORNITURA / *SUPPLY*	DISTRIBUZIONE A: / *DISTRIBUTION TO:*	
☒ POSITIVO / *POSITIVE*	☒ COMPLETA / *COMPLETE*	☒ Project Manager	☒ Administration
☐ NEGATIVO / *NEGATIVE*	☐ PARZIALE / *PARTIAL*	☒ Project Quality Manager	☒ Project Eng-/Procurement Coord
☐ PUNTI PENDENTI / *PUNCH-LIST*	☐ ULTIMA / *FINAL*	☒ Warehouse	☐ Supplier

NOTE / *NOTES*

Note:
None

L' INCARICATO /*Person in charge* ROSETTI MARINO *Supply Management dept.*		IL RAPPR. DEL CLIENTE / *Client Representative*	IL FORNITORE /*Vendor*	CONSTRUCTION MANAGER *Only requested for Punch List to be closed at Yard*
Nome Cognome *Name Surname*	**Firma** *Signature*			
Massimiliano Berghenti		N.A.	N.A.	N.A.

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO / *The present RELEASE NOTE does not relieve the Supplier of the responsibility of any possible defects and/or malfunctioning arising during the utilisation.*

3 MAINTENANCE DOSSIER

3.1 SPARE PARTS

3.1.1 SPARE PART INDEX REGISTER (COMMISSIONING, 2 YEAR OPERATION)

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Base Load Power Hub (BLPH)

SPARE PART INDEX REGISTER (COMMISSIONING, 2 YEAR OPERATION)
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-COM-LIS-00029

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	18-02-2025

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
01	03/02/2025	Accepted for Construction (AFC)	GLL	APD	AHN
00	17/01/2025	Issue for Review (IFR)	GLL	APD	AHN

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

ROSETTI MARINO

SPARE PARTS LIST

CROSSWIND

Document Title	Commissioning and 2 years spare parts list					
The document relates to	HOLLANDSE KUST NOORD WIND PARK Project - Base Load Power Hub (BLPH)					Contract: CW-I-WP4-2023-05
Project ID	123A90	Doc. n°	1724000936-COM-LIS-00029	Rev.: Accepted for Construction (AFC)	Rev. Date: 03-Feb-25	Status: AFC / Class: 2

The equipment consists of the following units/components

1 Tag no.: P-50001 A/B

2 Tag description: Sea Water Lift Progressive Cavity Pump

3 Manufacturer model/type no.: 25A24 (317873)

4 Manufacturer serial no.: 070P140016399 070P140016400

5 No. of units: 2

6 Quantity of parts FITTED / INSTALLED per unit/component

Supplier: PCM GROUP ITALIA SRL

Address: Via Venti Settembre 14/7
16121 GENOVA GE
ITALY

PO Number: 1724000936

PO description: Sea Water Lift Progressive Cavity Pumps

Supplier telephone no: +39 340 149 1115

E-mail: gboellisi@pcm.eu

Contact name: MR GIAN-MARCO BOELLISI

Contact mobile no: +39 340 149 1115

WEBSITE http://www.pcm.eu

General Information:

Item Number	Total number of identical spares installed	Description of recommended spare parts	Parts/drawing ref.			Material	Certificate Type (if applicable)	Certificate Reference (if applicable)	Shelf life (years)	Weight (net)	Weight (gross)	Volume (m3)	HS Code	ECCN Code	% US Content	Country of origin	Supplier part no.	Manufacturer part no.	Manufacturename	Commissioning spares: Quantity ordered	2 Years spares: Quantity ordered	Remarks
			Project Datasheet no.	Project Detail dwg. no.	Item ref.																	
7		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	2	STATOR 25A24 164 NBR COATING P3 BLUE RAL5003	1724000936-MAC-DS-00012	1724000936-MAC-DD-00006	1	NBR	N/A	N/A	3	21,5	30	0,01	TBA	TBA	0	France	STA00071	77418-1646	PCM	0	2	Included in base scope
1	2	SHEATH KIT C6/C7 M6/M7 NBR H	1724000936-MAC-DS-00012	1724000936-MAC-DD-00006	3/ 105A / 127/ 127A	NBR	N/A	N/A	3	0,5	2	0,001	TBA	TBA	0	France	NM-1374-PR	NM-1374-PR	PCM	0	2	NM-1374-PR kit includes 2 x item 3 + 6 x 105A + 2 x 127 + 2 x 127A / Not included in base scope
1	2	STATIC SEAL KIT	1724000936-MAC-DS-00012	1724000936-MAC-DD-00006	13 / 14	NBR	N/A	N/A	3	2	4	0,005	TBA	TBA	0	Japan	DIGIAN-392481-02	DIGIAN-392481-02	PCM	2	2	DIGIAN-392481-02 kit includes 1 x item 13 + 11 x item 14 / Included in base scope
1	2	STATOR SEAL KIT	1724000936-MAC-DS-00012	1724000936-MAC-DD-00006	14A	NBR	N/A	N/A	3	0,1	0,5	0,001	TBA	TBA	0	Japan	NM-4290-PR	NM-4290-PR	PCM	2	2	NM-4290-PR includes 2 x 45892-160 (Item 14A) / Included in base scope
1	2	MECHANICAL SEAL	1724000936-MAC-DS-00012	1724000936-MAC-DD-00006	16 / 17	NBR / UNS S32760	3.1	N/A	5	15	30	0,005	TBA	TBA	0	Netherland	DIGIAN-392481-01	ISC2-PX - 60MM - 400370175	Flowserve	0	1	Included in base scope
1	2	ROTOR 25-4P-E10 R1 C M	1724000936-MAC-DS-00012	1724000936-MAC-DD-00006	20	UNS S32760	3.1	N/A	5	16	30	0,01	TBA	TBA	0	France	M-001931A257	M-001931A257TS	PCM	0	2	Included in base scope
1	2	SHAFT LINE KIT C7M NBR E-CTFE COATING (H)	1724000936-MAC-DS-00012	1724000936-MAC-DD-00006	3/ 22/ 105A/ 106/ 127/ 127A / 30/ 127B/ 210	NBR / Halar / SS316L	N/A	N/A	5	2,3	5	0,005	TBA	TBA	0	France	NM-1363-PR	NM-1363	PCM	0	2	Not included in base scope
1	2	SEALING ASSEMBLY SHAFTLINE NBR FOOD P	1724000936-MAC-DS-00012	1724000936-MAC-DD-00006	30/ 127B/ 210	NBR / SS316L	N/A	N/A	5	0,5	2	0,001	TBA	TBA	0	France	NM-3384-PR	NM-3384-PR	PCM	0	2	Not included in base scope
80	160	SCREW HC M12-16 TR	1724000936-MAC-DS-00012	1724000936-MAC-DD-00006	105B	UNS S32760	3.1	N/A	10	0,01	0,02	0,0001	TBA	TBA	0	France	C06125C257T	C06125C257T	PCM	0	40	Not included in base scope
20	40	FLANGE SCREW KIT	1724000936-MAC-DS-00012	1724000936-MAC-DD-00006	250A / 204 /107	UNS S32760	3.1	N/A	10	5	7	0,01	TBA	TBA	0	France	DI317873-PR1	DI317873-PR1	PCM	0	5	DI317873-PR1 includes 8 x Item 250A & 107 + 16 Item 204 / Not included in base scope
10	20	CENTRALIZER D35 AV7	1724000936-MAC-DS-00012	1724000936-MAC-DD-00006	400	POM H	N/A	N/A	10	3	7	0,01	TBA	TBA	0	France	W-004957078	W-004957078	PCM	0	5	Not included in base scope
12	24	EXTERNAL CENTRALIZER AV7	1724000936-MAC-DS-00012	1724000936-MAC-DD-00006	400B	PA66	N/A	N/A	10	5	10	0,01	TBA	TBA	0	France	N-108969099	N-108969099	PCM	0	4	Not included in base scope
18	36	EXTERNAL CENTRALIZER SCREW KIT	1724000936-MAC-DS-00012	1724000936-MAC-DD-00006	401 / 401B	UNS S32760	N/A	N/A	10	0,5	1	0,001	TBA	TBA	0	France	DI317873-PR2	DI317873-PR2	PCM	0	10	DI317873-PR1 includes 3 x Item 401 & 401A / Not included in base scope
14																						
15																						
16																						
17																						
18																						
19																						
20																						
21																						
22																						
23																						
24																						
25																						
26																						
27																						
28																						
29																						
30																						
31																						
32																						
33																						
34																						
35																						
36																						
37																						
38																						
39																						
40																						
41																						
42																						
43																						
44																						
45																						

3.2 LUBRICANT

3.2.1 UTILITIES AND LUBRICANT LIST

Base Load Power Hub (BLPH)

UTILITIES AND LUBRICANT LIST
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-LIS-00035



ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	17-03-2025

Document Class: 2

02	05/03/2025	Accepted for Construction (AFC)	APD	GLL	AHN
01	29/01/2025	Accepted for Construction (AFC)	APD	GLL	AHN
00	10/12/2024	Issue for Review (IFR)	APD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	Accepted for Construction (AFC)
02	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
4	

PROJECT PACKAGE: HOLLANDSE KUST NOORD WIND PARK Project	
CLIENT NAME: CrossWind	
PO N°: CW-I-WP4-2023-05	
DOCUMENT N° : 1724000936-MAC-LIS-00035	

Progress Cavity Pumps - UTILITIES & LUBRICANT SCHEDULE

Rev: 02

Date: 05/03/2025

SR NO	TAG NO	DESCRIPTION	VENDOR NAME	POINT OF LUBRICATION	TYPE OF LUBRICATION	OIL TYPE	RECOMMENDED BRANDS	FIRST FILL		TOP UP		LUBE CHANGE		REMARKS
								BY VENDOR / CLIENT	QUANTITY (Oil - Ltrs. / pump & Grease - Grams / Motor or equip)	FREQUENCY (Hrs.)	QUANTITY (Oil - Ltrs. / pump & Grease - Grams / Motor or equip)	FREQUENCY (Hrs.)	QUANTITY (Oil - Ltrs. / pump & Grease - Grams / Motor or equip)	
1	P-50001 A/B	SHEATH (x2)	PCM	Refer to 1724000936-MAC-MAN-00031	Grease	Grease	TOTAL / AXA GR1 (Recommanded), SHELL / ALBIDA EP1 MOBIL / XHP221 FUCHS / Geralyn AW/W1 (or equivalent)	By Vendor	170 g	Lubricated for life	Lubricated for life	-	Lubricated for life*	* only if sheath dismantling
2		GEAR BEARING	NORD	Refer to 1724000936-MAC-MAN-00031	Mineral Oil CLP 220	ISO VG 220	Mobil Mobilgear 600 XP 220 Shell Omala S2 G 220 Fuchs Renolin CLP 220 (or equivalent)	By Vendor	2.7 L	every 6 months	0.9 L	10.000h or 2 years	2.7 L	
		PUMP ROLLER BEARING (x2)	PCM	Refer to 1724000936-MAC-MAN-00031	Grease	Grease	ELF / AVIATION N°10 UPTON / 400 LABO	By Vendor	200g per bearing 400g total	-	-	1 year	200g per bearing 400g total	
3		MOTOR BEARING (NDE and DE)	ABB	Refer to 1724000936-MAC-MAN-00031	Grease	Grease	Shell Gadus S5 V100 2 UNIREX N3 - ESSO Total Multis Complex S2A (or equivalent)	By Vendor	Lubricated for Life	-	Lubricated for Life	-	Lubricated for Life	
4		SEAL SYSTEM PLAN 51 BUFFER FLUID	FLOWSERVE	Refer to 1724000936-MAC-MAN-00031	Clean Water	-	-	By Contactor	5L	-	-	6 months	5 L	

Note: Top-up quantities are approximations.

3.3 MAINTENANCE DATA

3.3.1 INSTALLATION, OPERATING AND MAINTENANCE MANUAL (PUMP AND MOTOR, INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
	30-01-2025

Base Load Power Hub (BLPH)

INSTALLATION, OPERATING AND MAINTENANCE MANUAL (PUMP AND MOTOR, INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)
For Sea Water Lift Progressive Cavity Pumps (P-50001 A/B)

Document Number: 1724000936-MAC-MAN-00031

Document Class: 3

01	17/01/2025	Issue for Information (IFI)	JCD	GLL	AHN
00	25/11/2024	Issue for Information (IFI)	JCD	GLL	AHN
Rev.	Date	Description	Prepared	Reviewed	Approved

PCM | keep it moving

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)
00	Issue for Information (IFI)

HOLDS LIST

No.	Description
1	
2	
3	
4	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Table of contents

1 Pump 4

2 Mechanical Seal 81

3 API Plan 51 90

4 Heating Jacket System 105

5 Coupling 112

6 Gear Box 121

7 Motor 270

8 Pressure Relief Valve 303

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

1 Pump

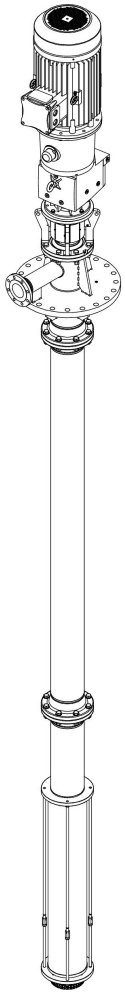
Pump Model	Product Reference	PCM serial nr	Tag number	Manual
25A24	317873	070P140016399	P-50001A	NIPMAVM00EN
		070P140016400	P-50001B	

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

keep it moving

INSTRUCTION MANUAL

TO BE KEPT FOR FUTURE REFERENCE



PCM Moineau™ AV pump

Models: 3AV12 – 6AV6 – 6AV12 – 6AV24 – 13AV6 – 13AV12 – 13AV24 – 25AV6 – 25AV12 – 25AV24 – 40AV6 – 40AV12 – 50AV18 – 60AV6 – 60AV12 – 120AV12

Document No.: NIPMAVM00EN (genuine manual)

Date issued: 01/2019

PCM Technologies S.A.S.

6 Boulevard Bineau – 92300 Levallois-Perret – France

Phone: +33 (0) 1.77.68.31.00 – www.pcm.eu – contact@pcm.eu

Declaration of Conformity

We declare that the subassembly described below complies with the requirements of the Machinery Directive 2006/42/EC.

The subassembly complies with the harmonised standard EN ISO 12100.

Champtocé sur Loire, 01/01/2019

Table of contents

1. Introduction 5
1.1. General 5
1.2. Limits of the guarantee 5
1.3. Information regarding residual risks 5
1.4. Environment 6
2. Characteristics and installation 7
2.1. Operating principle 7
2.1.1. Principle of the pump 7
2.1.2. Pump rotation direction 7
2.1.3. Sealing by single mechanical seal 8
2.1.4. Sealing by double mechanical seal 9
2.2. Markings 9
2.3. Build Specifications 9
2.3.1. Pump 9
2.3.2. Dynamic seal 10
2.3.3. Allowable force and torque 10
2.4. General Dimensions 11
2.5. Operating Specifications 11
2.5.1. Pump performance 11
2.5.2. Influence of rotation speed 12
2.5.3. Performance curves 12
2.5.4. Pump motors 13
2.6. Equipment Installation 14
2.6.1. Installation precautions 14
2.6.2. Pipework connections 16
2.6.3. Pump position 16
2.6.4. Connecting the dynamic sealing system (cartridge type) 16
2.6.5. Gearbox lubrication 20
2.6.6. Motor connection 20
3. Operation 22
3.1. Commissioning 22
3.1.1. Before start-up 22
3.1.2. Start-up 23
3.2. Normal operating procedure 24
3.2.1. Start-up procedure 24
3.2.2. General Operating Precautions 24
3.2.3. Shutdown Procedure 24
3.2.4. Operating Procedure in the Event of an Incident 24
3.2.5. Automatic control 25
4. Maintenance 26
4.1. Spare parts list 26
4.2. Cross-section of the pump 27
4.2.1. Monobloc pump 27
4.3. Sealing by single mechanical seal 29
4.4. Sealing by double mechanical seal 29
4.5. Handling Equipment and Procedure 29
4.5.1. Handling in the horizontal position 30
4.5.2. Lifting the pump 31
4.5.3. Handling in the vertical position 31
4.6. Reassembling a pump delivered in several sections 32
4.7. Storage conditions 33
4.7.1. In PCM standard packaging 33

4.7.2. After Unpacking ... 34
4.7.3. In Packaging according to S.E.I. 4c ... 34
4.8. Specialist Tools ... 34
4.9. Rules on preventive maintenance operations ... 34
4.10. Periodic Inspection ... 34
4.11. Cleaning ... 35
4.11.1. External cleaning ... 35
4.11.2. Internal cleaning ... 35
4.12. Lubrication ... 35
4.13. Thread locking ... 36
4.14. Tightening torques ... 36
4.15. Troubleshooting the pump ... 37
4.15.1. Incidents and causes ... 37
4.15.2. Solutions ... 39
4.16. Troubleshooting the seals ... 40
4.16.1. Incidents and causes ... 40
4.16.2. Solutions ... 41
4.17. Disassembling the pump in horizontal position ... 41
4.17.1. Residual fluids ... 42
4.17.2. Disassembling the rear part of the pump in horizontal position ... 42
4.17.3. Disassembling the front part of the pump in horizontal position ... 44
4.18. Reassembling the pump in horizontal position ... 47
4.19. Disassembling the pump in the vertical position ... 52
4.20. Reassembling the pump in the vertical position ... 60
4.21. Disassembling the sealing system ... 69
4.22. Reassembling the sealing system ... 71
4.23. Equipment Storage when not in Use ... 74
4.23.1. Preserving the Rubber Components ... 74
4.23.2. Preserving the sealing systems ... 74
5. Appendices ... 75

1. Introduction

1.1. General

The pump you have just acquired was manufactured and inspected with the utmost care.

This manual contains information for qualified and authorised personnel on how to install, commission, run and maintain the equipment mentioned on the front cover. It also contains important information regarding safety and potential hazards related to the equipment. Users should read these instructions carefully before carrying out any commissioning, repair or maintenance work on or near the equipment.

The information contained in this manual may not be copied or published in any form whatsoever, whether by printing, photography, recording on microfilm or any other means (electronic or mechanical) without the prior written consent of PCM.

The information given in this manual is subject to change without notice.

PCM or its representatives decline all responsibility in the event of damage resulting from the use of this manual. This exemption from responsibility applies to damage of all types, including (without any limit) compensatory damages, whether direct or indirect, loss of data, profits or return of capital, loss or damage caused to the property of others, and third-party claims.

PCM or its representatives accept no responsibility and do not guarantee the accuracy, completeness, or up-to-date nature of the information contained in this manual.

1.2. Limits of the guarantee



Before performing any maintenance operations on the pump, check that all necessary precautions have been taken: upstream and downstream valves closed, pipework cleaned and purged, electrical power supply disconnected and disabled. Check also that all the usual precautions have been taken in accordance with the regulations in force regarding the safety of personnel.

On receiving the pump, examine it immediately to check that no signs of damage are apparent. If it is visibly damaged, indicate clearly on the carrier's documents that the merchandise was received damaged, with a brief description of the type of damage observed. If you decide to accept the equipment, please send a registered letter with acknowledgement of receipt to the carrier within forty-eight hours, with a copy to your PCM service centre.

Comply with handling and storage conditions (see page 29).

To avoid all risk of damage or accidents (in particular when the products being conveyed are hazardous), it is essential that you do not use the equipment for an application other than the one provided for in our Technical description (see Appendices).



WARNING: To maintain the original qualities of the pump and to preserve the PCM guarantee on the equipment as well as compliance with the machines directive, it is essential to use genuine PCM parts only.

1.3. Information regarding residual risks

PCM have taken into account all internal risks for the equipment and draw the attention of the user to the residual risks if the following verifications are not carried out:

- Compliance with the pump conditions of use.
- Fixing of the pump.

- Connections of the pipework to and from the pump.
- Installing security devices against overpressure, cavitation and frost.
- Installing accessories to prevent foreign bodies from entering the pumping circuit.
- Compliance with the electrical wiring instructions.
- Continuous feeding of the pump.
- Leak tightness of the assembly.
- For maintenance purposes, all necessary precautions against hazardous fluids.
- Compliance with the operating and maintenance instructions.
- Protection casing in place.
- Exclusive use of original PCM parts.

1.4. Environment

PCM is committed to an environmental protection initiative in accordance with the recommendations of the ISO 14001 standard.

PCM has set up a system through which its customers can ask PCM to handle the disposal of waste material (used pumps and spare parts). This system is especially useful for the disposal of parts containing elastomers, such as the stators of eccentric rotor pumps or hoses from peristaltic pumps.

All returns must be sent to the PCM factory, carriage paid. The equipment must be clean, with the pump and drive completely emptied of products, and must arrive with the sheet entitled: risk prevention (see Appendices)

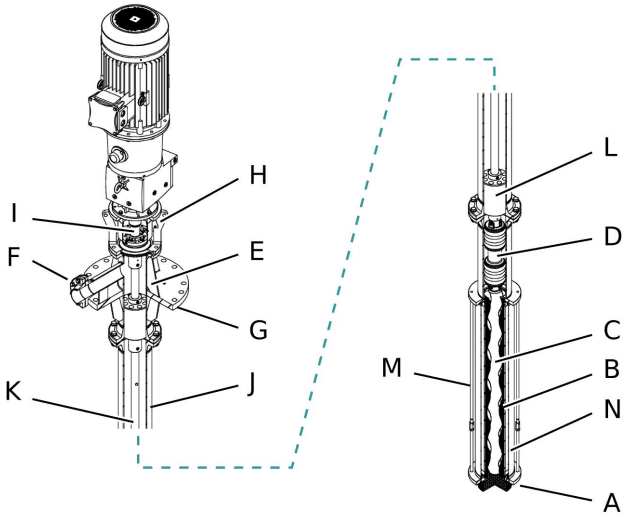
All items returned for this purpose must be legibly marked with the words 'Equipment to be recycled'.

Send to: PCM – Rue René Moineau – 49123 Champtocé-sur-Loire – France

2. Characteristics and installation

2.1. Operating principle

2.1.1. Principle of the pump



A: Stator port with strainer (suction port). B: Stator. C: Rotor. D: Connecting rod. E: Body. F: Body flange (discharge port). G: Mounting flange. H: Spacer or Bearing. I: Drive shaft. J: Body extension. K: Connecting rod extension. L: Connecting rod centring device. M: Tie-rods. N: Stator casing.

The PCM Moineau™ progressing cavity pump (or eccentric screw pump) essentially consists of two internal helical gears, which have the following features:

- The stator, which is the external element, has one more lobe than the rotor, which is the internal element.
- In any given cross-section, each section of the rotor is in contact with the stator, creating a helical seal line along the pump.
- The helical pitch of the stator is double that of the rotor.

The PCM Moineau™ AV series pump is designed according to the principles of API Standard 676 (Positive Displacement Pumps – Rotary).

When the rotor is positioned in the stator, a series of watertight cavities is created. Consequently, when the rotor turns inside the stator, these cavities progress spirally around the outside of the rotor, conveying the fluid from the inlet to the outlet.

The PCM Moineau™ pump is a volumetric pump whose displacement is equal to the volume of one cavity. The drive system is directly attached to the pump by a flange, and drives the rotation of the rotor via a connecting rod.

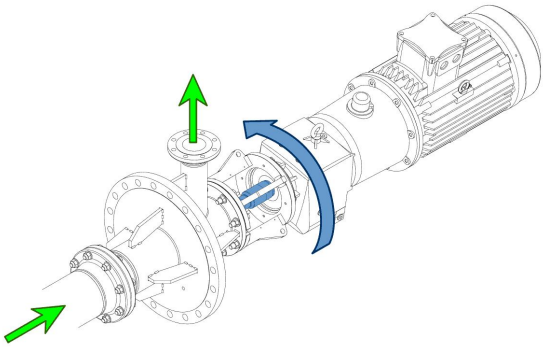
The pump body is equipped with a mounting flange enabling it to be fixed to a frame.

The pump can be supplied to customised lengths using extensions to the body and the connecting rod.

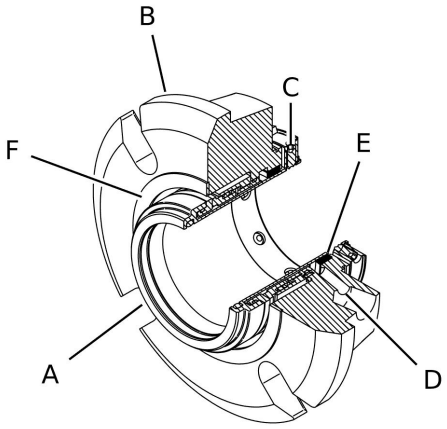
An optional stator casing is available to protect the stator against corrosion.

2.1.2. Pump rotation direction

The PCM Moineau™ AV series is designed for vertical installation, with the suction inlet at the bottom of the pump (at the level of the strainer) and the discharge on the body side. The rotor rotates clockwise when viewed from the drive shaft end.



2.1.3. Sealing by single mechanical seal



A: Sleeve. B: Body. C: Set screw. D: Orifice. E: Fix throttle bushing. F: Flat seal.

At the drive shaft, the seal between the pump body and the atmosphere is provided by a single cartridge-type mechanical seal system:

The cartridge-type mechanical seals enable rapid assembly with no need for adjustments. They must be installed in one piece.

The stationary ring is immobilised in the body (B). A rotating ring is installed on the sleeve (A), mounted on the drive shaft and fixed using set screws (C). The rotating ring comes into contact with the stationary ring via a spring. The thrusting force of the spring is preset in the factory.

The mechanical seal is equipped with lubrication orifices:

- FO ("Flush Out") orifice for lubricating the friction surfaces on the process fluid side.
- Q ("Quench") and D ("Drain") orifices for quenching the atmosphere side or collecting leaks.

Under normal operating conditions, there may be a slight leak. The mechanical seal is equipped with a fix throttle bushing (E) to contain this leak.

An optional single mechanical seal complying with API 682 is available.

NOTE: a mechanical seal must not run dry.
The auxiliary lubrication system must be clean and filtered.
The parts that receive the mechanical seal must be clean and free of defects.
Never separate the sleeve from the body.
Ensure that installation is performed under conditions of strict cleanliness.
During assembly, never force a part into position.

2.1.4. Sealing by double mechanical seal

The double mechanical seal is of cartridge type and must be installed in one piece. It consists of two single lubricated mechanical seals mounted front to back. The product to be sealed is insulated from the atmosphere by a barrier fluid confined between the two mechanical seals. With this type of seal, the pressure of the barrier fluid must be higher than the pressure of the product to be sealed.

The use of a double mechanical seal is mainly recommended with products with little lubrication, products that are very heavily solids laden or products that are dangerous in contact with the atmosphere.

The lubrication orifices are the following:

- LBI and LBO for the entry and exit of the barrier fluid
- V (if present) for venting
- D (if present) for drainage

An optional double mechanical seal complying with API 682 is available.

2.2. Markings

Information shown on the pump motor unit or on an identification plate attached to the pump:

- Manufacturer name and address.
- Serial Number
- The displacement and the rotation frequency of the pump unit.
- Maximum allowable pump pressure, according to its motor.
- Customer reference (optional).

This information is essential when ordering spare parts (contact the PCM service centre).



Pump characteristics (e.g. flow rate, pressure, speed of rotation, construction, direction of pump rotation, etc.) must not be modified without written permission from our customer services department.

2.3. Build Specifications

2.3.1. Pump

The materials used are as follows:

Element	Models	Material(s) used
Stator	All	NBR, FPM (FKM)
Sheath	All	NBR, FPM (FKM)
Static seal	All	O rings: NBR, FPM (FKM) Flange seals: Fibre and NBR binder
Dynamic seal	All	See section below
Rotor	All	X30Cr13 (1.4028 / AISI 420 – Optional chromium plating) - X2CrNiMoN22-5-3 (1.4462 / AISI 329 LN)
Drive shaft/ connecting rod extension	All	X2CrNiMoN22-5-3 (1.4462 / AISI 329 LN)
Connecting rod centring device	All	Polyoxymethylene (POMc)

Element	Models	Material(s) used
Body/stator port/body extension	All	S355JR (1.0045) - X2CrNiMo17-12-2 (1.4404 / AISI 316L) - X2CrNiMoN22-5-3 (1.4462 / AISI 329 LN) – Others on request
Strainer/ stator casing/ rods	All	X2CrNiMo17-12-2 (1.4404 / AISI 316L) - X2CrNiMoN22-5-3 (1.4462 / AISI 329 LN)
Brace	All	S355JR(1.0045)
Rod	3AV12, 6AV6, 6AV12, 6AV24, 13AV6, 13AV12, 13AV24, 25AV6, 25AV12, 25AV24, 40AV6, 40AV12, 60AV6	Nitrided 30CrNiMo8 (1.6580 with or without E-CTFE coating)
	50AV18, 60AV12, 120AV12	X2CrNiMo17-12-2 (1.4404 / AISI 316L) - X2CrNiMoN22-5-3 (1.4462 / AISI 329 LN)

The material designation comply with the AFNOR standard.

NOTE: The PCM Moineau™ AV series pumps are designed to resist corrosive environments. This includes the systematic use of painting systems dedicated to C3 and C5M environments (following ISO 12944) for parts that may oxidise and the use of stainless steel.

The process and details of how these painting systems are applied are defined in the technical description.

PCM Moineau™ AV series pumps are equipped with ANSI B16.5 Class 150 flanged connections.

2.3.2. Dynamic seal

The materials used for the dynamic seals are as follows:

Element	Material(s) used
Mechanical seal body	X2CrNiMo17-12-2 (1.4404 / AISI 316L) – X2CrNiMoN22-5-3 (1.4462 / AISI 329LN)
Friction surfaces of mechanical seal	Carbon/silicon carbide Silicon carbide/silicon carbide
O-rings	FPM (FKM)
Flat seal	Glass-filled PTFE

Other materials are available on request.

2.3.3. Allowable force and torque

The admissible forces and moments are defined by the API 676 standard.

Examples of maximum admissible forces and moments on the suction and discharge flanges:

Models	Flange	Max. forces Fx, Fy and Fz	Max. moments Mtx, Mty and Mtz
3AV12, 6AV6, 6AV12, 6AV24, 13AV6, 13AV12	Class 150 DN50 (NPS 2")	650 N (150 lbf)	350 Nm (250 lbf.ft)
13AV24, 25AV6, 25AV12	Class 150 DN80 (NPS 3")	1040 N (225 lbf)	560 Nm (375 lbf.ft)
25AV24, 40AV6, 40AV12, 50AV18, 60AV6, 60AV12, 120AV12	Class 150 DN100 (NPS 4")	1300 N (300 lbf)	700 Nm (500 lbf.ft)

2.4. General Dimensions

The general dimensions and weights are available in the General Arrangement Drawing of the pump submitted during execution.
If not, check the following drawing(s):

Model	Drawing number
3AV12, 6AV6, 6AV12, 6AV24, 13AV6, 13AV12, 13AV24, 25AV6, 25AV12, 25AV24, 40AV6, 40AV12, 50AV18, 60AV6, 60AV12, 120AV12	TPE00597
Motors	TPE00571, TPE00572

2.5. Operating Specifications



WARNING: Pumps do not tolerate dry running.



WARNING: Pump specifications (capacity, pressure, speed of rotation, construction, etc.) must not be changed without written authorisation from our Customer Service Department.

The specifications are indicated on the technical description of the equipment supplied.

The A-weighted sound pressure level (SPL) of pumps manufactured by PCM is below 80 dB(A), in compliance with the European directive in force concerning noise from motor-driven equipment.

PCM Moineau™ AV Series pumps are used in the oil industry.

Their design enables them to pump any type of fluid, including aqueous solutions, oils and hydrocarbons, flashing or not.

IMPORTANT: The operating temperature limit is determined by the stator material and the specifications given in the technical description provided in Appendix.

2.5.1. Pump performance

The pumps in the PCM Moineau™ range are volumetric pumps. This means that fluid is moved by imprisoning a certain quantity of fluid in a cavity created between the rotor and the stator. The flow is then generated by rotating the rotor relative to the stator.

The cavities must be sufficiently sealed to enable pumping by generating pressure and thus to produce good hydraulic efficiency. But they must also allow a slight degree of internal leakage to lubricate the contact between the rotor and the stator in order to improve mechanical efficiency and extend the life of the components. The internal leakage rate thus plays an important role in the performance of a Moineau™ pump.

As the overall efficiency of a volumetric pump is the product of the hydraulic efficiency and the mechanical efficiency, the efficiency of a PCM Moineau™ pump will depend on the compromise made with regard to the internal leakage rate, as shown by the table below:

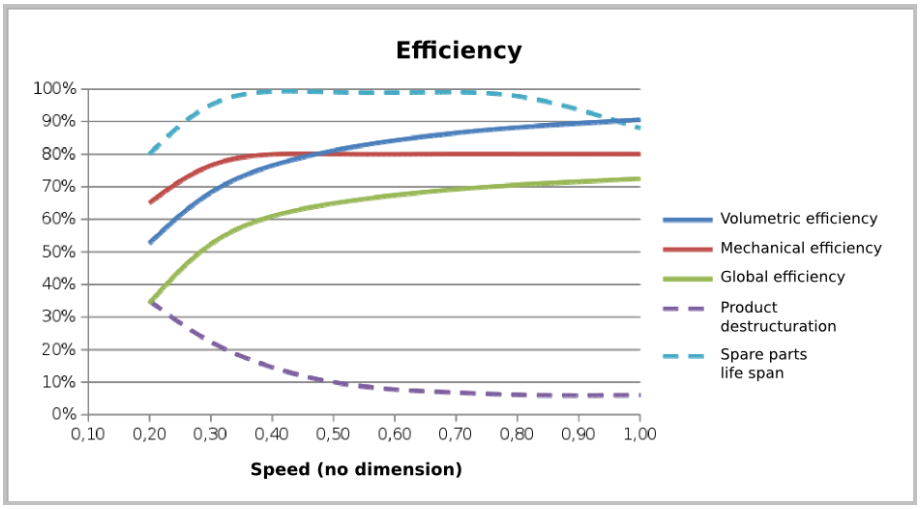
Parameter	Action	Hydraulic efficiency	Mechanical efficiency
Internal leakage rate	↗	↘	↗
	↘	↗	↘

2.5.2. Influence of rotation speed

As the internal leakage rate is independent of the rotation speed, we can increase the volumetric efficiency by increasing the rotation speed, as shown by the graph below.

In addition, the integrity of the product being pumped depends mainly on the leakage ratio. The leakage ratio is the ratio between the internal leakage rate and the total pump flow rate. Increasing the rotation speed thus reduces the leakage ratio and better respects the product being pumped.

With regard to the components' lifetimes, too low a rotation speed does not allow the hydrodynamic lubrication film to form, thus limiting the components' lifetimes. Too high a rotation speed, however, places too much mechanical stress on the components, as shown by the graph below.



Manufacturing tolerances, chemical attack on the elastomers and wear of the rotor and stator components can cause the internal leakage rate to vary from the flow rate initially predicted.

The following points should be noted:

- The flow rate will be better controlled if the leakage ratio is reduced, and thus the rotation speed slightly increased (>150 rpm). **The rotation speed must be maintained above 80 rpm during all the phases of the pump's use.**
- Respect for the integrity of the product increases with the pump's rotation speed.
- Due to the component manufacturing tolerances, two different stators may produce slightly different flow rates. The flow rate of the pump should thus be checked when new parts are installed.
- If the stator is not subject to chemical degradation or mechanical wear, the flow rate of the pump will remain constant.

2.5.3. Performance curves

The rotational speeds and pressures shown on the curves represent typical performance characteristics obtained with water at 20°C. When operating conditions differ from this standard, the performance characteristics must be adjusted according to:

- product characteristics (viscosity, fragility, abrasion),
- the characteristics of the application (operating speed, discharge pressure, available NPSH).

Inevitably with the tolerances of mechanical parts, and especially elastomer parts, after a stator is replaced the flow rate may fluctuate slightly.

The performance curves are available in the appendix.

2.5.4. Pump motors

Unless the customer issues specific requirements, the motor assemblies of PCM Moineau™ pumps are selected in order to optimise the overall efficiency of the pump motor unit and thus reduce installation costs.

Two operating phases are to be taken into account when selecting the motor assemblies: the start-up phase and the operating phase.

2.5.4.1. Start-up phase

After the stoppage phase, the coefficient of friction between the rotor and the stator is at its highest. The start-up torque can therefore be much higher than the torque in operation.

The start-up torque depends on:

- the stoppage time before start-up,
- the temperature of the stator during start-up,
- the nature of the fluid present in the stator during the stoppage (lubricity).

PCM Moineau™ pumps are specified to start at a high temperature after time-limited stoppage phases.

The gearmotors selected by PCM supply enough torque to start under normal conditions of electric power and pump operation.

2.5.4.2. Operating phase

During the operating phase, when the PCM Moineau™ pump is in its steady state, the pump operates with constant torque.

The operating torque depends on:

- mechanical efficiency,
- operating pressure.

The gearmotors selected by PCM are selected to supply enough torque to operate under the contractual conditions of pressure, viscosity and temperature.

2.5.4.3. Variable frequency operation

The use of a Variable Speed Drive (VSD) considerably extends the possibilities for using PCM Moineau™ pumps compared with fixed speed operation.

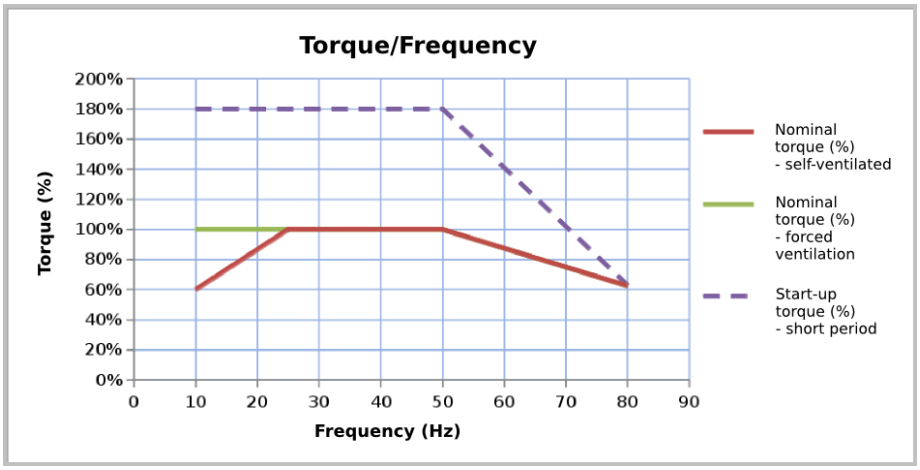
The frequency converter makes it possible to:

- extend continuous speed adjustment,
- save energy by adapting and optimising the process,
- adjust the speed for better control of the flow rate,
- configure programmable acceleration ramps for a gradual start or stop. Beneficial for the drive system and the pumped fluid, this prevents water hammer in the pipework and the pump.

2.5.4.4. Technical characteristics of variable frequency operation

Three-phase asynchronous motors supply a torque that is at its maximum at the nominal frequencies and voltages of the network to which it is connected.

Motors powered via a Variable Speed Drive (VSD) generally operate over a range of 10 to 80 Hz as shown by the graph below:



They supply a constant torque up to 50 Hz (or the nominal frequency), and then operate at constant power. The torque available thus decreases in proportion to the increase in speed.

2.5.4.5. Torque of an asynchronous motor in relation to drive frequency

For continuous operation at a **frequency of less than 25 Hz**, it is preferable to fit the motor with forced ventilation to avoid the risk of overheating and significant power loss.

For continuous operation at a **frequency of up to 80 Hz**, the motor power is chosen according to the torque available at 80 Hz.

The gearmotors powered by a Variable Speed Drive (VSD) and selected by PCM are selected to supply enough torque to start up and operate under the predefined conditions of pressure, viscosity and temperature.

2.5.4.6. Choice of the Variable Speed Drive (VSD)

The Variable Speed Drive chosen to power a PCM Moineau™ pump must:

- enable operation at a constant torque,
- be designed according to a characteristic at 50 Hz (or the nominal frequency),
- be sufficiently powerful to supply the start-up torque as a peak level and supply the pump in operation,
- supply a voltage compatible with the motor supplied by PCM,
- supply enough current to achieve the required torque,
- have electrical protection compatible with the characteristics of the installed motor.

Refer to the variator supplier's installation instructions and contact PCM customer services to validate your installation.

2.6. Equipment Installation

All PCM Moineau™ AV series pumps are inspected in our workshop before dispatch.

Large pumps can be delivered in sections for easier transport. See paragraph 4.6 for the procedure to reassemble the pump before installation.

2.6.1. Installation precautions



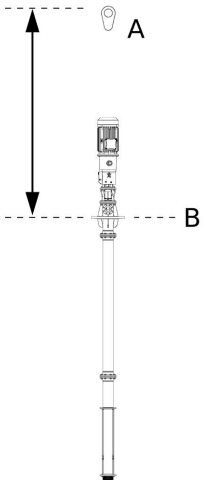
Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

Avoid installing the pump in a location where the ambient temperature might not be within the operating temperature limits of the pump (refer to the description in the Appendix). For an outdoor installation, it is

advisable to provide shelter above the equipment, and protection against freezing.

It is important to leave enough space around and above the pump to allow access for installation, maintenance and adjustments. If the pump is installed in a confined space (limited height available above the pump), it is important to leave enough space above the pump to enable it to be assembled/disassembled piece by piece (see paragraphs 4.19 and 4.20).

The height required between the lifting equipment (A) and the installation level (B) will be defined according to the dimensions of the pump and the tools used.



It is important to leave enough space next to the pump to store the pump and/or disassembled parts.

A safety valve or pressure switch and a pressure gauge located at the discharge will give protection and allow the pump's operating characteristics to be monitored. If a valve is present in the circuit, it is ESSENTIAL to provide a safety valve or pressure switch.

Without protection on the circuit, a valve at the discharge is often the cause of operating errors leading to damage to the pump or pipework, and presents a danger to personnel and equipment nearby.

The suction inlet should be sufficiently submerged to ensure proper operation of the pump. A minimum submersion level is defined for each pump on the drawing TPE00597. An anti-dry-running level sensor or transmitter installed on the tank will protect the pump when there is a shortage of the product to be pumped. Please ask PCM about our wide selection of accessories to suit your requirements.

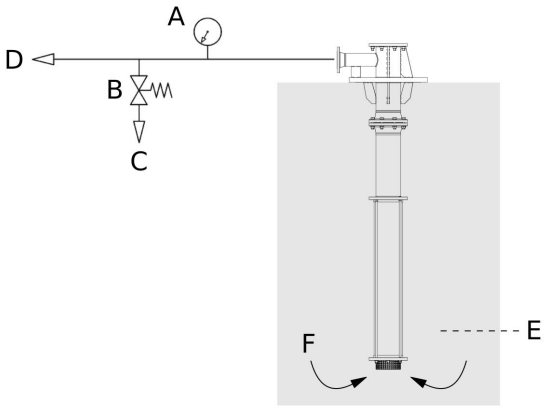
WARNING: Pumps do not tolerate dry running.

Special Addendum for Pump and Caisson Installation:

To install the Pump and the Caisson simultaneously, start by fitting Pump body extensions horizontally to the stator assembly. Do not forget the seal and tighten the screws. Re-start this operation as many time as required. Then, install the outside pump centralizers in the designated location (See specific Pump GAD).

Insert, the mounted assembly above inside the caisson. Use Glycerine to avoid friction between the pump centralizers and the inside of the caisson.

Use the special Lifting Tool T1 and T4 to lift Pump and Caisson assembly.



A: Press. gauge &/or press. switch. B: Pressure Relief Valve (PRV). C: Return to tank or drain. D: To process. E: Level sensor or transmitter to prevent dry running. F: Fluid inlet.

2.6.2. Pipework connections

The weights of the pipes must not be supported by the pump. The allowable torques and forces on the fittings are given in "Build Specifications" section.

2.6.3. Pump position

The pump and its drive mechanism must be installed vertically. The pump must be fixed to an adequately sized horizontal flange using screws and rawl plugs or anchor bolts.

2.6.4. Connecting the dynamic sealing system (cartridge type)

PCM Moineau™ AV series pumps are designed to operate solely with single or double mechanical seals.

Cartridge-type mechanical seals are pre-assembled and pre-adjusted in the factory, making maintenance operations easier.

It is important to ensure that the components of the equipment are kept as clean as possible and are protected from damage under all circumstances.

The performance characteristics of the equipment depend on its environment and the operating conditions to which it is subjected. You should therefore consider that the time spent checking the environment before installation can help to prevent premature failure and can therefore reduce equipment maintenance costs.

All handling must be done with the greatest care to protect the seal, which must not be subject to impact. An effective seal essentially depends on how carefully the mechanical seal is installed.

Before installation begins, ensure that all the parts to be installed are clean and that the products to be used are compatible with the seals.

You must also check that the O-rings have no trace of cuts, to avoid damaging the O-rings on assembly.

Ensure that there are no knocks or marks on the bearing surfaces of the O-rings, and eliminate any imperfections or scratches.

Carefully clean and examine the bearing surface and the bore of the cartridge.

2.6.4.1. Single mechanical seal

The friction surfaces are lubricated by the pumped product.

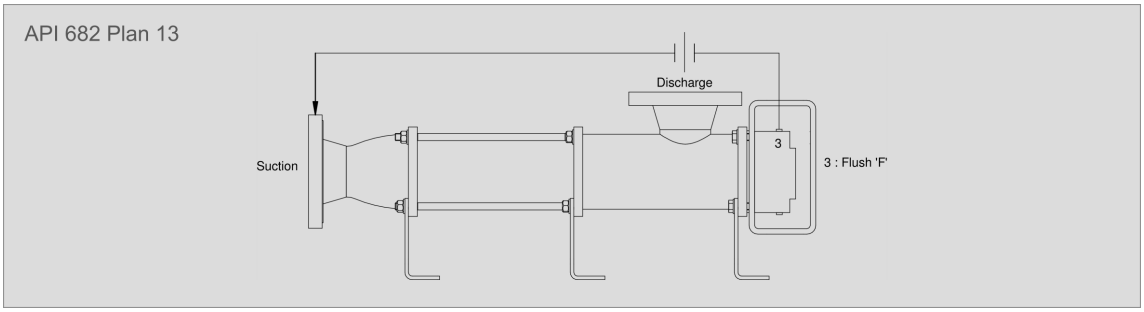
During the start-up phases, single mechanical seals with carbon/silicon carbide friction surfaces can tolerate dry running during short periods (a few minutes). However, PCM recommends adding an automatic greasing nipple for the quench "Q". Single mechanical seals with silicon carbide/silicon carbide friction surfaces do not tolerate

dry running and must be equipped with at least an automatic greasing nipple for the quench "Q".

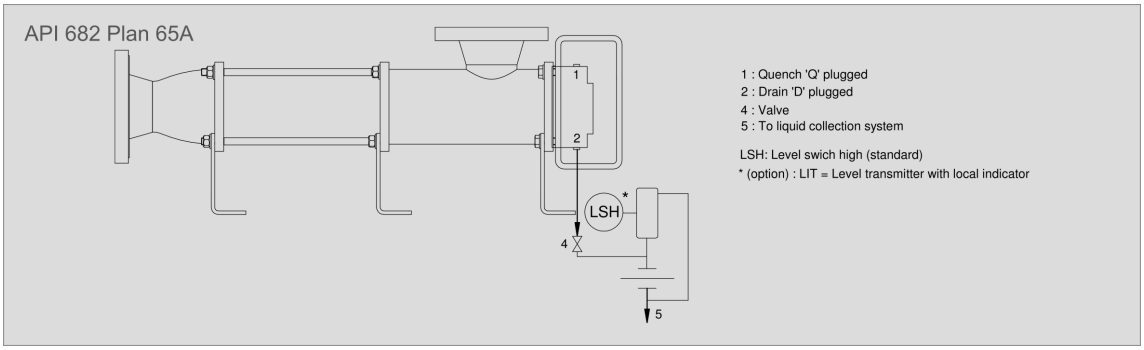
Mechanical seals can be used according to different sealing plans. These plans are described in the API 682 standard. The usual configurations are described below.

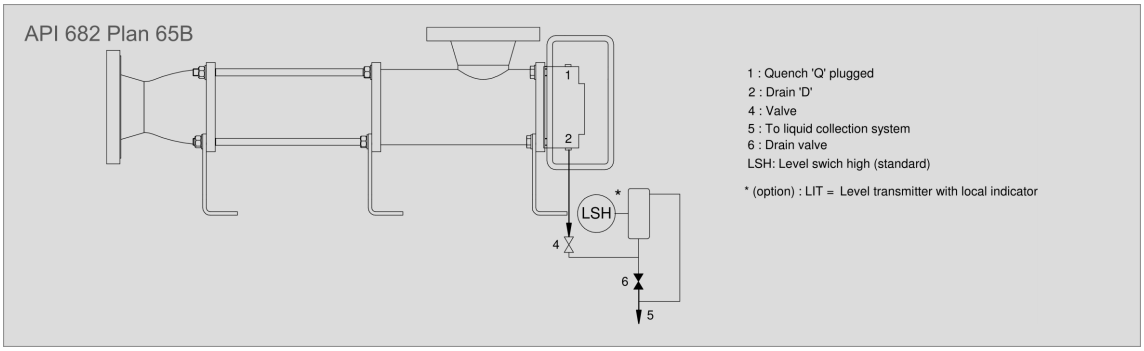
WARNING: the sealing plan connection must be carried out by qualified personnel.
The auxiliary lubrication system must be clean and filtered (if applicable).
Installation must be performed under the best conditions of cleanliness.

API 682 Plan 13 (as standard) Recirculation from pump seal chamber through a flow control orifice and back to the pump suction. This type of arrangement is suitable for vertical mounting of the pump.



API 682 Plan 65A or B (optional) Detection of any leak in the mechanical seal via an alarm system. For the assembly and installation of the lubrication system, see the specific instructions supplied with the associated lubrication system.





Note: a plan 13 can be combined with a plan 65A or B.

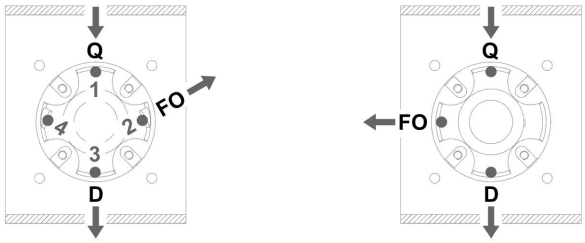
Other configurations are possible on request. For any changes of sealing plan, contact PCM.

2.6.4.1.1. Seal orientation

The seals used on vertical pumps can be oriented in any way.

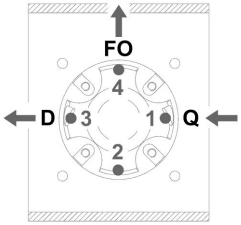
The diagrams below show an example of the orifice positions. The seals are shown seen from the motor in the direction of the pump.

Plan 13 :



API 682

Plan 65:



2.6.4.1.2. Fitting

The connections are of type 3/8" NPT on all the seal orifices.

The unused connections are closed off using metal plugs supplied with the pump.

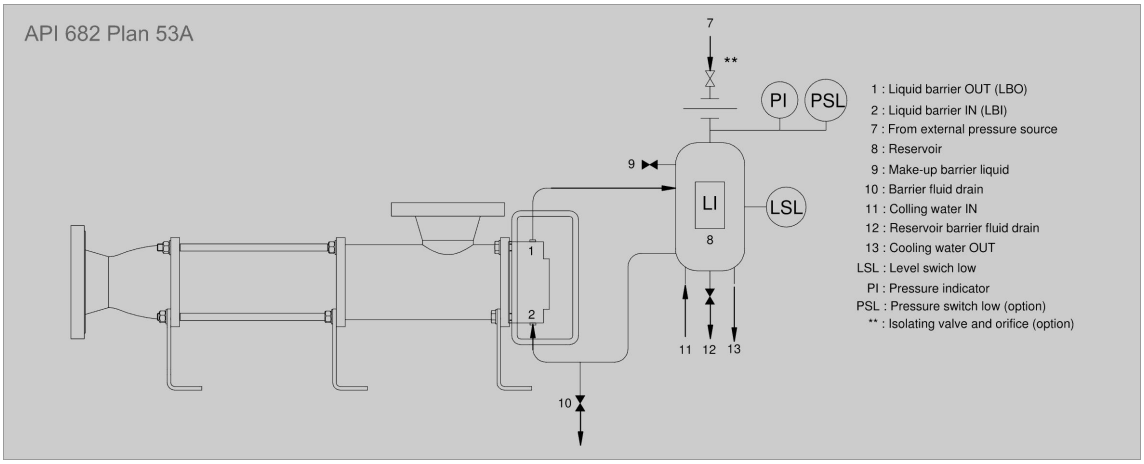
2.6.4.2. Double mechanical seal

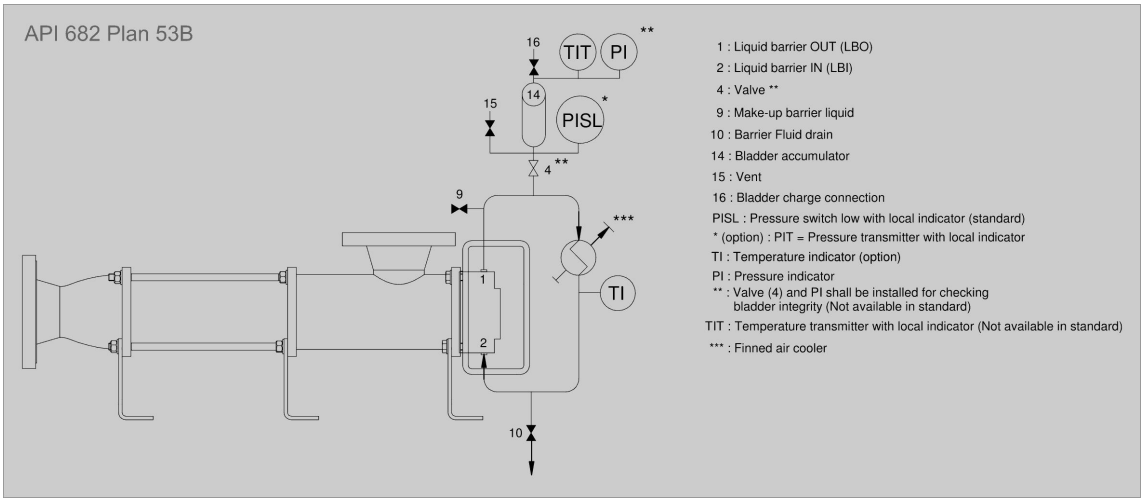
Double seals for PCM Moineau™ AV series pumps are designed to operate solely with a barrier fluid such as oil or glycol and water.

The usual configurations are API plan 53A and API plan 53B. These systems are described in the API 682 standard.

WARNING: the sealing plan connection must be carried out by qualified personnel.
The auxiliary lubrication system must be clean and filtered (if applicable).
Installation must be performed under the best conditions of cleanliness.

API 682 Plan 53A or 53B Supplied with barrier fluid from a pressurised tank.





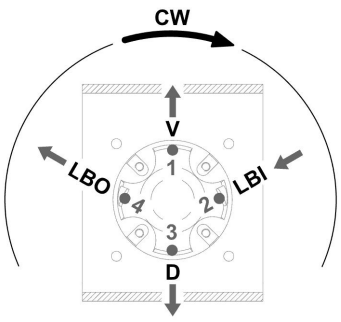
For the assembly and installation of the lubrication system, see the specific instructions supplied with the associated lubrication system.

2.6.4.2.1. Seal orientation

The seals used on vertical pumps can be oriented in any way.

The diagrams below show an example of the orifice positions. The seals are shown seen from the motor in the direction of the pump.

Plan 53A or 53B



CW: seen from the motor, the rotor turns clockwise.

2.6.4.2.2. Fitting

The connections are of type 3/8" NPT on all the seal orifices.

The unused connections are closed off using metal plugs supplied with the pump.

2.6.5. Gearbox lubrication

Gearboxes positioned vertically have a high level of oil to lubricate the first reduction gear stage.

The use of an optional expansion tank prevents oil leaking out of the vent screw if foam forms on the surface of the oil.

For the expansion tank connection procedure, see the drive system instructions in the appendix.

2.6.6. Motor connection

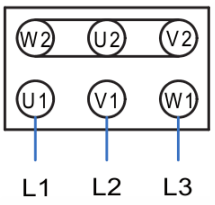
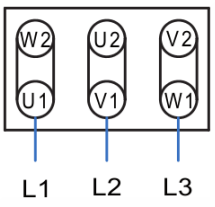
WARNING: All procedures must be performed by qualified personnel. PCM declines all responsibility if this requirement is not fulfilled. Before performing any connections, ensure that the electrical power supply has the characteristics listed on the motor plate. There is also a wiring diagram in the motor terminal box (see also the instructions in the Appendix).

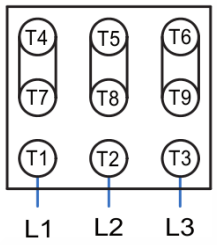
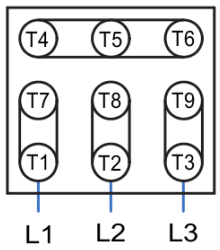
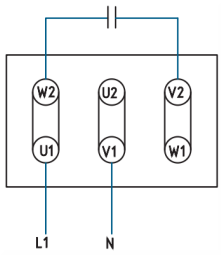
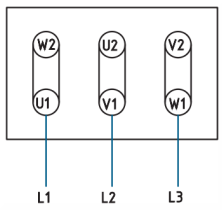
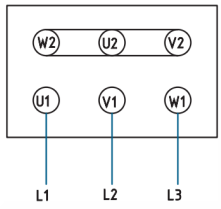
For thermal protection, the setting value is the current indicated on the motor.

When all connections have been made, the motor should be run at low speed for a few seconds (if possible using a mechanical or frequency variator) in order to check the sense of rotation as indicated by the arrow marked on the pump.

WARNING: Pumps do not tolerate dry running.

2.6.6.1. Examples of wiring diagrams

Device	Configuration	Diagram
Three-phase IEC motor	Y connection High voltage	
	Δ connection Low voltage	

Device	Configuration	Diagram
Three-phase NEMA motor	Y connection High voltage	
	YY connection Low voltage	
Forced ventilation	Single-phase operation Steinmetz connection 230V - 277V 50 + 60Hz	
	Three-phase operation Δ triangle connection 220V - 290V 50Hz 220V - 332V 60Hz	
	Three-phase operation Y star connection 380V - 500V 50Hz 380V - 575V 60Hz	

3. Operation

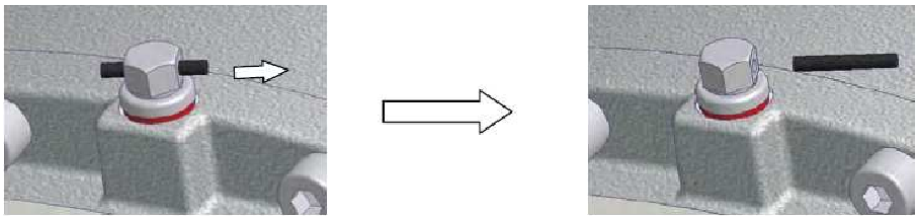
3.1. Commissioning

Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

3.1.1. Before start-up

Ensure that:

- The motor and baseplate are grounded (earthed).
- The electrical connections are correct and their arrangement does not lead to supplementary risks (falls).
- The gearbox has been filled with lubricant to the correct level.
- The motor has been filled with lubricant to the correct level.
- The gearbox screw (or vent valve or oil expansion tank) has been correctly installed and activated.



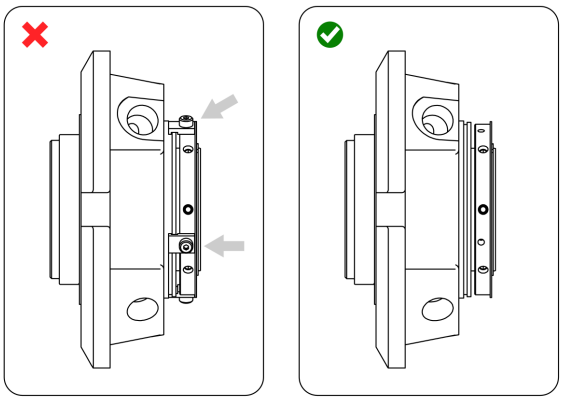
Activation of the vent screw



Installation of the vent valve

NOTE: for the positioning of the vent screw and the connection of the expansion tank, see the drive system instructions in the appendix.

- The product to be pumped is present in the tank and the pump body.
- The mechanical seal is connected to its sealing plan.
- The mechanical seal is vented (if used in a vertical installation or with a barrier fluid).
- The spacers (shown by the arrows on the diagram below) have been removed from the mechanical seal and conserved for maintenance operations.



- All valves installed upstream and downstream from the pump are open.
- The temperature and type of product to be pumped are correct.
- The alignment of the coupling has been checked.
- The screws are tightened to the right torque for their diameter.
- The direction of shaft rotation corresponds to the desired direction of pumped fluid flow.

Also follow the motor manufacturer's instructions (supplied in the appendix).

3.1.2. Start-up

WARNING: Never allow the pump to run dry!

To prevent dry running, PCM can supply a dry run protection system.

If the pump is not primed, you are advised to fill the pump body by hand. If the pump is temporarily not primed, the small amount of liquid remaining in the pump is enough to lubricate the stator until the next priming.

During the first few minutes of operation, check the following:

- The liquid being pumped reaches the end of the discharge pipe.
- The pump is not vibrating abnormally.
- No unusual noise.
- Sealing system functioning well.
- Check that the pressure stabilises, if a pressure gauge is installed.
- No abnormal heating of the stator or sealing system.

Check that the parameters (speed, flow rate, pressure, viscosity, and temperature) match the design parameters of the pump.

Note: it is normal for a fine black powder to form behind the mechanical seal. This is due to wear of the fix throttle bushing in the first moments of operation.

WARNING: If the values are not those indicated, consult your PCM service centre.

3.2. Normal operating procedure

The pump and its drive system can reach significant surface temperatures.



Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

3.2.1. Start-up procedure

Before each start-up, check the following:

- Fluid present at suction.
- Valves open on the suction and discharge pipes.
- Correct temperature of the product to be pumped.

Start the pump.

3.2.2. General Operating Precautions

During operation, ensure that:

- The pump is continuously supplied with product and power.
- The discharge pressure remains stable and below the maximum capacity of the pump.
- The temperature of the product being pumped remains within the operating limits.
- The operating instructions in force at the production site are observed.

3.2.3. Shutdown Procedure

This shutdown procedure depends on the type of product being pumped. Refer to the specific characteristics on the technical description (see Appendices).

The shutdown procedure is therefore defined by the process.

Nonetheless, the minimum procedure is to switch off the pump, then close the suction and discharge valves.



WARNING: for a product which settles, clean the pump using a suitable product in order to enable the pump to be restarted without damage. .



It is important to protect the pump against water hammer, which could destroy the equipment and cause a risk to staff and other equipment nearby.

WARNING: it is important to limit the time for which food is in contact with the pump components, and to flush the pump in the event of a prolonged stoppage (over 30 minutes).

3.2.4. Operating Procedure in the Event of an Incident

In the event of operating irregularities, such as:

- Pump does not start.
- Pump does not prime itself.
- Flow rate too low or irregular.
- Pump stops.
- Pump is not delivering.
- Pump is abnormally noisy.

Proceed as follows:

- Shut down the pump according to the shutdown procedure (see page 24).
- Hydraulically isolate the pump (suction, discharge).
- See "Troubleshooting" section (see page 37).

3.2.5. Automatic control

It is advisable to use devices that automatically control the operation of the pump.

Examples: pressure switch, valves with electrical position contact, dry running protection probe (capacitance probe).

4. Maintenance

4.1. Spare parts list

For the list of spare parts for your pump, contact the PCM service centre, giving the serial number of your equipment. This number is shown on the manufacturer identification plate.

You can ask us to repair your pump. Within three days of receiving it, we will supply a quotation showing the cost of the overhaul and how long it will take to do.

PCM service centre address:

PCM – Rue René Moineau – 49123 Champtocé-sur-Loire – France

Phone: +33 (0) 1.77.68.31.00 – contact@pcm.eu

PCM USA Inc. – 11940 Brittmoore Park Drive – Houston, TX 77041 – USA

Phone: +1 713-896-4888 – contact@pcm.eu

PCM China – Unit 10A01, Shanghai Mart, No. 2299 – Ya Nan West Road, Shanghai, China 200336

Phone: +86 21 6236 2521 – contact@pcm.eu

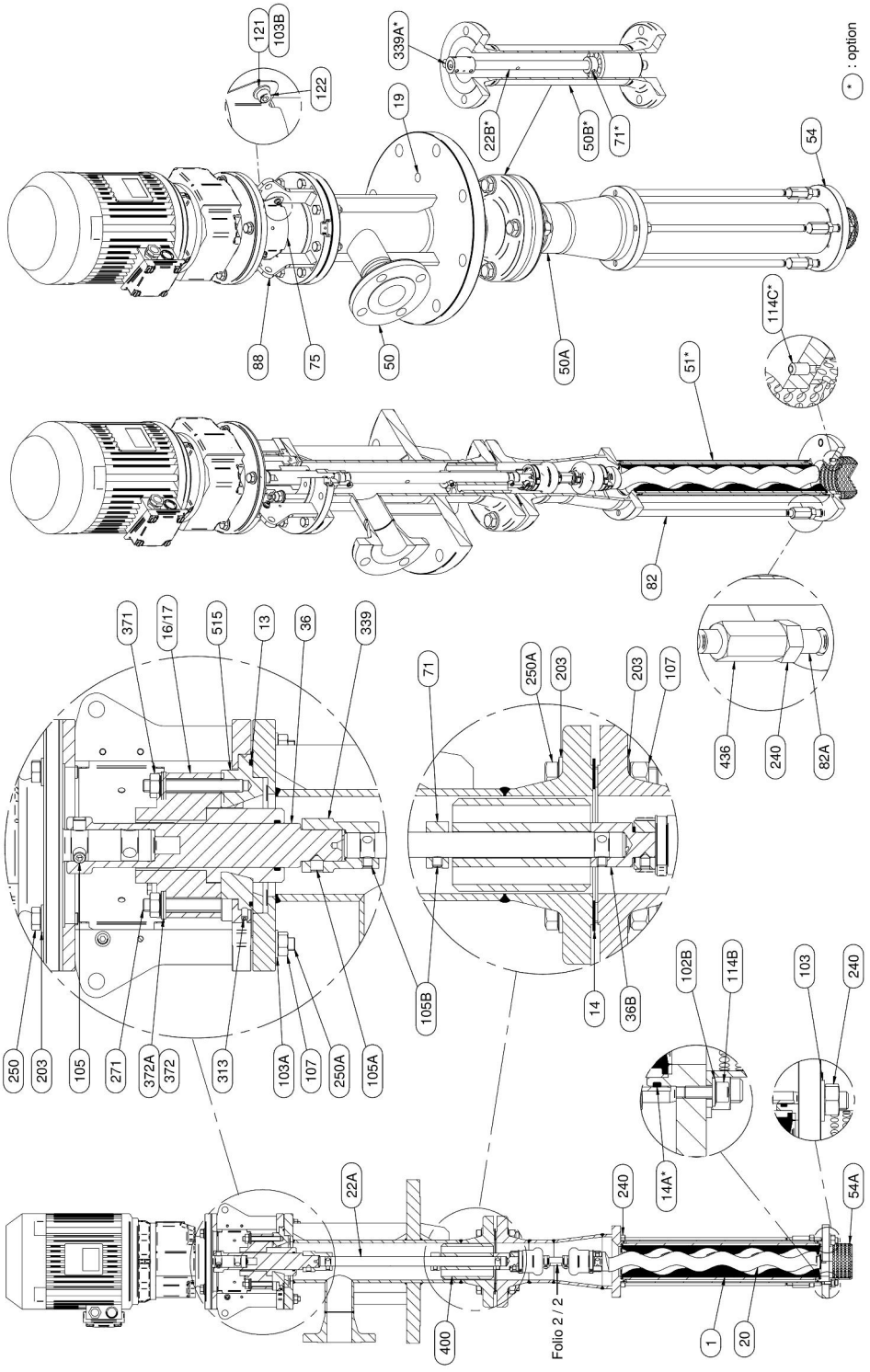
PCM MIDDLE EAST FZE – Office N° 741 – Building 5, East Wing, Block B – Dubai Airport Free Zone – PO Box 293527, Dubai – United Arab Emirates

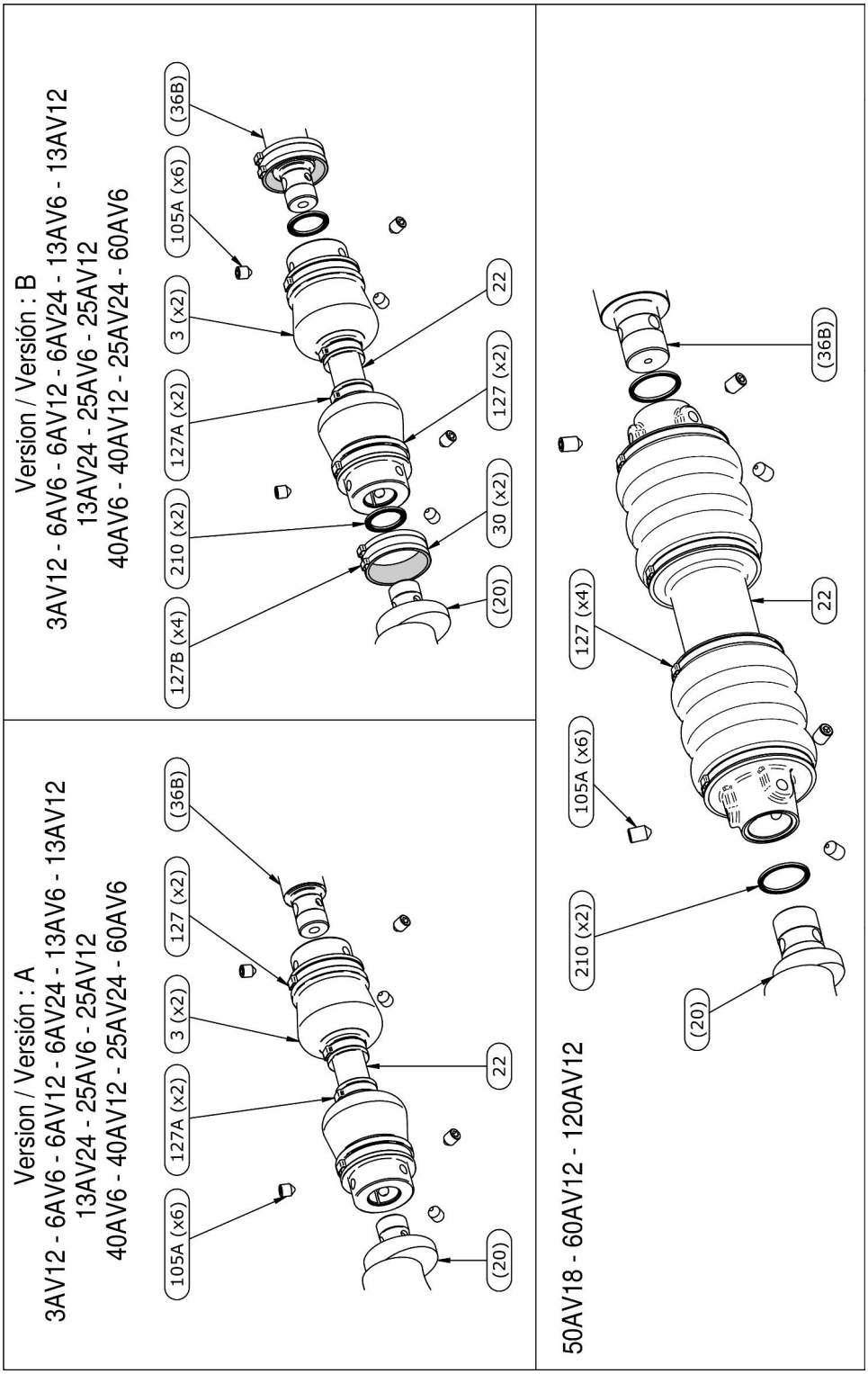
Phone: +971 42 04 58 48 – contact@pcm.eu

4.2. Cross-section of the pump

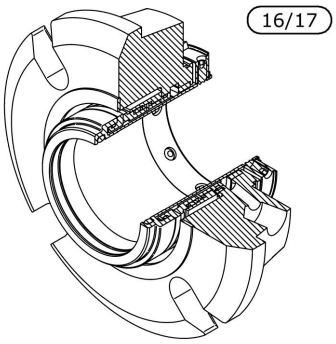
See Specific Cross-section provided during project execution.
If no specific drawing was provided, see below standard for all models.

4.2.1. Monobloc pump

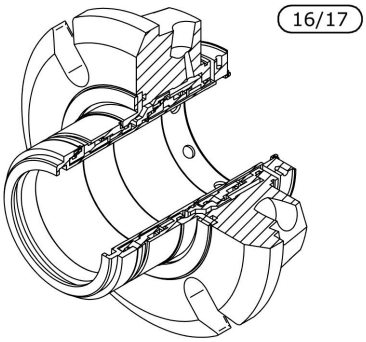



Version / Versión : B
3AV12 - 6AV6 - 6AV12 - 6AV24 - 13AV6 - 13AV12
13AV24 - 25AV6 - 25AV12
40AV6 - 40AV12 - 25AV24 - 60AV6
127B (x4)
210 (x2)
127A (x2)
3 (x2)
105A (x6)
(36B)
(20)
30 (x2)
127 (x2)
22
Version / Versión : A
3AV12 - 6AV6 - 6AV12 - 6AV24 - 13AV6 - 13AV12
13AV24 - 25AV6 - 25AV12
40AV6 - 40AV12 - 25AV24 - 60AV6
105A (x6)
127A (x2)
3 (x2)
127 (x2)
(36B)
22
(20)
50AV18 - 60AV12 - 120AV12
210 (x2)
105A (x6)
127 (x4)
(36B)
22
(20)

4.3. Sealing by single mechanical seal



4.4. Sealing by double mechanical seal



4.5. Handling Equipment and Procedure

WARNING: To handle the complete pump, refer to the procedure in force and comply with legislation concerning the safety of personnel. Slinging must be performed by trained, qualified personnel in accordance with the instructions given in this manual. Any failure to observe this rule releases PCM from all responsibility.
Before lifting the pump, ensure that all its components are securely fastened to each other. Do not sling with a single sling or an endless sling that can slip on the lifting hook.

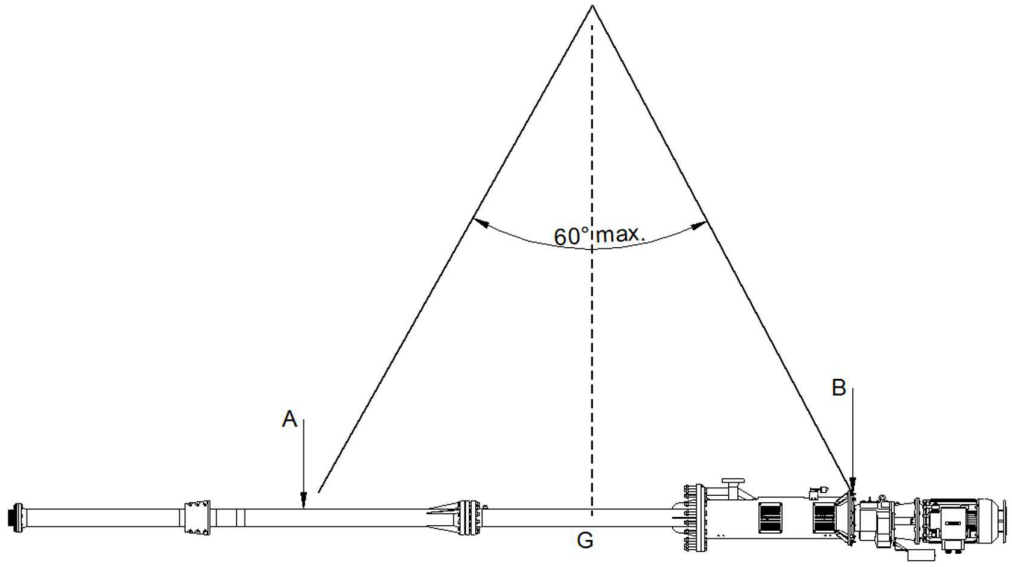
Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

4.5.1. Handling in the horizontal position

Use two single slings working in a loop on the stator (A) and the motor unit (B), while using a lining to protect the slings from sharp edges.

The hoisting rings that may be present on the motor unit (gearmotor, motor or gearbox) should not be used to lift the pump.

If the motor is equipped with an IEC or NEMA adaptor, do not attach the slings to the motor or the adaptor attach them to the gearbox.



Use a protective thimble or a sliding hook where the loop is situated. The max. loads on the pump units are available in the appendix.

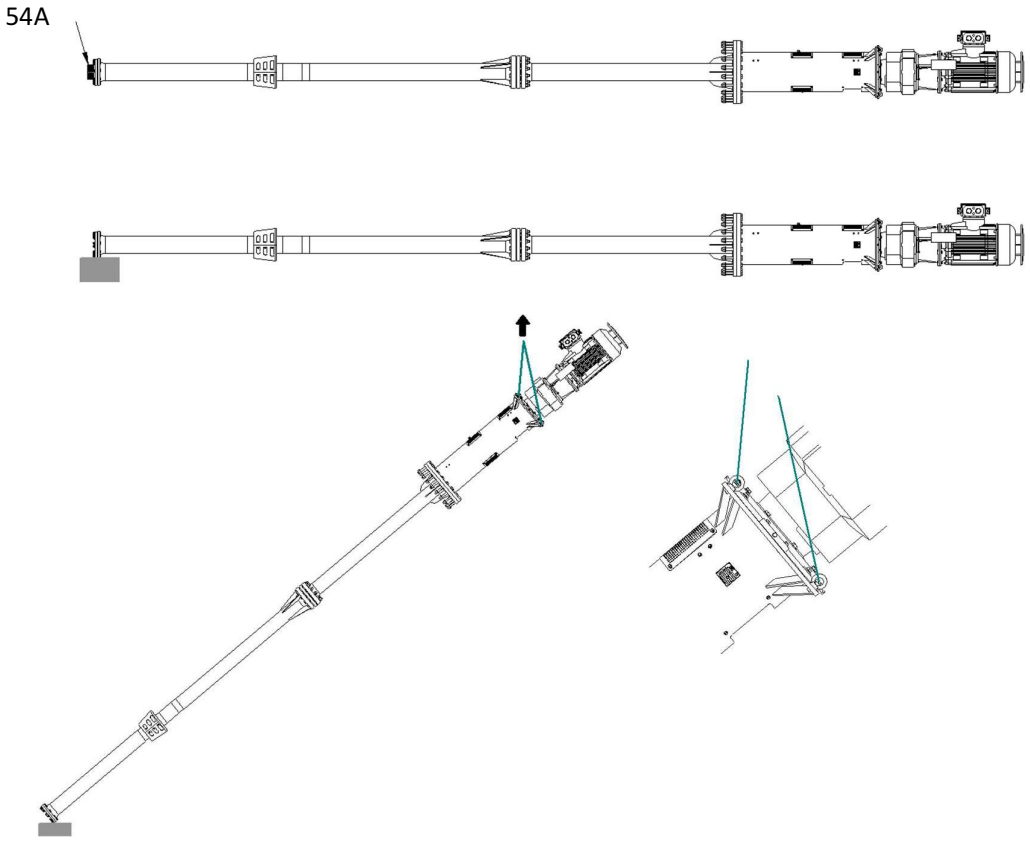
Use an adjustable sling with an adequate working load limit (WLL)[1]. Perform the adjustment with a series of tests to place the centre of gravity (G) of the load vertically below the hook (with latch), or position two slings of different lengths by attaching the shorter one on the heavier side so that the centre of gravity (G) of the load is positioned vertically below the hook (with latch).

For large pumps (longer than 7 metres), add a third lifting point at the centre of the pump.

The parts of the pump that cannot be handled may be lifted using a hoist and slings (or any similar lifting equipment). Metallic slings (chain, cable, etc.) are not recommended. Fragile parts must be handled with particular care to avoid impact. After removal, they must be laid in a stable position on wooden blocks, and protected from shocks.

1. WLL: Maximum allowable mass (kg) that can be hung vertically from the sling in normal use

4.5.2. Lifting the pump



1. Remove the strainer (54A) at the pump's suction port to avoid damaging it.
2. Install a wedge at the end of the pump beneath the stator port (54).
3. Lift the pump using the holes in the spacer (88) or the lifting eyes (310) for bearing pumps. Use lifting equipment compliant with the European machinery directive, which must be able to handle the load specified in the GAD. For large pumps (longer than 7 metres), add a lifting point at the centre of the pump.
4. Once the pump is vertical, refit the strainer (54A) at the suction port.
5. Before installing the pump, make sure the screws on the outside of the pump are correctly tightened.

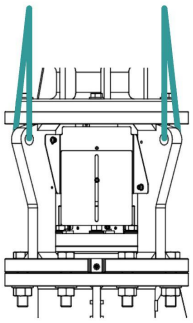
The hoisting rings that may be present on the motor unit (gearmotor, motor or gearbox) should not be used to lift the pump.

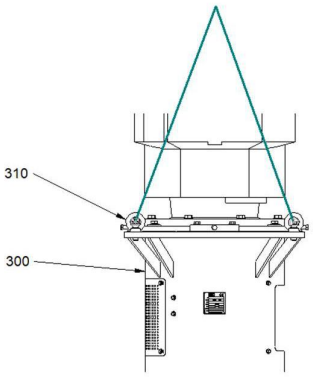
Follow the instructions in reverse order to position the pump horizontally.

For Pump and Caisson assembly lifting, use the special Lifting Tool T1 and T4.

4.5.3. Handling in the vertical position

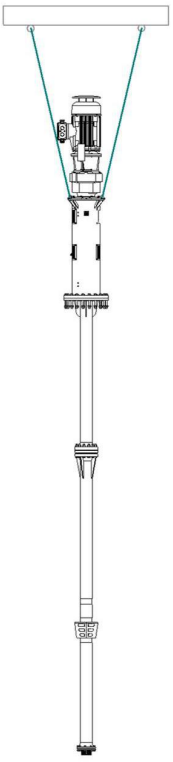
The pump must be lifted using the holes in the spacer (88) for monobloc pumps or the lifting eyes (310) available on the baseframe (300) for the bearing pumps. Use lifting equipment compliant with the European machinery directive, which must be able to handle the load specified in the General Arrangement Drawing.





The hoisting rings that may be present on the motor unit (gearmotor, motor or gearbox) should not be used to lift the pump.

The addition of a lifting beam will distance the hoists from the motor drive and from sensitive parts (motor terminal box, gearbox expansion tank), avoiding the risk of breakage during handling.



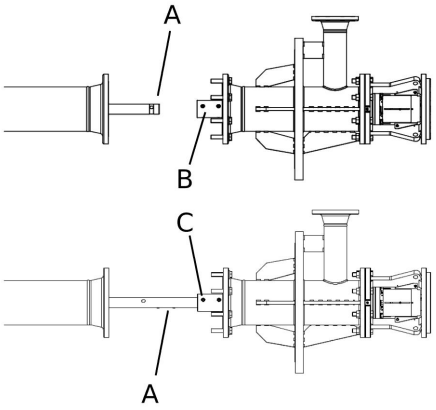
4.6 Reassembling a pump delivered in several sections

Large pumps can be delivered in sections for easier transport. The procedure for reassembling the pump in the horizontal position is described below.
NOTE: Ensure there is enough space (height) to lift the pump as a whole and position it vertically (see paragraph 4.5.2). If not, the pump must be assembled vertically section by section (see "Reassembling the pump in the vertical position" on page 60).



1.

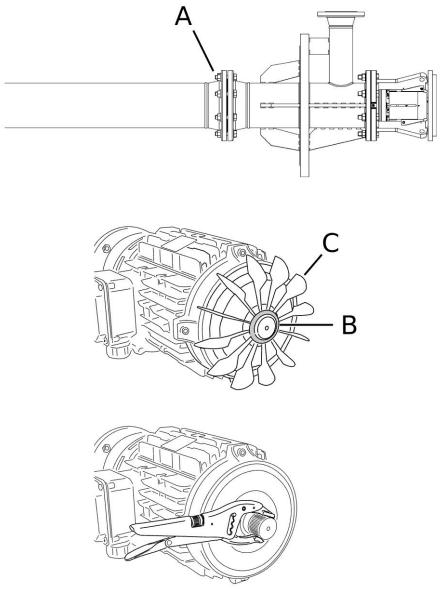
Position the sections of the pump in a straight horizontal line. Add wedges on either side of each section to prevent them moving.



2.

Grease the shaft ends (A) and insert the drive shaft (B) into the shaft (A). Coat the 3 screws (C) with Freinfilet® and screw in to the required torque:

- 10 Nm for models 3AV12, 6AV6, 6AV12, 6AV24, 13AV6, 13AV12
- 20 Nm for models 13AV24, 25AV6, 25AV12
- 40 Nm for models 25AV24, 40AV6, 40AV12, 60AV6
- 80 Nm for models 50AV18, 60AV12, 120AV12



3.

Bring the flanges into contact and tighten the screws (A) to the required torque. Do not forget the flat seal between the flanges.

The rotor/stator connection can be used to bring the flanges into contact. To do this, remove the motor's protective casing, the ring (B) and the fins (C). Using locking pliers, turn the shaft on the motor side. Once the flanges are in contact and the screws tightened, refit the fins, the ring and the protective casing for the motor.

4.7. Storage conditions

4.7.1. In PCM standard packaging

Pumps and pump parts must be stored in their original packaging, in a stable position, protected from impact and in a dry location.

4.7.2. After Unpacking

- Protect the equipment from impact and from dust.

4.7.3. In Packaging according to S.E.I. 4c

Every six months:

- Replace the desiccant pouches.
- Check machined surfaces, and lubricate if necessary,

Every month:

- Turn the pump through four or five revolutions using the fan or bearing shaft.

4.8. Specialist Tools

No special tools are necessary for maintenance in the horizontal position (see paragraphs 4.17 and 4.18).

For maintenance in the vertical position (see paragraphs 4.19 and 4.20), a set of tools available from the PCM catalogue is required. The set includes the tools listed below.

Reference	Name	Quantity
T1	Tool for Caisson Lifting	2
T2	Body extension support flange	2
T3	Body extension support clamp (with bolts)	2
T4	Body extension lifting plate	1
T5	Body lifting plate	1
T6	Shaft line support clamp (with bolts)	1
T7	Shaft extension support clamp (with bolts)	1
T8	Hoisting ring for the shaft line and shaft extensions (with needle screw)	1

4.9. Rules on preventive maintenance operations



WARNING: All servicing must be carried out by trained, qualified personnel in accordance with the instructions given in the present manual.
Any failure to observe this rule releases PCM from all responsibility.
Before performing any maintenance operations on the pump, check that all necessary precautions have been taken: upstream and downstream valves closed, pipework cleaned and purged, electrical power supply disconnected and disabled. Check also that all the usual precautions have been taken in accordance with the regulations in force regarding the safety of personnel.

4.10. Periodic Inspection

If the equipment is used daily, the following should be checked:

- Complete leak tightness of the pump (once a week).
- Tightness of the assembly mounting hardware (port, stator, body, spacer, drive) (once a month).
- Level of lubricant in the drive, if applicable (once a month).
- Anchoring (once a year).

- Motor current and cleanliness of drive ventilation grid (once a month).
- Condition of power supply electrical ducts (once a year).
- Alignment of the coupling for bearing pumps (once a year).

4.11. Cleaning



Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

4.11.1. External cleaning

Remove any dirt that could damage the paint and corrode the pump.

4.11.2. Internal cleaning

Cleaning procedures and frequency depend on the specific application of the pump, and the product being pumped. In any case, the minimum procedure is described below.

With the pump running, feed in the cleaning product that is compatible with the pumped product and pump materials at the suction end.

Cleaning time is defined according to the process using the pump. When this time has expired, shut down the pump according to "Shutdown Procedure" section of the chapter "Normal Operating Procedure" (see page 24).

4.12. Lubrication

The gearmotor, the bearing (if applicable) and the shaft line are supplied lubricated. Check the levels before putting the pump in service.

Consult the manufacturer documentation supplied in Appendix for the precautions to be taken when lubricating the gearmotor, where applicable.

The following table indicates the recommended lubricants to be used when servicing the pump:

Component to be lubricated	Recommended lubricant	Supplier
Gearbox shaft / drive shaft (36) connection	GERALYN 2 grease	FUCHS LUBRITECH
Connection between extension coupling (339/339A)/drive shaft (36/36B) or shaft extension (22A/22B)	GERALYN 2 grease	FUCHS LUBRITECH
Connection between drive system (E)/drive shaft (36/36B) or rotor (20)	GERALYN 2 grease	FUCHS LUBRITECH
Roller bearings (65)	AVIATION N°10	ELF
	RENOLIT LXC2	FUCHS LUBRITECH
Stator (1) (for assembly)	GLYCERINE	

* The type and quantity of lubricant per sheath depends on the pump model:

Model	Recommended lubricant	Supplier	Quantity of lubricant
3AV12, 6AV6, 6AV12, 6AV24, 13AV6, 13AV12	TOTAL AXA grease, grade 1	TOTAL	30 grams
13AV24, 25AV6, 25AV12			55 grams

Model	Recommended lubricant	Supplier	Quantity of lubricant
25AV24, 40AV6, 40AV12, 60AV6			170 grams
50A18, 60A12, 120A12	NEVASTANE EP 460 oil	TOTAL	0.75 litres

4.13. Thread locking

The following table indicates the recommended products to use when reassembling the pump:

Element to be locked	Recommended product	Supplier
Screws (105A/106A)	LOCTITE® 243	HENKEL
Nut (70)	LOCTITE® 243	HENKEL

4.14. Tightening torques

General tightening torque values for the fixing elements hardware are defined in the following table:

Screw diameter	Class 8.8 steel	Class 70 stainless steel
M4	4.1 N.m [2.95 lbf.ft]	4.1 N.m [2.95 lbf.ft]
M5	4.1 N.m [2.95 lbf.ft]	4.1 N.m [2.95 lbf.ft]
M6	10 N.m [7.38 lbf.ft]	7 N.m [5.16 lbf.ft]
M8	15 N.m [11.06 lbf.ft]	10 N.m [7.38 lbf.ft]
M10	30 N.m [22.13 lbf.ft]	20 N.m [14.75 lbf.ft]
M12	40 N.m [29.5 lbf.ft]	30 N.m [22.13 lbf.ft]
M14	65 N.m [47.94 lbf.ft]	50 N.m [36.88 lbf.ft]
M16	90 N.m [66.38 lbf.ft]	65 N.m [47.94 lbf.ft]

4.15. Troubleshooting the pump

4.15.1. Incidents and causes

Causes	Incident													Solutions (see section below)
	Pump does not start	Pump does not deliver	Pump does not prime itself	Pump stops running	Flow rate too low	Discharge pressure too low	Drive is overloaded	Pump is noisy or vibrates abnormally	Leak in shaft seal	Premature stator wear	Premature rotor wear	Flow rate is not constant	Joints deteriorate quickly	
The stator is swollen.	●			●			●			●			●	1
Rotor drive system is broken.	●	●	●	●										2
Product temperature is too high.	●		●	●	●	●	●	●		●	●		●	3
Sedimentation or precipitation of the fluid in the pump body	●	●	●	●			●	●		●	●		●	4
The solid bodies contained in the liquid are too voluminous	●	●		●			●			●	●		●	5
The electrical installation is not compliant, or is faulty.	●			●	●	●	●					●		6
The devices driving the pump are worn or broken.	●	●	●	●	●	●		●				●		7
Pump is blocked by a foreign body.	●	●		●			●			●	●		●	8
The stator has become hard and brittle.		●	●		●	●	●	●		●	●		●	9
The stator is sectioned at its rim.			●		●	●								10
The stator is worn.		●	●		●	●		●		●				11

Causes	Incident												Solutions (see section below)
	Pump does not start	Pump does not deliver	Pump does not prime itself	Pump stops running	Flow rate too low	Discharge pressure too low	Drive is overloaded	Pump is noisy or vibrates abnormally	Leak in shaft seal	Premature stator wear	Premature rotor wear	Flow rate is not constant	Joints deteriorate quickly	
The rotor is worn.		●	●		●	●		●		●				12
Leak in mechanical seal.			●						●					13
Incorrect direction of rotation.			●			●								14
Product temperature is lower than expected.		●	●		●	●								15
Net positive suction head is too low NPSHa<NPSHr		●			●	●		●		●	●	●	●	16
The pump suction is drawing in air.		●			●	●				●		●		17
Speed of rotation is too low.		●			●	●								18
Pump installation location, pipework and accessories should all be checked	●	●		●	●		●	●		●		●	●	19
The pump is running dry.		●	●					●		●				20
Viscosity of the pumped product is higher than expected.		●		●	●		●							21
Pressure at discharge is too high.	●	●		●	●		●	●		●	●		●	22
Speed of rotation is too high.							●	●		●	●		●	23

Causes	Incident													Solutions (see section below)
	Pump does not start	Pump does not deliver	Pump does not prime itself	Pump stops running	Flow rate too low	Discharge pressure too low	Drive is overloaded	Pump is noisy or vibrates abnormally	Leak in shaft seal	Premature stator wear	Premature rotor wear	Flow rate is not constant	Joints deteriorate quickly	
For a new pump or new stator: excessive static tightening.	●						●							24
Shaft is damaged (according to model).		●	●		●	●			●			●		25
The roller bearings are worn (according to model).								●	●					26
Stability of pump motor unit (according to model).								●						27

4.15.2. Solutions

Solution no.	Description
1	The stator material swells when in contact with the product being pumped. Check that the material and the product are those specified in the order. Otherwise contact the PCM service centre.
2	Determine the cause of failure by checking points 1, 3, 4, 5, 8, 22, and 23, and then replace the damaged parts.
3	The operating temperature limit is defined according to the stator material.
4	Clean the pump body and rinse the pump after each use.
5	Remove these bodies using a strainer, or contact the PCM service centre to obtain another pump.
6	Check the network voltage, motor connections, circuit breaker calibration, and number of phases.
7	Replace defective parts and check the load on the drive.
8	Disassemble the pump, clean it, and replace any defective components.
9	Check that the temperature is not higher than initially planned and that the product being pumped is the intended product. If any parameters change, contact the PCM service centre to determine a different pump construction.
10	This type of damage is typically caused by overpressure. Contact the PCM service centre.
11	Replace the stator and check the condition of the rotor.
12	Determine the cause of the wear: abrasion, corrosion, cavitation. Contact the PCM service centre to define a new rotor material if necessary, and install the new part.

Solution no.	Description
13	Remove the mechanical seal and replace it with a new one.
14	Change the electrical connections.
15	Contact the PCM service centre, who will recommend a tighter stator.
16	Reduce head loss in the suction pipe, lower the temperature, and raise the suction level.
17	Check the installation for leaks.
18	Contact the PCM service centre to determine the best way to increase the speed.
19	Check all pipes for obstruction by a foreign body, for a defective or improperly sealed valve, for a leaky poppet, etc.
20	Re-arrange the overall layout of the installation, or provide a dry running protection system.
21	For any viscosity change, contact the PCM service centre, who will re-calculate the parameters.
22	Measure the pressure using a pressure gauge, and compare it to the pressure stated in the technical description.
23	Contact the PCM service centre to determine the best way to reduce the speed.
24	Fill the pump, and rotate the motor fan about ten revolutions by hand.
25	Replace the shaft and the mechanical seal.
26	Remove the bearing or gearbox and replace the roller bearings and seals.
27	Adjust the feet or check the mountings.

4.16. Troubleshooting the seals

4.16.1. Incidents and causes

Causes	Incident				Solutions (see section below)
	Static leak in sealing system	Dynamic leak in sealing system from start-up	Abnormal heating in seal	The seal makes an abnormal noise	
The seal is damaged	●	●			1
Incorrect assembly	●	●			2
Geometric fault in the adapter fittings	●	●			3
Poor flatness of the mechanical seal surfaces	●	●			4
Operating conditions are too harsh		●			5

Causes	Incident				Solutions (see section below)
	Static leak in sealing system	Dynamic leak in sealing system from start-up	Abnormal heating in seal	The seal makes an abnormal noise	
Poor choice of seal		●			6
Poor lubrication and/or cooling			●		7
Poor lubrication, dry running				●	8

4.16.2. Solutions

Solution no.	Description
1	Check condition of seals, faces, etc.
2	(at the assembly procedure, taking care to follow the instructions.
3	Check the geometry.
4	Bed in the faces of the mechanical seal (contact your local PCM representative).
5	Check the operating conditions.
6	Review the choice of equipment to determine the most suitable seal.
7	Check the injections, sealing circuit, thermosyphon etc.
8	Restore the lubrication and pressurisation circuits. Eliminate gas pockets, etc.

4.17. Disassembling the pump in horizontal position

This paragraph describes maintenance for a pump that has been placed in horizontal position. PCM recommends maintaining the pump, excluding the tank, in horizontal position. If it is not possible to position the pump horizontally (lack of space above the pump for lifting), see "Disassembling the pump in vertical position" (page 52), which describes vertical disassembly section by section.



WARNING: Before performing any maintenance operations on the pump, check that all necessary precautions have been taken: upstream and downstream valves closed, pipework cleaned and purged, electrical power supply disconnected and disabled. Check also that all the usual precautions have been taken in accordance with the regulations in force regarding the safety of personnel.
Systems connected to the mechanical seal must be disconnected before disassembling the pump.



Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

4.17.1. Residual fluids

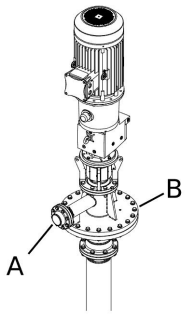
During maintenance operations, the fluid inside the pump is not fully evacuated. A certain volume of non-drainable fluid remains in the stator, with the quantity depending on the pump model:

Pump model	Fluid volume in the stator (in cm^3)
3AV12	90
6AV6	70
6AV12	200
6AV24	470
13AV6	150
13AV12	440
13AV24	1030
25AV6	470
25AV12	1400
25AV24	3310
40AV6	980
40AV12	2400
50AV18	7010
60AV6	1960
60AV12	4940
120AV12	9500

Take the necessary steps depending on the type of fluid present.

4.17.2. Disassembling the rear part of the pump in horizontal position

We recommend dismantling the pump from the drive end for maintenance operations on the motor and the sealing system.



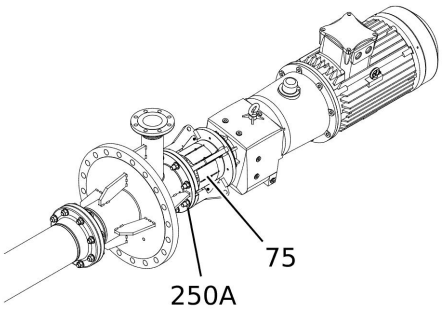
1.

Disengage the upper piping (A). Remove the fixing screws (B) from the mounting flange. If the pump is equipped with an external sealing plan, remove it and remove any pipes connected to the mechanical seal.



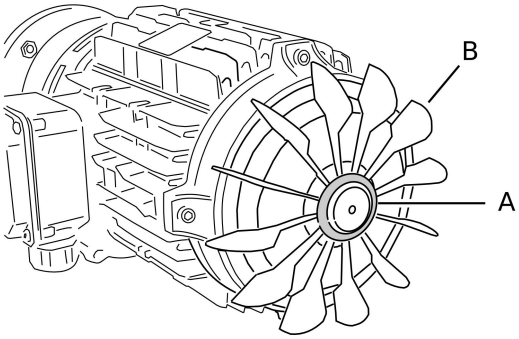
2.

Remove the pump from the tank following the instructions in paragraph 4.5 and install the pump horizontally on wedges. Add wedges on either side of the pump to prevent it moving. If it is not possible to position the pump horizontally (lack of space above the pump for lifting), see "Disassembling the pump in vertical position" (page 52), which describes vertical disassembly section by section.



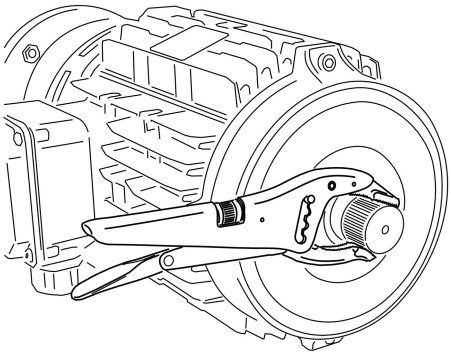
3.

Remove the fixing screws (250A) from the body and the casings (75).



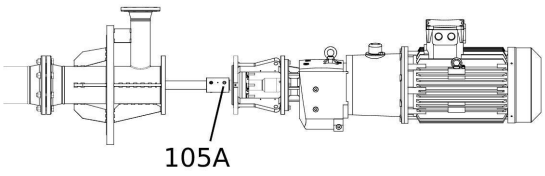
4.

Remove the motor's protective casing, the ring (A) and the fins (B).



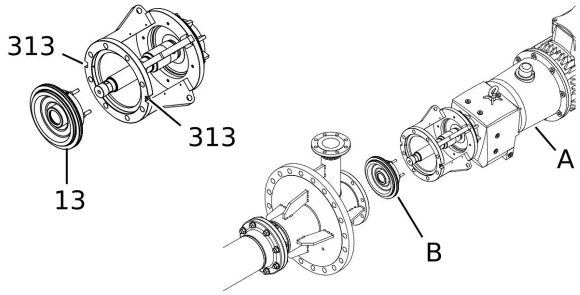
5.

Using locking pliers, turn the shaft to pull the drive back by about 70 mm.



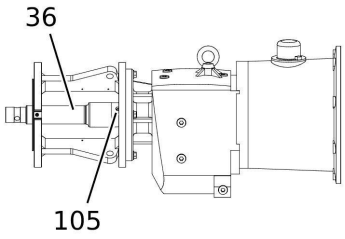
6.

Unscrew the 3 screws (105A).



7.

Remove the motor unit (A). Remove and check the seal (13). Unscrew the two screws (313) and remove the sealing system (B) only if it requires maintenance (removal instructions can be found in the "Removal of the sealing system" section, page 69).

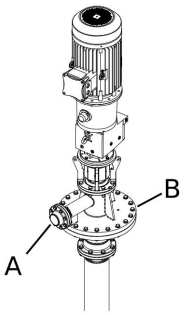


8.

Unscrew the 3 screws (105) and remove the shaft (36) for cleaning.

4.17.3. Disassembling the front part of the pump in horizontal position

We recommend dismantling the pump from the front for maintenance operations on the stator and the rotor.



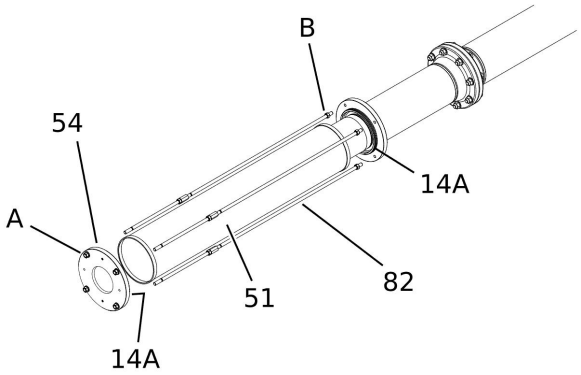
1.

Disengage the upper piping (A). Remove the fixing screws (B) from the mounting flange. If the pump is equipped with an external sealing plan, remove it and remove any pipes connected to the mechanical seal.



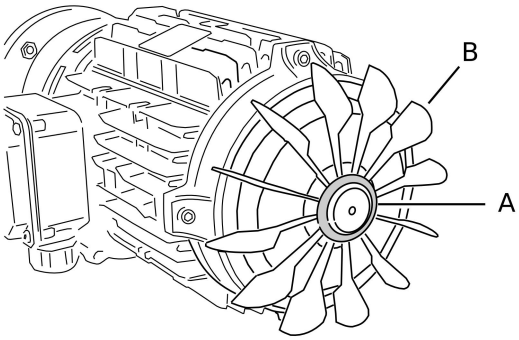
2.

Remove the pump from the tank following the instructions in paragraph 4.5 and install the pump horizontally on wedges. Add wedges on either side of the pump to prevent it moving. If it is not possible to position the pump horizontally (lack of space above the pump for lifting), see "Disassembling the pump in vertical position" (page 52), which describes vertical disassembly section by section.



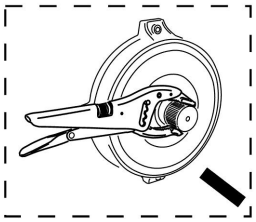
3.

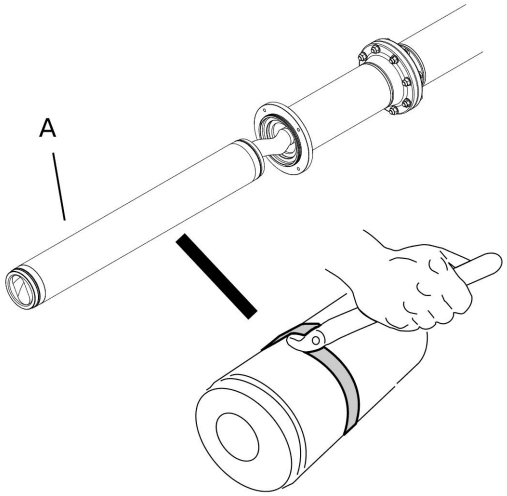
Remove the 4 nuts (A) and remove the pipe assembly (54). Unscrew the 4 nuts (B) to remove the 4 pins (82). If the pump is equipped with a protective casing for the stator (51), remove it and check the condition of the seals (14A).



4.

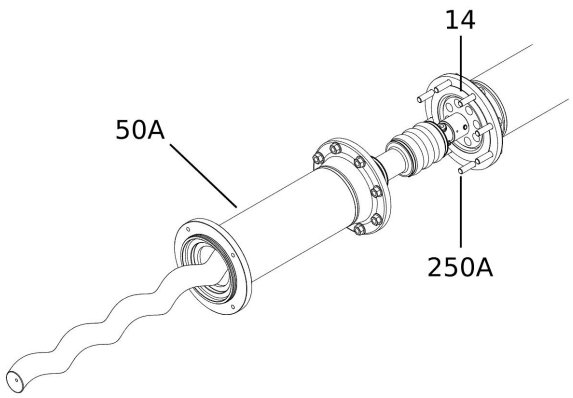
Remove the motor's protective casing, the ring (A) and the fins (B).





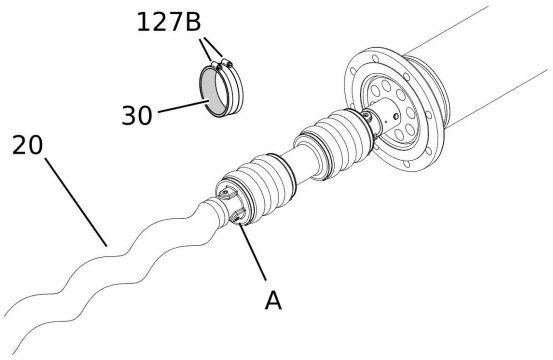
5.

Remove the stator (A). Block the shaft line on the motor side using a plier wrench and use a strap wrench to unscrew the stator.



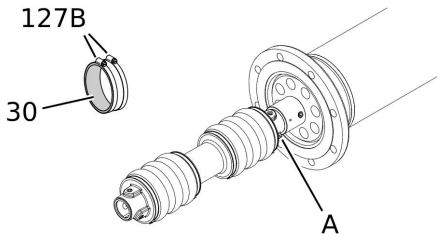
6.

Remove the screws (250A) and the body extension (50A). Remove and check the seal (14).



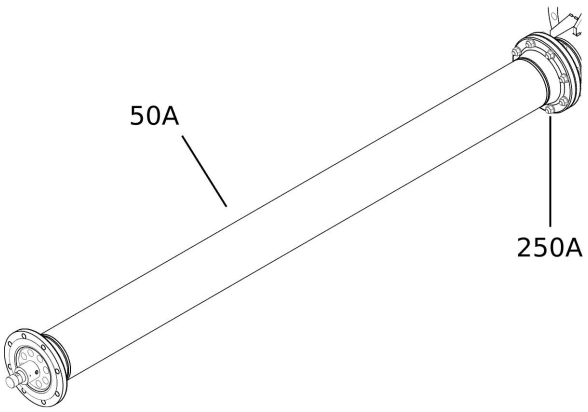
7.

Unscrew the 3 screws (A) and remove the rotor (20). If the pump is equipped with protective sheaths, the screws cannot be accessed directly. In this case, remove the collars (127B) and move the protective sheath (30) to reach the 3 screws (A). Remove and check the seal (210).



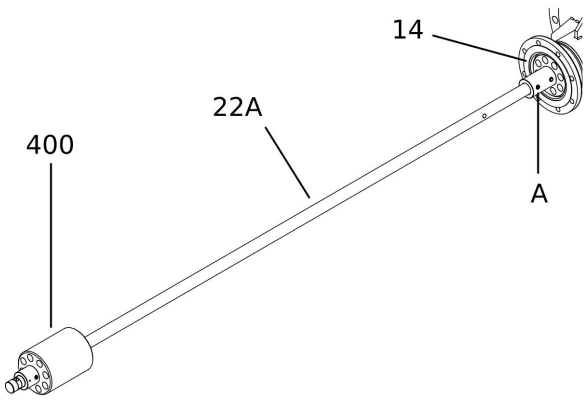
8.

Unscrew the 3 screws (A) and remove the connecting rod (22). If the pump is equipped with protective sheaths, the screws cannot be accessed directly. In this case, remove the collars (127B) and move the protective sheath (30) to reach the 3 screws (A). Remove and check the seal (210).



9.

Remove the screws (250A) and the body extension (50A).

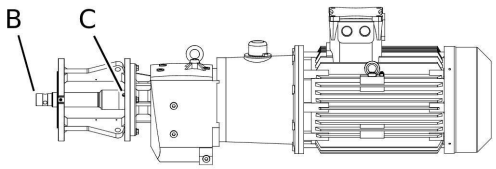


10.

Remove the 3 screws (A). Remove the shaft extension (22A) with the centring device (400). Check the condition of the centring device (400). Remove and check the seal (14).

NOTE: If the pump is equipped with several body extensions, repeat steps 9 and 10 for each extension before accessing the body (50). Check the condition of the centring devices (400) and seals (14).

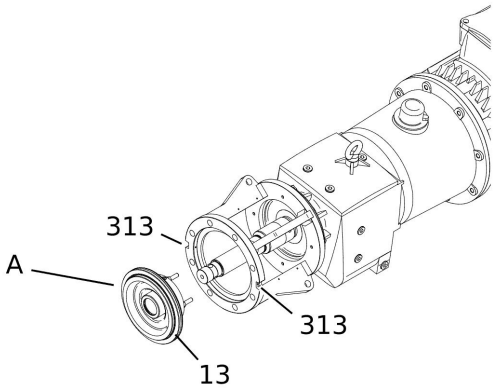
4.18. Reassembling the pump in horizontal position



1.

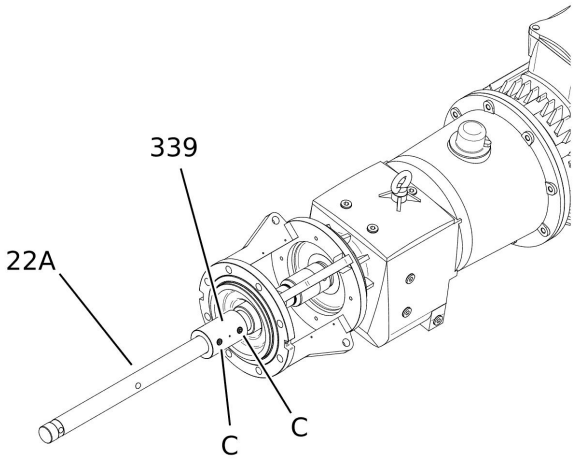
Grease the gearbox shaft and the shaft end (B). Coat the 3 screws (C) with Freinfilet® and screw in to the required torque:

- 10 Nm for models 3AV12, 6AV6, 6AV12, 6AV24, 13AV6, 13AV12
- 20 Nm for models 13AV24, 25AV6, 25AV12
- 40 Nm for models 25AV24, 40AV6, 40AV12, 60AV6
- 80 Nm for models 50AV18, 60AV12, 120AV12



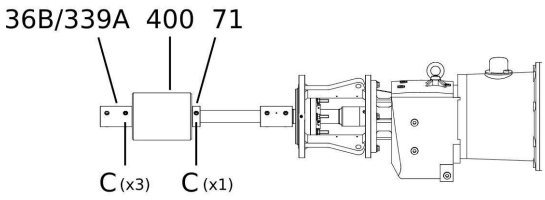
2.

Insert the sealing system (A) if it has been disassembled (reassembly instructions can be found in the "Reassembly of the sealing system" section, page 71). Insert the two screws (313) without tightening them. Do not forget the O-ring (13).



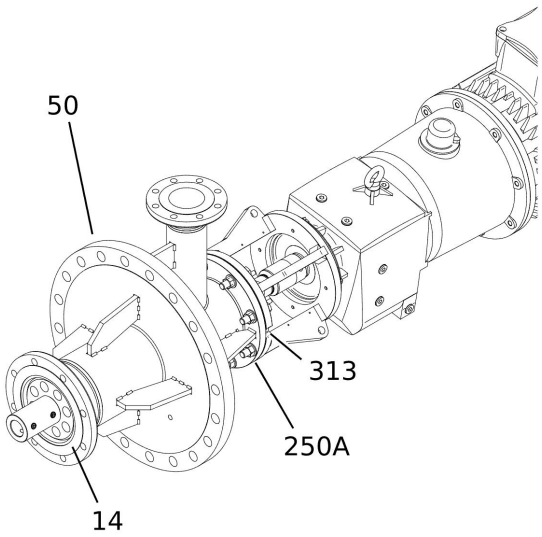
3.

Grease the shaft ends. Insert the extension coupling (339) and the shaft extension (22A). Coat the six screws (C) with Freinfilet and screw in to the required torque (see step 1).



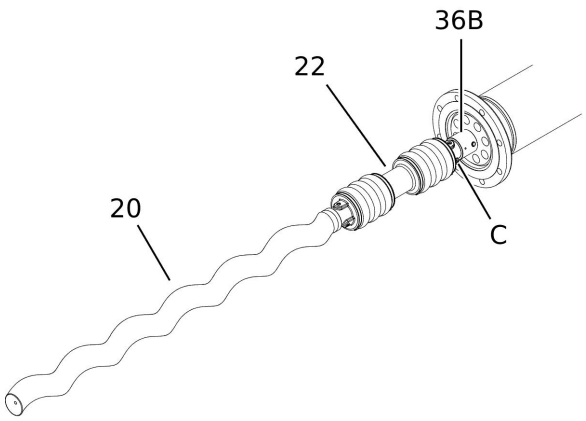
4.

Grease the shaft ends. Insert the retaining ring (71) and the centring device (400). If the pump is fitted with other shaft extensions (22A), insert an extension coupling (339A). Otherwise insert the drive shaft (36B) that links to the connecting rod assembly (22). Coat the four screws (C) with Freinfilet® and screw in to the required torque (see step 1).



5.

Fit the body (50), not forgetting the seal (13), and tighten the screws (250A). Tighten the two screws (313) in the spacer.
NOTE: If the pump is equipped with several body extensions, repeat steps 3, 4 and 5, not forgetting the seals (14) between the body extensions.



6.

Grease the shaft end and fix the connecting rod assembly (22) to the drive shaft (36B), not forgetting the seal (210). Coat the three screws (C) with Freinfilet and screw in to the required torque (see step 1). Do the same for the rotor (20).

If the pump is not equipped with protective sheaths (option A):

Insert the rotor into the connecting rod.

Coat the screws with Freinfilet and screw in to the required torque (see step 1).

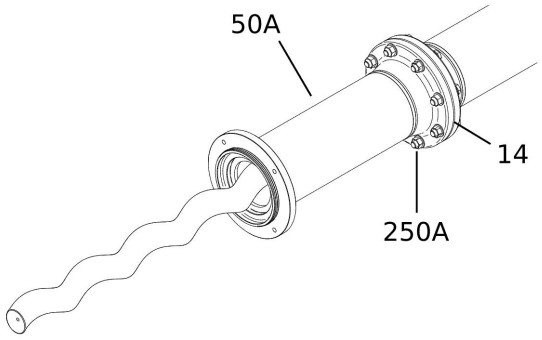
If the pump is equipped with protective sheaths (option B):

First fit the sheath and the seal together, then insert the rotor into the connecting rod.

Coat the 3 conical screws with Freinfilet® before screwing them in.

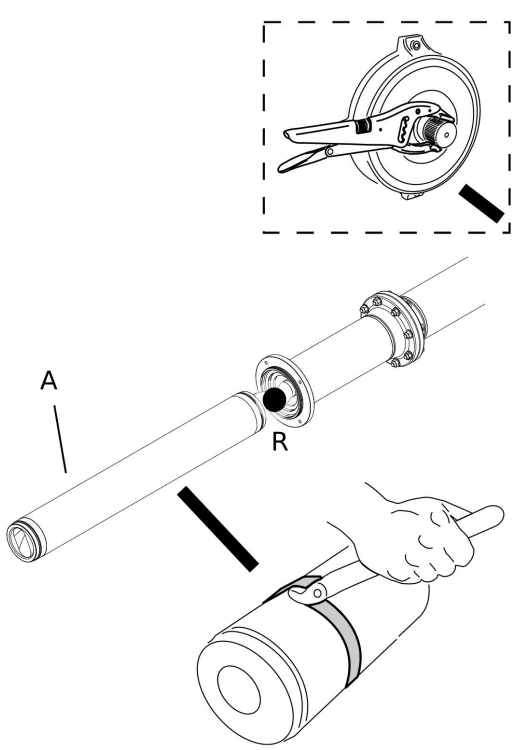
Check that the tightening torque (see step 1) is the same for all 3 screws.

Cover the screws with the sheath and tighten the collars at each end of the sheath.



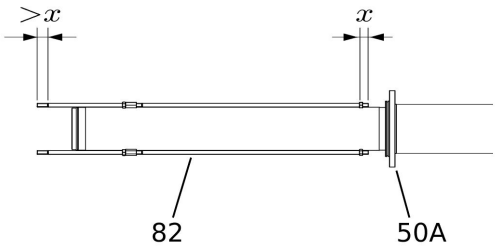
7.

Fit the last body extension (50A), not forgetting the seal (14), and tighten the screws (250A).



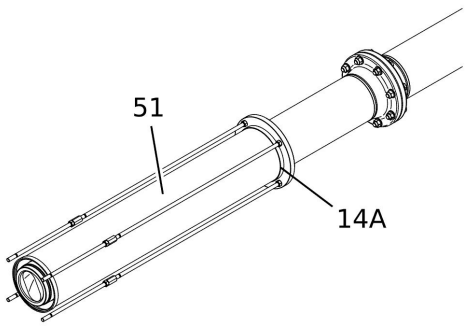
8.

Block the shaft line on the motor side using a plier wrench. Temporarily support the rotor at point R using a wedge or slings. Using a strap wrench, fit the stator (A).



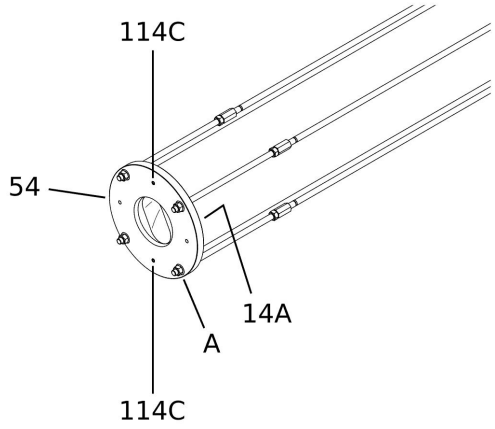
9.

The threads at the ends of the pins (82) do not have the same length. Position each pin so that the shortest thread, equipped with a nut, is screwed into the body extension (50A).



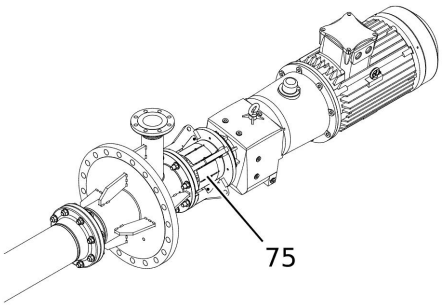
10.

Fit the protective casing for the stator (51) if the pump has one. Do not forget the O-ring (14A).



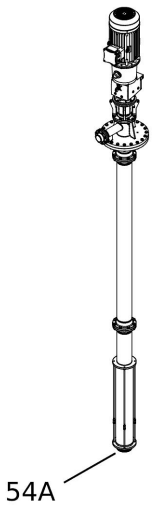
11.

Fit the pipe assembly (54) and tighten the nuts (A). Do not forget the seal (14A) if the pump is equipped with a protective casing for the stator (51). Tighten the two screws (114C) to hold the casing (51) in place. The strainer (54A) should only be fitted after lifting the pump.



12.

Finish reassembling the sealing system (see step 7 on page 73) and fix the casings (75).



13.

Lift the pump according to the instructions in paragraph 4.5. Once the pump is vertical, refit the strainer (54A) at the suction port.

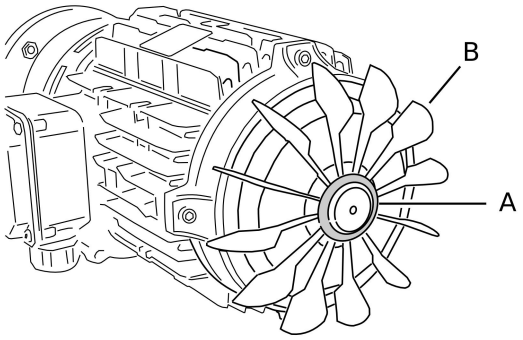
4.19. Disassembling the pump in the vertical position

This paragraph describes maintenance for a pump in vertical position. This type of maintenance is appropriate for an installation in a confined space (limited height available above the pump) and requires the use of special tools available in the PCM catalogue (see paragraph 4.8).

WARNING: Before performing any maintenance operations on the pump, check that all necessary precautions have been taken: upstream and downstream valves closed, pipework cleaned and purged, electrical power supply disconnected and disabled. Check also that all the usual precautions have been taken in accordance with the regulations in force regarding the safety of personnel.
Systems connected to the mechanical seal must be disconnected before disassembling the pump.

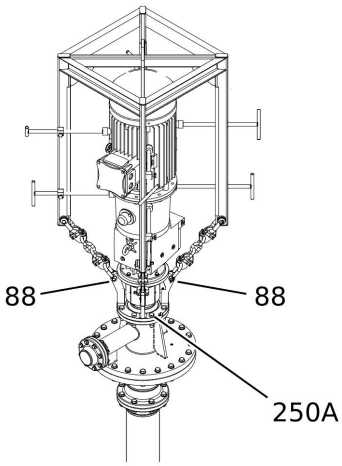
Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

During maintenance operations, the fluid inside the pump is not fully evacuated. A certain volume of non-drainable fluid remains in the stator, its quantity depending on the pump model (see the table in the "Residual fluids" section on page 42). Take the necessary steps depending on the type of fluid present.



1.

Remove the motor's protective casing, the ring (A) and the fins (B).



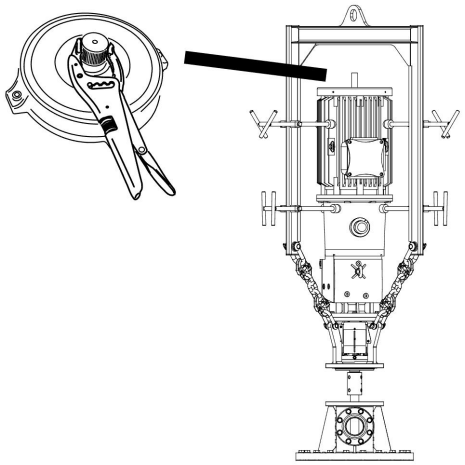
2.

For Monobloc Pumps :

Install the lifting tool in the holes in the spacer (88). Remove the fixing screws from the body (250A). If the pump is equipped with an external sealing plan, remove it and remove any pipes connected to the mechanical seal.

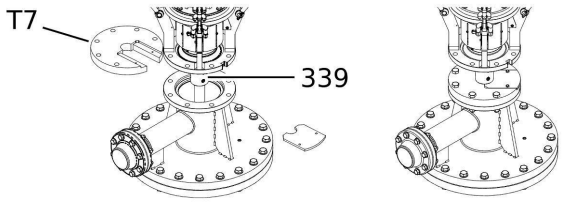
For Bearing Pumps :

Motor and Gear Unit to be removed separatly, then follow above instruction with spacer and bearing.



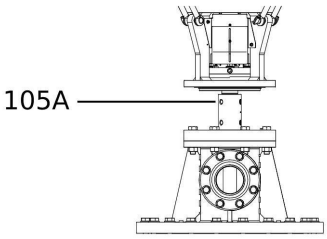
3.

Using locking pliers, turn the shaft to pull the drive back by about 70 mm.



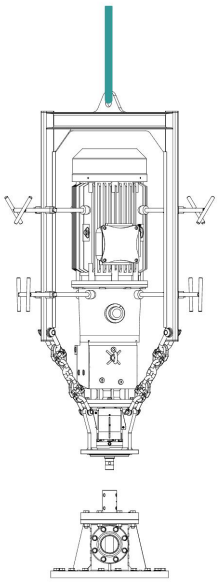
4.

Block the shaft beneath the extension coupling (339) using the support clamp (T7).



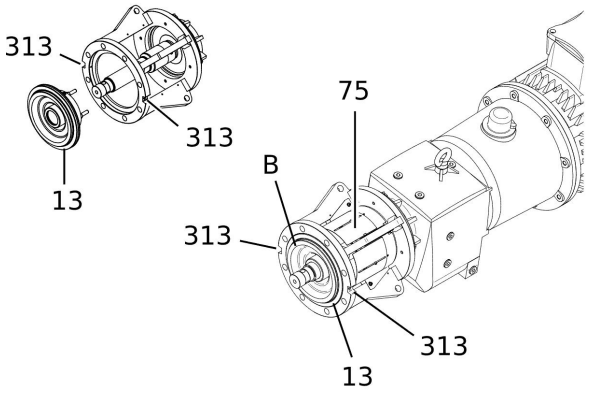
5.

Unscrew the three screws (105A) at the top of the extension coupling.



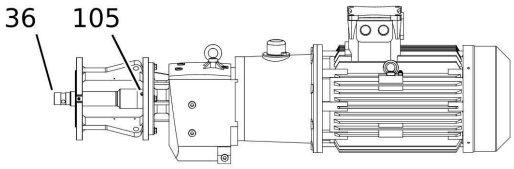
6.

Remove the motor unit.



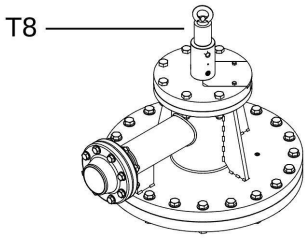
7.

Remove and check the seal (13). Unscrew the two screws (313), remove the casings (75) and remove the sealing system (B) only if it requires maintenance (removal instructions can be found in the "Removal of the sealing system" section, page 69).



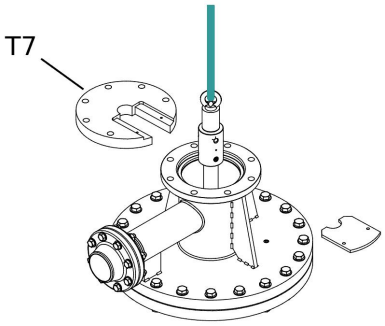
8.

Unscrew the 3 screws (105) and remove the shaft (36) for cleaning.



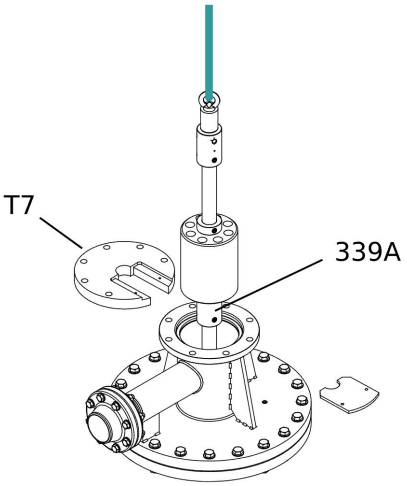
9.

Fit the lifting tool (T8) to the extension coupling (339) using three needle screws.



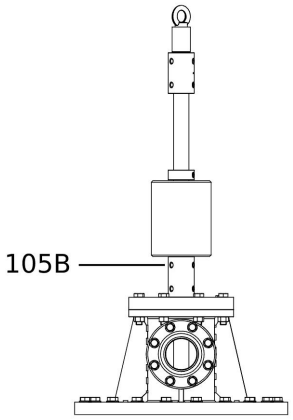
10.

Support the shaft with the lifting equipment and remove the support clamp (T7).



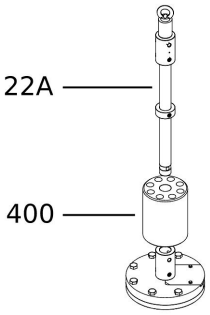
11.

Lift the shaft as far as the next extension coupling (339A) and block the shaft beneath the extension coupling (339A) using the support clamp (T7).



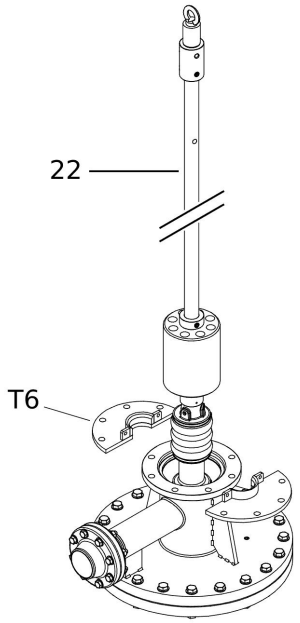
12.

Unscrew the three screws (105B) at the top of the extension coupling (339).



13.

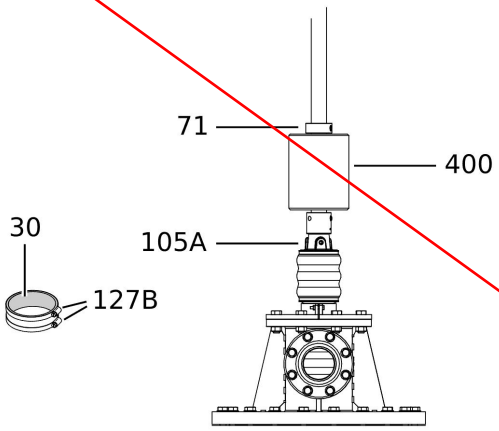
Remove the shaft extension (22A). Check the condition of the centring device (400).



14.

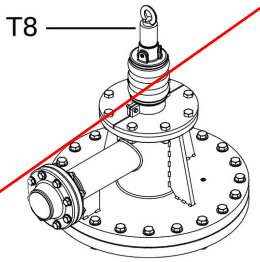
Repeat operations 9 to 13 for each shaft extension until you reach the shaft line (22). Use the support clamp (T6) to block the shaft line (22).

Tool not always required. If PCM does not provide it, remove the rotor/shaft line assembly with the final shaft extension available.



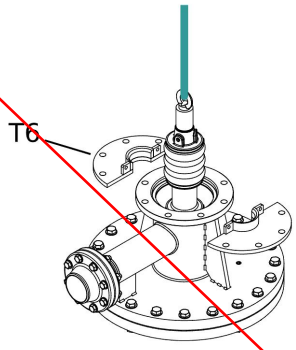
15.

Unscrew the three screws (105A) from the shaft line (22) and remove the shaft extension (22B). If the pump is equipped with protective sheaths, the screws cannot be accessed directly. In this case, remove the collars (127B) and move the protective sheath (30) to reach the three screws. Check the condition of the centring device (400) and seal (210).



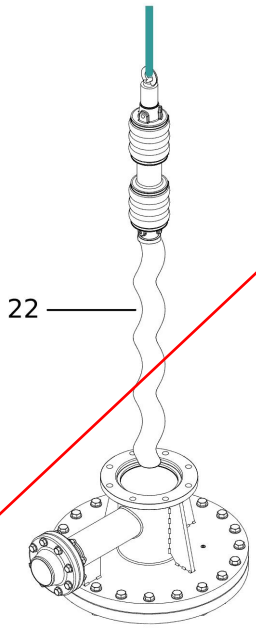
16.

Fit the lifting tool (T8) to the shaft line (22) using three needle screws.



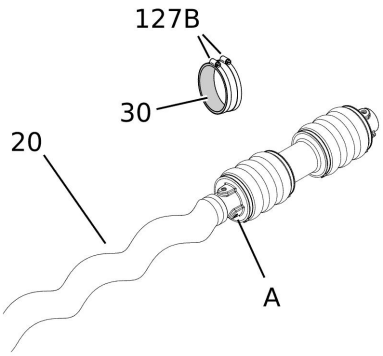
17.

Support the shaft line (22) with the lifting equipment and remove the support clamp (T6).



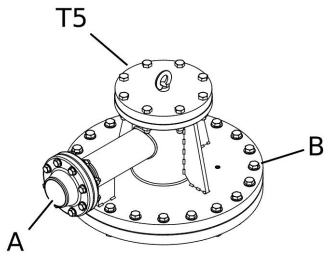
18.

Remove the shaft line (22) and the rotor (20).



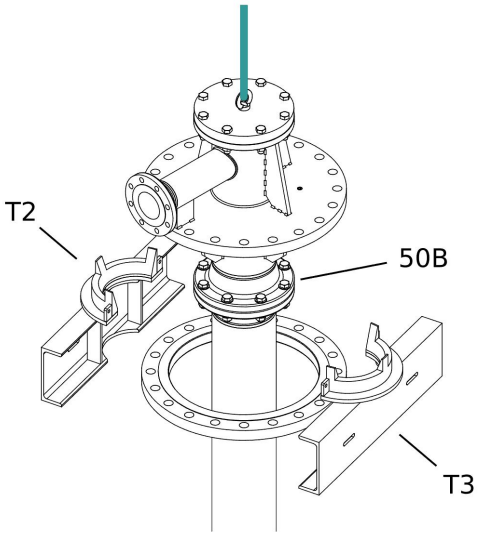
19.

Unscrew the 3 screws (A) and remove the rotor (20). If the pump is equipped with protective sheaths, the screws cannot be accessed directly. In this case, remove the collars (127B) and move the protective sheath (30) to reach the 3 screws (A). Remove and check the seal (210).



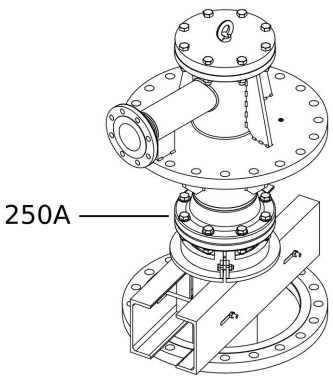
20.

Fit the lifting tool (T5) to the body. Disengage the upper piping (A). Remove the fixing screws (B) from the mounting flange.



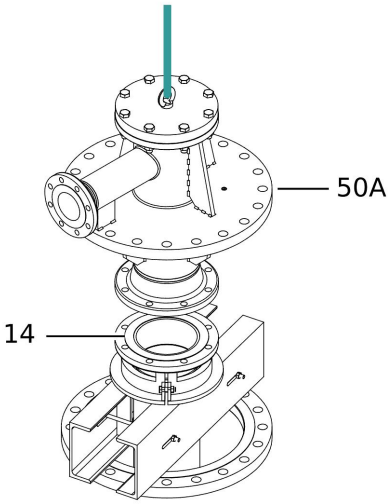
21.

Lift the body as far as the next body extension (50B). Install the support beams and clamps (T2 and T3) beneath the body extension flange (50B).



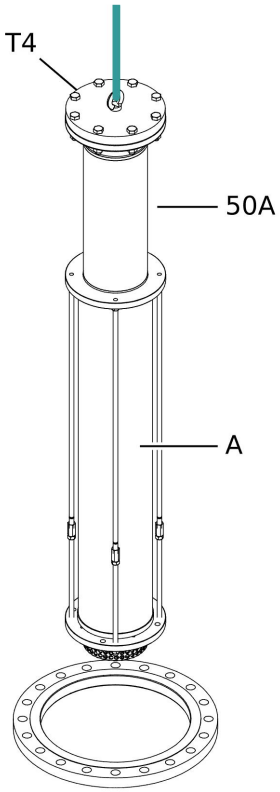
22.

Unscrew the screws (250A).



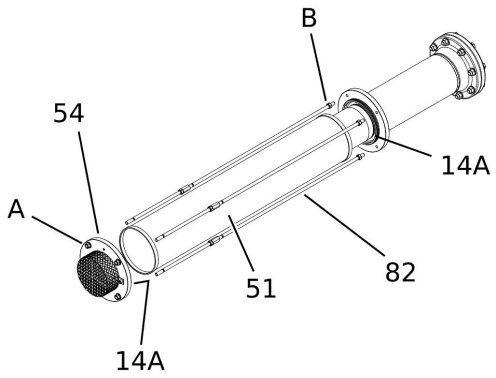
23.

Remove the body (50A). Remove and check the seal (14).



24.

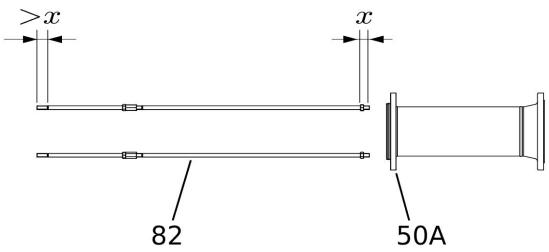
Repeat operations 20 to 23 until you can extract the last body extension (50A) and the stator (A). To lift the body extensions, use the lifting tool (T4).



25.

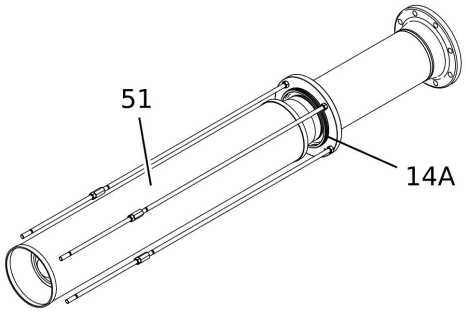
Remove the 4 nuts (A) and remove the pipe assembly (54). Unscrew the 4 nuts (B) to remove the 4 pins (82). If the pump is equipped with a protective casing for the stator (51), remove it and check the condition of the seals (14A). Remove the stator.

4.20. Reassembling the pump in the vertical position



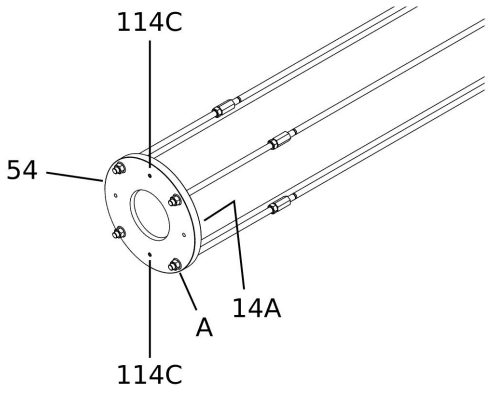
1.

Screw the four pins (82) to the body extension (50A). The threads at the ends of the pins (82) do not have the same length. Position each pin so that the shortest thread, equipped with a nut, is screwed into the body extension (50A).



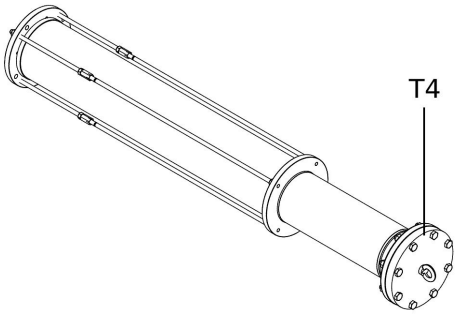
2.

Position the stator (1) and fit the protective casing for the stator (51) if the pump has one. Do not forget the O-ring (14A).



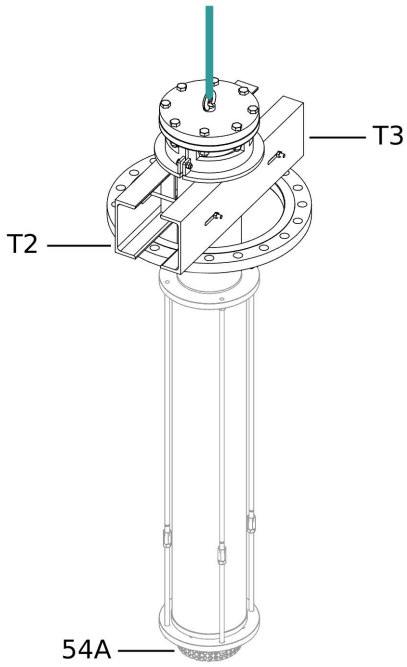
3.

Fit the pipe assembly (54) and tighten the four nuts (A). Do not forget the seal (14A) if the pump is equipped with a protective casing for the stator (51). Tighten the two screws (114C) to hold the casing (51) in place.



4.

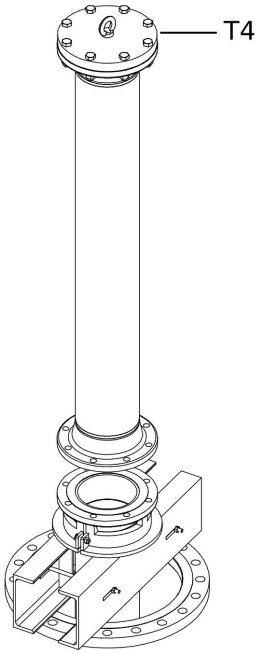
Fit the lifting tool (T4) to the body extension (50A).



5.

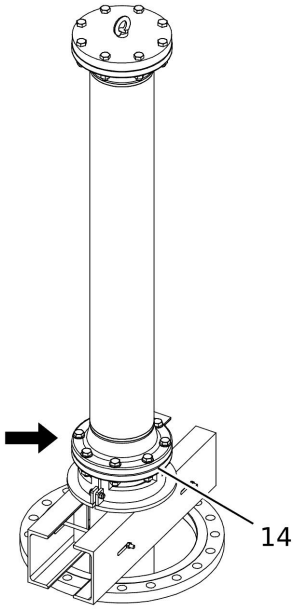
Lift the assembly above the tank and fit the strainer (54A).

Lower the assembly and install the support beams and clamps (T2 and T3) beneath the body extension flange (50A).



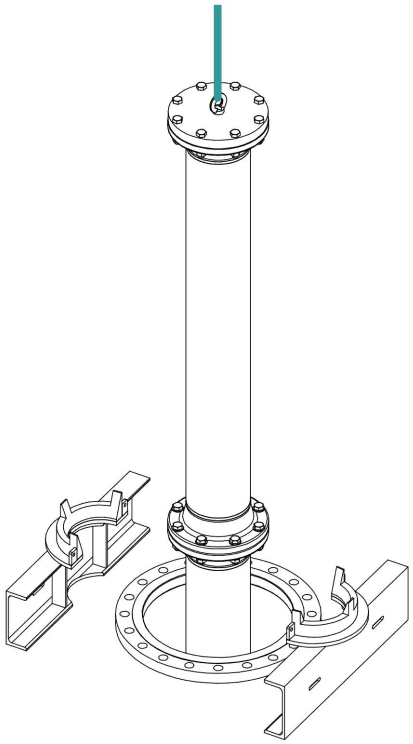
6.

Retrieve the lifting tool (T4). Fit it to another body extension (50B).



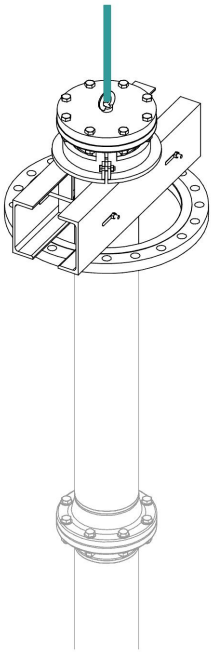
7.

Fit the body extension (50B) and screw in the screws to the required torque. Do not forget the O-ring (14).



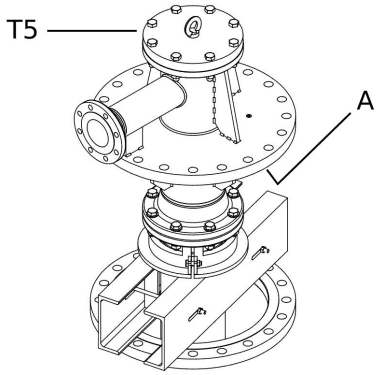
8.

Support the body extension with the lifting equipment and remove the support beams and clamps (T2 and T3).



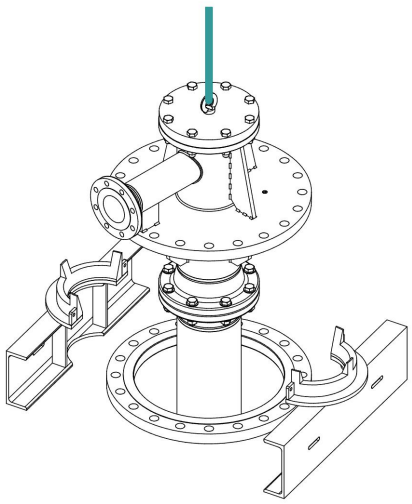
9.

Lower the body extension and reinstall the support beams and clamps (T2 and T3) beneath the body extension flange (50A).



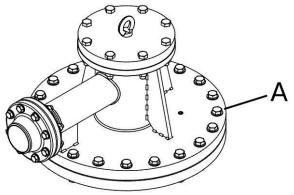
10.

Repeat operations 6 to 9 until the body is fixed (50). To lift the body, use the lifting tool (T5). Do not forget the mounting flange seal (A) before fixing the body.



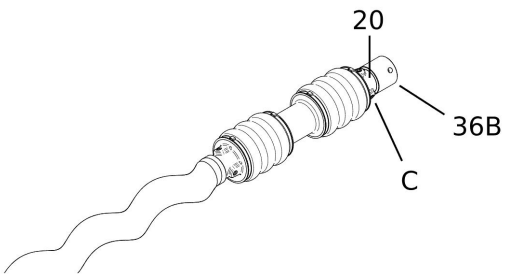
11.

Support the body and the body extensions with the lifting equipment and remove the support beams and clamps (T2 and T3).



12.

Lower the assembly and tighten the mounting flange fixing screws (A).



13.

Grease the end of the rotor (20) and the drive shaft (36B). Coat the screws (C) with Freinfilet® and screw in to the required torque:

- 10 Nm for models 3AV12, 6AV6, 6AV12, 6AV24, 13AV6, 13AV12
- 20 Nm for models 13AV24, 25AV6, 25AV12
- 40 Nm for models 25AV24, 40AV6, 40AV12, 60AV6
- 80 Nm for models 50AV18, 60AV12, 120AV12

Do not forget the O-rings (210).

If the pump is not equipped with protective sheaths (option A):

Insert the rotor into the connecting rod.

Coat the screws with Freinfilet and screw in to the required torque (see above).

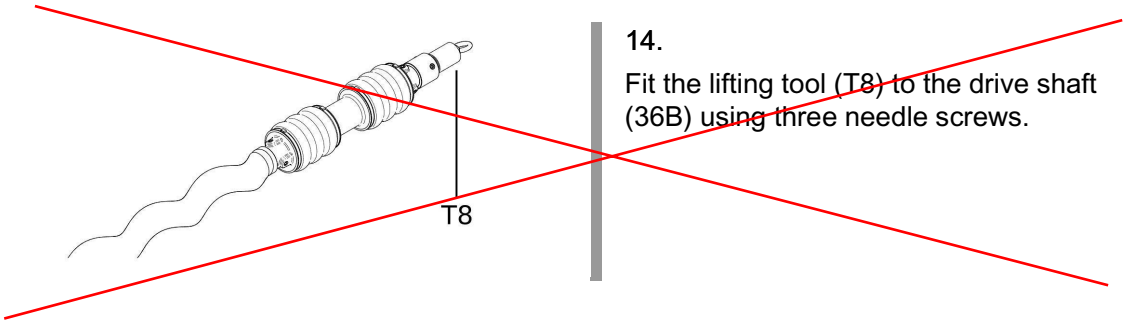
If the pump is equipped with protective sheaths (option B):

First fit the sheath and the seal together, then insert the rotor into the connecting rod.

Coat the 3 conical screws with Freinfilet® before screwing them in.

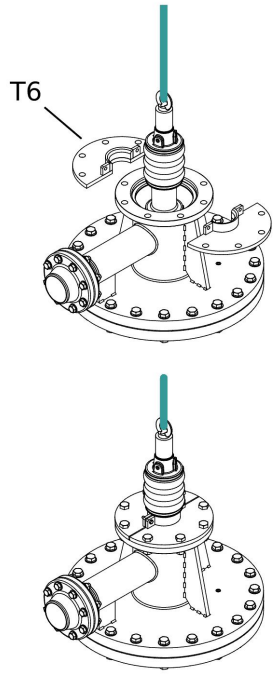
Check that the tightening torque (see above) is the same for all 3 screws.

Cover the screws with the sheath and tighten the collars at each end of the sheath.



14.

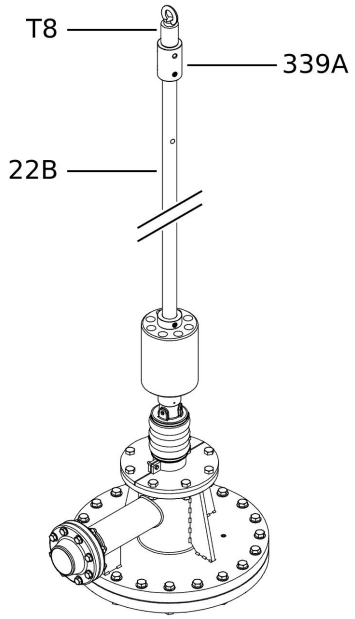
Fit the lifting tool (T8) to the drive shaft (36B) using three needle screws.



15.

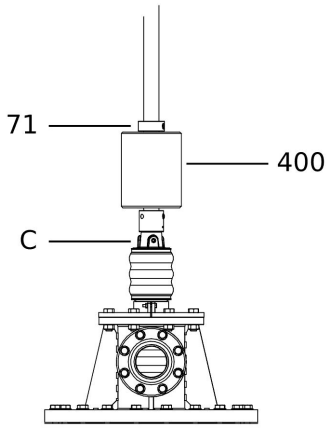
Lift the assembly above the body. Fit the support clamp (T6) to the shaft line (22).

Tool (T6) not always required. If not provided by PCM, lift the rotor and shaft line assembly with the final shaft extension.



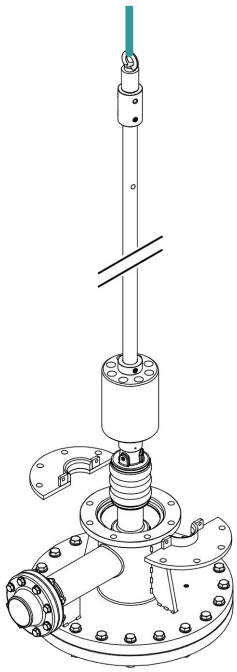
16.

Retrieve the lifting tool (T8). Fit it to another shaft extension (22B) with an extension coupling (339A).



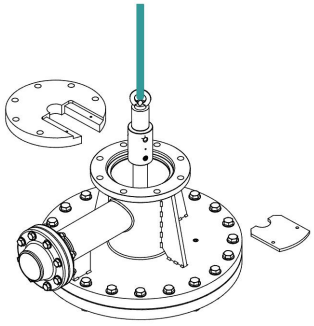
17.

Fit the shaft extension (22B). Coat the screws (C) with Freinfilet and screw in to the required torque (see step 13). Do not forget the centring device (400) and the retaining ring (71).



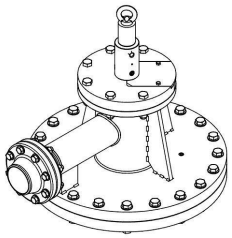
18.

Support the shaft extension with the lifting equipment and remove the support clamp (T6).



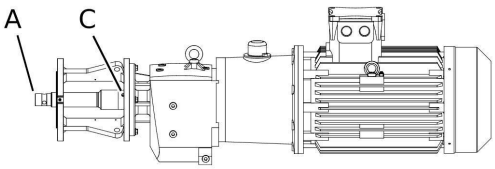
19.

Lower the shaft extension and install the support clamp (T7) beneath the extension coupling (339).



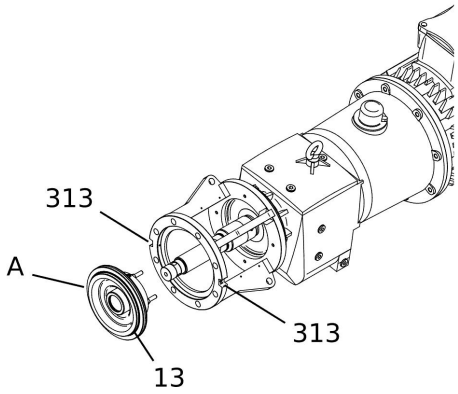
20.

Repeat operations 16 to 19 until the last extension is fixed (22A).



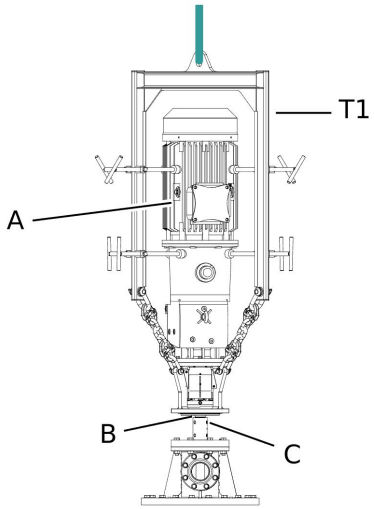
21.

Grease the shaft ends (A) and (B). Coat the three screws (C) with Freinfilet® and screw in to the required torque (see step 13).



22.

Insert the sealing system (A) if it has been disassembled (reassembly instructions can be found in the "Reassembly of the sealing system" section, page 71). Insert the two screws (313) without tightening them. Do not forget the O-ring (13).



23.

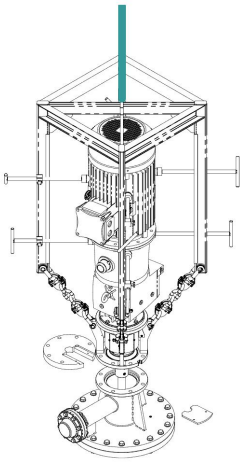
For Monobloc Pumps:

Lift the motor unit (A) using the lifting tool.

Grease the shaft end (B). Coat the three screws (C) with Freinfilet® and screw in to the required torque (see step 13).

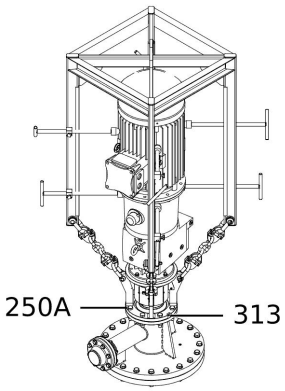
For Bearing Pumps:

Follow the steps 23 to 26, only with spacer (88) and bearing assembly. Motor and Gear Unit will be mounted separatly.
Install the coupling on the bearing shaft.
Install the Trunk / Baseframe on the mounting flange.
Install the Gear Unit and the Motor.
Proceed to the coupling alignment
Fix the guards for spacer and Trunk/Baseframe.



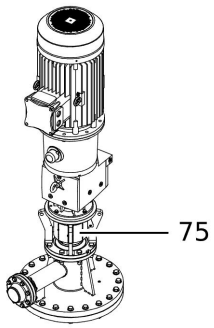
24.

Remove the support tool (T7) while supporting the motor unit.



25.

Lower the motor unit (A). Tighten the screws (250A). Tighten the two screws (313).

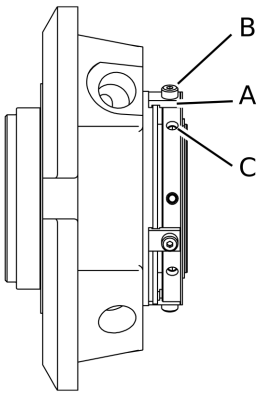


26.

Finish reassembling the sealing system (see step 7 on page 73) and fix the casings (75).

4.21. Disassembling the sealing system

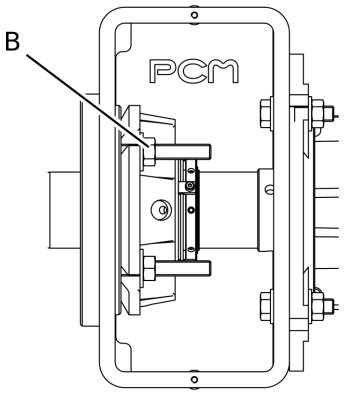
WARNING: Before any procedures are performed, the equipment must be at atmospheric pressure, ambient temperature, purged, and degassed. All control valves must be locked.
Before performing any servicing on the pump, please check that all necessary precautions have been taken: pump switched off, upstream and downstream valves closed, pipes cleaned and purged, electrical power supply disconnected and made inaccessible. All the usual precautions must be taken, in accordance with the texts in force regarding the safety of personnel.



1.

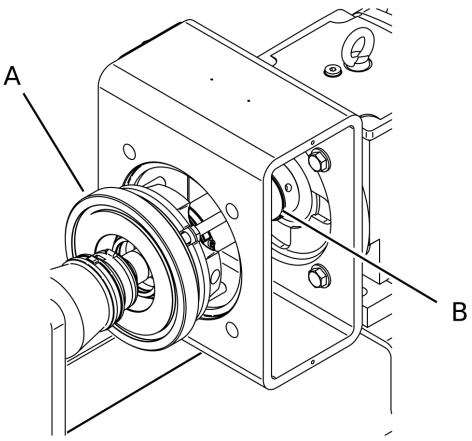
Fit the spacers (A) using screws (B).

Release the set screws (C).



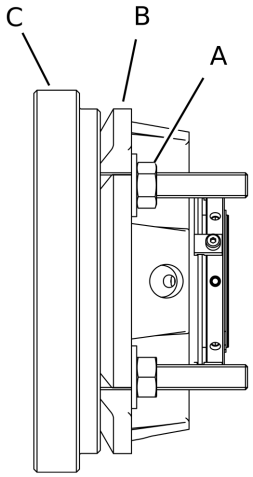
2.

Loosen the 4 screws (B) without removing them.



3.

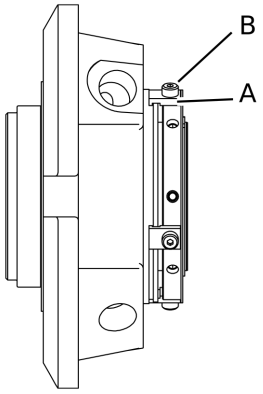
Remove the mechanical seal and mechanical seal support assembly (A) from the drive shaft (B).



4.

Remove the 4 nuts (A) and disassemble the mechanical seal (B) from the mechanical seal support (C).

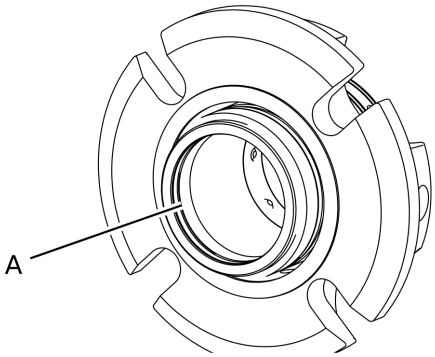
4.22. Reassembling the sealing system



1.

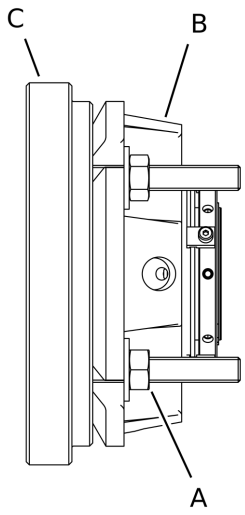
Ensure the seal gland is correctly positioned in its housing.

Check that the spacers (A) are in place and held by screws (B).



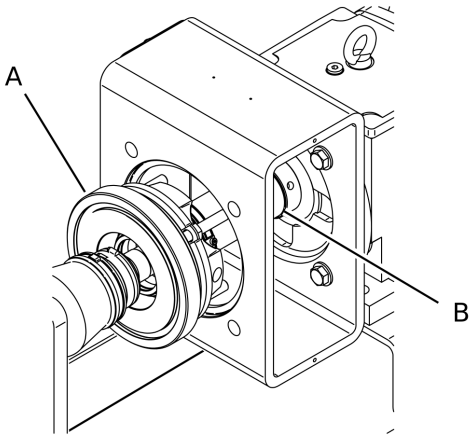
2.

Grease the sleeve O-ring (A).



3.

Position the mechanical seal (B) against the mechanical seal support (C) and position the nuts (A) without tightening them.



4.

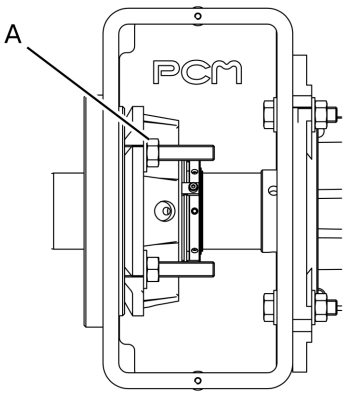
Fit the mechanical seal and mechanical seal support assembly (A) to the drive shaft (B).

5.

Orient the mechanical seal according to the lubrication system chosen (see the "Connecting the dynamic sealing system" section, page 16).

6.

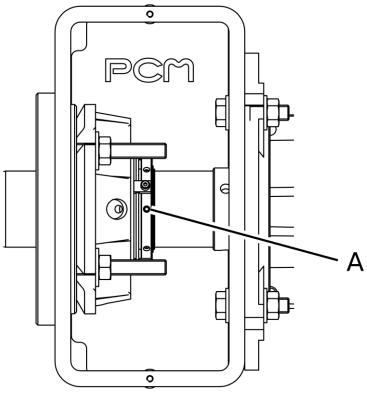
Follow the procedure to reassemble the pump.



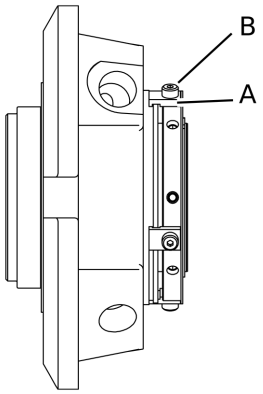
7.

Once the pump is fully assembled, tighten the nuts (A) to the recommended torque (see the "Tightening torques" section, page 36).

WARNING: If the mechanical seal is sealed by a flat seal, check the tightness again after an hour.



8.



9.

Remove the spacers (A) and screws (B).

10.

Connect the sealing system (see the "Connecting the dynamic sealing system (cartridge type)" section, page 16).

4.23. Equipment Storage when not in Use

Proceed as follows:

1. Release pressure at the suction and discharge.
2. Drain the pipework and the pump.
3. Clean the pipework and the pump using a cleaning product that is compatible with the pumped product and pump materials.
4. Run the pump for more effective cleaning.
5. Switch off the pump.
6. Isolate the pump from the rest of the circuit.

Prolonged stoppage of the pump can damage the hose fitted inside. Removing the hose is advisable if the pump needs to be stopped for more than three days.

4.23.1. Preserving the Rubber Components

We recommend that you store all rubber parts in a cool location, away from light to avoid damage by UV rays.

4.23.2. Preserving the sealing systems

When the seal is stored fitted to the machine, it is recommended that you rotate the shaft one quarter turn every two months to prevent the sealing faces from sticking.

5. Appendices

Risk prevention

Technical description

Accessories (optional)

Automatic control (optional)

Risk prevention

To return any equipment, please complete this form and include it with the equipment.

Equipment Return

Company using the equipment

.....

Activity

.....

Equipment Part No.

.....

Is the equipment likely to present any particular risks due to its use ?

☐ yes ☐ no

Chemical risks ☐ yes ☐ no

Product or Substance	Mode of Contamination	Prevention
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

Biological risks ☐ yes ☐ no

Biological Agents	Mode of Contamination	Prevention
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

2 Mechanical Seal

Description	Model - Size	Drawing number	PCM Reference	Manual
Single Inside-Cartridge	ISC2-PX - 60mm	F001604380_rev0	DIGIAN-392481-01	FIS190

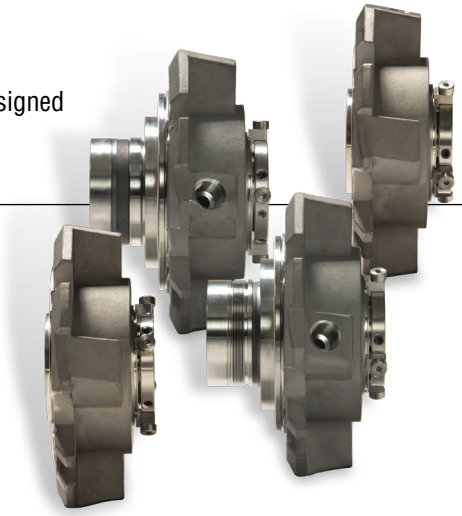
This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

FLOWSERVE

Installation Instructions

ISC2 Series

Innovative Standard Cartridge seal designed for general purpose applications.



1 Equipment Check

1.1 Follow plant safety regulations prior to equipment disassembly:

- 1.1.1 Wear designated personal safety equipment
- 1.1.2 Isolate equipment and relieve any pressure in the system
- 1.1.3 Lock out equipment driver and valves
- 1.1.4 Consult plant Safety Data Sheet (SDS) files for hazardous material regulations

1.2 Disassemble equipment in accordance with the equipment manufacturer's instructions to allow access to seal installation area.

1.3 Remove existing sealing arrangement (mechanical seal or otherwise). Clean seal chamber and shaft thoroughly.

1.4 Inspect surfaces under gaskets to ensure they are free from pits or scratches. Break all sharp corners on shaft steps, threads, reliefs, shoulders, key ways, etc. over which gasket(s) must pass and/or seal against.

1.5 Check shaft or sleeve OD, seal chamber bore, seal chamber depth, gland pilot, stud diameter, stud bolt pattern and distance to first obstruction to ensure they are dimensionally the same as shown in the seal assembly drawing.

1.6 Check seal assembly drawings for any modifications (reworks) to be made to the equipment for mechanical seal installation and act accordingly.

1.7 The equipment must be earthed to prevent sparks due to static electricity discharge

Shaft runout should be checked against the equipment manufacturer's specifications. Generally, should not exceed 0.05 mm (0.002 inch) TIR (Total Indicator Reading) at any point along the shaft for ball or roller type bearings. For sleeve type bearings, refer to manufacturer instructions. If the equipment is not completely dismantled, verify runout near seal location.

The above values apply to shaft speeds in the range from 1000 to 3600 RPM. For values above and below, consult your Flowserve representative. See Figure 1.

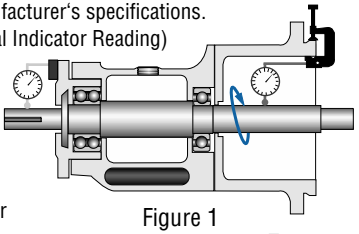


Figure 1

Shaft endplay should not exceed 0.25 mm (0.010 inch) TIR, regardless of thrust bearing type. See Figure 2.

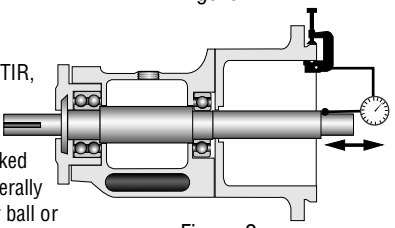


Figure 2

Radial bearing play at seal chamber face should be checked against the equipment manufacturer's specifications. Generally 0.05 - 0.10 mm (0.002 - 0.004 inch) will be applicable for ball or roller type bearings. For sleeve or journal type bearings, values will generally be in the order of 0.10 - 0.15 mm (0.004 - 0.006 inch). If equipment is found outside the general range, contact the equipment manufacturer and your Flowserve representative to verify the equipment's suitability for the seal.

Seal chamber squareness to the shaft centerline should be within 0.0005 mm/mm (0.0005 inch/inch) of seal chamber bore TIR.

Note: make sure that shaft endplay does not affect the reading. Verify the smoothness of the seal chamber face for a good gasket joint. See Figure 3.

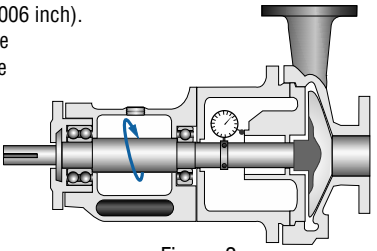


Figure 3

Concentricity of the shaft to the seal chamber bore or gland pilot register should be within 0.025 mm per 25 mm shaft diameter (0.001 inch per 1 inch shaft diameter) to a maximum of 0.125 mm (0.005 inch) TIR. See Figure 4.

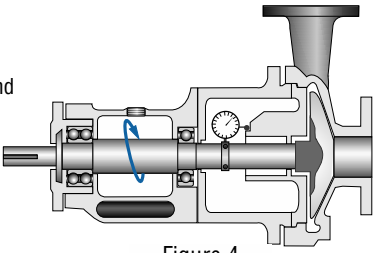
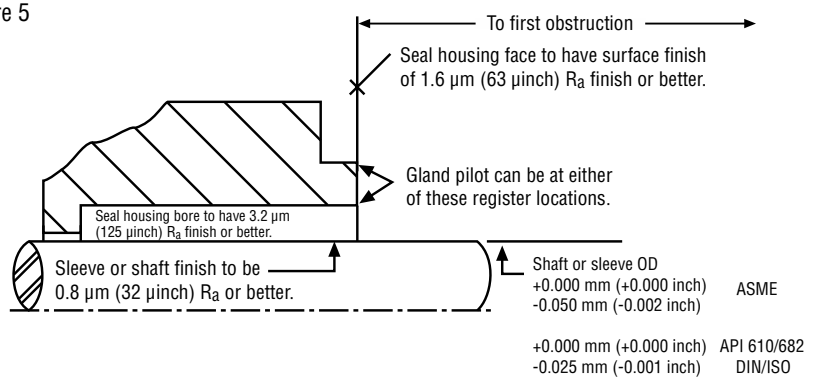


Figure 4

Surface finish requirements

Figure 5



Description

This ISC2 seal is a versatile cartridge mounted mechanical seal, designed for ease of installation and reliable operation. **No seal setting dimensions are required.** Removable setting devices provide proper alignment.

The ISC2 seal family consists of:

ISC2-PX - Single pusher seal with stationary springs

ISC2-PP - Dual pusher seal with stationary springs

ISC2-BX - Single metal bellows seal with rotating bellows

ISC2-BB - Dual metal bellows seal with rotating bellows

ISC2-XP - Single pusher seal with a pumping device for a Plan 23

ISC2-XB - Single metal bellows seal with a pumping device for a Plan 23

2 ISC2 Seal Installation

Note: No seal setting measurements are needed to install the seal. Instructions are for end-suction back pull-out pumps. Modification of these procedures may be required for other style pumps. Consult Flowserve for installation support.

2.1 **Lubricate the shaft** or pump sleeve lightly with silicone lubricant unless otherwise specified.

2.2 **Tighten the setting device cap screws** to ensure they are tight before installation.

2.3 **Slide the ISC2 seal cartridge** onto the shaft or pump sleeve with the setting devices toward the bearing housing. See Figure 2.

2.4 **Install the seal chamber** and bolt it in place on the bearing frame. See Figure 3.

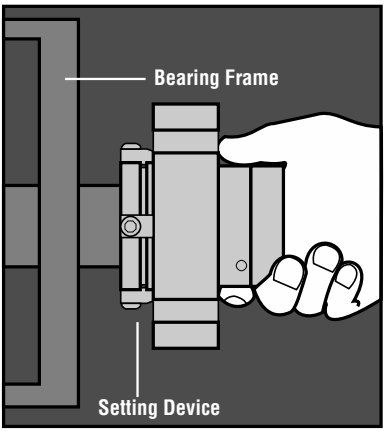


Figure 2

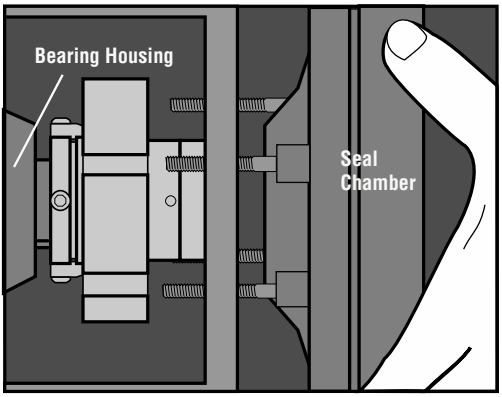


Figure 3

2.5 **Position the ISC2 seal** with the gland tight against the seal chamber.

2.6 **Orient the ISC2 seal** with the ports aiming as shown on the seal assembly drawing. See Section 3 for Piping Recommendations.

2.7 **Tighten the gland nuts evenly in a diagonal sequence.** Do not over-tighten the gland nuts, as this can warp seal parts and cause leakage. Confirm adequate thread engagement before final torque setting.

Recommended ISC2 seal minimum **gland nut torque** by size range:

Seal mm **Size** (inch)	25 - 50 (1.000 - 2.000)	54 - 70 (2.125 - 2.750)	75 - 102 (2.875 - 4.000)	108 - 152 (4.250 - 6.000)	159 - 203 (6.250 - 8.000)
Torque	**20 N-m (15 ft-lbs)**	**27 N-m (20 ft-lbs)**	**40 N-m (30 ft-lbs)**	**47 N-m (35 ft-lbs)**	**54 N-m (40 ft-lbs)**

Note: Some equipment with small bore seal chambers provide limited access to the gland bolting and setting device cap screws. In some situations, the gland fasteners interfere with the setting devices and window access may require deviation from the standard fastening sequence.

For example, the collar/sleeve assembly may need to be rotated slightly from its factory-set position by loosening the setting device cap screws, rotating the collar/sleeve assembly, then tightening the screws. When nonstandard processes are followed, be careful to maintain the integrity of the seal cartridge at all times.

2.8 Assemble the equipment per manufacturer specifications. Avoid pipe strain.

Align the coupling per manufacturer specifications.

2.9 With the impeller, shaft, coupling and bearings in their final operating position, tighten the drive collar set screws. See Figure 4.

Note: in designs that have two smaller screws, these are quarter dog screws that hold the collar to the sleeve and should not be tightened. A hex key was provided for the set screws, not for the quarter dog screws.

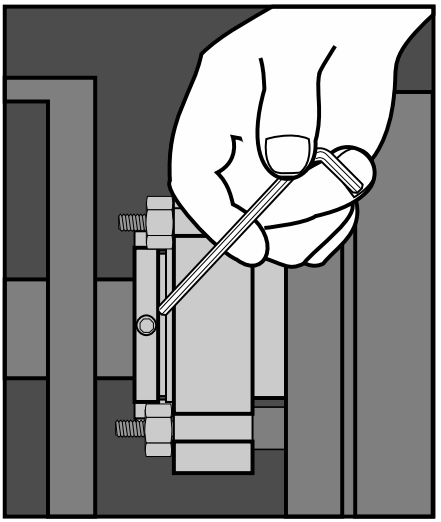


Figure 4

Recommended ISC2 seal minimum **set screw torque** by size range:

Seal mm **Size** (inch)	25 - 60 (1.000 - 2.500)	67 - 70 (2.625 - 2.750)	75 - 203 (2.875 - 8.000)	75 - 203 (2.875 - 8.000)
Gland Size	All	All	Standard Bore	Enlarged Bore
Torque	**4.5 N-m (40 in-lbs)**	**13.5 N-m (120 in-lbs)**	**16.9 N-m (150 in-lbs)**	**27.1 N-m (240 in-lbs)**

2.10 **Remove the setting devices** from the drive collar by loosening the cap screws. See Figure 5. Save the setting devices and fasteners for future use when the pump impeller is reset or when the seal is removed for repairs.

2.11 **Turn the shaft** by hand to ensure unobstructed rotation.

2.12 See **Operational Recommendations** before start-up.

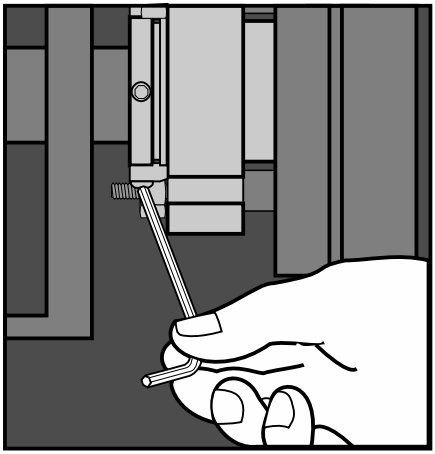


Figure 5

3 Piping Recommendations

3.1 Install and maintain an adequate piping plan. The ISC2 seal requires a clean, cool environment for maximum seal life. Typical piping plans are listed below. Contact Flowserve for additional piping plan information or technical support.

Important: *All red plastic caps/thread guards are for shipping protection only and should be replaced with either a piping connection or a metal plug in the same metallurgy as the gland.*

Plan 02: dead-ended seal chamber with no flush (single seals, always plug Flush port)

Plan 03: circulation created by the design of the seal chamber (single seals, always plug Flush port)

Plan 11: default inner seal flush from pump discharge on horizontal pumps (single seals)

Plan 13: default inner seal flush and vent from pump suction on vertical pumps (single seals

Plan 21: inner seal flush from pump discharge through a cooler for use with hot products (single seals)

Plan 23: inner seal flush from internal pumping device through cooler (ISC2-XP and ISC2-XB designs)

Plan 32: inner seal clean external flush for use with abrasive products or products that are incompatible with the seal (single seals)

Plan 52: dual seal circulation through a low pressure reservoir (dual seals)

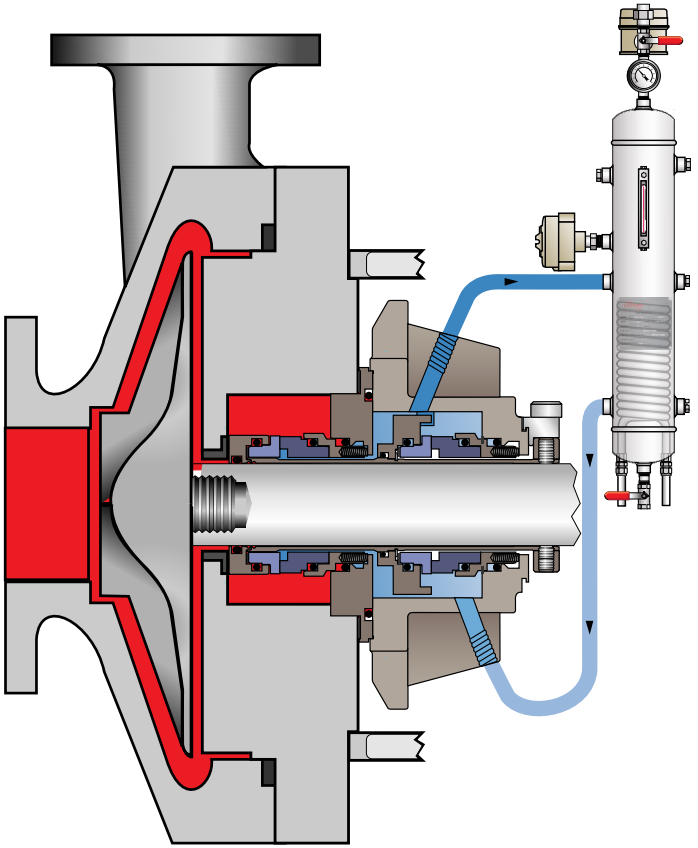
Plan 53: dual seal circulation through a pressurized reservoir (53A), finned tube array (53B) or piston accumulator (53C) (dual seals)

Plan 62: external quench on atmospheric side of seal (single seals)

3.2 For **dual seals,** LBI (Liquid Barrier Inlet) and LBO (Liquid Barrier Outlet) are marked on the gland. ISC2 seals are unidirectional and piping the correct inlet and outlet is important to proper circulation. The liquid barrier inlet should draw from the bottom of the support system while the liquid barrier outlet feeds the top of the system.

3.3 For **dual pressurized seal (Plan 53, double seal) operation**, supply a clean, compatible barrier fluid at a pressure at least 1.7 bar (25 psi) above the seal chamber pressure. See Figure 6. The pressure of the barrier fluid must not exceed the recommended maximum pressure.

Dual pressurized (Plan 53A) ISC2 with Supply Tank Figure 6



3.4 For **dual unpressurized (Plan 52, tandem seal) operation**, supply a clean, compatible buffer fluid at a pressure below the seal chamber pressure. The pressure in the seal chamber must not exceed the recommended maximum pressure.

3.5 For **single seal operation excluding Plan 23**, ensure all ports are fitted with piping or plugs. Plans 02 and 03 must close the Flush port with a metal plug in the same metallurgy as the gland. If Plan 62 is not used, the Quench port should be plugged. The Drain port should be connected to a drain line to prevent leakage along the shaft. Note: the Quench and Drain ports are smaller than the flush port as a distinguishing feature.

3.6 For **single seal operation with Plan 23,** FI (Flush Inlet) and FO (Flush Outlet) are marked on the gland. ISC2 seals are unidirectional and piping the correct inlet and outlet is important to proper circulation. The flush inlet should draw from the bottom of the cooler while the flush outlet feeds the top of the cooler. Ensure piping is optimized for thermosyphon flow.

4 Operational Recommendations

4.1 **Remove lock outs** on equipment and valves.

4.2 **Do not start up the pump dry** to check motor rotation or for any other reason. Open valves to flood pump with product fluid. Ensure that the seal flush or support system is operating. Vent air from the casing of the pump and the seal chamber before start-up.

4.3 **Observe the start-up.** If the seal runs hot or squeals, check the seal flush system. Do not allow the pump to run for any extended time if the seal gets hot or squeals.

4.4 **Do not exceed corrosion limits.** The ISC2 seal is designed to resist corrosion through proper material selection. Do not expose the ISC2 seal materials of construction to products outside of their corrosion limits. Consult Flowserve for chemical resistance recommendations.

4.5 **Do not exceed pressure and speed limits** established for the ISC2 seal.

4.6 **Do not exceed the temperature limits** of the ISC2 seal based on the materials of construction. For dual seals using supply tanks with cooling coils, turn on cooling water to the supply tank before start-up.

4.7 **Do not start up or run the ISC2 seal dry.** The seal chamber, pump and support systems should be thoroughly vented before start-up. Buffer or barrier fluid must flood the seal cavity of dual seals at all times during operation. Process fluid must be in the seal chamber at all times during single seal operation.

5 Repairs

This product is a precision sealing device. The design and dimension tolerances are critical to seal performance. Only parts supplied by Flowserve should be used to repair a seal.

To order replacement parts, refer to the part code and B/M number. A spare backup seal should be stocked to reduce repair time.

When seals are returned to Flowserve for repair, **decontaminate the seal assembly** and include an order marked **"Repair or Replace." A signed certificate of decontamination** must be attached. **A Safety Data Sheet (SDS) must be enclosed** for any product that came in contact with the seal. The seal assembly will be inspected and, if repairable, it will be rebuilt, tested, and returned.

The images of parts shown in these instructions may differ visually from the actual parts due to manufacturing processes that do not affect the part function or quality.

FLOWSERVE®

TO REORDER REFER TO
B/M # _____
F.O. _____

FIS190eng REV 09/2018 Printed in USA

To find your local Flowserve representative
and find out more about Flowserve Corporation,
visit www.flowserve.com

Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

While the information and specifications contained in this literature are believed to be accurate, they are supplied for informative purposes only and should not be considered certified or as a guarantee of satisfactory results by reliance thereon. Nothing contained herein is to be construed as a warranty or guarantee, express or implied, regarding any matter with respect to this product. Because Flowserve is continually improving and upgrading its product design, the specifications, dimensions and information contained herein are subject to change without notice. Should any question arise concerning these provisions, the purchaser/user should contact Flowserve Corporation at any one of its worldwide operations or offices.

© 2016 Flowserve Corporation

USA and Canada
Kalamazoo, Michigan USA
Telephone: 1 269 381 2650
Telefax: 1 269 382 8726

Europe, Middle East, Africa
Etten-Leur, the Netherlands
Telephone: 31 765 028 200
Telefax: 31 765 028 487

Asia Pacific
Singapore
Telephone: 65 6544 6800
Telefax: 65 6214 0541

Latin America
Mexico City
Telephone: 52 55 5567 7170
Telefax: 52 55 5567 4224

3 API Plan 51

Description	Flowserve Order Number	PCM reference	Main Manual
Plan 51 Reservoir	400370175-000200	DI317873-02	See below
MAIN COMPONENTS			
Type	Instrument Tag nr	Manual	
Level Indicator	50-LG-001 50-LG-002	76NOT028-An-01/2001	

FLOWSERVE®

After Market Services and Solutions
Manufacturing HUB Etten-Leur

Plan 51 Reservoir

Operation and Maintenance Manual

Flowserve order number : 400370175-000200

Manufacturing year : 2024

Customer order number : PO070-24-07869

Equipment item number : 50001A/B

Flowserve B.V.
Parallelweg 6
4878 AH Etten-Leur
The Netherlands

Revision 0, August 2024

TABLE OF CONTENTS — PAGE

1.0 INTRODUCTION 3

2.0 BRIEF DESCRIPTION 3

3.0 FUNCTION 4

4.0 SAFETY 4

5.0 TRANSPORT, STORAGE 5

6.0 INSTALLATION 5
6.1 INTERCONNECTING PIPING 5
6.2 ELECTRICAL CONNECTIONS 6

7.0 SET-UP 6

8.0 START-UP AND OPERATION 6
8.1 REFILLING WITHOUT A REFILL UNIT 7
8.2 REFILLING WITH A REFILL UNIT 7

9.0 SYSTEM CHECK, PROBLEM SOLVING 7

10.0 MAINTENANCE 8

11.0 SHUT-DOWN, DISASSEMBLY 8

12.0 SPARE PARTS, REPAIR 8

ATTACHMENTS

1. RESERVOIR ASSEMBLY DRAWING 9
2. INSTRUMENTATION 10

1.0 INTRODUCTION

All illustrations and details in these installation and operating instructions are subject to changes that are necessary to improve product performance without prior notice.

The copyright of these instructions is the property of Flowserve. These instructions are intended for Maintenance, Operating and Supervisory personnel and contain regulations and drawings of a technical character that may not, in full or in part, be copied, distributed, used without authorisation for competitive purposes, or given to others.

It should be understood that Flowserve does not accept any liability for instances of damage and/or malfunctioning incurred through non-adherence to these installation instructions.

2.0 BRIEF DESCRIPTION

The reservoir assembly drawing is included in this manual and can be found in attachment 1.

The reservoir is delivered as a complete assembled unit. Depending on customer requirements the reservoir design and additional components may vary. For the exact execution of the system, reference is made to the a.m. system assembly drawing. On the assembly drawing the design and operating conditions of the system can be found (pressure, temperature and volume) as well as the instrument settings.

The reservoir assembly consists of the following components:

Reservoir
The most popular use of the Plan 51 system is to supply a de- icing fluid to the atmospheric side of a single seal which is handling fluids at below freezing temperature.

Hand pump
The hand pump is used to refill the reservoir during operation.

Instrumentation
Various instruments can be fitted to the reservoir depending on the execution.
In general for plan 51 the instrumentation is limited only for level indication.

Valves
Valves are used for filling the vessel and for isolation of the vessel from the mechanical. The assembly drawing indicates the position of the valves that are supplied with the reservoir. The valves might also be part of the plant piping.

3.0 FUNCTION

The function of a Plan 51 reservoir system is:

- To prevent ice formation at the atmospheric side of the single mechanical seal this is handling fluids at below freezing temperature.

This is the simplest of the "vessel type systems" and is generally used to supply a 'dead ended' blanket of buffer fluid to the seal.

The most popular use of the Plan 51 system is to supply a de- icing fluid to the atmospheric side of a single seal which is handling fluids at below freezing temperature. The pumps handling these low temperature fluids are often covered in ice, frequently inches thick. Even in the warmest parts of the world. When the pumps are running the heat generation at the seal faces is sufficient to prevent icing occurring within seal components. However, when stopped. On cold standby duty the moisture in the atmosphere around the seal will freeze which unless cleared could cause the seal to fail. Assuming the prime mover is powerful enough to turn the pump with the seal iced up.

For these 'de-icing' applications glycol or methanol are typically used as the buffer fluid but the hazardous nature of the latter means that an auxiliary seal. Typically a lip seal will be needed in the seal to prevent leakage of the buffer fluid to atmosphere.

Any leakage of the seal will be carried to the reservoir by the buffer fluid.

Depending on the vapor pressure of the pumped product at ambient temperature, this leakage will be in gaseous form (volatile products) or as a liquid (non-volatile products).

In the case the pumping fluid is of a light hydrocarbon it could 'bubble' up through the vessel to vent but for heavier products this could be a problem.

Seal leakage will contaminate the buffer fluid and will be accumulated in the system. The leakage will cause a rise in level in the reservoir. The reservoir should be periodically drained and refilled with fresh buffer fluid to avoid a too high degree of contamination. It should be borne in mind that one now effectively has a single seal operation so that regular manual surveillance is recommended.

Flowserve doesn’t recommends plan 51 for non-volatile products.

The buffer fluid is required only prior to start-up and hence an isolating valve fitted in the drain line which is closed prior to start up, and an isolating valve between the seal and vessel. The vessel isolating valve is opened to flood the seal with buffer fluid prior to start up.

Note: The isolation valve in the gland drain is not supplied by Flowserve.

4.0 SAFETY

Please read these instructions carefully. Installation in accordance with the following instructions will contribute to long and trouble free operation of the Plan 51 reservoir.

For related mechanical seals, separate instructions are provided.

The ultimate user must ensure that personnel assigned to handle, install and operate the reservoir and related equipment is well acquainted with the design and operating requirements of such equipment.
Damage to any of the reservoir’s components may result in unsatisfactory performance, which can eventually result in (excessive) seal leakage. The degree of hazard depends on the sealed product and may have an effect on people and/or the environment.

Plant regulations concerning work safety, accident prevention and pollution must be strictly adhered to:

- Wear designated personal safety equipment
- Isolate equipment and relieve any pressure in the system
- Lock out equipment driver and valves
- Consult plant Material Safety Data Sheet (MSDS) files for hazardous material regulations
- Installation in hazardous areas is dependant on the explosion protection of the instrumentation. The ultimate user must judge in case of conflicting standards.

5.0 TRANSPORT, STORAGE

The Plan 51 reservoir and related equipment must be transported and stored in the unopened, original shipping box. The warehouse in which the reservoir and related equipment are stored must be dry and free of dust. Avoid exposing equipment to large temperature fluctuations, high humidity and radiation.

Reservoirs that have been dropped or have otherwise been subjected to heavy impacts during transport must not be installed. An inspection by Flowserve or its appointed representative is strongly advised

After a storage period of 3 years the reservoir must be inspected for its “as new” properties. This applies in particular to the instrumentation. An inspection by Flowserve is mandatory.

If the equipment is to be preserved with the reservoir installed, the preserving medium must not impair the function of the system by e.g. fouling and/or attack the secondary seals.

6.0 INSTALLATION

Mount the reservoir in the vertical position to a stand using the mounting lugs. Locate seal system as close to the seal as possible, while leaving sufficient room for operation and maintenance. To promote thermosyphoning in standby condition the reservoir must be mounted above the seal. For horizontal pumps the reservoir must be mounted 45 to 60 cm (18” to 24”) above the shaft centerline, for vertical pumps 45 to 60 cm above the seal gland inlet or outlet connection, whichever is the highest (unless otherwise specified).

6.1 Interconnecting piping

In a Plan 51 system, there is no circulation takes place; therefore no special attention must be paid to the execution of the interconnecting piping between the reservoir and the mechanical seal. Piping instructions are detailed on the system assembly drawing.

Minimize restrictions (e.g. use full port valves, limit the number of fittings). Unless otherwise specified, the minimum pipe size to be used is ¾”, schedule 80S maximum. Piping must be clean and free of burrs.

Total pipe length and number of bends should be kept to a minimum. Use smooth, large radius bends; do not use elbows, tees, etc. Ideally for plan 51 the pipe runs should be up right vertical to allow free flow of buffer fluid and hence make sure that the loop, including seal flange, does not include vapor traps.

Where applicable the following connections should be made. Note that the name of the connections on the seal /system assembly drawing may differ from those used in these instructions. In case of doubt contact you Flowserve representative.

Buffer fluid supply line to mechanical seal
The ***to seal*** connection should be connected to tap BI (buffer fluid inlet) on the mechanical seal flange.

Buffer fluid return line from mechanical seal
Not applicable for plan 51.

Flare connection/drain/disposal point connection
Depending on the execution of the Plan 51 reservoir, the ***vent / to flare*** connection should be connected to a drain or a disposal point.

Cooling water connections coil Inlet and coil outlet
Not applicable for plan 51.

6.2 Electrical connections (if applicable)
Electrical connections for instrumentation should be wired in accordance with the applicable instrument and plant requirements. Power supply for the electric motor of a forced draft cooler and external circulation pump should be wired in accordance with the applicable electric motor and plant requirements.

7.0 SET-UP

- Check whether the block bleed valve to the instrumentation is open (if applicable).
- Check whether the block valves of the level indicator are open and the drain and vent valves of the level indicator are closed (if applicable).
- Check whether the block valve to the flare is open (if applicable).
- Check whether the block valve in the drain line is closed (if applicable).
- Open the fill line and fill the reservoir with clean buffer fluid until normal liquid level. Buffer fluid may be specified on the reservoir assembly drawing. Flowserve can supply information on buffer fluid, temperature and flow requirements based on product type, seal size and product temperature. Ensure that the buffer fluid is clean and compatible with the product.
- Check the functionality of the level switch (es) during filling (if applicable).
- Close the block valve in the fill line (if applicable).
- Check for leakages at fittings and pipe work, rectify when necessary.

8.0 START-UP AND OPERATION

- Pressurize the equipment in which the seals are installed, following the instructions supplied by the equipment manufacturer.
- Check the seals, interconnecting piping and system for leakage, rectify when necessary.
- Buffer fluid pressure is usually equal to atmospheric or vapor recovery system pressure, unless otherwise specified.
- Start-up the equipment in accordance with the equipment's operating procedures unless specifically requested otherwise by Flowserve. If the equipment is not operating properly (e.g. seals and/or bearings running hot, cavitation, heavy vibration, etc.), shut down the equipment, investigate and remove the cause.

If seals are operated on a non-volatile product, the seal leakage will not evaporate, resulting in contamination of the buffer fluid. Because the level in the reservoir will rise over time, periodically drain the reservoir and refill with fresh buffer fluid at the quickest turn around if the equipment is not in shut down condition.

8.1 Refilling without a refill unit

- Close the valve between reservoirs and flare (if applicable).
- Open a vent valve to de-pressurize the reservoir.
- Refill the reservoir with clean buffer fluid using the fill connection.
- Close the fill connection.
- Close the vent valve.
- Follow the instructions as per 8.0.

8.2 Refilling with a refill unit

In this case the vessel can be refilled without de-pressurizing the vessel (if connected to a flare system). A refill unit can be a separate system that needs to be connected to the reservoir or it can be a hand pump that is supplied with the reservoir.

- Open the shutoff valve in the connecting line between refill unit and reservoir.
- Operate the hand lever or operate the motorized refill unit, at the same time checking the buffer fluid pressure by means of the pressure indicator.
- Upon completing the refill procedure, close the shutoff valve in the line between the refill unit and the reservoir.

9.0 SYSTEM CHECK, PROBLEM SOLVING

Checking of the system, limits itself to monitoring pressure, temperature, leakage and consumption of buffer fluid.

- Check the buffer fluid pressure regularly (typically once a week). The buffer fluid pressure must be equal to the flare/drain/disposal point pressure. (If applicable)
- Check the liquid level regularly (typically once a week). If the level is too high drain the buffer fluid to safe minimum level; refill with clean buffer fluid.
- Check the seals, system and interconnecting piping for leaks, rectify when necessary.
- Check the buffer fluid for impurities by collecting a sample (typically once a month). If dirty, drain the reservoir to safe minimum level and refill with clean buffer fluid.

Problem solving

PARAMETER	INDICATION (1)	POSSIBLE CAUSE	SOLUTION
Liquid level	Reducing fast (2)	• Too high lip seal leakage • Leakage in the system	• Check lip seal condition • Check connections for leakage
	High (3)	• Too high seal leakage	• Check primary seal condition

Notes:

(1): The liquid level drop should be monitored over time. A too a fast drop in liquid level compared to previous measurements could be an indication for one of the mentioned possible causes.

(3): A high liquid level with a non-volatile product indicates a too high primary seal leakage. This is an indication that the reservoir needs to be drained. The need for frequent draining is an indication of too high seal leakage.

10.0 MAINTENANCE

Renewal of buffer fluid

- Stop and de-pressurize the equipment in which the seals are installed.
- Close the valve between the reservoir and the flare (if applicable)
- De-pressurize the reservoir.
- Drain the reservoir.
- Refill the reservoir with clean buffer fluid.
- Check all components for damage or leaks and replace or repair when necessary.
- Follow instructions as per paragraphs 7.0 and 8.0 prior to re-starting the equipment.

11.0 SHUT-DOWN, DISASSEMBLY

The equipment can be shut down at any time. Before the reservoir can be removed the equipment in which the seal is installed must be de-pressurized.

For (re)-installation, removal and maintenance work, the complete reservoir system must be de-pressurized (and drained if required).

Product may be released during removal of the reservoir. Safety measures and protective equipment is required as per the plant's safety regulations.

12.0 SPARE PARTS, REPAIRS

The reservoir system is designed to provide reliable operation under a wide range of operating conditions. However, repairs will be necessary when components of the system reach the end of their normal life expectancy or when the system has been operated outside of its design capabilities.

All liabilities and warranties to Flowserve for damage incurred through the use of non-original replacement parts and accessories will be rendered null and void.

Please note that special manufacturing and delivery specifications exist for all parts of our products manufactured or produced by ourselves and the replacement parts are always offered in accordance with the latest technology and with the most current regulations and laws.

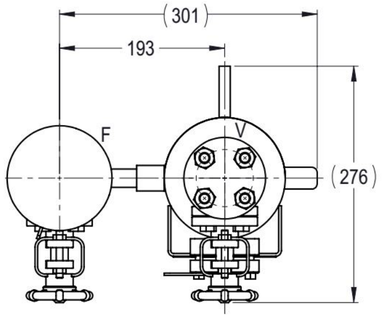
The information and specifications presented in this Operation and Maintenance Manual are believed to be accurate, but are supplied for information purposes only and should not be considered certified or as a guarantee of satisfactory results by reliance thereon.

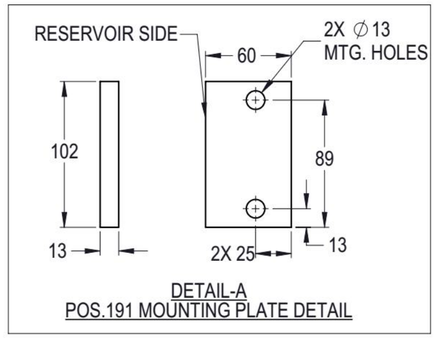
Nothing contained herein is to be construed as a warranty or guarantee, express or implied, with respect to the product. Although Flowserve Corporation can provide general application guidelines; it cannot provide specific information for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper selection, installation, operation and maintenance of Flowserve products. Because Flowserve Corporation is continually improving and upgrading its product design, the specifications, dimensions and information contained herein are subject to change without notice.

ATTACHMENT 1

Reservoir Assembly Drawing

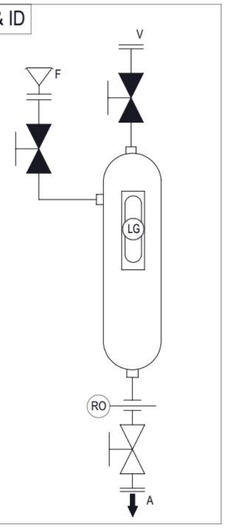
F001615657 1 (MM) Rev: 0 KAL Eng Marthandan, Harish Kumar (10184253) Aug-27-2024 15:58:03





DETAIL-A
POS.191 MOUNTING PLATE DETAIL

P & ID



DESIGN CONDITIONS

		UNIT
QUENCH FLUID	WATER	
DESIGN PRESSURE	12	BARG
DESIGN TEMPERATURE	-10 TO 93	°C
OPERATING PRESSURE	ATMOSPHERIC	BARG
OPERATING TEMPERATURE	MAX.80	°C
DESIGN CODE (VESSEL)	ASME VIII DIV 1	
DESIGN CODE (PIPING)	ASME B31.3	
EC DIRECTIVE	PED 2014/68/EU	
PED CATEGORY	SEP	
TOTAL VOLUME	7	LITER
VOLUME AT NLL	5	LITER
WEIGHT EMPTY	~40	KG

N.D. TESTING / INSPECTION

HYDROTEST PRESSURE	18	BARG
RADIOGRAPHY	NONE	
DYE-PENETRANT	100%	
MATERIAL CERTIFICATES	REFER NOTE 3	
INSPECTION	FLOWSERVE	

WELDING

WPS & PQR IN ACCORDANCE WITH ASME IX.

REMARKS

STAINLESS STEEL SURFACES SHALL NOT BE PAINTED.
CLEANING IN ACCORDANCE WITH RSD-SP-ENG-089E.
BOLTHOLES STRADDLE TO CENTERLINE.
STAINLESS STEEL WELDS TO BE PICKLED & PASSIVATED OR GLASS-PEARL CLEANED.
DO NOT USE TEFLON TAPE, BUT USE LOCTITE 577.

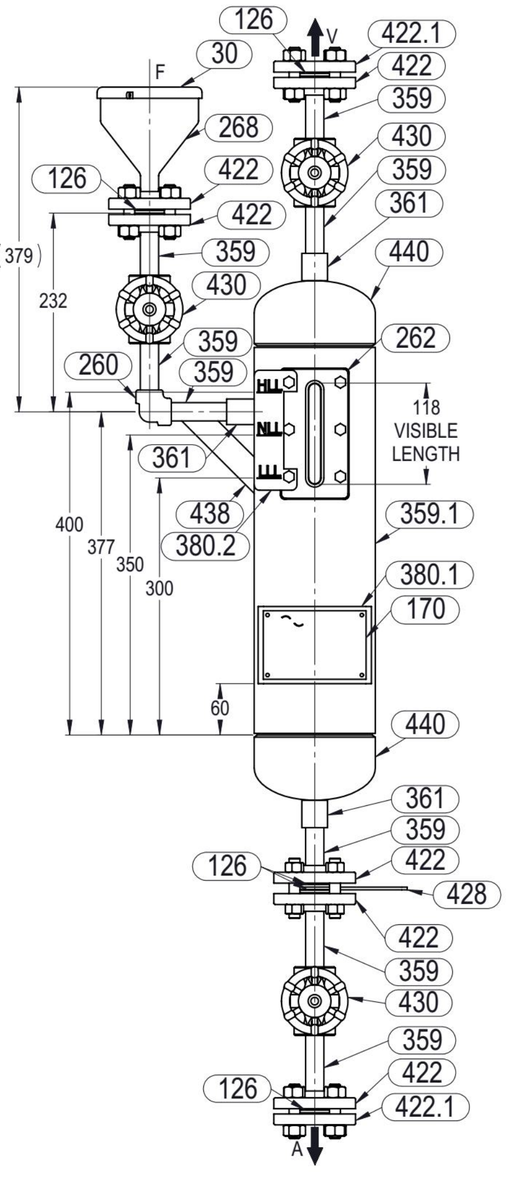
CONNECTIONS

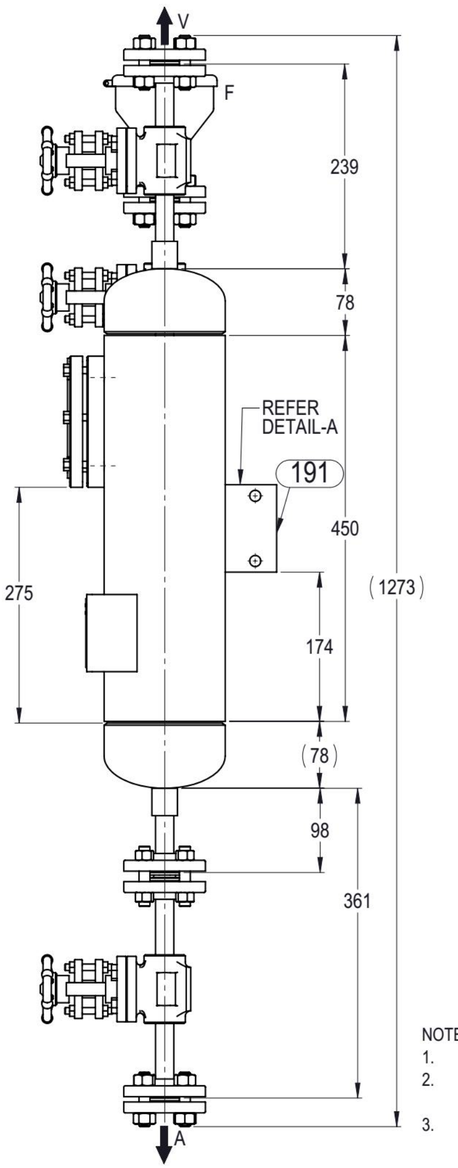
NO.	NAME	SIZE
A	TO SEAL	1/2 IN 300# RF + BLIND
F	FILLING	4 IN FUNNEL
V	VENT	1/2 IN 300# RF + BLIND

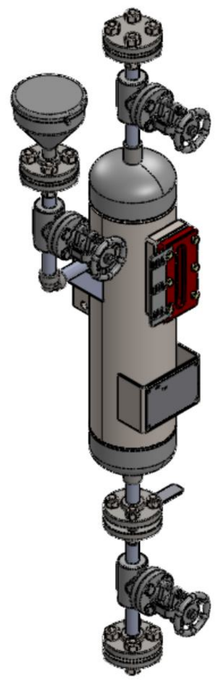
BILL OF MATERIAL NO: C100033782

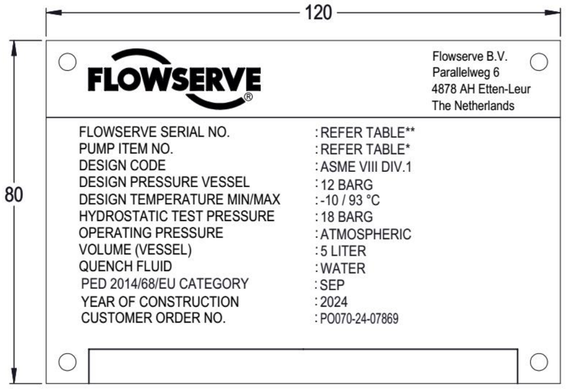
SPARE PARTS: [1] STARTUP [2] 2 YEAR [3] CAPITAL/CRITICAL

NO	PART CODE	QTY	DESCRIPTION	MATERIAL
30	C0538533ZZ-Q2	1	CAP, OTHER - DUST, 4 IN WITH CHAIN	GRADE 316/316L
126	C0111934ZZ	5	GASKET, SPIRAL WOUND -CL 300, 1/2 IN, SPIRAL WOUND	STAINLESS STEEL 316 + GRAPHITE
170	C100032896	1	PLATE, NAME - FOR AUXILIARY PLAN 51	316
191	C0243841ZZ-Q1	1	PLATE, MOUNTING - 102 X 60X 13 MM THK.	316
260	C0216202X941	1	ELBOW FITTING, PIPE - 1/2 IN, SOCKET WELD, CL 3000, 90 DEG	ASME SA-182 GRADE F316/F316L
262	C0560271ZZ	1	INDICATOR, LEVEL - GAUGE, WELD ON TYPE, VISIBLE LENGTH : 118 MM, BOROSILICATE GLASS	GRADE 316/316L
268	C0405667X941	1	STRAIGHT FITTING, PIPE - SWAGE, 4 IN X 1/2 IN, SCH 40, PBE, SMLS	ASME SA-182 GRADE F316/F316L
359	C0063392X951	1	PIPE, OTHER - SCH.80, 1/2 IN, SEAMLESS, PLAIN BOTH END	ASME SA-312 GRADE TP316/316L
359.1	C0172048X951	1	PIPE, OTHER - 5 IN X 450 MM LG, SCH 40, SMLS, BBE	ASME SA-312 GRADE TP316/316L
361	C0215993X941	3	STRAIGHT FITTING, PIPE - HALF COUPLING, 1/2 IN SW, CL. 3000	ASME SA-182 GRADE F316/F316L
380	4R124140ZZ-Q1	2	PLATE, NAME - FOR INSTRUMENT	ASME SA-240 GRADE 316/316L
380.1	C0234657ZZ-Q1	1	PLATE, NAME - BRACKET FOR NAMEPLATE	316
380.2	C0538973ZZ-Q2	1	PLATE, NAME - FOR LEVEL INDICATION, SIZE 2	316
422	C0362295X941	6	FLANGE, PIPE - 1/2 IN, CL 300, RFSW	ASME SA-182 GRADE F316/F316L
422.1	C0363170X941	2	FLANGE, PIPE - BLIND 1/2 IN CL 300	ASME SA-182 GRADE F316/F316L
428	C0095396ZZ	1	PLATE, ORIFICE - 1/2 IN, CL 300, 3.2 MM ORIFICE	316
430	C0369816ZZ	3	VALVE, GATE CL 800,1/2 IN SOCKET WELD,SCH 80,BOLTED BONNET,REDUCED BORE	316
438	C0493357X944-Q2	1	GUSSET, OTHER - 6 MM THK X 30 MM WIDE	ASME SA-240 GRADE 316/316L
440	C0489371X947	2	HEAD, RESERVOIR - CAP, 5 IN BUTT WELD, SCH 40	ASME SA-403 GRADE WP316/316L

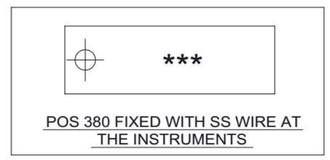








POS.170 NAMEPLATE DETAIL
(SCALE: NTS)



POS 380 FIXED WITH SS WIRE AT THE INSTRUMENTS

NOTES:
1. ALL VALUES IN () ARE REFERENCE DIMENSIONS.
2. CARBON STEEL STUDS(ASME SA-193 GR B7) & NUTS(ASME SA 194 GR 2H) WITH HOT-DIP GALVANIZED. ALL MISCELLANEOUS FASTENERS MUST BE 316 SS.
3. MATERIAL CERTIFICATE OF ALL PRESSURE CONTAINING PARTS (PIPES/FLANGES/PIPE FITTINGS) REQUIRES EN 10204 3.1. EN 10204 2.2 FOR NON-PRESSURE CONTAINING PARTS.

REV.	CHG NO.	DATE	REVD	CHKD	APVD
0	00210008	21-Aug-2024	HaMa	LoSh	HaSc
	DESC: RELEASE TO MANUFACTURE				

THIS PROPRIETARY AND/OR CONFIDENTIAL MATERIAL IS THE PROPERTY OF FLOWSERVE CORP. AND IS FURNISHED ONLY FOR THE PURPOSE INDICATED. FLOWSERVE RESERVES ALL RIGHTS IN THE MATERIAL, AND DOES NOT CONVEY PERMISSION TO MANUFACTURE OR USE THE CONFIDENTIAL OR PROPRIETARY INFORMATION CONTAINED HEREIN.

* PUMP ITEM NO.	** FLOWSERVE SERIAL NO.	*** INSTRUMENT TAG NUMBER LG	RO
50001 A	400370175-000200-001	TBA	TBA
50001 B	400370175-000200-002	TBA	TBA

DIM TOLERANCES (UNLESS SPECIFIED)
X. = ± 5 ANGLE = ± 0.5°
X.X = ± 2.5

ALL DIMENSIONS ARE REFERENCES UNLESS OTHERWISE SPECIFIED

OPERATING DATA
PRODUCT: SEA WATER
SEAL CHAMBER PRES: 5.9 barG Max
BARRIER FLUID: WATER
DISCHARGE PRES: 5.9 barG Max
API PLAN: 13/51

CUSTOMER DATA
CUSTOMER: PCM MANUFACTURING FRANCE SAS
ADDRESS: CHAMPTOCE-SUR-LOIRE FRANCE
ULTIMATE USER: CROSSWIND (JV SHELL + ENECO)
ADDRESS: THE NETHERLANDS
CUSTOMER P.O.: PO070-24-07869

SEAL DATA
MATL CODE: ----

JOB NUMBER	400370175-000200
DRWN	LoSh
DATE	23-Jul-2024
CHKD	LoSh
DATE	23-Jul-2024
APVD	HaSc
DATE	24-Jul-2024
3D MODEL NO. / REV.	F001614989 / 0
≈ WEIGHT ( )	64.95 lb (29 kg)

FLOWSERVE AMSS Seals & Systems

DRAWING TITLE
SEAL SYSTEM - GENERAL ARRANGEMENT
PLAN 51 -

SIZE	DRAWING NUMBER	REV.
A2	F001615657	0

3rd ANGLE | SCALE: 1:1 | DIM. UNITS: mm | SHEET: 1 OF: 1

TEMPLATE VERSION 4.5.10, JAN 2024

THIS PROPRIETARY AND/OR CONFIDENTIAL MATERIAL IS THE PROPERTY OF FLOWSERVE CORP. AND IS FURNISHED ONLY FOR THE PURPOSE INDICATED.
FLOWSERVE RESERVES ALL RIGHTS IN THE MATERIAL, AND DOES NOT CONVEY PERMISSION TO MANUFACTURE OR USE THE CONFIDENTIAL OR PROPRIETARY INFORMATION CONTAINED HEREIN.

ATTACHMENT 2

Instrumentation

LEVEL INDICATOR

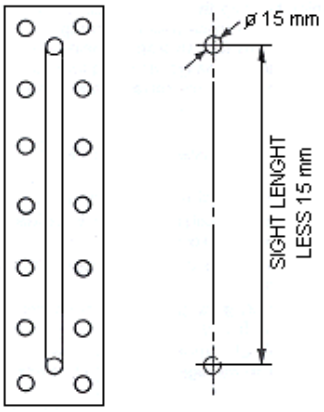
The Klinger and Trouvay & Cauvin alliance
Tel: +33 (0) 2.35.25.65.64 - Fax +33 (0) 2.35.25.65.53
www.ktc-fluidcontrol.com

INSTALLATION AND SERVICE GUIDE
KLINGER Weld-on Level Gauges for process applications

Models MWR (PN 100), MWT (PN 100), UWR (PN 100) & UWT (PN 100)

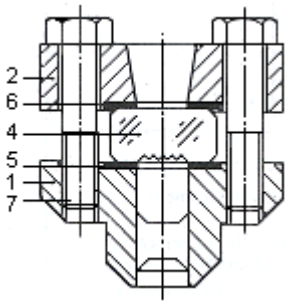
1 FITTING

First dismantle the gauge as shown in 3.2 changing glasses.
It is not necessary to cut a slot in the vessel wall. Two 15mm diameter holes should be drilled in the vessel with centres 15mm less than the sight length of the gauge, as shown in Fitting diagram. With combined sight gauges, it is recommended that two holes be drilled for each section of the sight. The centre piece should then be positioned accurately over the holes and tack welded into place. Check for correct alignment, and finish weld ensuring that the heat does not distort the centre piece. The gauge can then be reassembled using reverse procedure to that shown in 3.2.

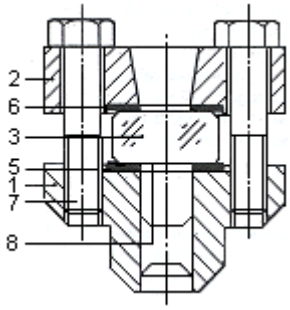


2 COMMISSIONING

Thermal shock considerably affects the life and performance of the glasses. Therefore, sharp changes in temperature should be avoided as much as possible. During initial warning up period, the cover and joints may settle and it is essential, therefore, to follow up all the clamping bolts to maintain the recommended torque (for correct order and torque see Tightening procedure).



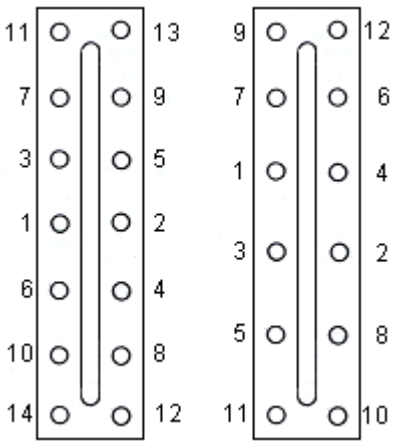
MWR :
ANSI class 600
PN 100
Max. temp. 400°C
Actual rating subject to pressure limitation of vessel and quality of weld.



MWT :
ANSI class 600
PN 100
Max. temp. 400°C
Actual rating subject to pressure limitation of vessel and quality of weld.

TIGHTENING PROCEDURE

COVER BOLT TORQUE		
Gauge	**DaN.m**	**Lbs.ft**
MWR	5.0	36
MWT	5.0	36



Item	Part list
1	Centre piece
2	Cover
3	Transparent glass type B
4	Reflex glass type B
5	Sealing joint
6	Cushion joint
7	Bolt
8	Protective shield (when fitted)

Note : UWR and UWT gauges can be supplied where the applications requires an enclosed glass. Please refer to MWR and MWT data for maintenance.

Further information

For further information, please send an E-mail to the following address: mkt@ktc-fluidcontrol.com
The characteristics of the products described on this page may be modified without notice, in the interests of regular improvement. In addition, the technical data reproduced here is provided for information only.

Ref: 76NOT028-An-01/2001

INSTALLATION AND SERVICE GUIDE
KLINGER Weld-on Level Gauges for process applications

Models MWR (PN 100), MWT (PN 100), UWR (PN 100) & UWT (PN 100)

3 MAINTENANCE INSTRUCTIONS

3.1 Any leaks which appear during service should immediately be stopped by following up all the clamping bolts in the correct order with the recommended torque (see Tightening procedure). If this fails to stop the leak it may be necessary to change the joints and the glass because the sealing surface may have suffered damage.

3.2 Changing glass

- Drain vessel to below level of glass to be changed,
- Relieve gauge and vessel of internal pressure,
- Release the clamping bolts,
- Remove the bolts from the gauge (supporting covers and internals),
- Remove the cover, glass, joints and protective shields, part 8 (if fitted),
- Clean joint faces of centre piece and cover, taking care not to damage joint face of centre piece,
- With new glass, joints and protective shields (if fitted) re-assemble gauge using reverse procedure, re-torque bolts from centre bolts as shown in Tightening procedure,
- Follow the commissionning procedure (point 2) to bring the gauge back into service.

4 REFURBISHING

No refurbishing should be necessary other than the replacement of glasses, joints and Protective shields (refer to 3.2).

5 IMPORTANT INSTRUCTIONS

5.1 Use only original KLINGER replacement parts,

5.2 Cleanliness is most essential when assembling and points listed under 3.2 must be observed,

4.3 Draughts may cause thermal shock, resulting in glass breakages. If there are windows, lift doors, etc..., in the vicinity it is advisable that the gauge should be screened.

5.4 Glass corrosion - if the glasses become opaque or the liquid level definition deteriorates, the glasses should be examined, cleaned and if worn, replaced at once.

5.5 Protective shields can only be fitted to Transparent Level Gauges - they must never be fitted to Reflex Level Gauges.

When protective shields are fitted, they should be positioned between sealing joint (5) and gauge glass (3).

6 SPARES

It is recommended that one complete set of glasses, joints and Protective shields be kept for spares and a new set ordered as soon as these are used.

6.1 When ordering spares, please quote :

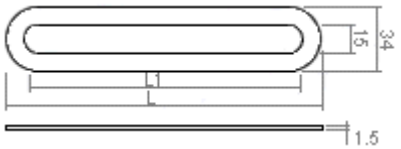
- type and size of gauge, e.g. MRW 2 - IX as stated on gauge type plate.
- construction of the level gauge components as stated on gauge plate, e.g. FS/H, M/H or M.

6.2 When ordering glasses, please quote transparent glasses type B + size :



Size	II	III	IV	V	VI	VII	VIII	IX
L	140	165	190	220	250	280	320	340

6.3 When ordering gaskets or Protective shields, please quote glasses type B + size of glass on which they are fitted :



Further information

For further information, please send an E-mail to the following address: mkt@ktc-fluidcontrol.com

The characteristics of the products described on this page may be modified without notice, in the interests of regular improvement. In addition, the technical data reproduced here is provided for information only.

Ref: 76NOT028-An-01/2001

4 HEATING JACKET SYSTEM

	Type	ATEX marking	PCM reference	Manual
THERMON	Terminator™ ZP	Zone 1, AEx eb IIC T4-T6	DI317873-03	PN50845-0320

Terminator™ ZP

Power Connection Kit

INSTALLATION PROCEDURES

For Power Connection, In-Line Splice Connection,
T-Splice Connection, or End Termination Applications



Terminator™ ZP

INSTALLATION PROCEDURES

Receiving, Storing and Handling

1. Inspect materials for damage incurred during shipping.
2. Report damages to the carrier for settlement.
3. Identify parts against the packing list to ensure the proper type and quantity has been received.
4. Store in a dry location.

Kit Contents

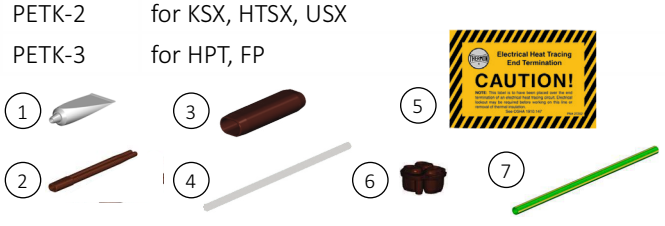


Item	Quantity	Description
1	1	Expediter Assembly Support Cap with O-Ring Threaded Grommet Compressor Grommet Support Base with O-Ring
2	1	Junction Box Lid
3	1	Junction Box Base with O-Ring
4	1	Nut
5	1	Banding
6	1	Banding Guide
7	1	Terminal Blocks with DIN Rail (Refer to terminal specifications for maximum allowable wire size)
8	1	Junction Box Cord

Order Separately

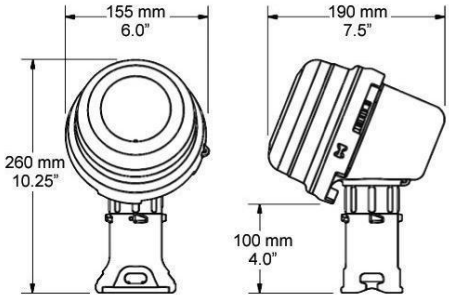
PETK Power and End Termination Kits (per cable)

PETK-1	for BSX, RSX, VSX-HT
PETK-2	for KSX, HTSX, USX
PETK-3	for HPT, FP



Item	Quantity	Description
1	1	RTV Tube
2	1	Power Connection Boot
3	1	End Cap
4	1	Tape Strip 6" (PETK-3 only)
5	1	End Termination Caution Label
6	1	GRW-G Grommet (PETK-3 only)
7	1	Ground Sleeve

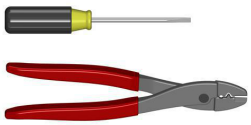
Dimensions



Installation Precautions

- To minimize the potential for arcing and fire caused by product damage or improper installation use ground-fault protection. The National Electrical Code (NEC) and Canadian Electrical Code (CEC) require ground-fault protection of equipment for each branch circuit supplying electric heat tracing.
- Installation must comply with Thermon requirements and be installed in accordance with the NEC, CEC, or any other applicable national and local codes.
- Component approvals and performance ratings are based on the use of Thermon specified parts only. User supplied power connection fittings must be listed or certified for intended use.
- Avoid electrostatic charge. Clean only with a damp cloth.
- De-energize all power sources before opening enclosure.
- Keep ends of heating cable and kit components dry before and during installation.
- Individuals installing these products are responsible for complying with all applicable safety and health guidelines. Proper personal protective equipment, or PPE, should be utilized during installation. Contact Thermon if you have any additional questions.

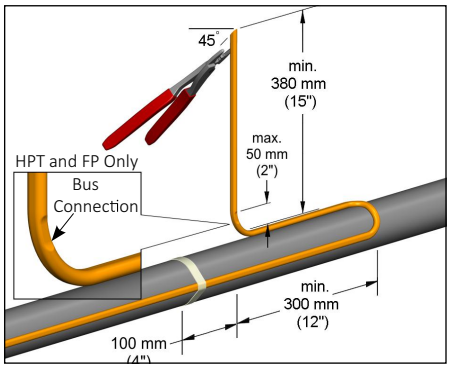
Tools Required



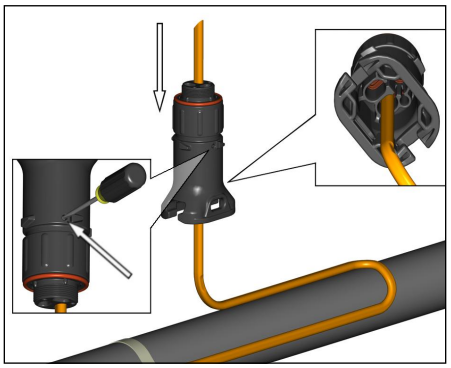
Certifications/Approvals

UL LISTED
FM Approved

IP66/Type 4X -60°C ≤ Ta ≤ +55°C
Ordinary & Hazardous Locations
Class I, Division 2, Groups A, B, C, & D
Class II, Division 2, Groups F & G, Class III
Class I, Zone 1, AEx eb IIC T4-T6

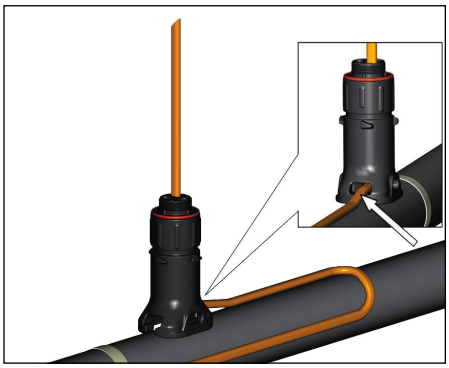


1. Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop. See page 5 for multiple cable installation tips.



2. Insert cable into expediter. If mounted on bottom or side of pipe, punch out weep hole

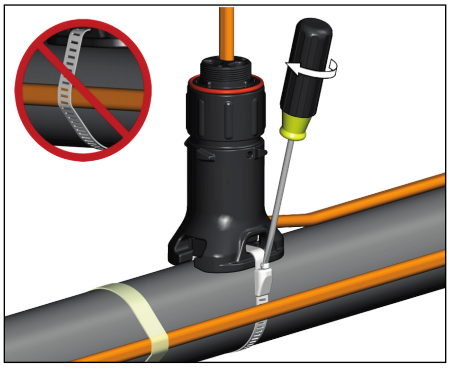
Note: For HPT and FP cable, exchange grommet in Terminator with GRW-G provided in PETK-3.



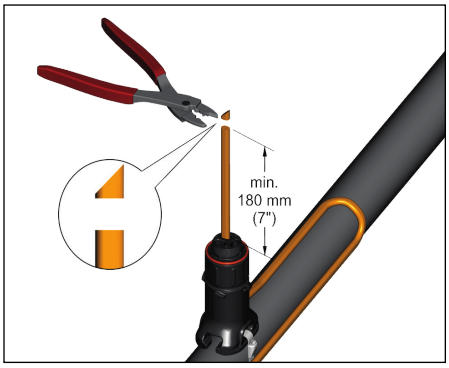
3. Slide expediter toward pipe and route cable through support base entry.



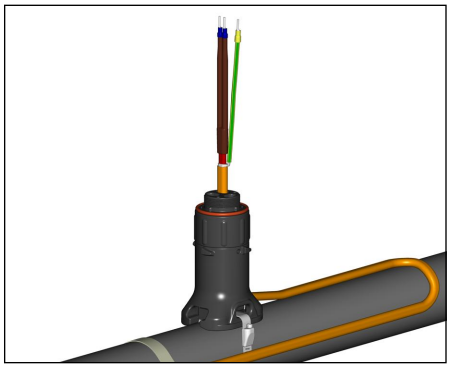
4. Insert banding guide into expediter and snap into place.



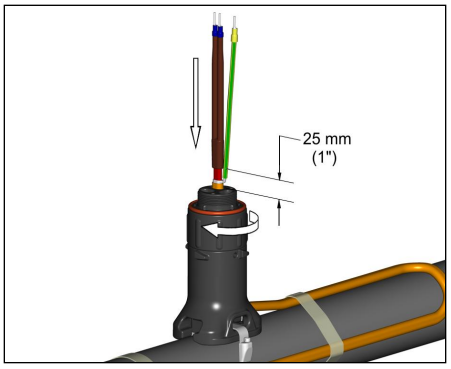
5. Mount expediter to pipe using pipe band. Do not band over cable.



6. Cut off end of cable.



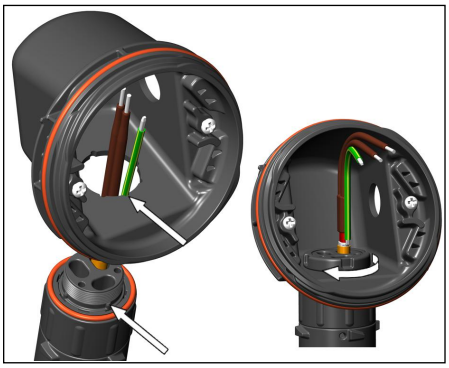
7. Terminate cable with appropriate PETK termination kit. Refer to PETK installation instructions.



8. Push excess cable back through expediter. Tighten cap securely. Tape cable expansion loop to pipe.



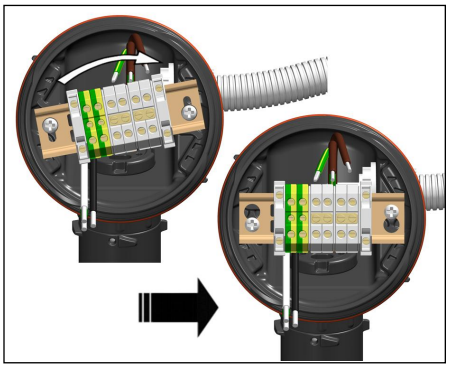
9. For power connection applications: Use dimple molded into side of junction box base to locate center of hole, drill for user supplied power connection fittings per manufacturer's recommendations.



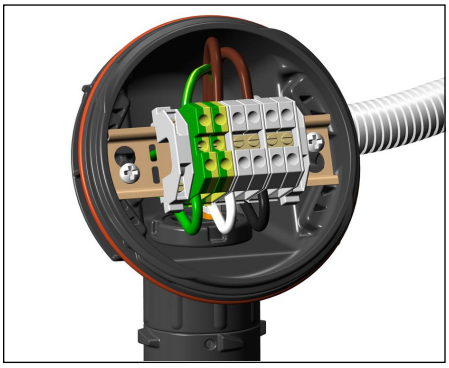
10. Mount junction box base on expediter. Make sure to align slots to properly orient junction box base. Tighten nut securely.



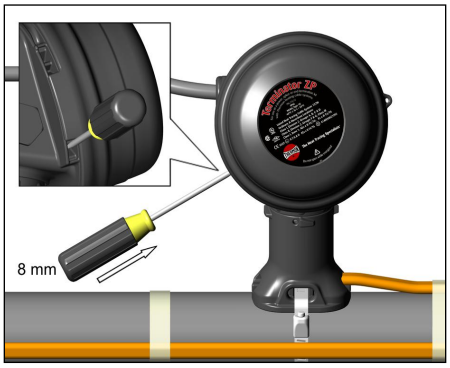
11. For power connection applications: Install power connection fittings (user supplied) and pull in power and ground wires.



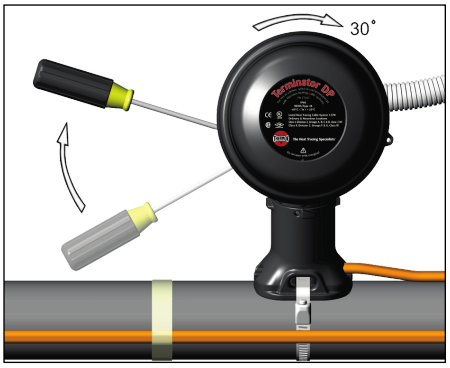
12. Install quick mount terminal blocks.



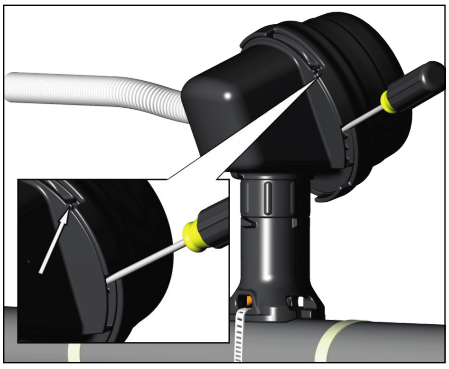
13. Complete system wiring. Refer to typical wiring details on page 5. Tightening torque 1.5 Nm–1.8 Nm (1.1 ft-lb–1.3 ft-lb).



14. Install junction box lid and twist hand tight. Insert screwdriver into ratchet slots located on side of junction box base.

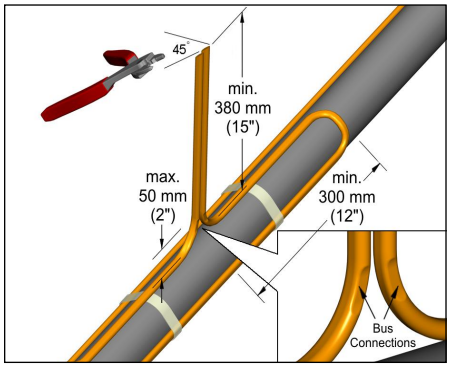


15. Use screwdriver to ratchet on junction box lid. Lid will rotate 30 degrees.

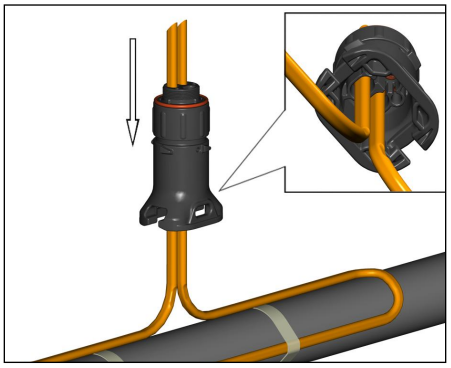


16. Lid latch mechanism fully engaged. To remove lid, repeat steps 14 and 15 but in the opposite direction.

Two Cable Layout Tips



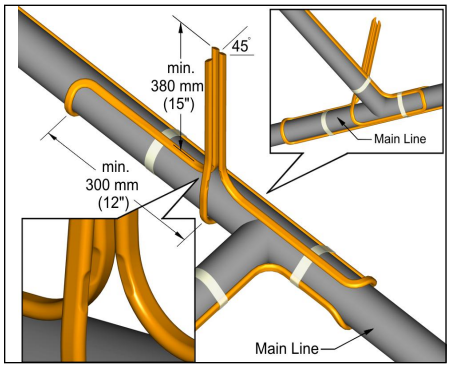
Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop.



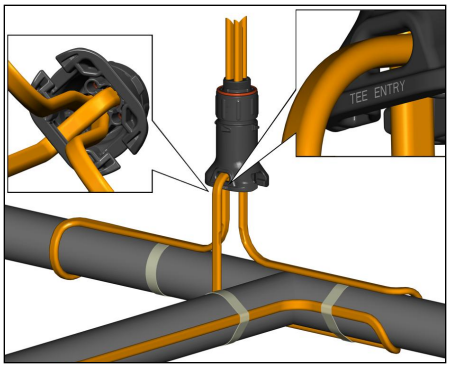
Insert two cables into expediter.

Note: For HPT and FP cable, exchange grommet in Terminator with GRW-G provided in PETK-3.

Three Cable Layout Tips

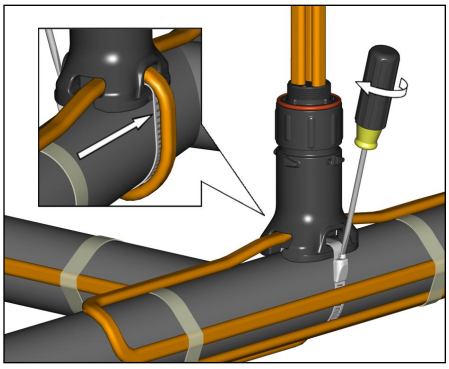


Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop.



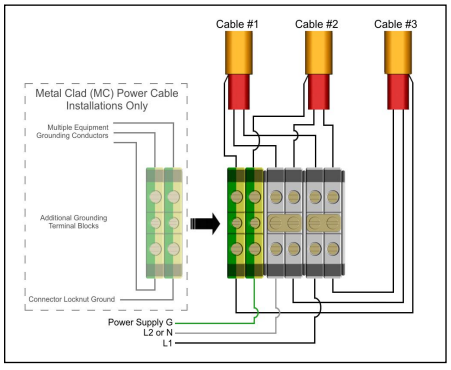
Insert three cables into expediter.

Note: For HPT and FP cable, exchange grommet in Terminator with GRW-G provided in PETK-3.

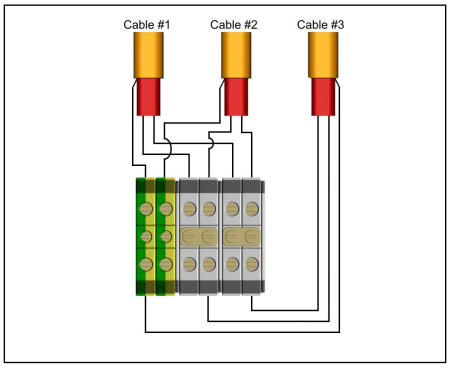


Mount expediter with three cables. Do not band over cable.

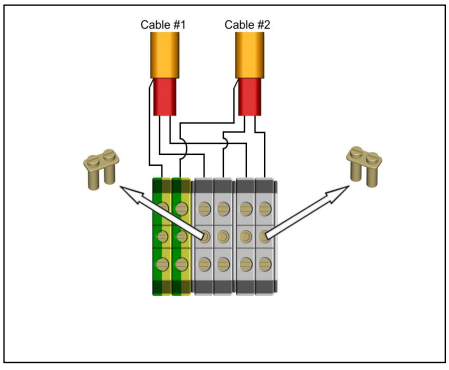
Typical Wiring Details



Power Connection (1 to 3 Cables). For 3 cable power connections, additional terminal blocks will be required when using 10mm² (#8 AWG) power supply wiring.



In-Line Splice and T-Splice



End Termination (1 to 2 Heating Cables) Remove jumpers for 2 cable terminations.



Corporate Headquarters: 100 Thermon Dr • PO Box 609 San Marcos, TX 78667-0609 • Phone: 512-396-5801 • 1-800-820-4328
For the Thermon office nearest you visit us at . . . www.thermon.com

Form No. PN50845-0320 © Thermon, Inc. • Printed in U.S.A. • Information subject to change.

5 COUPLING

	Type	ATEX marking	PCM reference	Manual
john crane	Serie L size 0090	II 2GD$_c$T3	C15099J000	IOM-L-EO/L-ES

L-EO & L-ES

L SERIES METAL MEMBRANE COUPLINGS

Fitting & Maintenance Instructions

FIGURE 1A. Spacer Option

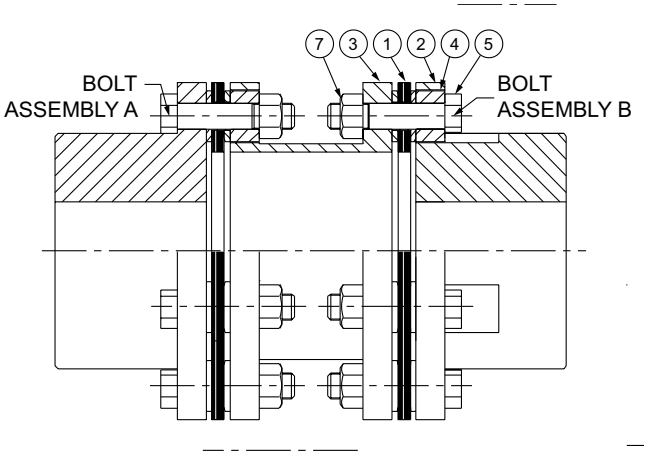
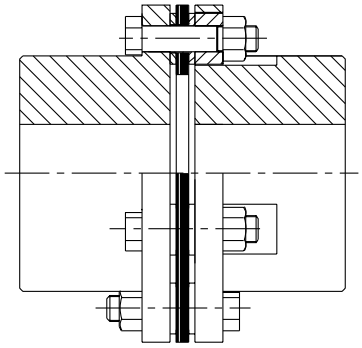


FIGURE 1B. Non-spacer Option



1 – Membrane pack

2 – Hub

3 – Spacer

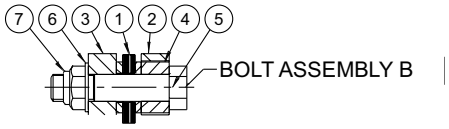
4 – Overload collar

5 – Bolt

6 – Washer (1850 and above)

7 – Locknut

FIGURE 1C. Bolt Assembly for Sizes LLES-1850 to 9025



Foreword

These instructions are provided to familiarize the user with the coupling and its designated use. These instructions must be read and applied whenever work is carried out on the coupling and must be kept available for future reference.

ATTENTION These instructions are for the fitting, operation and maintenance of the coupling as used in rotating equipment and will help to avoid danger and increase reliability. The information required may change with other types of equipment or installation arrangements. These instructions must be read in conjunction with the instruction manuals for both the driver and driven machinery. If the coupling is to be used for an application other than that originally intended or outside the recommended performance limits, John Crane must be contacted before its installation and use.

Any warranty may be affected by improper handling, installation or use of this coupling. Contact the company for information as to exclusive product warranty and limitations of liability.

If questions or problems arise, contact your local John Crane sales/service engineer or the original equipment manufacturer as appropriate.

ATTENTION John Crane couplings are precision products and must be handled appropriately. Take particular care to avoid damage to spigots, mating faces, hub bores, keyways and membranes. Do not excessively compress the coupling membranes during assembly. Refer to Table 1 for compression limits [Min gap 'X'].

These instructions are written for standard catalog products, generally designed in accordance with the drawing shown.

Safety Instructions

The following designations are used in the installation instructions to highlight instructions of particular importance.

IMPORTANT is used for items of particular concern when using the coupling.

ATTENTION where there is an obligation or prohibition concerning the avoidance of risk.

⚠ **where there is an obligation or prohibition concerning harm to people or damage to the equipment.**

Safety Instructions (continued)

IMPORTANT All reasonable care has been taken in the design and manufacture of this coupling to ensure that it will be safe when properly used. It is assumed that the user is aware of the statutory requirements of his plant.

ATTENTION When repairing John Crane's Metastream flexible disc couplings, only John Crane-approved parts should be used.

Maintenance work must only be carried out:
- **when the equipment is stationary and has been made safe**
- **by suitably trained and qualified personnel.**

Prior to installing or removing the coupling, ensure that the machinery is made safe.

Hubs must be adequately supported during installation or removal to avoid accidental damage should they slip.

The spacer must be adequately supported during installation or removal to avoid accidental damage should it slip.

ATTENTION Before starting the machinery, ensure that all necessary safety procedures are being observed.

IMPORTANT These instructions are of a general nature; if a general arrangement (GA) drawing is supplied with the coupling then all data indicated on that drawing takes precedence over information included in these instructions.

The usual extent of supply comprises:

- A hub for the driving machine (e.g., motor) shaft
- A hub for the driven machine shaft
- Two membrane pack assemblies (one for the non-spacer option)
- A spacer (distance piece). The overall length of the spacer plus membrane units is sized to suit the shaft end separation of the coupled machines
- A set of fasteners to assemble the unit between the two hub flanges

Storage

If the coupling is not to be used immediately, it should be stored away from direct heat in its original packing.

All documentation supplied with the coupling should be retained for future reference.

Spares

When requesting spares, always quote the full designation of the coupling,

The following spares can be purchased from John Crane:

- Bolt-set (ref. 4, 5, 6, 7)
- Hubs, bored to your requirement or unbored (ref. 2)
- Spacer (ref. 3)
- Membrane packs (ref. 1)

Installation

Remove coupling from packaging and carefully inspect for signs of damage. Pay particular attention to the hub bores and the spigot/recess location features, which should be free from burrs and other damage.

Installation of hubs

Prior to installing the coupling, ensure that the machinery is made safe. Hubs must be adequately supported during installation to avoid accidental damage should they slip.

Installation (continued)

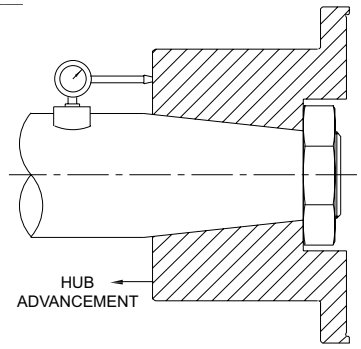
Parallel bore with keyed drive

1. Ensure the hub bore and mating shaft are clean.
2. The hub is usually installed with the hub face and shaft end flush although ±1-2 mm overhang is acceptable to correct for errors in setting distance between shaft ends (DBSE).
3. Measure the shaft diameter and hub bore to confirm the correct fit.
4. For clearance fits, install the key(s) into the shaft keyway and with a little lubrication on the shaft, slide the hub onto the shaft. The key should be a tight sliding fit in the keyway with a small clearance at the top of the key. Secure the hub to the shaft in the correct axial position with one or more grub screws.
5. John Crane recommends a light interference fit for most applications, and it may be necessary to apply heat to assist fitting of such hubs. A warm oil bath will usually be adequate. DO NOT spot heat or exceed 175°C as this may cause distortion. A thermal heat stick can be used to estimate the temperature before quickly sliding the hub onto the shaft. A suitable stop will ensure the correct axial position is located.

Taper bore with keyed drive (see Figure 2)

1. Thoroughly clean all contact surfaces and smear the tapered surfaces with oil.
2. Fit the hub onto the shaft without the key(s). Lightly hammer the hub with a soft-faced mallet to ensure metal-to-metal contact takes place.
3. Measure the distance from the end of the shaft to the face of the hub using a depth micrometer (record this measurement).
4. Securely mount a dial gauge onto the inboard hub flange and set to zero.
5. Remove the hub and fit the key(s), which should be a tight sliding fit in the keyway with a small clearance at the top of the key.
6. Refit the hub and draw up the shaft to the correct axial position indicated by the dial gauge. If an interference fit is required the hub may have to be heated (this is rare, however).
7. When the hub has cooled remeasure the distance from the end of the shaft to the face of the hub to confirm the correct axial position.
8. Fit the shaft-end retaining nut if applicable to ensure the hub is locked in position axially.
   NOTE: *The hub face may not be flush with the shaft end when taper bores are used.*

FIGURE 2



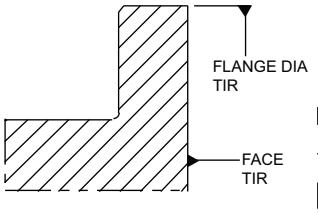
Hubs mounted by FB taper bushes

To mount hubs supplied with taper bushes, refer to the FB Taper Bushes Fitting & Maintenance Instructions, I-FB BUSH.

Unbored hubs

John Crane recommends a light interference fit for keyed hubs and shafts (e.g., a P7/h6 fit). The finished bore size can be calculated from the measured shaft diameter. When setting up the hub to machine the bore, use the hub location recess and face as datum surfaces, as shown in Figure 3. The hub face should be set such that the maximum runout does not exceed 0.025 mm TIR. The hub location recess should be set so the maximum runout does not exceed 0.03 mm TIR. Please note that for API 671 applications the required tolerances will be tighter.

FIGURE 3



Adapters

For machines where the coupling bolts to a flywheel, the coupling will be supplied with a SAE flange adapter. Refer to L-Series supplement for flywheel adaptor location and mounting details.

Shaft alignment

Align the center lines of the driving and driven machine shafts as follows:

1. Move the equipment into position.
2. Check for any soft foot and correct before commencing alignment.
3. With one machine firmly bolted down, set the DBSE according to the drawing or catalog dimension.

IMPORTANT DBSE should be measured between the inner faces of the hubs. DBSE may not be equal to the precise distance between shaft ends. In particularly, the faces of taper bored hubs may not be flush with the shaft end.

L-EO & L-ES

L SERIES METAL MEMBRANE COUPLINGS

Installation (continued)

4. Align the shaft center lines both horizontally and vertically by aligning the hub flanges. John Crane recommends the reverse periphery method for accurate alignment. This can be done using dial gauges or with laser shaft alignment kit. Further details are available from John Crane on request.
5. Recheck the DBSE after the shafts have been aligned.

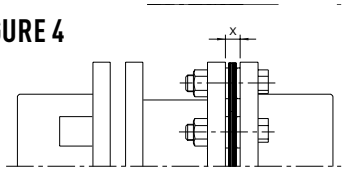
IMPORTANT The misalignment tolerances quoted in literature and on drawings allow for dynamic conditions and variations. For the best service from the coupling, John Crane recommends that installed misalignment is no more than 10% of the maximum allowable misalignment, allowance being made for any anticipated movements that will occur during operation (e.g., thermal movements on hot pumps).

Installation of the Transmission Unit

Spacer option – with flanged spacer and two membrane units

1. Support the spacer (3) in position between the hubs and align the larger sets of holes in the spacer flanges with the smaller sets of holes in the hub flanges, and vice versa.
2. Slide a membrane unit (1) between one end of the spacer and its corresponding hub, such that the holes in the membrane unit align with the holes in the spacer and hub flanges.
3. Assemble drive bolts as instructed in the Bolt Assembly section on below.
4. Moving to the other end of the coupling, check that the smaller bolt holes in the hub align with the larger bolt holes in the spacer flange, and vice versa.
5. Insert the second membrane unit (1) between the two flanges.
   NOTE: *To assist in this operation, a lever may be inserted between the spacer and hub flanges to move the spacer slightly against the flexibility of the membrane unit that was first fitted (Figure 4). Minimum gap 'X' when compressed is given in Table 1.*

FIGURE 4



6. Assemble drive bolts as instructed in the Bolt Assembly section on below ensuring all bolts are inserted from the hub towards the spacer.

Non-spacer option – with single membrane unit

1. Align the larger sets of holes in one hub flange with the smaller sets of holes in the other hub flange.
2. Slide a membrane unit (1) between the hubs, such that the holes in the membrane unit align with the holes in the hub flanges.
3. Insert drive bolts as instructed in the bolt assembly section below [Bolt Assembly A].

Finally, rotate the machinery two or three times slowly to ensure it moves freely. The coupling is now ready for continuous and trouble free service.

Bolt Assembly

Bolt assembly A

1. Sizes 0007 to 1560 Ensure the large flat machined on the head of the bolt (5) is next to the hub boss.
   Sizes 1850 to 9025 Place plain washer (6) over bolt (5).
2. Insert bolt from hub side into one of the smaller bolt holes in the hub flange and through the sleeve in the membrane unit (see Bolt Assembly A on the drawing).
3. Place collar (4) onto bolt shank (5) and secure using locknut (7).
4. Repeat Bolt Assembly A steps 1 through 3 for alternate holes around the hub flange.

Bolt assembly B

1. Place collar (4) over bolt (5), ensuring that the chamfer accommodates the bolt head radius.
2. From the hub side, pass bolt through one of the larger holes in the hub flange and insert through the sleeve in the membrane unit into the small hole of the spacer flange (see Bolt Assembly B on the drawing).
3. Sizes 0007 to 1560 Secure using locknuts (7).
   Sizes 1850 to 9025 Place plain washer (6) onto bolt shank (5). Secure using locknuts (7).
4. Repeat Bolt Assembly B steps 1 through 3 for the remaining holes around the hub flange.

NOTE:

- *Drive bolts must not be turned; hold the bolt and tighten the locknuts evenly one flange at a time in a "diametrically opposite" sequence.*
- *If a GA drawing is supplied with the coupling, tighten the nuts to the torque values quoted on that drawing, otherwise use the values quoted in Table 1.*

TABLE 1. Standard Coupling Bolt Tightness Torques

Coupling		Compressed 'X' Min. mm	Bolt	Spanner A/F mm	Bolt Tightening Torque	
					N-m	lb-ft
LDES-0007	L001	4.6	M5	8	4	3
LDES-0014	L002	4.6	M5	8	4	3
LDES-0028	L003	4.6	M6	10	6	4
LSES-0045	L004	5.0	M6	10	6	4
LSES-0090	L009	5.4	M8	13	15	11
LSES-0175	L017	6.1	M10	17	30	22
LSES-0265	L026	4.6	M12	19	54	40
LSES-0525	L052	8.1	M14	22	86	63
LSES-0810	L081	9.9	M16	24	165	122
LSES-1150	L115	10.1	M18	27	225	166
LSES-1560	L156	13.1	M20	30	322	237
LLES-1850	L185	20.4	M20	30	286	211
LLES-3000	L300	21.1	M22	32	389	287
LLES-4200	L420	21.9	M24	36	494	364
LLES-6000	L600	23.0	M30	46	981	724
LLES-9009	L909	24.1	M33	50	1335	985
LLES-9012	L912	25.0	M36	55	1714	1264
LLES-9015	L915	25.5	M36	55	1714	1264
LLES-9025	L925	27.6	M42	65	2741	2022

Operation, Inspection and Maintenance

Routine examination should include a periodic check on the tightness of fasteners and visual inspection of transmission components for signs of fatigue or wear.

If the coupled machinery is disturbed at any time, shaft alignment should be rechecked. Alignment checking is recommended if a deterioration of installation alignment during service is suspected.

Failures are rare and can generally be attributed to excessive misalignment and/or severe torsional overload. In all cases of coupling failure, the cause should be identified and corrected before replacing the coupling.

It is possible to repair the coupling by fitting replacement disc pack assemblies and, if necessary, the spacer.

Removing the coupling spacer

1. Having ensured that the equipment is safely isolated, loosen all the nuts (7) at both ends of the coupling, but do not remove them.
2. Support the spacer (3) and remove all the fasteners (4, 5, 6 and 7) from one end of the coupling.
3. Gently withdraw the membrane unit (1) from between the hub and spacer flanges, using a combined pulling and rotational action. If necessary, a lever may be used to move the spacer slightly against the flexibility of the other membrane unit (see Figure 4).
4. Remove all the fasteners from the second membrane unit and pull out the spacer and membrane unit. Separate the membrane unit from the spacer.
   - Do not attempt to dismantle the membrane units (disc pack assemblies) any further; replacements are always supplied as assembled units.
   - It is recommended that BOTH membrane units be replaced, as failure of one inevitably results in some damage to the other.

IMPORTANT Fastener sets (4, 5, 6 and 7) should be replaced after the coupling has been disassembled five times.

This section refers to couplings that bear the CE and ATEX required markings:

CE / ATEX Marking

All couplings that comply with CE and ATEX legislation will be marked as shown. This will be etched on the spacer element of the transmission unit if enough room is available.

A) Ambient temperature is standard (40ºC max)

CE Ex I $M2_C$ Ex II $2GD_C$ T6 (T85°C) john crane SL1 4LU, UK. XX

John Crane's Metastream metal membrane couplings are required for use in higher ambient temperatures, John Crane UK Ltd certifies that the equipment complies with the temperature classification range listed below in Table 2, and in all other respects complies with the type certificates.

TABLE 2

Ambient Range Marking		Group II, Category 2 GD **	Group I, Category 2 M2	Marking Option
Min.	Max.			
Unknown		T3 (T200°C)	Not Applicable	B
-55°C <	Ta < 150°C	T3 (T200°C)	Not Applicable	B
-55°C <	Ta < 90°C	T4 (T135°C)	150°C	C
-55°C <	Ta < 55°C	T5 (T100°C)	150°C	C
-55°C <	Ta < 40°C	T6 (T85°C)	150°C	A

B) Ambient temperature is (-55°C < Ta < 150ºC) OR ambient temperature is unspecified, the equipment is not suitable for mining applications, Group I, Category 2.

CE Ex II $2GD_C$ T3 (T200°C) john crane SL1 4LU, UK. XX

C) Ambient temperature is (-55°C < Ta < 90ºC)

When the ambient temp. is specified, 'T3' is replaced by the following 'T' mark (**) according to Table 2.

CE Ex I $M2_C$ Ex II $2GD_C$ ** john crane SL1 4LU, UK. XX

NOTE:

'XX' is the year of manufacture and will change. For example, for year 2016; XX = 16.
CE and EX marks must meet requirements of Annex II in Reg. (EC) No. 765/2008 and Annex II in Dir. 84/47/EEC respectively.

Operation in aggressive atmospheres

The following components contain non-metallic materials. Confirm compatibility or provide suitable protection if the coupling is to operate in an aggressive atmosphere.

- The hub electrical insulation (if supplied option) – reinforced thermosetting plastic
- Limited end float bearings (if supplied option) – PTFE based plastic

Temperature classification of John Crane's Metastream couplings

John Crane's metal membrane couplings, supplied in conformance with Directive 2014/34/EU, have to meet the classifications specified in Table 2 when used in accordance with instructions and information supplied.

T, L and H series couplings, using the disk type flexible elements, are covered by type examination certificate **Sira 02ATEX9403**.

M series couplings, using the diaphragm type flexible elements, are covered by type examination certificate **Sira 02ATEX9404**.

John Crane UK Ltd
361-366 Buckingham Avenue
Slough
SL1 4LU
United Kingdom
T: +44 (0) 1753 224 000
F: +44 (0) 1753 224 224
www.johncrane.com

Declaration of Conformity

EEC Directive 2014/34/EU of 26.02.2014
and resultant legislation and standards

We, the manufacturers – John Crane UK Ltd, – confirm that the explosion prevention requirements have been implemented for

Metastream® metal-membrane couplings

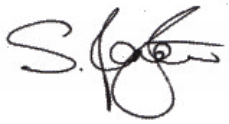
Equipment complies with the requirements of directive 2014/34/EU. It is in accordance with article 1 3. (a) of the directive and the fundamental Health and Safety requirements of Annex II, are fulfilled.

The current Type Examination Certificates for the couplings are:-

'T', 'L' & 'H' Series -	Sira 02ATEX9403
'M' Series -	Sira 02ATEX9404

The technical documentation is deposited with the designated notified body in accordance with article 13 (b) (ii) of the Directive 2014/34/EU.

SIRA Certification Services
Unit 6, Hawarden Industrial Park
Hawarden, Chester, CH5 3US
United Kingdom

Signed: 

Date: 20th July 2016

S. Pennington
(Engineering Manager - Couplings)

John Crane UK Ltd
361-366 Buckingham Avenue
Slough
SL1 4LU
United Kingdom
T: +44 (0) 1753 224 000
F: +44 (0) 1753 224 224
www.johncrane.com

Declaration of Incorporation

E.C. Machinery Directive (2006/42/EC)

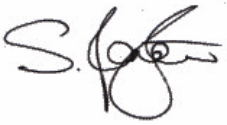
Section 1.0 - Machinery Description:
Flexible Power Transmission Ring and Diaphragm Form Membrane Couplings
Types:

'H', 'T', 'L' & 'M' Series

Section 2.0 - Applicable Harmonised Standards
ISO13709 (API 610) for centrifugal pumps
ISO14691 couplings for - General-purpose applications
ISO10441 (API 671) (opt) couplings for - Special-purpose applications

Section 3.0 - Declaration:
We, John Crane declare that under our sole responsibility for the supply of the machinery defined in Section 1.0 above, the said machinery parts are intended to be incorporated into other machinery or assembled with other machinery to constitute machinery as covered by this Directive.

The machinery parts, covered by this declaration must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive.

Signed: 

Date: 20th July 2016

S. Pennington
(Engineering Manager - Couplings)

If the products featured will be used in a potentially dangerous and/or hazardous process, your John Crane representative should be consulted prior to their selection and use. In the interest of continuous development, John Crane Companies reserve the right to alter designs and specifications without prior notice. It is dangerous to smoke while handling products made from PTFE. Old and new PTFE products must not be incinerated. ISO 9001 and ISO14001 Certified, details available on request.

smiths
bringing technology to life

©2017 John Crane Revised 10/17 **www.johncrane.com**

6 GEAR BOX

	Type	PCM reference	Manual
NORD DRIVESYSTEMS	SK672.1F IEC132K	FGAHXCG1256CEAA	B1000

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

Intelligent Drivesystems, Worldwide Services

INSTALLATION & OPERATING INSTRUCTIONS



NORD.COM/DOCS
DOCUMENT COLLECTION

Order number: 204154484-100
Type Description: SK672.1F IEC132K

NORD DRIVESYSTEMS

Order details

Order Number:	204154484-100
Equipment number:	
Product Name:	Nordbloc helical gearbox
NORD Model Type:	SK672.1F IEC132K
Ratio:	12,56
Mounting Position:	M4
Lubricant:	ISO VG 220 synthetic oil
Lubrication Quantity:	2,700 L

Table of contents

Operation and maintenance manual

Operating and installation instructions – Gear unit
B1000 Version: 3023

Operating and installation instructions – Gear unit
B1000 Version: 2424

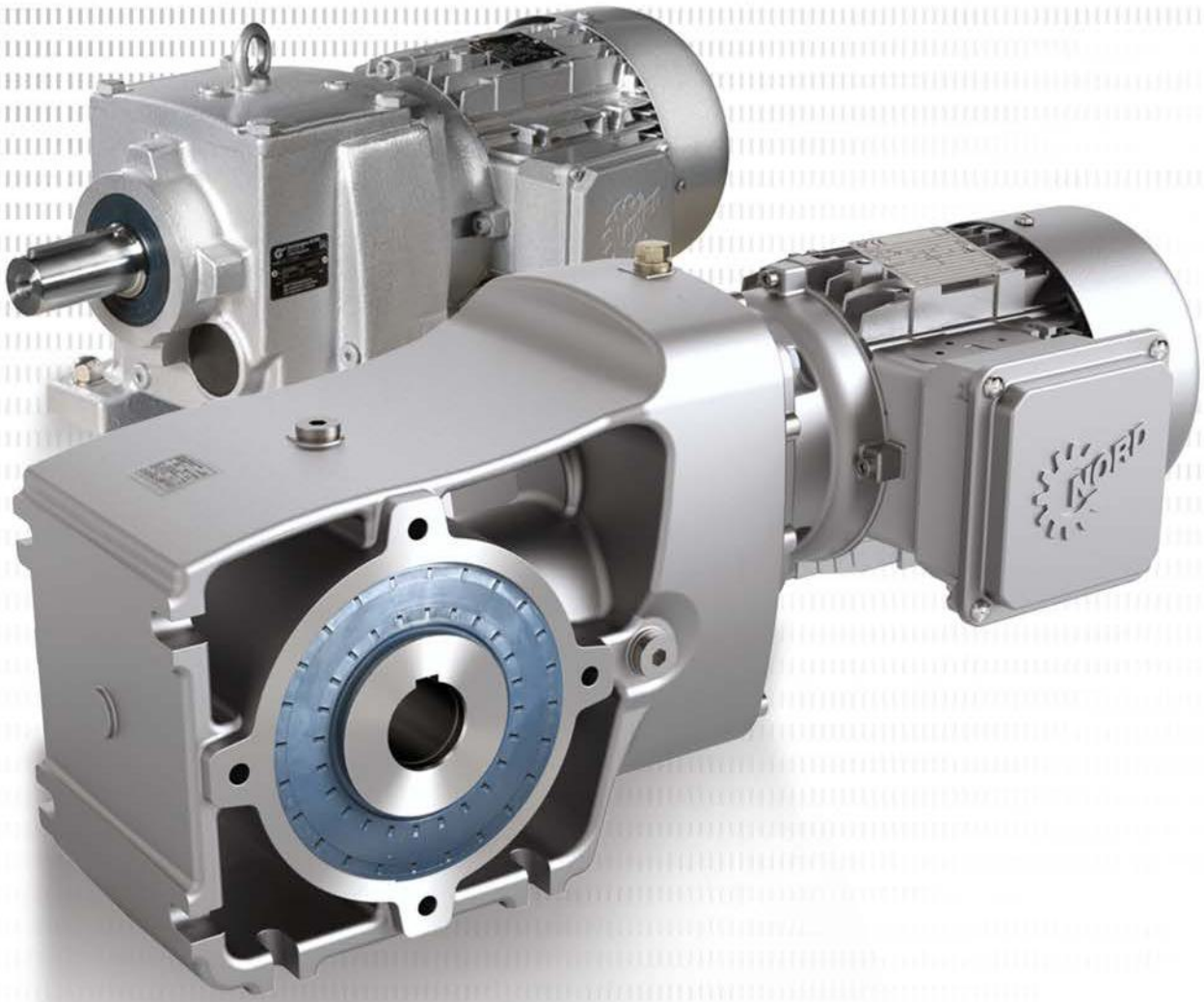
Spare part list

Spare parts list – NORDBLOC helical in-line gear unit
PL1011 Version: 1019

Spare parts list – Attachment Options
PL1080 Version: 3321

Declaration of manufacturer

Manufacturer`s declaration within the meaning of the RoHS Directive
C060000 Version: 2022



B 1000 – en

Gear units

Manual with installation instructions



Read document and keep for future reference

Read this document carefully prior to performing any work on or putting the device into operation. It is essential to read and observe the instructions in this document. They serve as the prerequisite for smooth and safe operation and the fulfilment of any warranty claims.

Contact Getriebebau NORD GmbH & Co. KG if your questions regarding the handling of the device are not answered in this document or if you require further information.

The German version of this document is the original. The German document is always decisive. If this document is available in other languages, this will be a translation of the original document.

Keep this document in the vicinity of the device so that it is available if required.

Use the version of this documentation that is valid for your device at the time of delivery. You can find the currently valid version of the documentation under www.nord.com.

Please also note the following documents:

- Gear unit catalogues,
- Documentation for the electric motor,
- Documentation for equipment which is attached or provided.

Documentation

Designation:	**B 1000**
Part no.:	**6052802**
Series:	Gear units and geared motors
Type series:	
Gear unit types:	**Helical gear unit** **NORDBLOC.1® helical in-line gear unit** **Standard helical gear unit** **Parallel shaft gear unit** **Bevel gear unit** **Helical worm gear unit** **MINIBLOC worm gear unit** **UNIVERSAL worm gear unit**

Version list

Title, **Date**	**Order number** / Version Internal code	**Remarks**
B 1000, February 2013	**6052802** / 0713	-
B 1000, September 2014	**6052802** / 3814	• General corrections
B 1000, April 2015	**6052802** / 1915	• New gear unit types SK 10382.1 + SK 11382.1
B 1000, March 2016	**6052802** / 0916	• General corrections • New bevel gear units SK 920072.1 + SK 930072.1
B 1000, September 2016	**6052802** / 3816	• General corrections • New helical gear units SK 071.1, SK 171.1, SK 371.1, SK 571.1, SK 771.1
B 1000, June 2018	**6052802** / 2518	• General corrections • New parallel shaft gear units SK 0182.1, SK 0282.1, SK 1282.1, SK 1382,1 • New worm gear unit SK 02040.1
B 1000, December 2018	**6052802** / 5018	• General corrections • Revision of safety and warning information • New NORDBLOC.1® helical in-line gear units SK 871.1, SK 971.1, SK 1071.1
B 1000, October 2019	**6052802** / 4419	• General corrections • Addition of GRIPMAXX™ (option M)

Title, **Date**	**Order number** / Version Internal code	**Remarks**
B 1000, September 2021	**6052802** / 3921 32551	• Editorial revision • General corrections and amendments
B 1000, July 2022	**6052802** / 2822 34343	• Revision of the maximum motor weights
B 1000, July 2023	**6052802** / 3023 36228	• General corrections • Revision of safety information • Enhancement of types in table “Maximum permitted motor weights”: SK 9xxx.1 and SK 1382.1 • Revision of lubricants • Adjustment of long-term storage
B 1000, June 2024	**6052802** / 2424 38062	• General corrections • Addition of gear unit types SK 1282.1 GJL, SK 1382.1 and SK 1382.1 GJL • Enhancement of types in table “Maximum permitted motor weights”: SK 971.1 and SK 1071.1 • Revision of lubricants

Table 1: Version list B 1000

Copyright notice

As an integral component of the device described here, this document must be provided to all users in a suitable form.
Any editing or amendment or other utilisation of the document is prohibited.

Publisher

Getriebebau NORD GmbH & Co. KG
Getriebebau-Nord-Straße 1 • 22941 Bargteheide, Germany • http://www.nord.com
Fon +49 (0) 45 32 / 289-0 • Fax +49 (0) 45 32 / 289-2253

Member of the NORD DRIVESYSTEMS Group

Table of Contents

1 Safety information 10
1.1 Intended use 10
1.2 Do not make any modifications. 10
1.3 Performing inspection and maintenance work 10
1.4 Personnel qualification 10
1.5 Safety for particular activities 11
1.5.1 Check for transport damage 11
1.5.2 Safety information for installation and maintenance 11
1.6 Hazards 11
1.6.1 Hazards when lifting 11
1.6.2 Hazards due to rotating parts 11
1.6.3 Hazards due to high or low temperatures 12
1.6.4 Hazards due to lubricants and other substances 12
1.6.5 Hazards due to noise 12
1.6.6 Hazards due to pressurised coolants 12

2 Description of gear units 13
2.1 Gear unit types and type designations 13
2.2 Name plate 15

3 Transport, storage, assembly 16
3.1 Transporting the gear unit 16
3.2 Storage and downtimes 16
3.2.1 General measures 16
3.2.2 Storage and downtimes in excess of 3 months 17
3.2.3 Storage and downtimes of more than 9 months 17
3.3 Preparing for installation 18
3.3.1 Check for damages 18
3.3.2 Remove corrosion protection agents 18
3.3.3 Check rotational direction 18
3.3.4 Check ambient conditions 18
3.3.5 Drives with nsd tupH surface treatment 18
3.3.6 Installing the oil expansion chamber (Option: OA) 19
3.3.7 Installing the oil reservoir tank (Option: OT) 19
3.4 Installing the gear unit 20
3.5 Installation of a hub on solid shaft (option: V, L) 21
3.6 Fitting push-on gear units with fastening element (option: B) 23
3.7 Fitting a hollow shaft with shrink disc (Option: S) 26
3.8 Fitting a hollow shaft with GRIPMAXX™ (Option: M) 28
3.9 Fitting the covers (option: H, H66) 30
3.10 Fitting the covers 31
3.11 Fitting a standard motor (Option: IEC, NEMA, AI, AN) 32
3.12 Mounting of the cooling coil onto the cooling system 36
3.13 Installation of the external oil/air cooler 36
3.13.1 Connecting hose lines 37
3.13.2 Electrical connection 37
3.14 Installation of an oil expansion chamber (Option: OA) 38
3.14.1 Installation of the sizes I, II and III 38
3.14.2 Installation of sizes 0A and 0B 39
3.15 Subsequent painting 39
3.16 Electrical connection of the mounted motor 39

4 Commissioning 40
4.1 Checking the oil level 40
4.2 Activating the vent 40
4.3 Activating the automatic lubricant dispenser 41
4.4 Cooling coil (Option: CC) 43
4.5 External oil/air cooler 44
4.6 Running-in time for the worm gear unit 44

4.7 AI/AN adapter operation with option BRG1 45
4.8 Checklist 45

5 Service and maintenance 46
5.1 Inspection and maintenance intervals 46
5.2 Service and maintenance work 47
5.2.1 Visual inspection for leaks 47
5.2.2 Check for running noises 47
5.2.3 Checking the oil level 48
5.2.4 Visual inspection of the rubber buffers (Option: G, VG) 48
5.2.5 Visual inspection of the hoses (Option: OT, CS2-X) 49
5.2.6 Re-greasing (Option: VL2, VL3, W, AI, AN) 49
5.2.7 Replacing the automatic lubricant dispenser 49
5.2.8 Change the oil 50
5.2.9 Clean and check vent screw 51
5.2.10 Replacing the shaft sealing ring 51
5.2.11 Re-lubrication of bearings in the gear unit 51
5.2.12 General overhaul 51

6 Disposal 52

7 Appendix 53
7.1 Versions and mounting position 53
7.1.1 Explanation of symbols 53
7.1.2 UNIVERSAL/MINIBLOC worm gear units 54
7.1.3 Parallel shaft gear units with oil level tank 55
7.1.4 Overview of mounting positions 56
7.2 Lubricants 69
7.2.1 Roller bearing greases 69
7.2.2 Gear oils 70
7.3 Screw tightening torques 72
7.4 Troubleshooting 73
7.5 Leakage and leak-tightness 74
7.6 Repair information 75
7.6.1 Repairs 75
7.6.2 Internet information 75
7.7 Warranty 75
7.8 Abbreviations 76

List of illustrations

Figure 1: Name plate 15
Figure 2: Example of a simple pulling device 21
Figure 3: Permissible application of force to drive and driven shafts 22
Figure 4: Applying lubricant to the shaft and the hub 23
Figure 5: Removing the factory-fitted closing cap 24
Figure 6: Gear unit mounted on shaft with a shoulder using the fastening element 24
Figure 7: Gear unit mounted on shaft without a shoulder using the fastening element 24
Figure 8: Removal using dismantling device 24
Figure 9: Mounting the rubber buffer (Option G and/or VG) on parallel shaft gear units 25
Figure 10: Attaching the torque support on bevel gear and worm gear units 25
Figure 11: Hollow shaft with shrink disc 26
Figure 12: GRIPMAXX™, exploded diagram 28
Figure 13: Fitting the covers, Option SH, Option H, and Option H66 30
Figure 14: Disassembly and assembly of the cover cap 31
Figure 15: Fitting the coupling onto the motor shaft - various types of coupling 34
Figure 16: Cooling cover 36
Figure 17: Connection of the oil/air cooler 37
Figure 18: Position of the oil expansion chamber 38
Figure 19: Position of the oil expansion chamber 39
Figure 20: Activating the vent screw 40
Figure 21: Activating the pressure vent screw 40
Figure 22: Removing the vent plug and fitting the special pressure vent 41
Figure 23: Fitting the grease collection container 41
Figure 24: Activating the automatic lubricant sensor with standard motor mounting 42
Figure 25: Adhesive label 42
Figure 26: Checking the oil level with a dipstick 48
Figure 27: Re-grease IEC/NEMA adapters AI and AN with option BRG1 49
Figure 28: Switching the automatic lubricant sensor with standard motor mounting 49
Figure 29: Parallel shaft gear units with oil level tank 55

List of tables

Table 1: Version list B 1000 4
Table 2: Gear unit types and type designations 13
Table 3: Versions and options 14
Table 4: Permissible machine shaft tolerances 29
Table 5: Motor weights IEC motors 32
Table 6: Motor weights NEMA motors 33
Table7: Motor parallel keys 35
Table 8: Position of the half-coupling on the NEMA motor shaft 35
Table 9: Checklist for commissioning 45
Table 10: Inspection and maintenance intervals 46
Table 11: Materials 52
Table 12: Roller bearing greases 69
Table 13: Gear oils 70
Table 14: Screw tightening torques 72
Table 15: Overview of malfunctions 73
Table 16: Definition of leakage according to DIN 3761 74

1 Safety information

1.1 Intended use

These gear units are used to transmit rotary movements. They convert velocity and torque. They are intended for use as part of a drive system in commercially used plant and machinery. The gear units must not be operated until it has been established that the plant or machinery can be safely operated with the gear unit. Suitable protective measures must be provided if failure of a gear unit or a geared motor could result in a risk to persons. The plant or machinery must comply with local legislation and directives. All applicable health and safety requirements must be met. In particular, the Machinery Directive 2006/42/EC and UKCA "Supply of Machinery (Safety) Regulations 2008" must be especially observed in the relevant areas of application.

The gear units and geared motors to which this manual with installation instructions refers to are usually components for installation in machines according to the current EC Machinery Directive 2006/42/EG.

In certain individual cases in which the gear unit or the geared motor is considered as a ready-to-install drive system for specific applications, this drive system is classified as a incomplete machine according to the current EC Machinery Directive 2006/42/EG. A corresponding declaration of incorporation is enclosed with the product.

The gear units may not be used in environments in which an explosive atmosphere can occur.

The gear units may only be used according to the information in the technical documentation from Getriebebau NORD GmbH & Co. KG. Damage to the gear unit may result if the gear unit is not used as intended and according to the information in the operating and installation manual. This may also result in personal injury.

The base or the gear unit mount must be appropriately dimensioned for the weight and torque. All of the fastenings provided must be used.

Some gear units are equipped with a cooling coil/cooling system. These gear units may only be operated if the cooling circuit is connected and in operation.

1.2 Do not make any modifications.

Do not make any structural modifications to the gear unit. Do not remove any protective guards. Do not change the original coating / paint or apply additional coatings / paints.

1.3 Performing inspection and maintenance work

Due to lack of maintenance and damage, malfunctions may occur which can result in personal injury.

- Carry out all servicing and maintenance work at the specified intervals.
- Also note that servicing is necessary after long storage periods prior to commissioning.
- Do not operate damaged gear units. The gear unit must not have any leaks.

1.4 Personnel qualification

All transport, storage, installation, commissioning and maintenance work must be carried out by qualified specialist personnel.

Qualified specialist personnel are persons who have the training and experience to recognise and avoid any possible risks.

1.5 Safety for particular activities

1.5.1 Check for transport damage

Transport damage may cause malfunctions of the gear unit, which may cause personal injury. Oil which escapes due to leaks may cause a slipping hazard.

- Check the packaging and the gear unit for transport damage.
- Do not operate damaged gear units.

1.5.2 Safety information for installation and maintenance

Before starting work on the gear unit disconnect the drive from the power supply and secure it against accidental switch-on. Allow the gear unit to cool down. Depressurise the cooling circuit lines.

Damaged or defective components, attachment adapters, flanges and covers may have sharp edges. Wear work gloves and work clothing.

1.6 Hazards

1.6.1 Hazards when lifting

Persons may be injured by falling or swinging gear units. Therefore also observe the following information:

- Cordon off a wide area around the hazard area. Take care that there is adequate space to avoid swinging loads.
- Never stand under suspended loads.
- Use adequately dimensioned means of transport which are suitable for the purpose. The weight of the gear unit can be obtained from the type plate.
- Only lift the gear unit by the factory-mounted eyebolts.

  If there are no eyebolts available, screw one eyebolt according to DIN 580 into each provided threaded hole. The eyebolts must be fully screwed in.
  Tighten the eyebolts only according to Chapter 3.1 "Transporting the gear unit". Only use the eyebolts to lift the gear unit without other components. The eye bolts are not designed for lifting the gear unit with attachments. Use the eyebolts on both the gear unit and the motor to lift a geared motor (observe the manufacturer's instructions for the motor).

1.6.2 Hazards due to rotating parts

Rotating parts cause a risk of entanglement. This may lead to severe injuries such as crushing or strangling.

- Provide contact protection. In addition to shafts, this also applies to fans as well as drives and driven elements such as belt drives, chain drives, shrink discs and couplings. Take possible run-on of the machine into consideration for the design of protective devices.
- Do not operate the drive without covers or hoods.
- Secure the drive to prevent activation during installation and maintenance work.
- For test operation do not switch on the drive without an installed driven element or secure the motor shaft key.
- Also observe the safety information in the operating and installation instructions provided by manufacturers of components supplied.

1.6.3 Hazards due to high or low temperatures

The gear unit may heat up to 90 °C during operation. Touching hot surfaces or contact with hot oil may result in burns. At very low ambient temperatures freezing may occur on contact.

- Only touch the gear unit when wearing gloves after operation or at very low ambient temperatures.
- Before starting maintenance work, allow the gear unit to cool down sufficiently after operation.
- Provide a contact guard if there is a risk that persons may touch the gear unit when it is in operation.
- Bursts of hot oil mist may be emitted from the pressure vent screw during operation. Provide a suitable guard so that persons cannot be injured by this.
- Do not place any flammable materials on the gear unit.

1.6.4 Hazards due to lubricants and other substances

Chemical substances which are used with the gear unit may be toxic. Eye injuries may result if these substances enter the eyes. Lubricants and adhesives may cause skin irritation.

Oil mist may escape when vent screws are opened.

Due to lubricants and conservation materials, gear units may be slippery and slip out of the hands. There is a slipping hazard from spilled lubricants.

- When working with chemical substances wear chemical-resistant gloves and work clothing. Wash your hands after working.
- Wear protective goggles if there is a possibility of splashed chemicals, for example when filling oil or during cleaning work.
- If chemicals enter the eyes, rinse with large amounts of cold water immediately. Consult a physician in case of symptoms.
- Observe the safety data sheets for the chemicals. Keep the safety data sheets in the vicinity of the gear unit.
- Collect spilled lubricants immediately with a binding agent.

1.6.5 Hazards due to noise

Some gear units or attached components may cause hazardous noise levels during operation. Wear hearing protection if work has to be carried out close to such gear units.

1.6.6 Hazards due to pressurised coolants

The cooling system is under high pressure. Damage or opening a cooling line which is under pressure may result in injury. Depressurise the cooling circuit before working on the gear unit.

2 Description of gear units

2.1 Gear unit types and type designations

Gear unit types / Type designations
UNICASE helical in-line gear unit **2-stage:** SK 02, SK 12, SK 22 SK 32, SK 42, SK 52, SK 62N, SK 62, SK 72, SK 82, SK 92, SK 102 **3-stage:** SK 03, SK 13, SK 23, SK 33N, SK 43, SK 53, SK 63, SK 73, SK 83, SK 93, SK 103
NORDBLOC.1® helical in-line gear unit **1-stage:** SK 071.1, SK 171.1, SK 371.1, SK 571.1, SK 771.1, SK 871.1, SK 971.1, SK 1071.1 **2-stage:** SK 072.1, SK 172.1, SK 372.1, SK 572.1, SK 672.1, SK 772.1, SK 872.1, SK 972.1 **3-stage:** SK 373.1, SK 573.1, SK 673.1, SK 773.1, SK 873.1, SK 973.1
STANDARD helical gear unit **2-stage:** SK 0, SK 01, SK 20, SK 25, SK 30, SK 33 **3-stage:** SK 010, SK 200, SK 250, SK 300, SK 330
UNICASE parallel gear unit **2-stage:** SK 0182NB, SK 0182.1, SK 0282NB, SK 0282.1, SK 1282, SK 1282.1, SK 1282.1 GJL, SK 2282, SK 3282, SK 4282, SK 5282, SK 6282, SK 7282, SK 8282, SK 9282 **3-stage:** SK 1382.1, SK 1382.1 GJL, SK 2382, SK 3382, SK 4382, SK 5382, SK 6382, SK 7382, SK 8382, SK 9382, SK 10382, SK 10382.1, SK 11382
UNICASE bevel gear unit **3-stage:** SK 9012.1, SK 9016.1, SK 9022.1, SK 9032.1, SK 9042.1, SK 9052.1, SK 9062.1, SK 9072.1, SK 9082.1, SK 9086.1, SK 9092.1, SK 9096.1 **4-stage:** SK 9013.1, SK 9017.1, SK 9023.1, SK 9033.1, SK 9043.1, SK 9053.1
NORDBLOC.1® bevel gear unit **2-stage:** SK 920072.1, SK 92072.1, SK 92172.1, SK 92372.1, SK 92672.1, SK 92772.1, SK 930072.1, SK 93072.1, SK 93172.1, SK 93372.1, SK 93672.1, SK 93772.1
UNICASE worm gear unit **2-stage:** SK 02040, SK 02040.1, SK 02050, SK 12063, SK 12080, SK 32100, SK 42125 **3-stage:** SK 13050, SK 13063, SK 13080, SK 33100, SK 43125
UNIVERSAL SI worm gear unit **1-stage:** SK 1SI31, SK 1SID31, SK 1SI40, SK 1SID40, SK 1SI50, SK 1SID50, SK 1SI63, SK 1SID63, SK 1SI75 **2-stage (helical worm gear unit):** SK 2SID40, SK 2SID50, SK 2SID63
UNIVERSAL SMI worm gear unit **1-stage:** SK 1SMI31, SK 1SMID31, SK 1SMI40, SK 1SMID40, SK 1SMI50, SK 1SMID50, SK 1SMI63, SK 1SMID63, SK 1SMI75 **2-stage (helical worm gear unit):** SK 2SMID40, SK 2SMID50, SK 2SMID63

Table 2: Gear unit types and type designations

Double gear units consist of two single gear units. The type designation of the SK 73/22 double gear unit, for example, means that the double gear unit consists of the single gear units SK 73 and SK 22.

Abbreviation	Description
(without)	Foot mounting with solid shaft
/31	Worm gear first stage
/40	Worm gear first stage
5	Reinforced output shaft
A	Hollow shaft
AI	Standard IEC motor attachment
AI…BRG1	Standard IEC motor attachment with manual re-lubrication
AI…RLS	Standard IEC motor attachment with integrated back stop
AL	Reinforced axial bearing
AN	Standard NEMA motor attachment
AN…BRG1	Standard NEMA motor attachment with manual re-lubrication
AN…RLS	Standard NEMA motor attachment with integrated back stop
B	Fastening element
CC	Cooling coil
D	Torque arm
DR	Pressure vent
EA	Splined hollow shaft
F	B5 flange
G	Rubber buffer for torque arm
H	Cover cap
/H10	Modular helical pre-stage for universal worm gear units
H66	IP66 cover
IEC	Standard IEC motor attachment
K	Torque bracket
L	Solid shaft both sides
M	GRIPMAXX™
MK	Motor bracket
NEMA	Standard NEMA motor attachment
OA	Oil expansion chamber
OT	Oil level tank
R	Back stop
S	Shrink disc
SCP	Screw conveyor flange
SO1	Synthetic oil ISO VG 220
V	Solid shaft (for standard helical gear units: reinforced drive)
VG	Reinforced rubber buffer
VI	Viton radial shaft seals
VL	Reinforced output bearings
VL2	Agitator version - Reinforced bearings
VL3	Agitator version - Reinforced bearings - Drywell
VS	Reinforced shrink disc
W	Free drive shaft
X	Housing foot mounting
Z	B14 flange

Table 3: Versions and options

2.2 Name plate

The name plate must be firmly attached to the gear unit and must not be subjected to permanent soiling. Please contact the NORD service department if the name plate is illegible or damaged.

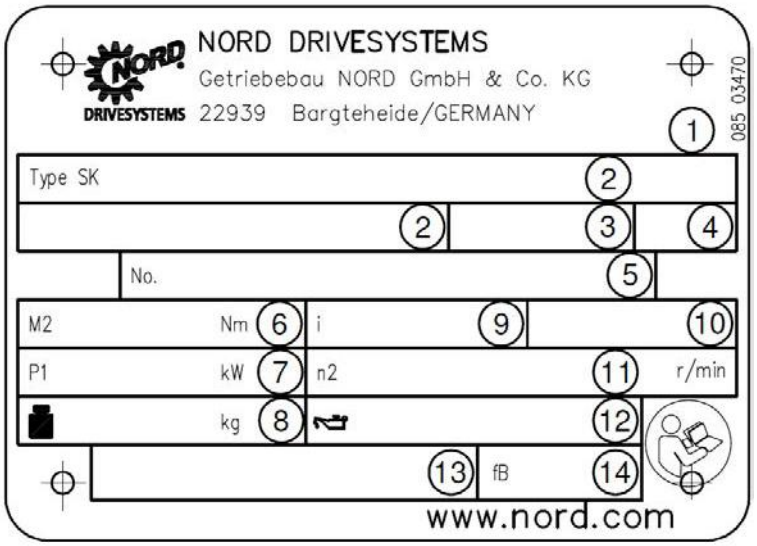


Figure 1: Name plate

Explanation

1	DataMatrix code	8	Weight
2	NORD gear unit type	9	Overall gear unit ratio
3	Operating mode	10	Installation position
4	Year of manufacture	11	Rated speed of gear unit output shaft
5	Serial number	12	Lubricant type, viscosity and quantity
6	Rated torque of gear unit output shaft	13	Customer part number
7	Drive power	14	Operating factor

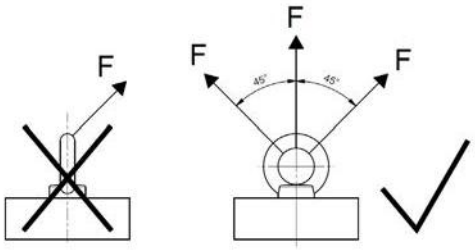
3 Transport, storage, assembly

3.1 Transporting the gear unit

⚠ WARNING

Hazard due to falling loads

- The thread of the eyebolt must be fully screwed in.
- As shown in the illustration to the right, only lift on the eyebolts vertically to the female thread and not more oblique than 45° to the vertical.
- Note the centre of gravity of the gear unit.



Only use the eyebolts attached to the gear unit for transport. If geared motors have an additional eyebolt attached to the motor, this must also be used.

Transport the gear unit with care. Impacts to the free ends of shafts may cause internal damage to the gear unit.

No additional loads must be attached to the gear unit.

Use suitable aids such as cross-beams or similar to facilitate the attachment or transportation of the gear unit. Gear units without eyebolts may only be transported with shackles and lifting straps or chains at an angle of 90° to 70° to the horizontal.

3.2 Storage and downtimes

3.2.1 General measures

- Store the gear unit in a dry space, relative humidity less than 60%.
- Store the gear unit at a temperature in the range of – 5 °C to + 50 °C without severe temperature fluctuations.
- Do not expose the gear unit to direct sunlight or UV light.
- There must be no aggressive or corrosive substances (contaminated air, ozone, gases, solvents, acids, alkalis, salts, radioactivity etc.) in the immediate vicinity.
- The gear unit must not be exposed to vibration or oscillation.
- Store the gear unit in the mounting position (see chapter 7.1 "Versions and mounting position"). Secure it against falling.

3.2.2 Storage and downtimes in excess of 3 months

Note the following measures in addition to Section 3.2.1 "General measures".

- Repair damages to the coating. Check if a corrosion protection agent has been applied to the flange bearing surfaces, the shaft ends and the unpainted surfaces. If required, apply a suitable corrosion protection agent to the surfaces.
- Seal all openings on the gear unit.
- The output shaft must be rotated by at least one revolution every 3 months so that the contact position of the gear teeth and the roller bearings are changed.

3.2.3 Storage and downtimes of more than 9 months

Under certain conditions, storage of 2 to 3 years is possible. The specified storage duration is only approximate. The actual storage duration depends on the local conditions. Note the following measures in addition to Sections 3.2.1 "General measures"and 3.2.2 "Storage and downtimes in excess of 3 months".

Gear units can be supplied prepared for long-term storage. The gear units are completely filled with lubricant, or a VCI corrosion protection agent is added to the gear oil. The adhesive label on the housing shows the respective information.

Conditions of the gear unit and storage area for long-term storage prior to commissioning:

- Store the gear unit at a temperature in the range of -5 °C to +40 °C without severe temperature fluctuations.
- Check if the sealing cord in the vent screw is in place. It must not be removed during storage.
- Store the gear unit in a dry space. With a relative humidity less than 60%, the gear unit can be stored for up to 2 years; with a relative humidity less than 50%, storage of up to 3 years is possible.
- In tropical regions, protect the gear unit against damage by insects.
- Gear unit components such as motors, brakes, couplings, belt drive, and cooling units must be protected for a long-term storage in accordance to their operating instructions.

In addition to the preparations listed in 4 "Commissioning", the following measures are necessary before commissioning:

- Check the gear unit for external damage.
- After storage of more than 2 years, or with storage temperatures outside the permissible range from -5 °C to +40 °C, change the lubricant and the radial shaft seals in the gear unit before commissioning.
- If the gear unit is completely filled, the oil level must be reduced according to the mounting position. For the lubricant quantity and lubricant type, refer to the information on the name plate.
- For the option with manual re-lubrication, change the bearing grease after a storage period of more than two years. The service life of the grease is reduced after a storage time or gear unit shutdown of more than 9 months (see chapter 5.2.6 "Re-greasing (Option: VL2, VL3, W, AI, AN)").

3.3 Preparing for installation

3.3.1 Check for damages

Please examine the delivery for transport and packaging damage immediately on receipt. Pay particular attention to radial shaft seals and sealing caps. Report any damage to the carrier immediately.

Do not put the drive into operation if damage such as leaks are visible.

3.3.2 Remove corrosion protection agents

All bare metal surfaces and shafts of the drive are protected with corrosion protection agents before shipping.

Thoroughly remove corrosion protection agents and any dirt (e.g. colour residues) from all shafts, flange surfaces and gear unit attachment surfaces before assembly.

3.3.3 Check rotational direction

If an incorrect rotational direction may result in damage or potential risk, check for the correct rotational direction of the output shaft during a test run before attaching it to the machine. Ensure the correct rotational direction during operation.

For gear units with an integrated back stop, switching the drive motor to the blocked direction of rotation, may result in damage to the gear unit. Gears with integrated back stops are marked with arrows on the drive/driven sides. The arrows point in the rotation direction of the gear unit. When connecting the motor and during motor control, ensure, e.g. by testing the field of rotation, that the gear unit can only operate in the direction of rotation.

3.3.4 Check ambient conditions

Make sure that no aggressive or corrosive substances which attack metal, lubricants or elastomers are present at the installation site or are subsequently expected during operation. If such substances are to be expected, contact Getriebebau NORD.

The gear unit, especially its radial shaft seals should be protected from exposure to direct sunlight.

The standard permissible ambient temperature range for synthetic gear unit oils (CLP PG … and CLP HC…) is –20 °C to +40 °C. This temperature range can be extended according to the lubricant table (see chapter 7.2.2 "Gear oils"), if all mounted materials of the gear unit and the application-related speed, torques and modes of operation allow this. Note the project planning documents of the order for this. In case of doubt, ask Getriebebau NORD.

For mineral oil (CLP), the permissible ambient temperature range in accordance to the above stated lubricant table is restricted. The lubricant type is indicated on the name plate (see chapter 2.2 "Name plate ").

For installation altitudes above 1000 m above sea level, the permissible speed and torques may be reduced. Note the project planning documents of the order for this. In case of doubt, ask Getriebebau NORD.

3.3.5 Drives with nsd tupH surface treatment

Drives with **nsd tupH** surface treatment must be electrically decoupled from other components by the use of non-conductive intermediate layers in order to prevent galvanic corrosion.

3.3.6 Installing the oil expansion chamber (Option: OA)

Mount the oil expansion chamber (Option OA) according to Chapter 3.14 "Installation of an oil expansion chamber (Option: OA)".

3.3.7 Installing the oil reservoir tank (Option: OT)

Mount the oil reservoir tank (Option OT) according to document WN 0-521 30.

A pressure vent is optionally available. If available, screw the M12x1.5 pressure relief vent into the oil reservoir tank.

3.4 Installing the gear unit

NOTICE!

Gear unit damage through overheating

- For geared motors, check that the cooling air from the motor fan can circulate around the gear unit without obstruction.

NOTICE

Damage of bearing and gear wheel

- Do not carry out any welding work on the gear unit.
- Do not use the gear unit as earth connection for welding work.

The following conditions must be met at the installation site in order to prevent overheating during operation:

- There must be adequate space around the gear unit.
- Air must be able to flow freely past all sides of the gear unit.
- For geared motors, the cooling air from the motor fan must be able to circulate around the gear unit without obstruction.
- The gear unit must not be enclosed or encased.
- The gear unit must not be exposed to high energy radiation.
- Do not direct warm exhaust air from other units onto the gear unit.
- The base or flange to which the gear unit is attached must not input any heat into the gear unit during operation.
- Do not allow dust to accumulate in the area of the gear unit

Install the gear unit in the correct mounting position (see chapter 7.1 "Versions and mounting position")**. Oil checking and oil drain screws must be accessible.**

The base or flange to which the gear unit is fitted should be vibration-free, torsionally rigid and flat. The flatness of the bolting surface on the base or flange must comply with DIN ISO 2768-2 tolerance class K.

Precisely align the gear unit with the drive shaft of the machine in order to prevent additional forces from being imposed on the gear unit due to distortion.

Fasten the gear unit to all gear unit feet of one side or to all flange holes. Use bolts with a minimum quality of 8.8. Tighten the bolts with correct torques (see chapter 7.3 "Screw tightening torques").

For foot and flange-mounted gear units (Option XZ or XF), ensure tension-free bolting. The foot mounting is used to fasten the gear unit. It is designed to absorb the reaction forces from the torque, radial and axial forces as well as the weight. B5 or B14 flanges are basically not designed to absorb the reaction forces. In case of doubt, contact Getriebebau NORD for investigation of the particular case.

Earth the gear unit housing. For geared motors, ensure the earthing via the motor connection.

3.5 Installation of a hub on solid shaft (option: V, L)

NOTICE

The gear unit may be damaged by axial forces.

Bearings, gearwheels, shafts and housings may be damaged by incorrect fitting.

- Use a suitable pulling device.
- Do not hit the hub with a hammer.

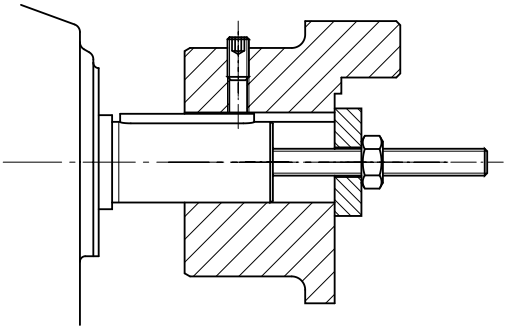


Figure 2: Example of a simple pulling device

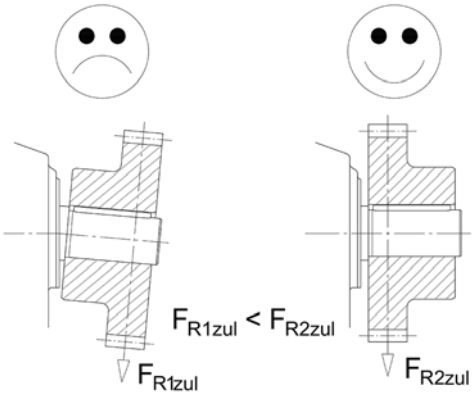
During fitting, ensure that the shaft axes are precisely aligned with each other. Comply with the permissible tolerance details provided by the manufacturer.

Information

Use the end thread of the shafts for pulling. Fitting can be facilitated by coating the hub with lubricant or heating it up to approx. 100 °C beforehand.

The maximum radial forces FR1 and FR2 and axial forces FA2 which are imposed on the driving and driven elements of the gear unit must not be exceeded (refer to the name plate). Pay particular attention to the correct tension of belts and chains.

Additional loads due to unbalanced hubs are not permitted.



The transverse force must be applied as closely as possible to the gear unit. For drive shafts with free shaft ends (Option W), the maximum permissible transverse force F_{R1} applies for the application of the transverse force to the centre of the free shaft journal. For output shafts, the application of the transverse force F_{R2} must not exceed the dimension x_{R2}. If the radial force F_{R2} is stated on the name plate, but no dimension x_{R2} is stated, application of force is assumed to be to the centre of the shaft journal.

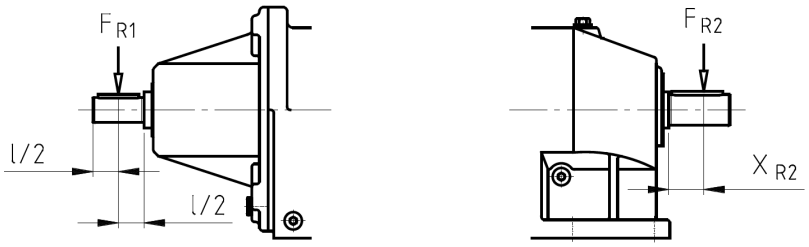


Figure 3: Permissible application of force to drive and driven shafts

3.6 Fitting push-on gear units with fastening element (option: B)

⚠ WARNING

Risk of severe injuries

If the screw fastenings of the torque arm are removed during operation, the gear unit will rotate around the output shaft.

- Secure the screw fastening against loosening, e.g. with Loctite 242 or a second nut.

NOTICE

The gear unit may be damaged by axial forces.

Bearings, gearwheels, shafts and housings may be damaged by incorrect fitting.

- Use a suitable pulling device.
- Do not strike the gear unit with a hammer.

Assembly and subsequent dismantling is facilitated by applying an anti-corrosive lubricant to the shaft before fitting (e.g. NORD Anti-Corrosion Part No. 089 00099). Excess lubricant may escape after fitting and may drip off. This escape of grease is not due to a leak in the gear unit. Thoroughly clean these points on the output shaft after a running-in time of approx. 24 hours.

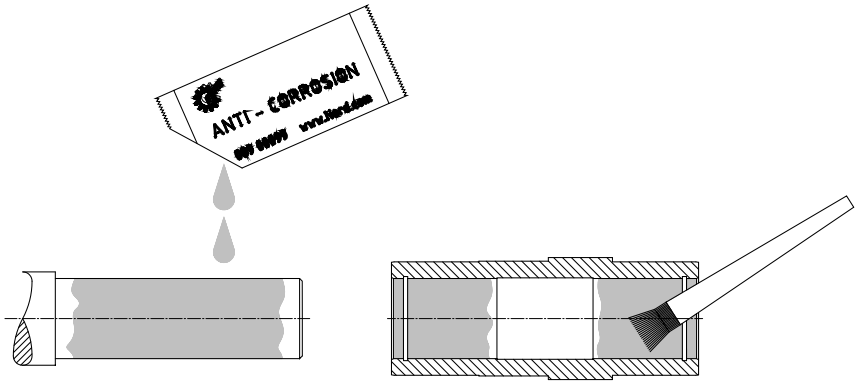


Figure 4: Applying lubricant to the shaft and the hub

For push-on gear units with cover cap IP66 (Option H66) and fastening element (Option B) the pressed-in closing cap must be pushed out before installing the gear unit. The pressed-in closing cap may be destroyed during dismantling. A 2nd closing cap is supplied as a spare part. Fit the closing cap after installation of the gear unit as described in Section 3.9 "Fitting the covers (option: H, H66)".



Figure 5: Removing the factory-fitted closing cap

The gear unit can be fitted to solid shafts with and without a shoulder using the fixing element (Option B). Tighten the fastening element bolt with correct torque (see chapter 7.3 "Screw tightening torques").

When fastening without a contact shoulder, a circlip is used in the hollow shaft for axial fastening.

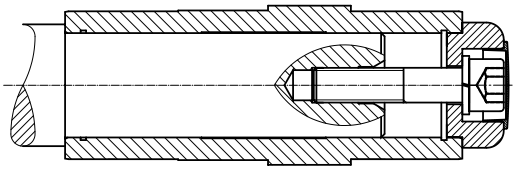


Figure 6: Gear unit mounted on shaft with a shoulder using the fastening element

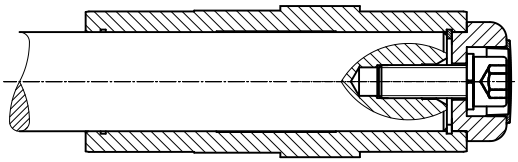


Figure 7: Gear unit mounted on shaft without a shoulder using the fastening element

A gear unit can be removed from a shaft with a shoulder e.g. using the following device.

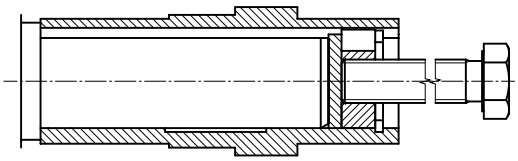


Figure 8: Removal using dismantling device

Do not distort the support when installing push-on gear units with a torque support. Tension-free mounting is aided by the rubber buffer (Option G or VG).

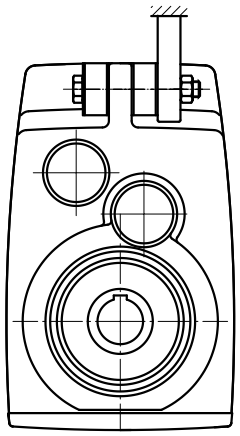
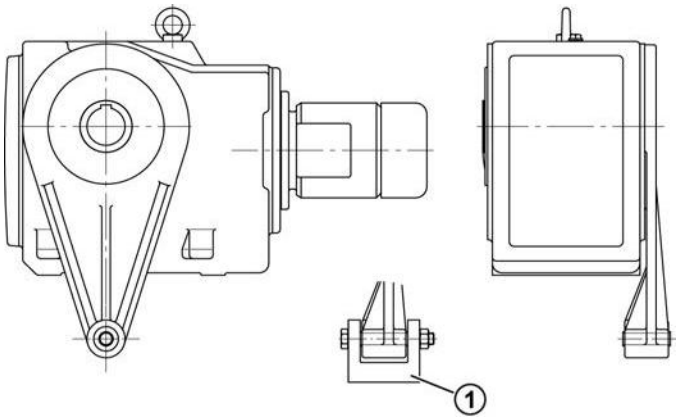


Figure 9: Mounting the rubber buffer (Option G and/or VG) on parallel shaft gear units

To fit the rubber buffer, tighten the screw fastening until there is no play between the contact surfaces when there is no load. For screw fastenings with standard thread, then rotate the fastening nut half a turn in order to pre-tension the rubber buffer. Greater pre-tension is not permissible.



Explanation	
1	Always support torque support on both sides

Figure 10: Attaching the torque support on bevel gear and worm gear units

Tighten the fastenings of the torque support with the correct torque (see chapter 7.3 "Screw tightening torques")and secure them against loosening, e.g. with Loctite 242 or Loxeal 54-03.

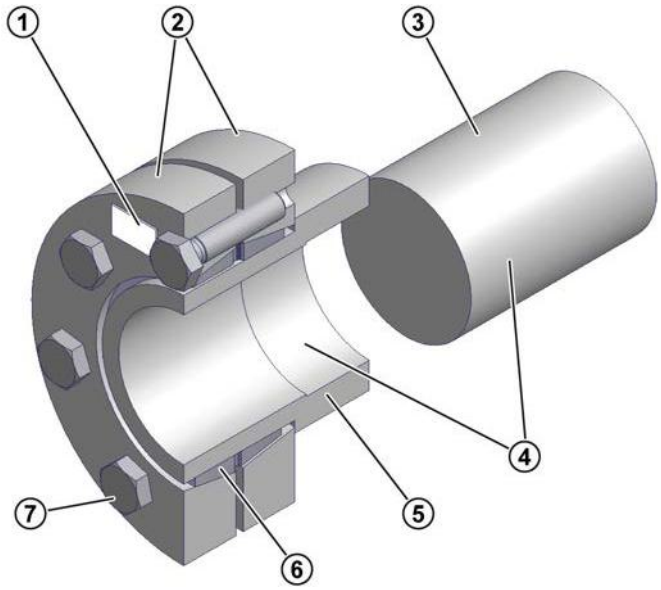
3.7 Fitting a hollow shaft with shrink disc (Option: S)

NOTICE

Risk of damage to the gear unit if the shrink disk is installed incorrectly

- Do not tighten the tensioning bolts if the solid shaft is not installed. This would permanently deform the hollow shaft.

Hollow shafts with shrink discs must be protected from dust, dirt and moisture. NORD recommends option H/H66 (see chapter 3.9 "Fitting the covers (option: H, H66)").



	Explanation
1	Shrink disc, type, part no. and torque details for tensioning bolts
2	Tensioning flanges
3	Solid shaft of machine
4	Shaft and hollow shaft bore **FREE OF GREASE**
5	Hollow shaft of gear unit
6	Double half-slotted inner ring
7	Tensioning bolts DIN 931 (933) -10.9

Figure 11: Hollow shaft with shrink disc

The shrink disc is supplied ready for fitting. It must not be dismantled prior to fitting.

The solid shaft material must have a minimum yield strength of 360 N/mm^2. This ensures that no permanent deformation occurs due to the clamping force.

If necessary, also observe the documentation from the manufacturer of the shrink disc.

Prerequisites

- The hollow shaft must be completely free of grease.
- The solid shaft of the machine must be completely free of grease.
- The external diameter of the solid shaft must be within the tolerance h6 or k6 for highly irregular operation, unless otherwise specified in the order-related dimension sheet. The fit must be according to DIN EN ISO 286-2.

Fitting procedure

1. Remove the cover, if any.
2. Loosen the tensioning bolts of the shrink disc, but do not unscrew them completely. Tighten the tensioning bolts gently by hand until there is no play between the flanges and the inner ring.
3. Lightly grease the bore of the inner ring. Push the shrink disc onto the hollow shaft until the outer clamping flange is flush with the hollow shaft.
4. Grease the solid shaft of the machine in the area which will later come into contact with the bushing in the hollow shaft. Do not grease the bronze bushing. It is essential that the tensioning seat of the hollow shaft is free of grease.
5. Insert the solid shaft of the machine into the hollow shaft so that the area around the shrink connection is completely filled.
6. Tighten the tensioning bolts of the shrink disc with approx. ¼ rotation of the bolt per turn **in sequence** in a clockwise direction by several turns.

   Use a torque wrench to tighten the tensioning bolts to the tightening torque specified on the shrink disc.
7. Check if there is an even gap between the clamping flanges. If this is not the case, the shrink disc connection must be dismantled and checked for correct fit.
8. Mark the hollow shaft of the gear unit and the solid shaft of the machine with a label in order to detect any slippage under load.

Standard disassembly procedure:

⚠ WARNING

Danger of injury due to sudden mechanical release

The elements of the shrink disc are under great mechanical tension. Sudden release of the outer rings produces high separating forces and can result in uncontrolled detachment of shrink disc components.

- Do not remove any tensioning bolts if you have not ensured that the external outer rings of the shrink disc have been released from the inner ring.

1. Loosen the tensioning bolts of the shrink disc with approx. ¼ rotation of the bolt per turn **in sequence** in a clockwise direction by several turns. Do not remove the tensioning bolts from their thread.
2. Loosen the clamping flanges from the cone of the inner ring.
3. Remove the gear unit from the solid shaft of the machine.

If a shrink disc has been in use for a long period or is dirty, dismantle it and clean it before refitting. Check the shrink disc for damage or corrosion. Replace the damaged elements if they are not in perfect condition.

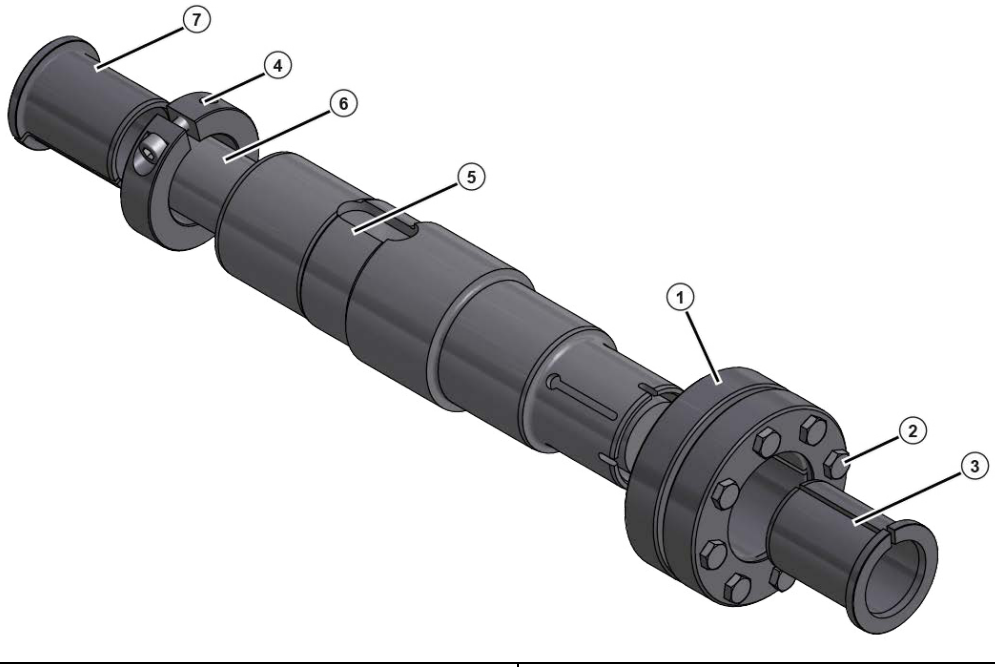
Coat the conical surfaces with MOLYKOTE® G-Rapid Plus or a similar lubricant. Place some multi-purpose grease on the screw thread and the contact surfaces of the screw heads.

3.8 Fitting a hollow shaft with GRIPMAXX™ (Option: M)

NOTICE

Damage to the gear unit due to incorrect installation

- Do not tighten the tensioning bolts of the shrink disc until the solid shaft and the torque bush are in the correct position.



1	Shrink disc	5	Hollow shaft (gear unit)
2	Tensioning bolts	6	Solid shaft (machine)
3	Torque bush	7	Support bush
4	Clamping ring		

Figure 12: GRIPMAXX™, exploded diagram

Take all expected peak loads into account when dimensioning the solid shaft or the machine shaft.

The solid shaft material must have a minimum yield strength of 360N/mm^2. This ensures that no permanent deformation occurs due to the clamping force.

Do not use any lubricants, corrosion protection agents, assembly paste or other coatings on the mating surfaces of the shaft, the bushes, the clamping rings or the shrink disc.

Prerequisites

- The solid shaft [6] must be free from burrs, corrosion, lubricants or other foreign bodies.
- The hollow shaft [5], the bushes [3], [7], the clamping ring [4] and the shrink disc [1] must be free from dirt, grease or oil.
- The solid shaft diameter must be within the following tolerances:

Metric machine shafts		
From	To	ISO 286-2 Tolerance h11(-)
Ø [mm]	Ø [mm]	[mm]
10	18	-0.11
18	30	-0.13
30	50	-0.16
50	80	-0.19
80	120	-0.22
120	180	-0.25

Imperial machine shafts		
From	To	ISO 286-2 Tolerance h11(-)
Ø [in]	Ø [in]	[in]
0.4375	0.6875	-0.004
0.7500	1.0625	-0.005
1.1250	1.9375	-0.006
2.0000	3.1250	-0.007
3.1875	4.6875	-0.008
4.7500	7.0625	-0.009

Table 4: Permissible machine shaft tolerances

Fitting procedure

1. Determine the correct installation position of the shrink disc [1] on the gear unit. Ensure that the position of the hollow shaft [5] corresponds to the details in the order.
2. Slide the support bush [7] and the clamping ring [4] onto the solid shaft [6]. Ensure that the support bush is correctly positioned. Secure the support bush [7] with the clamping ring [4] by tightening the clamping ring bolt with the appropriate torque (see chapter 7.3 "Screw tightening torques").
3. Push the gear unit onto the secured support bush [7], up to the stop against the clamping ring.
4. Slightly loosen the tensioning bolts [2] and push the shrink disc [1] onto the solid shaft.
5. Push the torque bush [3] onto the solid shaft.
6. Tighten the 3 or 4 tensioning bolts [2] until finger-tight and ensure that the outer rings of the shrink disc are pulled together parallel. Then tighten the remaining bolts.
7. Tighten the tensioning bolts successively in a clockwise direction by several turns – **not crosswise** – with approx. ¼ rotation of the bolt per turn. Use a torque wrench to achieve the tightening torque specified on the shrink disc.

   After tightening the tensioning bolts, there must be an even gap between the clamping flanges. If this is not the case, dismantle the shrink disc connection and check the fit.

Dismantling procedure

⚠ WARNING

Danger of injury due to sudden mechanical release

The elements of the shrink disc are under great mechanical tension. Sudden release of the outer rings produces high separating forces and can result in uncontrolled detachment of shrink disc components.

- Do not remove any tensioning bolts if you have not ensured that the external outer rings of the shrink disc have been released from the inner ring.

1. Unscrew the tensioning bolts [2] of the shrink disc in sequence, with approximately half a turn (180°), until the inner ring of the shrink disc can be moved.
2. Pull the shrink disc [1] with the torque bush [3] off from the shaft.
3. Remove the outer rings of the shrink disc from the conical inner ring. For this it may be necessary to lightly tap the bolts with a soft-face hammer or to lightly lever the outer rings apart.
4. Pull the gear unit off the machine shaft.

Clean all individual components before refitting. Check the bushes and the shrink disc for damage or corrosion. Replace the bushes and the shrink disc if they are not in perfect condition. Coat the conical seat of the outer rings and the outside of the clamping ring with MOLYKOTE® G-Rapid Plus or a similar product. Place some multi-purpose grease on the screw thread and the contact surfaces of the screw heads.

3.9 Fitting the covers (option: H, H66)

Use all fastening screws. Secure the fastening screws by coating them with securing lubricant, e.g. Loctite 242, Loxeal 54-03. Tighten the fastening screws with the correct torque (see chapter 7.3 "Screw tightening torques").

For covers with Option H66, press in the new condition closing cap by tapping it lightly with a hammer.

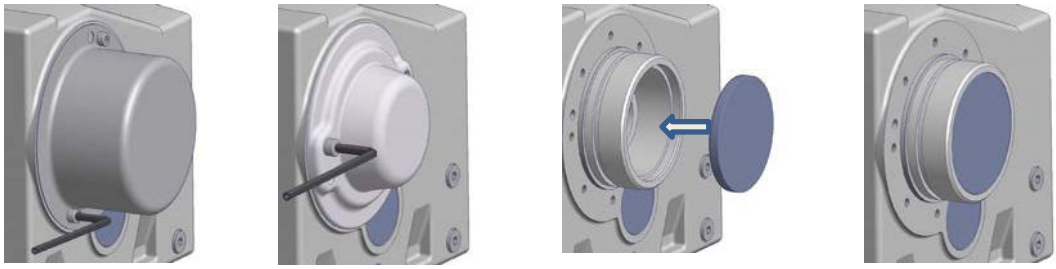


Figure 13: Fitting the covers, Option SH, Option H, and Option H66

3.10 Fitting the covers

Some versions of universal worm gear units are delivered as standard with a plastic cover cap. The cover cap protects the radial shaft seals against the entry of dust and other contamination. The cover cap can attached on the A side or the B side. It can be removed by hand without tools.

NOTICE

Damage to the expansion elements of the cover cap

- Do not jam the cover cap when pulling it off or attaching it.

Pull the cover cap off vertically prior to the installation of the universal worm gear unit. After completing the fitting, attach the cover cap onto the right side by attaching the expanding elements into the threaded holes on the output flange.



Figure 14: Disassembly and assembly of the cover cap

3.11 Fitting a standard motor (Option: IEC, NEMA, AI, AN)

Depending on the gear unit type, exceptions are permissible with the maximum motor weights. These are indicated in the tables below and must not be exceeded.

Maximum permitted motor weights														
Motor size	63	71	80	90	100	112	132	160	180	200	225	250	280	315
Max. motor weight [kg]	**25**	**30**	**50**	**50**	**80**	**80**	**100**	**250**	**250**	**350**	**500**	**1000**	**1000**	**1500**
SK 32, SK 3282, SK 9032.1, SK 32100, SK 772.1, SK 773.1					100	100								
SK 42, SK 4282, SK 9042.1, SK 42125					100	100	130	200						
SK 52, SK 63, SK 5282, SK 6382, SK 9052.1, SK 872.1, SK 873.1, SK 972.1, SK 973.1					100	100	130							
SK 62, SK 73, SK 83, SK 6282, SK 7382, SK 8382, SK 9072.1					100	100	130							
SK 72, SK 82, SK 93, SK 103, SK 7282, SK 8282, SK 9382, SK 10382.1, SK 9082.1, SK 9086.1, SK 9092.1, SK 9096.1							130							
SK 920072.1, SK 92072.1, SK 0, SK 071.1, SK 0182.1, SK 930072.1, SK 93072.1, SK 93372.1			40											
SK 1382NB, SK 1382.1, SK 92372, SK 92372.1, SK 12063, SK 372.1, SK 371.1, SK 1382.1 GJL					60									
SK 971.1										250 [1]				
SK 1091.1											350 [2]			

1 In mounting positions M2, M4, M6: 350 kg, otherwise, as indicated.

2 In mounting positions M1, M2, M4, M5, M6: 500 kg, otherwise, as indicated.

Table 5: Motor weights IEC motors

Maximum permitted motor weights														
Motor size		56C		140TC		180TC	210TC	250TC	280TC	320TC	360TC	400TC		
Max. motor weight [kg]		**30**		**50**		**80**	**100**	**200**	**250**	**350**	**700**	**700**		
SK 62, SK 72, SK 73, SK 83, SK 93, SK 9072.1, SK 6282, SK 7282, SK 7382, SK 8382, SK 9382											500	500		

Table 6: Motor weights NEMA motors

Fitting a standard motor to the IEC adapter (Option IEC) or NEMA adapter (Option NEMA)

1. Clean the motor shaft and the flange surfaces of the motor and motor adapter, and check them for damage. Check the motor dimensions. The dimensions must be within the tolerances according to DIN EN 50347 or NEMA MG1 Part 4.
2. For motor sizes 90, 160, 180 and 225, position the spacer bushes that may be provided onto the motor shaft.
3. Position the half-coupling onto the motor shaft so that the motor parallel key engages into the groove of the half-coupling. Tighten the half-coupling in accordance with the motor manufacturer's instructions. With standard helical gear units, observe dimension B between the half-coupling and the collar (see "Figure 15"). Adjust the coupling in accordance with the specifications indicated on the adhesive plate for certain **NEMA adapters** .
4. If the half-coupling contains a setscrew, secure the coupling axially on the shaft. Coat the setscrew with securing adhesive before screwing it in, e.g. Loctite 242 or Loxeal 54-03, and tighten it with the correct torque (see chapter 7.3 "Screw tightening torques").
5. Sealing of the flange surfaces is recommended if the motor is installed outside or in a humid environment. Completely coat the flange surfaces with surface sealant, e.g. Loctite 574 or Loxeal 58-14.
6. Attach the motor to the adapter. Also attach the enclosed ring gear or the enclosed gear sleeve (see figure below).
7. Tighten the adapter bolts with the correct torque (see chapter 7.3 "Screw tightening torques").

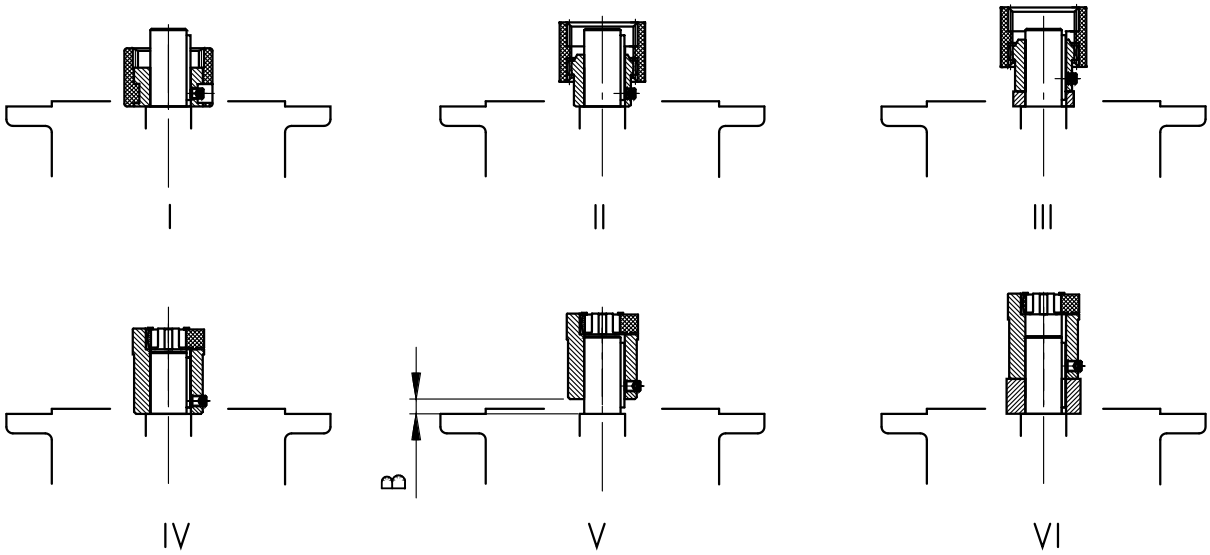


Figure 15: Fitting the coupling onto the motor shaft - various types of coupling

I Curved tooth coupling (BoWex®), one-piece

II Curved tooth coupling (BoWex®), two-piece

III Curved tooth coupling (BoWex®), two-part with spacer bush

IV Claw coupling (ROTEX®), two-piece

V Claw coupling (ROTEX®), two-piece, observe dimension B:

Standard helical gear units: SK 0, SK 01, SK 20, SK 25, SK 30, SK 33 (2-stage) SK 010, SK 200, SK 250, SK 300, SK 330 (3-stage)		
	IEC size 63	IEC size 71
Dimension B (Fig. V)	B = 4.5 mm	B = 11.5 mm

VI Claw coupling (ROTEX®), two-piece with spacer bush

Fitting a standard motor to the IEC adapters AI160–AI315 (Option AI) or NEMA adapters AN250TC–AN400TC (Option AN)

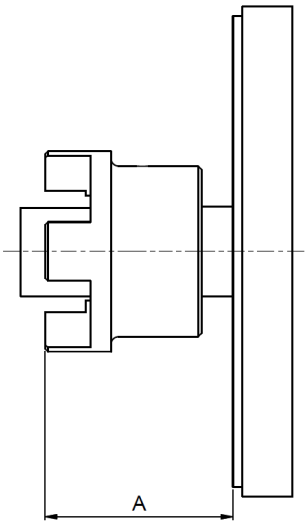
1. Clean the motor shaft and the flange surfaces of the motor and motor adapter, and check them for damage. Check the motor dimensions. The dimensions must be within the tolerances according to DIN EN 50347 or NEMA MG1 Part 4.
2. Remove the motor shaft's key.

   Note: For adapter AI315, the key does not have to be dismantled. Continue with Step 5. of this description.
3. With the adapters AI160, AI180 and AI225, attach the spacer bush supplied with the product.
4. Attach the key supplied with the product (see "Table7: Motor parallel keys").
5. For the attachment of the half-coupling, heat up the half-coupling to approx. 100 °C. Position the half-coupling as follows:
   - Push AI160, AI180 and AI225 on to the spacer bush.
   - Push AI200, AI250, AI280 and AI315 on to the motor shaft collar.
   - AN250TC–AN400TC until dimension A has been attained (see "Table 8: Position of the half-coupling on the NEMA motor shaft")

6. If the half-coupling contains a setscrew, secure the coupling axially on the shaft. Coat the setscrew with securing adhesive before screwing it in, e.g. Loctite 242 or Loxeal 54-03, and tighten it with the correct torque (see chapter 7.3 "Screw tightening torques").
7. Sealing of the flange surfaces is recommended if the motor is installed outside or in a humid environment. Completely coat the flange surfaces with surface sealant, e.g. Loctite 574 or Loxeal 58-14.
8. Attach the motor to the adapter. Also attach the enclosed ring gear or the enclosed gear sleeve (see **Figure 15: Fitting the coupling onto** the motor shaft - various types of coupling). For the AN360TC and AN400TC adapters, attach the adapter flange to the motor first, and screw the motor onto the adapter.
9. Tighten the adapter bolts with the correct torque (see chapter 7.3 "Screw tightening torques").

IEC/NEMA type	Coupling	Shaft ø	Motor shaft's key
AI 160	R42	42	AB12x8x45
AI 180	R48	48	AB14x9x45
AN 250	R42	41.275	B3/8x3/8x1 1/2
AN 280	R48	47.625	B1/2x1/2x1 1/2
AI 200	R55	55	B16x10x50x
AN 320	R55	53.976	B1/2x1/2x1 1/2
AI 225	R65	60	B18x11x70
AN 360 R350	R65	60.325	B5/8x5/8x2 1/4
AI 250	R75	65	B18x11x70
AI 280	R75	75	B20x12x70
AN 360 R450	R75	60.325	B5/8x5/8x3 1/8
AN 400	R75	73.025	B3/4x3/4x3 1/4

Table7: Motor parallel keys



NEMA type	Coupling size	A [mm]
N250TC R350	R42	83
N250TC 300S	R42	86
N280TC R350	R48	87.5
N280TC 300S	R48	102.5
N320TC	R55	91
N360TC/350	R65	126.5
N360TC/450	R75	150.5
N400TC	R75	164.5

Table 8: Position of the half-coupling on the NEMA motor shaft

3.12 Mounting of the cooling coil onto the cooling system

WARNING

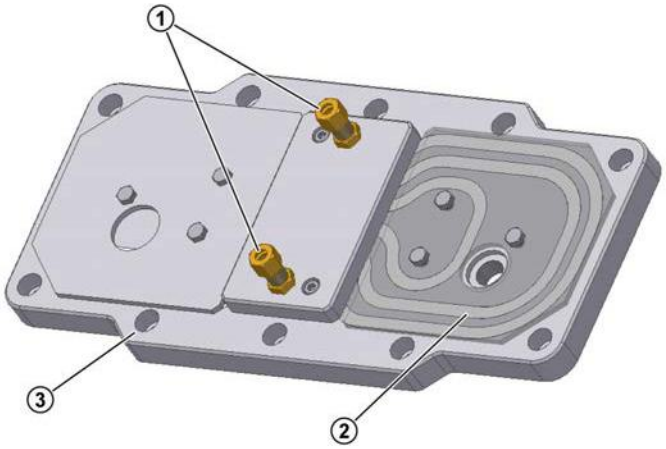
Risk of injury due to pressure discharge

- Ensure that the pressure is released from the cooling circuit before carrying out any work on the gear unit.

NOTICE

Damage to the cooling coil

- Do not twist the connection pieces during installation.
- Ensure load-free assembly of the connection pipes or hoses.
- Even after the installation, no external forces must be able to act on the cooling coil via the connection pieces.
- Prevent vibrations from reaching the cooling coil during operation.



Explanation

1 Connection pieces with cutting ring screw connections
2 Cooling coil
3 Housing cover

Figure 16: Cooling cover

The cooling coil is installed in the housing cover. For the inlet and outlet of cooling fluid, connection pieces with cutting ring screw connections according to DIN 2553 are provided on the housing cover for a connection of a pipe with an external diameter of 10 mm.

Remove the sealing plug from the screw necks prior to assembly and flush the cooling coil to prevent any contamination of the cooling system. Then, connect the connection pieces with the coolant circuit. The flow direction of the coolant is irrelevant.

3.13 Installation of the external oil/air cooler

Information

Installation information

To ensure optimal air supply, the distance between the cooling unit and the wall should be at least 600 mm.

3.13.1 Connecting hose lines

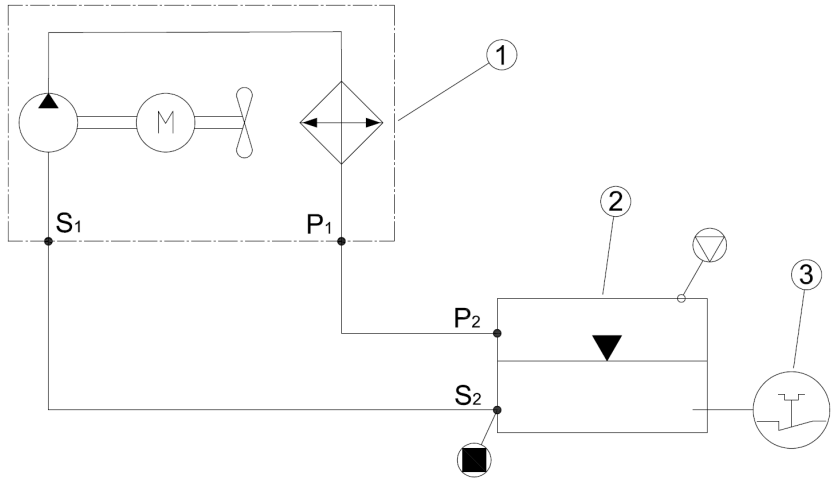
NOTICE

Gear unit is supplied without oil filling

- Fill the gear unit with oil before commissioning.

The scope of delivery includes the oil/air cooler and the necessary hose lines.

Connect the oil/air cooler according to the illustration. Make sure that the oil/air cooler has not been mounted above the gear unit.



1	Oil/air cooler
2	Gear unit
3	Optional temperature monitoring
S	Intake connection/oil drain of the gear unit
P	Gear unit pressure connection/connection above or below the oil level

Figure 17: Connection of the oil/air cooler

Fasten the union nuts according to 7.3 "Screw tightening torques".

After assembling the oil lines, fill the gear unit housing with the gear oil type that is printed on the name plate. The oil quantity on the name plate is a guide value and may vary depending on the gear ratio. Approximately 4.5 l of oil are additionally required for the hose lines. When filling, use the oil level screw as an indicator for the correct oil level.

3.13.2 Electrical connection

Ensure the electrical connection according to the operating and installation instructions of the oil/air cooler. Make sure that the direction of rotation of the motor or the fan wheel matches the information provided by the manufacturer of the cooling unit.

3.14 Installation of an oil expansion chamber (Option: OA)

3.14.1 Installation of the sizes I, II and III

The oil expansion chamber is available in 3 sizes with different capacities:

- 0.7 l (size I)
- 2.7 l (size II)
- 5.4 l (size III)

The oil expansion chamber must be mounted vertically with the hose connection facing downwards and the vent screw facing upwards. Taking the hose length into account, the container should be fitted as high as possible. For suggestions for the position of the oil expansion chamber, see the following illustration.

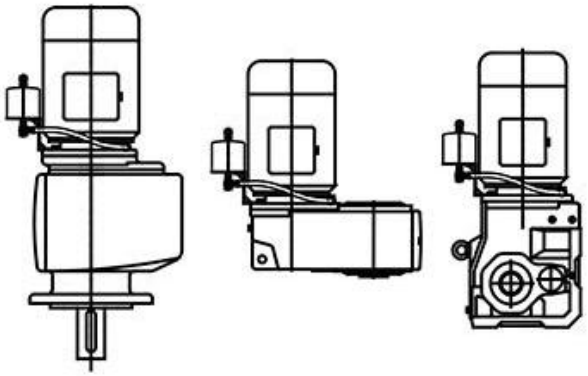


Figure 18: Position of the oil expansion chamber

1. After installing the gear unit, remove the top screw plug.
2. Screw in the reduction or extension with the existing sealing ring.

   For gear units having an oil maintenance bore with an M10x1 thread, also consider document WN 0-521 35.

3. If the fastening screw is screwed into a through hole, seal the thread with a medium-strength screw-securing material such as LOXEAL 54-03 or Loctite 242.
4. Screw on the expansion tank. If the necessary screw insertion depth of 1.5 × d can no longer be achieved, use a 5 mm longer screw. If a longer screw cannot be fitted, use a stud and a nut with appropriate dimensions.
5. Attach the vent hose with the enclosed hollow screws and seals.
6. Screw the enclosed M12 x 1.5 vent plug and sealing ring into the tank.

3.14.2 Installation of sizes 0A and 0B

The oil expansion chamber must be mounted vertically with the connection pipe facing downwards and the vent screw facing upwards. Install the container as high as possible. Suggestions for the position of the oil expansion chamber see Figure 18. Note that with the M4 configuration with terminal box position in position 2, the installation of the oil expansion chamber is not possible.

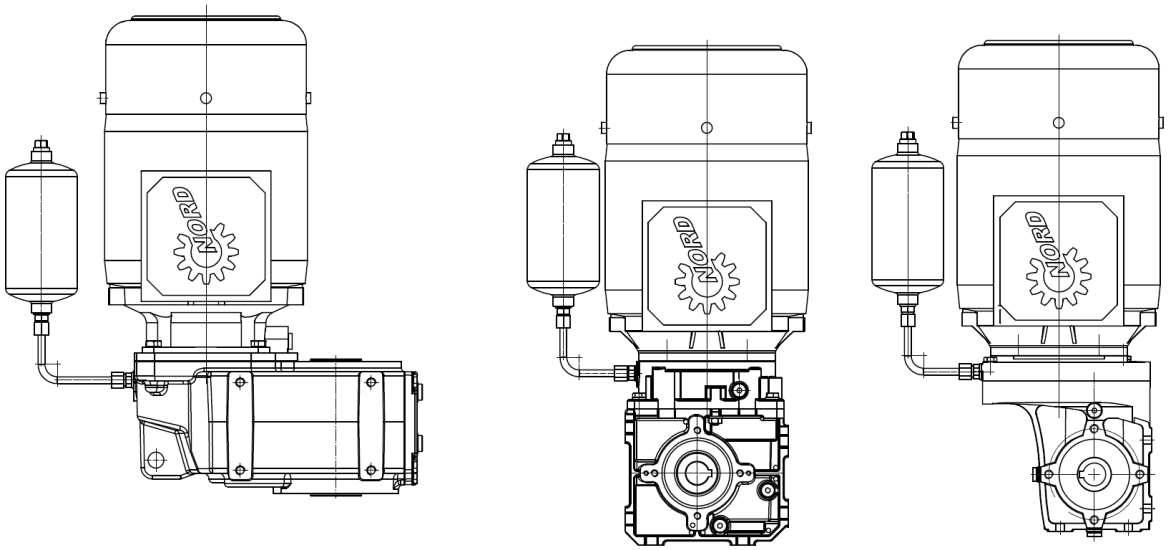


Figure 19: Position of the oil expansion chamber

1. After installing the gear unit, remove the oil level screw or the top screw plug.
2. Install the oil expansion chamber according to Figure 18. Align it parallel to the motor shaft.
3. Maintain the maximum tightening torque of 12 Nm for screwing the oil expansion chamber onto the gear unit housing.

3.15 Subsequent painting

For retrospective painting of the gear unit, the shaft sealing rings, rubber elements, pressure vent screws, hoses, type plates, adhesive labels and motor coupling components must not come into contact with paints, lacquers or solvents, as otherwise the components may be damaged or made illegible.

3.16 Electrical connection of the mounted motor

For geared motors (gear units with attached electric motor), the electric motor has its own operating instructions. If these operating instructions are not available, please request them from the motor manufacturer Ensure the electrical connection of the motor in accordance with the operating instructions of the motor. Usually, there is a connection diagram in the terminal box of the motor.

4 Commissioning

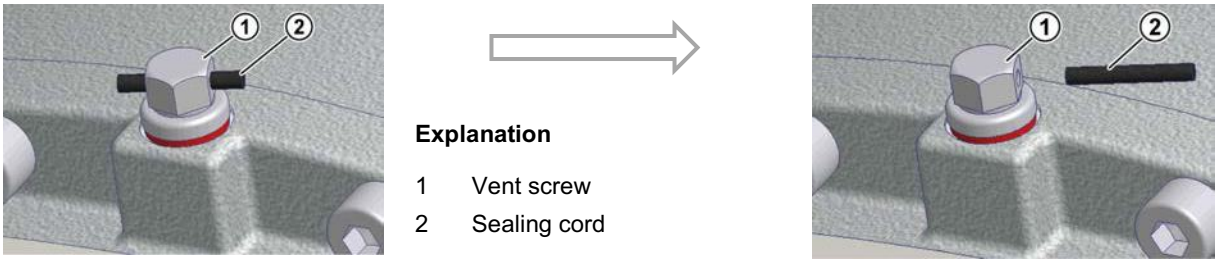
4.1 Checking the oil level

Check the oil level before commissioning (see chapter 5.2 "Service and maintenance work").

4.2 Activating the vent

If venting of the gear unit is provided, the vent or the pressure vent must be activated before commissioning. Double gear units consist of two single units, are equipped with 2 oil chambers and possibly 2 vents.

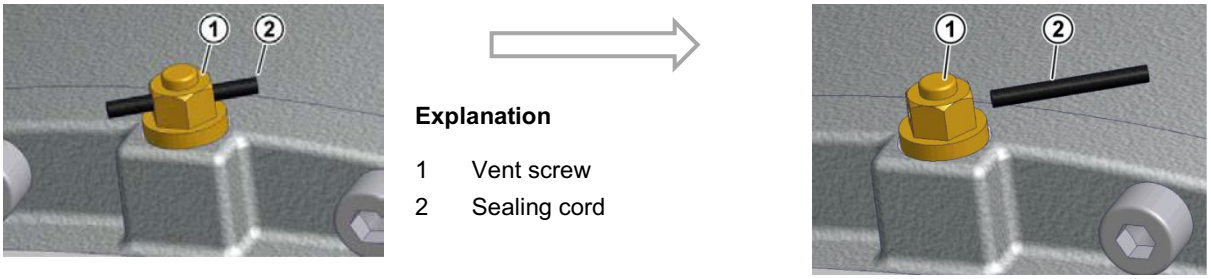
To activate, remove the sealing cord in the vent screw. For the vent screw position, see Section 7.1 "Versions and mounting position".



Explanation

1 Vent screw
2 Sealing cord

Figure 20: Activating the vent screw

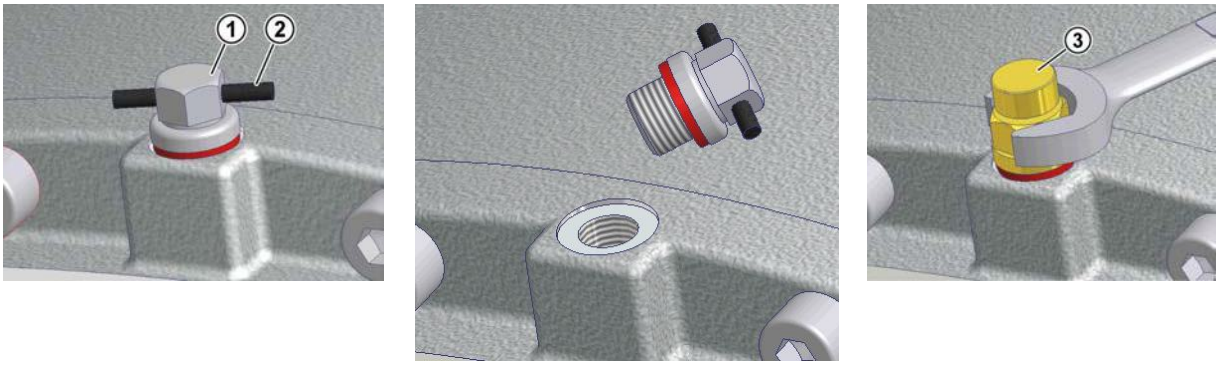


Explanation

1 Vent screw
2 Sealing cord

Figure 21: Activating the pressure vent screw

Special pressure vents are supplied as loose parts. Unscrew the vent screw and replace it with the special pressure vent and seal.



Explanation

1	Vent screw	2	Sealing cord	3	Special vent screw

Figure 22: Removing the vent plug and fitting the special pressure vent

4.3 Activating the automatic lubricant dispenser

Some gear unit types with standard motor (Option IEC/NEMA, not AI/AN) have an automatic lubricant dispenser for the roller bearings. The lubricant sensor must be activated prior to commissioning the gear unit The cartridge case cover of the adapter for attaching an IEC/NEMA standard motor has a red information sign for activation of the lubricant dispenser. Opposite to the lubricant dispenser there is a grease escape hole which is closed with a G1/4 cap screw. After activation of the lubricant dispenser, the cap screw can be removed and replaced with the grease collection container (Part No. 28301210) which is supplied separately with the delivery.

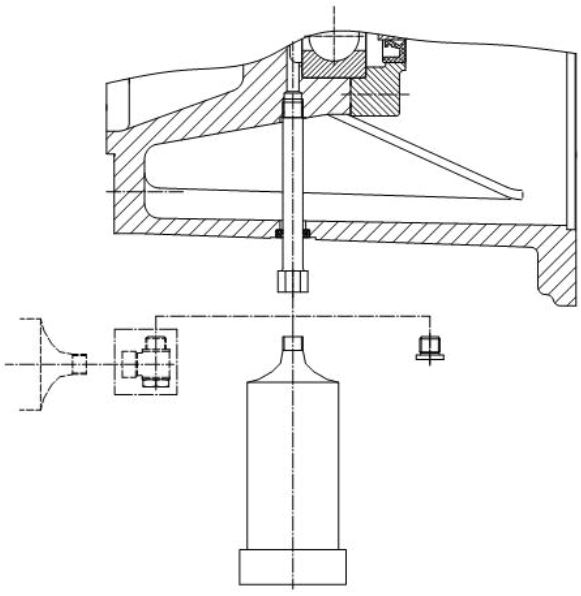
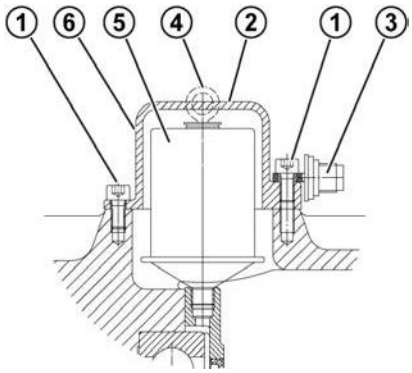


Figure 23: Fitting the grease collection container

Procedure:

1. Loosen and remove the cap screws.
2. Remove the cartridge cover.

3. Screw the activation screw into the lubricant dispenser until the lug breaks off at the defined fracture point.
4. Re-fit the cartridge cover. Attach the cartridge cover with the cap screws (see chapter 7.3 "Screw tightening torques").
5. Mark month and year of activation on the adhesive label.



	Explanation
1	Cap screws M8 x 16
2	Cartridge cover
3	Activation screw
4	Lug
5	Lubricant sensor
6	Position of adhesive label

Figure 24: Activating the automatic lubricant sensor with standard motor mounting

Adhesive label



Figure 25: Adhesive label

4.4 Cooling coil (Option: CC)

NOTICE

Gear unit damage due to overheating

- Only start up the drive after the cooling coil has been connected to the cooling circuit, and the cooling circuit has been put into operation.

If there is a danger of frost, a suitable anti-freeze solution must be added to the cooling water in due time.

The coolant must have a thermal capacity similar to water.

- Specific thermal capacity of water at 20 °C: c = 4.18 kJ/kgK

Clean, industrial water without any air bubbles or sediments is recommended as a coolant. The hardness of the water must be between 1 dH and 15 dH; the pH value must be between pH 7.4 and pH 9.5. No aggressive liquids may be added to the coolant!

The **coolant pressure** must not exceed **8 bar**. We also recommend fitting a pressure reducer at the coolant inlet to avoid damage due to excessive pressure.

The **coolant inlet temperature** must not exceed 40 °C. **10 °C** are recommended.

The required **coolant flow rate** is **10 l/min**.

The temperature and the flow rate of the cooling fluid must be monitored and ensured. The drive must be shut down if the permissible temperature is exceeded.

4.5 External oil/air cooler

NOTICE

Gear unit damage due to overheating

- Only start up the drive after the external oil/air cooler has been connected and put into operation.

NOTICE

Damage due to high line pressure

- In case of cold starting, ensure that the maximum permissible viscosity of the lubricant is not exceeded, in order to prevent excess pressure in the pump and the lubrication lines.

Main components of the external oil/air cooler:

- Motor
- Pump
- Heat exchanger

After mounting and filling the oil/air cooler, check the oil level in the gear unit. Make sure that the oil/air cooler is vented.

For basic information on the available versions of the oil/air cooler, refer to our G1000 catalogue (see www.nord.com).

For detailed information on the external oil/air cooler, refer to the relevant operating instructions. The information contained therein takes precedence.

Unless otherwise indicated by the manufacturer of the external oil/air cooler, the following applies to it:

- Minimum line pressure on the suction side: -0.4 bar
- Maximum viscosity of the lubricant: 1000 mm²/s

Select a motor speed on the coil/air cooler, which ensures complete filling of the pump. This can be achieved by not falling below the minimum line pressure on the suction side.

Information

Gear oil temperature regulation

It is recommended to only switch on the cooling unit at an oil temperature above 60 °C and to switch it off at an oil temperature below 45 °C. For this purpose, temperature regulation can be optionally provided by means of a thermistor (PT100), which has been installed in the oil sump of the gear unit.

The maximum permissible gear oil temperature must not exceed +90 °C.

4.6 Running-in time for the worm gear unit

In order to achieve maximum efficiency of the worm gear unit, the gear unit must be subjected to a running-in period of approx. 25 h – 48 h under maximum load.

There may be a reduction in efficiency before the running-in period is complete.

4.7 AI/AN adapter operation with option BRG1

In connection with option BRG1 (manual re-lubrication), the IEC adapters (option: AI) or the NEMA adapters (option: AN) may be operated at a maximum input speed of 1800 min^{-1}. Higher speeds would lead to premature failure of the seals and coupling spider.

4.8 Checklist

Checklist		
Subject of check	**Date of check:**	**Information see Section**
Is the vent screw activated or the pressure vent screwed in?		4.2
Does the required mounting position comply with the actual position?		7.1
Are the external gear shaft forces within permitted limits (chain tension)?		3.5
Is the torque arm installed correctly?		3.6
Are rotating parts covered with a contact guard?		3.9
Is the automatic lubricant sensor activated?		4.3
Is the cooling system connected?		3.12 3.13

Table 9: Checklist for commissioning

5 Service and maintenance

5.1 Inspection and maintenance intervals

Inspection and maintenance intervals	Inspection and maintenance work	Information, see Section
At least every six months	• Visual inspection	5.2.1
	• Check for running noises	5.2.2
	• Oil level check	5.2.3
	• Visual inspection of hose	5.2.5
	• Re-grease/remove excess grease (only applicable for free input shaft/option W, for agitator bearings/option VL2/VL3 and for AI…/AN… adapters with option BRG1)	5.2.6
	• Replace the automatic lubricant sensor/remove excess grease (for IEC/NEMA standard motor installations, an interval of one year for the replacement of the lubricant sensor is permissible for running times of < 8 h/day); drain or replace the lubricant collection container at each second replacement of the lubricant sensor	5.2.7
For operating temperatures up to 80 °C Every 10,000 operating hours, at least every 2 years	• Change the oil (if filled with synthetic products, the interval is doubled; with the use of ***SmartOilChange***, the interval is specified by ***SmartOilChange***)	5.2.8
	• Clean or replace the vent screw as necessary	5.2.9
	• Replacing the radial shaft seals; see Chapter 5.2.1 for further information	5.2.10
Every 20,000 operating hours, at least every 4 years	• Re-lubricate the bearings in the gear unit	5.2.11
At least every 10 years	• General overhaul	5.2.12

Table 10: Inspection and maintenance intervals

Information

The oil change intervals apply for normal operating conditions and operating temperatures up to 80 °C. The oil change intervals are reduced in the case of extreme operating conditions (operating temperatures higher than 80 °C, high humidity, aggressive environment and frequent fluctuations in the operating temperature).

Information

SmartOilChange determines the optimum time for an oil change based on a continuous determination of the oil temperature. With ***SmartOilChange*** from Getriebebau NORD, this is achieved entirely on the basis of product-specific key data, the specified ambient temperature and internal measurement values of the power electronics such as the current consumption. Additional hardware is therefore not required for the Getriebebau NORD solution.

The measurement results are processed and interpreted by the integrated software and result in the display of the calculated residual time until the next oil change.

5.2 Service and maintenance work

5.2.1 Visual inspection for leaks

The gear unit must be checked for leaks. Attention should be paid to escaping gear oil and traces of oil on the exterior or underneath the gear unit. In particular, the radial shaft seals, cover caps, screw fittings, hoses and housing joints should be checked.

Information

Radial shaft seals are components with a limited life and are subject to wear and ageing. The service life of radial shaft seals depends on various ambient conditions. Temperature, light (especially UV light), ozone and other gases and liquids affect the ageing process of radial shaft seals. Some of these influences may change the physical or chemical properties of the radial shaft seals and result in a significant reduction of their service life. Foreign matter (e.g. dust, sludge, sand, metallic particles) and excess temperature (excessive speed or external heating) accelerate the wear of the sealing lip. These sealing lips are made of an elastomer material and are lubricated with a special grease at the factory. This reduces the wear due to their function and ensures a long service life. An oil film in the region of the rubbing sealing lip is therefore normal and is not due to leakage (see chapter 7.5 "Leakage and leak-tightness").

The following applies to radial shaft seals on gear unit output shafts: "Under moderate operating conditions (up to 80 °C oil temperature), the manufacturers of radial shaft seals state non-binding typical lifetimes of up to 10,000 operating hours."

NOTICE

Damage to the radial shaft seals through unsuitable cleaning agents

Unsuitable cleaning agents may damage the radial shaft seals, which may then cause an increased risk of leaks.

- Do not clean the gear unit with cleaning agents which contain acetone or benzol.
- Avoid contact with hydraulic oils.

If leaks are suspected, the gear unit should be cleaned, the oil level checked and checked again for leaks after approx. 24 hours. If a leak is confirmed (dripped oil), the gear unit must be repaired immediately. Please contact the NORD service department.

If the gear unit is equipped with a cooling coil in the housing cover, the connections and the cooling coil must be checked for leaks. If there are any leaks, these must be repaired immediately. Please contact the NORD service department.

5.2.2 Check for running noises

If the gear unit produces unusual running noises or vibrations, this could indicate damage to the gear unit. In this case the gear unit must be repaired immediately. Please contact the NORD Service department.

5.2.3 Checking the oil level

Section 7.1 "Versions and mounting position"describes the mounting positions and the corresponding oil level screws. With double gear units, the oil level must be checked on both units. The pressure vent must be at the position marked in Section 7.1 "Versions and mounting position".

The oil level does not need to be checked on gear units without oil level screw (see chapter 7.1 "Versions and mounting position").

Gear unit types that are not supplied with an oil filling must be filled before the oil level is checked.

The oil level must only be carried out when the gear unit is at a standstill and has cooled down. Provide protection against accidental activation. Check the oil level with an oil temperature of between 10 °C to 40 °C.

Gear units with oil level screw

1. Unscrew the oil level screw corresponding to the mounting position (see chapter 7.1 "Versions and mounting position").

Information

At the first oil level check a small amount of oil may escape, as the oil level may be above the lower edge of the oil level hole.

2. The correct oil level is at the lower edge of the oil level hole. If the oil level is too low, adjust the oil level with the corresponding oil type.
3. Screw the oil level screw and all previously loosened screw connectors back in correctly.

Gear units with an oil level tank

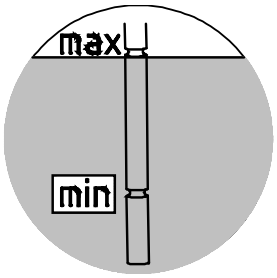


Figure 26: Checking the oil level with a dipstick

1. Screw the screw plug with dipstick (thread G1¼) out of the oil level container.
2. The oil level must be between the upper and lower marking when the dipstick is fully screwed in (see Figure 26). If the oil level is too low, adjust the oil level with the corresponding oil type.
3. Screw the screw plug with dipstick and all previously loosened screw connectors back in correctly.

Gear units with oil inspection glass

1. The oil level can be seen directly in the window.
2. The correct oil level is:
   - Maximum: the middle of the oil inspection glass,
   - Minimum: Lower edge of the oil inspection glass.
3. If the oil level is not correct, adjust the oil level by draining off oil or topping up with the type of oil stated on the name plate.

5.2.4 Visual inspection of the rubber buffers (Option: G, VG)

If these show damage such as tears to the surface, the rubber elements must be replaced. In this case, please contact NORD Service.

5.2.5 Visual inspection of the hoses (Option: OT, CS2-X)

Gear units with an oil tank and external cooling units have rubber hoses.

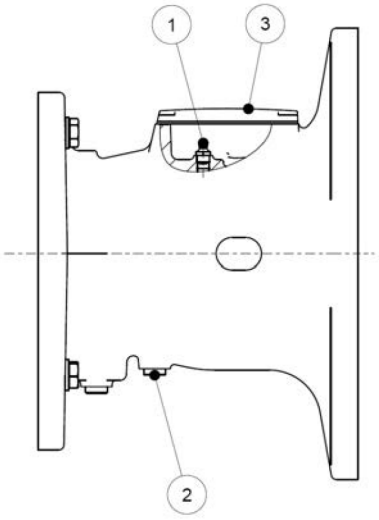
Check the hoses and screw connectors for leaks, cuts, tears, porous areas and chafing. In case of damage, the hoses must be replaced. Please contact the NORD service department.

5.2.6 Re-greasing (Option: VL2, VL3, W, AI, AN)

Some gear unit designs are equipped with a re-greasing device.

For the agitator versions VL2 and VL3, unscrew the vent screw opposite the grease nipple prior to re-greasing. Inject grease until a quantity of 20 - 25g escapes from the vent hole. Screw the vent screw back in.

For option W and the IEC/NEMA adapters AI and AN with option BRG1, grease the outer roller bearing with approx. 20–25 g of grease at the grease nipple. With the IEC/NEMA adapters AI and AN, the grease nipple is located under a bolt-on inspection cover. Before re-greasing, unscrew the grease drain screw so that the excess grease can drain off. Remove the excess grease on the motor adapter.



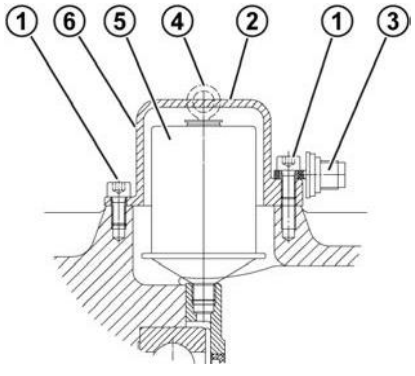
1: Conical grease nipple
2: Grease drain screw
3: Inspection cover

Figure 27: Re-grease IEC/NEMA adapters AI and AN with option BRG1

Recommended grease:

- Petamo GHY 133N (Klüber Lubrication)

5.2.7 Replacing the automatic lubricant dispenser



Explanation

1 Cap screws M8 x 16
2 Cartridge cover
3 Activation screw
4 Lug
5 Lubricant dispenser
6 Position of adhesive label

Figure 28: Switching the automatic lubricant sensor with standard motor mounting

(Lubricant sensor: Part No.: 28301000 or for food-compatible grease Part No.: 28301010)

1. Unscrew the cartridge cover.
2. Unscrew the lubricant sensor.
3. Screw in the new lubricant sensor.
4. Remove excess grease from the adapter.
5. Activate the full lubricant sensor (see chapter 4.3 "Activating the automatic lubricant dispenser").

The grease collection container (Part No. 28301210) must be replaced or drained with every second replacement of the lubricant sensor. Due to the form of the container, a residual amount of grease remains in the container.

1. Unscrew the grease collection container from the screw connector.
2. Press grease out of the grease collection container. To do this, push the internal piston back with a rod. The rod may have a maximum diameter of 10 mm. Collect the extracted grease and dispose it properly.
3. Check the collecting vessel. If the collecting vessel is damaged, replace it with a new one.
4. Screw the collecting vessel back into the drain hole on the motor adapter.

5.2.8 Change the oil

On the figures in Section 7.1 "Versions and mounting position"the positions of the oil drain screw, the oil level screw and the vent screw, if present, are shown depending on the mounting position.

WARNING

Danger of burns

The oil may be very hot. Use protective equipment.

Procedure:

1. Place a collection vessel under the oil drain screw or the oil drain tap.
2. Screw out the oil level screw (if present) and the oil drain screw. When using an oil reservoir tank, screw out the screw plug with dipstick.
3. Completely drain the oil from the gear unit.
4. Check the sealing rings of the oil drain screw and the oil level screw. If a sealing ring is damaged, replace the corresponding screw. You can also clean the threads and coat them with securing adhesive e.g. Loctite 242 54-03 before screwing them in.
5. Screw the oil drain screw into the hole and tighten to the correct torque (see chapter 7.3 "Screw tightening torques").
6. Using a suitable filling device, refill with oil of the same type through the oil level hole until oil emerges from the oil level hole. The oil can also be filled through the hole of the pressure vent screw or of a screw plug located higher than the oil level. If an oil reservoir tank is used, fill the oil through the upper inlet (thread G1¼) until the oil level is set as described in Section 5.2.3 "Checking the oil level".
7. Check the oil level after at least 15 min, if using an oil level container after at least 30 min.

Information

The oil does not need to be replaced for gear units without oil drain screws (see chapter 7.1 "Versions and mounting position"). The gear unit are lifelong lubricated.

Standard helical gear units do not have an oil level screw. Here, new oil is injected through the threaded hole of the vent.

5.2.9 Clean and check vent screw

1. Unscrew the vent screw.
2. Thoroughly clean the vent screw, e.g. with compressed air.
3. Check the vent screw and the sealing ring. If the sealing ring is damaged, use a new vent screw.
4. Screw the vent screw back in.

5.2.10 Replacing the shaft sealing ring

Once the shaft sealing ring has reached the end of its service life, the oil film in the region of the sealing lip increases and a measurable leakage with dripping oil occurs. **The radial shaft seal must then be replaced.** The space between the sealing lip and the protective lip must be filled approximately 50 % with grease on fitting (recommended grease: PETAMO GHY 133N). Take care that after fitting, the new radial shaft seal does not run in the old wear track.

5.2.11 Re-lubrication of bearings in the gear unit

NOTICE

Damage to the gear unit due to insufficient lubricant

There is a risk of bearing failure in the event of inadequate lubrication.

- It is essential to comply with the recommended intervals.
- Only use greases which are approved by Getriebebau NORD.
- Never mix different greases. If different greases are mixed, the gear unit may be damaged due to inadequate lubrication caused by incompatibility between the different greases.
- Avoid contamination of the grease with foreign substances and washing out of the grease by lubricating oil.

Please contact the NORD Service department for replacement of the grease in the roller bearings.

Recommended grease: Petamo GHY 133N - Klüber Lubrication. (see chapter 7.2.1 "Roller bearing greases")

5.2.12 General overhaul

The general overhaul must be carried out by a specialist workshop with suitable equipment and be qualified personnel with appropriate equipment in observance of national regulations and laws. We recommend that the general overhaul is carried out by the NORD Service Department.

During general overhaul, the gear unit is completely dismantled. The following work steps are carried out:

- All gear unit components are cleaned.
- All gear unit components are checked for damage.
- Damaged parts are replaced.
- All roller bearings are replaced.
- Replace all seals, radial shaft seals and Nilos rings.
- Optional: The back stop will be renewed.
- Optional: Replace the elastomers in the coupling.

6 Disposal

Observe the current local regulations. In particular, lubricants must be collected and disposed of correctly.

Gear unit components	Material
Gearwheels, shafts, roller bearings, keys, circlips, …	Steel
Gear unit housing, housing components, …	Grey cast iron
Light alloy gear unit housing, light alloy housing components, …	Aluminium
Worm gears, sockets, ...	Bronze
Radial shaft seals, sealing caps, rubber components, …	Elastomers with steel
Coupling components	Plastic and steel
Flat seals	Asbestos-free sealing material
Gear oil	Additive mineral oil
Synthetic gear oil (adhesive label: CLP PG)	Polyglycol-based lubricants
Synthetic gear oil (adhesive label CLP PG)	Poly-alpha-olefin based lubricants
Cooling coil, embedding material of the cooling coil, screw fittings	Copper, epoxy, yellow brass

Table 11: Materials

7 Appendix

7.1 Versions and mounting position

Information

The gear unit types SK 320, SK 172, SK 272, SK 372 as well as SK 273 and SK 373, the gear unit types SK 01282 NB, SK 0282 NB and SK 1382 NB and the UNIVERSAL/MINIBLOC gear unit types are lifelong lubricated. These gear units do not have oil level screws.

7.1.1 Explanation of symbols



Vent



Oil level



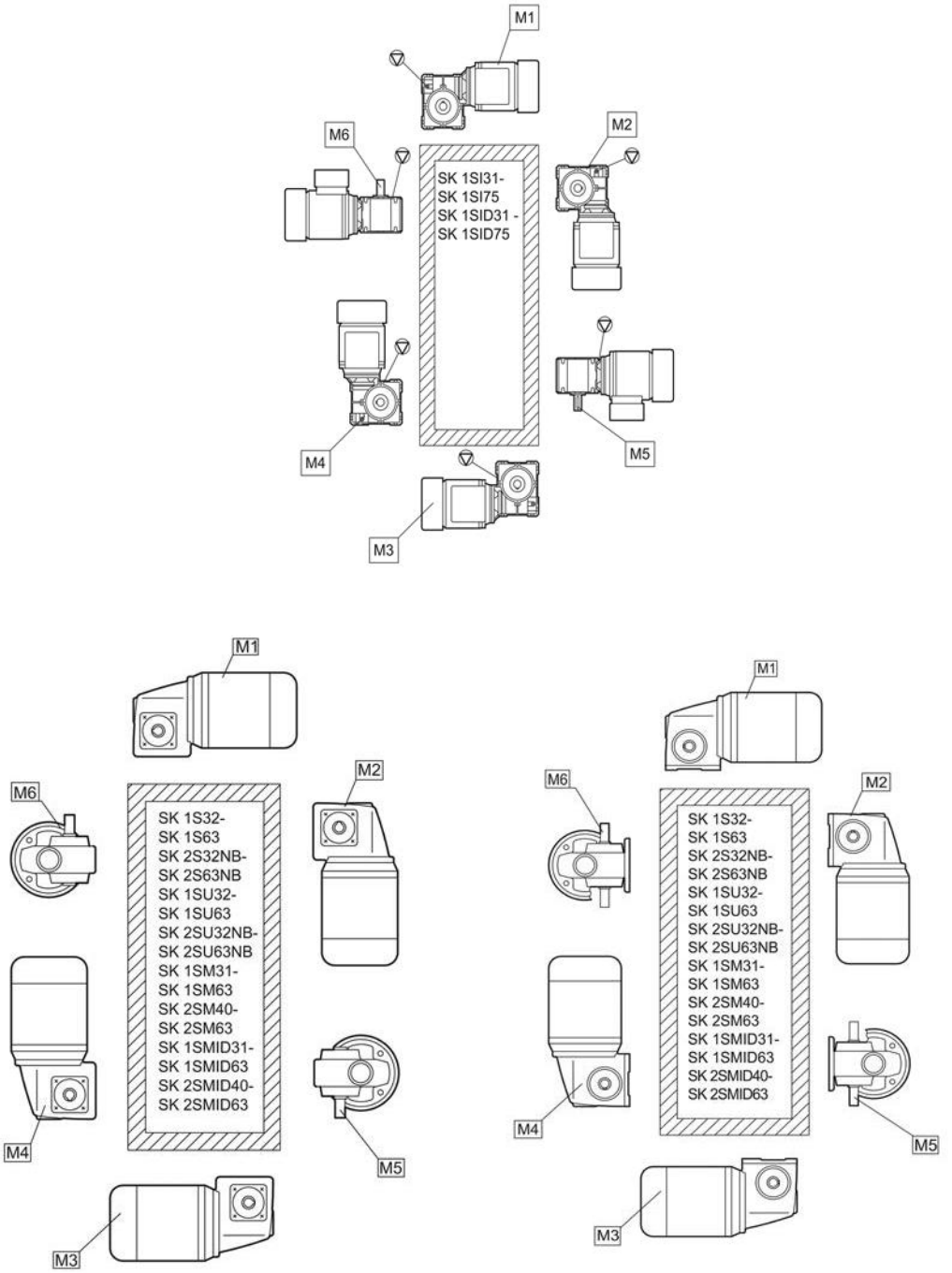
Oil drain

7.1.2 UNIVERSAL/MINIBLOC worm gear units

NORD UNIVERSAL/MINIBLOC worm gear units are suitable for all installation positions. They have an oil filling which is independent of the mounting position.

As an option, types SI and SMI can be equipped with a vent screw. Gear units with vents must be installed in the stated mounting position.

Types SI, SMI, S, SM and SU as 2-stage gear unit types and types SI, SMI as worm gear units for direct motor mounting have an oil filling which depends on the mounting position and must be installed in the stated position.



7.1.3 Parallel shaft gear units with oil level tank

The following illustration applies to the M4 configuration of gear unit types SK 9282, SK 9382, SK 10282, SK 10382, SK 10382.1, SK 11282, SK 11382, SK 11382.1 and SK 12382 with oil reservoir tank.

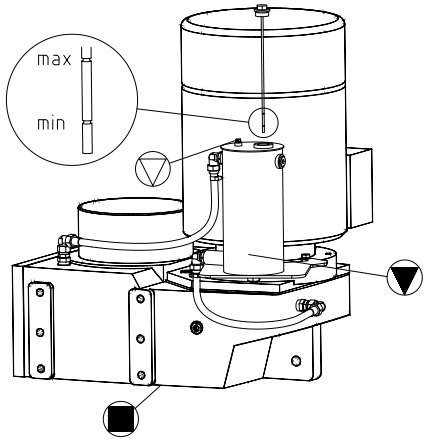
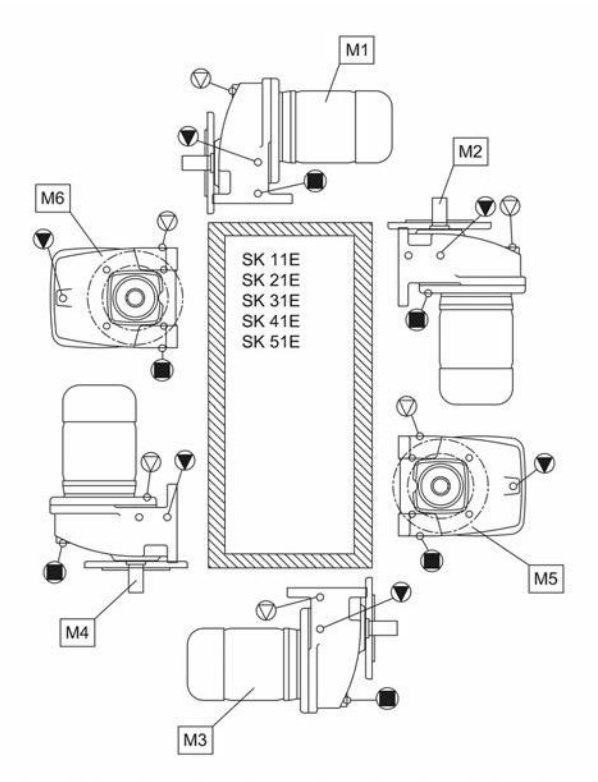
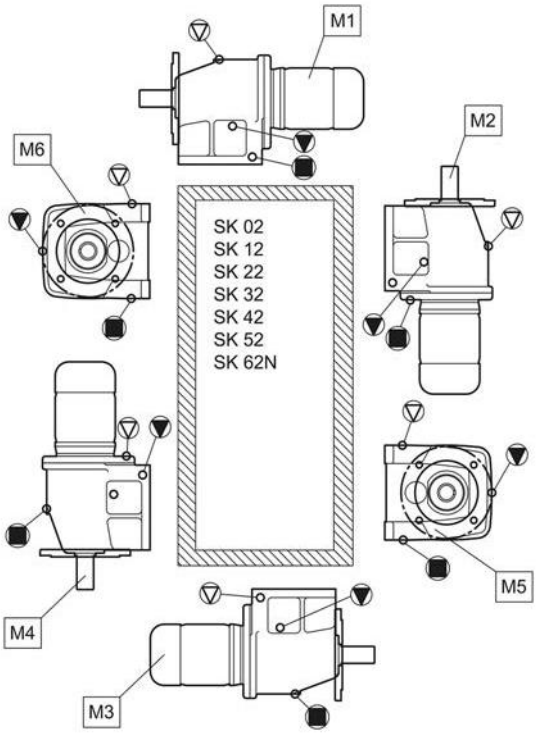
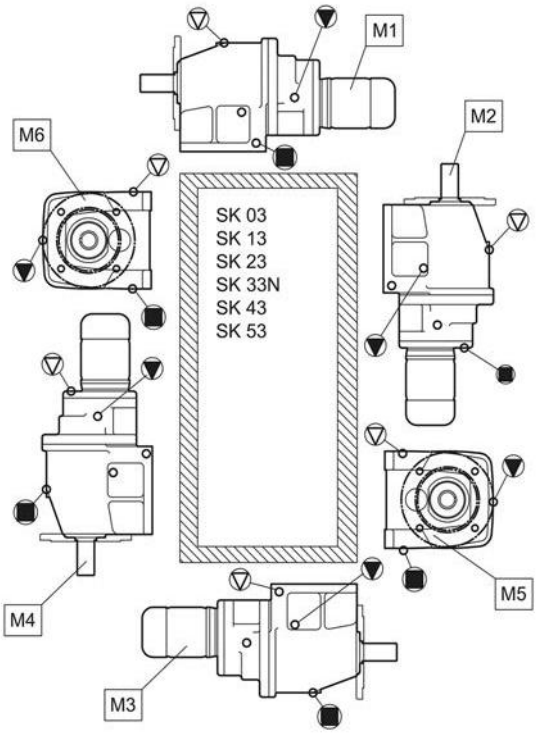


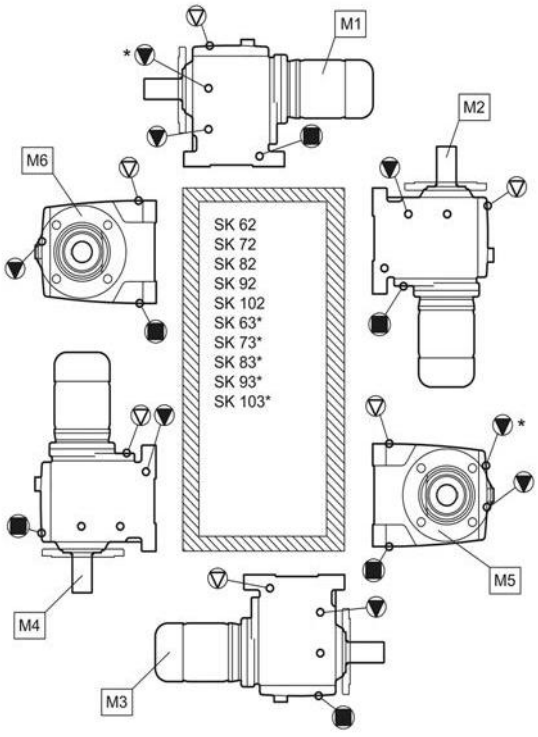
Figure 29: Parallel shaft gear units with oil level tank

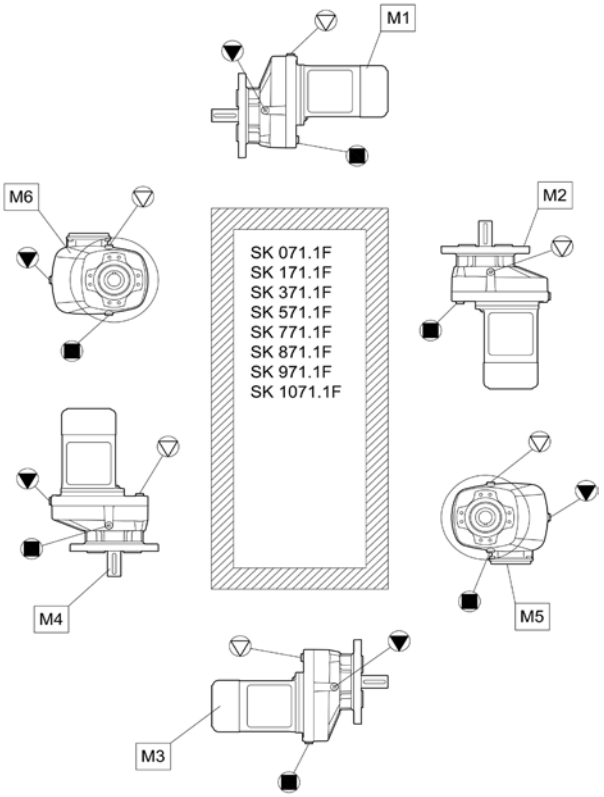
7.1.4 Overview of mounting positions

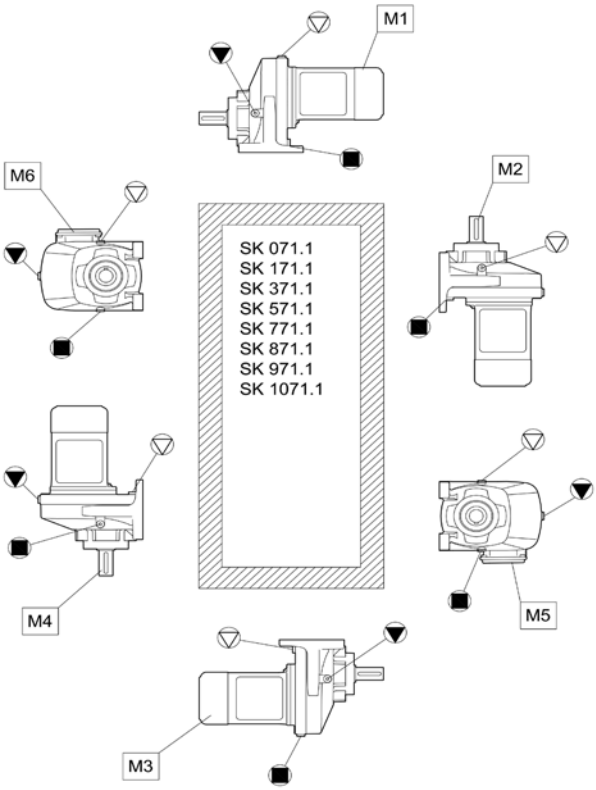


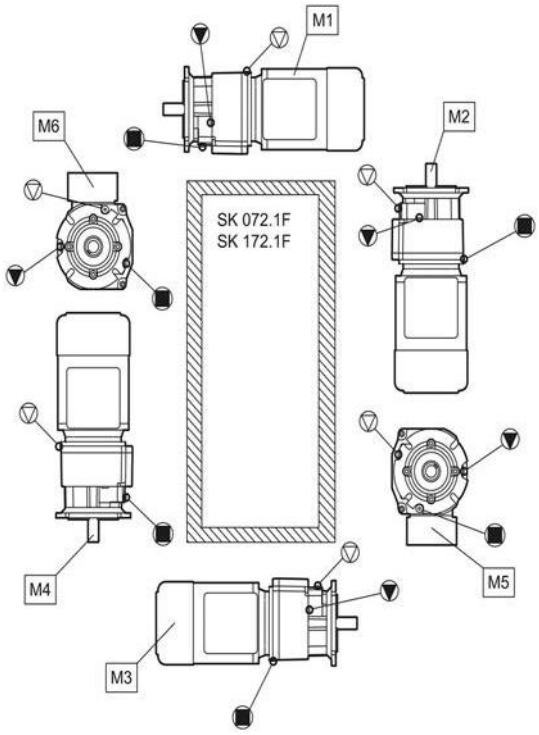


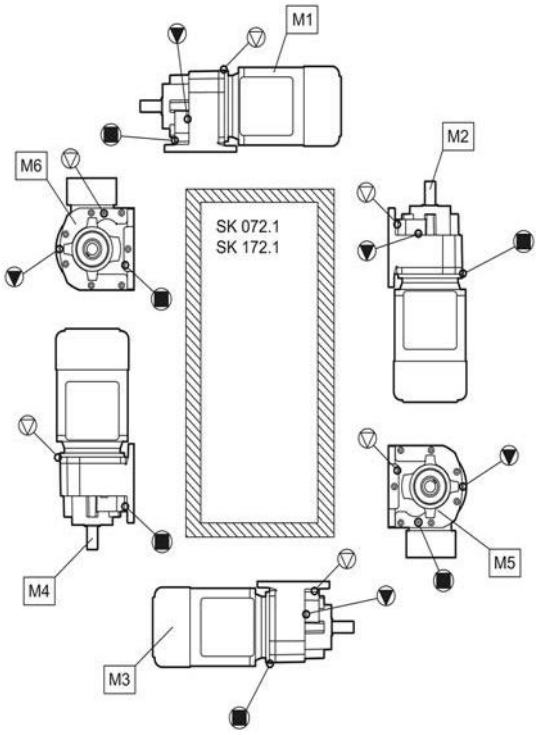


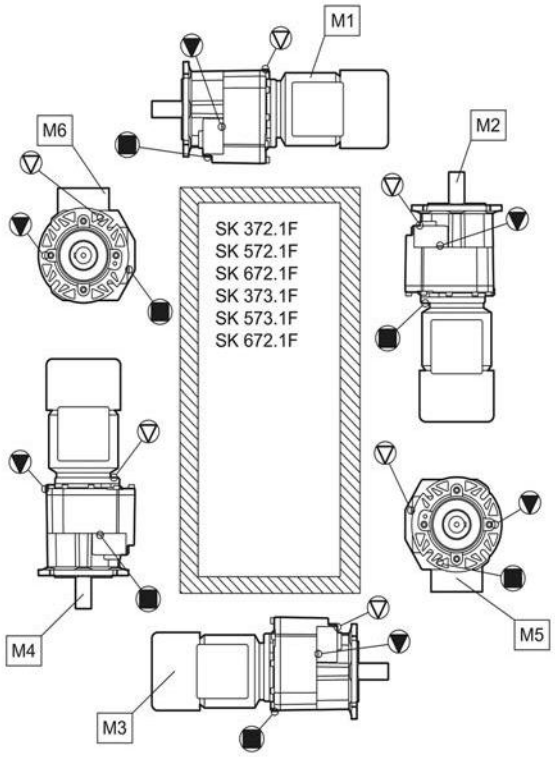


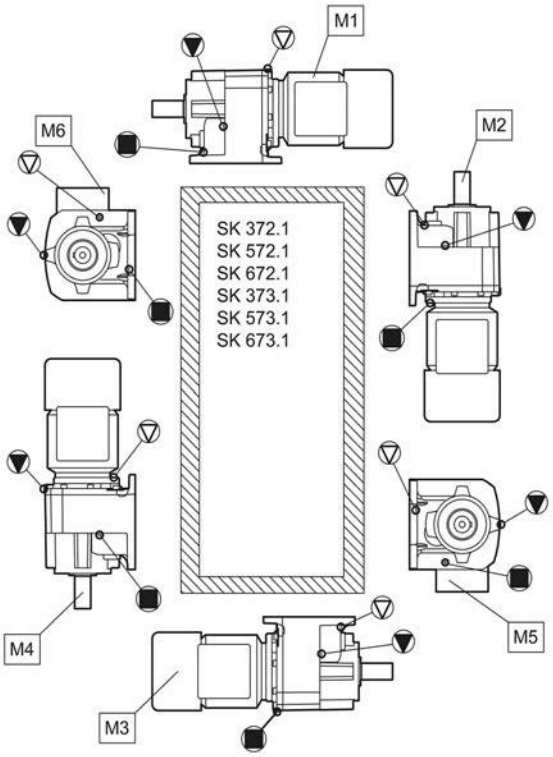

M1
M6
M2
SK 071.1F
SK 171.1F
SK 371.1F
SK 571.1F
SK 771.1F
SK 871.1F
SK 971.1F
SK 1071.1F
M4
M5
M3

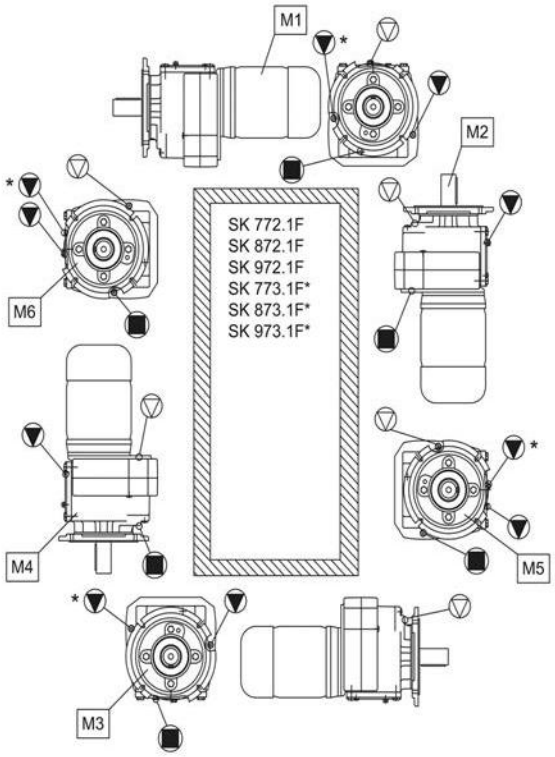

M1
M6
M2
SK 071.1
SK 171.1
SK 371.1
SK 571.1
SK 771.1
SK 871.1
SK 971.1
SK 1071.1
M4
M5
M3

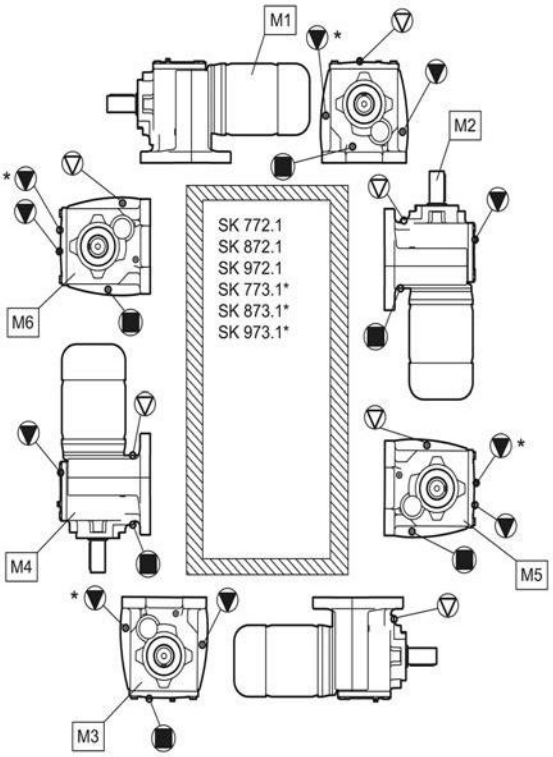

M1
M6
M2
SK 072.1F
SK 172.1F
M4
M5
M3

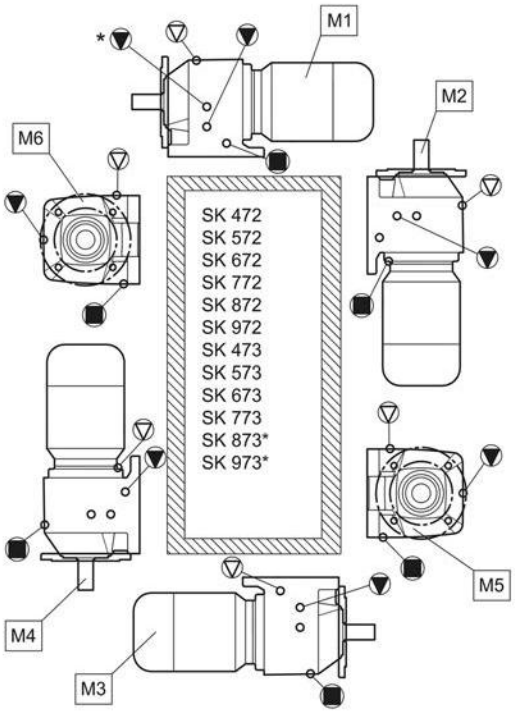

M1
M6
M2
SK 072.1
SK 172.1
M4
M5
M3

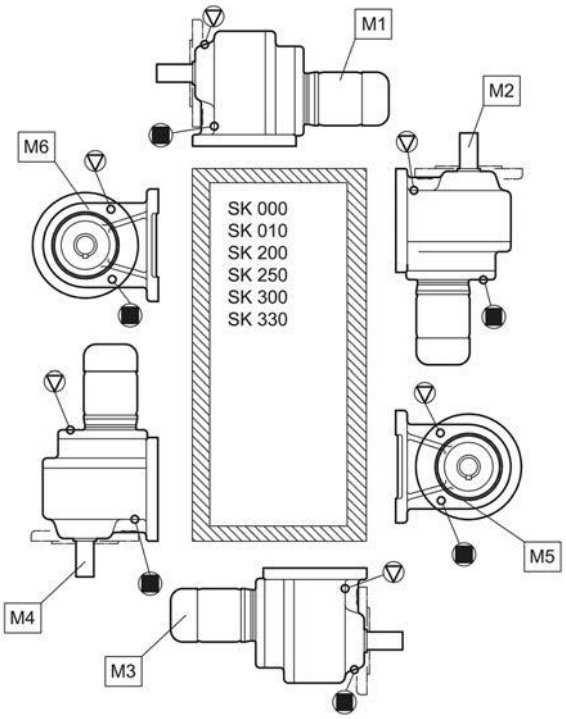

M1
M2
M3
M4
M5
M6
SK 372.1F
SK 572.1F
SK 672.1F
SK 373.1F
SK 573.1F
SK 672.1F

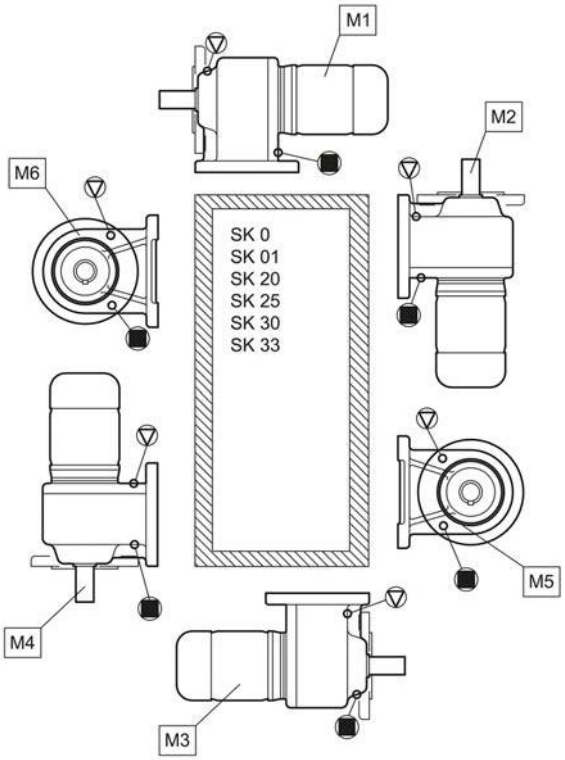

M1
M2
M3
M4
M5
M6
SK 372.1
SK 572.1
SK 672.1
SK 373.1
SK 573.1
SK 673.1

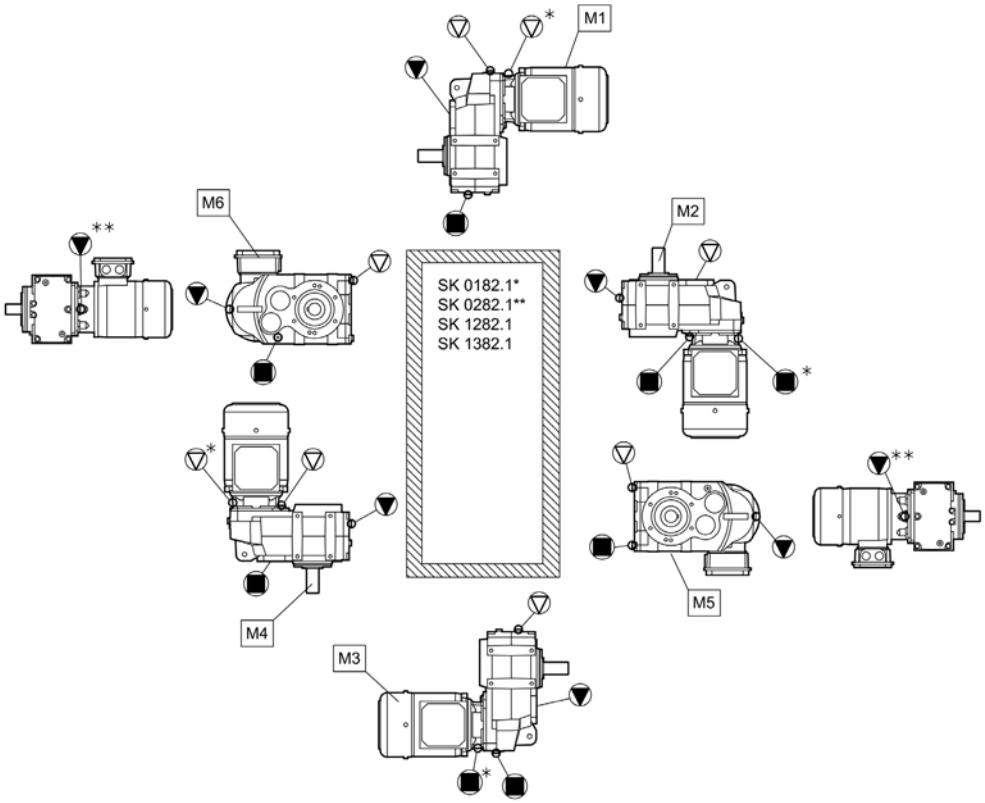

M1
M2
M3
M4
M5
M6
SK 772.1F
SK 872.1F
SK 972.1F
SK 773.1F*
SK 873.1F*
SK 973.1F*

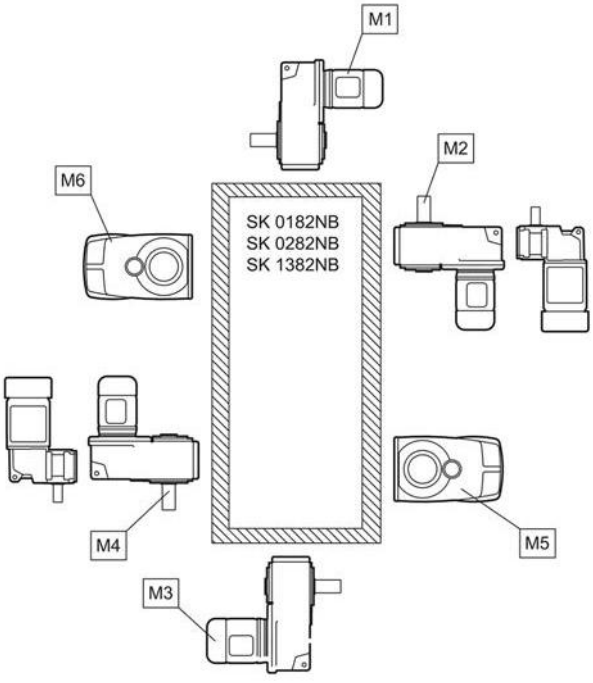

M1
M2
M3
M4
M5
M6
SK 772.1
SK 872.1
SK 972.1
SK 773.1*
SK 873.1*
SK 973.1*

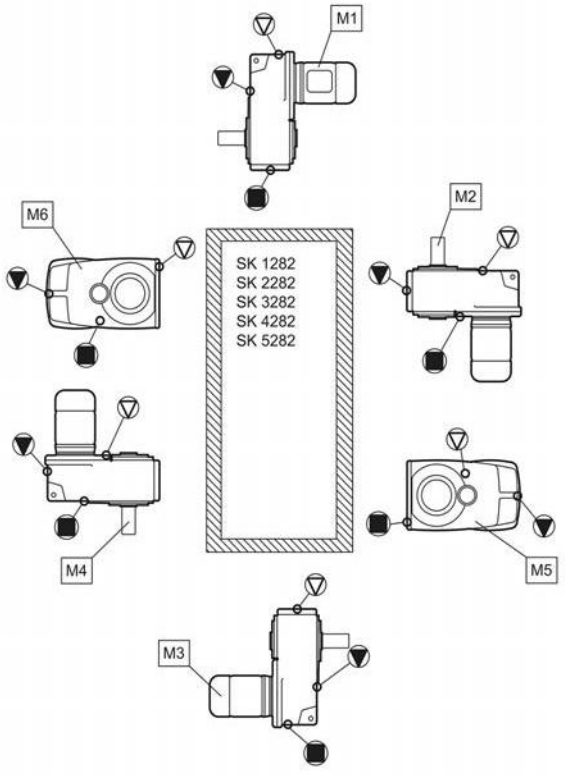

M1
*
M2
M6
SK 472
SK 572
SK 672
SK 772
SK 872
SK 972
SK 473
SK 573
SK 673
SK 773
SK 873*
SK 973*
M5
M4
M3

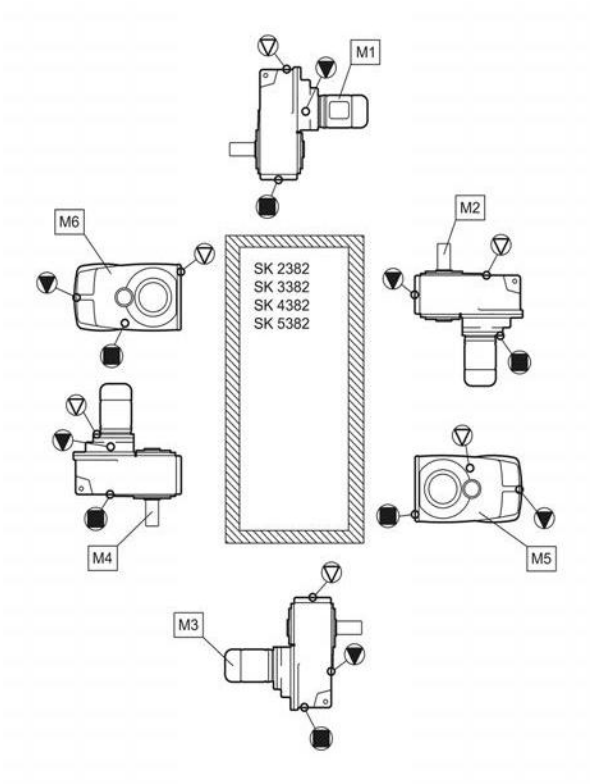

M1
M2
M6
SK 000
SK 010
SK 200
SK 250
SK 300
SK 330
M5
M4
M3

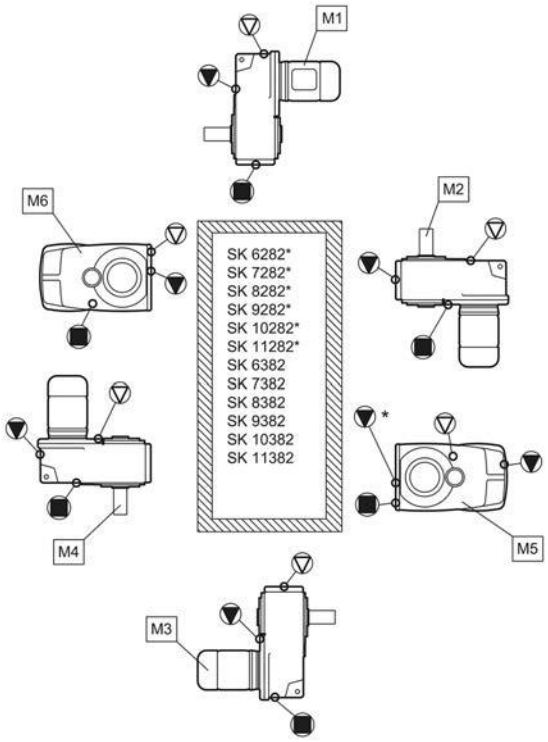

M1
M2
M6
SK 0
SK 01
SK 20
SK 25
SK 30
SK 33
M5
M4
M3

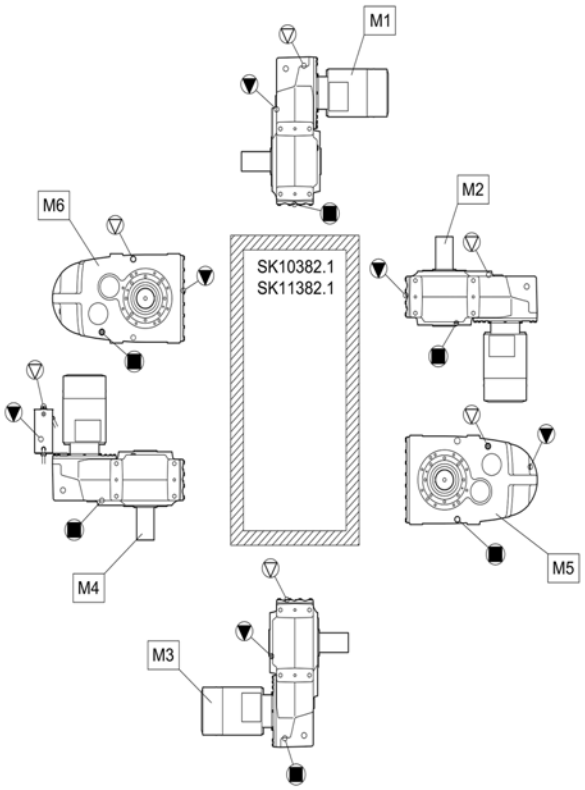

M1
M2
M3
M4
M5
M6
SK 0182.1*
SK 0282.1**
SK 1282.1
SK 1382.1

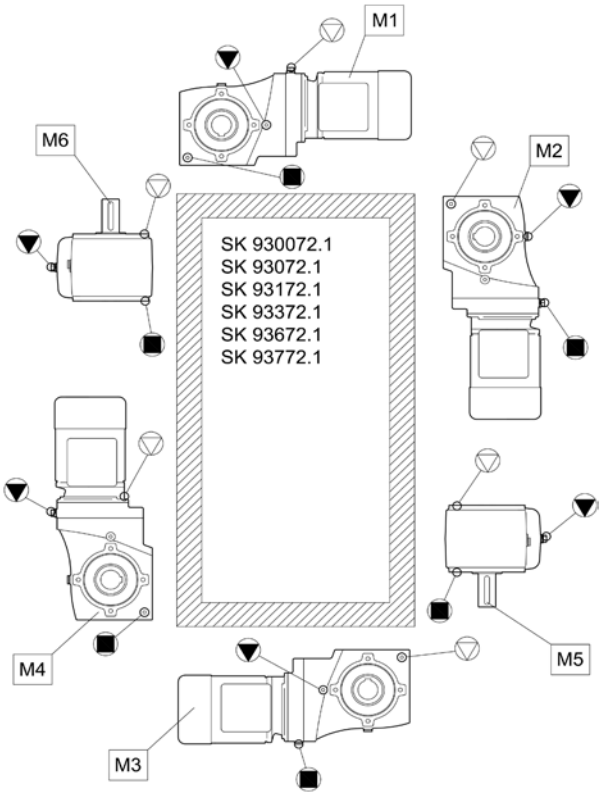

M1
M2
M3
M4
M5
M6
SK 0182NB
SK 0282NB
SK 1382NB

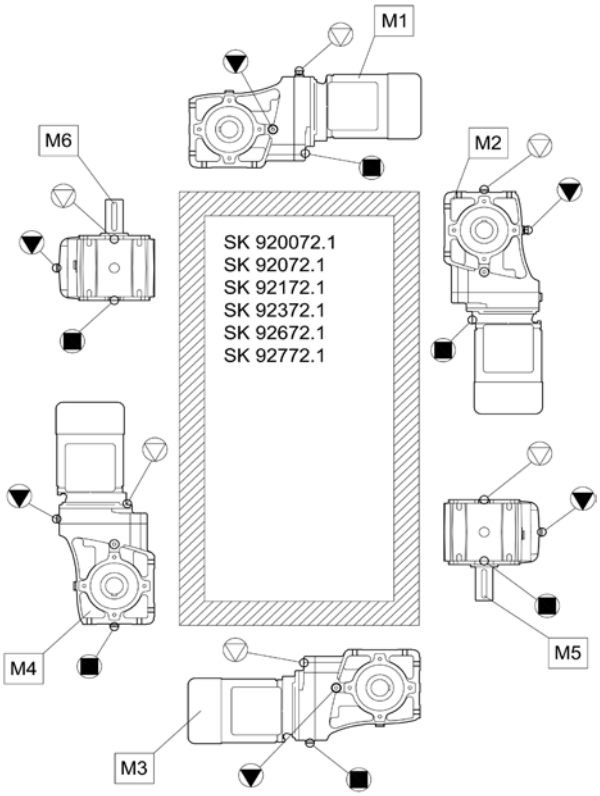

M1
M2
M3
M4
M5
M6
SK 1282
SK 2282
SK 3282
SK 4282
SK 5282

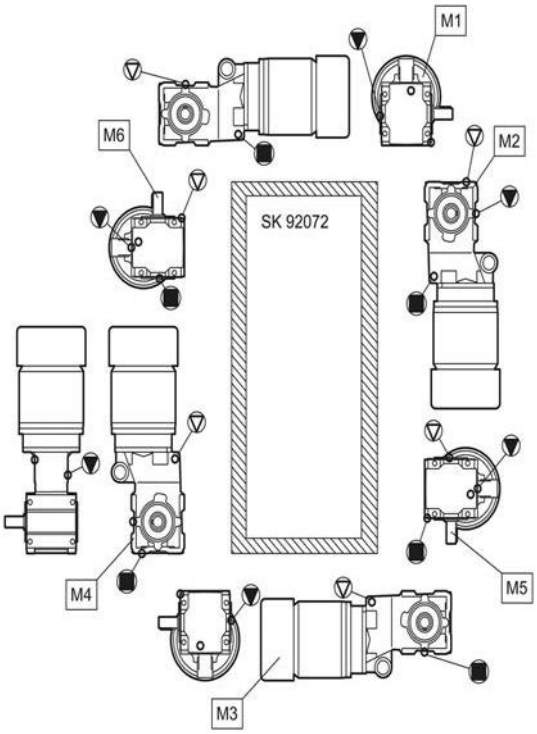

M1
M6
M2
SK 2382
SK 3382
SK 4382
SK 5382
M4
M5
M3

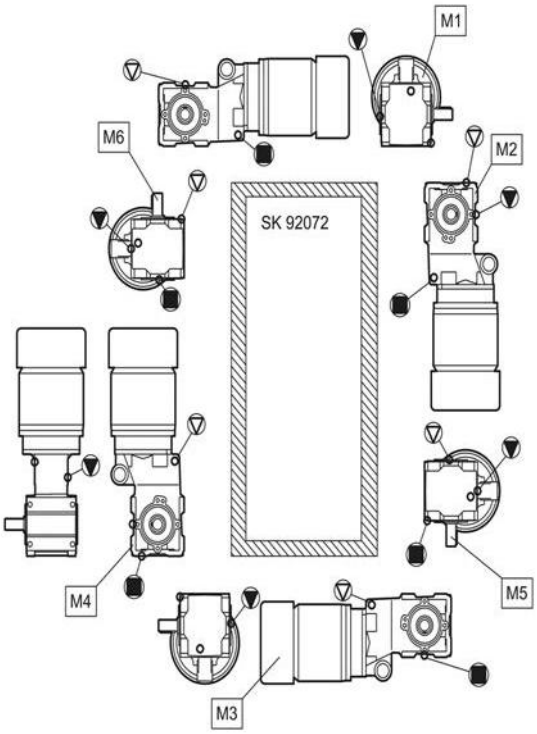

M1
M6
M2
SK 6282*
SK 7282*
SK 8282*
SK 9282*
SK 10282*
SK 11282*
SK 6382
SK 7382
SK 8382
SK 9382
SK 10382
SK 11382
*
M4
M5
M3

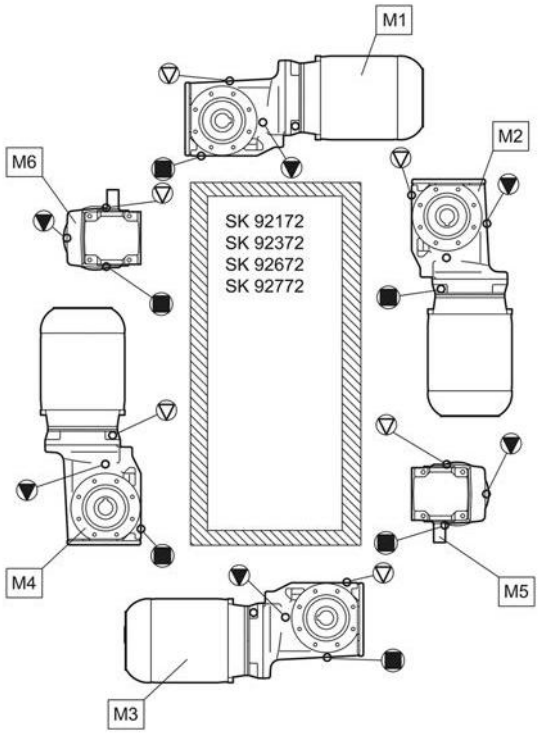

M1
M6
M2
SK10382.1
SK11382.1
M4
M5
M3

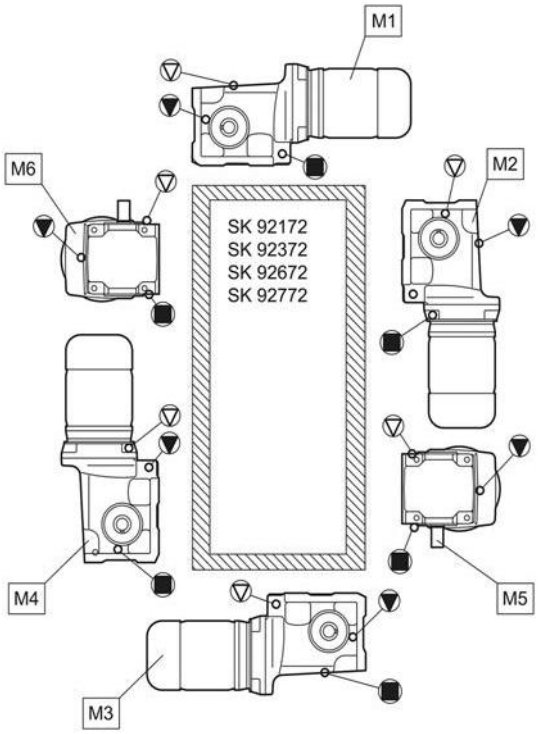

M1
M6
M2
SK 930072.1
SK 93072.1
SK 93172.1
SK 93372.1
SK 93672.1
SK 93772.1
M4
M5
M3

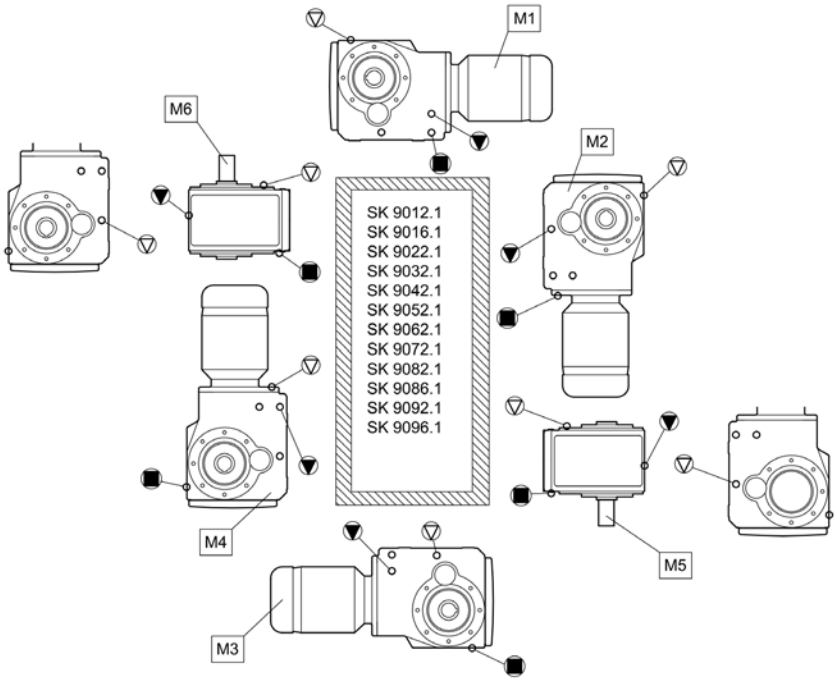

M1
M6
M2
SK 920072.1
SK 92072.1
SK 92172.1
SK 92372.1
SK 92672.1
SK 92772.1
M4
M5
M3

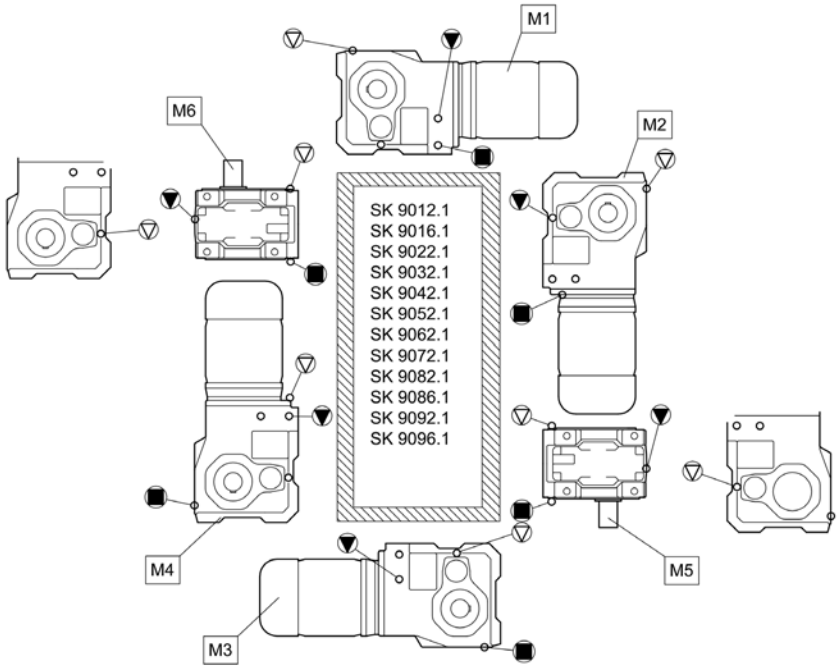

M1
M6
M2
SK 92072
M4
M5
M3

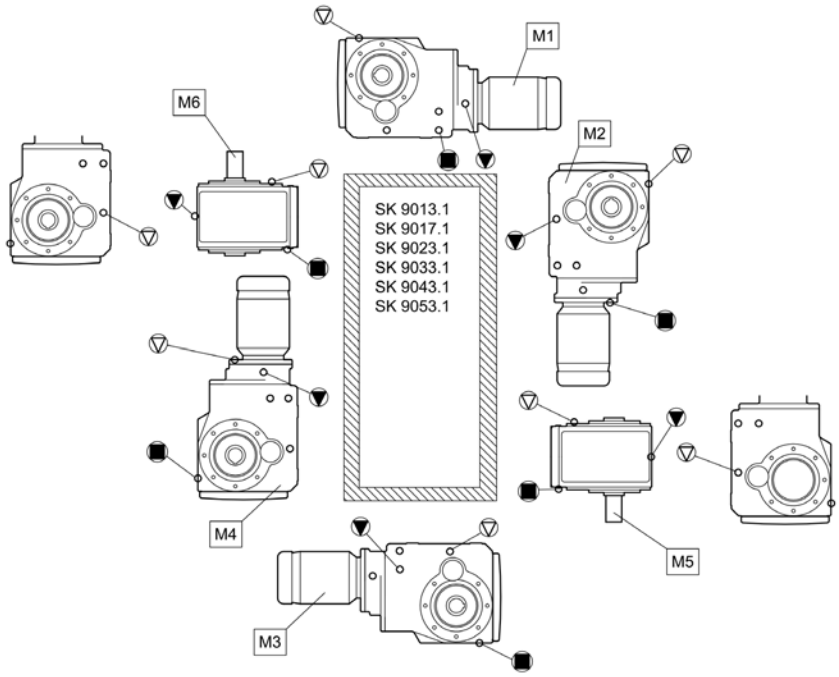

M1
M6
M2
SK 92072
M4
M5
M3

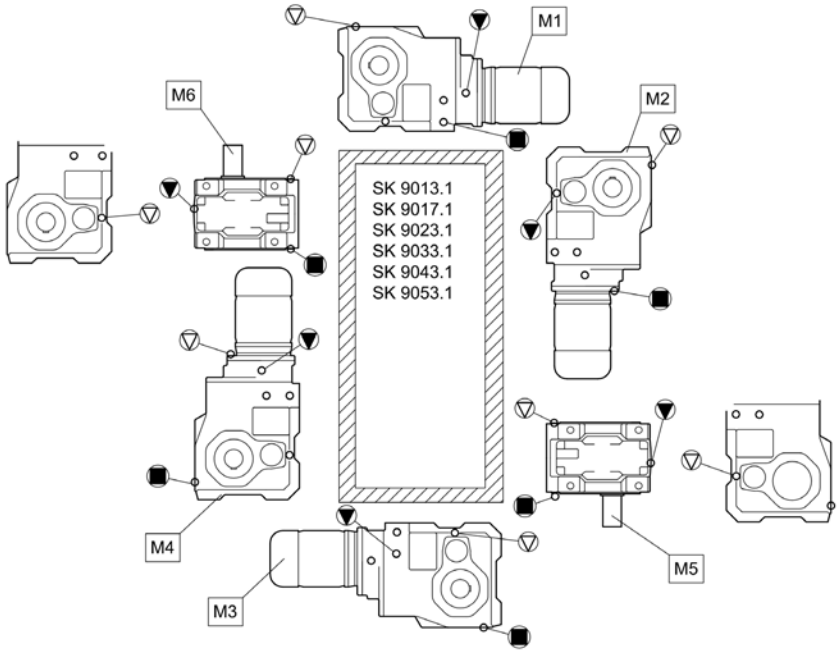

M1
M2
M6
SK 92172
SK 92372
SK 92672
SK 92772
M4
M5
M3

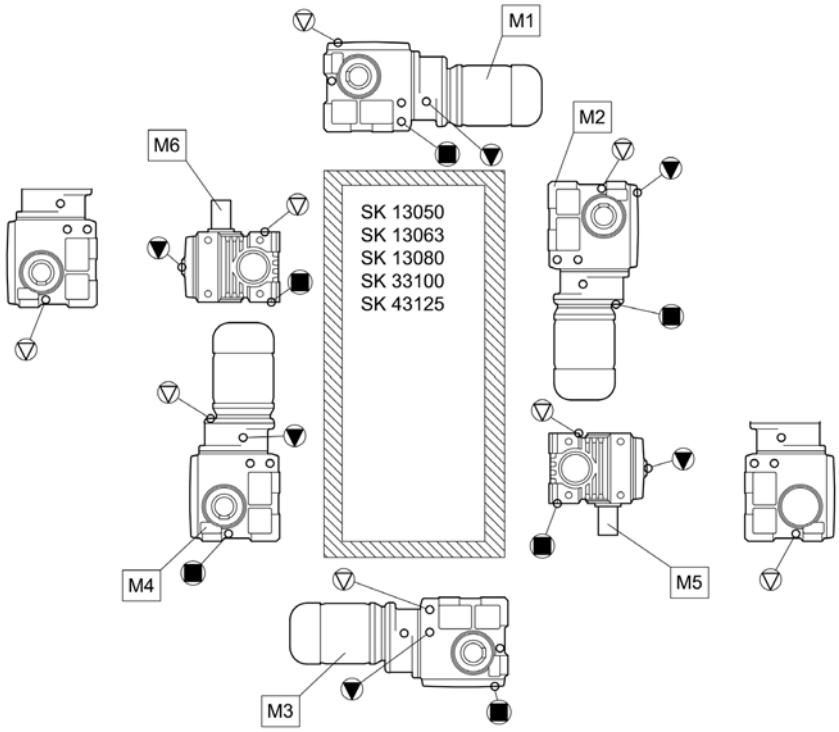

M1
M6
M2
SK 92172
SK 92372
SK 92672
SK 92772
M4
M5
M3

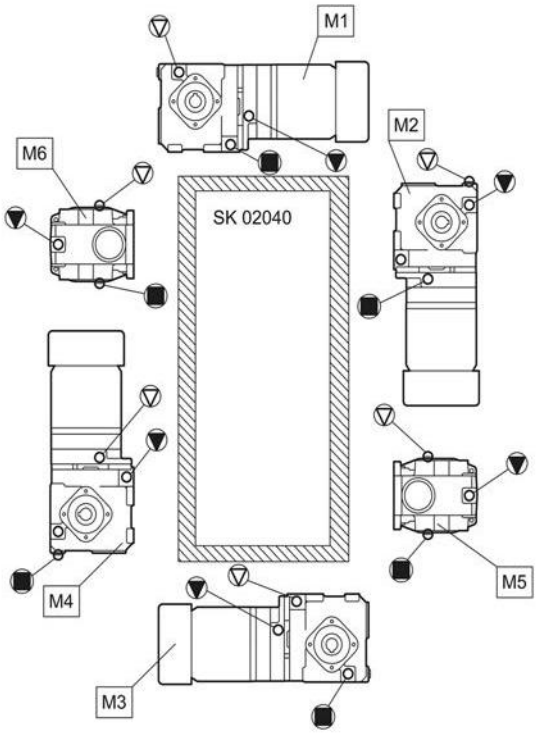

M1
M6
M2
SK 9012.1
SK 9016.1
SK 9022.1
SK 9032.1
SK 9042.1
SK 9052.1
SK 9062.1
SK 9072.1
SK 9082.1
SK 9086.1
SK 9092.1
SK 9096.1
M4
M5
M3

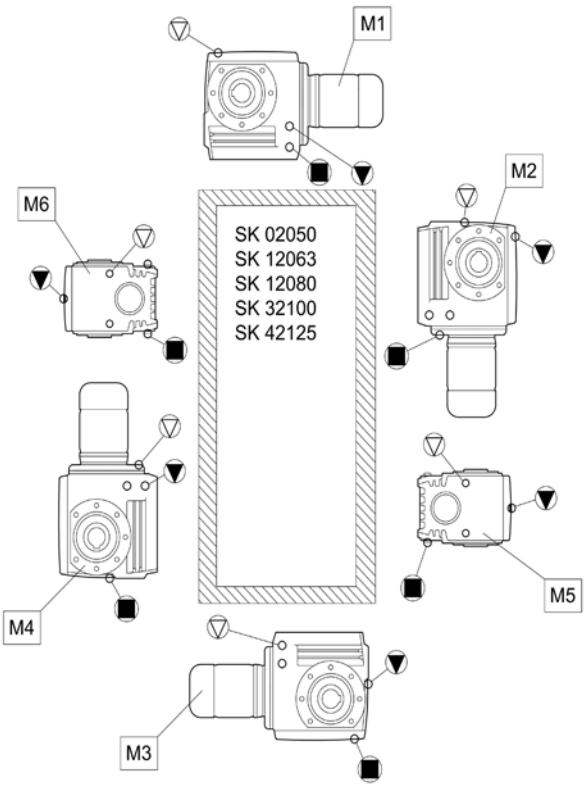

M1
M6
M2
SK 9012.1
SK 9016.1
SK 9022.1
SK 9032.1
SK 9042.1
SK 9052.1
SK 9062.1
SK 9072.1
SK 9082.1
SK 9086.1
SK 9092.1
SK 9096.1
M4
M5
M3

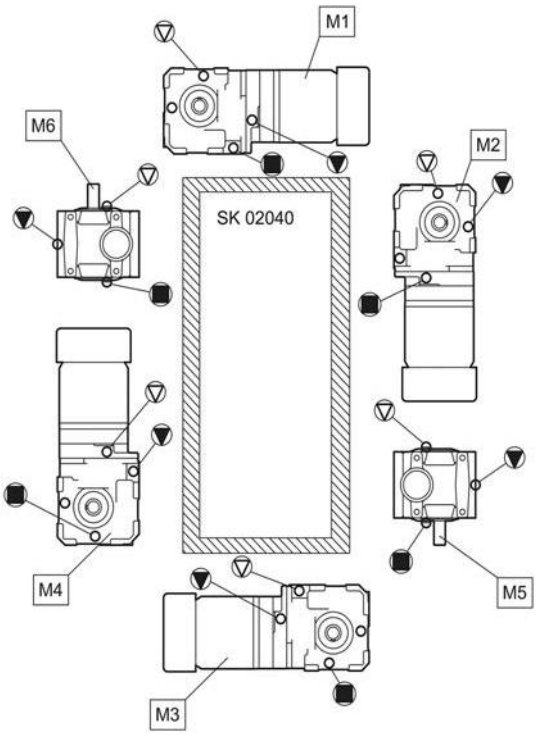

M1
M6
M2
SK 9013.1
SK 9017.1
SK 9023.1
SK 9033.1
SK 9043.1
SK 9053.1
M4
M5
M3

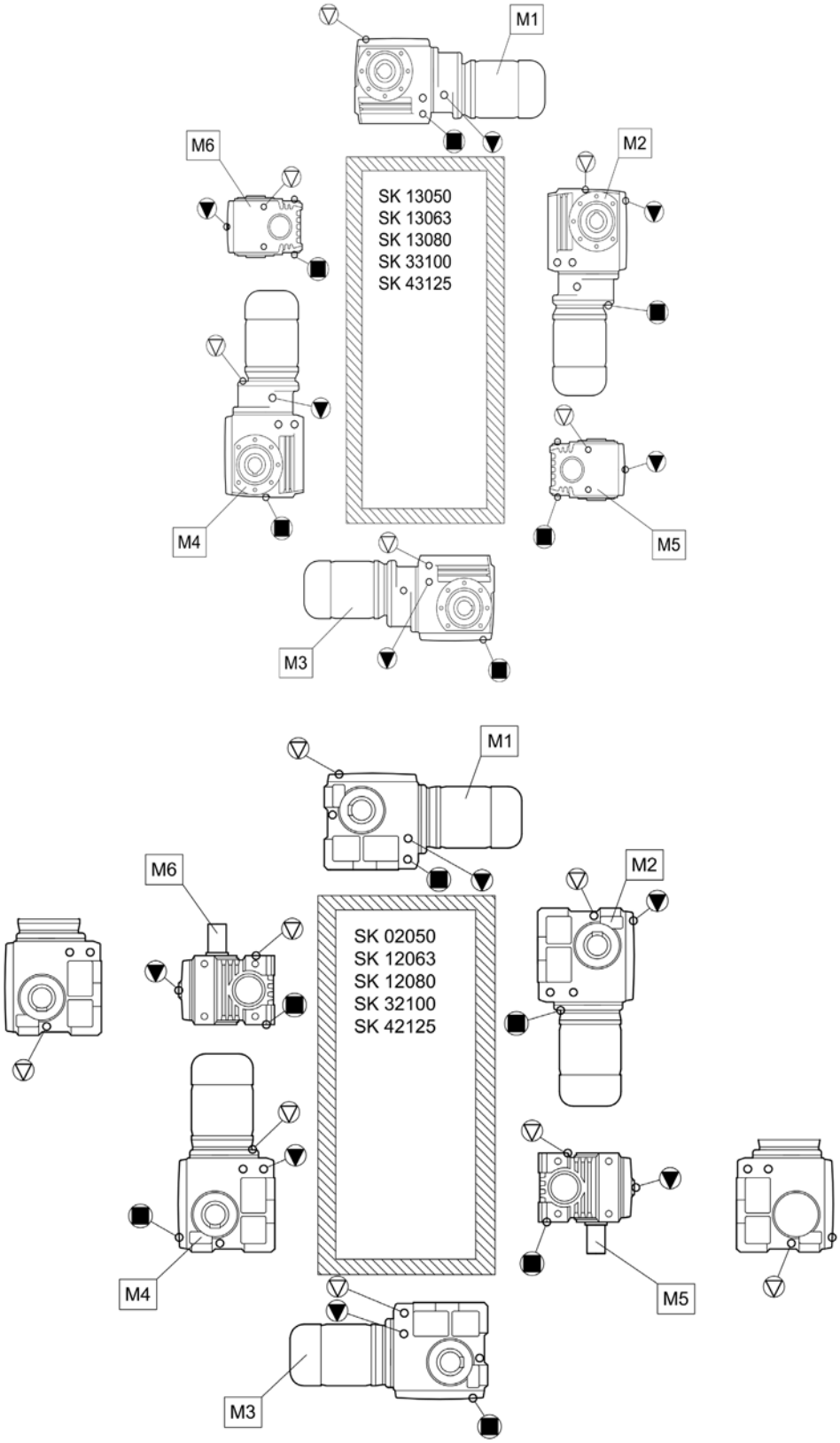

M1
M6
M2
SK 9013.1
SK 9017.1
SK 9023.1
SK 9033.1
SK 9043.1
SK 9053.1
M4
M5
M3

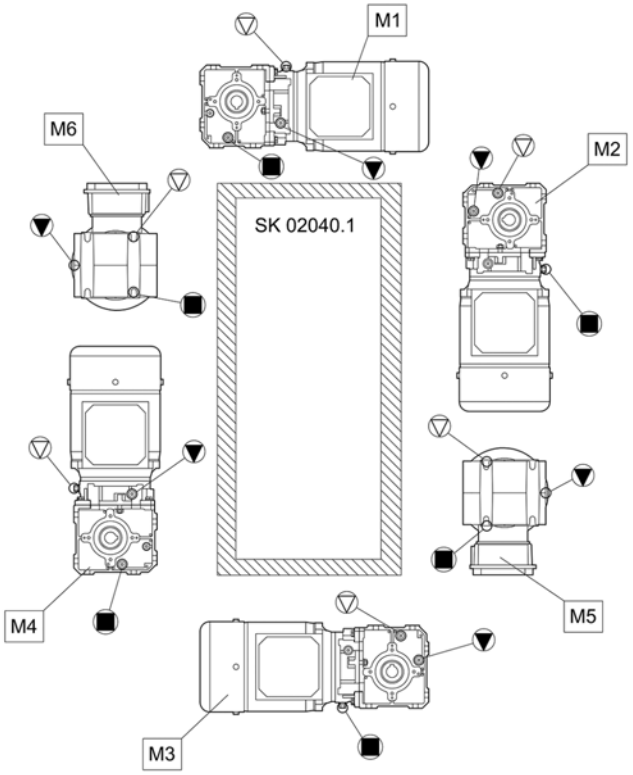

M1
M6
M2
SK 13050
SK 13063
SK 13080
SK 33100
SK 43125
M4
M5
M3


M1
M2
M6
SK 02040
M4
M5
M3


M1
M2
M6
SK 02050
SK 12063
SK 12080
SK 32100
SK 42125
M4
M5
M3


M1
M6
M2
SK 02040
M4
M5
M3


M1
M6
M2
SK 13050
SK 13063
SK 13080
SK 33100
SK 43125
M4
M5
M3
M1
M6
M2
SK 02050
SK 12063
SK 12080
SK 32100
SK 42125
M4
M5
M3


M1
M6
M2
SK 02040.1
M4
M5
M3

7.2 Lubricants

With the exception of types SK 11382.1, SK 12382 and SK 9096.1, the gear units are filled with lubricant for the required mounting position and are ready for operation as delivered. The initial filling corresponds to a lubricant from the column for the ambient temperatures (standard version) in the lubricant table.

7.2.1 Roller bearing greases

This table contains comparable approved roller bearing greases from various manufacturers. The manufacturer can be changed within a lubricant type. Observe the ambient temperature range.

Mixing different greases is not permissible. When changing the grease, different greases of one lubricant type within the relevant ambient temperature range may be mixed in a maximum ratio of 1/20 (5%).

When changing the lubricant type or the ambient temperature range, please consult Getriebebau NORD. Otherwise, no warranty can be accepted for the function of the gear units.

Lubricant type	Ambient temperature	Castrol	KLÜBER LUBRICATION	Mobil	
Grease (mineral oil)	-30…60 °C	Spheerol EPL 2	-	Mobilux EP 2	Gadus S2 V220 2
Grease (PAO)	-25…80 °C	-	PETAMO GHY 133 N	-	-

Table 12: Roller bearing greases

7.2.2 Gear oils

This table shows comparable approved lubricants from various manufacturers. The oil manufacturer can be changed within a viscosity and lubricant type. Only change the lubricant type or the viscosity after consultation with Getriebebau NORD.

Mixing different oils is not permissible. When changing the gear oil, different oils of one lubricant type with the same viscosity may be mixed in a maximum ratio of 1/20 (5%).

Lubricant type	Details on name plate	DIN (ISO) / Ambient temperature	Castrol	FUCHS	KLÜBER LUBRICATION	Mobil	Shell
Mineral oil	CLP 680	ISO VG 680 0...40 °C	-	-	-	Mobilgear 600 XP 680	Omala S2 GX 680
	CLP 220	ISO VG 220 -10…40 °C	Alpha EP 220 Alpha SP 220	Renolin CLP 220 Renolin CLP 220 VCI	Klüberoil GEM 1-220 N	Mobilgear 600 XP 220	-
	CLP 100	ISO VG 100 -15…25 °C	-	-	Klüberoil GEM 1-100 N	-	-
Synthetic oil (Polyglycol)	CLP PG 680	ISO VG 680 -20...40 °C	-	-	Klübersynth GH 6-680	-	-
	CLP PG 460	ISO VG 460 -25…80 °C	-	-	Klübersynth GH 6-460	-	-
	CLP PG 220	ISO VG 220 -25…80 °C	Optigear Synthetic 1300/220	Renolin PG 220	Klübersynth GH 6-220	-	-
Synthetic oil (hydrocarbon)	CLP HC 680	ISO VG 680 -30…80 °C	-	-	Klübersynth GEM 4-680	Mobil SHC 636	-
	CLP HC 460	ISO VG 460 -30…80 °C	-	-	-	Mobil SHC 634	-
	CLP HC 220	ISO VG 220 -40…80 °C	Alphasyn EP 220	Renolin UNISYSN XT 220 Renolin Unisyn CLP 220 Renolin Unisyn Gear 220 VCI	Klübersynth GEM 4-220 N Klübersynth MEG 4-220	Mobil SHC 630 Mobil SHC Gear 630	Omala S4 GX 220
Bio-degradable oil	CLP E 680	ISO VG 680 -5…40 °C	-	Plantogear 680 S	-	-	-
	CLP E 220	ISO VG 220 -5…40 °C	-	Plantogear 220 S	-	-	-
Food grade oil	CLP PG H1 680	ISO VG 680 -5…40 °C	-	-	Klübersynth UH1 6-680	-	-
	CLP PG H1 220	ISO VG 220 -25…40 °C	-	Cassida Fluid WG 220	Klübersynth UH1 6-220	-	-
	CLP HC H1 220	ISO VG 220 -25…40 °C	-	-	-	Mobil SHC Cibus 220	-
Gear unit – fluid grease based on mineral oil	GP 00 K-10	-10 … 60 °C	Spheerol EPL 00	-	-	-	-
	GP 00 K-30	-30 … 60 °C	Tribol GR 100-00 PD	-	-	-	-

Table 13: Gear oils

The required lubricant quantity and the lubricant type are stated on the name plate. The precise quantities vary depending on the exact gear ratio and options OSG and OT, if available. When filling,

always observe the oil level screw hole or, with option OT, the dipstick as an indicator of the precise quantity of oil.

After changing the lubricant, and in particular after the initial filling, the oil level may change during the first few hours of operation, as the oil galleries and the hollow spaces only fill gradually during operation. After a short run-in period, we recommend another check of the oil level.

If the gear unit contains an oil inspection glass, we recommend an adjustment of the oil level after an operating time of approximately 2 hours, so that the oil level is visible in the oil inspection glass when the gear unit is at a standstill and has cooled down. An oil level check via the oil inspection glass is only possible after this time.

Gear unit types SK 11282, SK 11382, SK 11382.1, SK 12382 and SK 9096.1 are usually supplied without oil.

7.3 Screw tightening torques

Screw tightening torques [Nm]							
Dimensions	Screw fastenings in strength classes				Cap screws	Threaded pin on coupling	Screw fastenings on covers
	8.8	10.9	12.9	V2A-70 V4A-70			
M4	3.2	5	6	2.8	-	-	-
M5	6.4	9	11	5.8	-	2	-
M6	11	16	19	10	-	-	6.4
M8	27	39	46	24	11	10	11
M10	53	78	91	48	11	17	27
M12	92	135	155	83	27	40	53
M16	230	335	390	207	35	-	92
M20	460	660	770	414	-	-	230
M24	790	1150	1300	711	80	-	460
M30	1600	2250	2650	1400	170	-	-
M36	2780	3910	4710	2500	-	-	1600
M42	4470	6290	7540	4025	-	-	-
M48	6140	8640	16610	5525	-	-	-
M56	9840	13850	24130	8860	-	-	-
G½	-	-	-	-	75	-	-
G¾	-	-	-	-	110	-	-
G1	-	-	-	-	190	-	-
G1¼	-	-	-	-	240	-	-
G1½	-	-	-	-	300	-	-

Table 14: Screw tightening torques

Installing hose unions

Oil the thread of the union nut, the cutting ring and the thread of the connecting piece. Tighten the union nut with a spanner until the union nut becomes more difficult to turn. Turn the union nut further by approx. 30° to 60° but only to a maximum of 90° while holding the connecting piece with a spanner. Remove excess oil from the union.

7.4 Troubleshooting

NOTICE!

Gear unit damage

- Shut down the gear unit immediately in case of malfunction.

Gear unit malfunctions		
Error	**Possible cause**	**Remedy**
Unusual running noises, vibrations	Oil too low or bearing damage or gear wheel damage	Consult NORD Service department
Oil escaping from gear unit or motor	Defective seal	Consult NORD Service department
Oil escaping from pressure vent	Incorrect oil level	Use oil expansion chamber (Option OA)
	Incorrect, dirty oil	Oil change
	Unfavourable operating conditions	Consult NORD Service department
Gear unit becomes too hot	Unfavourable installation conditions or gear unit damage	Consult NORD Service department
Shock when switching on, vibrations	Motor coupling defective	Replace elastomer ring
	Gear unit fastening loose	Tighten motor and gear unit fastening screws
	Defective rubber element	Replace rubber element
Output shaft does not rotate although motor is running	Breakage in gear unit	Consult NORD Service department
	Motor coupling defective	
	Shrink disc slip	

Table 15: Overview of malfunctions

7.5 Leakage and leak-tightness

Gear units are filled with oil or grease to lubricate the moving parts. Seals prevent the escape of lubricants. Full leak-tightness is technically not possible, as a certain film of moisture, for example on the radial shaft seals is normal and advantageous for a long-term sealing effect. In the region of vents, oil moisture may be visible due to the escape of function-related oil mist. In the case of grease-lubricated labyrinth seals such as Taconite sealing systems, the used grease emerges from the sealing gap. This apparent leak is not a fault.

According to the test conditions as per DIN 3761, the leak is determined by the medium to be sealed. In bench tests, it exceeds the function-related moisture on the sealing edge in a defined test period and results in dripping of the medium to be sealed. The measured quantity which is then collected is designated as leakage.

Definition of leakage according to DIN 3761 and its appropriate use					
Term	**Explanation**	**Location of leakage**			
		Radial shaft seal	**In IEC adapter**	**Housing joint**	**Vent**
Sealed	No moisture apparent	No fault present			
Damp	Moisture film locally restricted (not an area)	No fault present			
Wet	Moisture film beyond the extent of the component	No fault present		Check, if repair is necessary	No fault present
Measurable leakage	Recognisable stream, dripping	Repair recommended			
Temporary leakage	Temporary malfunction of the sealing system or oil leak due to transport *)	No fault present		Check, if repair is necessary	No fault present
Apparent leakage	Apparent leakage, e.g. due to soiling or sealing systems, which can be re-lubricated	No fault present			

Table 16: Definition of leakage according to DIN 3761

*) Previous experience has shown that moist or wet radial shaft seals stop leaking in the further process. Therefore, under no circumstances can replacement be recommended at this stage. The reason for momentary moisture may be e.g. small particles under the sealing lip.

7.6 Repair information

For enquiries to our technical and mechanical service department, please have the exact gear unit type and, if applicable, the order number to hand. You can find this information on the name plate.

7.6.1 Repairs

In case of repair, remove all non-original parts from the gear unit or geared motor. No guarantee can be given for any attached parts, such as rotary encoders or external fans.

Send the device to the following address:

Getriebebau NORD GmbH & Co. KG
Serviceabteilung
Getriebebau-Nord-Straße 1
22941 Bargteheide

Information

If possible, state the reason for returning the component/device. Specify a contact person for queries.

This is important in order to keep repair times as short as possible.

7.6.2 Internet information

In addition, you will find the manuals in the available languages on our website: www.nord.com.

7.7 Warranty

NORD GmbH & Co. KG accepts no liability for damage to persons, materials or assets as a result of failure to observe this operating manual, operating errors or incorrect use. General wearing parts, e.g. radial seals are excluded from the warranty.

7.8 Abbreviations

2D	Dust explosion-proof gear units, Zone 21
2G	Gas explosion-proof gear units, Zone 1
3D	Dust explosion-proof gear units, Zone 22
ATEX	**AT**mosphrères **EX**plosible
B5	Flange fastening with through holes
B14	Flange fastening with threaded holes
CLP	Mineral oil
CLP HC	Synthetic polyalphaolefin oil
CLP PG	Synthetic polyglycol oil
cSt	Centistokes
CW	Clockwise, right rotation
CCW	Counter-clockwise, left rotation
°dH	Water hardness in German hardness degrees 1 dH = 0.1783 mmol/l
DIN	Deutsches Institut für Normung [*German Institute for Standardisation*]
E	Ester oil
EC	European Community
EN	European standard
F_R	Radial force
F_A	Axial force
H1	Lubricant for the food industry
IE1	Standard efficiency motors
IE2	High efficiency motors
IEC	International Electrotechnical Commission
NEMA	National Electrical Manufacturers Association
IP55	International protection
ISO	International standardisation organisation
pH	pH value
PPE	Personal Protective Equipment
DIR	Directive
UKCA	UK Conformity Assessed
VCI	Volatile Corrosion Inhibitor
VG	Viscosity group
WN	Document from Getriebebau NORD

Key word index

A

Activating the vent 40
Address....75

C

Change the oil 50
Check the hose....49
Checking the oil level....48
Cooling coil 43
Cooling system 36
Covers 30

D

Disposal of materials 52

E

Electric motor....39
Electrical connection....39

F

Fault....73

G

Gear unit types 13
General overhaul 51
GRIPMAXX™ 28

H

H66 option 23
Hollow shaft with GRIPMAXX™ (Option M)..28
Hose union 72

I

Installation....18
Intended use....10
Internet....75
Introduction of forces 21

L

Leakage....74
Long-term storage 17
Lubricant dispenser 41, 50
Lubricant quantities 69
Lubricants 69

M

Maintenance 75
Maintenance intervals 46
Maintenance work
- Check for running noises 47
- Checking the oil level 48
- Leaks 47
- Lubricant dispenser 49
- Oil change 50
- Radial shaft seal 51
- Re-greasing VL2, VL3, W and AI/AN 49
- Vent screw.... 51
- Visual inspection 47

Motor 39

N

Name plate.... 15
nsd tupH.... 18

O

Oil level 40
Option M 28
Options.... 14

P

Pulling device.... 21
Push-on gear unit.... 23

R

Radial shaft seal 51
Re-grease the bearings 51
Re-greasing 49
Repairs.... 75
Roller bearing greases.... 69
Running noises 47
Running-in time.... 44

S

Safety information 10
Service 75

Service intervals 46
Shrink disc 26, 28
Standard motor 33
Surface treatment
nsd tupH 18

T

Tightening torques 72
Transport 11, 16

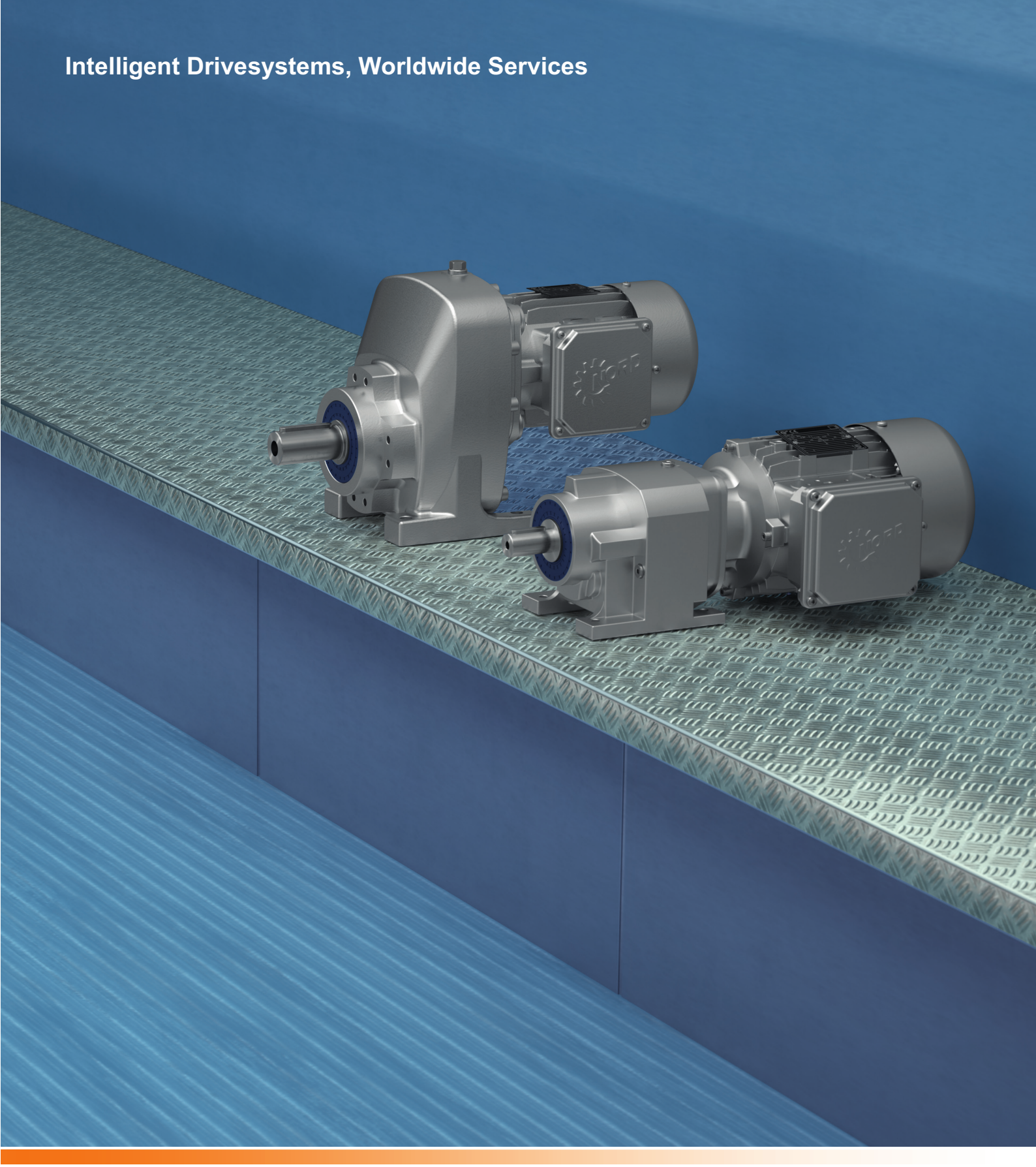
V

Vent 40
Vent screw 51
Visual inspection 47
Visual inspection of hose 49

Headquarters
Getriebebau NORD GmbH & Co. KG
Getriebebau-Nord-Str. 1
22941 Bargteheide, Deutschland
T: +49 45 32 / 289 0
F: +49 45 32 / 289 22 53
info@nord.com

6052802 / 2424

Intelligent Drivesystems, Worldwide Services



DE EN FR

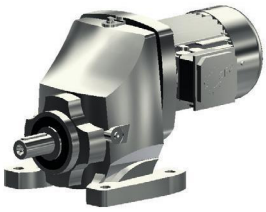
PL1011

Ersatzteilkatalog NORDBLOC
Spare parts catalogue NORDBLOC
Catalogue de pièces de rechange NORDBLOC

NORD® DRIVESYSTEMS



Allgemeine Ersatzteile
General parts list
Vues éclatées et nomenclature

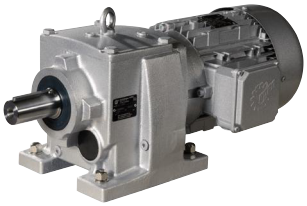


NORDBLOC.1 - Stirnradgetriebe
NORDBLOC.1 - Helical Gear Units
NORDBLOC.1 - Réducteurs à engrenages cylindriques

SK 071.1 - SK 771.1 ..... 4 - 7
SK 871.1 - SK 1071.1 ..... 8 - 11
SK 072.1 - SK 672.1 ..... 12 - 13
SK 772.1 - SK 972.1 ..... 14 - 15
SK 373.1 - SK 673.1 ..... 16 - 17
SK 773.1 - SK 973.1 ..... 18 - 19

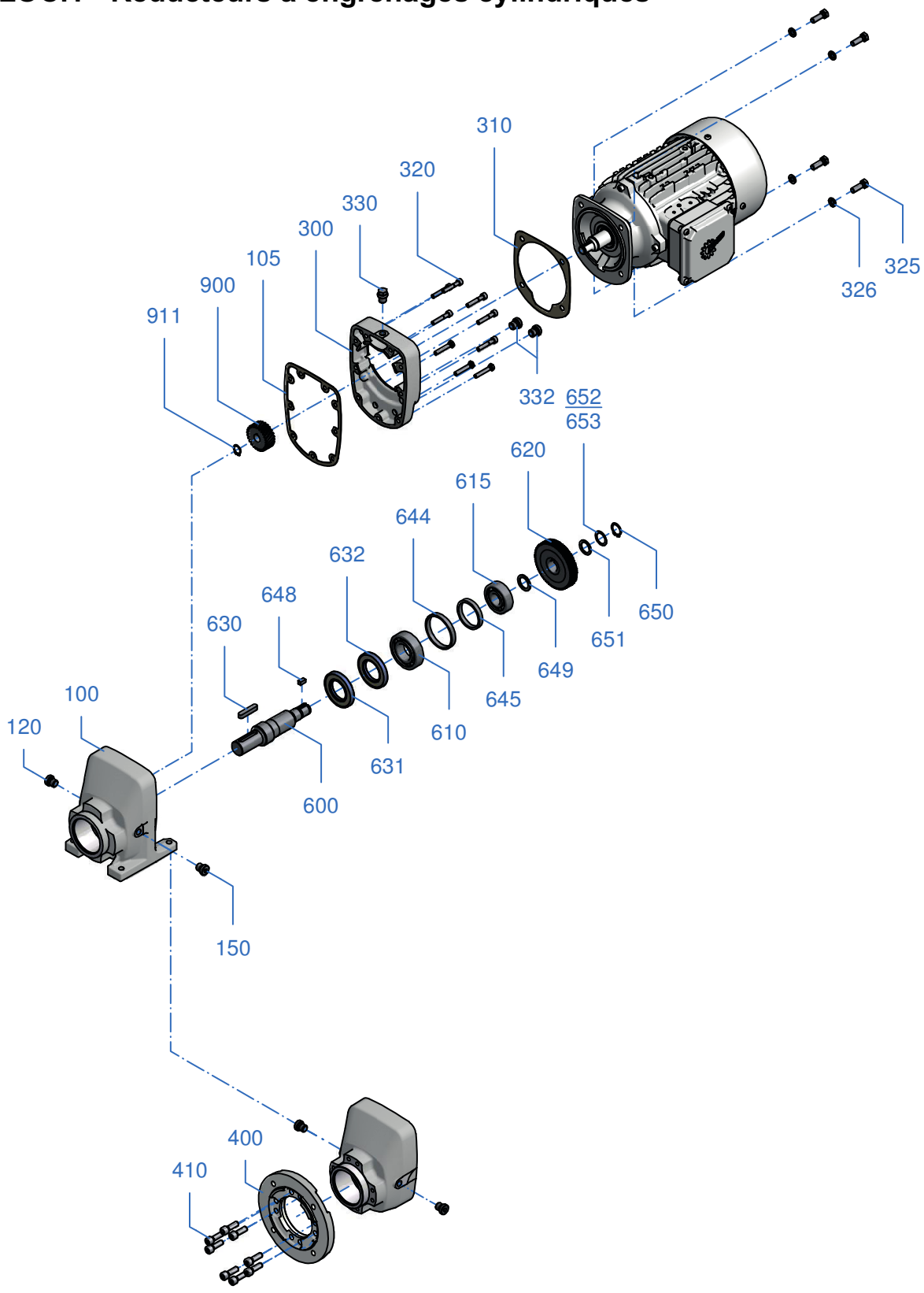


Bestellangaben ..... 20 - 21
Order details
Informations de commande



NORDBLOC.1 - Stirnradgetriebe
NORDBLOC.1 - Helical Gear Unit
NORDBLOC.1 - Reducteurs à engrenages cylindriques

EB 553 9000 E3 #1





SK 071.1 - SK 771.1

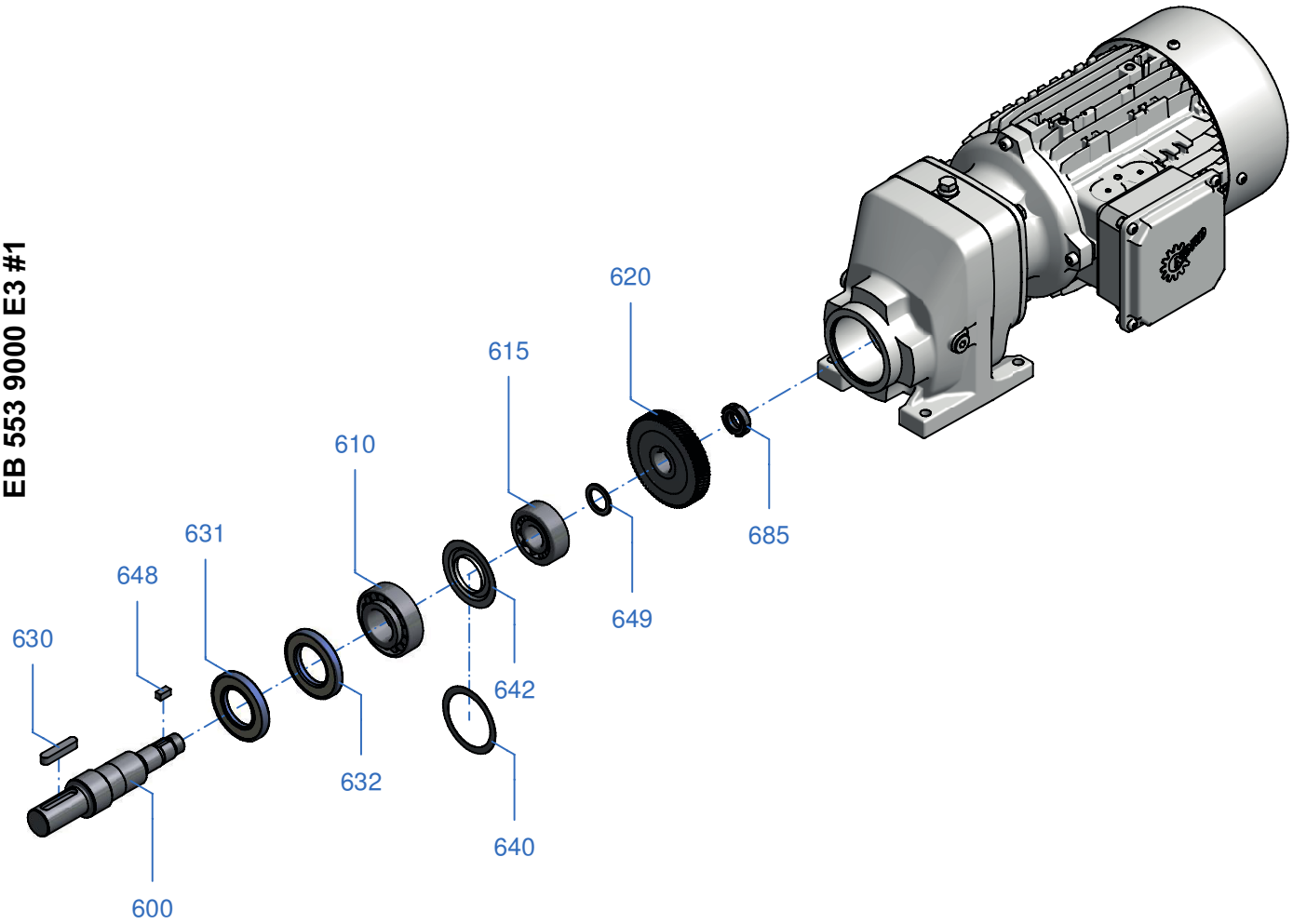
DE		GB		FR	
100	Gehäuse	100	Housing	100	Boîtier
105	Dichtung	105	Seal	105	Bague d‘étanchéité
120	Schraube	120	Screw	120	Vis
150	Schraube	150	Screw	150	Vis
300	Getriebedeckel	300	Gear unit cover	300	Couvercle du réducteur
310	Dichtung	310	Seal	310	Bague d‘étanchéité
320	Schraube	320	Screw	320	Vis
325	Schraube	325	Screw	325	Vis
326	Federring	326	Lock washer	326	Rondelle élastique
330	Schraube	330	Screw	330	Vis
332	Schraube	332	Screw	332	Vis
400	Flansch	400	Flange	400	Bride
410	Schraube	410	Screw	410	Vis
600	Abtriebswelle	600	Output shaft	600	Arbre de sortie
610	Wälzlager	610	Roller bearing	610	Palier
615	Wälzlager	615	Roller bearing	615	Palier
620	Abtriebsrad	620	Output gear	620	Roue de sortie
630	Passfeder	630	Key	630	Clavette
631	Wellendichtring	631	Radial shaft seal	631	Bague d‘étanchéité de l‘arbre
632	Wellendichtring	632	Radial shaft seal	632	Bague d‘étanchéité de l‘arbre
644	Buchse	644	Socket	644	Douille
645	Buchse	645	Socket	645	Douille
648	Passfeder	648	Key	648	Clavette
649	Buchse	649	Socket	649	Douille
650	Sicherungsring	650	Circlip	650	Circlip
651	Stützscheibe	651	Supporting disc	651	Rondelle support
652	Passscheibe	652	Shim	652	Rondelles d‘ajustage
653	Passscheibe	653	Shim	653	Rondelles d‘ajustage
900	Antriebsritzel	900	Driving pinion	900	Pignon d‘entrée
911	Sicherungsring	911	Circlip	911	Circlip



DRIVESYSTEMS

NORDBLOC.1 - Stirnradgetriebe mit verstärkter Lagerung VL
NORDBLOC.1 - Helical Gear Unit with reinforced bearing VL
NORDBLOC.1 - Reducteurs à engrenages cylindriques avec roulements renforcés VL

EB 553 9000 E3 #1



Restliche Getriebeteile siehe Ersatzteilkatalog NORDBLOC Stirnradgetriebe

Remaining gear parts see catalogue NORDBLOC Helical Inline Gear Unit



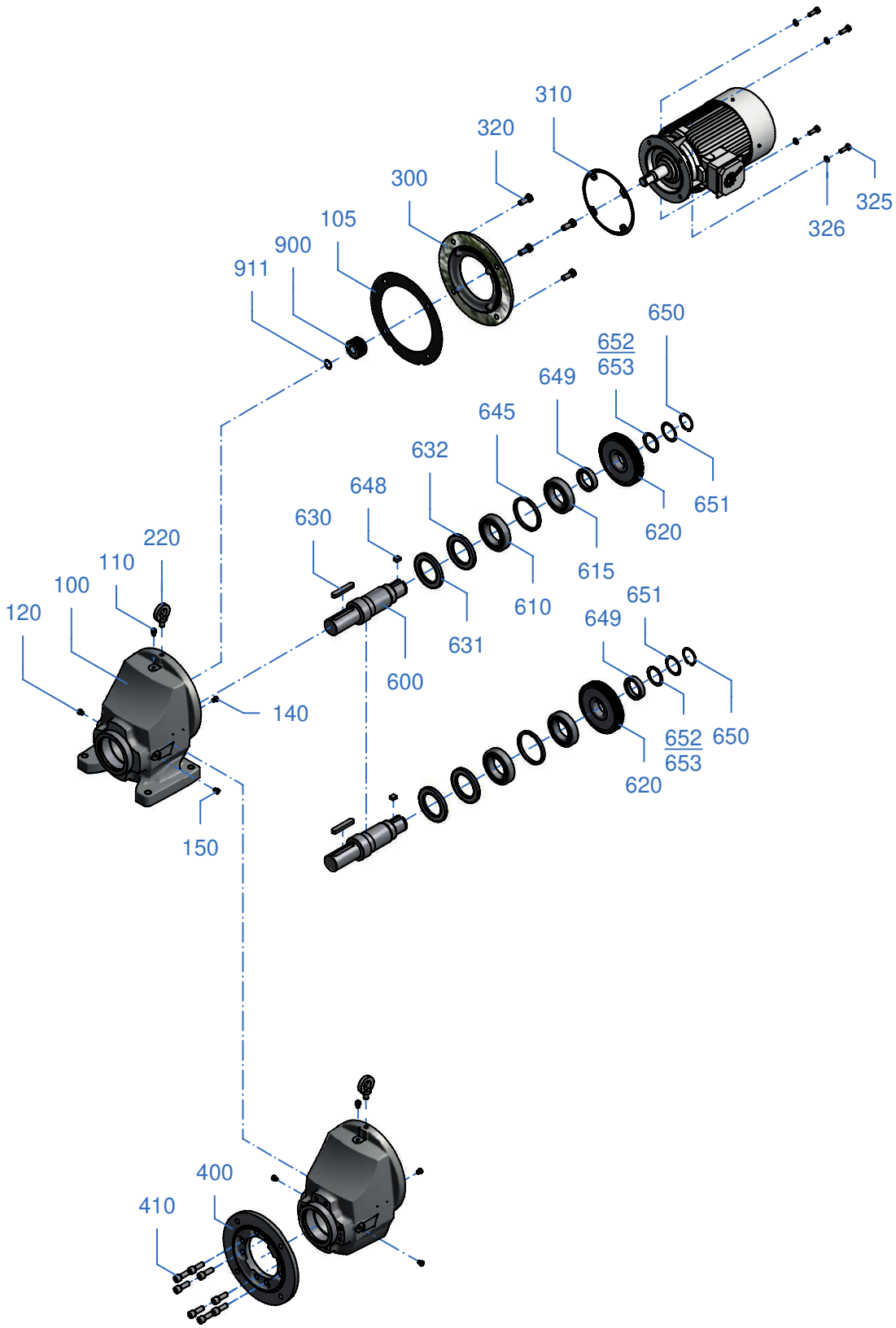
DE		GB		FR	
600	Abtriebswelle	600	Output shaft	600	Arbre de sortie
610	Wälzlager	610	Roller bearing	610	Palier
615	Wälzlager	615	Roller bearing	615	Palier
620	Abtriebsrad	620	Output gear	620	Roue de sortie
630	Passfeder	630	Key	630	Clavette
631	Wellendichtring	631	Radial shaft seal	631	Bague d‘étanchéité de l‘arbre
632	Wellendichtring	632	Radial shaft seal	632	Bague d‘étanchéité de l‘arbre
640	Passscheibe	640	Shim	640	Rondelles d‘ajustage
642	Nilosring	642	Nilos-ring	642	Bague Nilos
648	Passfeder	648	Key	648	Clavette
649	Buchse	649	Socket	649	Douille
685	Nutmutter	685	Locknut	685	Écrou à encoches



DRIVESYSTEMS

NORDBLOC.1 - Stirnradgetriebe
NORDBLOC.1 - Helical Gear Unit
NORDBLOC.1 - Reducteurs à engrenages cylindriques

EB 556 9000 E1 #1



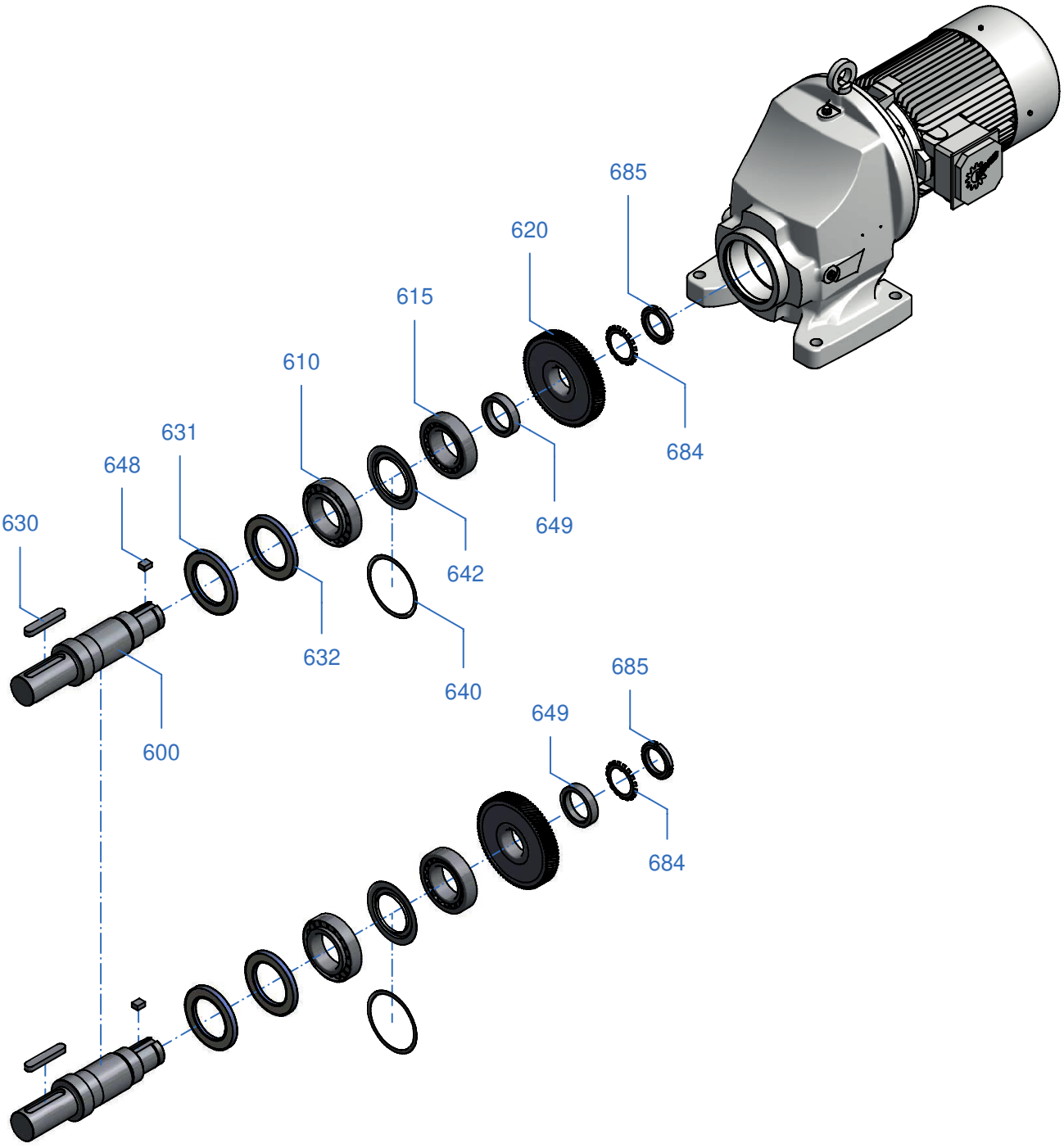


SK 871.1 - SK 1071.1

DE		GB		FR	
100	Gehäuse	100	Housing	100	Boîtier
105	Dichtung	105	Seal	105	Bague d‘étanchéité
110	Schraube	120	Screw	120	Vis
120	Schraube	120	Screw	120	Vis
140	Schraube	120	Screw	120	Vis
150	Schraube	150	Screw	150	Vis
220	Schraube	120	Screw	120	Vis
300	Getriebedeckel	300	Gear unit cover	300	Couvercle du réducteur
310	Dichtung	310	Seal	310	Bague d‘étanchéité
320	Schraube	320	Screw	320	Vis
325	Schraube	325	Screw	325	Vis
326	Federring	326	Lock washer	326	Rondelle élastique
400	Flansch	400	Flange	400	Bride
410	Schraube	410	Screw	410	Vis
600	Abtriebswelle	600	Output shaft	600	Arbre de sortie
610	Wälzlager	610	Roller bearing	610	Palier
615	Wälzlager	615	Roller bearing	615	Palier
620	Abtriebsrad	620	Output gear	620	Roue de sortie
630	Passfeder	630	Key	630	Clavette
631	Wellendichtring	631	Radial shaft seal	631	Bague d‘étanchéité de l‘arbre
632	Wellendichtring	632	Radial shaft seal	632	Bague d‘étanchéité de l‘arbre
645	Buchse	645	Socket	645	Douille
648	Passfeder	648	Key	648	Clavette
649	Buchse	649	Socket	649	Douille
650	Sicherungsring	650	Circlip	650	Circlip
651	Stützscheibe	651	Supporting disc	651	Rondelle support
652	Passscheibe	652	Shim	652	Rondelles d‘ajustage
653	Passscheibe	653	Shim	653	Rondelles d‘ajustage
900	Antriebsritzel	900	Driving pinion	900	Pignon d‘entrée
911	Sicherungsring	911	Circlip	911	Circlip

NORDBLOC.1 - Stirnradgetriebe mit verstärkter Lagerung VL
NORDBLOC.1 - Helical Gear Unit with reinforced bearing VL
NORDBLOC.1 - Reducteurs à engrenages cylindriques avec roulements renforcés VL

EB 556 9000 E1 #2

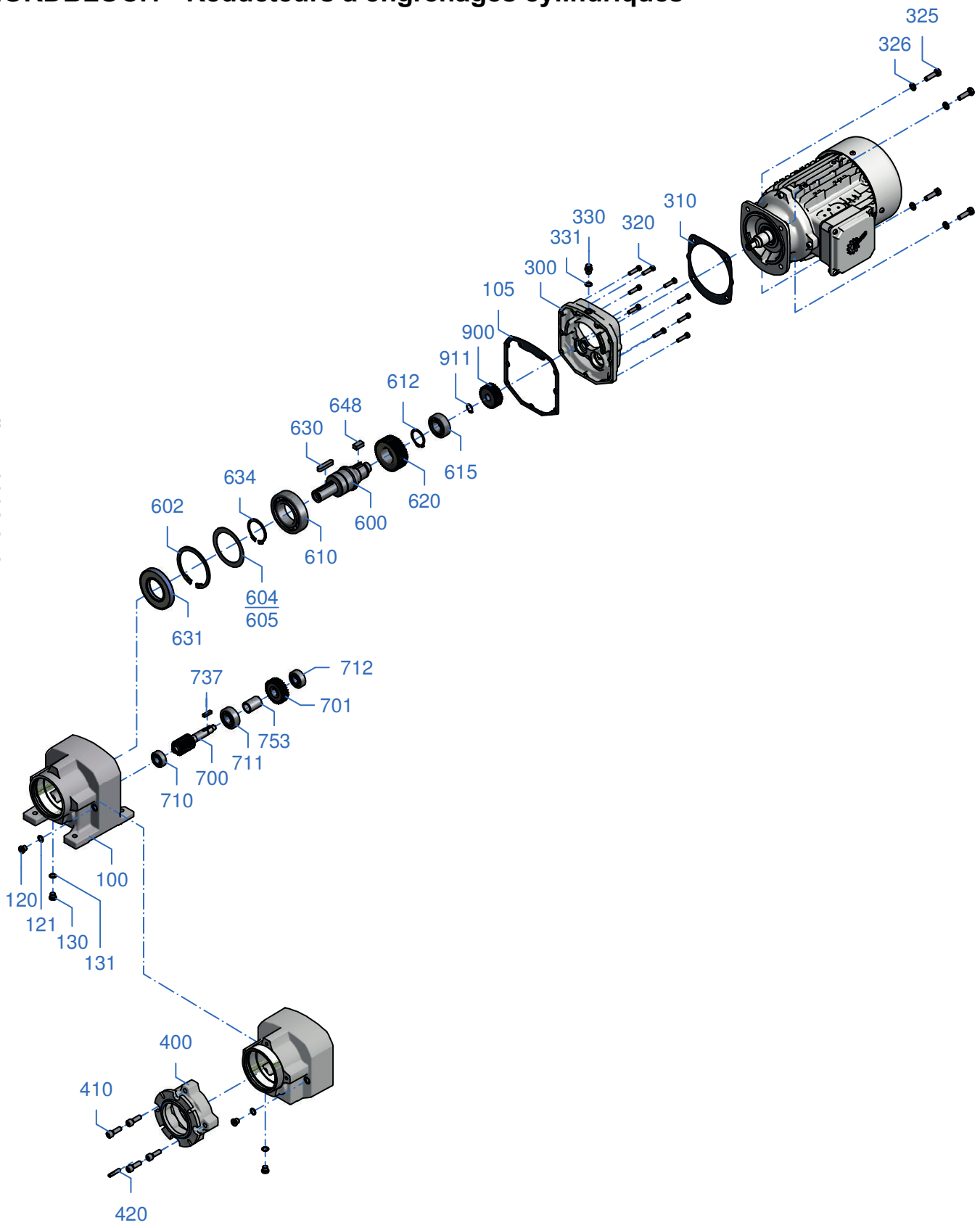




DE		GB		FR	
600	Abtriebswelle	600	Output shaft	600	Arbre de sortie
610	Wälzlager	610	Roller bearing	610	Palier
615	Wälzlager	615	Roller bearing	615	Palier
620	Abtriebsrad	620	Output gear	620	Roue de sortie
630	Passfeder	630	Key	630	Clavette
631	Wellendichtring	631	Radial shaft seal	631	Bague d‘étanchéité de l‘arbre
632	Wellendichtring	632	Radial shaft seal	632	Bague d‘étanchéité de l‘arbre
640	Passscheibe	640	Shim	640	Rondelles d‘ajustage
642	Nilosring	642	Nilos-ring	642	Bague Nilos
648	Passfeder	648	Key	648	Clavette
649	Buchse	649	Socket	649	Douille
684	Sicherungsblech	684	Securing plate	684	Tôle de sécurité
685	Nutmutter	685	Locknut	685	Écrou à encoches

NORDBLOC.1 - Stirnradgetriebe
NORDBLOC.1 - Helical Gear Unit
NORDBLOC.1 - Reducteurs à engrenages cylindriques

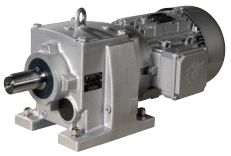
EB 573 9000 E1 #1





SK 072.1 - SK 672.1

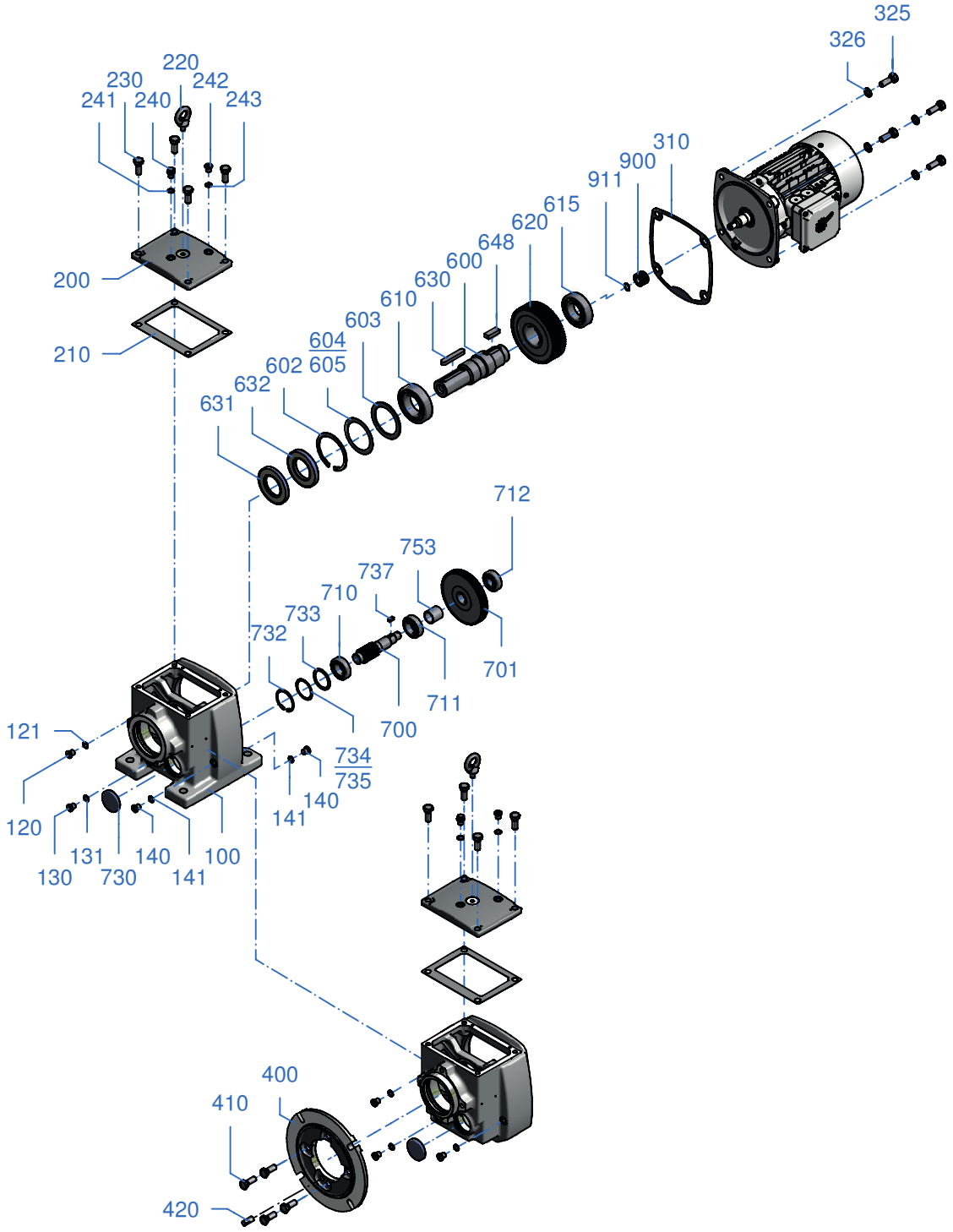
DE		GB		FR	
100	**Gehäuse**	100	Housing	1100	Boîtier
105	**Dichtung**	105	Seal	105	Bague d‘étanchéité
120	**Schraube**	120	Screw	120	Vis
121	**Dichtung**	121	Seal	121	Bague d‘étanchéité
130	**Schraube**	130	Screw	130	Vis
131	**Dichtung**	131	Seal	131	Bague d‘étanchéité
300	**Getriebedeckel**	300	Gear unit cover	300	Couvercle du réducteur
310	**Dichtung**	310	Seal	310	Bague d‘étanchéité
320	**Schraube**	320	Screw	320	Vis
325	**Schraube**	325	Screw	325	Vis
326	**Federring**	326	Lock washer	326	Rondelle élastique
330	**Schraube**	330	Screw	330	Vis
331	**Dichtung**	331	Seal	331	Bague d‘étanchéité
400	**Flansch**	400	Flange	400	Bride
410	**Schraube**	410	Screw	410	Vis
420	**Stift**	420	Pin	420	Goupille
600	**Abtriebswelle**	600	Output shaft	600	Arbre de sortie
602	**Sicherungsring**	602	Circlip	602	Circlip
604	**Passscheibe**	604	Shim	604	Rondelles d‘ajustage
605	**Passscheibe**	605	Shim	605	Rondelles d‘ajustage
610	**Wälzlager**	610	Roller bearing	610	Palier
612	**Sicherungsring**	612	Circlip	612	Circlip
615	**Wälzlager**	615	Roller bearing	615	Palier
620	**Abtriebsrad**	620	Output gear	620	Roue de sortie
630	**Passfeder**	630	Key	630	Clavette
631	**Wellendichtring**	631	Radial shaft seal	631	Bague d‘étanchéité de l‘arbre
634	**Sicherungsring**	634	Circlip	634	Circlip
648	**Passfeder**	648	Key	648	Clavette
700	**Ritzelwelle**	700	Pinion shaft	700	Arbre de pignon
701	**Antreibsrad**	701	Drive gear	701	Roue d‘entrée
710	**Wälzlager**	710	Roller bearing	710	Palier
711	**Wälzlager**	711	Roller bearing	711	Palier
712	**Wälzlager**	712	Roller bearing	712	Palier
737	**Passfeder**	737	Key	737	Clavette
753	**Buchse**	753	Socket	753	Douille
900	**Antriebsritzel**	900	Driving pinion	900	Pignon d‘entrée
911	**Sicherungsring**	911	Circlip	911	Circlip

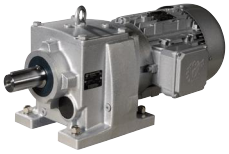


DRIVESYSTEMS

NORDBLOC.1 - Stirnradgetriebe
NORDBLOC.1 - Helical Gear Unit
NORDBLOC.1 - Reducteurs à engrenages cylindriques

EB 577 9000 E3 #1

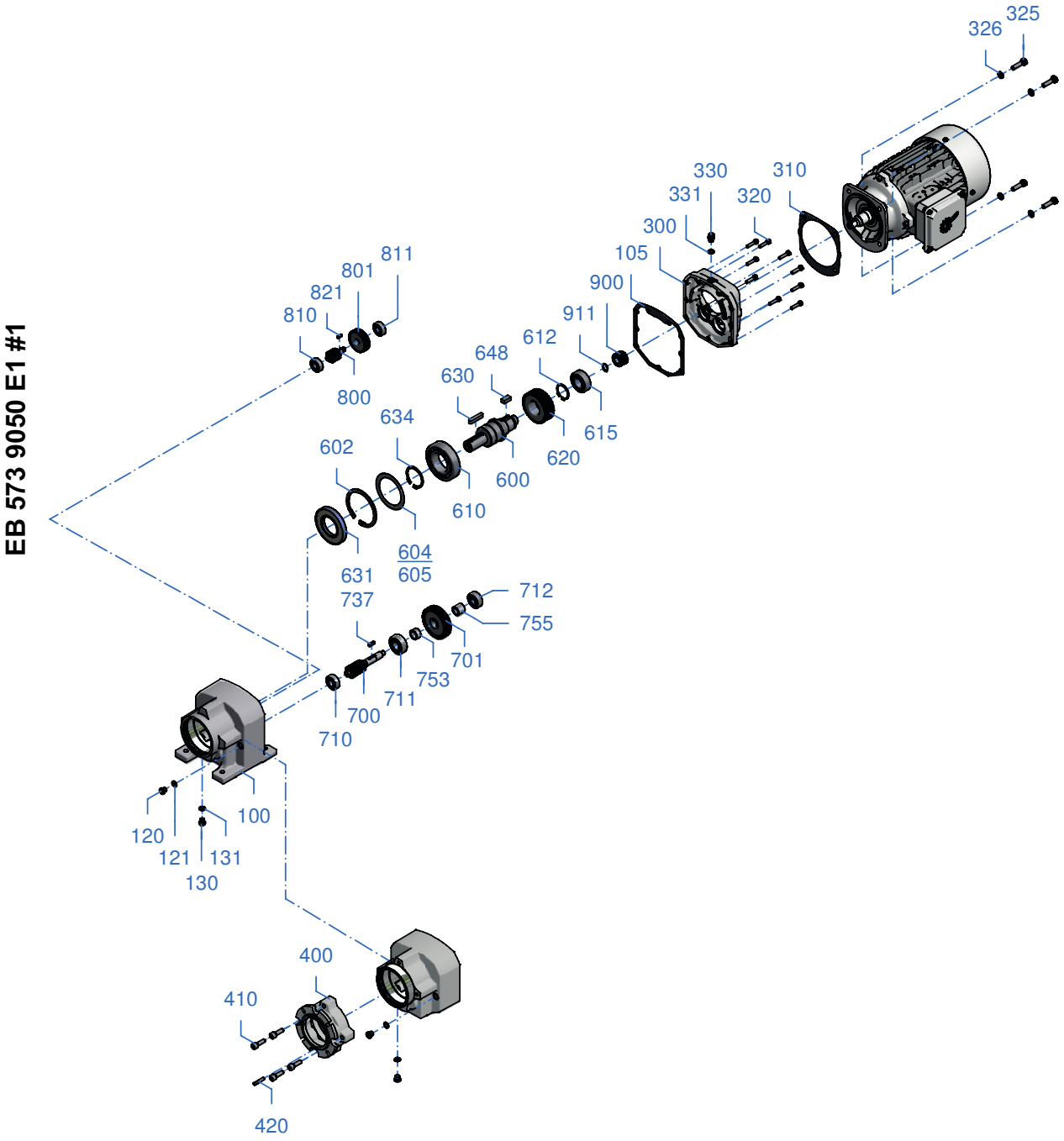




SK 772.1 - SK 972.1

DE		GB		FR	
100	Gehäuse	100	Housing	100	Boîtier
120	Schraube	120	Screw	120	Vis
121	Dichtung	121	Seal	121	Bague d'étanchéité
130	Schraube	130	Screw	130	Vis
131	Dichtung	131	Seal	131	Bague d'étanchéité
140	Schraube	140	Screw	140	Vis
141	Dichtung	141	Seal	141	Bague d'étanchéité
200	Gehäusedeckel	200	Housing cover	200	Couvercle du carter
210	Dichtung	210	Seal	210	Bague d'étanchéité
220	Schraube	220	Screw	220	Vis
230	Schraube	230	Screw	230	Vis
240	Schraube	240	Screw	240	Vis
241	Dichtung	241	Seal	241	Bague d'étanchéité
242	Schraube	242	Screw	242	Vis
243	Dichtung	243	Seal	243	Bague d'étanchéité
310	Dichtung	310	Seal	310	Bague d'étanchéité
325	Schraube	325	Screw	325	Vis
326	Federring	326	Lock washer	326	Rondelle élastique
400	Flansch	400	Flange	400	Bride
410	Schraube	410	Screw	410	Vis
420	Stift	420	Pin	420	Goupille
600	Abtriebswelle	600	Output shaft	600	Arbre de sortie
602	Sicherungsring	602	Circlip	602	Circlip
603	Stützscheibe	603	Supporting disc	603	Rondelle d'appui
604	Passscheibe	604	Shim	604	Rondelles d'ajustage
605	Passscheibe	605	Shim	605	Rondelles d'ajustage
610	Wälzlager	610	Roller bearing	610	Palier
615	Wälzlager	615	Roller bearing	615	Palier
620	Abtriebsrad	620	Output gear	620	Roue de sortie
630	Passfeder	630	Key	630	Clavette
631	Wellendichtring	631	Radial shaft seal	631	Bague d'étanchéité de l'arbre
632	Wellendichtring	632	Radial shaft seal	632	Bague d'étanchéité de l'arbre
648	Passfeder	648	Key	648	Clavette
700	Ritzelwelle	700	Pinion shaft	700	Arbre de pignon
701	Antriebsrad	701	Drive gear	701	Roue d'entrée
710	Wälzlager	710	Roller bearing	710	Palier
711	Wälzlager	711	Roller bearing	711	Palier
712	Wälzlager	712	Roller bearing	712	Palier
730	Verschlusskappe	730	Sealing cap	730	Bouchon
732	Sicherungsring	732	Circlip	732	Circlip
733	Stützscheibe	733	Supporting disc	733	Rondelle support
734	Passscheibe	734	Shim	734	Rondelles d'ajustage
735	Passscheibe	735	Shim	735	Rondelles d'ajustage
737	Passfeder	737	Key	737	Clavette
753	Buchse	753	Socket	753	Douille
900	Antriebsritzel	900	Driving pinion	900	Pignon d'entrée
911	Sicherungsring	911	Circlip	911	Circlip

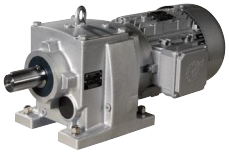
NORDBLOC.1 - Stirnradgetriebe
NORDBLOC.1 - Helical Gear Unit
NORDBLOC.1 - Reducteurs à engrenages cylindriques





SK 373.1 - SK 673.1

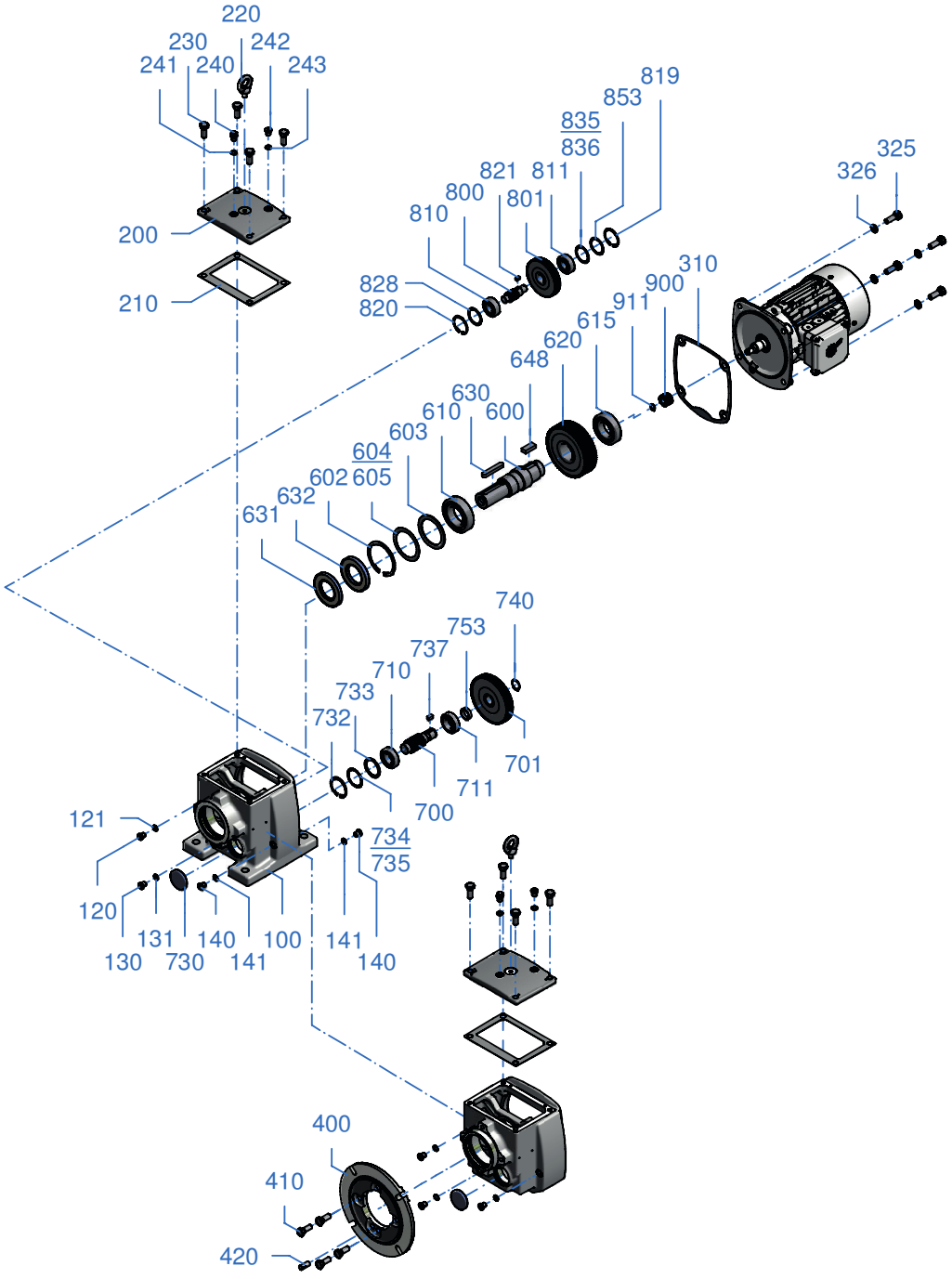
DE		GB		FR	
100	**Gehäuse**	100	Housing	100	Boîtier
105	**Dichtung**	105	Seal	105	Bague d'étanchéité
120	**Schraube**	120	Screw	120	Vis
121	**Dichtung**	121	Seal	121	Bague d'étanchéité
130	**Schraube**	130	Screw	130	Vis
131	**Dichtung**	131	Seal	131	Bague d'étanchéité
300	**Getriebedeckel**	300	Gear unit cover	300	Couvercle du réducteur
310	**Dichtung**	310	Seal	310	Bague d'étanchéité
320	**Schraube**	320	Screw	320	Vis
325	**Schraube**	325	Screw	325	Vis
326	**Federring**	326	Lock washer	326	Rondelle élastique
330	**Schraube**	330	Screw	330	Vis
331	**Dichtung**	331	Seal	331	Bague d'étanchéité
400	**Flansch**	400	Flange	400	Bride
410	**Schraube**	410	Screw	410	Vis
420	**Stift**	420	Pin	420	Goupille
600	**Abtriebswelle**	600	Output shaft	600	Arbre de sortie
602	**Sicherungsring**	602	Circlip	602	Circlip
604	**Passscheibe**	604	Shim	604	Rondelles d'ajustage
605	**Passscheibe**	605	Shim	605	Rondelles d'ajustage
610	**Wälzlager**	610	Roller bearing	610	Palier
612	**Sicherungsring**	612	Circlip	612	Circlip
615	**Wälzlager**	615	Roller bearing	615	Palier
620	**Abtriebsrad**	620	Output gear	620	Roue de sortie
630	**Passfeder**	630	Key	630	Clavette
631	**Wellendichtring**	631	Radial shaft seal	631	Bague d'étanchéité de l'arbre
634	**Sicherungsring**	634	Circlip	634	Circlip
648	**Passfeder**	648	Key	648	Clavette
700	**Ritzelwelle**	700	Pinion shaft	700	Arbre de pignon
701	**Antriebsrad**	701	Drive gear	701	Roue d'entrée
710	**Wälzlager**	710	Roller bearing	710	Palier
711	**Wälzlager**	711	Roller bearing	711	Palier
712	**Wälzlager**	712	Roller bearing	712	Palier
737	**Passfeder**	737	Key	737	Clavette
753	**Buchse**	753	Socket	753	Douille
755	**Buchse**	755	Socket	755	Douille
800	**Ritzelwelle**	800	Pinion shaft	800	Arbre de pignon
801	**Antriebsrad**	801	Drive gear	801	Roue d'entrée
810	**Wälzlager**	810	Roller bearing	810	Palier
811	**Wälzlager**	811	Roller bearing	811	Palier
821	**Passfeder**	821	Key	821	Clavette
900	**Antriebsritzel**	900	Driving pinion	900	Pignon d'entrée
911	**Sicherungsring**	911	Circlip	911	Circlip

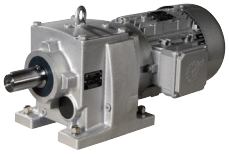


DRIVESYSTEMS

NORDBLOC.1 - Stirnradgetriebe
NORDBLOC.1 - Helical Gear Unit
NORDBLOC.1 - Reducteurs à engrenages cylindriques

EB 577 9050 E4 #1





SK 773.1 - SK 973.1

DE		GB		FR	
100	Gehäuse	1100	Housing	100	Boîtier
120	Schraube	120	Screw	120	Vis
121	Dichtung	121	Seal	121	Bague d‘étanchéité
130	Schraube	130	Screw	130	Vis
131	Dichtung	131	Seal	131	Bague d‘étanchéité
140	Schraube	140	Screw	140	Vis
141	Dichtung	141	Seal	141	Bague d‘étanchéité
200	Gehäusedeckel	200	Housing cover	200	Couvercle du carter
210	Dichtung	210	Seal	210	Bague d‘étanchéité
220	Schraube	220	Screw	220	Vis
230	Schraube	230	Screw	230	Vis
240	Schraube	240	Screw	240	Vis
241	Dichtung	241	Seal	241	Bague d‘étanchéité
242	Schraube	242	Screw	242	Vis
243	Dichtung	243	Seal	243	Bague d‘étanchéité
310	Dichtung	310	Seal	310	Bague d‘étanchéité
325	Schraube	325	Screw	325	Vis
326	Federring	326	Lock washer	326	Rondelle élastique
400	Flansch	400	Flange	400	Bride
410	Schraube	410	Screw	410	Vis
420	Stift	420	Pin	420	Goupille
600	Abtriebswelle	600	Output shaft	600	Arbre de sortie
602	Sicherungsring	602	Circlip	602	Circlip
603	Stützscheibe	603	Supporting disc	603	Rondelle d’appui
604	Passscheibe	604	Shim	604	Rondelles d‘ajustage
605	Passscheibe	605	Shim	605	Rondelles d‘ajustage
610	Wälzlager	610	Roller bearing	610	Palier
615	Wälzlager	615	Roller bearing	615	Palier
620	Abtriebsrad	620	Output gear	620	Roue de sortie
630	Passfeder	630	Key	630	Clavette
631	Wellendichtring	631	Radial shaft seal	631	Bague d‘étanchéité de l‘arbre
632	Wellendichtring	632	Radial shaft seal	632	Bague d‘étanchéité de l‘arbre
648	Passfeder	648	Key	648	Clavette
700	Ritzelwelle	700	Pinion shaft	700	Arbre de pignon
701	Antriebsrad	701	Drive gear	701	Roue d‘entrée
710	Wälzlager	710	Roller bearing	710	Palier
711	Wälzlager	711	Roller bearing	711	Palier
730	Verschlusskappe	730	Sealing cap	730	Bouchon
732	Sicherungsring	732	Circlip	732	Circlip
733	Stützscheibe	733	Supporting disc	733	Rondelle d’appui
734	Passscheibe	734	Shim	734	Rondelles d‘ajustage
735	Passscheibe	735	Shim	735	Rondelles d‘ajustage
737	Passfeder	737	Key	737	Clavette
740	Sicherungsring	740	Circlip	740	Circlip
753	Buchse	753	Socket	753	Douille
800	Ritzelwelle	800	Pinion shaft	800	Arbre de pignon
801	Antriebsrad	801	Drive gear	801	Roue d‘entrée
810	Wälzlager	810	Roller bearing	810	Palier
811	Wälzlager	811	Roller bearing	811	Palier
819	Sicherungsring	819	Circlip	819	Circlip
820	Sicherungsring	820	Circlip	820	Circlip
821	Passfeder	821	Key	821	Clavette
828	Stützscheibe	828	Supporting disc	828	Rondelle support
835	Passscheibe	835	Shim	835	Rondelles d‘ajustage
836	Passscheibe	836	Shim	836	Rondelles d‘ajustage
853	Stützscheibe	853	Supporting disc	853	Rondelle d’appui
900	Antriebsritzel	900	Driving pinion	900	Pignon d‘entrée
911	Sicherungsring	911	Circlip	911	Circlip

Bestellangaben
Order details
Informations de commande

Kontaktdaten / Contact details / Contacts:

Firma / Company / Entreprise:

Straße / Street / Rue

Stadt / Town / Ville:

PLZ / Postcode/
Code postal:

Telefon / Telephone / Téléphone:

Fax:

E-mail:





Getriebebau NORD

Getriebebau-Nord-Straße 1
D-22941 Bargteheide
Telefon +49(0) 4532/289-0
Telefax +49(0)4532/289-2253
E-Mail info@nord.com
www.nord.com

DE

Diese NORD Ersatzteilliste beinhaltet eine standardisierte Darstellung der NORD Getriebe. Um Ihnen das Finden und Nachbestellen von Ersatzteilen zu erleichtern, finden Sie am Ende der Ersatzteilliste ein Bestellformular mit wichtigen Hinweisen zur Bestimmung der richtigen Teile.

Für Rückfragen stehen wir Ihnen gerne zur Verfügung. Ihren lokalen Ansprechpartner finden Sie unter http://locator.nord.com.

EN

This NORD spare parts list contains a standardised depiction of NORD gear units. In order to enable you to find and re-order replacement parts more easily, you can find an order form and important information regarding the identification of the correct components at the end of this spare parts list.

We will be glad to help you if you have any queries: You can find your local contact partner under http://locator.nord.com.

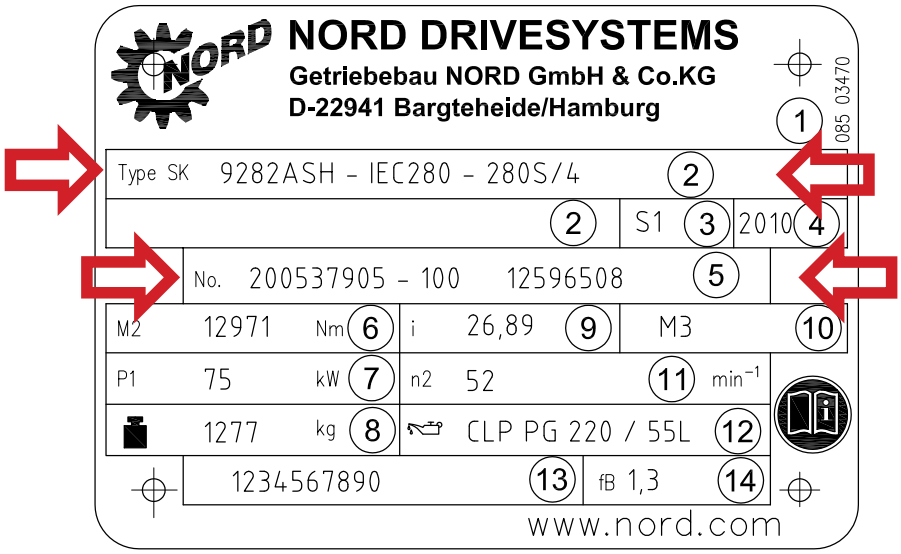
FR

Cette liste de pièces de rechange NORD contient une représentation standard des réducteurs NORD. Pour faciliter la recherche et la commande de pièces de rechange, un formulaire de commande se trouve à la fin de la liste des pièces de rechange et vous donne toutes les informations essentielles pour déterminer les pièces dont vous avez besoin.

En cas de questions, n'hésitez pas à nous contacter. Pour connaître votre interlocuteur local, veuillez consulter le site http://locator.nord.com.

Bestellangaben
Order details
Informations de commande

Erläuterung des Typenschildes
Explanation of the rating plate
Explication de la plaque signalétique



DE

1 Matrix – Barcode
2 NORD - Getriebetyp
3 Betriebsart
4 Herstellungsjahr
5 Fabrikationsnummer
6 Nenndrehmoment der Getriebeabtriebswelle
7 Antriebsleistung
8 Gewicht entsprechend Auftragsausführung
9 Gesamte Getriebeübersetzung
10 Einbaulage
11 Nenndrehzahl der Getriebeabtriebswelle
12 Schmierstoffart, -viskosität und –menge
13 Kundenmaterialnummer
14 Betriebsfaktor

EN

1 Matrix – Barcode
2 NORD gear unit type
3 Operating mode
4 Year of manufacture
5 Serial number
6 Rated torque of gear unit output shaft
7 Drive power
8 Weight according to ordered version
9 Overall gear unit ratio
10 Installation orientation
11 Rated speed of gear unit output shaft
12 Lubricant type, viscosity and quantity
13 Customer's part number
14 Operating factor

FR

1 Code matriciel, à barres
2 Type de réducteur NORD
3 Mode de fonctionnement
4 Année de fabrication
5 Numéro de série
6 Couple nominal de l'arbre de sortie du réducteur
7 Puissance d'entraînement
8 Poids selon l'exécution du contrat
9 Rapport de réduction total
10 Position de montage
11 Vitesse de rotation nominale de l'arbre de sortie du réducteur
12 Type de lubrifiant, viscosité et quantité
13 Numéro d'article client
14 Facteur de service

Ersatzteil-Bestellung / Replacement parts order / Commande de pièces de rechange:

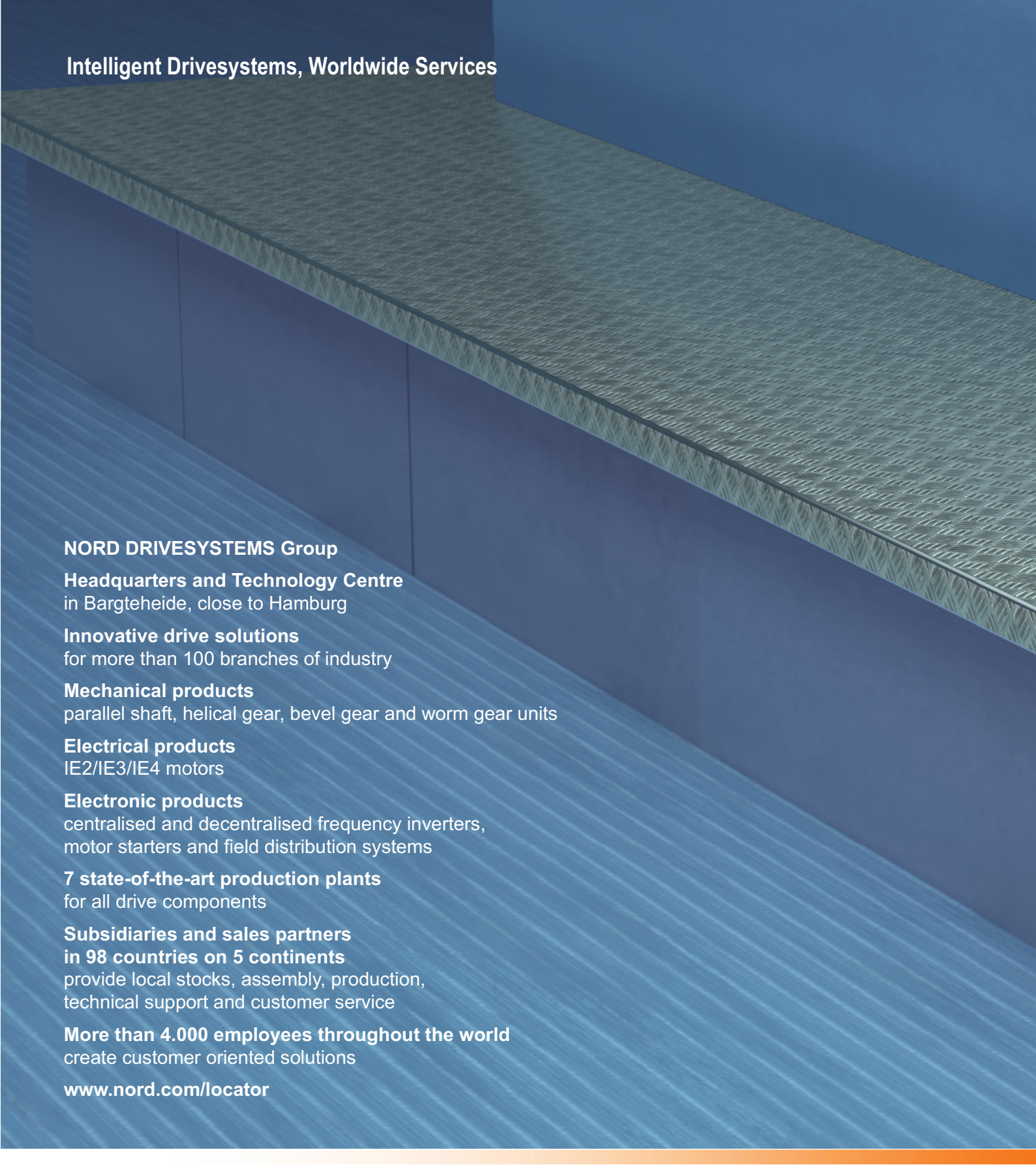
Bezeichnung / Designation / Désignation:

Pos.-Nr. / Item No. / N° pos :

Stückzahl / Pieces / Quantité:

Getriebetyp / Gear unit type / Type de réducteur:

Fabrikationsnummer / Serial No. / Numéro de série:



NORD DRIVESYSTEMS Group

Headquarters and Technology Centre
in Bargteheide, close to Hamburg

Innovative drive solutions
for more than 100 branches of industry

Mechanical products
parallel shaft, helical gear, bevel gear and worm gear units

Electrical products
IE2/IE3/IE4 motors

Electronic products
centralised and decentralised frequency inverters,
motor starters and field distribution systems

7 state-of-the-art production plants
for all drive components

Subsidiaries and sales partners
in 98 countries on 5 continents
provide local stocks, assembly, production,
technical support and customer service

More than 4.000 employees throughout the world
create customer oriented solutions

www.nord.com/locator

Headquarters:

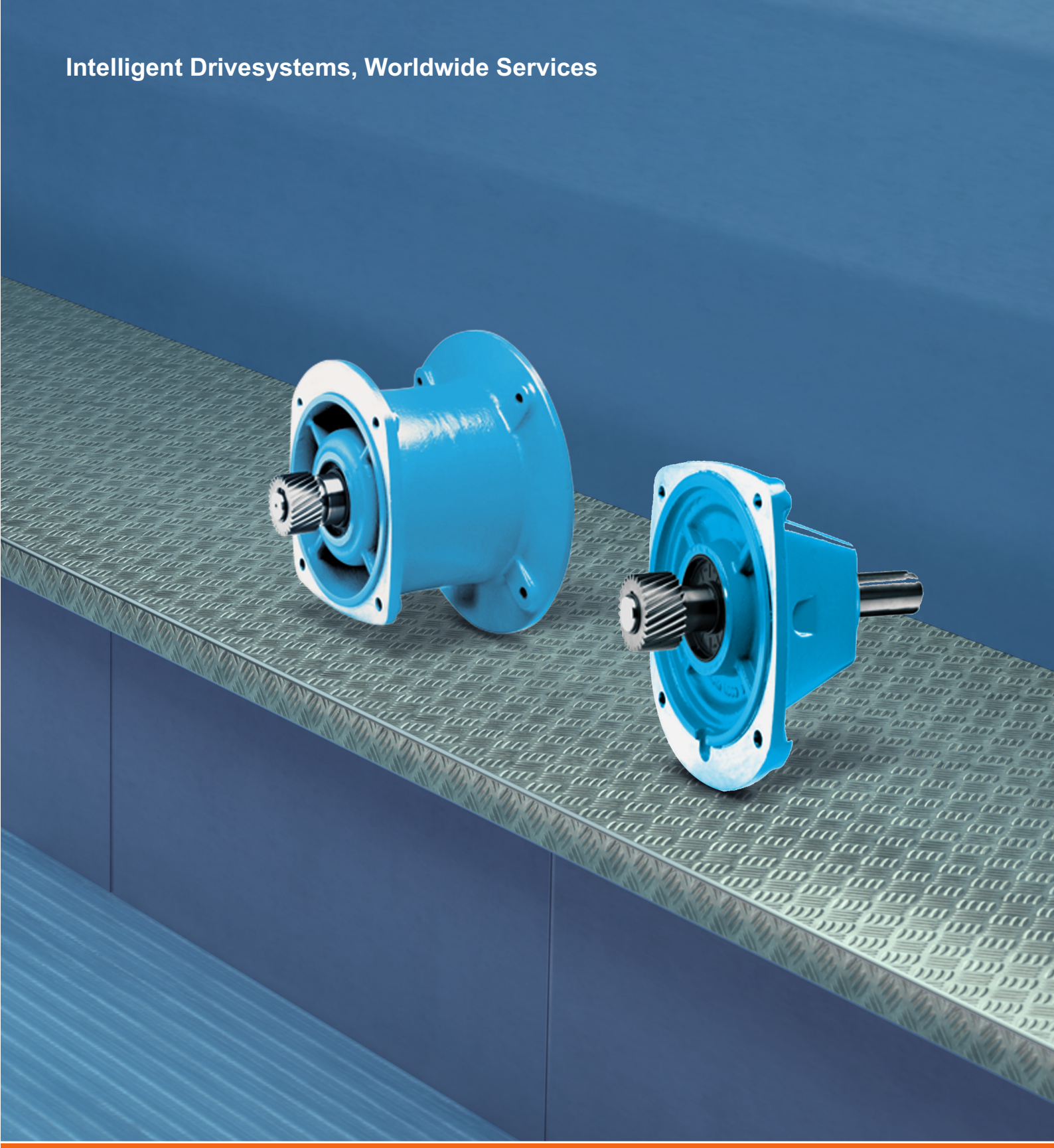
Getriebebau NORD GmbH & Co. KG
Getriebebau-Nord-Straße 1
D - 22941 Bargteheide
Fon +49 (0) 4532 / 289-0
Fax +49 (0) 4532 / 289-2253
info@nord.com, www.nord.com

Member of the NORD DRIVESYSTEMS GROUP

NORD® DRIVESYSTEMS

Mat.Nr. 6002399 / 1019

Intelligent Drivesystems, Worldwide Services



DE EN FR

PL1080

Ersatzteilkatalog Anbauoptionen
Spare part catalogue for attachment options
Catalogue des pièces de rechange : options de montage

NORD® DRIVESYSTEMS

Inhaltsübersicht
Table Of Contents
Sommaire

Allgemeine Ersatzteile
General parts list
Vues éclatées et nomenclature





W-Adapter. . . . . 4 - 7
W-Adapter
Lanterne W

IEC/NEMA. . . . . 8 - 9

AI/AN . . . . . 10 - 11

Servo . . . . . 12 - 13

Motorkonsole . . . . . 14 - 15
Motor bracket
Console moteur

Ölausgleichsbehälter . . . . . 16 - 17
Oil expansion tank
Vase d’expansion d’huile

Ölstandsbehälter. . . . . 18 - 19
Oil storage tank
Angle de commande d‘huile

Ölkontrollwinkel. . . . . 20 - 21
Oil-monitoring elbow
Vase d’expansion d’huile

Ölkontrolldeckel . . . . . 22 - 23
Oil control cover
Couvercle de commande huile

Allgemeine Ersatzteile
General parts list
Vues éclatées et nomenclature

Ölkühler . . . . . 22 - 23
Oil cooler
Refroidisseur d‘huile

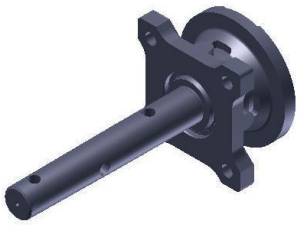
Wasserkühler . . . . . 24 - 25
Water cooler
Refroidisseur d‘eau

Taconite . . . . . 26 - 27

Gripmaxx . . . . . 28 - 29

Screw Conveyor . . . . . 30 - 33

Bestellangaben . . . . . 34 - 35
Order details
Informations de commande



Alu-Anbauten siehe auch Ersatzteilkatalog PL1035 Universal-Schneckengetriebe

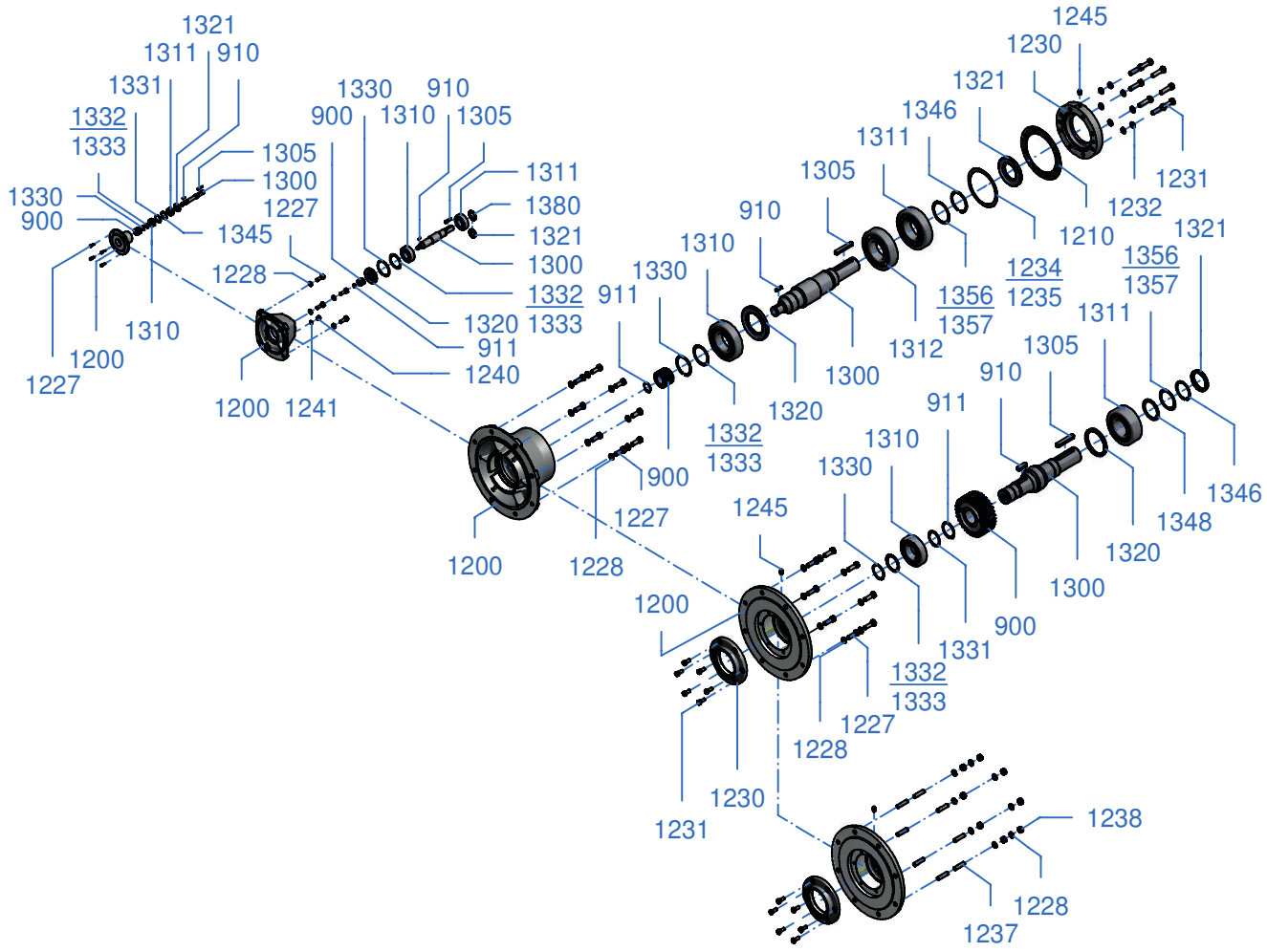
For aluminium attachments see also spare part catalogue PL1035 Universal worm gear units

Pour les montages alu, voir également le catalogue de pièces de rechange du réducteur à vis sans fin Universal PL1035

W-Adapter
W-Adapter
Lanterne W

SK 0, SK 01, SK 20, SK 25, SK 30, SK 33
SK 010, SK 200, SK 250, SK 300, SK 330
SK 11 E - SK 51 E / SK 02 - SK 62 / SK 03 - SK 63
SK 0182 NB - SK 1382 NB / SK 1282 - SK 5282 / SK 2382 - SK 6382
SK 02040 - SK 42125 / SK 13050 - SK 43125
SK 071.1 - SK 972.1 / SK 373.1 - SK 973.1
SK 2S40, SK 2S50, SK 2S63, SK 2S75
SK 62 - SK 72 / SK 73 - SK 93
SK 6282 - SK 7282 / SK 7382 - SK 9382
SK 82 - SK 102 / SK 103
SK 8282 - SK 9282
SK 9072.1 - SK 9092.1 / SK 9096.1
SK 10382.1, SK 11382.1, SK 12382

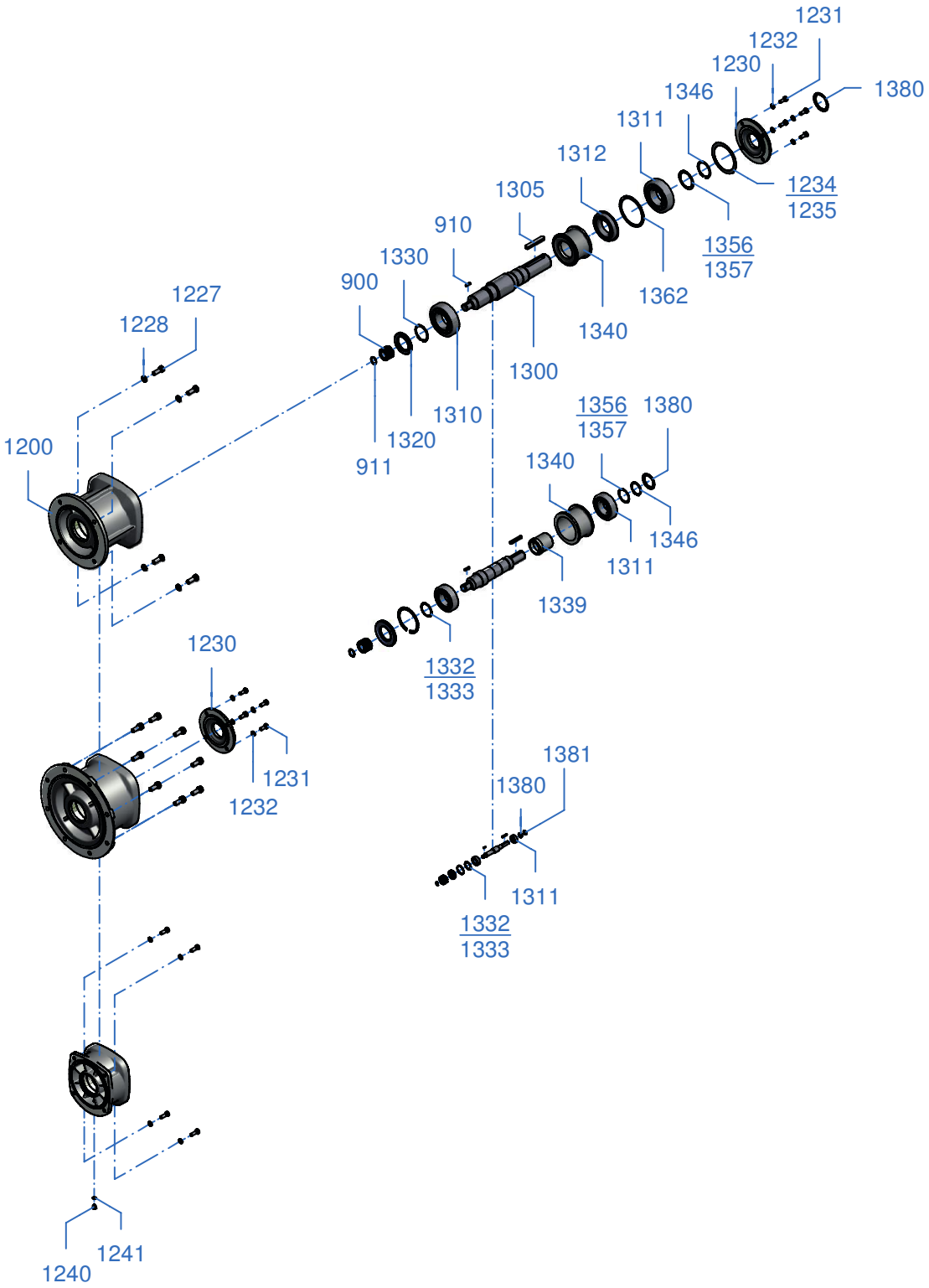
EB 508 9014 E3 #1



DE		GB		FR	
900	Antriebsritzel	900	Drive pinion	900	Pignon d'entrée
910	Passfeder	910	Key	910	Clavette
911	Sicherungsring	911	Circlip	911	Circlip
1200	Gehäuse	1200	Housing	1200	Carter
1210	Dichtung	1210	Gasket	1210	Bague d'étanchéité
1227	Schraube	1227	Screw	1227	Vis
1228	Federring	1228	Lock washer	1228	Rondelle élastique
1230	Deckel	1230	Lid	1230	Couvercle
1231	Schraube	1231	Screw	1231	Vis
1232	Federring	1232	Lock washer	1232	Rondelle élastique
1234	Passscheibe	1234	Shim	1234	Rondelles d'ajustage
1235	Passscheibe	1235	Shim	1235	Rondelles d'ajustage
1237	Schraube	1237	Screw	1237	Vis
1238	Mutter	1238	Nut	1238	mère
1240	Schraube	1240	Screw	1240	Vis
1241	Dichtung	1241	Gasket	1241	Bague d'étanchéité
1245	Schmiernippel	1245	Lubricating nipple	1245	Graisseur
1300	Antriebswelle	1300	Drive shaft	1300	Arbre d'entréé
1305	Passfeder	1305	Key	1305	Clavette
1310	Wälzlager	1310	Roller bearing	1310	Palier
1311	Wälzlager	1311	Roller bearing	1311	Palier
1312	Wälzlager	1312	Roller bearing	1312	Palier
1320	Wellendichtring	1320	Radial shaft seal	1320	Bague d'étanchéité de l'arbre
1321	Wellendichtring	1321	Radial shaft seal	1321	Bague d'étanchéité de l'arbre
1330	Sicherungsring	1330	Circlip	1330	Circlip
1331	Sicherungsring	1331	Circlip	1331	Circlip
1332	Passscheibe	1332	Shim	1332	Rondelles d'ajustage
1333	Passscheibe	1333	Shim	1333	Rondelles d'ajustage
1345	Sicherungsring	1345	Circlip	1345	Circlip
1346	Sicherungsring	1346	Circlip	1346	Circlip
1348	Stützscheibe	1348	Supporting disc	1348	Rondelle support
1356	Passscheibe	1356	Shim	1356	Rondelles d'ajustage
1357	Passscheibe	1357	Shim	1357	Rondelles d'ajustage
1380	Gammaring	1380	Gamma ring	1380	Déflecteur

W0 - WIV

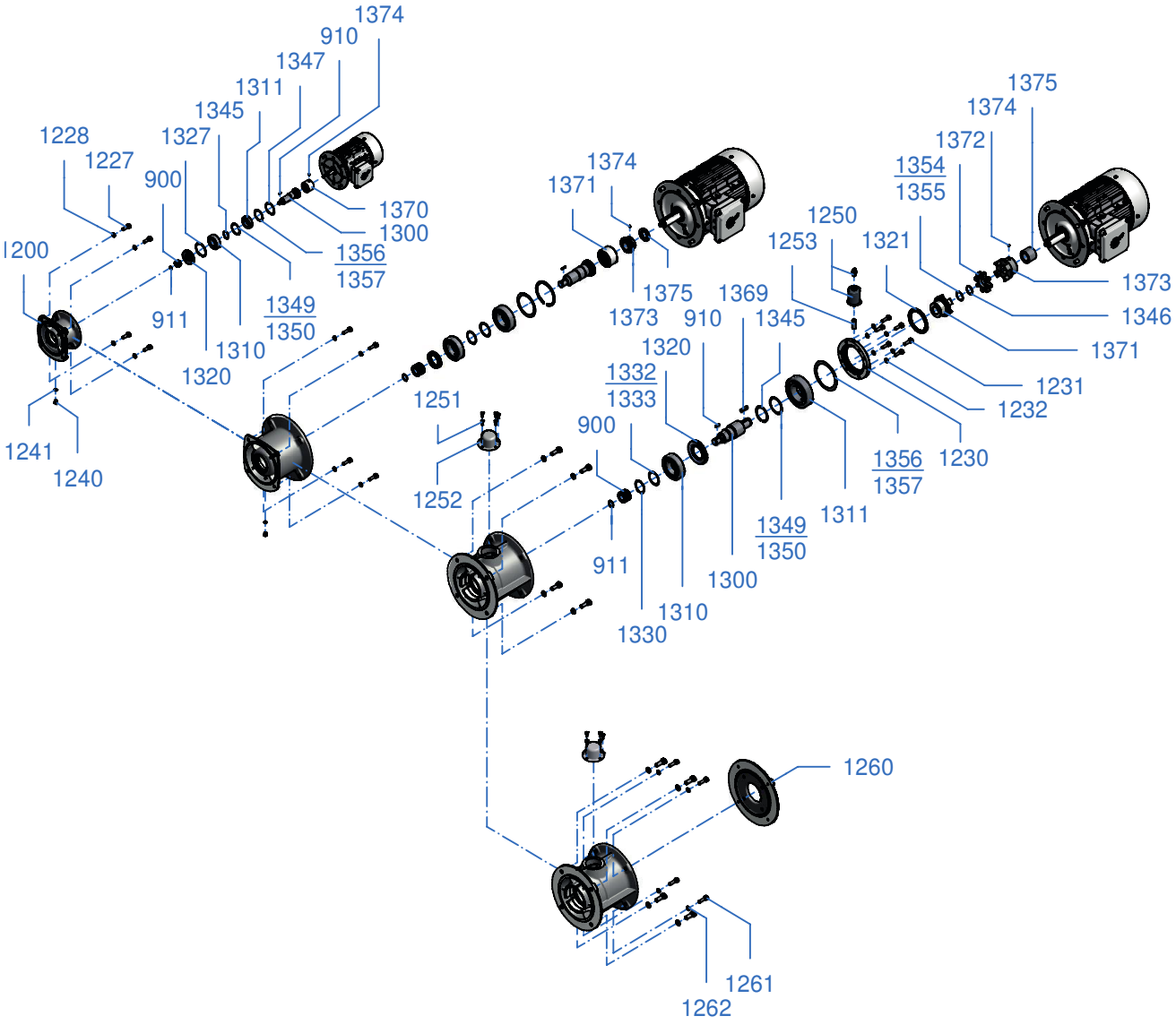
EB 526 9054 E1 #1



DE		GB		FR	
900	Antriebsritzel	900	Drive pinion	900	Pignon d'entrée
910	Passfeder	910	Key	910	Clavette
911	Sicherungsring	911	Circlip	911	Circlip
1200	Gehäuse	1200	Housing	1200	Carter
1227	Schraube	1227	Screw	1227	Vis
1228	Federring	1228	Lock washer	1228	Rondelle élastique
1230	Deckel	1230	Lip	1230	Couvercle
1231	Schraube	1231	Screw	1231	Vis
1232	Federring	1232	Lock washer	1232	Rondelle élastique
1234	Passscheibe	1234	Shim	1234	Rondelles d'ajustage
1235	Passscheibe	1235	Shim	1235	Rondelles d'ajustage
1240	Schraube	1240	Screw	1240	Vis
1241	Dichtung	1241	Gasket	1241	Bague d'étanchéité
1300	Antriebswelle	1300	Drive shaft	1300	Arbre d'entréé
1305	Passfeder	1305	Key	1305	Clavette
1310	Wälzlager	1310	Roller bearing	1310	Palier
1311	Wälzlager	1311	Roller bearing	1311	Palier
1312	Wälzlager	1312	Roller bearing	1312	Palier
1320	Wellendichtring	1320	Radial shaft seal	1320	Bague d'étanchéité de l'arbre
1330	Sicherungsring	1330	Circlip	1330	Circlip
1332	Passscheibe	1332	Shim	1332	Rondelles d'ajustage
1333	Passscheibe	1333	Shim	1333	Rondelles d'ajustage
1339	Abstandshülse	1339	Spacer bush	1339	Douille-entretoise
1340	Abstandshülse	1340	Spacer bush	1340	Douille-entretoise
1346	Sicherungsring	1346	Circlip	1346	Circlip
1356	Passscheibe	1356	Shim	1356	Rondelles d'ajustage
1357	Passscheibe	1357	Shim	1357	Rondelles d'ajustage
1362	Buchse	1362	Socket	1362	Douille
1380	Gammaring	1380	Gamma ring	1380	Déflecteur
1381	Scheibe	1381	Washer	1381	Rondelle

IEC 63 - 112 / IEC 132 - 180 / IEC 160 - 315
NEMA 56C, 140TC, 180TC, 210TC, 250TC, 280TC, 320TC, 360TC, 400TSC

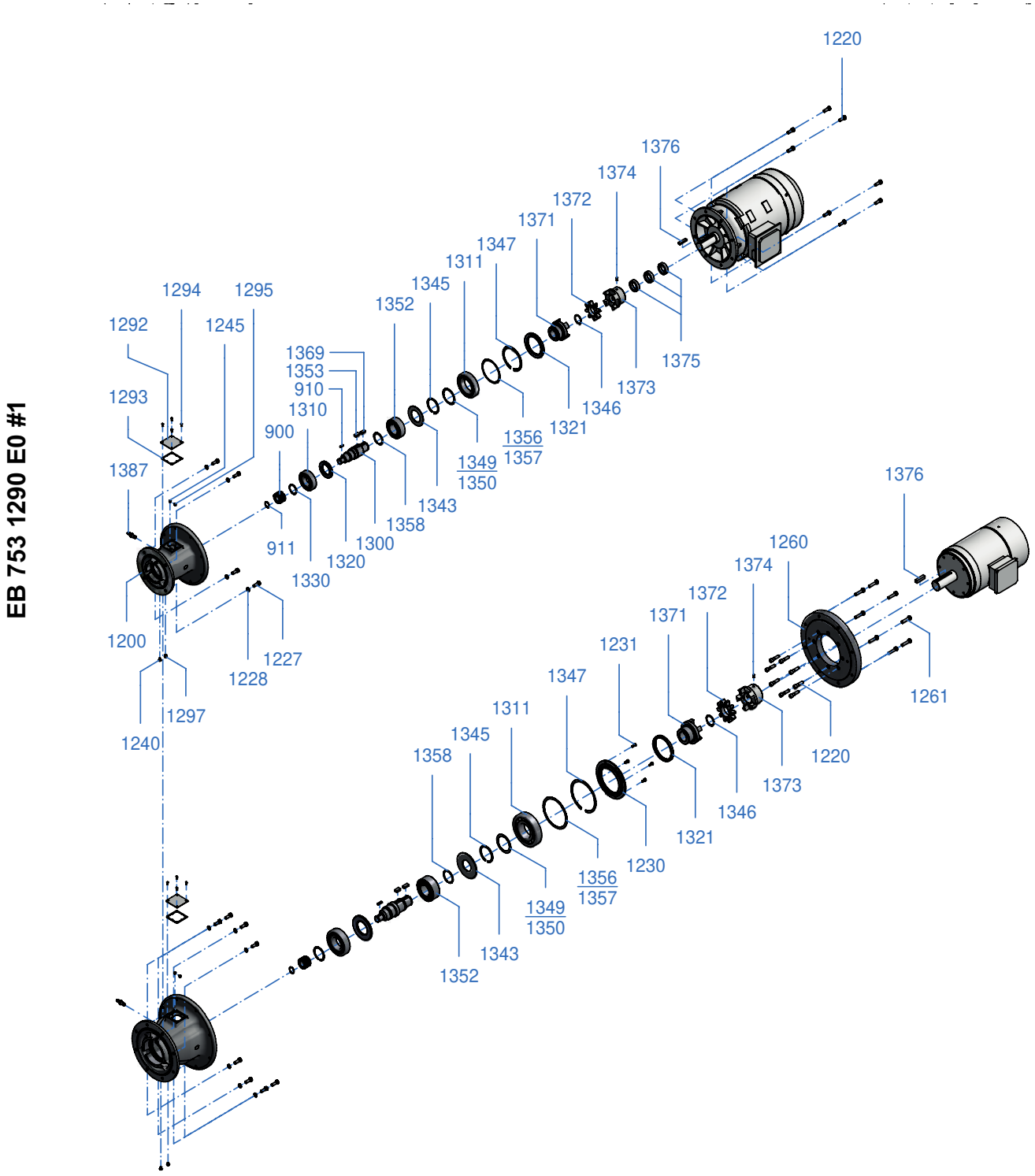
EB 507 9041 E1 #1



DE		GB		FR	
900	Antriebsritzel	900	Drive pinion	900	Pignon d'entrée
910	Passfeder	910	Key	910	Clavette
911	Sicherungsring	911	Circlip	911	Circlip
1200	Gehäuse	1200	Housing	1200	Carter
1227	Schraube	1227	Screw	1227	Vis
1228	Federring	1228	Lock washer	1228	Rondelle élastique
1230	Deckel	1230	Lip	1230	Couvercle
1231	Schraube	1231	Screw	1231	Vis
1232	Federring	1232	Lock washer	1232	Rondelle élastique
1240	Schraube	1240	Screw	1240	Vis
1241	Dichtung	1241	Gasket	1241	Bague d'étanchéité
1250	Schmierstoffkatusche	1250	Lubricant cartridge	1250	Cartouche de lubrifiant
1251	Schraube	1251	Screw	1251	Vis
1252	Abdeckung	1252	Cover	1252	Cache
1253	Verlängerung	1253	Extension	1253	Rallonge
1260	Zwischenflansche	1260	Intermediate flange	1260	Bride intermédiaire
1261	Schraube	1261	Screw	1261	Vis
1262	Federring	1262	Lock washer	1262	Rondelle élastique
1300	Antriebswelle	1300	Drive shaft	1300	Arbre d'entréé
1310	Wälzlager	1310	Roller bearing	1310	Palier
1311	Wälzlager	1311	Roller bearing	1311	Palier
1320	Wellendichtring	1320	Radial shaft seal	1320	Bague d'étanchéité de l'arbre
1321	Wellendichtring	1321	Radial shaft seal	1321	Bague d'étanchéité de l'arbre
1327	Sicherungsring	1327	Circlip	1327	Circlip
1330	Sicherungsring	1330	Circlip	1330	Circlip
1332	Passscheibe	1332	Shim	1332	Rondelles d'ajustage
1333	Passscheibe	1333	Shim	1333	Rondelles d'ajustage
1345	Sicherungsring	1345	Circlip	1345	Circlip
1346	Sicherungsring	1346	Circlip	1346	Circlip
1347	Sicherungsring	1347	Circlip	1347	Circlip
1349	Passscheibe	1349	Shim	1349	Rondelles d'ajustage
1350	Passscheibe	1350	Shim	1350	Rondelles d'ajustage
1354	Passscheibe	1354	Shim	1354	Rondelles d'ajustage
1355	Passscheibe	1355	Shim	1355	Rondelles d'ajustage
1356	Passscheibe	1356	Shim	1356	Rondelles d'ajustage
1357	Passscheibe	1357	Shim	1357	Rondelles d'ajustage
1369	Passfeder	1369	Key	1369	Clavette
1370	Kupplungsgehäuse	1370	Coupling housing	1370	Manchon d'accouplement
1371	Kupplungshälfte	1371	Half-coupling	1371	Demi-raccord
1372	Zahnkranz	1372	Ring gear	1372	Couronne dentée
1373	Kupplungshälfte	1373	Half-coupling	1373	Demi-raccord
1374	Schraube	1374	Screw	1374	Vis
1375	Buchse	1375	Socket	1375	Douille

AI160, AI180, AI200, AI225, AI250, AI280, AI315
AN250TC, AN280TC, AN320TC, AN360TC, AN400TC

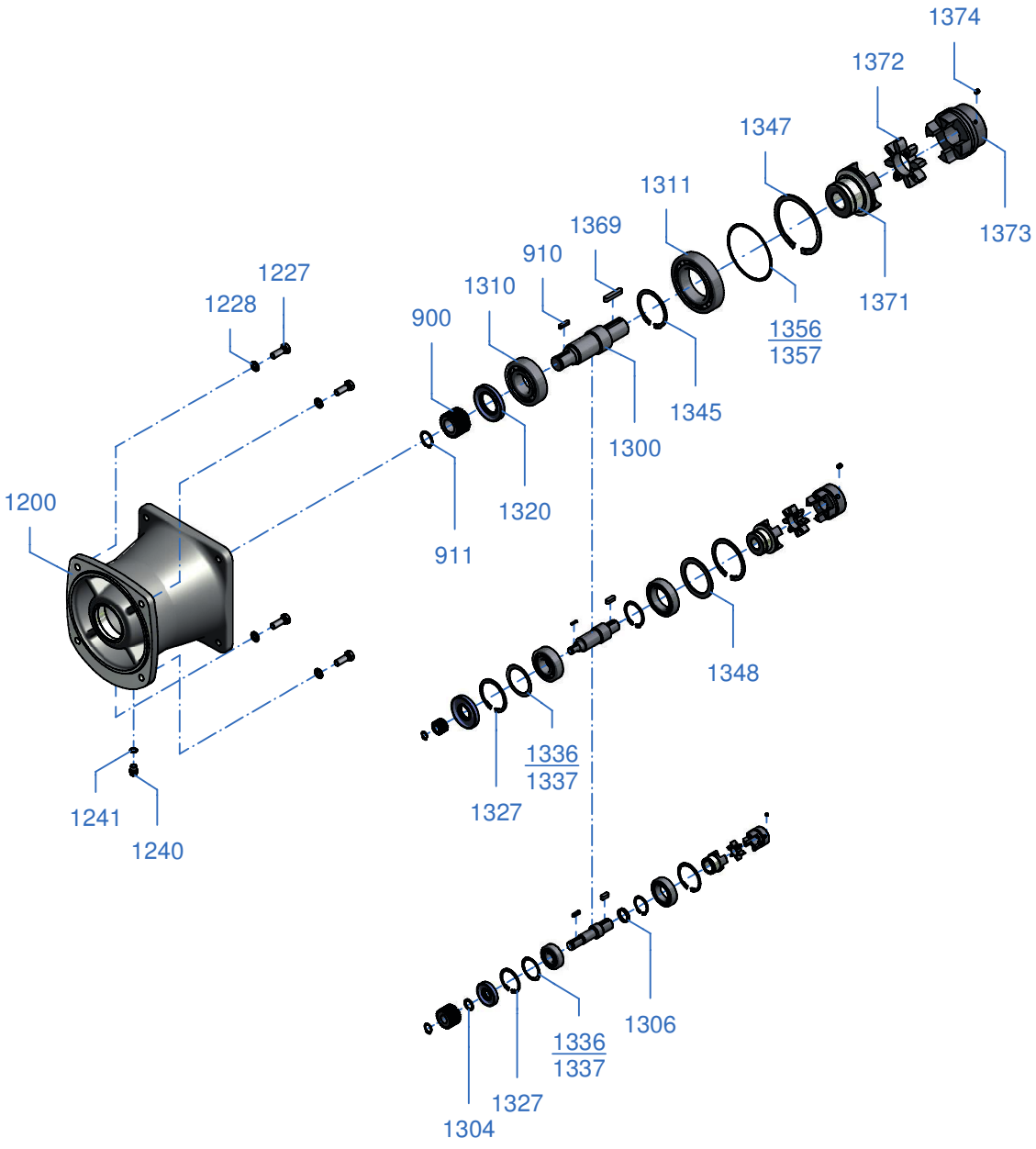
EB 753 1290 E0 #1



DE		GB		FR	
900	Antriebsritzel	900	Drive pinion	900	Pignon d'entrée
910	Passfeder	910	Key	910	Clavette
911	Sicherungsring	911	Circlip	911	Circlip
1200	Gehäuse	1200	Housing	1200	Carter
1220	Schraube	1220	Screw	1220	Vis
1227	Schraube	1227	Screw	1227	Vis
1228	Federring	1228	Lock washer	1228	Rondelle élastique
1230	Deckel	1230	Lip	1230	Couvercle
1231	Schraube	1231	Screw	1231	Vis
1240	Schraube	1240	Screw	1240	Vis
1245	Schmiernippel	1245	Lubricating nipple	1245	Graisseur
1260	Zwischenflansche	1260	Intermediate flange	1260	Bride intermédiaire
1261	Schraube	1261	Screw	1261	Vis
1292	Klemmenkastendeckel	1292	Terminal box lid	1292	Couvercle de la boîte à bornes
1293	Dichtung	1293	Gasket	1293	Bague d'étanchéité
1294	Schraube	1294	Screw	1294	Vis
1295	Ölschraube	1295	oil screw	1295	Vis à huile
1300	Antriebswelle	1300	Drive shaft	1300	Arbre d'entréé
1310	Wälzlager	1310	Roller bearing	1310	Palier
1311	Wälzlager	1311	Roller bearing	1311	Palier
1320	Wellendichtring	1320	Radial shaft seal	1320	Bague d'étanchéité de l'arbre
1321	Wellendichtring	1321	Radial shaft seal	1321	Bague d'étanchéité de l'arbre
1330	Sicherungsring	1330	Circlip	1330	Circlip
1343	Dichtscheibe	1343	Sealing washer	1343	Rondelle d’appui
1345	Sicherungsring	1345	Circlip	1345	Circlip
1346	Sicherungsring	1346	Circlip	1346	Circlip
1347	Sicherungsring	1347	Circlip	1347	Circlip
1349	Passscheibe	1349	Shim	1349	Rondelles d'ajustage
1350	Passscheibe	1350	Shim	1350	Rondelles d'ajustage
1352	Rücklaufsperre	1352	Back stop	1352	Anti-devireur
1353	Passfeder	1353	Key	1353	Clavette
1356	Passscheibe	1356	Shim	1356	Rondelles d'ajustage
1357	Passscheibe	1357	Shim	1357	Rondelles d'ajustage
1358	Sicherungsring	1358	Circlip	1358	Circlip
1369	Passfeder	1369	Key	1369	Clavette
1371	Kupplungshälfte	1371	Half-coupling	1371	Demi-raccord
1372	Zahnkranz	1372	Ring gear	1372	Couronne dentée
1373	Kupplungshälfte	1373	Half-coupling	1373	Demi-raccord
1374	Schraube	1374	Screw	1374	Vis
1375	Buchse	1375	Socket	1375	Douille
1376	Passfeder	1376	Key	1376	Clavette
1387	Schalter/Sensor	1387	Switch/Sensor	1387	Changer/Capteur

Servo 100/160 S, 130/160 S, 130/250 S, 165/160 S, 165/250 S, 215/250 S, 215/300 S, 300/300 S, 300/350

EB 514 9021 E2 #1

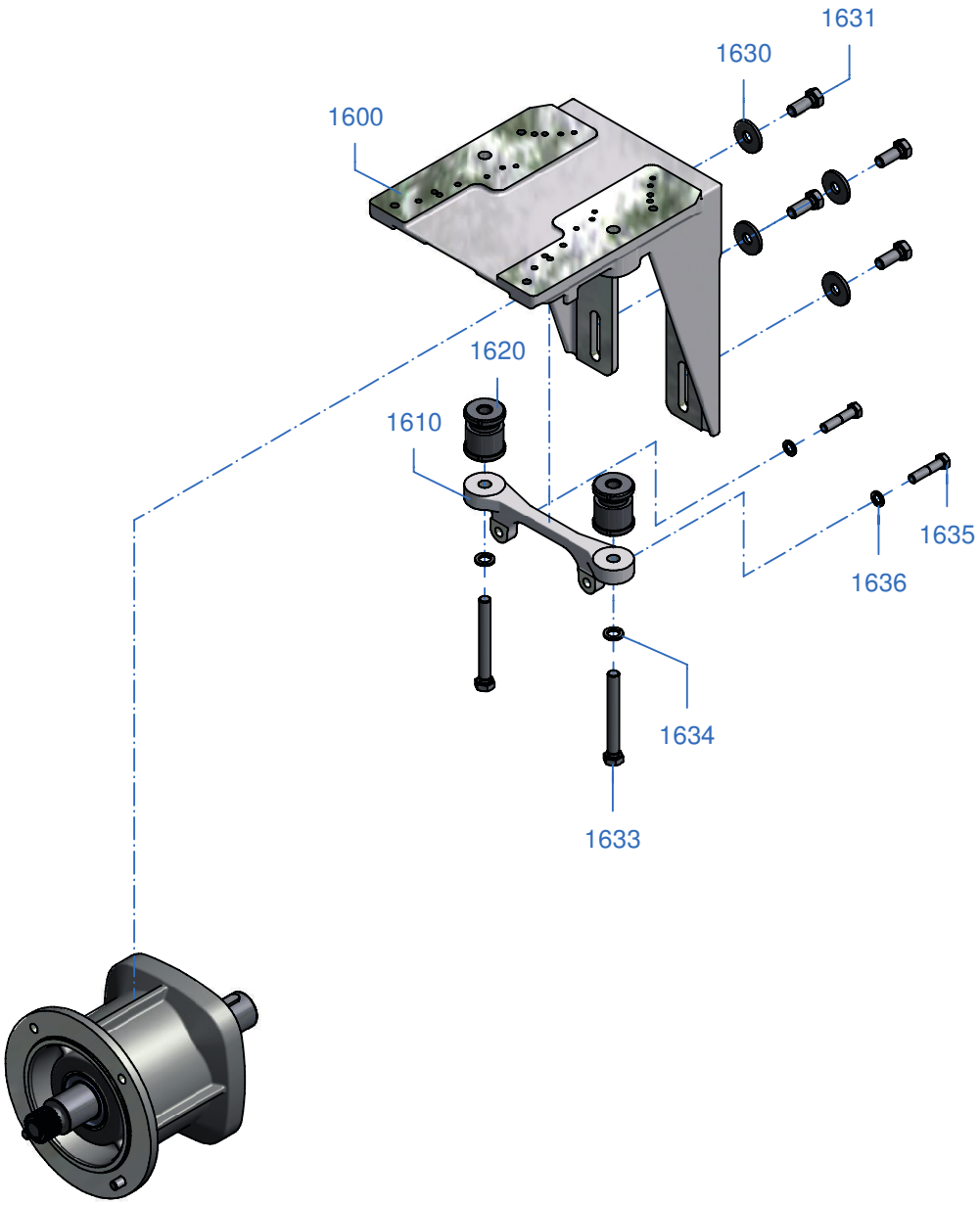


DE		GB		FR	
900	Antriebsritzel	900	Drive pinion	900	Pignon d'entrée
910	Passfeder	910	Key	910	Clavette
911	Sicherungsring	911	Circlip	911	Circlip
1200	Gehäuse	1200	Housing	1200	Carter
1227	Schraube	1227	Screw	1227	Vis
1228	Federring	1228	Lock washer	1228	Rondelle élastique
1240	Schraube	1240	Screw	1240	Vis
1241	Dichtung	1241	Gasket	1241	Bague d'étanchéité
1300	Antriebswelle	1300	Drive shaft	1300	Arbre d'entréé
1304	Stützscheibe	1304	Supporting disc	1304	Rondelle support
1306	Stützscheibe	1306	Supporting disc	1306	Rondelle support
1310	Wälzlager	1310	Roller bearing	1310	Palier
1311	Wälzlager	1311	Roller bearing	1311	Palier
1320	Wellendichtring	1320	Radial shaft seal	1320	Bague d'étanchéité de l'arbre
1327	Sicherungsring	1327	Circlip	1327	Circlip
1336	Passscheibe	1336	Shim	1336	Rondelles d'ajustage
1337	Passscheibe	1337	Shim	1337	Rondelles d'ajustage
1345	Sicherungsring	1345	Circlip	1345	Circlip
1347	Sicherungsring	1347	Circlip	1347	Circlip
1348	Stützscheibe	1348	Supporting disc	1348	Rondelle support
1356	Passscheibe	1356	Shim	1356	Rondelles d'ajustage
1357	Passscheibe	1357	Shim	1357	Rondelles d'ajustage
1369	Passfeder	1369	Key	1369	Clavette
1371	Kupplungshälfte	1371	Half-coupling	1371	Demi-raccord
1372	Zahnkranz	1372	Ring gear	1372	Couronne dentée
1373	Kupplungshälfte	1373	Half-coupling	1373	Demi-raccord
1374	Schraube	1374	Screw	1374	Vis

Motorkonsole
Motor bracket
Console moteur

MK I - MK V
MK I - MK V

EB 526 9052 E1 #1

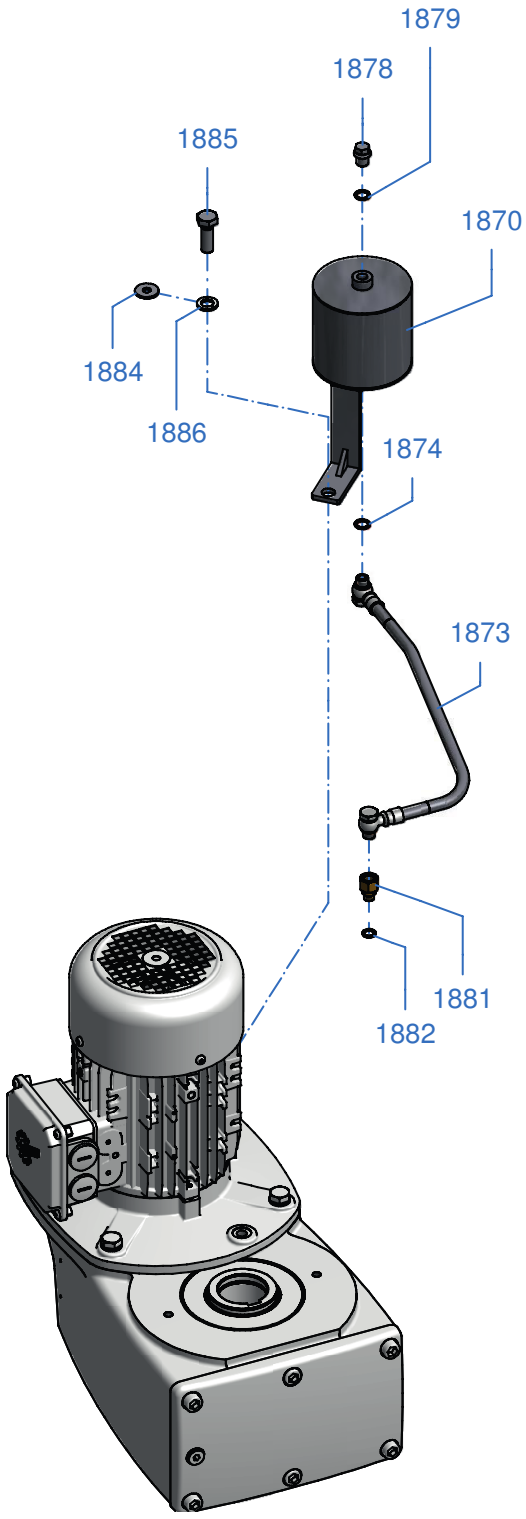


Motorkonsole
Motor bracket
Console moteur

DE		GB		FR	
1600	Motorkonsole	1600	Motor bracket	1600	Console moteur
1610	Halterung	1610	Holder	1610	Support
1620	Schraube	1620	Screw	1620	Vis
1630	Scheibe	1630	Washer	1630	Rondelle
1631	Schraube	1631	Screw	1631	Vis
1633	Schraube	1633	Screw	1633	Vis
1634	Federring	1634	Spring lock washer	1634	Rondelle élastique
1635	Schraube	1635	Screw	1635	Vis
1636	Federring	1636	Spring lock washer	1636	Rondelle élastique

Ölausgleichsbehälter
Oil expansion tank
Réservoir d’expansion d’huile

SK 42, SK 43, SK 52, SK 53, SK 62, SK 63, SK 72, SK 73, SK 82, SK 83, SK 92, SK 93, SK 102, SK 103
SK 4282, SK 4382, SK 5282, SK 5382, SK 6282, SK 638 2, SK 7282, SK 7382, SK 8282, SK8382
SK 9042.1, SK 9043.1, SK 9052.1, SK 9053.1, SK 9072 .1, SK 9082.1, SK 9086.1, SK 9092.1, SK 9096.1



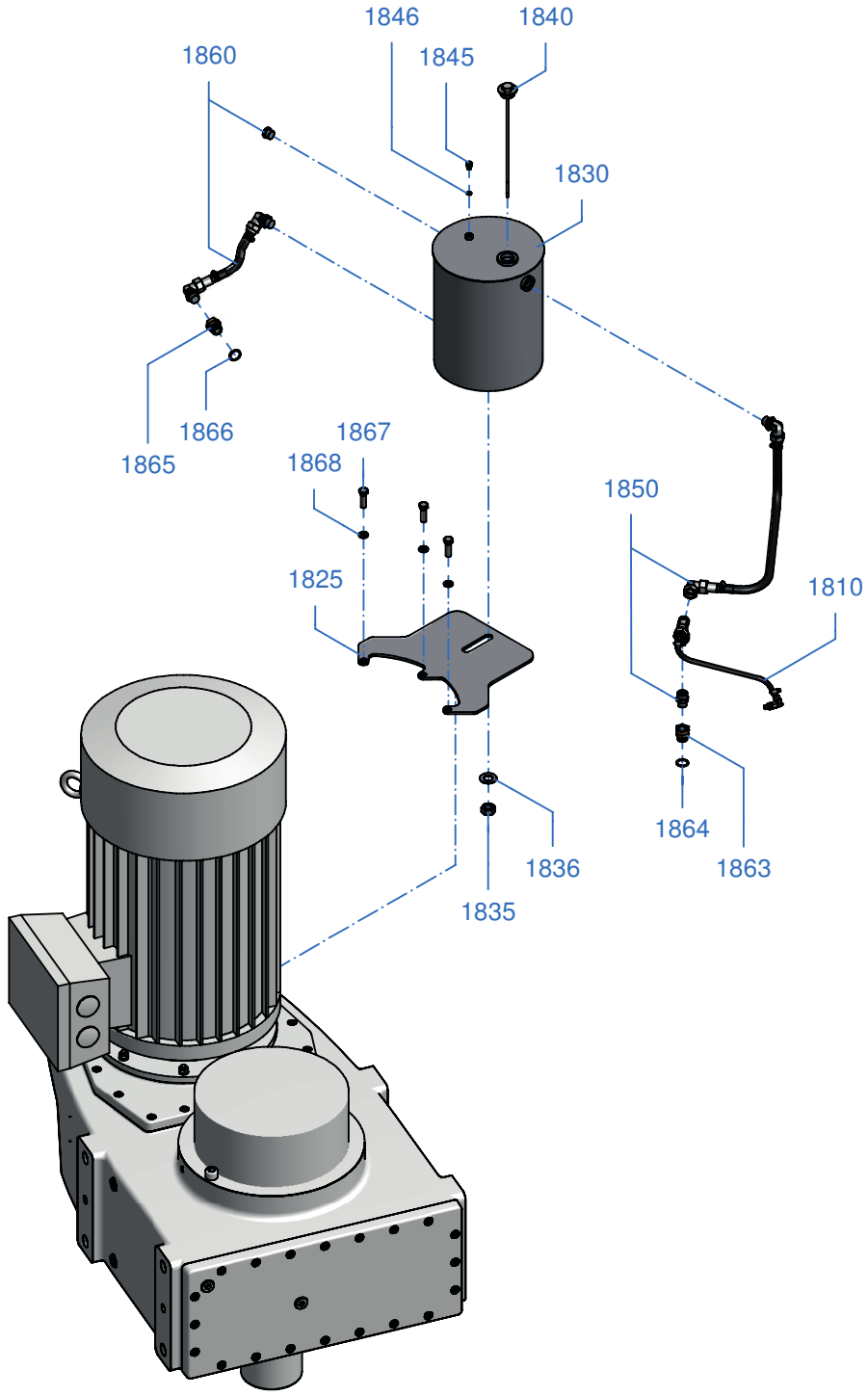
EB 283 9039 E3 #1

Ölausgleichsbehälter
Oil expansion tank
Réservoir d’expansion d’huile

DE		GB		FR	
1870	Ölausgleichsbehälter	1870	Oil expansion chamber	1870	Réservoir d'expansion d'huile
1873	Schlauch	1873	Hose	1873	Tuyau
1874	Dichtung	1874	Seal	1874	Bague d'étanchéité
1878	Entlüftung	1878	Vent	1878	Évent
1879	Dichtung	1879	Seal	1879	Bague d'étanchéité
1881	Reduzierung	1881	Reducer	1881	Réduction
1882	Dichtung	1882	Seal	1882	Bague d'étanchéité
1884	Scheibe	1884	Washer	1884	Rondelle
1885	Schraube	1885	Screw	1885	Vis
1886	Scheibe	1886	Washer	1886	Rondelle

Ölstandsbehälter
Oil storage tank
Réservoir de niveau d’huile

SK 9282, SK 9382, SK 10382.1, SK 11382.1, SK 12382



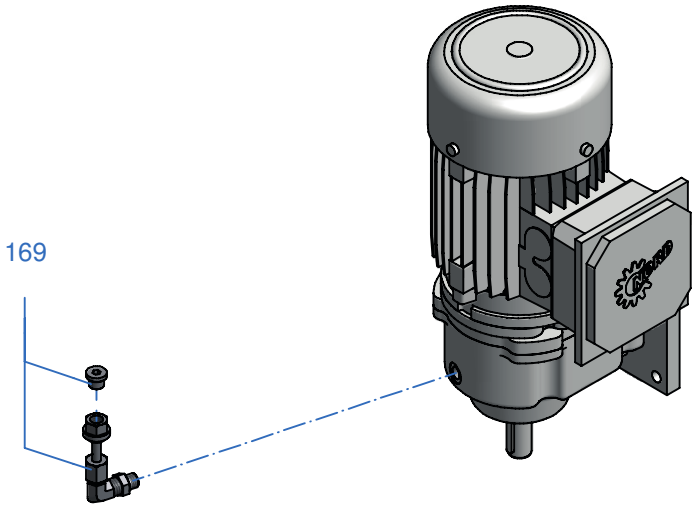
EB 283 9046 E #1

Ölstandsbehälter
Oil storage tank
Réservoir de niveau d’huile

DE		GB		FR	
1810	Gehäuseentlüftung	1810	Housing vent	1810	Évent de carter
1825	Halterung	1825	Holder	1825	Support
1830	Ölstandsbehälter	1830	Oil level vessel	1830	Vase d‘expansion d‘huile
1835	Mutter	1835	Nut	1835	Écrou
1836	Scheibe	1836	Washer	1836	Rondelle
1840	Entlüftungsdeckel	1840	Ventilation cover	1840	Couvercle d‘évent
1845	Entlüftungsschraube	1845	Standard vent plug	1845	Vis d‘évent
1846	Dichtung	1846	Gasket	1846	Bague d’étanchéité
1850	Baugruppe	1850	Module	1850	Module
1860	Baugruppe	1860	Module	1860	Module
1863	Reduzierung	1863	Reducer	1863	Réduction
1864	Dichtung	1864	Gasket	1864	Bague d’étanchéité
1865	Reduzierung	1865	Reducer	1865	Réduction
1866	Dichtung	1866	Gasket	1866	Bague d’étanchéité
1867	Schraube	1867	Screw	1867	Vis
1868	Scheibe	1868	Washer	1868	Rondelle

Ölkontrollwinkel
Oil-monitoring elbow
Angle de commande d‘huile

EB 283 9051 E1 #1

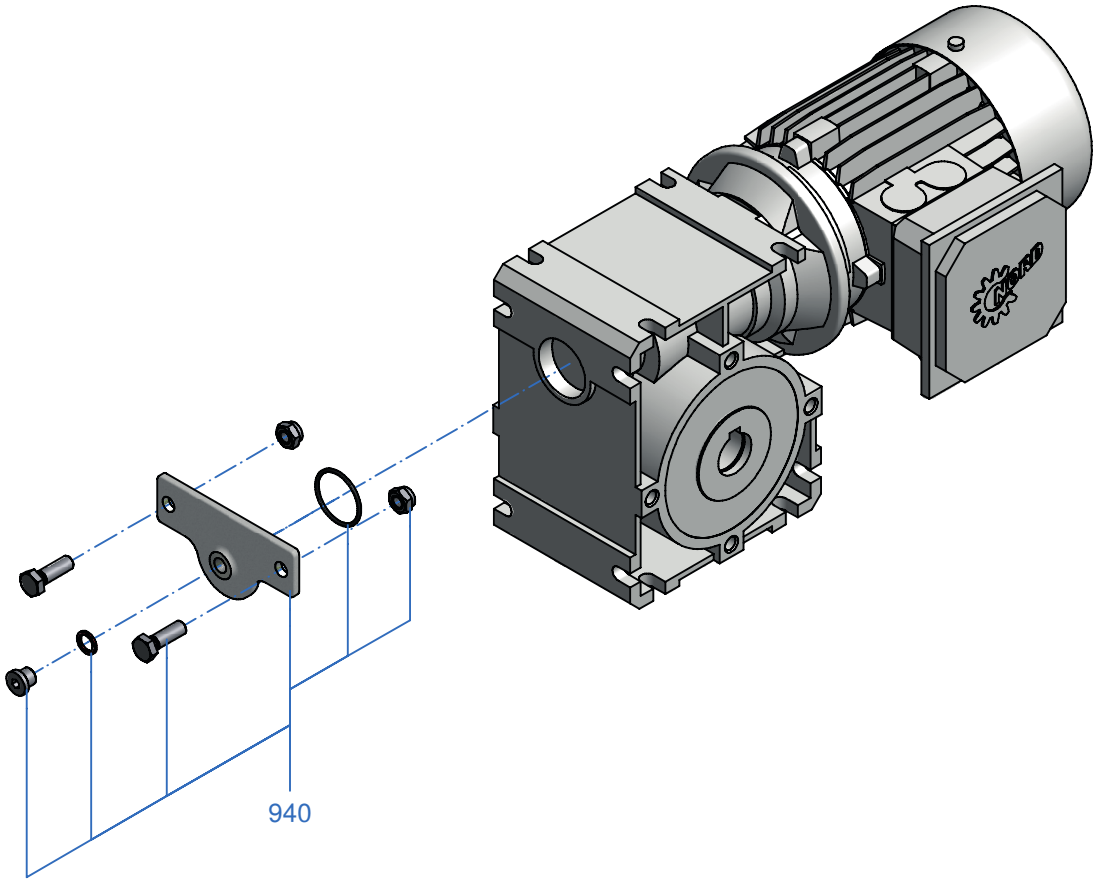


Ölkontrollwinkel
Oil-monitoring elbow
Angle de commande d‘huile

DE		GB		FR	
169	Ölstandsanzeiger	169	Oil level indicator	169	Affichage du niveau d’huile

Ölkontrolldeckel
Oil control cover
Couvercle de commande huile

EB 606 9065 E1 #1

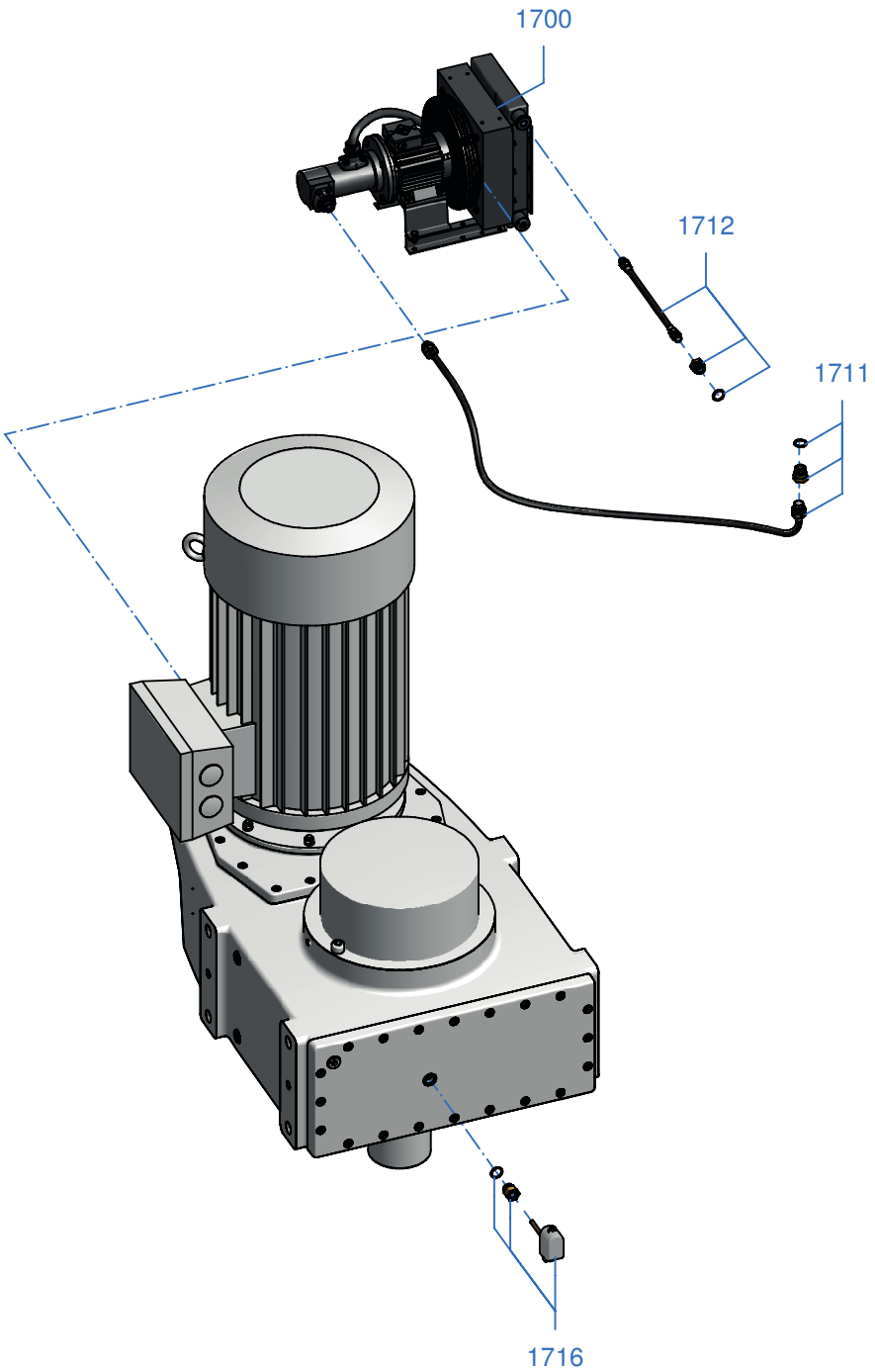


Ölkontrolldeckel
Oil control cover
Couvercle de commande huile

DE		GB		FR	
940	Ölkontrolldeckel	940	Oil contol cover	940	couvercle de commande huile

Ölkühler
Oil cooler
Refroidisseur d‘huile

SK 62, SK 72, SK 82, SK 102, SK 63, SK 73, SK 73, S K 103
SK 6282, SK 7282, SK 8282, SK 11282, SK 6382, SK 73 82, SK 8382, SK 11382 SK 9072.1, SK 9082.1, SK 9086.1, SK 9096.1



EB 280 9249 E3 #1

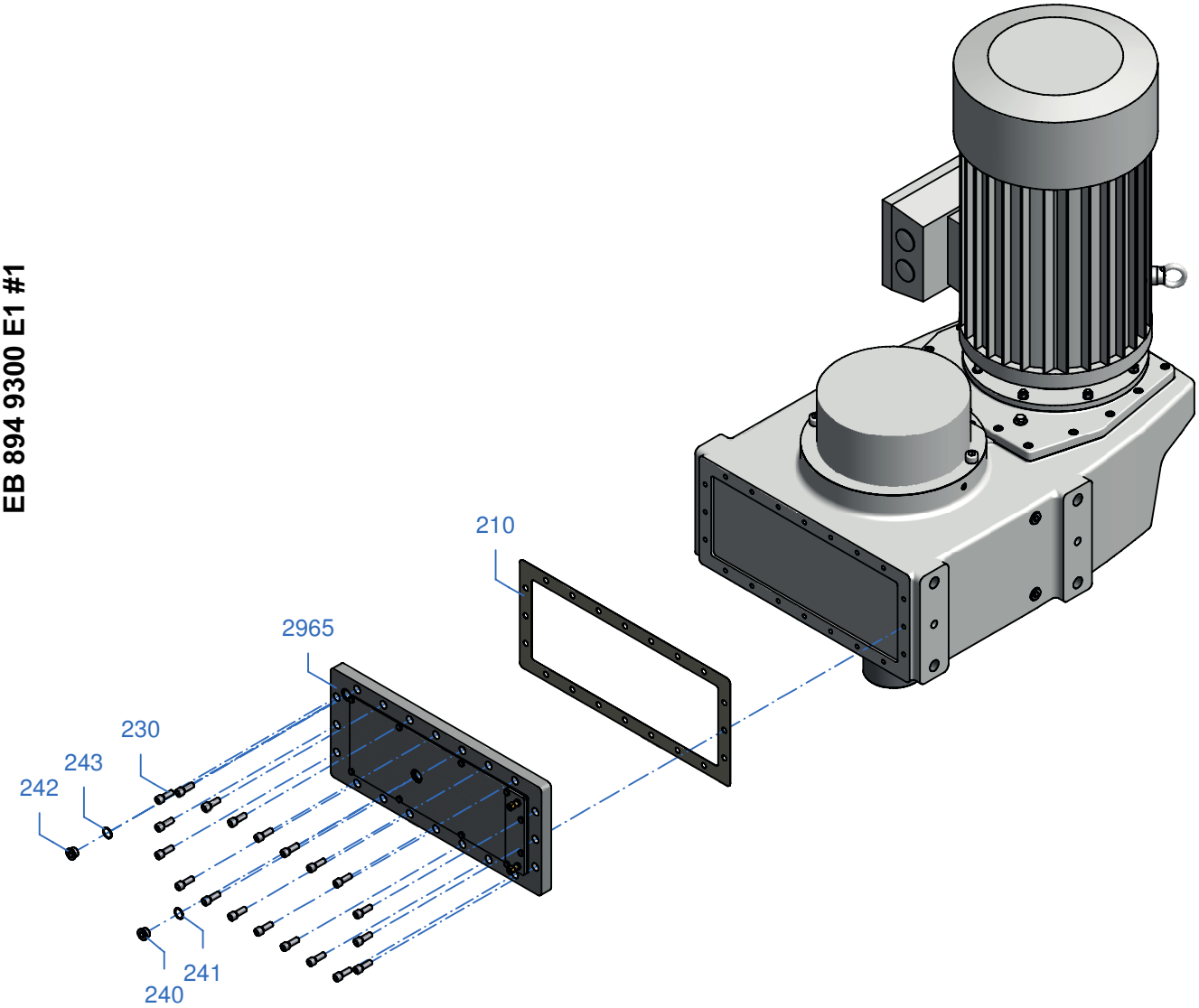
Ölkühler
Oil cooler
Refroidisseur d‘huile

DE		GB		FR	
1700	Ölkühler	1700	Oil cooler	1700	Refroidisseur d‘huile
1711	Schlauchleitung	1711	Hose	1711	Câble souple
1712	Schlauchleitung	1712	Hose	1712	Câble souple
1716	Anschlusskopf Druckschalter	1716	Pressure switch connector head	1716	Extrémité de connexion pressostat

Wasserkühler
Water cooler
Refroidisseur d‘eau

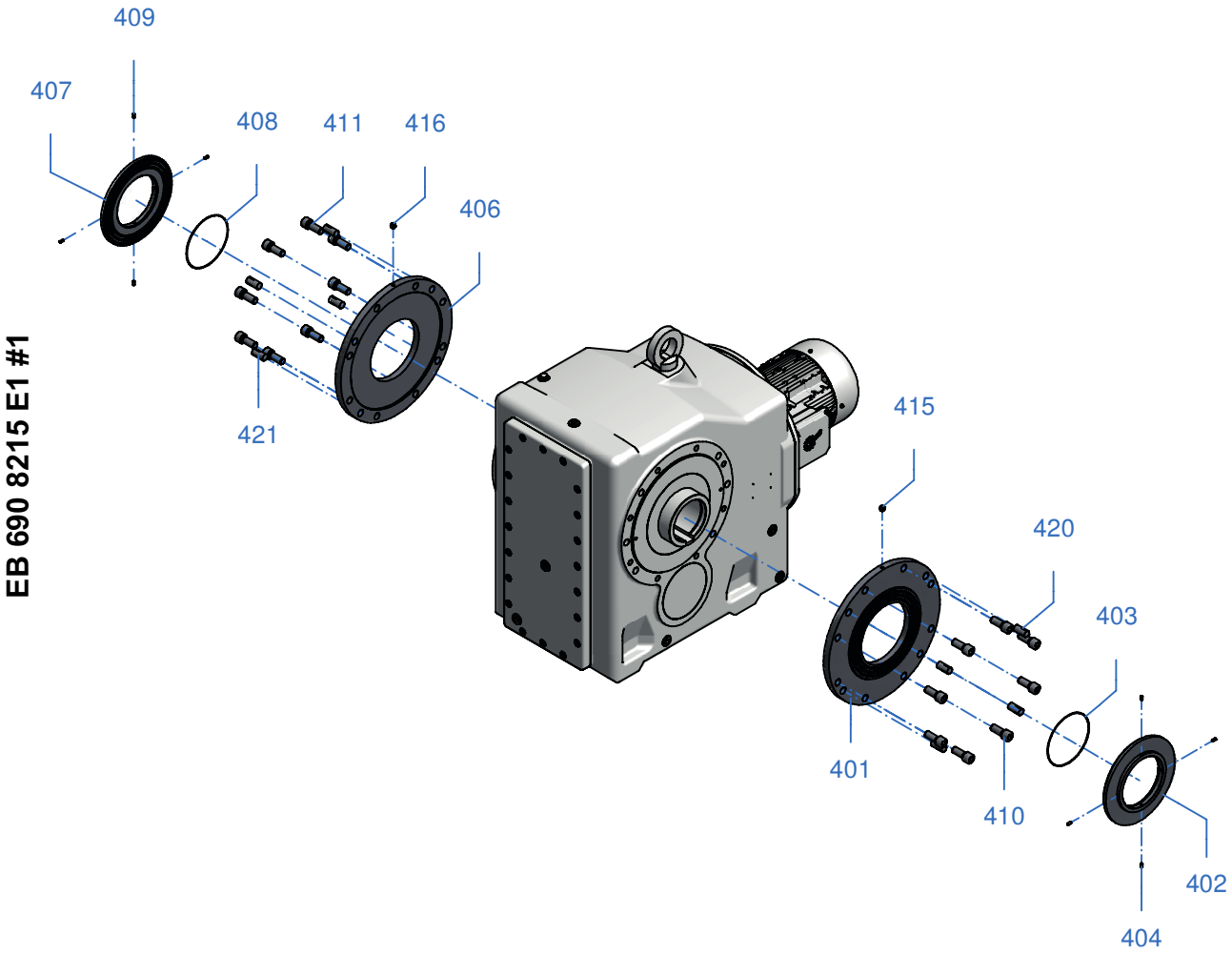
SK 6282, SK 7282, SK 8282, SK 9282, SK 6382, SK 7382, SK 8382, SK9382,
SK 10382.1, SK 11382.1, SK 12382
SK 9072.1, SK 9082.1, SK 9086.1, SK 9092.1, SK 9096.1

EB 894 9300 E1 #1



DE		GB		FR	
210	Dichtung	210	Seal	210	Bague d'étanchéité
230	Schraube	230	Screw	230	Vis
240	Schraube	240	Screw	240	Vis
241	Dichtung	241	Seal	241	Bague d'étanchéité
242	Schraube	242	Screw	242	Vis
243	Dichtung	243	Seal	243	Bague d'étanchéité
2965	Deckel	2965	Lid	2965	Couvercle

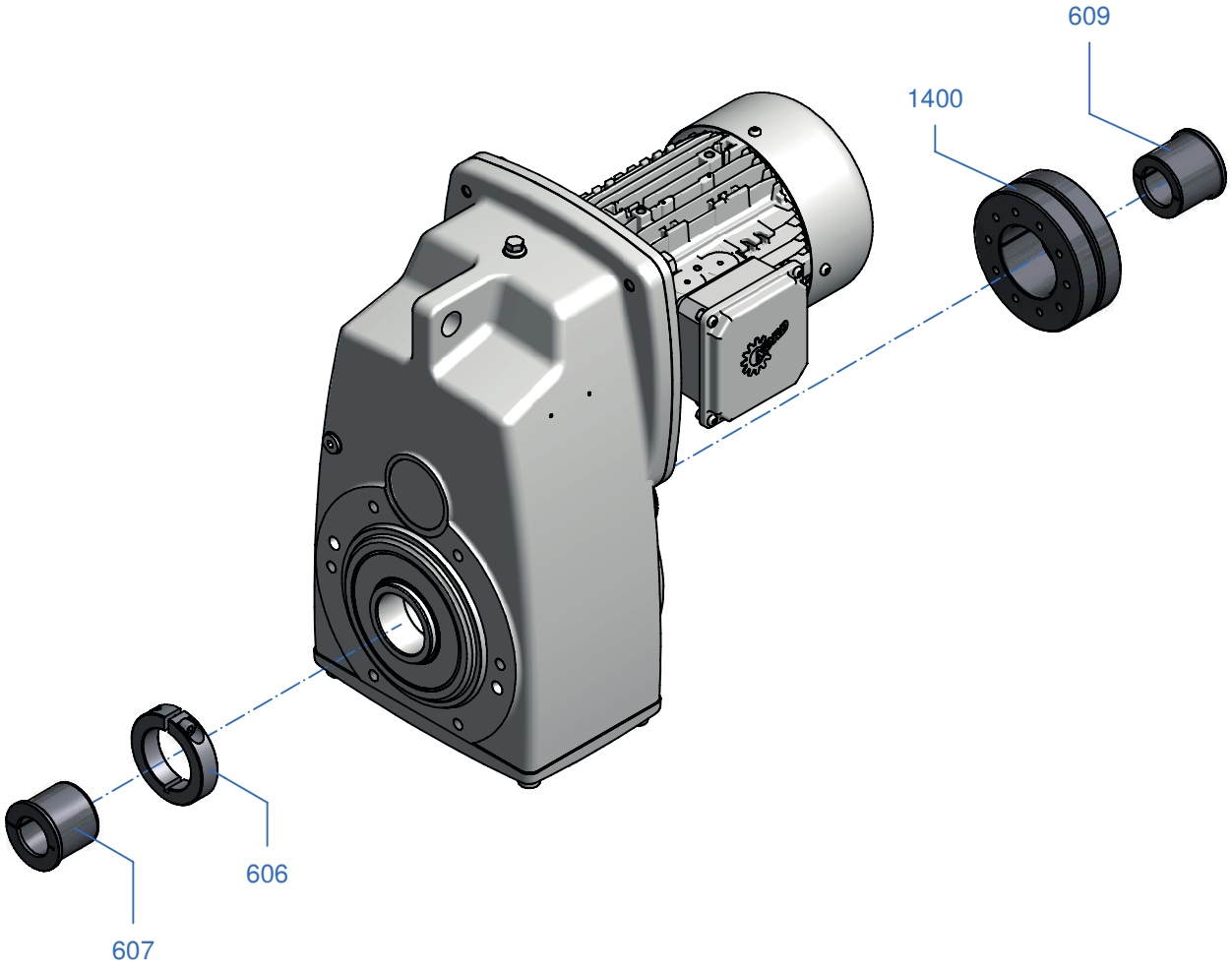
SK 9052.1, SK 9072.1, SK 9082.1, SK 9086.1, SK 9092 .1, SK 9096.1



EB 690 8215 E1 #1

DE		GB		FR	
401	Labyrinthbuchse	401	Labyrinth bush	401	Douille à labyrinthe
402	Labyrinthbuchse	402	Labyrinth bush	402	Douille à labyrinthe
403	O-Ring	403	O-ring	403	Joint torique
404	Gewindestift	404	Screw pin	404	Vis sans tête
406	Labyrinthbuchse	406	Labyrinth bush	406	Douille à labyrinthe
407	Labyrinthbuchse	407	Labyrinth bush	407	Douille à labyrinthe
408	O-Ring	408	O-ring	408	Joint torique
409	Gewindestift	409	Screw pin	409	Vis sans tête
410	Schraube	410	Screw	410	Vis
411	Schraube	411	Screw	411	Vis
415	Schmiernippel	415	Lubricating nipple	415	Graisseur
416	Schmiernippel	416	Lubricating nipple	416	Graisseur
420	Stift	420	Pin	420	Goupille
421	Stift	421	Pin	421	Goupille

EB 842 9009 E1 #1

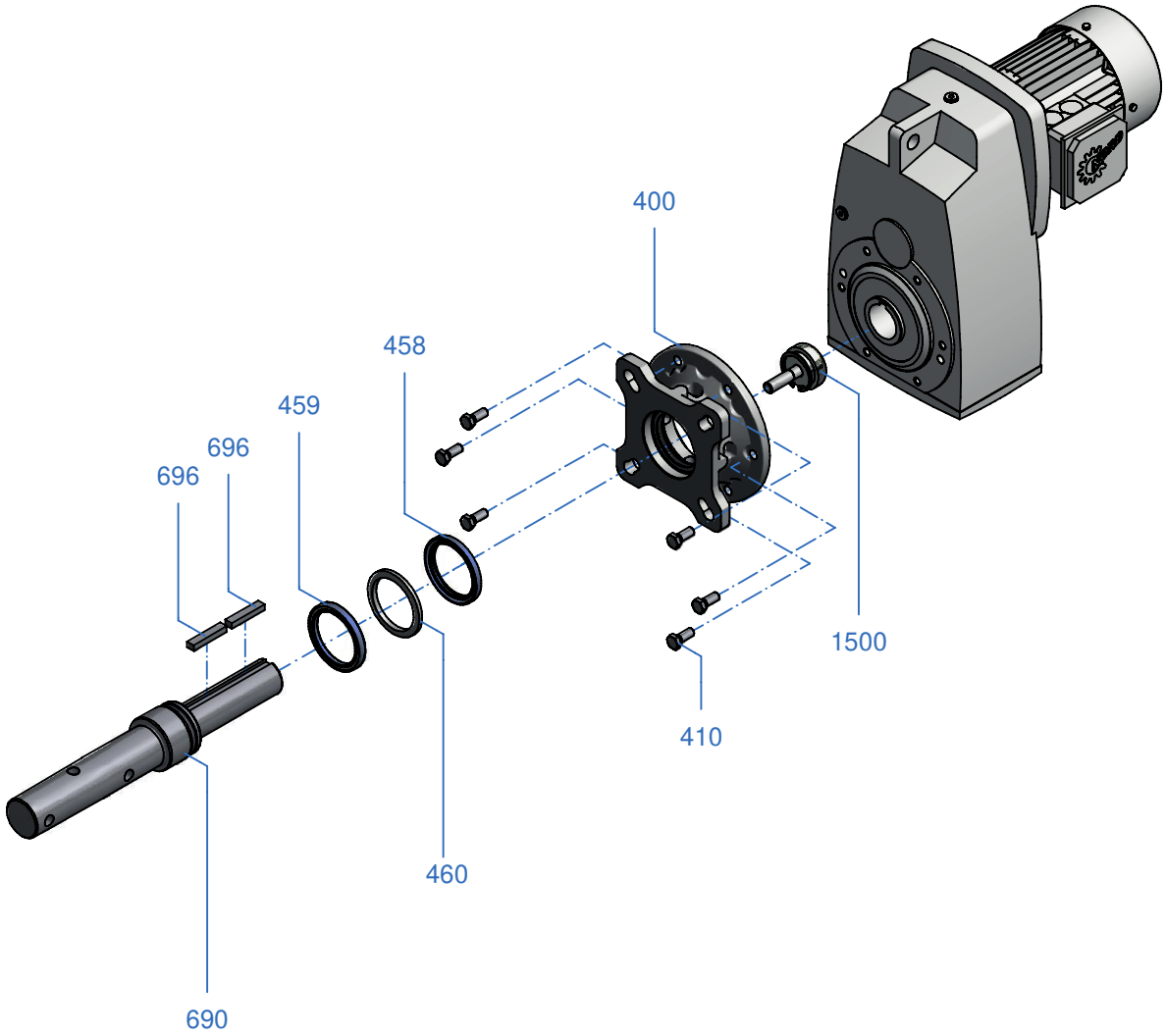


DE		GB		FR	
606	Klemmring	606	Clamping ring	606	Bague de serrage
607	Klemmbuchse	607	Clamping bush	607	Douille de serrage
609	Klemmbuchse	609	Clamping bush	609	Douille de serrage
1400	Schrumpfscheibe	1400	Shrink disc	1400	Frette de serrage

SK 1282 SCP - SK 6282 SCP
SK 1382 SCP - SK 6382 SCP

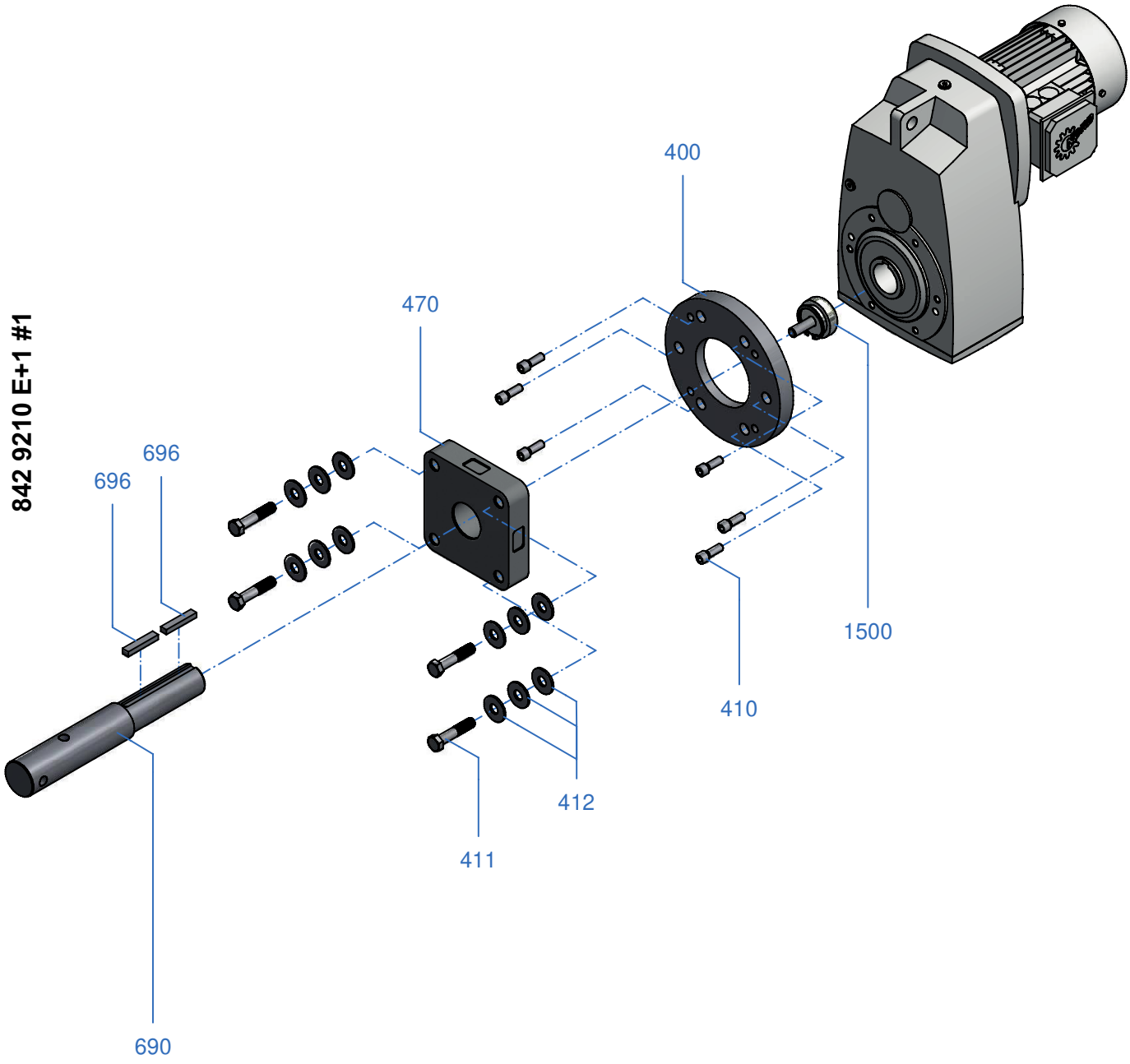
SK 9012.1 SCP - SK 9052.1 SCP
SK 9013.1 SCP - SK 9053.1 SCP

842 9210 E0 #1



DE		GB		FR	
400	Flansch	400	Flange	400	Bride
410	Schraube	410	Screw	410	Vis
458	Wellendichtring	458	Radial shaft seal	458	Bague d‘étanchéité de l‘arbre
459	Wellendichtring	459	Radial shaft seal	459	Bague d‘étanchéité de l‘arbre
460	Filzring	460	Felt ring	460	Bague en feutre
690	Einsteckwelle	690	Plug-in shaft	690	Arbre de sortie plein
696	Passfeder	696	Key	696	Clavette
1500	Baugruppe Befestigungselement	1500	Modul fastening element	1500	Module élément de fixation

SK 1282 SC - SK 9282 SC
SK 1382 SC - SK 9382 SC



DE	
400	Flansch
410	Schraube
411	Schraube
412	Scheibe
470	Dichtungspaket
690	Einsteckwelle
696	Passfeder
1500	Baugruppe Befestigungselement

GB	
400	Flange
410	Screw
411	Screw
412	Washer
470	Seal package
690	Plug-in shaft
696	Key
1500	Modul fastening element

FR	
400	Bride
410	Vis
411	Vis
412	Rondelle
470	Paquet d‘étanchéité
690	Arbre de sortie plein
696	Clavette
1500	Module élément de fixation

Bestellangaben
Order details
Informations de commande

Kontaktdaten / Contact details / Contacts:

Firma / Company / Entreprise:

Straße / Street / Rue

Stadt / Town / Ville:

PLZ / Postcode/
Code postal:

Telefon / Telephone / Téléphone:

Fax:

E-mail:





Getriebebau NORD

Getriebebau-Nord-Straße 1
D-22941 Bargteheide
Telefon +49(0) 4532/289-0
Telefax +49(0)4532/289-2253
E-Mail info@nord.com
www.nord.com

DE

Diese NORD Ersatzteilliste beinhaltet eine standardisierte Darstellung der NORD Getriebe. Um Ihnen das Finden und Nachbestellen von Ersatzteilen zu erleichtern, finden Sie am Ende der Ersatzteilliste ein Bestellformular mit wichtigen Hinweisen zur Bestimmung der richtigen Teile.

Für Rückfragen stehen wir Ihnen gerne zur Verfügung. Ihren lokalen Ansprechpartner finden Sie unter http://locator.nord.com.

GB

This NORD spare parts list contains a standardised depiction of NORD gear units. In order to enable you to find and re-order replacement parts more easily, you can find an order form and important information regarding the identification of the correct components at the end of this spare parts list.

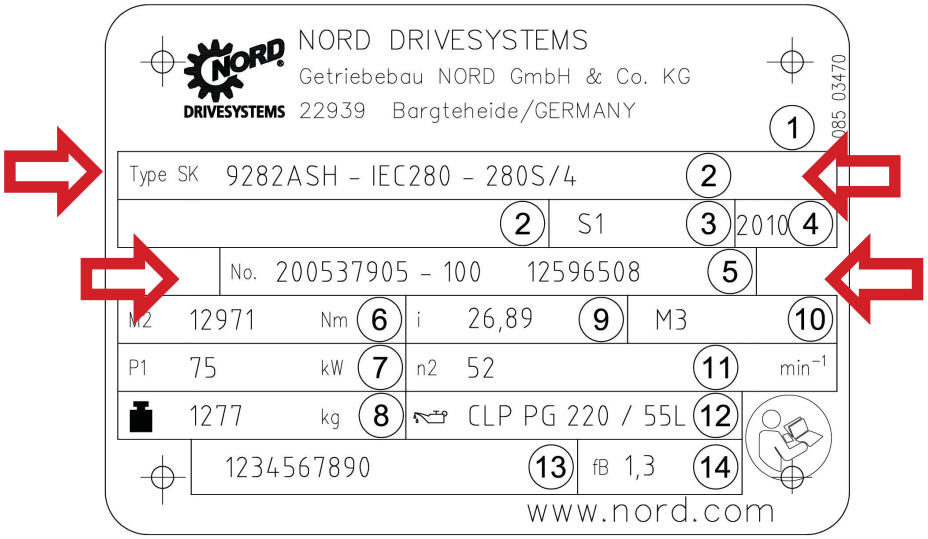
We will be glad to help you if you have any queries: You can find your local contact partner under http://locator.nord.com.

FR

Cette liste de pièces de rechange NORD contient une représentation standard des réducteurs NORD. Pour faciliter la recherche et la commande de pièces de rechange, un formulaire de commande se trouve à la fin de la liste des pièces de rechange et vous donne toutes les informations essentielles pour déterminer les pièces dont vous avez besoin.

En cas de questions, n'hésitez pas à nous contacter. Pour connaître votre interlocuteur local, veuillez consulter le site http://locator.nord.com.

Erläuterung des Typenschildes
Explanation of the rating plate
Explication de la plaque signalétique



DE

1 Matrix – Barcode
2 NORD - Getriebetyp
3 Betriebsart
4 Herstellungsjahr
5 Fabrikationsnummer
6 Nenndrehmoment der Getriebeabtriebswelle
7 Antriebsleistung
8 Gewicht entsprechend Auftragsausführung
9 Gesamte Getriebeübersetzung
10 Einbaulage
11 Nenndrehzahl der Getriebeabtriebswelle
12 Schmierstoffart, -viskosität und –menge
13 Kundenmaterialnummer
14 Betriebsfaktor

GB

1 Matrix – Barcode
2 NORD gear unit type
3 Operating mode
4 Year of manufacture
5 Serial number
6 Rated torque of gear unit output shaft
7 Drive power
8 Weight according to ordered version
9 Overall gear unit ratio
10 Installation orientation
11 Rated speed of gear unit output shaft
12 Lubricant type, viscosity and quantity
13 Customer's part number
14 Operating factor

FR

1 Code matriciel, à barres
2 Type de réducteur NORD
3 Mode de fonctionnement
4 Année de fabrication
5 Numéro de série
6 Couple nominal de l'arbre de sortie du réducteur
7 Puissance d'entraînement
8 Poids selon l'exécution du contrat
9 Rapport de réduction total
10 Position de montage
11 Vitesse de rotation nominale de l'arbre de sortie du réducteur
12 Type de lubrifiant, viscosité et quantité
13 Numéro d'article client
14 Facteur de service

Ersatzteil-Bestellung / Replacement parts order / Commande de pièces de rechange:

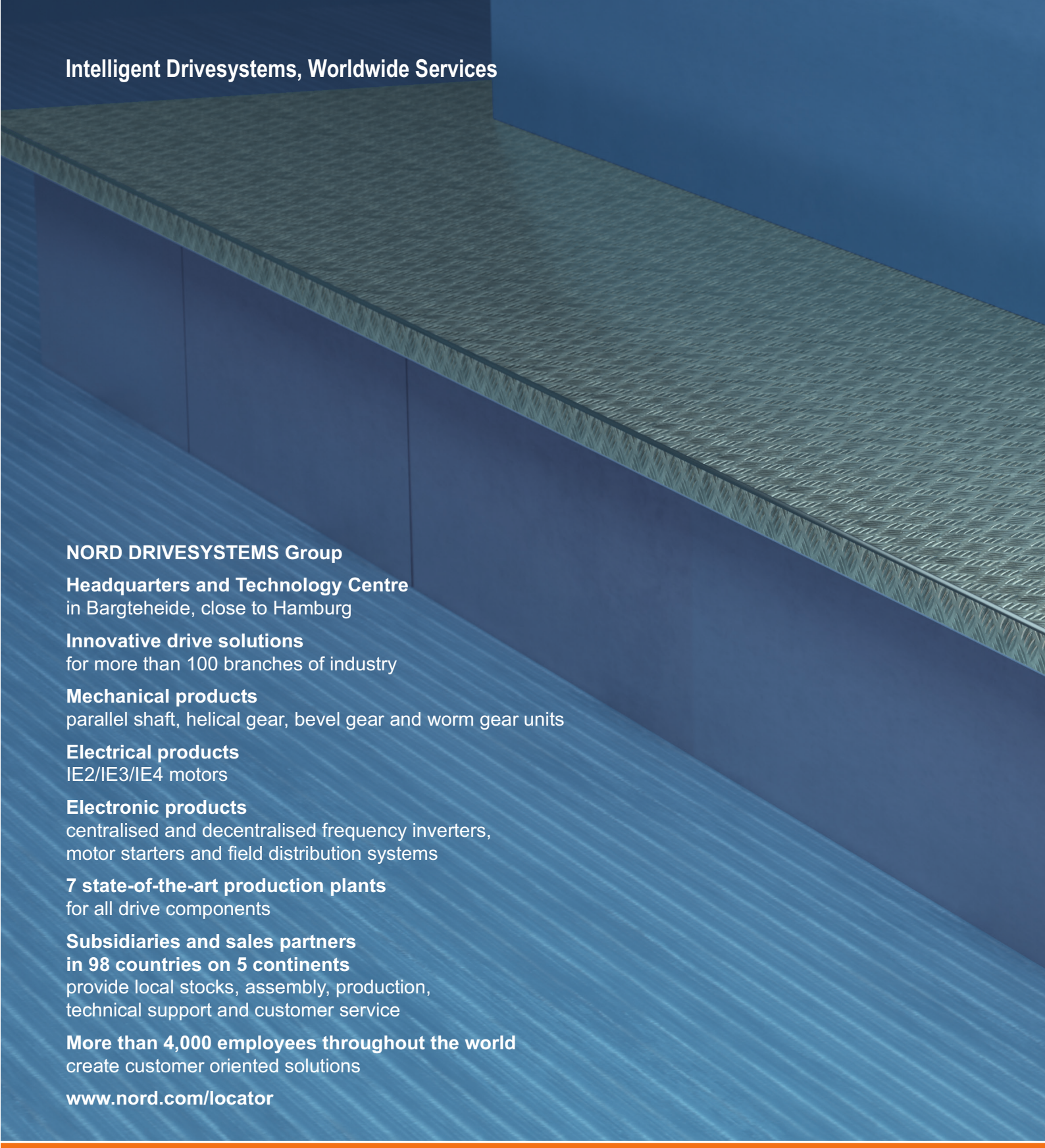
Bezeichnung / Designation / Désignation:

Pos.-Nr. / Item No. / N° pos :

Stückzahl / Pieces / Quantité:

Getriebetyp / Gear unit type / Type de réducteur:

Fabrikationsnummer / Serial No. / Numéro de série:



NORD DRIVESYSTEMS Group

Headquarters and Technology Centre
in Bargteheide, close to Hamburg

Innovative drive solutions
for more than 100 branches of industry

Mechanical products
parallel shaft, helical gear, bevel gear and worm gear units

Electrical products
IE2/IE3/IE4 motors

Electronic products
centralised and decentralised frequency inverters,
motor starters and field distribution systems

7 state-of-the-art production plants
for all drive components

Subsidiaries and sales partners
in 98 countries on 5 continents
provide local stocks, assembly, production,
technical support and customer service

More than 4,000 employees throughout the world
create customer oriented solutions

www.nord.com/locator

Headquarters:

Getriebebau NORD GmbH & Co. KG
Getriebebau-Nord-Straße 1
22941 Bargteheide, Germany
Fon +49 (0) 4532 / 289-0
Fax +49 (0) 4532 / 289-2253
info@nord.com, www.nord.com

Member of the NORD DRIVESYSTEMS GROUP

NORD® DRIVESYSTEMS

Mat.Nr. 6002299 / 3321

Manufacturer's statement

(according to the guideline 2011/65/EU of 08.06.2011)

DRIVESYSTEMS

Getriebebau NORD

GmbH&Co.KG
Getriebebau-Nord-Str. 1
D-22941 Bargteheide
Tel.: +49 (0) 4532 / 289 - 0
Fax: +49 (0) 4532 / 289 – 2253
http:\\www.nord.com
info@nord-de.com

The EU Directive 2011/65/EU dated 08.06.2011 is the new version of the EU Directive 2002/95/EU dated 27.01.2003.

The Directive was implemented under national law by the present version of the Electrical and Electronic Appliances Law [Elektro- und Elektronikgerätegesetz] (ElektroG). Devices governed by this directive may not contain more than 0.1 weight percent of lead, mercury, chrome 6, polybrominated biphenyl (PBB) or polybrominated diphenyl ether (PBDE) or 0.01 weight percent cadmium per homogenous material.

Mechanical drive components delivered by Getriebebau Nord are principally not governed by the scope of application of the EU Directive 2011/65/EU. If the drive components are intended to be used in products governed by the scope of application of the EU Directive 2011/65/EU, the manufacturer must ensure that the end product meets the requirements of the EU Directive.

For this case, Getriebebau NORD declares that the following drive components conform with the essential requirements of the electric and electronic act and the guideline 2011/65/EG of 08.06.2011and the guideline 2015/863/EG of 31.03.2015:

Gear units:

Helical gear units:

SK11E, SK21E, ..., SK51E, SK02,SK12, ...SK102, SK03, SK13, ..., SK103
In the versions / options:
F, XZ, XF, VL, IEC, NEMA, AI, AN, RLS, SEK, SEP, W, VI, OA, SO1

Helical gear units NORDBLOC:

SK172, SK272, ..., SK972, SK273, SK373, ..., SK973,
SK071.1, SK171.1, SK371.1, SK571.1, SK771.1, SK871.1, SK971.1, SK1071.1
SK072.1, SK172.1, SK372.1, ..., SK673.1, SK772.1, ..., SK973.1
In the versions / options:
F, XZ, XF, VL, AL, IEC, NEMA, AI, AN, SEK, SEP, W, VI, OA, SO1

Standard helical gear units:

SK0, SK01, SK20, ..., SK33, SK010, SK200, ..., SK330
In the versions / options:
Z, XZ, XF, F, 5, V, AL, IEC, NEMA, W, VI, SO1

Flat gear units:

SK0182NB, SK0282NB, SK0182.1, SK0282.1, SK1282.1, SK1282, ..., SK11282,
SK1382NB, SK1382.1, SK2382, ..., SK11382.1, SK12382
In the versions / options:
A, V, Z, F, X, S, VS, EA, B, G, VG, H, H66, VL, VL2, VL3, IEC, NEMA, AI, AN, RLS, SEK, SEP, W, VI, OA, OT, SO1, SCP

Industrial gear units:
MAXXDRIVE helical gear units SK5207, SK5307...SK15207, SK15307
MAXXDRIVE bevel helical gear units SK5407, SK5507...SK15407, SK15507
MAXXDRIVE XT bevel helical gear units SK5217...SK11217
MAXXDRIVE XD helical gear units SK15319
MAXXDRIVE XJ bevel helical gear units SK5418
MAXXDRIVE XS bevel helical gear units SK49320, SK59320
In the versions / options:
A, AS, B, D, DRY, EA, ED, EV, EW, F, FAN, FK, F1, H/H66, IEC, L, LC, LCX, MC, MD, MF, MFB, MS, MSB, MFK, MFT, MSK, MSKB, MST, MFTB, MSTB, MT, NEMA, OT, R, V, VL, VL2, VL3, VL4, VL5, VL6, W1, W2, W3, WG, WX, SAFOMI
Tac, FV, EF, DB, DR, OSG, OST, PS

Bevel gear units:
SK920072.1, SK92072, SK92172, ..., SK92772, SK92072.1, SK92172.1, ..., SK92772.1,
SK930072.1, SK93072.1, SK93172.1, ..., SK93772.1,
SK9012.1, SK9016.1, SK9022.1, ..., SK9096.1,
SK9013.1, SK9017.1, SK9023.1, ..., SK9053.1
In the versions / options:
A, V, L, Z, F, X, D, K, S, VS, EA, R, G, VG, B, H, H66, VL, VL2, VL3, IEC, NEMA, AI, AN, RLS, SEK, SEP, W, VI, OA, SO1, SCP

Helical worm gear units:
SK02040, SK02040.1, SK02050, ..., SK42125, SK13050, SK13080, ..., SK43125
In the versions / options:
A, V, L, X, Z, F, D, S, B, H, H66, VL, IEC, NEMA, RLS, SEK, SEP, W, VI, OA

Worm gear unit Minibloc:
SK1SM31, SK1SM40, ..., SK1SM63, SK2SM40, ..., SK2SM63
In the versions / options:
A, V, L, Z, F, D, X, B, IEC, NEMA, W, VI

UNIVERSAL worm gear units:
SK1SI31, SK1SI40, ..., SK1SI75, SK1SID31, ..., SK1SID75, SK2SID40, ..., SK2SID63, SK1SIS31, ..., SK1SIS63, SK2SIS40, ..., SK2SIS63, SK1SMI31, ..., SK1SMI75, SK1SMID31, ..., SK1SMID75, SK2SMID40, ..., SK2SMID63
In the versions / options:
V, A, L, X, Z, F, D, H, H10, /31, /40, IEC, NEMA, W, VI

Motor console:
MK I, MK II, MK III, MK IV, MK V

Adjusting gear units:
R080, R100, R196, R210, R250, R280, R300, R350, R375, R400, R500
In the designs: U, Z

Getriebebau NORD
GmbH&Co.KG

Bargteheide, 21.01.2022
Place and Date of Issue

U. Küchenmeister, managing director

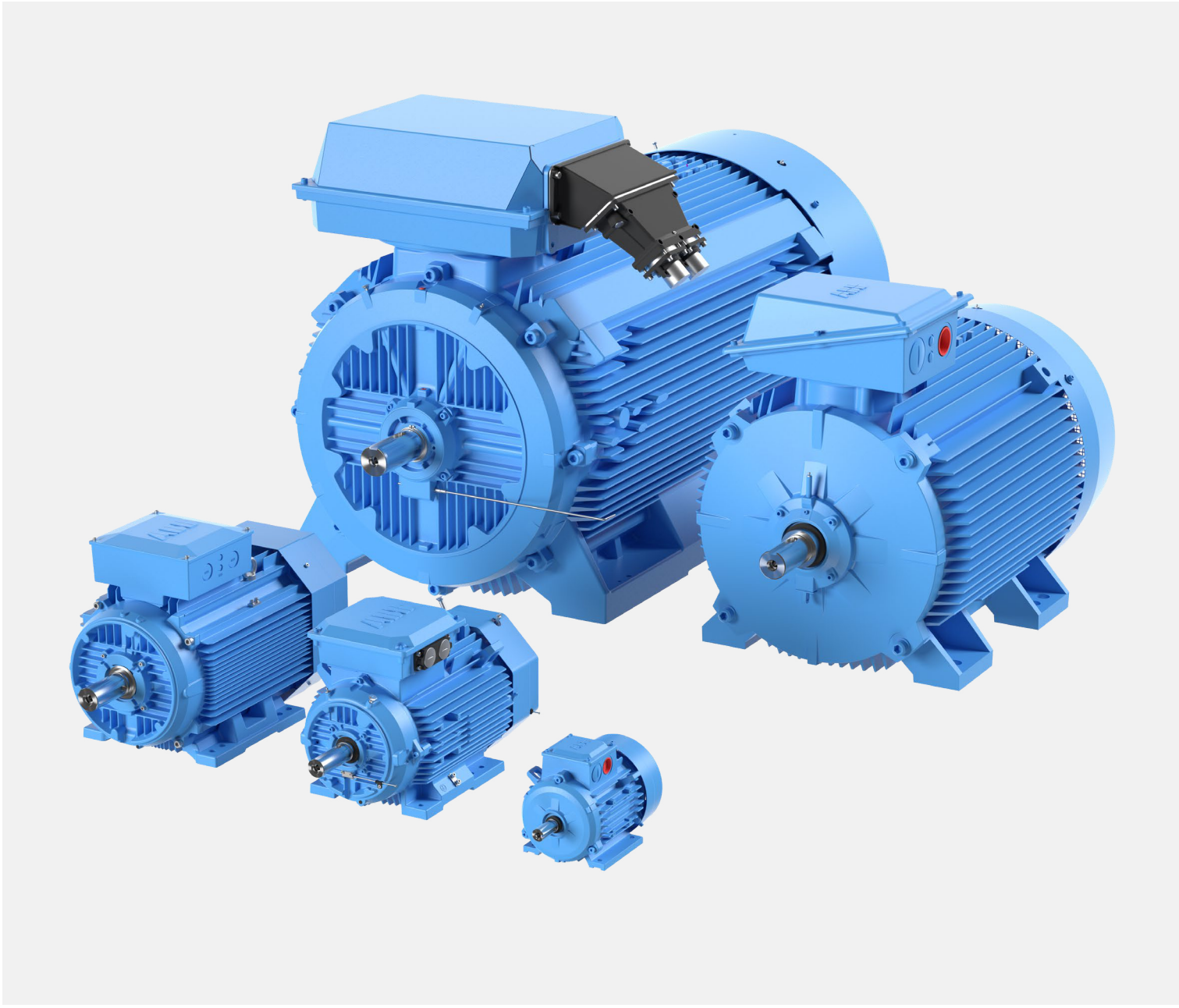
Dr. O. Sadi, technical managing director

7 MOTOR

	Type	Motor tag number (ABB Serial n°)	PCM reference	Manual
ABB	M3BP 132SMF 4	PM-50001A (3G1F2433998068)	DI317873-01	3GZF500730-85 Rev H 06-2022
		PM-50001B (3G1F2434998069)		

INSTALLATION, OPERATION, MAINTENANCE AND SAFETY MANUAL

Low voltage motors
Installation, operation, maintenance and safety manual



More languages – please go to:
new.abb.com/motors-generators/iec-low-voltage-motors/manuals

Contents

Contents 3
1 Introduction 5
1.1 Declaration of Conformity 5
1.2 Validity 5

2 Safety considerations 6

3 Handling 7
3.1 Reception 7
3.2 Transportation and storage 7
3.3 Lifting 8
3.4 Motor weight 8

4 Installation and commissioning 9
4.1 General 9
4.2 Motors with other than deep groove ball bearings 9
4.3 Insulation resistance check 10
4.4 Foundation 10
4.5 Balancing and fitting coupling halves and pulleys 11
4.6 Mounting and alignment of the motor 11
4.7 Radial forces and belt drives 11
4.8 Motors with drain plugs for condensation 12
4.9 Cabling and electrical connections 12
4.9.1 Connections for different starting methods 13
4.9.2 Connections of auxiliaries 13
4.10 Terminals and direction of rotation 13

5 Operation 14
5.1 General 14

6 Low voltage motors in variable speed operation 15
6.1 Introduction 15
6.2 Winding insulation 15
6.2.1 Selection of winding insulation for ABB converters 15
6.2.2 Selection of winding insulation with all other converters 15
6.3 Thermal protection 15
6.4 Bearing currents 16
6.4.1 Elimination of bearing currents with ABB converters 16
6.4.2 Elimination of bearing currents with all other converters 16
6.5 Cabling, grounding and EMC 17
6.6 Operating speed 17
6.7 Motors in variable speed applications 17
6.7.1 General 17
6.7.2 Motor loadability with AC_8_ _ – Series of converters with DTC control 17
6.7.3 Motor loadability with AC_5_ _ – series of converter 18
6.7.4 Motor loadability with other voltage source PWM-type converters 18
6.7.5 Short time overloads 18
6.8 Rating plates 18
6.9 Commissioning the variable speed application 18

7 Maintenance 19
7.1 General inspection 19
7.1.1 Standby motors 19
7.2 Lubrication. 20
7.2.1 Motors with permanently greased bearings 20
7.2.2 Motors with regreasable bearings 20
7.2.3 Lubrication intervals and amounts 21
7.2.4 Lubricants 22

8 After Sales Support 23
8.1 Spare parts. 23
8.2 Dismantling, re-assembly and rewinding 23
8.3 Bearings 23

9 Environmental requirements 24

10 Troubleshooting 25

11 Figures 27

1 Introduction

These instructions must be followed to ensure safe and proper installation, operation and maintenance of the motor. They should be brought to the attention of anyone who installs, operates or maintains the motor or associated equipment. The motor is intended for installation and use by qualified personnel, familiar with health and safety requirements and national legislation. Ignoring these instructions may invalidate all applicable warranties.

1.1 Declaration of Conformity

The conformity of the end product according to Directive 2006/42/EC (Machinery) has to be established by the commissioning party when the motor is fitted to the machinery.

1.2 Validity

These instructions are valid for the following ABB electrical machine types, in both motor and generator operation:

- series MT*, MXMA,
- series M1A*, M2A*/M3A*, M2B*/M3B*, M4B*, M2C*/M3C*, M2F*/M3F*, M2L*/M3L*, M2M*/M3M*, M2Q*, M2R*/M3R*, M2V*/M3V*
- in IEC frame sizes 56-500
- in NEMA frame sizes 58*, 50**

There is a separate manual for e.g. Ex motors ‘Low voltage motors for explosive atmospheres: Installation, operation and maintenance and safety manual (3GZF500730-47).

Additional information is required for some machine types due to special application and/or design considerations.

Additional manual is available for the following motors:

- roller table motors
- water cooled motors
- smoke extraction motors
- brake motors
- motors for high ambient temperatures
- motors in marine applications for mounting on open deck
- of ships or offshore units

2 Safety considerations

The motor is intended for installation and use by qualified personnel, familiar with health and safety requirements and national legislation.

Safety equipment necessary for the prevention of accidents at the installation and operating site must be provided in accordance with local regulations.



WARNING

Emergency stop controls must be equipped with restart lockouts. After emergency stop a new start command can take effect only after the restart lockout has been intentionally reset.

Points to be observed:

1. Do not step on the motor.
2. The temperature of the outer casing of the motor may be hot to the touch during normal operation and especially after shut-down.
3. Some special motor applications may require additional instructions (e.g. when supplied by frequency converter).
4. Observe rotating parts of the motor.
5. Do not open terminal boxes while energized.

3 Handling

3.1 Reception

Immediately upon receipt, check the motor for external damage (e.g. shaft-ends, flanges and painted surfaces) and, if found, inform the forwarding agent without delay.

Check all rating plate data, especially voltage and winding connections (star or delta). The type of bearing is specified on the rating plate of all motors except the smallest frame sizes.

In the case of a variable speed drive application check the maximum loadability allowed according to frequency stamped on the motor's second rating plate.

3.2 Transportation and storage

The motor should always be stored indoors (above –20 °C), in dry, vibration-free and dust-free conditions. During transportation, shocks, falls and humidity should be avoided. In other conditions, please contact ABB.

Unprotected machined surfaces (shaft-ends and flanges) should be treated against corrosion.

It is recommended that shafts are rotated periodically (once per quarter) by hand to prevent grease migration.

Anti-condensation heaters, if fitted, are recommended to be used to avoid water condensing in the motor.

The motor must not be subject to any external vibrations at standstill so as to avoid causing damage to the bearings.

Motors fitted with cylindrical-roller and/or angular contact bearings must be fitted with locking devices during transport.

3.3 Lifting

All ABB motors above 25 kg are equipped with lifting lugs or eyebolts.

Only the main lifting lugs or eyebolts of the motor should be used for lifting the motor. They must not be used to lift the motor when it is attached to other equipment.

Lifting lugs for auxiliaries (e.g. brakes, separate cooling fans) or terminal boxes must not be used for lifting the motor. Because of different output, mounting arrangements and auxiliary equipment, motors with the same frame may have a different center of gravity.

Damaged lifting lugs must not be used. Check that eyebolts or integrated lifting lugs are undamaged before lifting.

Lifting eyebolts must be tightened before lifting. If needed, the position of the eyebolt can be adjusted using suitable washers as spacers.

Ensure that proper lifting equipment is used and that the sizes of the hooks are suitable for the lifting lugs.

Care must be taken not to damage auxiliary equipment and cables connected to the motor.

Remove eventual transport jigs fixing the motor to the pallet.

Specific lifting instructions are available from ABB.



WARNING

During lifting, mounting or maintenance work, all necessary safety considerations shall be in place and special attention to be taken that nobody will be subject to lifted load.

3.4 Motor weight

The total motor weight can vary within the same frame size (center height) depending on different output, mounting arrangement and auxiliaries.

The following table shows estimated maximum weights for machines in their basic versions as a function of frame material.

The actual weight of all ABB's motors, except the smallest frame sizes (56 and 63), is shown on the rating plate.

—

Table 3.1: Minimum cross-sectional area of protective conductors

Frame size	Aluminum, Weight kg	Cast iron, Weight kg	Add. for brake
56	4.5	–	–
63	6	–	–
71	8	13	5
80	14	20	8
90	20	30	10
100	32	40	16
112	36	50	20
132	93	90	30
160	149	130	30
180	162	190	45
200	245	275	55
225	300	360	75
250	386	405	75
280	425	800	–
315	–	1 700	–
355	–	2 700	–
400	–	3 500	–
450	–	4 500	–
5000	–	2 800	–

If the motor is equipped with a separate fan, contact ABB for the weight.

4 Installation and commissioning



WARNING

Disconnect and lock out before working on the motor or the driven equipment.

4.1 General

All rating plate values must be carefully checked to ensure that the motor protection and connection will be properly done.

When starting the motor for the first time or after it has been in storage more than 6 months, apply the specified quantity of grease.

See section “7.2.2 Motors with re-greasable bearings” for more details.

When fitted in a vertical position with the shaft pointing downwards, the motor must have a protective cover to prevent foreign objects and fluid from falling into the ventilation openings. This task can also be achieved by a separate cover not fixed to the motor. In this case, the motor must have a warning label.

4.2 Motors with other than deep groove ball bearings

Remove transport locking if employed. Turn the shaft of the motor by hand to check free rotation, if possible.

Motors equipped with cylindrical roller bearings: Running the motor with no radial force applied to the shaft may damage the roller bearing due to “sliding”,

Motors equipped with angular contact ball bearing: Running the motor with no axial force applied in the right direction in relation to the shaft may damage the angular contact bearing.



WARNING

For motors with angular contact bearings the axial force must not by any means change direction.

The type of bearing is specified on the rating plate.

4.3 Insulation resistance check

Measure insulation resistance (IR) before commissioning, after long periods of standstill or storage when winding dampness may be suspected. IR shall be measured directly on the motor terminals with the supply cables disconnected in order to avoid them affecting the result.

Insulation resistance should be used as a trend indicator to determine changes in the insulation system. In new machines the IR is usually thousands of Mohms and thus following the change of IR is important so as to know the condition of the insulation system. Typically, the IR should not be below 10 MΩ and in no case below 1 MΩ (measured with 500 or 1000 VDC and corrected to 25 °C). The insulation resistance value is halved for each 20 °C increase in temperature.

Figure 1, in chapter 11, can be used for the insulation correction to the desired temperature.



WARNING

To avoid risk of electrical shock, the motor frame must be grounded and the windings should be discharged against the frame immediately after each measurement.

If the reference resistance value is not attained, the winding is too damp and must be oven dried. The oven temperature should be 90 °C for 12-16 hours followed by 105 °C for 6-8 hours.

If fitted drain hole plugs must be removed and closing valves must be opened during heating. After heating, make sure the plugs are refitted. Even if the drain plugs are fitted, it is recommended to disassemble the end shields and terminal box covers for the drying process.

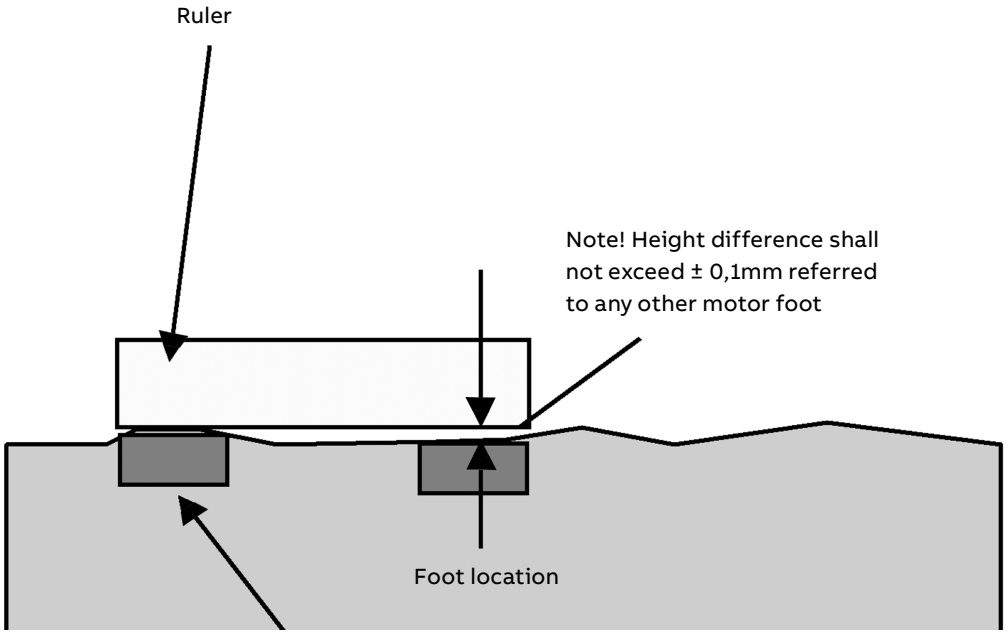
Windings drenched in seawater normally need to be rewound.

4.4 Foundation

The end user has full responsibility for preparation of the foundation.

Metal foundations should be painted to avoid corrosion.

Foundations must be even and sufficiently rigid to withstand possible short circuit forces. They must be designed and dimensioned to avoid the transfer of vibration to the motor and vibration caused by resonance. See figure below.



4.5 Balancing and fitting coupling halves and pulleys

As standard, balancing of the motor has been carried out using half key.

Coupling halves or pulleys must be balanced after machining the keyways. Balancing must be done in accordance with the balancing method specified for the motor.

Coupling halves and pulleys must be fitted on the shaft by using suitable equipment and tools which do not damage the bearings and seals.

Never fit a coupling half or pulley by hammering or removing it by using a lever pressed against the body of the motor.

4.6 Mounting and alignment of the motor

Ensure that there is enough space for free airflow around the motor. It is recommended to have a clearance between the fan cover and the wall etc. of at least ½ of the air intake of the fan cover. Additional information may be found from the product catalog or from the dimension drawings available on our web pages: **www.abb.com/motors&generators.**

Correct alignment is essential to avoid bearing, vibration and possible shaft failures.

Mount the motor on the foundation using the appropriate bolts or studs and place shim plates between the foundation and the feet.

Align the motor using appropriate methods.

If applicable, drill locating holes and fix the locating pins into position.

Mounting accuracy of coupling half: check that clearance b is less than 0.05 mm and that the difference a1 to a2 is also less than 0.05 mm. See figure 2.

Re-check the alignment after final tightening of the bolts or studs.

Do not exceed permissible loading values for bearings as stated in the product catalogs.

Check that the motor has sufficient airflow. Ensure that no nearby objects or direct sunshine radiate additional heat to the motor.

For flange mounted motors (e.g. B5, B35, V1), make sure that the construction allows sufficient air flow on the outer surface of the flange.

4.7 Radial forces and belt drives

Belts must be tightened according to the instructions of the supplier of the driven equipment. However, do not exceed the maximum belt forces (i.e. radial bearing loading) stated in the relevant product catalogs.



WARNING

Excessive belt tension will damage bearings and can cause shaft damage.

4.8 Motors with drain plugs for condensation

Check that drain holes and plugs face downwards. In vertical position mounted motors, the drain plugs may be in horizontal position.

Motors with sealable plastic drain plugs are delivered in an open position. In very dusty environments, all drain holes should be closed.

4.9 Cabling and electrical connections

The terminal box on standard single speed motors normally contains six winding terminals and at least one earth terminal.

In addition to the main winding and earthing terminals, the terminal box can also contain connections for thermistors, heating elements or other auxiliary devices.

Suitable cable lugs must be used for the connection of all main cables. Cables for auxiliaries can be connected into their terminal blocks as such.

Motors are intended for fixed installation only. Unless otherwise specified, cable entry threads are metric. The IP class of the cable gland must be at least the same as those of the terminal boxes.

Certified conduit hub or cable connector has to be used at the time of installation.



Cables should be mechanically protected and clamped close to the terminal box to fulfill the appropriate requirements of IEC/EN 60079-0 and local installation standards.

Unused cable entries must be closed with blanking elements according to the IP class of the terminal box.

The degree of protection and diameter are specified in the documents relating to the cable gland.



WARNING

Use appropriate cable glands and seals in the cable entries according to the type and diameter of the cable.

Earthing must be carried out according to local regulations before the motor is connected to the supply voltage.

The earth terminal on the frame has to be connected to PE (protective earth) with a cable as shown in Table 5 of IEC/EN 60034-1:

Table 4.1: Minimum cross-sectional area of protective conductors

Cross-sectional area of phase conductors of the installation, S, [mm²]	Minimum cross-sectional area of the corresponding protective conductor, S, [mm²]
4	4
6	6
10	10
16	16
25	25
35	25
50	25
70	35
95	50
120	70
150	70
185	95
240	120
300	150
400	185

In addition, earthing or bonding connection facilities on the outside of electrical apparatus must provide effective connection of a conductor with a cross-sectional area of at least 4 mm².

The cable connection between the network and motor terminals must meet the requirements stated in the national standards for installation or in the standard IEC/EN 60204-1 according to the rated current indicated on the rating plate.

> When the ambient temperature exceeds +50 °C, cables having permissible operating temperature of +90 °C as minimum shall be used. Also all other conversion factors depending on the installation conditions shall be taken into account while sizing the cables.

Ensure that the motor protection corresponds to the environment and weather conditions. For example, make sure that water cannot enter the motor or the terminal boxes.

The seals of terminal boxes must be placed correctly in the slots provided to ensure the correct IP class. A leak could lead to penetration of dust or water, creating a risk of flashover to live elements.

4.9.1 Connections for different starting methods

The terminal box on standard single speed motors normally contains six winding terminals and at least one earth terminal. This enables the use of DOL- or Y/D –starting.

For two-speed and special motors, the supply connection must follow the instructions inside the terminal box or in the motor manual.

The voltage and connection are stamped on the rating plate.

Direct-on-line starting (DOL):
Y or D winding connections may be used.

For example, 690 VY, 400 VD indicates Y-connection for 690 V and D-connection for 400 V.

Star/Delta (Wye/Delta) starting (Y/D):
The supply voltage must be equal to the rated voltage of the motor when using a D-connection.

Remove all connection links from the terminal block.

Other starting methods and severe starting conditions:
In cases where other starting methods e.g. converter or soft starter will be used in the duty types of S1 and S2, it is considered that the device is “isolated from the power system when the electrical machine is running” as in the standard IEC 60079-0 and thermal protection is optional.

4.9.2 Connections of auxiliaries

If a motor is equipped with thermistors or other RTDs (Pt100, thermal relays, etc.) and auxiliary devices, it is recommended they be used and connected by appropriate means. For certain applications, it is mandatory to use thermal protection. More detailed information can be found in the documents delivered with the motor. Connection diagrams for auxiliary elements and connection parts can be found inside the terminal box.

The maximum measuring voltage for the thermistors is 2.5 V. The maximum measuring current for Pt100 is 5 mA. Using a higher measuring voltage or current may cause errors in readings or a damaged temperature detector.

The insulation of thermal sensors fulfills the requirements of basic insulation.

4.10 Terminals and direction of rotation

The shaft rotates clockwise when viewing the shaft face at the motor drive end, and the line phase sequence – L1, L2, L3 – is connected to the terminals as shown in figure 3.

To alter the direction of rotation, interchange any two connections on the supply cables.

If the motor has a unidirectional fan, ensure that it rotates in the same direction as the arrow marked on the motor.

5 Operation

5.1 General

The motors are designed for the following conditions unless otherwise stated on the rating plate:

- Motors are to be installed in fixed installations only.
- Normal ambient temperature range is from –20 °C to +40 °C.
- Maximum altitude is 1000 m above sea level.
- The variation of the supply voltage and frequency may not exceed the limits mentioned in relevant standards. Tolerance for supply voltage is ±5 %, and for frequency ±2 % according to the figure 4 (EN / IEC 60034-1, paragraph 7.3, Zone A). Both extreme values are not supposed to occur at the same time.

The motor can only be used in applications for which it is intended. The rated nominal values and operation conditions are shown on the motor rating plates. In addition, all requirements of this manual and other related instructions and standards must be followed.

If these limits are exceeded, motor data and construction data must be checked. Please contact ABB for further information.



WARNING

Ignoring any instructions or maintenance of the apparatus may jeopardize safety and thus prevent the use of the motor.

6 Low voltage motors in variable speed operation

6.1 Introduction

This part of the manual provides additional instructions for motors used in frequency converter supplies. The motor is intended to operate from a single frequency converter supply and not motors running in parallel from one frequency converter. Instructions given by the converter manufacturer shall be followed.

Additional information may be required by ABB to decide on the suitability for some motor types used in special applications or with special design modifications.

6.2 Winding insulation

Variable speed drives create higher voltage stresses than the sinusoidal supply on the winding of the motor. Therefore, the winding insulation of the motor as well as the filter at the converter output must be dimensioned according following instructions.

6.2.1 Selection of winding insulation for ABB converters

In the case of ABB e.g. AC_8_ _-series and AC_5_ _-series single drives with a diode supply unit (uncontrolled DC voltage), the selection of winding insulation and filters can be made according to table 6.1.

6.2.2 Selection of winding insulation with all other converters

The voltage stresses must be limited below accepted limits. Please contact the system supplier to ensure the safety of the application. The influence of possible filters must be taken into account while dimensioning the motor.

6.3 Thermal protection

Most of the motors covered by this manual are equipped with PTC thermistors or other type of RTD's in the stator windings. It is recommended to connect those to the frequency converter. Read more in chapter 4.9.2.

6.4 Bearing currents

Insulated bearings or bearing constructions, common mode filters and suitable cabling and grounding methods must be used according to the following instructions and using table 6.1.

—

Table 6.1 Selection of winding insulation for ABB converters

	P_N < 100 kW	P_N ≥ 100 kW or IEC315 ≤ Frame size ≤ IEC355	P_N ≥ 350 kW or IEC400 ≤ Frame size ≤ IEC450
U_N ≤ 500 V	Standard motor	Standard motor + Insulated N-bearing	Standard motor + Insulated N-bearing + Common mode filter
500V > U_N ≤ 600V	Standard motor + dU/dt –filter (reactor) OR Reinforced insulation	Standard motor + dU/dt –filter (reactor) + Insulated N-bearing OR Reinforced insulation + Insulated N-bearing	Standard motor + Insulated N-bearing + dU/dt –filter (reactor) + Common mode filter OR Reinforced insulation + Insulated N-bearing + Common mode filter
500V > U_N ≤ 600V (cable length > 150 m)	Standard motor	Standard motor + Insulated N-bearing	Standard motor + Insulated N-bearing + Common mode filter
600V > U_N ≤ 690V	Reinforced insulation + dU/dt –filter (reactor)	Reinforced insulation + dU/dt –filter (reactor) + Insulated N-bearing	Reinforced insulation + Insulated N-bearing + dU/dt –filter (reactor) + Common mode filter
600V > U_N ≤ 690V (cable length > 150 m)	Reinforced insulation	Reinforced insulation + Insulated N-bearing	Reinforced insulation + Insulated N-bearing + Common mode filter

6.4.1 Elimination of bearing currents with ABB converters

In case of ABB frequency converter e.g. AC_8_ _- and AC_5_ _-series with a diode supply unit, the methods according to table 6.1 must be used to avoid harmful bearing currents in motors.

Insulated bearings which have aluminum oxide coated inner and/or outer bores or ceramic rolling elements are recommended. Aluminum oxide coatings shall also be treated with a sealant to prevent dirt and humidity penetrating into the porous coating. For the exact type of bearing insulation, see the motor's rating plate. Changing the bearing type or insulation method without ABB's permission is prohibited.

6.4.2 Elimination of bearing currents with all other converters

The user is responsible for protecting the motor and driven equipment from harmful bearing currents. Instructions described in chapter 6.4.1 can be used as guideline, but their effectiveness cannot be guaranteed in all cases.

6.5 Cabling, grounding and EMC

To provide proper grounding and to ensure compliance with any applicable EMC requirements, motors above 30 kW shall be cabled by shielded symmetrical cables and EMC glands, i.e. cable glands providing 360° bonding.

Symmetrical and shielded cables are highly recommended also for smaller motors. Make the 360° grounding arrangement at all the cable entries as described in the instructions for the glands. Twist the cable shields into bundles and connect to the nearest ground terminal/bus bar inside the terminal box, converter cabinet, etc.

Proper cable glands providing 360° bonding must be used at all termination points such as motor, converter, possible safety switch, etc.

For motors of frame size IEC 280 and above, additional potential equalization between the motor frame and the driven equipment is needed, unless both are mounted on a common steel base. In this case, the high frequency conductivity of the connection provided by the steel base should be checked by, for example, measuring the potential difference between the components.

More information about grounding and cabling of variable speed drives can be found in the manual “Grounding and cabling of the drive system” (Code: 3AFY 61201998).

6.6 Operating speed

For speeds higher than the nominal speed stated on the motor’s rating plate or in the respective product catalog, ensure that either the highest permissible rotational speed of the motor or the critical speed of the whole application is not exceeded.

6.7 Motors in variable speed applications

6.7.1 General

With ABB’s frequency converters, the motors can be dimensioned by using ABB’s DriveSize dimensioning program. The tool is downloadable from the ABB website (www.abb.com/motors&generators).

For application supplied by other converters, the motors must be dimensioned manually. For more information, please contact ABB.

The loadability curves (or load capacity curves) are based on nominal supply voltage. Operation in under or over voltage conditions may influence on the performance of the application.

6.7.2 Motor loadability with AC_8_ _ – Series of converters with DTC control

The loadability curves presented in Figures 5a – 5d are valid for ABB AC_8_ _-series converters with uncontrolled DC-voltage and DTC-control. The figures show the approximate maximum continuous output torque of the motors as a function of supply frequency. The output torque is given as a percentage of the nominal torque of the motor. The values are indicative and exact values are available on request.

The maximum speed of the motor and application may not be exceeded!

6.7.3 Motor loadability with AC_5_ _ – series of converter

The loadability curves presented in Figures 6a – 6d are valid for AC_5_ _ -series converters.
The figures show the approximate maximum continuous output torque of the motors as a function of supply frequency. The output torque is given as a percentage of the nominal torque of the motor. The values are indicative and exact values are available on request.

The maximum speed of the motor and application may not be exceeded!

6.7.4 Motor loadability with other voltage source PWM-type converters

For other converters, with uncontrolled DC voltage and minimum switching frequency of 3 kHz (200…500 V), the dimensioning instructions as mentioned in chapter 6.7.3 can be used as guidelines. However, it shall be noted that the actual thermal loadability can also be lower. Please contact the manufacturer of the converter or the system supplier.

The actual thermal loadability of a motor may be lower than shown by guideline curves.

6.7.5 Short time overloads

ABB motors can usually be temporarily overloaded as well as used in intermittent duties. The most convenient method to dimension such applications is to use the DriveSize tool.

6.8 Rating plates

The usage of ABB's motors in variable speed applications do not usually require additional rating plates. The parameters required for commissioning the converter can be found from the main rating plate. In some special applications, however, the motors can be equipped with additional rating plates for variable speed applications.

Those include the following information:
- speed range
- power range
- voltage and current range
- type of torque (constant or quadratic)
- and converter type and required minimum switching frequency.

6.9 Commissioning the variable speed application

The commissioning of the variable speed application must be done according to the instructions of the frequency converter and local laws and regulations. The requirements and limitations set by the application must also be taken into account.

All parameters needed for setting the converter must be taken from the motor rating plates.
The most often needed parameters are:
- nominal voltage
- nominal current
- nominal frequency
- nominal speed
- nominal power

In case of missing or inaccurate information, do not operate the motor before ensuring correct settings!

ABB recommends using all the suitable protective features provided by the converter to improve the safety of the application. Converters usually provide features such as (names and availability of features depend on manufacturer and model of the converter):
- minimum speed
- maximum speed
- acceleration and deceleration times
- maximum current
- maximum torque
- stall protection

7 Maintenance



WARNING

Voltage may be connected at standstill inside the terminal box for heating elements or direct winding heating.

7.1 General inspection

1. Inspect the motor at regular intervals, at least once a year. The frequency of checks depends on, for example, the humidity level of the ambient air and on the local weather conditions. This can initially be determined experimentally and must then be strictly adhered to.
2. Keep the motor clean and ensure free ventilation airflow. If the motor is used in a dusty environment, the ventilation system must be regularly checked and cleaned.
3. Check the condition of shaft seals (e.g. V-ring or radial seal) and replace if necessary.
4. Check the condition of connections and mounting and assembly bolts.
5. Check the bearing condition by listening for any unusual noise, vibration measurement, bearing temperature, inspection of spent grease or SPM bearing monitoring. Pay special attention to bearings when their calculated rated life time is coming to an end.

When signs of wear are noticed, dismantle the motor, check the parts and replace if necessary. When bearings are changed, replacement bearings must be of the same type as those originally fitted. The shaft seals have to be replaced with seals of the same quality and characteristics as the originals when changing bearings.

In the case of the IP 55 motor and when the motor has been delivered with a plug closed, it is advisable to periodically open the drain plugs in order to ensure that the way out for condensation is not blocked and allows condensation to escape from the motor. This operation must be done when the motor is at a standstill and has been made safe to work on.

7.1.1 Standby motors

If the motor is in standby for a longer period of time on a ship or in other vibrating environment the following measures have to be taken:

1. The shaft must be rotated regularly every 2 weeks (to be reported) by means of starting up of the system. In case a start-up is not possible, for any reason, at least the shaft has to be turned by hand in order to achieve a different position once a week. Vibrations caused by other vessel's equipment will cause bearing pitting which should be minimized by regular operation/hand turning.
2. The bearing must be greased while rotating the shaft every year (to be reported). If the motor has been provided with roller bearing at the driven end, the transport lock must be removed before rotating the shaft. The transport locking must be remounted in case of transportation.
3. All vibrations must be avoided to prevent a bearing from failing. All instructions in the motor instruction manual for commissioning and maintenance have to be followed. The warranty will not cover the winding and bearing damages if these instructions have not been followed.

7.2 Lubrication



WARNING

Beware of all rotating parts!



WARNING

Grease can cause skin irritation and eye inflammation. Follow all safety precautions specified by the manufacturer of the grease.

Bearing types are specified in the respective product catalogs and on the rating plate of all motors, except smaller frame sizes.

Reliability is a vital issue for bearing lubrication intervals. ABB uses mainly the L1 -principle (i.e. that 99 % of the motors are certain to make the life time) for lubrication.

7.2.1 Motors with permanently greased bearings

Bearings are usually permanently greased bearings of 1Z, 2Z, 2RS or equivalent.

As a guide, adequate lubrication for sizes up to 250 can be achieved for the following duration, according to L_1. For duties with higher ambient temperatures, please contact ABB. The informative formula to change the L1 values roughly to L_{10} values: $L_{10} = 2.0 \times L_1$.

Duty hours for permanently greased bearings at ambient temperatures of 25 °C and 40 °C are:

—

Table 7.1

Frame size	Poles	Duty hours at 25 °C	Duty hours at 40 °C
56	2	52 000	33 000
56	4–8	65 000	41 000
63	2	49 000	31 000
63	4–8	63 000	40 000
71	2	67 000	42 000
71	4–8	100 000	56 000
80–90	2	100 000	65 000
80–90	4–8	100 000	96 000
100–112	2	89 000	56 000
100–112	4–8	100 000	89 000
132	2	67 000	42 000
132	4–8	100 000	77 000
160	2	60 000	38 000
160	4–8	100 000	74 000
180	2	55 000	34 000
180	4–8	100 000	70 000
200	2	41 000	25 000
200	4–8	95 000	60 000
225	2	36 000	23 000
225	4–8	88 000	56 000
250	2	31 000	20 000
250	4–8	80 000	50 000

Data is valid up to 60 Hz.

7.2.2 Motors with regreasable bearings

Lubrication information plate and general lubrication advice.

If the motor is equipped with a lubrication information plate, follow the given values.

Greasing intervals regarding mounting, ambient temperature and rotational speed are defined on the lubrication information plate.

During the first start or after a bearing lubrication a temporary temperature rise may appear, approximately 10 to 20 hours.

Some motors may be equipped with a collector for old grease. Follow the special instructions given for the equipment.

A. Manual lubrication

Regreasing while the motor is running

- Remove grease outlet plug or open closing valve if fitted.
- Be sure that the lubrication channel is open.
- Inject the specified amount of grease into the bearing.
- Let the motor run for 1-2 hours to ensure that all excess grease is forced out of the bearing. Close the grease outlet plug or closing valve, if fitted.

Regreasing while the motor is at a standstill

If it is not possible to re-grease the bearings while the motors are running, lubrication can be carried out while the motor is at a standstill.

- In this case, use only half the amount of grease and then run the motor for a few minutes at full speed.
- When the motor has stopped, apply the rest of the specified amount of grease to the bearing.
- After 1–2 running hours, close the grease outlet plug or closing valve, if fitted.

B. Automatic lubrication

The grease outlet plug must be removed permanently with automatic lubrication or open closing valve, if fitted.

ABB recommends only the use of electromechanical systems.

The amount of grease per lubrication interval stated in the table should be multiplied by three if a central lubrication system is used. When using a smaller automatic re-grease unit (one or two cartridges per motor) the normal amount of grease can be used.

When 2-pole motors are automatically re-greased, the note concerning lubricant recommendations for 2-pole motors in the Lubricants chapter should be followed.

The used grease should be suitable for automatic lubrication. The automatic lubrication system deliverer and the grease manufacturer's recommendations should check.

Calculation example of amount of grease for automatic lubrication system

Central lubrication system: Motor IEC M3_P 315_ 4-pole in 50 Hz network, re-lubrication interval according to Table is 7600 h/55 g (DE) and 7600 h/40 g (NDE):

(DE) RLI = 55 g/7600 h*3*24 = 0,52 g/day

(NDE) RLI = 40 g/7600 h*3*24 = 0,38 g/day

Calculation example of amount of grease for single automation lubrication unit (cartridge)

(DE) RLI = 55 g/7600 h*24 = 0,17 g/day

(NDE) RLI = 40 g/7600 h*24 = 0,13 g/day

RLI = Re-lubrication interval, DE = Drive end, NDE = Non drive end

7.2.3 Lubrication intervals and amounts

Lubrication intervals for vertical motors are half of the values shown in the table below.

As a guide, adequate lubrication can be achieved for the following duration, according to L_1. For duties with higher ambient temperatures please contact ABB. The informative formula to change the L1 values roughly to L10 values is $L_{10} = 2.0 \times L_1$, with manual lubrication.

The lubrication intervals are based on a bearing operating temperature of 80 °C (ambient temperature +25 °C).



An increase in the ambient temperature raises the temperature of the bearings correspondingly. The interval values should be halved for a 15 °C increase in bearing temperature and may be doubled for a 15 °C decrease in bearing temperature.

Higher speed operation, e.g. in frequency converter applications, or lower speed with heavy load will require shorter lubrication intervals.



WARNING

The maximum operating temperature of the grease and bearings, +110 °C, must not be exceeded. The designed maximum speed of the motor must not be exceeded.

—

Table 7.2

Frame size	Amount of grease g/bearing	kW	3600 r/min	3000 r/min	kW	1800 r/min	1500 r/min	kW	1000 r/min	kW	500-900 r/min
					Ball bearings, lubrication intervals in duty hours						
112	10	all	10 000	13 000	all	18 000	21 000	all	2 5 000	all	28 000
132	15	all	9 000	11 000	all	17 000	19 000	all	23 000	all	26 500
160	25	≤ 18,5	9 000	12000	≤ 15	18 000	21 500	≤ 11	24 000	all	24 000
160	25	> 18,5	7 500	1 0000	> 15	15 000	18 000	> 11	22 500	all	24 000
180	30	≤ 22	7 000	9 000	≤ 22	15 500	18 500	≤ 15	24 000	all	24 000
180	30	> 22	6 000	8 500	> 22	14 000	17 000	> 15	21 000	all	24 000
200	40	≤ 37	5 500	8 000	≤ 30	14 500	17 500	≤ 22	23 000	all	24 000
200	40	> 37	3 000	5 500	> 30	10 000	12 000	> 22	16 000	all	20 000
225	50	≤ 45	4 000	6 500	≤ 45	13 000	16 500	≤ 30	22 000	all	24 000
225	50	> 45	1 500	2 500	> 45	5 000	6 000	> 30	8 000	all	10 000
250	60	≤ 55	2 500	4 000	≤ 55	9 000	11 500	≤ 37	15 000	all	18 000
250	60	> 55	1 000	1 500	> 55	3 500	4 500	> 37	6 000	all	7 000
280[1)]	60	all	2 000	3 500	–	–	–	–	–	–	–
280[1)]	60	–	–	–	all	8 000	10 500	all	14 000	all	17 000
280	35	all	1 900	3 200	–	–	–	–	–	–	–
280	40	–	–	–	all	7 800	9 600	all	13 900	all	15 000
315	35	all	1 900	3 200	–	–	–	–	–	–	–
315	55	–	–	–	all	5 900	7 600	all	11 800	all	12 900
355	35	all	1 900	3 200	–	–	–	–	–	–	–
355	70	–	–	–	all	4 000	5 600	all	9 600	all	10 700
400	40	all	1 500	2 700	–	–	–	–	–	–	–
400	85	–	–	–	all	3 200	4 700	all	8 600	all	9 700
450	40	all	1 500	2 700	–	–	–	–	–	–	–
450	95	–	–	–	all	2 500	3 900	all	7 700	all	8 700
5008	40	all	3 000	5 300	–	–	–	–	–	–	–
5008	85	–	–	–	all	6400	9 500	all	17 200	all	19 400
5010	40	all	1 300	2 400	–	–	–	–	–	–	–
5010	85	–	–	–	all	4 900	7 200	all	13 200	all	14 800
5012	85	–	–	–	all	2 700	3 900	all	7 100	all	8 000

Frame size	Amount of grease g/bearing	kW	3600 r/min	3000 r/min	kW	1800 r/min	1500 r/min	kW	1000 r/min	kW	500-900 r/min
				Roller bearings, lubrication intervals in duty hours							
160	25	≤ 18,5	4 500	6 000	≤ 15	9 000	10 500	≤ 11	12 000	all	12 000
160	25	> 18,5	3 500	5 000	> 15	7 500	9 000	> 11	11 000	all	12 000
180	30	≤ 22	3 500	4 500	≤ 22	7 500	9 000	≤ 15	12 000	all	12 000
180	30	> 22	3 000	4 000	> 22	7 000	8 500	> 15	10 500	all	12 000
200	40	≤ 37	2 750	4 000	≤ 30	7 000	8 500	≤ 22	11 500	all	12 000
200	40	> 37	1 500	2 500	> 30	5 000	6 000	> 22	8 000	all	10 000
225	50	≤ 45	2 000	3 000	≤ 45	6 500	8 000	≤ 30	11 000	all	12 000
225	50	> 45	750	1 250	> 45	2 500	3 000	> 30	4 000	all	5 000
250	60	≤ 55	1 000	2 000	≤ 55	4 500	5 500	≤ 37	7 500	all	9 000
250	60	> 55	500	750	> 55	1 500	2 000	> 37	3 000	all	3 500
280[1)]	60	all	1 000	1 750	–	–	–	–	–	–	–
280[1)]	70	–	–	–	all	4 000	5 250	all	7 000	all	8 500
280	35	all	900	1 600	–	–	–	–	–	–	–
280	40	–	–	–	all	4 000	5 300	all	7 000	all	8 500
315	35	all	900	1 600	–	–	–	–	–	–	–
315	55	–	–	–	all	2 900	3 800	all	5 900	all	6 500
355	35	all	900	1 600	–	–	–	–	–	–	–
355	70	–	–	–	all	2 000	2 800	all	4 800	all	5 400
400	40	all	–	1 300	–	–	–	–	–	–	–
400	85	–	–	–	all	1 600	2 400	all	4 300	all	4 800
450	40	all	–	1 300	–	–	–	–	–	–	–
450	95	–	–	–	all	1 300	2 000	all	3 800	all	4 400
5008	40	all	–	2 700	–	–	–	–	–	–	–
5008	85	–	–	–	all	3 200	4 700	all	8 600	all	9 700
5010	40	all	–	1 200	–	–	–	–	–	–	–
5010	85	–	–	–	all	2 500	3 600	all	6 600	all	7 400
5012	85	all	–	–	all	1 300	1 900	all	3 500	all	4 000

[1)] M3AA

7.2.4 Lubricants

WARNING

Do not mix different types of grease. Incompatible lubricants may cause bearing damage.

When re-greasing, use only special ball bearing grease with the following properties:

- good quality grease with lithium complex soap and with mineral- or PAO-oil
- base oil viscosity 100-160 cST at 40 °C
- consistency NLGI grade 1.5 - 3 *)
- temperature range –30 °C - +120 °C, continuously

*) A stiffer end of scale is recommended for vertical mounted motors or in hot conditions.

The above mentioned grease specification is valid if the ambient temperature is above –30 °C or below +55 °C, and the bearing temperature is below 110 °C; otherwise, consult ABB regarding suitable grease.

Grease with the correct properties is available from all major lubricant manufacturers.

Admixtures are recommended, but a written guarantee must be obtained from the lubricant manufacturer, especially concerning EP admixtures, that admixtures do not damage bearings or the properties of lubricants at the operating temperature range.

WARNING

In general, lubricants containing EP admixtures are not recommended. In some cases it can cause harm in the bearing, therefore its use has to be evaluated case by case together with lubricant suppliers.

The following high performance greases can be used:

- **Mobil** **Unirex N2** or **N3** (lithium complex base)
- **Mobil** **Mobilith SHC 100** (lithium complex base)
- **Shell** **Gadus S5 V 100 2** (lithium complex base)
- **Klüber** **Klüberplex BEM 41-132** (special lithium base)
- **FAG** **Arcanol TEMP110** (lithium complex base)
- **Lubcon** **Turmogrease L 802 EP PLUS** (special lithium base)
- **Total** **Multis Complex S2 A** (lithium complex base)

Always use high speed grease for high speed 2-pole motors where the speed factor is higher than 480,000 (calculated as Dm x n where Dm = average bearing diameter, mm; n = rotational speed, r/min).

The following greases can be used for high speed cast iron motors but not mixed with lithium complex greases:

- **Klüber** **Klüber Quiet BQH 72-102** (polyurea base)
- **Lubcon** **Turmogrease PU703** (polyurea base)

If other lubricants are used, check with the manufacturer that the qualities correspond to those of the above mentioned lubricants. The lubrication intervals are based on the listed high performance greases above. Using other greases can reduce the interval.

8 After Sales Support

8.1 Spare parts

Unless otherwise stated, spare parts must be original parts or approved by ABB.

When ordering spare parts, the motor serial number, full type designation and product code, as stated on the rating plate, must be specified.

8.2 Dismantling, re-assembly and rewinding

Rewinding should always be carried out by qualified repair shops.

Smoke venting and other special motors should not be rewound without first contacting ABB.

8.3 Bearings

Special care should be taken with the bearings.

These must be removed using pullers and fitted by heating or using special tools.

Bearing replacement is described in detail in a separate instruction leaflet available from the ABB Sales Office.

Any directions placed on the motor, such as labels, must be followed. The bearing types indicated on the rating plate must not be changed.

9 Environmental requirements

Most of ABB's motors have a sound pressure level not exceeding 82 dB (A) (± 3 dB) at 50 Hz.

Values for specific motors can be found in the relevant product catalogs. At 60 Hz sinusoidal supply, the values are approximately 4 dB(A) higher compared to 50 Hz values stated in the product catalogs.

For sound pressure levels at frequency converter supplies, please contact ABB.

When motor(s) need to be scrapped or recycled, appropriate means, local regulations and laws must be followed.

10 Troubleshooting

These instructions do not cover all details or variations in equipment nor provide information for every possible condition to be met in connection with installation, operation or maintenance. Should additional information be required, please contact the nearest ABB Sales Office.

Motor troubleshooting chart
Your motor service and any troubleshooting must be handled by qualified persons who have the proper tools and equipment.

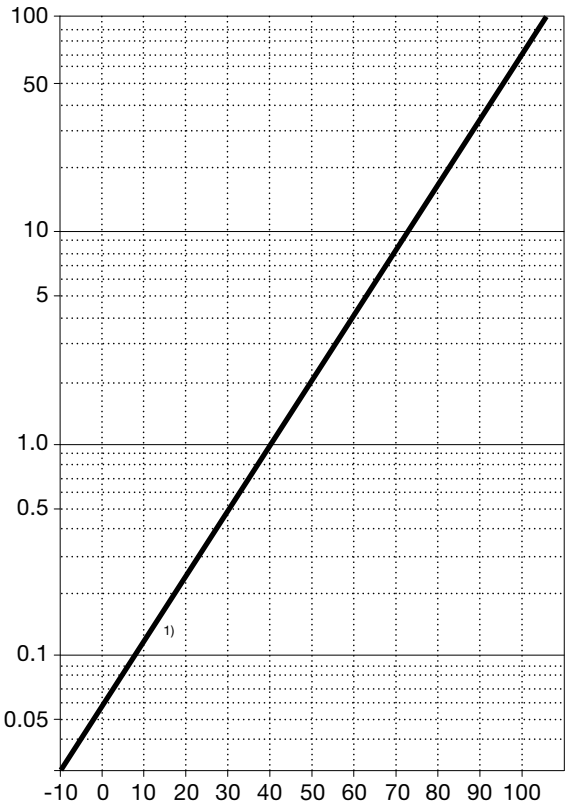
Table 10.1: Troubleshooting

TROUBLE	CAUSE	WHAT TO DO
Motor fails to start	Blown fuses	Replace fuses with proper type and rating.
	Overload trips	Check and reset overload in starter.
	Improper power supply	Check to see that power supplied agrees with motor rating plate and load factor.
	Improper line connections	Check connections against diagram supplied with motor.
	Open circuit in winding or control switch	Indicated by humming sound when switch is closed. Check for loose wiring connections and ensure that all control contacts are closing.
	Mechanical failure	Check to see if motor and drive turn freely. Check bearings and lubrication.
	Short circuited stator	Contact ABB or Ensure that the supply is disconnected and grounding for work done, disconnect the cables and measure the insulation resistance.
	Poor stator coil connection	Indicated by blown fuses. Motor must be rewound. Remove end shields and locate fault.
	Motor may be overloaded	Reduce load.
Motor stalls	One phase may be open	Check lines for open phase.
	Wrong application	Change type or size. Consult equipment supplier.
	Overload	Reduce load.
	Low voltage	Ensure the rating plate voltage is maintained. Check connection.
	Open circuit	Fuses blown. Check overload relay, stator and push buttons.
Motor runs and then dies down	Power failure	Check for loose connections to line, fuses and control.
Motor does not accelerate up to nominal speed	Not applied properly	Consult equipment supplier for proper type.
	Voltage too low at motor terminals because of line drop	Use higher voltage or transformer terminals or reduce load. Check connections. Check conductors for proper size.
	Starting load too high	Check the motor's starts against "no load".
	Broken rotor bars or loose rotor	Look for cracks near the rings. A new rotor may be required, as repairs are usually temporary.
	Open primary circuit	Locate fault with testing device and repair.

TROUBLE	CAUSE	WHAT TO DO
Motor takes too long to accelerate and/or draws high current	Excessive load	Reduce load.
	Low voltage during start	Check for high resistance. Make sure that an adequate cable size is used.
	Defective squirrel cage rotor	Replace with new rotor.
	Applied voltage too low	Correct power supply.
Wrong rotation direction	Wrong sequence of phases	Reverse connections at motor or at switchboard.
Motor overheats while running	Overload	Reduce load.
	Frame or ventilation openings may be full of dirt and prevent proper ventilation of motor	Open vent holes and check for a continuous stream of air from the motor.
	Motor may have one phase open	Check to make sure that all leads and cables are well connected.
	Grounded coil	Motor must be rewound.
	Unbalanced terminal voltage	Check for faulty leads, connections and transformers.
Motor vibrates	Motor misaligned	Realign.
	Weak support	Strengthen base.
	Coupling out of balance	Balance coupling.
	Driven equipment unbalanced	Rebalance driven equipment.
	Defective bearings	Replace bearings.
	Bearings not in line	Repair motor
	Balancing weights shifted	Rebalance rotor.
	Contradiction between balancing of rotor and coupling (half key - full key)	Rebalance coupling or rotor.
	Poly phase motor running single phase	Check for open circuit.
	Excessive end play	Adjust bearing or add shim.
Scraping noise	Fan rubbing end shield or fan cover	Correct fan mounting.
	Loose on bedplate	Tighten holding bolts.
Noisy operation	Air gap not uniform	Check and correct end shield fits or bearing fits.
	Rotor unbalance	Rebalance rotor.
Hot bearings	Bent or sprung shaft	Straighten or replace shaft.
	Excessive belt pull	Decrease belt tension.
	Pulleys too far away from shaft shoulder	Move pulley closer to motor bearing.
	Pulley diameter too small	Use larger pulleys.
	Misalignment	Correct by realignment of the drive.
	Insufficient grease	Maintain proper quality and amount of grease in bearing.
	Deterioration of grease or lubricant contaminated	Remove old grease, wash bearings thoroughly in kerosene and replace with new grease.
	Excess lubricant	Reduce quantity of grease, bearing should not be more than half full.
	Overloaded bearing	Check alignment, side and end thrust.
	Broken ball or rough races	Replace bearing, clean housing thoroughly first.

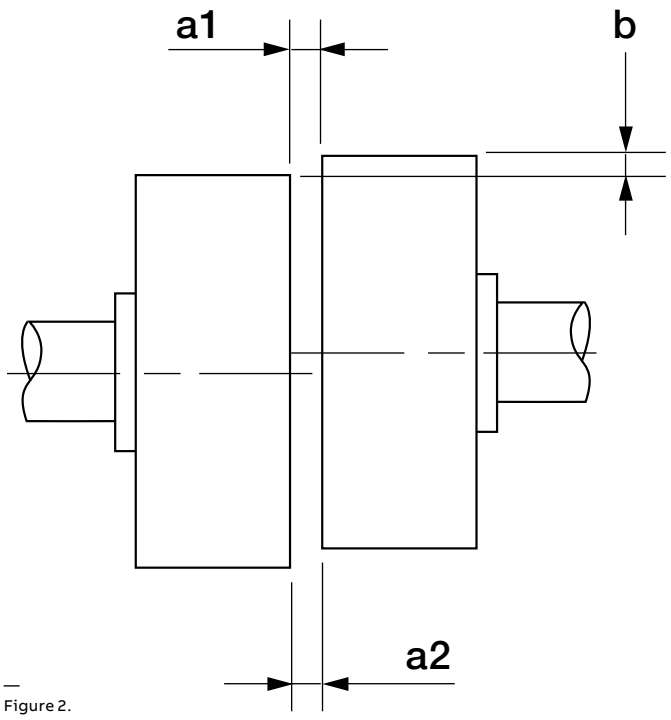
11 Figures

—
Figure 1. Diagram illustrating the insulation resistance dependence from the temperature and how to correct the measured insulation resistance to the temperature of 40 °C.
—
Figure 2. Mounting of half-coupling or pulley



—
Figure 1.

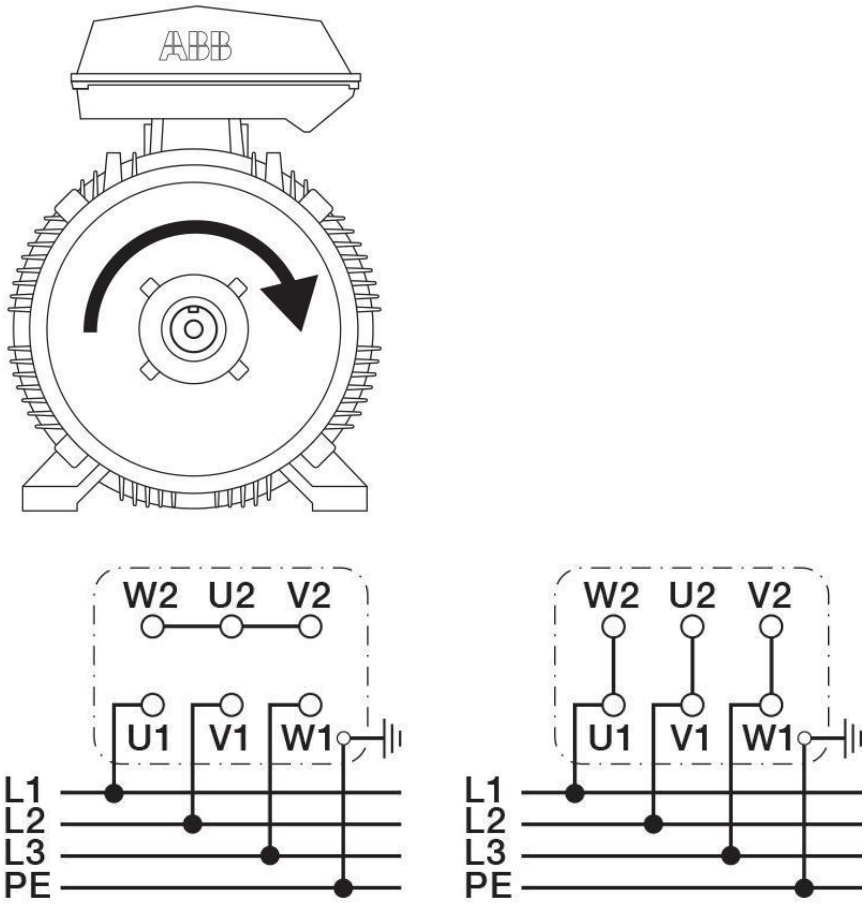
Key	X-axis: Winding temperature, Celsius Degrees Y-axis: Insulation Resistance Temperature Coefficient, ktc 1) To correct observed insulation resistance, R_i, to 40 °C multiply it by the temperature coefficient $k_{tc} \cdot R_{i\,40\,°C} = R_i$ x



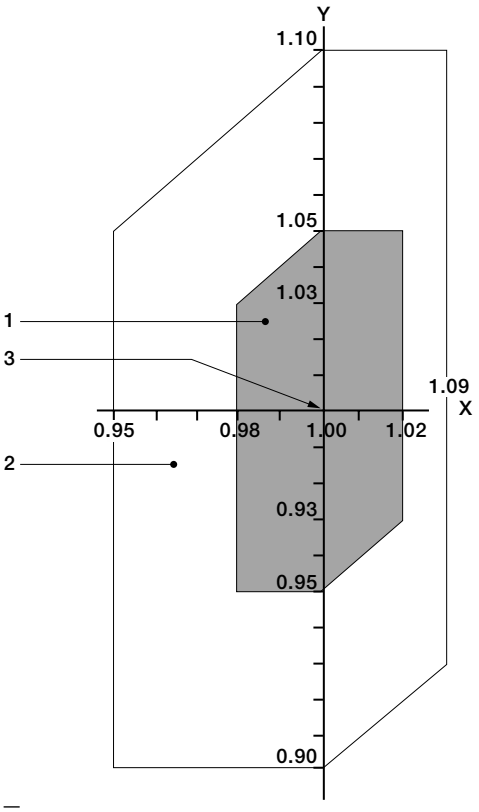
—
Figure 2.

—
Figure 3. Connection of terminals for main supply

—
Figure 4. Voltage and frequency deviation in zones A and B



—
Figure 3.



	X axis	frequency p.u.
	Y axis	voltage p.u.
Key	1	zone A
	2	zone B (outside zone A)
	3	rating point

—
Figure 4.

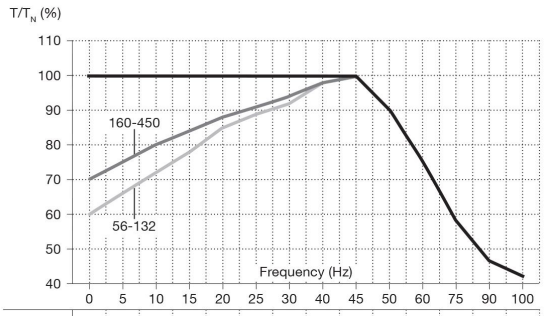
Guideline loadability curves with converters with DTC control

—
Figure 5a. Conventer with DTC control, 50 Hz, temperature rise B

—
Figure 5b. Conventer with DTC control, 60 Hz, temperature rise B

—
Figure 5c. Conventer with DTC control, 50 Hz, temperature rise F

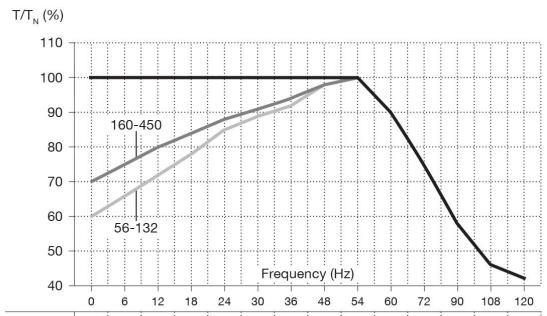
—
Figure 5d. Conventer with DTC control, 60 Hz, temperature rise F



Frequency (Hz)	0	5	10	15	20	25	30	40	45	50	60	75	90	100
IC411[1]	60	66	72	78	85	89	92	98	100	90	75	58	46	42
IC411[2]	70	75	80	84	88	91	94	98	100	90	75	58	46	42
IC416[3]	100	100	100	100	100	100	100	100	100	90	75	58	46	42

[1] Self ventilated, IEC frame sizes 56-132
[2] Self ventilated, IEC frame sizes 160-450
[3] Separate motor cooling (force ventilated)

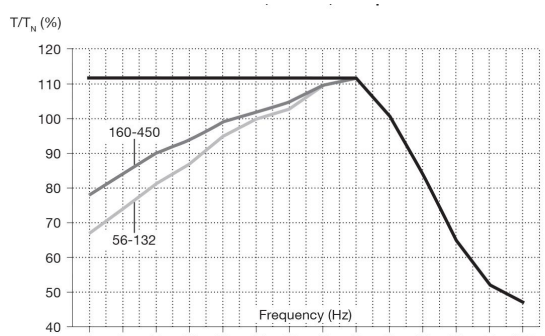
—
Figure 5a.



Frequency (Hz)	0	6	12	18	24	30	36	48	54	60	72	90	108	120
IC411[1]	60	66	72	78	85	89	92	98	100	90	75	58	46	42
IC411[2]	70	75	80	84	88	91	94	98	100	90	75	58	46	42
IC416[3]	100	100	100	100	100	100	100	100	100	90	75	58	46	42

[1] Self ventilated, IEC frame sizes 56-132
[2] Self ventilated, IEC frame sizes 160-450
[3] Separate motor cooling (force ventilated)

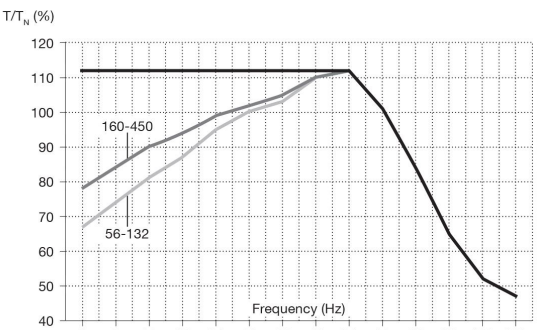
—
Figure 5b.



Frequency (Hz)	0	5	10	15	20	25	30	40	45	50	60	75	90	100
IC411[1]	67	74	81	87	95	100	103	110	112	101	84	65	52	47
IC411[2]	78	84	90	94	99	102	105	110	112	101	84	65	52	47
IC416[3]	112	112	112	112	112	112	112	112	112	101	84	65	52	47

[1] Self ventilated, IEC frame sizes 56-132
[2] Self ventilated, IEC frame sizes 160-450
[3] Separate motor cooling (force ventilated)

—
Figure 5c.



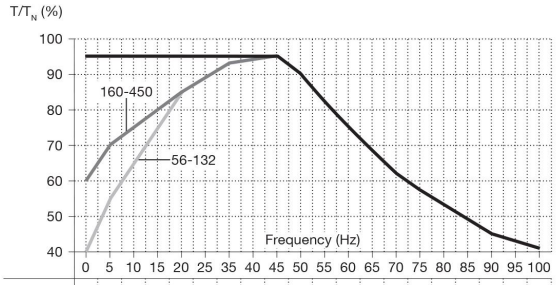
Frequency (Hz)	0	6	12	18	24	30	36	48	54	60	72	90	108	120
IC411[1]	67	74	81	87	95	100	103	110	112	101	84	65	52	47
IC411[2]	78	84	90	94	99	102	105	110	112	101	84	65	52	47
IC416[3]	112	112	112	112	112	112	112	112	112	101	84	65	52	47

[1] Self ventilated, IEC frame sizes 56-132
[2] Self ventilated, IEC frame sizes 160-450
[3] Separate motor cooling (force ventilated)

—
Figure 5d.

Guideline loadability curves with other voltage source PWM type

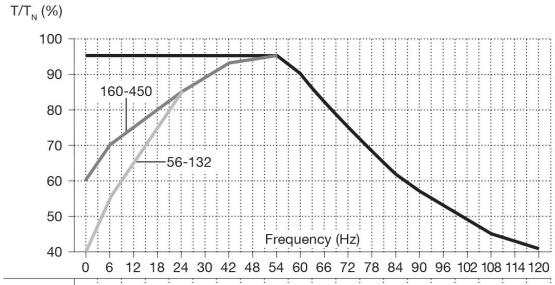
—
Figure 6a. Other voltage source PWM type converter, 50 Hz, temperature rise B
—
Figure 6b. Other voltage source PWM type converter, 60 Hz, temperature rise B
—
Figure 6c. Other voltage source PWM type converter, 50 Hz, temperature rise F
—
Figure 6d. Other voltage source PWM type converter, 60 Hz, temperature rise F



Frequency (Hz)	0	5	10	15	20	25	35	40	45	50	55	60	65	70	75	80	85	90	95	100
IC411[1]	40	55	65	75	85	89	93	94	95	90	82	75	68	62	57	53	49	45	43	41
IC411[2]	60	70	75	80	85	89	93	94	95	90	82	75	68	62	57	53	49	45	43	41
IC416[3]	95	95	95	95	95	95	95	95	95	90	82	75	68	62	57	53	49	45	43	41

[1] Self ventilated, IEC frame sizes 56-132
[2] Self ventilated, IEC frame sizes 160-450
[3] Separate motor cooling (force ventilated)

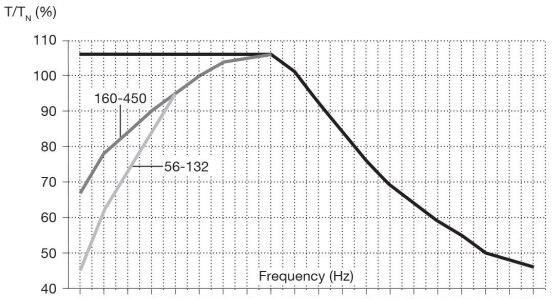
—
Figure 6a.



Frequency (Hz)	0	6	12	18	24	30	42	48	54	60	66	72	78	84	90	96	102	108	114	120
IC411[1]	40	55	65	75	85	89	93	94	95	90	82	75	68	62	57	53	49	45	43	41
IC411[2]	60	70	75	80	85	89	93	94	95	90	82	75	68	62	57	53	49	45	43	41
IC416[3]	95	95	95	95	95	95	95	95	95	90	82	75	68	62	57	53	49	45	43	41

[1] Self ventilated, IEC frame sizes 56-132
[2] Self ventilated, IEC frame sizes 160-450
[3] Separate motor cooling (force ventilated)

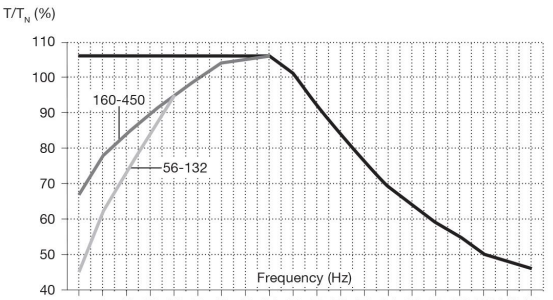
—
Figure 6b.



Frequency (Hz)	0	5	10	15	20	25	35	40	45	50	55	60	65	70	75	80	85	90	95	100
IC411[1]	45	62	73	84	95	100	104	105	106	101	92	84	76	69	64	59	55	50	48	46
IC411[2]	67	78	84	90	95	100	104	105	106	101	92	84	76	69	64	59	55	50	48	46
IC416[3]	106	106	106	106	106	106	106	106	106	101	92	84	76	69	64	59	55	50	48	46

[1] Self ventilated, IEC frame sizes 56-132
[2] Self ventilated, IEC frame sizes 160-450
[3] Separate cooling (force ventilated)

—
Figure 6c.



Frequency (Hz)	0	6	12	18	24	30	42	48	54	60	66	72	78	84	90	96	102	108	114	120
IC411[1]	45	62	73	84	95	100	104	105	106	101	92	84	76	69	64	59	55	50	48	46
IC411[2]	67	78	84	90	95	100	104	105	106	101	92	84	76	69	64	59	55	50	48	46
IC416[3]	106	106	106	106	106	106	106	106	106	101	92	84	76	69	64	59	55	50	48	46

[1] Self ventilated, IEC frame sizes 56-132
[2] Self ventilated, IEC frame sizes 160-450
[3] Separate motor cooling (force ventilated)

—
Figure 6d.

—
new.abb.com/motors-generators

© Copyright 2022 ABB. Alle rettigheder forbeholdes.
Specifikationer kan ændres uden forudgående varsel.

3GZF500730-85 Rev H 06-2022

8 PRESSURE RELIEF VALVE

TAI MILANO S.P.A.	Type	Tag n°	PCM reference	Manual
	24/8637	50-PSV-006 50-PSV-007	DIGIAN-392481-05	08.06IE rev 05

TAI MILANO S.p.A.

ISTRUZIONI PER TARATURA, MONTAGGIO, SMONTAGGIO E MANUTENZIONE

INSTRUCTION FOR SETTING, ASSEMBLY, DISASSEMBLY AND MAINTENANCE

VALVOLE DI SICUREZZA A MOLLA

SPRING LOADED SAFETY VALVES

Serie 3000W

Series 3000W

08.06IE rev 05

TAI MILANO S.p.A.

TAI MILANO S.p.A.

Manuale No. 08.06IE Rev. 5 maggio 2024

Manual No. 08.06IE Rev. 5 May 2024

Istruzioni per messa a punto, montaggio, smontaggio e manutenzione delle valvole di sicurezza a molla serie 3000W.

Instructions for setting, assembly, disassembly and maintenance of series 3000W spring loaded safety valves.

Questo manuale si compone di 48 pagine.

This manual comprises 48 pages.

Le istruzioni in esso contenute si riferiscono a valvole di normale produzione, tuttavia sono generalmente applicabili anche a valvole in esecuzione speciale. Qualora le vostre valvole non fossero illustrate in questo manuale, Vi preghiamo di contattarci.
Di alcuni accessori la TAI fornisce specifiche istruzioni a completamento del presente manuale

The instructions contained herein refer to valves of standard production but are however generally applicable to valves of special design.
Should your valves be not covered by the present instructions, please contact us.
For some accessories TAI provides specific instructions in addition to the present manual

Precauzioni aggiuntive per la sicurezza del personale per apparecchi a pressione soggetti a Direttiva 2014/34/UE (ATEX)

Additional safety precautions for pressure containing equipments subjected to Directive 2014/34/UE (ATEX)

Anche se le valvole di sicurezza non rientrano tra prodotti cui la direttiva 2014/34/UE deve essere applicata, in aggiunta alle “Precauzioni per la sicurezza” di cui al paragrafo 1.3.0, devono essere osservate le seguenti ulteriori precauzioni:

Even if safety valves are not in the scope of the Directive 2014/34/UE, in addition to ”Safety precautions” in par. 1.3.0, the additional precautions below shall be followed:

Per installazione, smontaggio e manutenzione utilizzare utensili in materiali idonei ad evitare scintille.

For installation, removal and maintenance tools in materials able to avoid sparks should be used.

Per la messa a terra della valvola utilizzare l’apposita vite contrassegnata col simbolo della terra.
I tubi che convogliano sfiati e drenaggi, se collegati con guarnizioni in materiale isolante, risultano elettricamente isolati dal corpo/coperchio della valvola.

For connecting the valve to ground, the proper screw marked with ground symbol should be used.
Piping connecting vents and drains, if attached with gaskets in isolating materials, results to be electrically isolated from the valve body/bonnet.

Consigliamo l’uso di Loctite 577 in luogo di nastro PTFE quale materiale sigillante per filettature NPT.

Loctite 577 instead of PTFE tape for sealing NPT threading is recommended.

Prevedere misure protettive se la temperatura massima (indicata sulla targa) può essere pericolosa per il rischio di esplosione.

Provide protective measures if the max temperature (marked on tag) can be dangerous for explosion risk.

SICUREZZA

INTRODUZIONE SULLA SICUREZZA

La TAI MILANO produce Valvole di Sicurezza in vari design e invita i propri Clienti a tenere in considerazione, oltre alle seguenti generiche indicazioni di Sicurezza, tutte le indicazioni, caratteristiche e funzionalità proprie di ciascun designo.
È importante tenere sempre in considerazione le condizioni (fluido, intervallo di temperature ammissibili, intervallo di pressioni operative e di taratura, massima capacità di scarico, massima contropressione ammissibile) per le quali la valvola è stata progettata.
Una valvola utilizzata in condizioni differenti da quelle di progetto potrebbe non funzionare correttamente, con una conseguente mancanza di Sicurezza.
In caso di dubbi vi invitiamo a verificare la documentazione fornita con le valvole o, qualora essa non fosse sufficiente a chiarire tali dubbi, a contattarci direttamente.

USO IMPROPRIO

Le Valvole di Sicurezza sono strumenti delicati ed è necessario non farne un uso improprio.
In caso di uso improprio delle stesse la TAI MILANO non è più responsabile per esse.
In caso di manomissione dei componenti che la compongono, la valvola potrebbe non funzionare più correttamente. Si considera manomissione anche l'applicazione di vernici o strati protettivi su componenti in movimento o funzionalmente importanti.
Si ricorda che la Garanzia si esaurisce una volta rimosso uno qualsiasi dei sigilli di sicurezza presenti sulla valvola.
La valvola di sicurezza non svolge la sua funzione di sicurezza qualora sia installata la vite di blocco; è pertanto necessario rimuovere la vite di blocco per mettere in servizio la valvola (se non diversamente indicato, le valvole TAI vengono sempre spedite con la vite di blocco non installata).

FLUIDI PERICOLOSI

Quando si lavora con fluidi pericolosi e/o dannosi per la salute umana è necessario agire con attenzione e attenersi scrupolosamente alle prescrizioni contenute nelle Normative di riferimento.
A titolo di esempio, sono considerati fluidi pericolosi e/o dannosi per la salute umana:

- Fluidi esplosivi e/o infiammabili
- Fluidi caldi o freddi
- Fluidi tossici e/o irritanti
- Fluidi inquinanti
- Fluidi corrosivi

Quando si lavora con questi fluidi può essere necessario prendere alcune precauzioni come, per esempio:

- Utilizzare protezioni per gli operatori (guanti, maschere, …)
- Utilizzare strumenti dedicati
- Non disperdere tale fluido nell'ambiente

Se viene utilizzato il foro di drenaggio previsto nel corpo valvola, tenere presente che tutti i drenaggi di fluidi infiammabili, tossici o comunque pericolosi devono essere convogliati in un luogo sicuro a pressione minore di quella minima del sistema drenato.
Analogamente, se il fluido è infiammabile, tossico o comunque pericoloso, il foro di sfiato del coperchio per le valvole a molla o del coperchio del pilota per le valvole pilotate deve essere collegato con un luogo sicuro a pressione atmosferica.

SICUREZZA DURANTE L'INSTALLAZIONE E LA RIMOZIONE

È necessario che il personale incaricato all'installazione e alla rimozione della valvola sia qualificato e che rispetti, oltre alle indicazioni contenute in questo manuale, le norme di riferimento per la tipologia di valvola di sicurezza in questione.
Prima di mettere in esercizio la valvola assicurarsi che il dispositivo di blocco sia stato rimosso.
Durante la rimozione della valvola prestare attenzione alla temperatura della stessa e alla possibilità che nella valvola sia ancora presente (sia all'ingresso che all'uscita) fluido in pressione e/o pericoloso.
Per le valvole pilotate, prestare particolare attenzione nell'operazione di rimozione ad eventuale liquido presente nel duomo della valvola principale che deve essere adeguatamente drenato (per il drenaggio è necessario rimuovere il pilota e far uscire il liquido dal collegamento tra valvola e pilota).
Per eseguire la rimozione della valvola con l'impianto in funzione è necessario intercettare la valvola a monte (anche eventuale presa remota della pressione per il pilota) e, se ha scarico convogliato, anche a valle.
Attenzione: durante tale operazione la valvola non svolge più la sua azione di sicurezza.

SICUREZZA DURANTE L'UTILIZZO

Assumere sempre che l'intera valvola, compresa la flangia di uscita, possa essere alla temperatura del fluido in ingresso alla stessa. Attenzione: durante l'apertura/chiusura la valvola di sicurezza è soggetta a repentini cambi di temperatura.
La valvola di sicurezza potrebbe generare rumore durante la sua apertura. Il produttore potrà fornire, su richiesta, una stima dell'intensità del rumore.
In caso di scarico libero è necessario non sostare/transitare in prossimità dello stesso per evitare di entrare in contatto con il fluido scaricato in fase di apertura.
La stessa raccomandazione è applicabile alle valvole con coperchio aperto (utilizzabili solamente su aria e vapore) per le quali il fluido, durante l'apertura della valvola, può uscire anche attraverso il coperchio.

SICUREZZA DURANTE LA MANUTENZIONE

È necessario che il personale incaricato alla manutenzione della valvola sia qualificato e che rispetti, oltre alle indicazioni di questo manuale, le norme di riferimento per la valvola di sicurezza in questione.
La manutenzione è un processo molto delicato nella vita della Valvola di Sicurezza e può essere causa di danni irreparabili e di problemi di funzionamento per la valvola.
Quando si effettua manutenzione su valvole che hanno esercito con fluidi pericolosi è necessario prestare maggiore attenzione in quanto parte del fluido potrebbe ancora essere nella valvola.
Per le valvole pilotate, prestare particolare attenzione nell'operazione di rimozione di eventuale liquido presente nel duomo della valvola principale.
La TAI non si assume alcuna responsabilità a riguardo.
Vi invitiamo a utilizzare solamente ricambi originali TAI MILANO e a non manomettere i componenti della valvola per alcun motivo. Non sono considerate manomissioni solamente le operazioni indicate nella sezione relativa alla Manutenzione di questo manuale.
Consigliamo di sostituire sempre le parti soffici della valvola quando si effettua la manutenzione.

La TAI MILANO non assume alcuna responsabilità per problemi legati ad un'erronea manutenzione eseguita da personale non alle proprie dipendenze.

PRECAUZIONI DI IMPIEGO

Seguono alcuni esempi di pericoli e precauzioni da prendere quando si lavora con una valvola di sicurezza:

- Fluido e/o superfici calde: pericolo di ustione.
  Indossare indumenti protettivi e termicamente isolanti.
  Assumere che tutta la valvola sia alla stessa temperatura del fluido.

- Fluido e/o superfici fredde: pericolo di ustione da freddo.
  Indossare indumenti protettivi e termicamente isolanti.
  Assumere che tutta la valvola sia alla stessa temperatura del fluido.

- Fluidi corrosivi e/o irritanti: pericolo di ferite e/o irritazioni.
  Indossare indumenti protettivi.

- Fluidi infiammabili e/o esplosivi: pericolo di incendio e/o esplosione.
  Utilizzare utensili in materiali idonei ad evitare scintille.
  Per la messa a terra della valvola utilizzare l'apposita vite contrassegnata col simbolo della terra. I tubi che convogliano sfiati e drenaggi, se collegati con guarnizioni in materiale isolante, risultano elettricamente isolati dal corpo/coperchio della valvola.
  Consigliamo l'uso di Loctite 577 in luogo di nastro PTFE quale materiale sigillante per filettature NPT. Prevedere misure protettive se la temperatura massima (indicata sulla targa) può essere pericolosa per il rischio di esplosione.

- Fluidi tossici e/o inquinanti: pericolo di intossicazione e/o inquinamento ambientale.
  Indossare adeguate protezioni e prendere precauzioni particolari per non disperdere il fluido nell'ambiente.

- Valvola che perde: pericolo di inquinamento ambientale, intossicazione, incendio.
  Assicurarsi che il fluido disperso non sia pericoloso e mantenere un'adeguata distanza. Se necessario disinstallare la valvola per eseguire la manutenzione indossando gli adeguati indumenti protettivi.

- Valvola che apre: improvviso e forte rumore.
  L'apertura della valvola genera un rumore forte e improvviso, indossare tappi per le orecchie.

- Coperchio aperto: pericolo di blocco delle parti mobili.
  Installare adeguate protezioni e assicurarsi che la valvola non possa essere bloccata.

- Bordi e spigoli taglienti: pericolo di ferite.
  Indossare guanti da lavoro e maneggiare la valvola con cautela.

AMBIENTE

RISPETTO DELL'AMBIENTE

La TAI MILANO lavora nel rispetto dell'Ambiente ed è certificata UNI ISO 14001:2015.

INQUINAMENTO

Eventuali problemi di funzionamento e/o installazione della valvola di sicurezza possono essere causa di inquinamento ambientale se del fluido pericoloso viene disperso nell'ambiente.
Per evitare questo problema è necessario operare in accordo a questo manuale durante l'installazione, l'utilizzo, la rimozione, la manutenzione e lo smaltimento della valvola.
La TAI MILANO non si assume alcuna responsabilità su problemi di inquinamento ambientali legati ad un errato utilizzo delle sue valvole di sicurezza.

SMALTIMENTO

Le Valvole di Sicurezza devono essere smaltite in accordo ai regolamenti Locali in materia di smaltimento dei rifiuti.
Prestare attenzione alla possibile presenza di fluido di processo (soprattutto se esso è un fluido pericoloso) all'interno della valvola da smaltire.
Qualora la valvola sia stata in contatto con un fluido pericoloso è, inoltre, necessario eseguire una bonifica della stessa prima dello smaltimento.
I materiali che compongono la valvola sono indicati sul disegno di assieme della stessa.
Tali materiali possono essere: metalli (componente principale della maggior parte delle valvole), grafite, polimeri e altro materiale plastico.

ASSISTENZA

La persona di riferimento per l'assistenza e il servizio post-vendita è il Project Manager dell'ordine della valvola.
In ogni caso, qualsiasi mail inviata a tai@taimilano.it o qualsiasi telefonata al numero +390229525941 riceverà risposta.
È importante fornire il Numero di Serie della valvola al momento della richiesta per dare al produttore un riferimento univoco della valvola in questione

SAFETY

INTRODUCTION TO SAFETY

TAI MILANO produces Safety Valves in various designs and invites its Customers to take into consideration, in addition to the following generic Safety indications, all the indications, characteristics and functionalities of each design.
It is important to always consider the conditions (fluid, permissible temperature range, operating and calibration pressure range, maximum discharge capacity, maximum allowable back pressure. . .) for which the valve has been designed. A valve used in conditions other than those of design may not function properly, resulting in a lack of safety.
If you have any doubts, please check the documentation supplied with the valves or, if it is not sufficient to clarify these doubts, contact us directly.

IMPROPER USE

Safety Valves are delicate instruments and must not be misused. In case of improper use of the same TAI MILANO is no longer responsible for them.
If the valve components are manumitted, the valve may no longer work properly. The application of paint or protective layers on moving or functionally important components is also considered tampering.
Please note that the Warranty expires once any of the safety seals on the valve are removed.
The safety valve does not perform its safety function if the test gag is installed; it is therefore necessary to remove the test gag to put the valve into service (unless otherwise indicated, TAI valves are always shipped with the locking screw not installed).

DANGEROUS MEDIA

When working with fluids that are dangerous and/or harmful to human health, it is necessary to act with care and scrupulously follow the prescriptions contained in the reference standards.
By way of example, they are considered dangerous and/or harmful to human health:

- Explosive and/or flammable fluids
- Hot or cold fluids
- Toxic and/or irritant fluids
- Polluting fluids
- Corrosive fluids

When working with these fluids it may be necessary to take certain precautions such as, for example:

- Use protection for operators (gloves, masks, . . .)
- Use dedicated tools
- Do not disperse this fluid in the environment

If the drain hole of the body of the valve is used, it it is important to consider that in case of dangerous media it is important to convoy the drain in a safety place with a lower pressure that the body of the valve.
In the same way, if the valve is working with a dangerous media, the bonnet vent hole for spring operated valves and the pilot bonnet vent hole for pilot operated valves must be connected to a safe place with ambient pressure.

SAFETY DURING INSTALLATION AND REMOVAL

It is necessary that the personnel in charge of installing and removing the valve is qualified and that it comply, in addition to the indications contained in this manual, with the reference standards for the type of safety valve in question.
Before putting the valve into operation, make sure that the locking device has been removed.
When removing the valve, pay attention to the valve temperature and the possibility that there is still a pressurized and/or dangerous fluid in the valve (both inlet and outlet).
For pilot operated valves, during the dismantling pay particular attention to the liquid that could be in the pressure chamber of the main valve that should be drained (draining consist in removing the pilot and drain the liquid from the connection between the main valve and the pilot).
To dismantle the valve with the system in operation, it is necessary to intercept the valve upstream (also the eventual remote pressure pick-up of the pilot) and, if it has conveyed discharge, also downstream.
Attention: during this operation the valve no longer carries out its safety action.

SAFETY DURING USE

Always assume that the entire valve, including the outlet flange, can be at the inlet fluid temperature. Attention: during opening/closing the safety valve is subject to sudden temperature changes.
The safety valve may generate noise when it is opened. The manufacturer can provide, on request, an estimate of the noise intensity.
In case of free discharge it is necessary not to stop/transit near it to avoid coming into contact with the fluid discharged during the opening phase.
The same recommendation is applicable to valves with open bonnet (usable only on air and steam) for which the fluid can also escape through the bonnet when the valve is opened.

SAFETY DURING MAINTENANCE

It is necessary that the personnel responsible for the maintenance of the valve is qualified and that it comply, in addition to the instructions in this manual, with the reference standards for the safety valve in question.
Maintenance is a very delicate process in the life of the Safety Valve and can cause irreparable damage and functional problems for the valve.
When carrying out maintenance on valves that have operated with dangerous fluids you need to be more careful as part of the fluid may still be in the valve.
For pilot operated safety valves, pay particular attention in the operation of removing the eventual liquid contained in the pressure chamber of the main valve.
TAI accepts no liability regarding this.
Please use only original TAI MILANO spare parts and do not tamper with the valve components for any reason. Only the operations indicated in the Maintenance section of this manual are not considered tampering.
We recommend always replacing soft valve parts when performing maintenance.
TAI MILANO assumes no responsibility for problems related to incorrect maintenance carried out by personnel not employed by it.

PRECAUTIONS FOR USE

The following are some examples of hazards and precautions to be taken when working with a safety valve:

- Fluid and/or hot surfaces: burns.
  Wear protective and thermal insulating clothing.

- Fluid and/or cold surfaces: danger of cold burn.
  Wear protective and thermal insulating clothing.

- Corrosive and/or irritant fluids: danger of injury and/or irritation.
  Wear protective clothing.

- Flammable and/or explosive fluids: fire and/or explosion hazard.
  Use tools made of suitable materials to avoid sparks.
  Use the appropriate screw marked with the earth symbol to ground the valve.
  Pipes conveying vents and drains, when connected with insulating material seals, are electrically insulated from the body/caps of the valve.
  We recommend the use of Loctite 577 instead of PTFE tape as NPT thread sealant.
  Take protective measures if the maximum temperature (indicated on the nameplate) can be dangerous due to the risk of explosion.

- Toxic and/or polluting fluids: danger of intoxication and/or environmental pollution. Wear suitable protection and take special precautions to avoid dispersal of the fluid into the environment.

- Leaking valve: danger of environmental pollution, intoxication, fire, . . .
  Make sure that the dispersed fluid is not dangerous and maintain an adequate distance. If necessary, uninstall the valve to perform maintenance wearing the appropriate protective clothing.

- Opening of the valve: sudden and high noise.
  The opening of the valve could cause sudden and high noise, wear the proper ears protections.

- Open bonnet: danger of blocking moving parts.
  Install appropriate guards and ensure that the valve cannot be blocked.

- Sharp edges: danger of injury.
  Wear work gloves and handle the valve with care.

ENVIRONMENT

RESPECT FOR THE ENVIRONMENT

TAI MILANO works in respect of the Environment and is certified UNI ISO 14001:2015

POLLUTION

Safety Valves must be disposed of in accordance with local waste disposal regulations.
Pay attention to the possible presence of process medium (especially if it is a dangerous medium) inside the valve to be disposed of.
If the valve has been in contact with a hazardous medium, it is also necessary to clean it before disposal.
The materials that make up the valve are indicated on the valve assembly drawing. These materials can be: metals (main component of most valves), graphite, polymers and other plastics.

DISPOSAL

Safety Valves must be disposed of in accordance with local waste disposal regulations.
Pay attention to the possible presence of process medium (especially if it is a dangerous medium) inside the valve to be disposed of.
If the valve has been in contact with a hazardous medium, it is also necessary to clean it before disposal.
The materials that make up the valve are indicated on the valve assembly drawing. These materials can be: metals (main component of most valves), graphite, polymers and other plastics.

ASSISTANCE

The contact person for service and after-sales service is the Project Manager of the valve order.
In any case, any email sent to tai@taimilano.it or any phone call to +390229525941 will be answered.
It is important to provide the Valve Serial Number at the time of request to give the manufacturer a unique reference for the valve in question.

TAI MILANO S.p.A. garantisce esclusivamente difetti di materiale o malfunzionamenti sorti, durante il periodo di garanzia, in normali condizioni d'uso. La garanzia decade automaticamente in caso di manomissione (rottura dei sigilli), alterazione o riparazione del prodotto effettuate da persone non autorizzate o con l'impiego di parti di scorta non di costruzione originale TAI.
In particolare, non può essere oggetto di garanzia la tenuta tra monte e valle della valvola qualora il fluido scaricato trascini particelle solide (sporcizia) o il suo stato fisico differisca da quello per il quale la valvola è dichiarata idonea.

Se la Vs. valvola è speciale o, per qualunque ragione, non è qui indicata, Vi preghiamo di contattarci.

TAI MILANO S.p.A. guarantees exclusively material failures or malfunctions occurring, within the warranty period, under normal operating conditions. The warranty is void in case of tampering (breakage of the seals), alteration or repair of the product carried out by unauthorized persons or with the use of spare parts other than those supplied by TAI.
In particular, the tightness between the upstream and downstream sides of the valve can't be subject to guarantee, if the discharged fluid drags solid particles (dirt) or its physical state differs from that for which the valve is declared suitable.

Should your valves be of special design or for any reason not covered by the present instructions, please contact us.

DEFINIZIONI

Pressione di taratura: la pressione prestabilita alla quale la valvola comincia ad aprirsi nelle condizioni di esercizio. Essa è la pressione relativa, misurata all'ingresso della valvola, alla quale le forze che tendono ad aprire la valvola sono in equilibrio con le forze che spingono l'otturatore contro la sede nelle specifiche condizioni di servizio.

Sovrappressione: incremento di pressione al di sopra della pressione di taratura necessaria perché l'otturatore compia l'alzata dichiarata, espresso di solito come percentuale della pressione di taratura.

Pressione differenziale di prova a freddo: la pressione relativa alla quale la valvola comincia ad aprirsi al banco con contropressione atmosferica. Essa include correzioni per tenere conto delle condizioni di esercizio, ad esempio contropressione e temperatura.

Pressione di richiusura: valore della pressione relativa di ingresso a cui l'otturatore ristabilisce il contatto con la sede.

Blowdown: differenza tra pressione di taratura e pressione di richiusura, solitamente espressa in percentuale della pressione di taratura.

Pressione di scarico P_1: la pressione totale usata per dimensionare la valvola, comunque non minore della pressione di taratura più sovrappressione più pressione atmosferica.

Contropressione generata: la pressione statica esistente all'uscita della valvola causata dal flusso del fluido attraverso la valvola ed il sistema di scarico.

Contropressione imposta: la pressione statica, generata da altre fonti, esistente all'uscita della valvola nel momento in cui la stessa deve intervenire.

DEFINITIONS

***Set pressure**: The predetermined pressure at which the safety valve begins to open, i.e. the gauge pressure measured at the valve inlet at which the pressure forces that tend to open the valve for the specific service conditions are in equilibrium with the forces that retain the valve disc on its seat.*

***Overpressure**: A pressure increase over the set pressure at which the safety valve attains the lift specified by the manufacturer, usually expressed as a percentage of the set pressure.*

***Cold differential test pressure**: The pressure at which the valve is set to begin to open on the test bench with atmospheric back pressure. This test pressure includes corrections for service conditions, such as back pressure and temperature.*

***Reseating pressure**: The inlet gauge pressure at which the disc re-establishes contact with the seat.*

***Blowdown**: The difference between set and re-seating pressures, normally stated as a percentage of set pressure.*

***Relieving pressure P_1**: The total pressure at valve inlet at which the capacity is calculated. This cannot be lower than set pressure plus overpressure plus atmospheric pressure.*

***Built-up backpressure**: The static pressure present at the valve outlet caused by flow through the valve and the discharge system.*

***Superimposed backpressure**: The static pressure present at the valve outlet at the time when the device is required to operate. It is the result of pressure in the discharge system from other sources.*

INDICE

1.0.0	**Istruzioni per la conservazione e l'installazione delle valvole**	**pag. 6**
1.1.0	Protezione prima della spedizione	pag. 6
1.2.0	Conservazione delle valvole prima del montaggio	pag. 6
1.3.0	Precauzioni per la sicurezza del personale	pag. 7
1.4.0	Caratteristiche principali	pag. 8
1.5.0	Principio di funzionamento	pag. 8
1.6.0	Istruzioni per l'installazione	pag. 9
1.7.0	Conservazione delle valvole dopo l'installazione	pag. 10
1.8.0	Uso delle valvole dopo l'installazione	pag. 11
2.0.0	**Istruzioni per la regolazione, montaggio e smontaggio delle valvole flangiate serie 3000W**	**pag. 12**
2.1.0	Regolazione delle valvole senza leva	pag. 12
2.2.0	Regolazione delle valvole con Leva di sollevamento semplice, con o senza premistoppa L_2	pag. 16
2.3.0	Smontaggio e montaggio	pag. 17
2.4.0	Dispositivo di blocco G_2 per valvole con coperchio chiuso	pag. 22
2.5.0	Golfare per il sollevamento della Valvola – Accesorio Y6	pag. 23
3.0.0	**Istruzioni per la manutenzione**	**pag. 28**
3.1.0	Lubrificazione	pag. 28
3.2.0	Ripristino delle sedi del boccaglio e dell'otturatore	pag. 28
3.3.0	Superfinitura	pag. 31
3.4.0	Istruzioni aggiuntive per valvole con otturatore in due pezzi D_2 per vapore	pag. 31
4.0.0	**Istruzioni particolari per valvole destinate al servizio con ossigeno o con fluidi a temperature di esercizio criogeniche (inferiori a –46°C)**	**pag. 33**
Accessori per la lappatura forniti dalla TAI		**pag. 36**
Banco prova valvole di sicurezza		**pag. 36**
Appendice A - Coppie di serraggio della bulloneria		**pag. 37**

CONTENTS

1.0.0	***Instructions for conservation and installation of the valves***	***page 6***
1.1.0	*Protection before shipment*	*page 6*
1.2.0	*Conservation of the valves before installation*	*page 6*
1.3.0	*Personnel safety precautions*	*page 7*
1.4.0	*Main features*	*page 8*
1.5.0	*How the valve works*	*page 8*
1.6.0	*Instructions for installation*	*page 9*
1.7.0	*Conservation of the valves after installation*	*page 10*
1.8.0	*Operation of the valves after installation*	*page 11*
2.0.0	***Instructions for setting, disassembly, assembly of series 3000W flanged valves***	***page 12***
2.1.0	*Adjustment of valves without lever*	*page 12*
2.2.0	*Adjustment of valves with packed or plain single acting lifting lever lever L_2*	*page 16*
2.3.0	*Disassembly and assembly*	*page 17*
2.4.0	*Test gag G_2 for valves with closed bonnet*	*page 22*
2.5.0	*Valve lifting eye – Accessory Y6*	*page 23*
3.0.0	***Instructions for maintenance***	***page 28***
3.1.0	*Lubrification*	*page 28*
3.2.0	*Repair of nozzle and disc seats*	*page 28*
3.3.0	*Super finish*	*page 31*
3.4.0	*Added instructions for valves with two piece discs type D_2 for steam service*	*page 31*
4.0.0	**Special instructions for valves for service with oxygen or at cryogenic temperature (below –46°C)**	***page 33***
Lapping accessories supply by TAI		***page 36***
Safety Valve Test Bench supplied by TAI		***page 36***
Annex A - Bolt preloading by torque		***page 37***

1.0.0 ISTRUZIONI PER LA CONSERVAZIONE E L'INSTALLAZIONE DELLE VALVOLE

1.1.0 Protezione prima della spedizione

Le valvole e/o parti, prima della spedizione, sono protette dalla corrosione nel modo sotto indicato:

- Le parti esterne in acciaio al carbonio delle valvole sono verniciate con primer ricco di zinco; la bulloneria in acciaio al carbonio è zincata.
- Le superfici esterne lavorate sono protette con una pellicola protettiva di tipo spellabile.
- Le parti interne in acciaio al carbonio delle valvole, grezze di fusione o lavorate, sono protette con olio inibitore di corrosione (tipo Valvoline - Tectyl 506) che, dopo evaporazione del solvente, lascia sulla superficie un rivestimento protettivo e non ha bisogno di solventi per la rimozione.
- Gli accoppiamenti mobili sono lubrificati con lacca o lubrificanti a film secco "Molykote". Le parti filettate sono lubrificate con "Never Seez - Nickel Grade", che assicura, in aggiunta alla lubrificazione, la protezione dagli agenti atmosferici.
- Gli imbocchi sono protetti con tappi di polietilene per impedire l'ingresso di polvere, sporco e sostanze estranee nei corpi valvola.
- Le parti di ricambio sono preimballate in tessuto impregnato con cera microcristallina.

1.2.0 Conservazione delle valvole prima del montaggio

1.2.1 Purché lo stoccaggio venga effettuato al coperto in ambiente ragionevolmente asciutto e in atmosfera esente da agenti contaminanti, gli accorgimenti adottati sono sufficienti a proteggere valvole e/o parti di ricambio per un periodo di tempo valutabile in:

- 5 anni per le parti in acciaio al carbonio verniciate, zincate o lubrificate
- 3 anni per le parti ricoperte con vernice spellabile
- 18 mesi max per le parti protette con olio inibitore di corrosione
- 5 anni per le parti di ricambio avvolte in tessuto impregnato, purché venga mantenuto il preimballo originale.

1.0.0 INSTRUCTIONS FOR CONSERVATION AND INSTALLATION OF THE VALVES

1.1.0 Protection before shipment

Before shipment, the valves and/or spare parts, are protected from corrosion in the following manner:

- the external surface of carbon steel valves is painted with a primer rich in zinc; the carbon steel bolting is zinc coated (galvanized).
- the unpainted external machined surfaces are protected with a protective film (stripping type).
- the inside of carbon steel valve is protected with a corrosion inhibitor oil (type Valvoline - Tectyl 506) which, after evaporation of the solvent, leaves a protective film on the surface which requires no solvent for removal.
- the sliding parts are lubricated with lubricant lacquer or dry film lubricant "Molykote".
The threaded parts are lubricated with "Never Seez – Nickel Grade", which ensure, in addition to the lubrication, protection from atmospheric agents.
- the valve inlet/outlet are protected by poliethylene plugs to prevent entry of dust, dirt or other foreign matter in the valve body.
- the spare parts are pre-packed in micro-crystalline wax impregnated cloth.

1.2.0 Conservation of the valves before installation

1.2.1 As long as storage takes place indoors in reasonably dry conditions and free from atmospheric contaminants, the above measures are sufficient to protect the valves and/or spare parts for an estimated period of:

- 5 years for parts in painted carbon steel, zinc coated or lubricated
- 3 years for parts protected with a stripping type film
- 18 months maximum for parts protected with a corrosion inhibitor oil
- 5 years for the spare parts wrapped in the original microcrystalline max impregnated cloth.

1.2.2 Viceversa, qualora le valvole vengano conservate all'aperto, oppure installate con notevole anticipo sulla data di messa in servizio dell'impianto, la durata della protezione diminuisce (non supera i 12 mesi per le parti trattate con olio inibitore) e le valvole vanno soggette a un deterioramento inevitabile, la cui rapidità dipende dalle condizioni ambientali (in particolare modo dall'umidità, atmosfera marina o industriale) e dall'entità di contatti accidentali con pioggia, liquidi, sporco, sabbia o sostanze estranee in genere.

1.2.2 Vice versa, if the valves are stored outdoors or installed earlier than the plant start up, the duration of the protection diminishes (it does not go over 12 months for parts treated with corrosion inhibitory oil) and the valves are subject to an inevitable deterioration, the rapidity depending on the environmental conditions (particularly humidity, marine or industrial atmospheres) and the entity of accidental contacts with rain, liquids, dirt, sand or foreign substances in general.

1.2.3 Si raccomanda pertanto di conservare le valvole nel loro imballo originale in ambiente coperto, asciutto e pulito fino al momento della installazione. Ciò consente, anche al cessare dell'effetto delle sostanze protettive, di mantenere a lungo le valvole in condizioni tali da non pregiudicarne l'impiego.

1.2.3 It is advisable therefore that before the installation the valves be stored indoors in their original packing in clean and dry environment. In this way, and even in the case that the protective measures taken cease to be effective, the valves may be maintained for long periods without adverse effect on their operation.

1.3.0 Precauzioni per la sicurezza del personale

Non avvicinarsi allo scarico della valvola di sicurezza.
Quando la valvola apre, se scarica gas o vapore, si genera un rumore improvviso molto forte.
Installare le valvole in modo da consentire un facile e sicuro accesso a tutti i lati e spazio sufficiente per lo smontaggio e la manutenzione.
Assumere che i tubi di ingresso e uscita dalla valvola siano alla stessa temperatura del fluido.
Se viene utilizzato il foro di drenaggio previsto nel corpo valvola, tenere presente che tutti i drenaggi di fluidi infiammabili, tossici o comunque pericolosi devono essere convogliati in un luogo sicuro a pressione minore di quella minima del sistema drenato.
Analogamente, se il fluido è infiammabile, tossico o comunque pericoloso, il foro di sfiato del coperchio delle valvole con soffietto deve essere collegato con un luogo sicuro a pressione atmosferica.
Se il fluido è infiammabile, tossico o comunque pericoloso, usare le opportune protezioni personali (indumenti protettivi, maschera antigas) prima di smontare la valvola e lavare, con i prodotti idonei per il fluido specifico, tutte le parti prima di ogni lavorazione.
Onde evitare rischi, eseguire tutte le operazioni di smontaggio, montaggio e manutenzione seguendo le istruzioni di questo manuale. In particolare, prima di separare la valvola dal processo e di separare le parti fra di loro, assicurarsi che non vi sia pressione.

1.3.0 Personnel safety precautions

Keep clear of the safety valve discharge.
When the valve opens, if it discharges gas or vapour, a sudden, very strong noise is generated.
In installing the valve sufficient surrounding space should be left to ensure safe and easy access for removal and maintenance.
Assume that the valve inlet and outlet piping is at the same temperature as the medium.
The valve body drain hole is plugged by factory before delivery. If it is unplugged at site to make use of it, it must be connected to a safe location at lower pressure than the drained system.
The threaded hole in the bonnet of bellows valves is protected by factory with a plastic tap. If the medium which may escape from it is toxic, flammable or in any way dangerous, it shall be disposed to a safe place at atmosphere or atmospheric pressure.
If medium is toxic, flammable or in any way dangerous suitable protective clothing (including the use of a gas mask) should be worn when disassembling the valve and all parts shall be washed with specific suitable products before handling or machining.
To avoid taking any risks, carry out disassembly, assembly and all maintenance operations following the instructions contained in this manual. In particular, before removing the valve from the process and separating the parts form each other, make sure that there is no pressure.

1.4.0 Caratteristiche principali

Le valvole di sicurezza delle serie 3000W, sono progettate per la protezione contro la sovrappressione di apparecchi a pressione contenenti liquidi, gas e/o vapori, a pressione maggiore di 0.4 bar.

Esse non sono idonee alla protezione contro aumenti di pressione estremamente rapidi come, ad esempio, quelli dovuti a reazioni esplosive.

Esse sono del tipo ad angolo, con attacchi flangiati, a pieno boccaglio, ad azione diretta, caricate a molla. Le valvole possono essere accessoriate con soffietto e pistone di bilanciamento.

1.4.0 Main features

Series 3000W, safety valves are designed for the protection against overpressure of vessels/pipes containing liquids, gases and/or vapours, at a pressure higher than 0.4 bar.

They are not suitable for the protection against extremely fast pressure surges such as explosive reactions, etc.

They are flanged, angle pattern, direct acting, spring loaded, removable full nozzle design. Valves can also be equipped with balancing bellows and auxiliary piston.

1.5.0 Principio di funzionamento

La valvola di sicurezza è un dispositivo di limitazione della pressione automatico, auto-azionato, caricato a molla, sensibile alla pressione a monte della valvola stessa. La valvola, comincia ad aprirsi alla pressione a cui è stata tarata (la forza dovuta alla pressione che agisce sull'otturatore è uguale al carico iniziale della molla); di conseguenza si genera pressione anche nella camera compresa fra sede di boccaglio e di otturatore, otturatore, anello di regolazione del blowdown. L'aumento della pressione agente sulla superficie inferiore dell'otturatore fornisce la spinta aggiuntiva necessaria a provocare la rapida apertura della valvola. (Quando scarica gas o vapore, si dice che la valvola "scoppia".) La pressione sale al di sopra della pressione di taratura e l'alzata aumenta. La massima portata è ottenuta alla sovrappressione dichiarata. La distanza fra l'anello di regolazione e l'otturatore, oltre a controllare il "blowdown", determina l'incremento di pressione, sopra il valore di taratura, in corrispondenza del quale si ottiene lo "scoppio".

1.5.0 How the valve works

Safety valves are automatic, spring loaded, pressure-relieving devices actuated by the upstream pressure without any energy other than that of the fluid.

A valve begins to open at the pressure for which it is set (the force resulting from the pressure acting on the disc is equal to the initial spring load); as a consequence pressure is generated in the chamber bounded by the nozzle/disc seat, the disc, and the blowdown adjusting ring. The increase of pressure acting on the lower surface of the disc, outside the seat, grants the additional thrust necessary to rapidly lift the disc. (When a compressible fluid is relieved, the valve is said to "pop".) Pressure accumulates above the set pressure and the lift increases. Maximum capacity is obtained at the stated overpressure.

The distance between the adjusting ring and the disc, besides controlling the blowdown, determines the difference between popping and set pressure.

1.6.0 Istruzioni per l'installazione

1.6.1- Evitare urti o scosse nell'installazione, per prevenire danni.
- Pulire le connessioni delle valvole e l'interno del boccaglio; le impurità nel boccaglio possono danneggiare la sede della valvola in fase di apertura.
- Installare le valvole in posizione verticale con il cappello verso l'alto.
- Installare i tiranti con i dadi. Stringere tutti i dadi a mano prima di usare la chiave. Applicare in croce la stessa coppia ai tiranti.
- L'attacco al serbatoio deve essere diretto e il più corto possibile. Il bocchello sul quale la valvola va installata deve essere, possibilmente, arrotondato all'ingresso.
- Le tubazioni di ingresso e uscita devono avere, come minimo, la stessa dimensione nominale delle connessioni della valvola ed essere libere da ostruzioni. Esse devono essere autodrenanti, rispettivamente verso il serbatoio e il collettore degli scarichi (se lo scarico è convogliato).
- La tubazione di scarico deve essere conformata in modo da impedire l'accumulo di sporcizia, condense o acqua meteorica (nel caso di scarico all'atmosfera) nel corpo valvola.
- Se si interpone una valvola di intercettazione, questa deve essere del tipo a pieno passaggio.
- Gli scarichi liberi devono essere supportati per impedire che le forze generate dal fluido allo scarico si trasmettano al tronchetto di ingresso.
- In nessun caso gli scarichi devono trasmettere al corpo valvola forze dovute a montaggio forzato o espansione termica.

1.6.2 Collocazione delle valvole.
- Le valvole devono essere installate in modo da consentire la accessibilità e lo smontaggio; intorno ad esse deve essere lasciato sufficiente spazio.
- E' possibile installare la valvola senza valvole di intercettazione. In questo caso eventuali operazioni di manutenzione devono essere effettuate quando l'impianto è fuori servizio. Per poter effettuare operazioni di manutenzione con l'impianto in servizio occorre che la valvola sia intercettata a monte e, se lo scarico è convogliato in un sistema in pressione, anche a valle.

1.6.0 Instructions for installation

1.6.1- During installation avoid knocking or jolting of the valve to prevent damages.
- Clean thoroughly the valve connections and the nozzle; inside impurities on the nozzle may damage the valve seat during opening.
- Install the valve in a vertical position with the cap pointing upwards.
- Install studs with nuts. Tighten all nuts finger tight before torquing. Evenly torque the studs applying torque crosswise.
- Connection with the vessel should be direct and as short as possible. The nozzle on which the valve is mounted should have a rounded entrance if possible.
- The inlet and outlet piping should have the same size as or larger than the size of the valve connections and be free from obstructions. They shall be self draining respectively to the protected vessel and to the relief header (if any).
- The discharge piping must have an internal diameter at least equal to that of the outlet of the valve and must be designed to avoid accumulation of dirt, rain or condensates in the valve body.
- If a shut-off valve is installed, same must be the full passage type.
- Open discharge piping must be supported to avoid force generated by the medium at discharge being transmitted to the inlet pipe.
- In no case whatsoever any force due to forced alignment and thermal expansion should be transmitted from the discharge piping to the valve body.

1.6.2 Valve location.
- Sufficient space for easy access and removal should be provided around the valve.
- It is possible to install the valve without shut-off valves. In this case any maintenance activity must be whilst the plant is out of service. To be able to service the safety valve with plant in operation it is necessary that the valve inlet and, if the discharge is to a closed system under pressure, also the outlet be shut off.

- Le valvole devono essere installate il più vicino possibile all'apparecchio protetto; tuttavia, per processi che implichino fluttuazioni di pressione, le valvole devono essere poste lontano dall'origine di queste in una zona di pressioni più stabili.
Il montaggio delle valvole su apparecchi soggetti a vibrazioni, con frequenza e ampiezza tali da eccitare il movimento di otturatore e molla delle valvole, dovrebbero essere evitato. La precisione della pressione di taratura e la tenuta della valvola potrebbero essere influenzate.
- Ogni volta che una valvola di sicurezza è posta a valle di organi capaci di creare turbolenza (valvole riduttrici, diaframmi, boccagli, altre valvole e raccordi) è necessario che tra tali organi e la valvola stessa vi sia una tubazione dritta di adeguata lunghezza (almeno 8-10 diametri).

- Valves should be placed as close as possible to the protected equipment; however, on installations that have pulsating pressure the valve should be located far from the source of pulsations in a more stable pressure region. Locating valves an equipment subjected to vibrations, with frequency and amplitude able to excite valve disc and spring movement, should be avoided valve set pressure accurancy and seat tightness could be affected.
- Each time that a safety valve is positioned downstream of fittings and valves capable of creating turbulence (pressure reducing valves, orifice plates and flow nozzles, other valves and fittings) it is necessary for an adequate length (at least 8 to 10 diameters) of straight pipe to be provided between these pieces of equipment and the valve itself.

1.6.3 I coperchi di valvole con soffietto sono muniti di foro di sfiato filettato e tappato per la spedizione; per assicurare il corretto funzionamento della valvola, il tappo va rimosso ed il coperchio va sfiatato in luogo sicuro a pressione atmosferica.
Ghiaccio, insetti o sporcizia non devono poter ostruire il tubo di sfiato.
Il rischio di congelamento dell'umidità atmosferica entro il coperchio, per effetto di bassi valori della temperatura del fluido di processo e/o dell'ambiente, deve essere attentamente valutato. (Vedere le note dedicate a pag. 33).

1.6.3 The bonnets of bellows valves are equipped with a threaded vent hole closed by a plug for shipping; to ensure the proper functioning of the valve, the plug should be removed and the bonnet vent should be disposed to a safe location at atmospheric pressure.
Ice, insects or dirt must be not able to clog the vent pipe hole.
The risk of freezing of atmospheric moisture inside the bonnet, as consequence of the low temperature of the process medium and/or ambient conditions needs to be carefully evaluated.
(Refer to the specific notes on page 33).

1.7.0 Conservazione delle valvole dopo la installazione

1.7.0 Conservation of the valves after installation

1.7.1 Quando le valvole sono installate, e prima che vengano messe in esercizio, occorre evitare che sporco, pioggia, liquidi, sabbia ed altre sostanze estranee in genere penetrino all'interno della valvola, danneggiandone o ostruendone le parti.
Occorre anche evitare che le parti interne delle valvole vengano danneggiate da operazioni preliminari alla messa in servizio, quali:
- pulizia delle tubazioni, che può dare origine a fenomeni di corrosione per incompatibilità tra i materiali della valvola e i fluidi usati per la pulizia, o introdurre scaglie, scorie e sostanze estranee nella valvola con conseguente danneggiamento delle sedi alla prima apertura.

1.7.1 Once the valves are installed, and before they go into operation, it must be avoided that dirt rain, liquids, sand, or other foreign matters penetrate to the inside of the valve, damaging and obstructing their parts.
Also, avoid damage to the internal parts of same which could be caused through operations carried out prior to start-up, such as:
- cleaning of the piping, which could give rise to corrosion phenomena through incompatibility between the materials of the valve and the medium used for cleaning, or which could introduce foreign substances such as scales, slag etc. into the valve with consequent damage to the seats at the first opening.

- Prova idraulica, che richiede il blocco della valvola, con possibilità di danneggiare le sedi e lo stelo a seguito di un uso non corretto del dispositivo di blocco. Inoltre, in caso di prova idraulica delle tubazioni di scarico i soffietti possono essere irrimediabilmente danneggiati.
Pertanto si raccomanda di effettuare tali operazioni installando flange cieche al posto della valvola.

- hydrostatic test, which requires blocking the valve, with the possibility of damage to seats and spindle as a result of incorrect use of the test gag. Furthermore, in the case of hydrostatic testing of the discharge pipes, bellows could suffer irreparable damage.
Therefore to carry out the above operations it is advisable to install blind flanges in place of the valve.

1.7.2 Prima della spedizione, tutte le valvole sono tarate alla pressione di scatto richiesta dal Cliente. Non dovrebbe, pertanto, essere necessaria alcuna regolazione in loco. Prima dell'installazione è necessario un accurato controllo visivo delle valvole. Tuttavia, in caso sussistano dubbi di danneggiamenti o manipolazioni durante il trasporto o la movimentazione, è consigliabile controllare la pressione di taratura e la posizione dell'anello di blowdown al banco prova in accordo alle indicazioni del Manuale.

1.7.2 Before shipment, all valves are adjusted to the set pressure requested by the Customer. Therefore, no further adjustments should be required at the job-site. Before installation an accurate visual check of the valve is necessary. However, should there be suspicion that the valve has been damaged or altered during handling or transport, it is advisable to check set pressure and blowdown ring position at the test bench in accordance with the indications provided in the Manual.

1.8.0 Uso delle valvole dopo l'installazione

1.8.0 Operation of the valves after installation

1.8.1 Istruzioni per l'avviamento
Prima dell'avviamento tutte le valvole di sicurezza devono essere oggetto di ispezione visiva, al fine di accertare che:
- Sia stata installata la valvola di sicurezza giusta.
- La targhetta della valvola indichi un valore della pressione di taratura compatibile con la protezione dell'apparecchiatura su cui è installata.
- Non vi siano flangie cieche, valvole chiuse od ostruzioni delle tubazioni
- I sigilli, posti in fabbrica per evitare manomissioni delle regolazioni, siano integri.

1.8.1 Start-up instructions
Before start-up a visual inspection should be carried out. It should also be checked that:
- The correct safety valve is installed.
- The tag shows the proper set pressure for the equipment to be protected.
- There are no blind flanges, closed valves or piping obstructions.
- Seals, applied in our factory to avoid unauthorized adjustments, are unbroken.

1.8.2 Ispezioni periodiche
E' necessario controllare periodicamente la pressione di taratura, la libertà di movimento dello stelo e le tenute di sede e verso ambiente, al fine di verificare l'efficienza della valvola.

1.8.2 Periodic inspection
Set pressure, as well as seat tightness and tightness to atmosphere and freedom of movement of the spindle, should be checked in order to ensure the efficiency of the valve.
After the safety valve has opened, it is recommended to check that the disc has properly re-established contact with the seat of the nozzle and tightness has been restored.

Dopo ogni intervento della valvola, è opportuno controllare che l'otturatore sia tornato correttamente a contatto con la sede del boccaglio, ripristinando la tenuta. Eventuali perdite possono essere rilevate a orecchio e, nel caso di fluidi caldi o freddi, controllando le variazioni di temperatura prodotte nel corpo valvola. In caso di primo esercizio dell'impianto, consigliamo di controllare l'efficienza della valvola entro i primi 2 anni; l'intervallo di tempo programmato per i successivi controlli potrà essere modificato, sulla base dei risultati ottenuti e, comunque, nel rispetto dei regolamenti vigenti.

Seat leakage, if any, can be detached by hearing and, if the fluid is cold or hot, checking the changes of the temperature of the valve body.
We recommend to check the valve efficiency within 2 years, since the start-up of the plant; the time interval fixed for the next scheduled inspections could be different, on the base of the first results or according to the applicable Code requirements.

2.0.0 ISTRUZIONI PER LA REGOLAZIONE, MONTAGGIO E SMONTAGGIO DELLE VALVOLE FLANGIATE SERIE 3000W

2.0.0 INSTRUCTIONS FOR SETTING, DISASSEMBLY, ASSEMBLY OF SERIES 3000W (FLANGED VALVES)

2.1.0 Regolazione delle valvole senza leva

Qualora risultasse necessario modificare la pressione di taratura stabilita oppure la pressione di richiusura della valvola ("blowdown") si dovrà procedere come segue:

2.1.0 Adjustment of valves without lever

If it should be necessary to alter the established set pressure or the valve blowdown, the instructions below should be followed:

2.1.1 Togliere il cappello (3) e la spina di fissaggio (8). Alzare l'anello di regolazione (7) agendo con un cacciavite sui denti dell'anello stesso, verso destra, fino a toccare l'otturatore, staccandosi poi di 2 denti verso sinistra assicurandosi che l'otturatore batta sul boccaglio e non sull'anello.

2.1.1 Remove cap (3) and the adjusting ring pin (8). Raise the blowdown ring (7) by moving the teeth of the ring to the right with a screwdriver until the disc is touched and then move 2 teeth to the left, making sure that the disc touches the nozzle and not the ring.

2.1.2 Controllare la pressione differenziale di prova su banco prova, a temperatura ambiente e contropressione atmosferica, con aria o acqua, come indicato sul certificato di'identità e collaudo della valvola.

Nota. La presenza di acqua all'interno della valvola può essere incompatibile con le condizioni di servizio. In particolare, devono essere considerati i rischi di formazione di idrati e/o di ghiaccio.

Per evitarli, la valvola deve essere asciugata completate, dopo le prove di taratura e tenuta, anche facendola aprire più volte e flussandola con aria secca o azoto, al fine di eliminare ogni traccia di acqua dalle sedi.

La pressione di prova viene elevata fino a quando la valvola si apre (con l'aria, "scoppia"; con acqua, si stabilisce un modesto flusso continuo).

Allentare il controdado (18) e:

- avvitare la vite di regolazione (17) se si deve aumentare la pressione di taratura
- svitare la vite di regolazione se si deve diminuire la pressione di taratura.

2.1.2 *The adjustment of the cold differential test pressure is carried out on a test bench, at ambient temperature and atmospheric back pressure, with air or water, as indicate in the "Identity and Test Certificate".*

Note. The presence of water inside the valve could be incompatible with the operating conditions. Risks of icing and/or hydrate formation have mainly to be evaluated. In order to avoid these risks, the valve has to be dried after set pressure adjustment and seat tightness test, also by opening and flowing it with air or nitrogen to remove any trace of water from the seats

The test pressure is increased until the valve opens ("pops," with air; a small continuous flow take place, with water).

Loosen the adjusting screw lock nut (18) and tighten the spring adjusting screw (17) if the set pressure is to be increased, loosen it if the set pressure is to be lowered.

2.1.3 Per ogni valvola, il campo entro cui è possibile variare la taratura è indicato nel "Certificato di Identità e di Collaudo".

2.1.3 For all valves, the range within which it is possible to vary the spring setting is shown in the "Test and Identification Certificate".

2.1.4 La regolazione della pressione differenziale di prova viene eseguita con contropressione atmosferica.
Se esiste contropressione imposta, la valvola deve essere regolata ad una pressione uguale alla differenza fra la pressione di taratura richiesta e la contropressione. Quanto sopra, ovviamente, non si riferisce alle valvole con soffietto di bilanciamento. Se esiste contropressione generata, di questa, usualmente, non si tiene conto.

2.1.4 The safety valve differential test pressure is adjusted with atmospheric back pressure. If there is a superimposed back pressure, the valve must be adjusted at a pressure equal to the difference between the required set pressure and the back pressure. This, of course, does not apply to valves with balancing bellows. If there is a built-up back pressure, this is not usually taken into account.

Esempio:
Pressione di taratura: 10 bar
Contropressione imposta: 2 bar
Pressione differenziale di prova a freddo:
10 -2 = 8 bar

Example:
Desired set pressure: 10 bar
Superimposed back pressure: 2 bar
Cold differential test pressure:
10 - 2 = 8 bar

2.1.5 La pressione a cui la valvola si apre cambia con la temperatura della molla; la taratura al banco, a temperatura ambiente, dovrebbe tenere conto della temperatura di esercizio. È perciò buona pratica, quando la legge ed i regolamenti lo permettano, correggere il valore della pressione differenziale di prova a freddo delle valvole con coperchio chiuso, in funzione della temperatura di scarico della valvola, come da tabella.

2.1.5 The set pressure of the valve is affected by the temperature of the spring; the pressure adjustment, at the test bench, at ambient temperature, should consider the operating temperature.
It is therefore good practice, if the rules and the regulations do not forbid it, to correct the cold differential test pressure of valves with closed bonnet, according to the relieving temperature, as shown in the table below.

Temperatura di scarico [°C] *Relieving temperature [°C]*		Correzione della pressione differenziale di prova a freddo *Correction of the cold differential test pressure*
da (incluso) *from (inclused)*	a (escluso) *to (esclused)*	
-196	-140	-3%
-140	-90	-2%
-90	267	Nessuno / None
267	350	+2%
350	420	+3%
420	540	+4%

Nota bene: Le correzioni, proposte dalla tabella, si riferiscono a valvole non coibentate.

Note: Corrections, proposed in the table, refer to valves not insulated.

2.1.6 Stabilita la pressione di scatto desiderata, posizionare l'anello di regolazione del blow-down (7) come indicato qui di seguito.
Come detto al paragrafo 2.1.1, durante la taratura della molla l'anello di regolazione del blowdown viene portato a toccare l'otturatore e poi arretrato di 2 denti.
Se l'anello viene lasciato in questa posizione, la valvola, quando scarica in esercizio la sua piena portata, ha un blowdown molto elevato (pressione di richiusura molto bassa). È perciò necessario abbassare l'anello di regolazione, spostandolo verso sinistra del numero indicativo di denti dato dalla tabella riportata nella pagina seguente.
Il blowdown delle valvole installate può variare in funzione della composizione, pressione e temperatura del fluido e del tipo di installazione, e può essere regolato in sito posizionando opportunamente l'apposito anello di regolazione.

2.1.6 Once the desired set pressure is established, position the blowdown adjusting ring (7) as indicated herebelow.
As said in paragraph 2.1.1, during the spring setting the blowdown adjusting ring should touch the disc and then be turned back 2 teeth.
If the ring is left in this position, when in operation the valve discharges its full capacity, it will have a very long blowdown (very low reclosing pressure). Therefore, the adjusting ring must be lowered, moving it to the left by the number of teeth indicated in the table on the next page.
The blowdown of installed valves can vary, depending on the analysis, pressure and temperature of the medium and on the type of installation, and can be adjusted on the spot by suitably positioning the adjusting ring.

2.1.7 Regolata la valvola, rimettere la spina di fissaggio (8), assicurandosi che la spina della vite stessa si innesti in una delle cave dell'anello (7). Bloccare il controdado (18) quindi rimettere il cappello (3).

2.1.7 When the valve is adjusted, put back in place the adjusting ring pin (8), making sure that the pin is engaged in one of the slots in the blowdown ring (7). Fix the adjusting screw lock nut (18) and put the cap (3) in place again.

Serie 3000W – Posizione del'anello di regolazione
Series 3000W _ Blowdown adjusting ring position

Pressione [bar] da a Pressure [bar] *from to*		0,4 1	1,1 1,5	1,6 2	2,1 3,5	3,6 5	5,1 9	> 9			
Orifizio *Orifice*	*Area* cm^2	No. di denti da arretrare *No. of teeth to be turned back*									
C	0,502	2	2	2	2	2	2	3			
D	0,785	2	2	2	2	2	2	3			
E	1,43	2	2	2	2	2	2	3			
F	2,54	3	3	3	3	3	4	4			
G	3,8	3	3	3	3	4	4	4			
H	5,94	3	3	3	4	5	5	5			
J	9,08	5	5	6	7	8	8	8			
K	13,2	5	6	7	8	8	8	8			
K_2	16,6	7	8	9	9	9	9	9			
L	21,2	9	10	11	11	11	11	11			
M	25,5	13	14	15	15	15	15	15			
N	31,1	12	13	13	13	13	13	13			
P	45,3	16	16	16	16	16	16	16			
P_3	63,6	22	22	22	22	22	22	22			
Q	78,5	25	25	25	25	25	25	25			
R_1	103,2	18	18	18	18	18	18	18			
T_1	167,7	30	30	30	30	30	30	30			

Nota bene: quando impiegate con liquido, in presenza di contropressioni imposte superiori al 20-25% della pressione di taratura, l'anello di regolazione delle valvole della Serie 3000W, con orifizi C, D, E, F, G, è opportuno sia posizionato a 2 denti, quale che sia il valore della pressione di taratura.

Note: in service with liquid, when the superimposed back pressure exceeds 20-25% of set pressure, the blowdown adjusting ring of Series 3000W valves with orifices C, D, E, F, G, should be adjusted at 2 teeth, whatsoever the set pressure value.

2.2.0 Regolazione delle valvole con leva di sollevamento semplice, con o senza premistoppa L2

2.2.1 Dopo aver rimosso le viti del coperchio (22 – fig. 7), spingere verso il basso la leva (3-2); la forcella della leva (3-6) ruoterà consentendo al cappello (3-1) di essere rimosso.

2.2.2 Per la regolazione, eseguire le stesse operazioni descritte per le valvole senza leva.

2.2.3 Regolata la valvola, riposizionare il cappello (3-1) e le viti del coperchio (22 – fig. 7); poi sollevare la leva (3-2) ed assicurarsi che esista il gioco tra la forcella della leva (3-6) ed il piatto leva (3-9).

No.	Denominazione *Part name*	Acciaio carbonio *Carbon steel*	Acciaio inox *Stainless steel*
3-1	Cappello *Cap*	A216-WCB	A351-CF8M
3-2	Leva *Lever*	Acciaio al carbonio (·) *Carbon steel (·)*	Acciaio al carbonio (·) *Carbon steel (·)*
3-3	Premistoppa *Gland*	AISI 316	AISI 316
3-4	Baderne *Packing ring*	PTFE	PTFE
3-5	Albero *Lever shaft*	AISI 316	AISI 316
3-6	Forcella *Lever fork*	AISI 316	AISI 316
3-7	Bussola *Bushing*	Teflon	Teflon
3-8	Bussola *Bushing*	AISI 316	AISI 316
3-9	Piatto leva *Lever head*	AISI 316	AISI 316
3-10	Dado *Lock nut*	AISI 316	AISI 316
3-11	Spina *Pin*	AISI 316	AISI 316
3-15	Tappo *Plug*	Acciaio al carbonio (·) *Carbon steel (·)*	AISI 316
19	Guarnizione *Gasket*	PTFE	PTFE

(·) Zincato
(·) Zinc coated

2.2.0 Adjustment of valves with packed or plain single acting lifting lever L2

2.2.1 After removing the bonnet bolts (22 – fig 7), push down the lever (3-2); the lever fork (3-6) will rotate, allowing the cap (3-1) to be disassembled.

2.2.2 The adjustment is carried out following the same operations described for valves without lever.

2.2.3 Once the valve is adjusted, put in place the cap (3-1) and the bonnet bolts (22 – fig. 7); then pull the lever (3-2) in vertical position and make sure that a clearance exists between the lever fork (3-6) and the lever head (3-9).

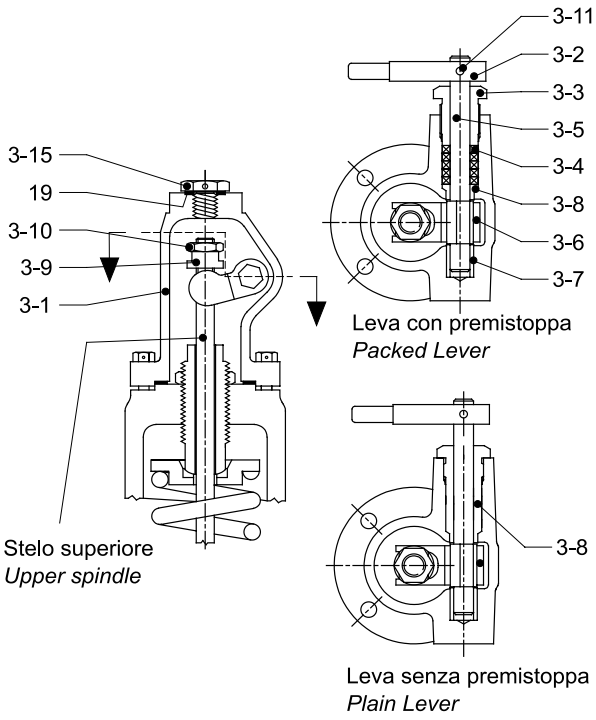


Fig. 1

2.3.0 Smontaggio e montaggio

2.3.1 Tutte le filettature delle valvole sono destrorse.

2.3.2 Smontaggio

Per lo smontaggio della valvola eseguire progressivamente le seguenti operazioni:

Togliere le viti (22), il cappello (3-1) e la guarnizione (19-4). Allentare il controdado (18) e svitare la vite di taratura (17) fino a scaricare completamente la molla (14). Togliere i dadi (21), il coperchio (2), poi la molla con i guidamolla (15) e la guarnizione (19-3).

ATTENZIONE - Prima di allentare completamente i dadi (21) del corpo-coperchio, assicurarsi che la molla (14) sia totalmente scaricata.

2.3.2.1.0 **Valvole aventi classe della flangia d'ingresso minore o uguale ad ASME 600**

2.3.2.1.1 Valvole con orifizi da H a T1.

(rif. Figg. 7, 8, 9)

L'otturatore è filettato sullo stelo.

Tirando verso l'alto lo stelo (10) si sfileranno dal corpo (1) anche la guida (9), l'otturatore (6) e gli accessori "soffietto (12) + protezione (13)", se presenti. Assieme a questi componenti accessori verrà sfilata anche la guarnizione (19-2) (*).

Qualora la guida risultasse bloccata entro il corpo, è possibile estrarla facendo leva con un cacciavite dopo averlo impegnato entro la cava circonferenziale praticata sulla guida stessa.

Tenere fermo l'otturatore e ruotare lo stelo in senso antiorario, esercitando contemporaneamente una trazione affinché la sua filettatura si impegni entro quella dell'otturatore; quindi svitarlo completamente.

Per separare il soffietto dall'otturatore, bloccare quest'ultimo e svitare il soffietto, impegnando una chiave a settore entro uno dei fori radiali presenti nella ghiera del soffietto. Non cercare di svitare il soffietto applicando la coppia torcente alla sua flangia superiore; le onde potrebbero venire irrimediabilmente danneggiate.

(*) Il diametro interno della protezione soffietto di alcune valvole ha diametro interno maggiore di quello esterno dell'otturatore; perciò la protezione rimarrà posizionata entro il corpo assieme alla guarnizione (19-2).

2.3.0 Disassembly and assembly

2.3.1 All the valve threads are right-hand.

2.3.2 Disassemble

To disassemble the valve, carry out the following operations:

Remove the screws (22), the cap (3-1), and the gasket (19-4). Loosen the lock nut (18) and unscrew the spring adjusting screw (17), until to completely unload the spring (14).

Remove the nuts (21), the bonnet (2) and then the spring with its buttons (15) and the gasket (19-3).

WARNING - Before loosening the body nuts (21) completely, make sure that the spring (14) is totally released.

2.3.2.1.0 ***Valves with ASME class of the inlet flange up to 600***

2.3.2.1.1 Valves with orifices from H to T1.

(refer to figures 7, 8, 9)

The disc is screwed to the spindle.

Pulling the spindle (10) upwards, guide (9), disc (6) and accessories "bellows (12) + protector (13), if any, will be extracted from the body (1). The gasket (19-2) will be also slipped out together with the accessory parts (*).

If the guide gets stuck in the body, it can be extracted by levering with a screwdriver inserted in the circumferential groove in the guide itself.

Lock the disc and rotate the spindle in a counter clockwise direction, pulling at the same time. When the threading becomes engaged in that of the disc, unscrew completely.

To separate the bellows from the disc, lock the last one and unscrew the bellows, engaging a pin wrench into one of the radial hole of the bellows ring nut. Don't apply any torque to the bellows upper flange; bellows convolutions could be damaged, irreparably.

(*) The internal diameter of the bellows protector of some valves is larger than the outer diameter of the disc; therefore the protector will stay in the body together with the gasket (19-2).

2.3.2.1.2 Valvole con orifizi da C a G.

(rif. Figg. 11,12)

L'otturatore (6) è unito allo stelo (10) o, se presente, al soffietto (12), con un anello elastico (6-4).

Lo stelo delle valvole con soffietto è semplicemente infilato entro la bussola "a ditale", saldata al soffietto.

L'otturatore degli orifizi C, D ed E è in due pezzi. L'inserto otturatore (6-1) è solo alloggiato entro il porta-otturatore (6-2).

Estrarre la guida (9) dal corpo (1) facendo leva con un cacciavite entro la cava circonferenziale della guida stessa.

Nel caso di valvole senza soffietto, tirare verso l'alto lo stelo per sfilare dal corpo anche la guida e l'otturatore. Per separare questi componenti, serrare in morsa lo stelo e spingere la guida contro l'otturatore.

Nel caso di valvole con soffietto, prima sfilare lo stelo dalla guida, poi togliere dal corpo la guida, facendo leva con un cacciavite entro la sua cava circonferenziale, e il soffietto, con attaccato l'otturatore.

Per separare il soffietto dall'otturatore, bloccare quest'ultimo e tirare la bussola cieca "a ditale" del soffietto; se insufficiente, fare leva sull'otturatore, con 2 cacciaviti contrapposti, inseriti tra otturatore e bussola "a ditale".

L'inserto otturatore degli orifizi C, D ed E può rimanere appoggiato alla sede del boccaglio oppure accoppiato al porta-otturatore. Attenzione a non perderlo.

2.3.2.2 **Valvole aventi classe della flangia d'ingresso ASME 900 e 1500**

Le possibili varianti esecutive dei componenti e le modalità di smontaggio sono analoghe a quelle descritte ai punti precedenti. Si introducono le seguenti varianti costruttive:

Lo stelo delle valvole con orifizi da C a J è solo infilato entro l'otturatore (il porta-otturatore, per C, D ed E).

Il soffietto delle valvole con orifizio C, D o E è saldato al porta-otturatore, che diviene così parte integrante del soffietto (rif. Fig. 13).

2.3.2.1.2 Valves with orifices from C to G.

(refer to figures 11, 12)

The disc (6) is coupled to the spindle (10) or to the bellows (12), if any, by a retaining ring (6-4).

The spindle of valves with bellows is simply inserted into the thimble shaped bushing, welded to the bellows.

The disc is in two parts for orifices C, D and E. The disc insert (6-1) is simply fitted in the disc-holder (6-2).

Extract the guide (9) from the body (1) by levering with a screwdriver inserted in the circumferential groove in the guide itself.

If the valve isn't equipped with bellows, pull the spindle upwards to extract guide and disc from the body. To withdraw these parts, lock the spindle in a vice and push the guide against the disc/disc-holder.

If the valve is equipped with bellows, first withdraw the spindle from the guide, then remove from the body the guide, by levering with a screwdriver inserted in its circumferential groove, and the bellows, with the disc coupled to.

To separate bellows and disc/disc-holder, lock this and pull the thimble shaped bushing of the bellows; if not sufficient, insert two screwdrivers, in opposite positions, into the gap between disc/disc holder and bushing and lever.

C, D or E disc insert could stay on the nozzle seat or fitted in the disc-holder. Pay attention to avoid loosing it.

2.3.2.2 ***Valves with ASME class of the inlet flange 900 and 1500***

The part variations and assembling procedures are similar to those described in the previous points. The following manufacturing variations applies:

The spindle of valves with orifices from C to J is simply inserted into the disc (disc-holder for C, D and E orifices).

The bellows of valves with C, D and E orifices is welded to the disc-holder that is so integrated in the bellows (refer to figure 13).

2.3.2.3 **Valvole aventi classe della flangia d'ingresso ASME 2500**

Sono disponibili solo valvole in esecuzione senza soffietto con orifizi: C, D, E, F, G.

Le valvole con orifizio G hanno disegno identico a quello delle valvole con classe d'ingresso 900 o 1500.

Il trim delle valvole con orifizi C, D, E, F è mostrato in figura 14.

Il gruppo otturatore (6-1, 6-2, 6-3, 6-4) è vincolato allo stelo (10) attraverso la filettatura del nipplo (6-3).

Per separare queste parti, tenere fermo lo stelo e ruotare il porta-otturatore (6-2), esercitando contemporaneamente una trazione, per trascinare in rotazione il nipplo, la cui filettatura deve prima impegnare e poi disimpegnare quella dello stelo.

Una volta separato il gruppo otturatore dallo stelo, togliere le due metà dell'anello (6-4) dal porta-otturatore, poi sfilare nipplo e inserto otturatore (6-1).

Togliere la spina di fermo (8), filettata entro il corpo, e poi l'anello di regolazione (7), filettato sul boccaglio (5).

Per togliere il boccaglio, impegnare una chiave a settore entro uno dei fori radiali presenti sulla sua parte inferiore e svitare.

I fori non sono praticati quando incompatibili con il tipo di accoppiamento/guarnizione previsto - per esempio RJ. In questo caso si deve bloccare la parte inferiore del boccaglio entro una morsa a agire sul corpo per svitare le due parti.

2.3.3 Montaggio

Per il montaggio, eseguire l'operazione inversa a quella dello smontaggio; bloccando per primo il boccaglio della valvola.

Gli orifizi C, D ed E, che hanno l'inserto otturatore alloggiato, ma non bloccato, entro il porta-otturatore (figura 11). Consigliamo di applicare in poco di grasso sui piani di contatto tra le due parti, per tenerle unite durante l'assemblaggio.

Valvole con classi d'ingresso ASME 2500 e orifizi C, D, E, F, (figura 14). Controllare che le due metà dell'anello (6-4) siano infilate fino a battuta, entro la cava del porta-otturatore (6-2), per consentire il disimpegno della filettatura del nipplo (6-3) da quella dello stelo e, all'estremità di quest'ultimo, di posizionarsi all'interno dell'anello in due metà.

2.3.2.3 ***Valves with ASME class of the inlet flange 2500***

Valves without bellows and orifices from C to G are only available.

Orifice G valves are similar to the ones with inlet flange class ASME 900 and 1500.

The trim of C, D, E, F orifices is shown in figure 14.

The disc assembly (6-1, 6-2, 6-3, 6-4) is coupled to the spindle (10) through the thread of the nipple (6-3).

To disassembly, lock the spindle and turn the disc-holder (6-2), in counter clockwise direction, pulling at the same time, to drug the nipple, which thread must fist engage and then disengage the spindle one.

Ones the disc assembly has been separated from he spindle, to disassemble, extract the two parts of the ring (6-4) from the disc-holder (6-2) groove, then withdraw the nipple and the disc insert (6-1).

Remove the adjusting ring pin (8), threaded in the body, and then the blowdown ring (7), threaded on the nozzle (5).

To remove the nozzle, engage a pin wrench into one of the radial holes in the lower part of the nozzle and unscrew. However there is no hole if the facing/gasket of the flange - e.g. RJ - is incompatible with it. In such case use a vice to hold firm the lower part of the nozzle and loosen the nozzle-body threaded coupling acting on the valve body.

2.3.3 Assemble

To assemble the valve, reverse the operation for disassembly, first fixing the valve nozzle.

C, D and E orifices use a disc insert that isn't locked in the disc-holder (figure 11 refers). We suggest to apply a thin layer of grease on the contact surfaces between these parts, to keep them coupled, while assembling.

Valves with inlet pressure class ASME 2500 and orifices C, D, E, F (figure 14 refers). Check that the two parts of the ring (6-4) are completely inserted in the groove of the disc-holder (6-2) to allow for the nipple thread to disengage the spindle one and, for the spindle end, to enter the ring (6-4).

Prima di caricare la molla (14), assicurarsi che l'otturatore (6) appoggi sulla sede del boccaglio (5) e non sull'anello di regolazione (7).

Before loading the spring (14), make sure that the disc (6) rests on the nozzle seat (5) and not on the blowdown ring (7).

2.3.4 Prove di tenuta della sede

Dopo aver regolato la pressione di taratura, e riposizionato l'anello di regolazione del blowdown, deve essere controllata la tenuta tra monte e valle della sede della valvola.

La prova di tenuta della sede è eseguita in accordo allo standard API 527.

Il fluido da impiegare e il valore della pressione di prova sono indicati sul certificato d'identità e collaudo (tipicamente 90% della pressione di taratura o 0.3 bar sotto la stessa se minore di 3 bar).

La perdita deve essere determinata immediatamente dopo aver fatto aprire la valvola.

2.3.4 Seat tightness test

After set pressure and blowdown have been adjusted, the tightness between inlet and outlet of the valve shall be checked.

The seat tightness test complies with the prevision of API Std 527.

Test medium and pressure value are reported in the "Identity and Test Certificate" (usually 90% of the set pressure or 0.3 bar less than set pressure when lower than 3 bar).

The leakage rate shall be determined immediately after valve opening.

2.3.4.1 Prova con aria

La figura 2 mostra lo schema di prova, con aria sotto acqua, e la perdita ammessa, in bolle per minuto, per valvole con sede metallica, in conformità ad API Std. 527 nel caso di valvole con coperchio aperto si sigilla mediante grasso il gioco fra stelo e guida).

Per valvole con sede soffice non è consentita alcuna perdita.

Le bolle devono essere contate non appena assumono una frequenza costante.

La pressione di prova deve essere applicata per un minimo di 1 minuto per valvole con dimensioni di ingresso fino a 2" (DN 50); 2 minuti per dimensioni di ingresso da 2,5" (DN 65) a 4" (DN 100); 5 minuti per dimensioni di ingresso di 6" (DN 150) o maggiori.

2.3.4.1 Testing with air

Figure 2 shows the test sketch and the allowable leakage rate, in bubbles per minute, for valves with metal seat, in accordance with API Std 527 (in the case of open bonnet valves, the clearance between guide and spindle shall be sealed with grease).

No leakage is allowed for valves with soft seat.

Count bubbles after they appear at uniform rate.

The test pressure shall be applied for a minimum of 1 minute for valves of inlet size through 2" (DN 50); 2 minutes for inlet sizes from 2,5" (DN 65) to 4" (DN 100); 5 minutes for inlet sizes 6" (DN 150) and larger.

2.3.4.2 Prova con acqua

Togliere il tappo dal foro di drenaggio del corpo e versare acqua nel corpo valvola fino a stabilire un flusso attraverso il foro di drenaggio. Solo quando il livello dell'acqua entro il corpo è stabile, la valvola deve essere osservata per il tempo necessario a definire la portata di perdita (1 minuto almeno per le valvole con sede soffice).

Per le valvole con sede metallica, la perdita ammessa è pari a 10 centimetri cubici all'ora per pollice di dimensione nominale d'ingresso.

Per valvole con sede soffice non è consentita alcuna perdita.

2.3.4.2 Testing with water

Remove the body drain hole plug and pour water into the body until water overflows through the drain hole. When the water level inside the body is stable, the valve shall be observed for the time necessary to define the leakage flow rate (1 minute minimum, for valve with soft seat).

For valves with metal-to-metal seats, the allowable leakage rate is 10 cubic centimetres per hour per inch of nominal inlet size.

No leakage is allowed for valves with soft seat.

2.3.5 Prova di tenuta delle guarnizioni soggette alla contropressione

(riferirsi alle figure 3 e 4)

La tenuta delle guarnizioni indicate dalle frecce deve essere controllata con acqua e sapone.

Fluido di prova: aria

Pressioni di prova:

6 bar, per valvole senza soffietto (fig. 3)

3 bar, per valvole con soffietto (fig. 4)

2.3.5 Tightness test of seals subject to back pressure (refer to figures 3 and 4)

The tightness of seals indicated by an arrow shall be checked for leakage with soap and water.

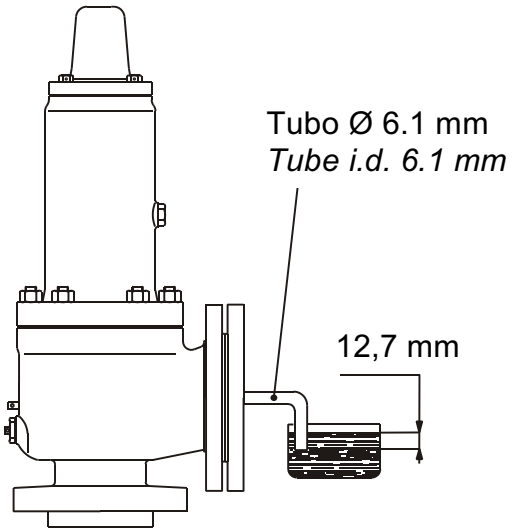
Test medium: air

Test pressures:

6 bar for valves without bellows (fig. 3)

3 bar for valves with bellows (fig. 4)

Fig. 2



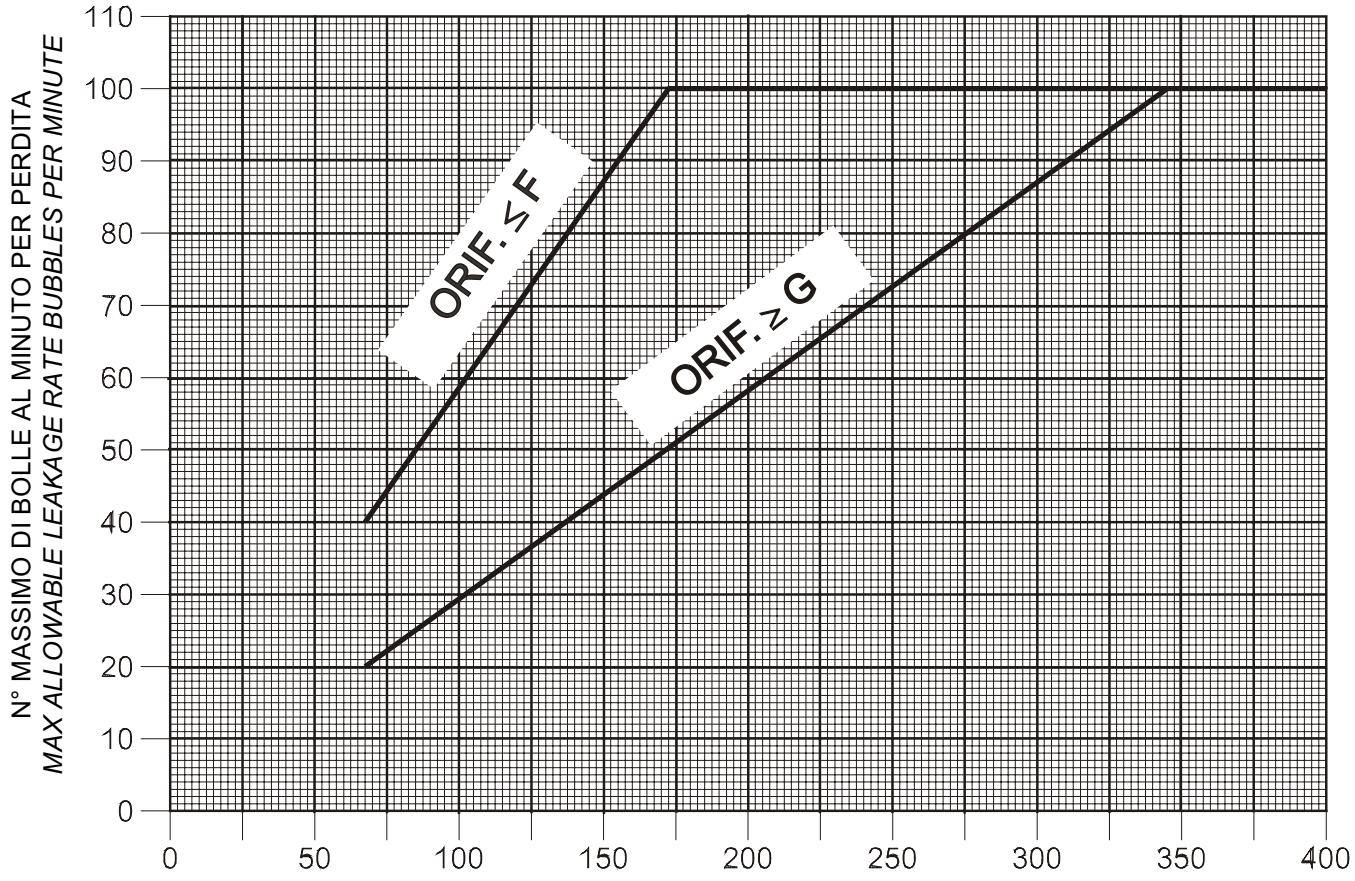


Fig. 3

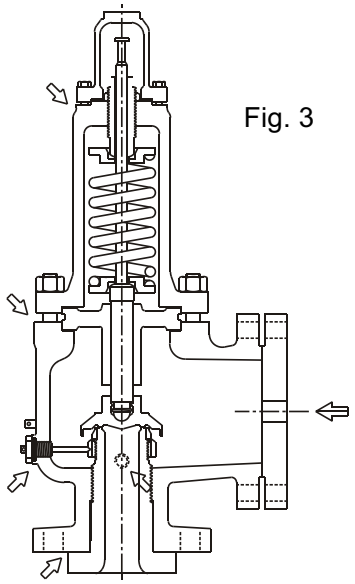
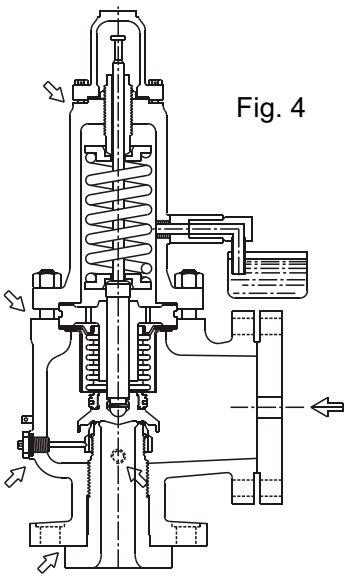


Fig. 4



VALVOLA CON SOFFIETTO
BELLOWS VALVE

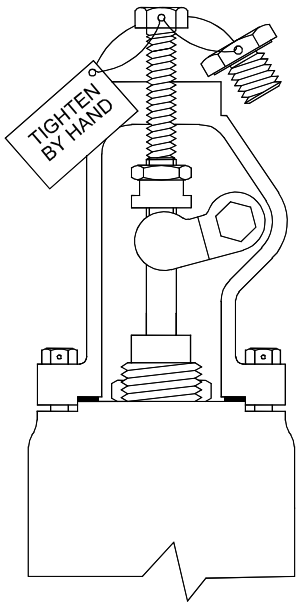
2.4.0 Dispositivo di blocco G_2 per valvole con coperchio chiuso e leva

Per bloccare la valvola, rimuovere dal cappello (3-1) il tappo (3-15) ed avvitare a mano la vite di blocco.

2.4.0 Test gag G_2 for valves with closed bonnet and lever

To block the valve, remove plug (3-15) from cap (3-1) and hand tighten the blocking screw.

Fig. 5



2.5.0 Golfare per il sollevamento della valvola – Accessorio Y6

2.5.1 Il materiale del golfare (3-14) è acciaio al carbonio, quale che siano i materiali delle altre parti della valvola. Per evitare problemi di corrosione si consiglia perciò di togliere il golfare, dopo l'installazione della valvola. (Allentare i grani di sicurezza (3-13) e svitare il golfare dal cappello (3-1), nel caso di valvole senza leva, dal nipplo (3-12), nel caso di valvole con leva.)

2.5.2 Nel caso di valvole senza leva, viene fornito un tappo in plastica per la protezione della filettatura di ancoraggio del golfare.
Nel caso di valvole con leva, viene fornito un tappo filettato (3-15), che può sostituire il nipplo, qualora si ritenga opportuno.
Il materiale del nipplo (3-12) è comunque scelto in funzione del materiale del cappello (3-1), per evitare problemi di corrosione galvanica, e può perciò rimanere avvitato al cappello anche in esercizio, svolgendo la funzione di tappo.

ATTENZIONE - Prima di mettere in esercizio la valvola assicurarsi che il nipplo (3-12) (o il tappo (3-15)) sia serrato al cappello in modo da garantire la tenuta della guarnizione (19-5).

2.5.0 Valve lifting eye. – Accessory Y6

2.5.1 Lifting eye material is carbon steel, whatever the materials of other valve parts. To avoid corrosion, we suggest removing the lifting eye, after the installation of the valve on the protected equipment. (Unscrew the lock set screws (3-13) and then the lifting eye from the cap (3-1), in case of valve without lever, from the nipple (3-12), if the lever is present.)

2.5.2 In case of valve without lever, a plastic plug is supplied for the protection of the threaded hole drilled in the cap for the lifting eyebolt coupling.
In case of valve with lever, a threaded plug (3-15) is supplied, to replace the nipple, if this option is preferred, as nipple material has been chosen to avoid galvanic corrosion when coupled to the cap (3-1) and, therefore, it needs not to be removed before valve operation.

WARNING - Before putting the valve into operation, make sure that the nipple (3-12) (or the plug (3-15)) has been tightened enough to ensure the gasket (19-5) sealing.

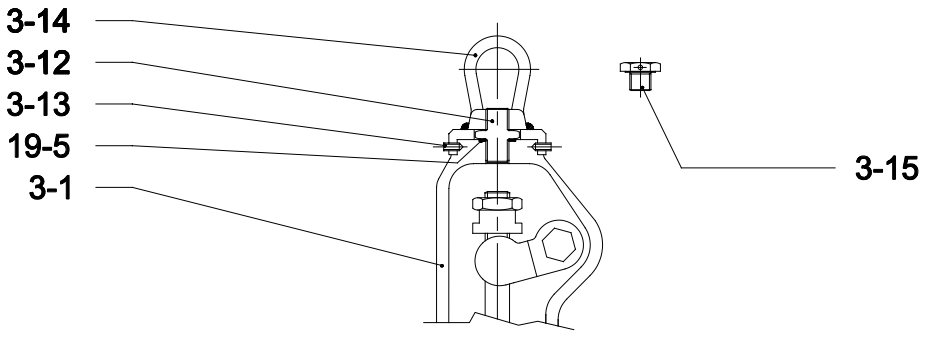
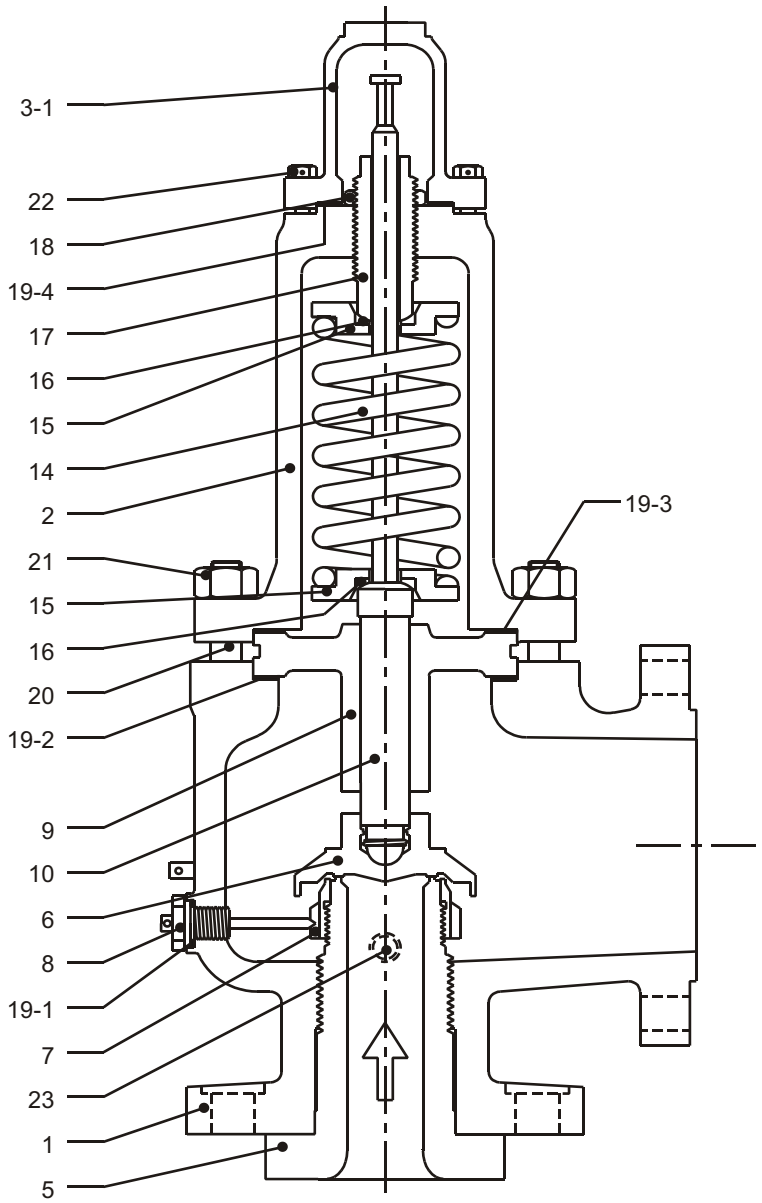


Fig. 6

VALVOLA SERIE 3000W
CON COPERCHIO CHIUSO

SERIES 3000W SAFETY VALVE
WITH CLOSED BONNET

Fig. 7



No.	Denominazione / *Part name*	No.	Denominazione / *Part name*
1	Corpo / *Body*	15	Guidamolla / *Spring button*
2	Coperchio / *Bonnet*	16	Cuscinetto / *Bearing*
3-1	Cappello / *Cap*	17	Vite di regolazione della taratura / *Spring adj. screw*
5 (*)	Boccaglio / *Nozzle*	18	Dado di fermo / *Lock nut*
6 (*)	Otturatore / *Disc*	19 (*)	Guarnizioni / *Gaskets*
7	Anello regolazione blowdown / *Blowdown adj. ring*	20	Prigionieri del corpo / *Body studs*
8	Spina ferma anello di regolazione / *Adj. ring pin*	21	Dadi del corpo / *Body nuts*
9	Guida / *Guide*	22	Viti del coperchio / *Bonnet bolts*
10	Stelo / *Spindle*	23	Tappo drenaggio ½" NPT / *½" NPT body drain plug*
14 (*)	Molla / *Spring*		

(*) Parti di scorta raccomandate

(*) Recommendend spare parts

VALVOLA SERIE 3000W
CON SOFFIETTO (B)

SERIES 3000W SAFETY VALVE
WITH BELLOWS (B)

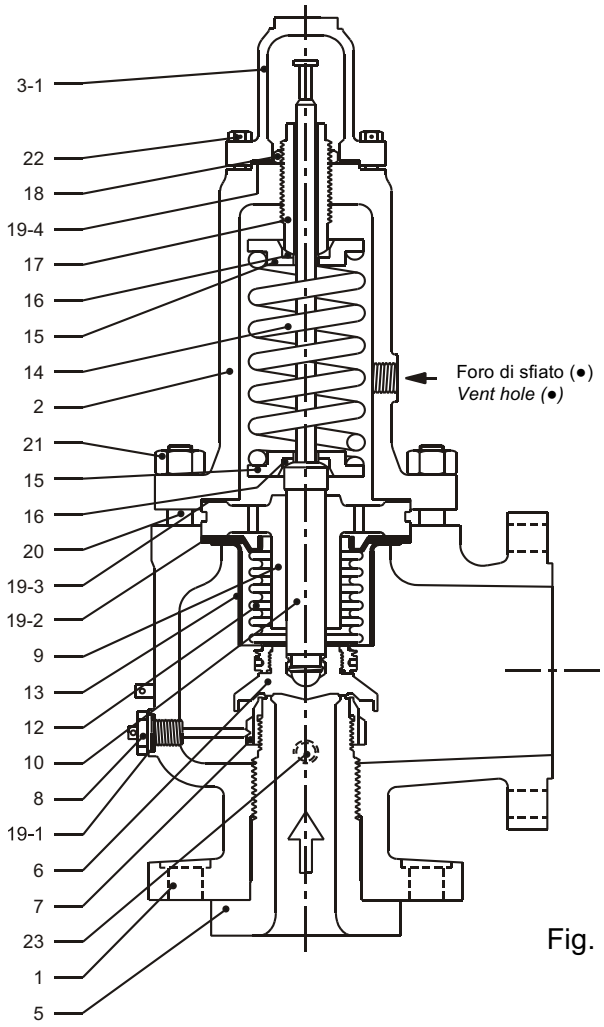


Fig. 8

(·) Dimens. Valvola / *Valve size* — Foro sfiato /*Vent hole*

1x2, 1½x2, 1½x3, 2x3, 3x4	½" NPT
4L6 (300), 4M6 (150-300)	½" NPT
Altre dimensioni / *Other sizes*	1" NPT

VALVOLA SERIE 3000W
CON SOFFIETTO (B) E PISTONE (P)

SERIES 3000W SAFETY VALVE
WITH BELLOWS (B) AND PISTON (P)

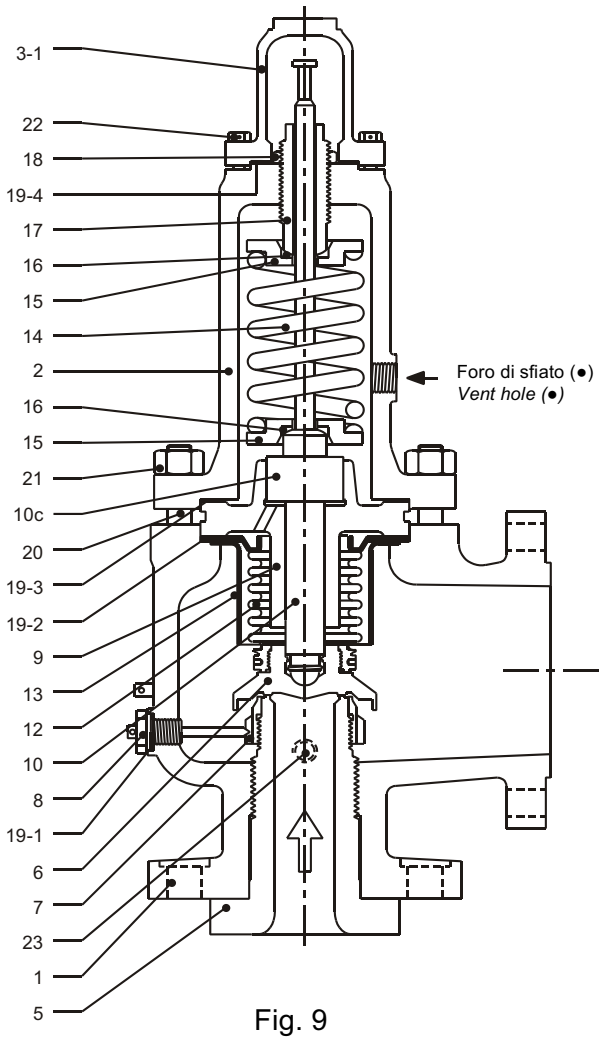


Fig. 9

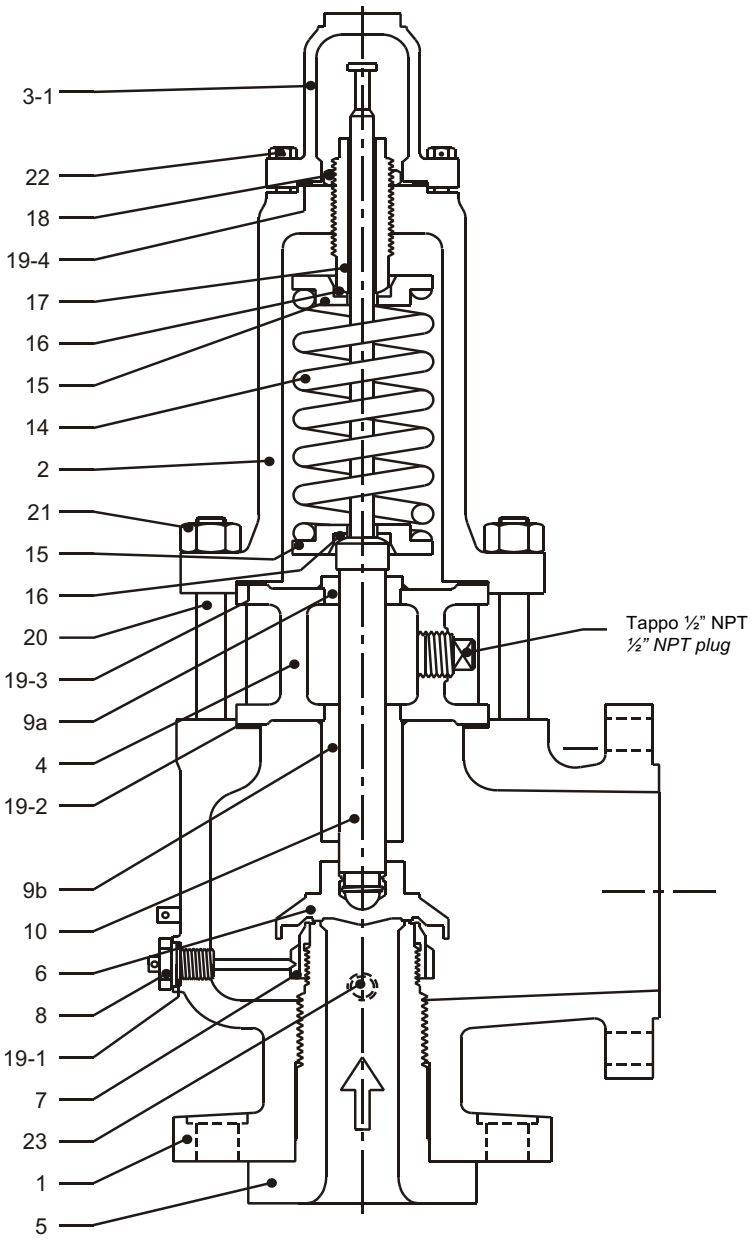
No.	Denominazione / *Part name*	No.	Denominazione / *Part name*
1	Corpo / *Body*	13	Protezione soffietto / *Bellows protector*
2	Coperchio / *Bonnet*	14 (*)	Molla / *Spring*
3-1	Cappello / *Cap*	15	Guidamolla / *Spring button*
5 (*)	Boccaglio / *Nozzle*	16	Cuscinetto / *Bearing*
6 (*)	Otturatore / *Disc*	17	Vite di regolazione della taratura / *Spring adj. screw*
7	Anello regolazione blowdown / *Blowdown adj. ring*	18	Dado di fermo / *Lock nut*
8	Spina ferma anello di regolazione / *Adj. ring pin*	19 (*)	Guarnizioni / *Gaskets*
9	Guida / *Guide*	20	Prigionieri del corpo / *Body studs*
10	Stelo / Spindle	21	Dadi del corpo / *Body nuts*
10c	Pistone / *Piston*	22	Viti del coperchio / *Bonnet bolts*
12 (*)	Soffietto / *Bellows*	23	Tappo drenaggio ½" NPT / *½" NPT body drain plug*

(*) Parti di scorta raccomandate — *(*) Recommendend spare parts*

VALVOLA SERIE 3000W
CON ESTENSIONE (E) E COPERCHIO CHIUSO

SERIES 3000W SAFETY VALVE
WITH EXTENSION (E) AND CLOSED BONNET

Fig. 10



No.	Denominazione / *Part name*	No.	Denominazione / *Part name*
1	Corpo / *Body*	14 (*)	Molla / *Spring*
2	Coperchio / *Bonnet*	15	Guidamolla / *Spring button*
3-1	Cappello / *Cap*	16	Cuscinetto / *Bearing*
4	Estensione / *Extension*	17	Vite di regolazione della taratura / *Spring adj. screw*
5 (*)	Boccaglio / *Nozzle*	18	Dado di fermo / *Lock nut*
6 (*)	Otturatore / *Disc*	19 (*)	Guarnizioni / *Gaskets*
7	Anello regolazione blowdown / *Blowdown adj. ring*	20	Prigionieri del corpo / *Body studs*
8	Spina ferma anello di regolazione / *Adj. ring pin*	21	Dadi del corpo / *Body nuts*
9a	Bussola di guida superiore / *Upper guide bushing*	22	Viti del coperchio / *Bonnet bolts*
9b	Bussola di guida inferiore / *Lower guide bushing*	23	Tappo drenaggio ½" NPT / *½" NPT body drain plug*
10	Stelo / *Spindle*		

(*) Parti di scorta raccomandate

(*) Recommendend spare parts

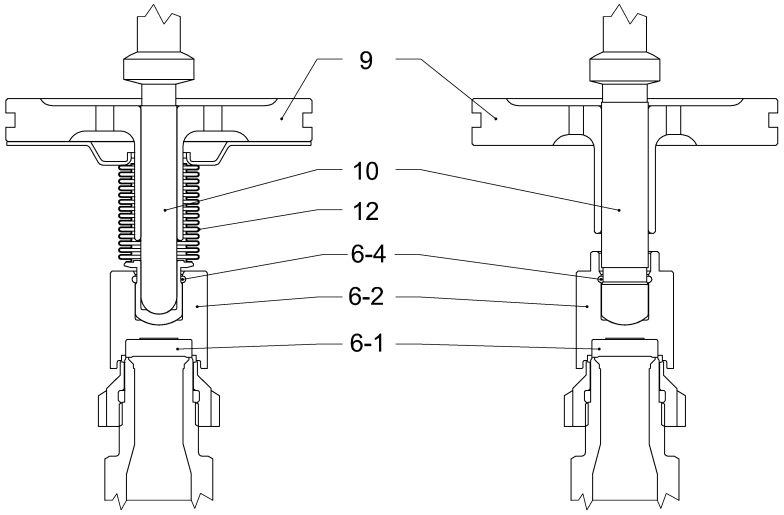


Fig. 11

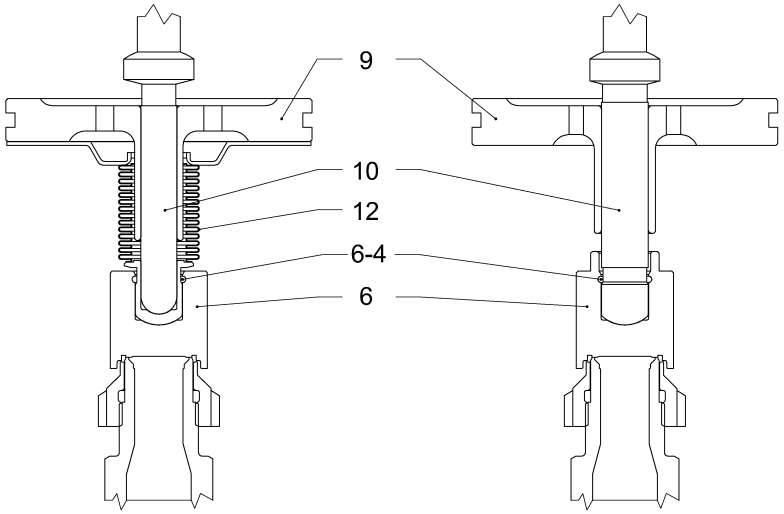


Fig. 12

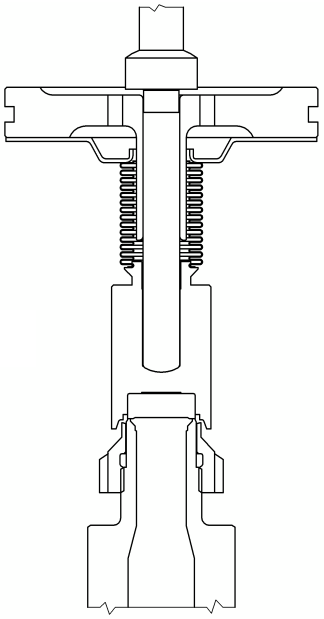


Fig. 13

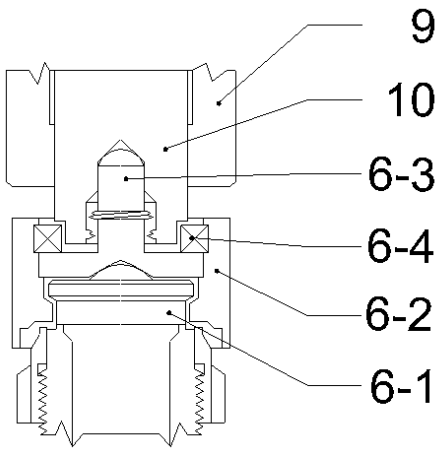


Fig. 14

3.0.0 ISTRUZIONI PER LA MANUTENZIONE

3.1.0 Lubrificazione

Tutte le filettature e la superficie di accoppiamento vite di taratura-guidamolla superiore devono essere protette con composto antigrippante lubrificante Never Seez Nickel grade della Bostick Emhart o prodotto equivalente; le superfici dello stelo inferiore a contatto con la guida devono essere protette con lubrificante a film secco (es.: Dow Corning Molykote 321R).

Prima di procedere all'applicazione dei lubrificanti, tutte le superfici dovranno essere pulite e sgrassate.

Ovviamente il lubrificante non va applicato quando esso sia incompatibile con il fluido di processo o quando esso possa contaminare fluidi purissimi che vengano recuperati anziché sfiatati all'atmosfera.

3.2.0 Ripristino delle sedi del boccaglio e dell'otturatore

3.2.1 Qualora le sedi dell'otturatore e del boccaglio risultassero intaccate o segnate, è bene rilavorare i piani di tenuta, asportando meno materiale possibile. Rispettare la larghezza dei piani di tenuta originali e l'ortogonalità con le filettature e i piani di appoggio.

3.2.2 L'operazione di smerigliatura manuale dovrebbe essere eseguita sotto controllo di una persona specializzata.

A pag. 30 è illustrato l'uso degli appositi anelli e piastre in ghisa o acciai speciali per la smerigliatura dell'otturatore e del boccaglio.

Gli abrasivi consigliati sono quelli a base di carburo di silicio o carborundum e olio.

3.2.3 Le figure 15 e 16 rappresentano piastre di lappatura di grosso spessore in ghisa dura o acciaio indeformabile con una superficie scanalata (per trattenere la pasta abrasiva) e rettificata. Detta piastra serve per smerigliare la sede dei boccagli.

3.0.0 INSTRUCTIONS FOR MAINTENANCE

3.1.0 Lubrication

All threadings and the contact surface between the spring adjusting screw and the upper button must be protected with an anti-seizing lubricating compound, type Bostick Emhart's "Never Seez Nickel Grade" or equivalent. The lower spindle surface in contact with the guide must be coated with a dry film lubricant (e.g. Dow Corning's "Molykote 321R").

Before applying the lubricant, degrease and thoroughly clean all surfaces.

Lubricating compound should not, of course, be used when it is incompatible with the process fluid or when it might contaminate extremely pure fluids which are recovered instead of being discharged to the atmosphere

3.2.0 Repair of nozzle and disc seats

3.2.1 If the seating surfaces of the disc and nozzle are dented or marked, it is advisable to remachine the seating surfaces, taking away as little material as possible. Keep to the width of the original seating surfaces and the squareness between the threading and seating surfaces.

3.2.2 Manual grinding should be done under the supervision of a qualified person.

Correct use of the proper cast iron or special steel rings and plates for grinding the disc and seat is illustrated on page 30. Abrasives with a silicon carbide or carborundum and oil base are recommended.

3.2.3 Figures 15 and 16 show a lapping plate in cast iron or indeformable steel with a surface grooved to hold the lapping compound and ground. The above plate is used to grind the nozzle seat.

Una buona smerigliatura si ottiene girando 4-5 volte il pezzo nel senso indicato in fig. 16; quindi alzarlo e girarlo di 30° continuando fino ad ottenere la finitura superficiale desiderata.
E' consigliabile servirsi di due piastre; la prima per una smerigliatura grossolana con abrasivo di grana 400 circa, la seconda per una smerigliatura finale servendosi di una pasta abrasiva di grana 800 circa.
La figura 15 indica come impiegare il blocchetto lappatore per ripristinare la planarità della piastra dopo che questa è stata usata più volte per la lappatura dei boccagli. E' consigliabile rettificare periodicamente la superficie della piastra su macchina utensile.

A good grinding is obtained by rotating the piece 4 or 5 times as indicated in fig. 16; then lifting it and turning it 30° and then continuing to grind until the desired surface finish is obtained.
It is advisable to use 2 plates; the first for a coarse grinding (about grade 400 lapping compound), the second for a final grinding (about grade 800 lapping compound).
Fig. 15 shows how to use a small lapping block for the manual reconditioning of the plate after it has been used a few times for the lapping of the nozzles. It is advisable to machine grind the surface of the plate periodically.

3.2.4 La figura 17 rappresenta un anello lappatore per otturatori in ghisa dura o acciaio indeformabile con una superficie scanalata e rettificata.
Una buona smerigliatura si ottiene girando 5-6 volte di 30° l'anello lappatore; quindi alzarlo e girarlo di 30° continuando fino ad ottenere la finitura superficiale desiderata.
Prima di procedere alla smerigliatura della sede dell'otturatore si consiglia di ripassare il piano rettificato dell'anello lappatore sulla piastra come indicato in fig. 16.

3.2.4 Figure 17. shows a lapping ring for the disc, in cast iron or indeformable steel, with a grooved and ground surface.
A good grinding is obtained by rotating the lapping ring 5 to 6 times by 30° each time; then lifting and rotating 30° and then continuing to grind until the desired surface finish is obtained.
Before proceeding to grind the disc it is advisable to recondition the surface of the lapping ring over the plate, as shown in fig. 16.

Fig. 15

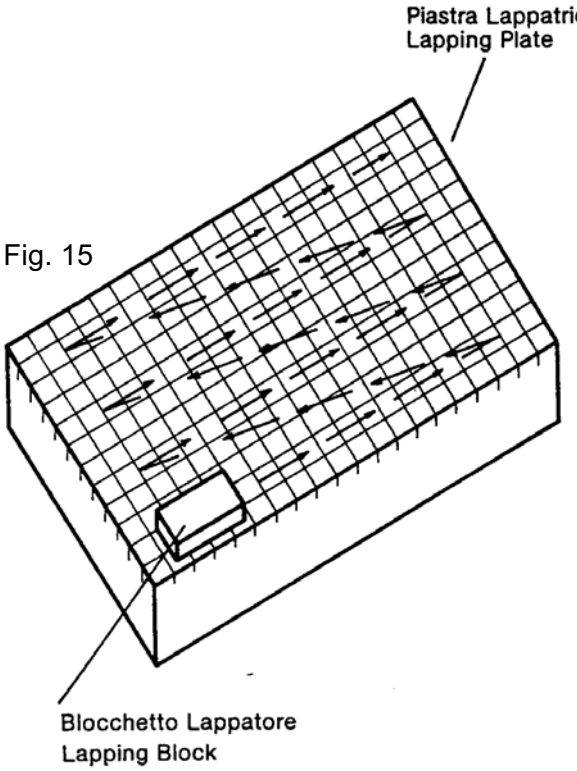
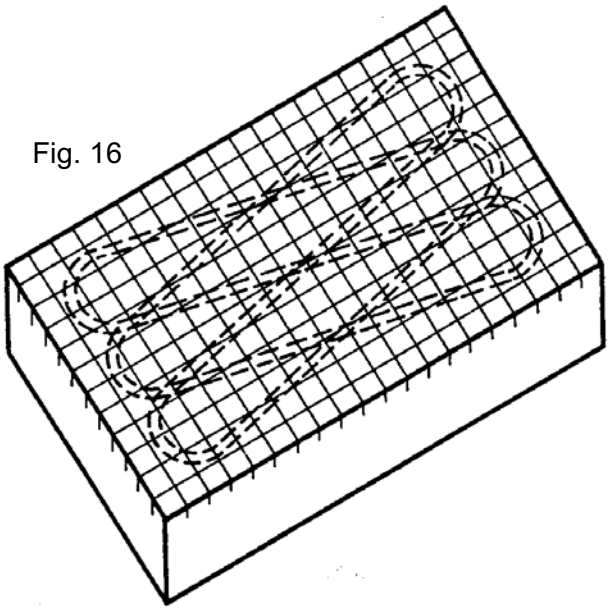


Fig. 16



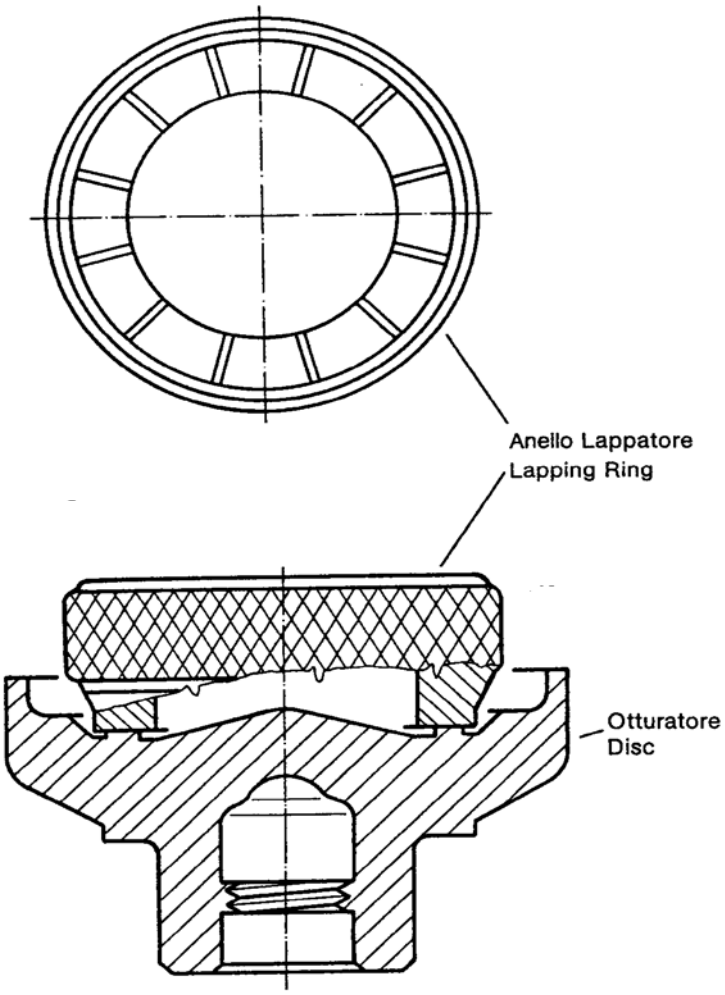


Fig. 17

3.3.0 Superfinitura

E' un'operazione supplementare che può essere eseguita dopo la lappatura per rendere ancora più lisci i piani di tenuta, fino a conferire loro l'aspetto speculare. La superfinitura migliora la tenuta. Si esegue con diamante in sospensione liquida. Su un anello lappatore liscio si fissa uno speciale panno

lucidatore adesivo (Pellon) tagliato secondo la forma dell'anello. Con l'uso di un pennello si bagna il panno con il liquido e quindi si opera come per la lappatura, insistendo solo per pochi secondi.

3.3.0 Super finish

This supplementary operation, which can be carried out after lapping, will polish the seat surfaces to a mirror-like appearance, thus improving the seating tightness. Diamond bort in liquid suspension is used in this operation, which is carried out as follows: use a special adhesive polishing pad (Pellon); cut it to size; fix it to a smooth lapping ring; using a brush, wet the pad with the liquid and proceed as for lapping, continuing no longer than a few seconds.

3.4.0 Istruzioni aggiuntive per valvole con otturatore in due pezzi D_2 per vapore

3.4.0 Added instructions for valves with two piece discs type D_2 for steam service

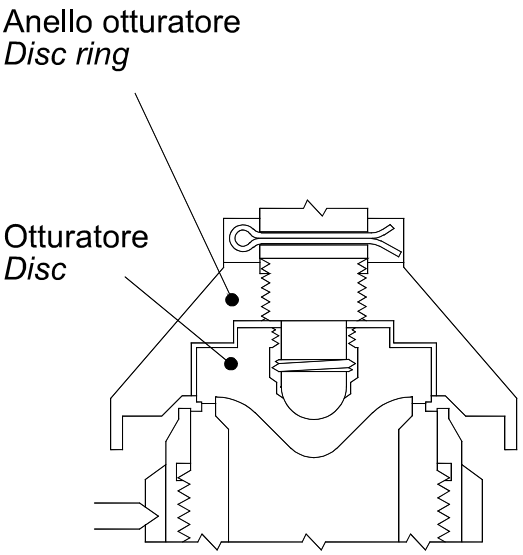


Fig. 18

Prima di assemblare la valvola controllare lo stato dell'accoppiamento tra punta dello stelo e otturatore.

In particolare, se si sostituisce l'otturatore, occorre lappare in accoppiamento le due parti per ottenere l'adattamento reciproco delle superfici W di appoggio.

Usare abrasivo a grana 800 circa e agire con l'otturatore, come se si trattasse di un anello lappatore. Lappare fino a che il contatto non si estende su una fascia sufficientemente larga Wmin, come indicato in fig. 19.

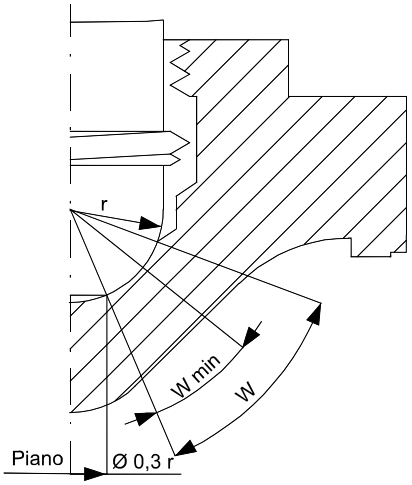
Se l'otturatore tocca lo stelo solo in corrispondenza del centro della superficie semi-sferica non insistere nel lappare, ma ricreare prima un piano, all'estremità dello stelo, di diametro pari circa il 30% del raggio della sfera (fig. 19).

Before assembling, check the condition of the contact surfaces between the tip of the spindle and disc. In particular, if the disc is replaced, the two parts must both be ground together to obtain perfectly matching contact surfaces W. Use 800 approximately grain lapping compound and work with the disc as though it were a lapping ring. Lap until contact has extended over a sufficiently wide surface Wmin, as indicated in fig. 19.

If the disc touches the spindle only in correspondence to the centre of the semi-spherical tip, do not persist in lapping, but first create a plane surface at the end of the spindle, the diameter of which should be about 30% of the radius of the sphere (fig. 19).

Per regolare il gioco “a” tra otturatore e anello otturatore portare quest’ultimo contro l’otturatore fino ad annullare la luce tra i due pezzi; quindi, prendendo per riferimento il foro dello stelo per la copiglia di fissaggio, ruotare in senso antiorario l’anello otturatore di un numero di fresature pari a quello riportato, per ogni orifizio, nella tabella di fig. 20.
Avvitare l’anello di regolazione del blowdown completamente, o quasi, sul boccaglio per essere certi che lo stesso non vada poi a toccare l’anello otturatore, impedendo il contatto tra otturatore e boccaglio. Quando la valvola è rimontata, sistemare l’anello di regolazione nella posizione originale.

To adjust the clearance ”a” between disc and disc ring, move the latter against the disc until the gap between the two pieces disappears; then, using as a reference point the spindle hole for the cotter pin, rotate in an anticlockwise direction the disc ring back by the number of grooves equal to that indicated for each orifice in the table in fig. 20.
Screw the blowdown adjustment ring completely or almost completely down on the nozzle to ensure that same does not touch the disc ring preventing contact between disc and nozzle seating surfaces.
When the valve is re-assembled, adjust the disc ring to the original position.



$$W\,min = \frac{2}{3}W$$

Fig. 19

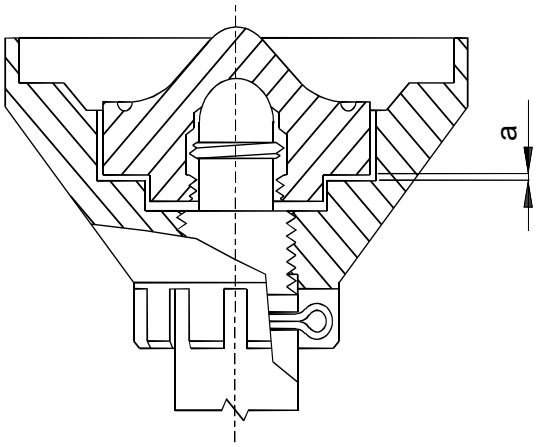


Fig. 20

Orifizio *Orifice*	No. fresature *No. of grooves*
G	4
H	4
J	4
K	4 ÷ 5
K_2	4 ÷ 5
L	5
M	5
N (51 bar)	5
N (147 bar)	7
P	8
P_3	7
Q	8

4.0.0 ISTRUZIONI PARTICOLARI PER VALVOLE DESTINATE AL SERVIZIO CON OSSIGENO O CON FLUIDO A TEMPERATURE DI ESERCIZIO CRIOGENICHE (INFERIORI A -46°C)

Queste valvole sono assemblate in fabbrica, secondo particolari procedure atte a garantire:
-un elevato grado di pulizia
-l'uso di lubrificanti compatibili con le condizioni di esercizio
-l'assenza di umidità/condense e olio entro la valvola e, in particolare, tra le sedi di tenuta.

Si raccomanda il rispetto delle seguenti regole:

Pulizia
Pulire accuratamente, con solvente non infiammabile ad alta volatilità, le superfici di tutti le parti che sono a contatto con il fluido, a valvola aperta.
Asciugare tutte le parti. L'eventuale soffiatura deve utilizzare aria compressa secca e priva di tracce d'olio. In alternativa,usare azoto.

Lubrificazione
Per le valvole per servizio con ossigeno, non applicare alcun lubrificante su stelo guida e otturatore. Applicare sono un grasso compatibile con l'ossigeno, come il Fomblin Vac3, sulla superficie del gradino di battuta e tenuta del boccaglio con il corpo.
Per le valvole per servizio criogenico, le parti filettate possono essere protette con composto anti-grippante in pasta, tipo Never Seez Ns 165; le superfici di scorrimento e snodo dello stelo devono essere spruzzate con una quantità minima di lubrificante a film secco, compatibile con la temperatura operativa. Si consiglia l'impiego di PTFE spray, come il Chesterton 82808.

4.0.0 SPECIAL INSTRUCTIONS FOR VALVES FOR SERVICE WITH OXYGEN OR AT CRYOGENIC TEMPERATURE (BELOW -46°C)

These valves are assembled, at the factory, according to dedicated procedures to guarantee:
-a high degree of cleanness
-the application of lubricants suitable for the operating conditions.
-that no moisture and lubricant traces are closed inside the valve, specially, between nozzle and disc seats

We recommend operating according to the following instructions:

Cleanness
Accurately clean, with a high volatility non-flammable solvent, the surfaces of all parts in contact with the fluid, at valve open.
Dry all parts. Blow them, if necessary, with dry and clean compressed air or nitrogen from bottles.

Lubrication
No lubricant has to be applied to spindle, guide and disc of valves for oxygen service. Only the surface of the byte of the nozzle, byte that seals against the body, can be greased with an oxygen suitable lubricant, as "Fomblin Vac3".
The threads of valve for cryogenic service can be protected with anti-seizing lubricating compound, type Never seez Ns 165; the sliding and bearing surfaces of the spindle must be coated with a thin film of dry lubricant, compatible with the operating temperature. We suggest the use of PTFE dry film lubricant, as Chesterton 82808.

Taratura

È necessario che anche il circuito di prova abbia lo stesso grado di pulizia delle valvole da tarare. Per la taratura, si consiglia l'uso di azoto, da bombola, in luogo dell'aria compressa, se questa non è adeguatamente essiccata e priva di tracce d'olio.

Le valvole sono tarate in fabbrica con azoto, con la sola eccezione delle valvole per servizio con liquidi marcate UV, poiché, in conformità alle regole di ASME VIII, in questo caso, la pressione di taratura deve essere stabilita con acqua (o altro liquido).

Il fluido di prova è indicato sul certificato d'identità e collaudo.

In questi casi, una volta ultimate le prove, è assolutamente necessario asciugare internamente la valvola, farla aprire più volte e flussandola con aria secca o azoto, al fine di eliminare ogni traccia di acqua dalle sedi.

Set pressure adjustment

The test ring must be as clean as the valve to set is. We suggest the use of nitrogen as test medium, instead of compressed air, unless it isn't thoroughly dried and cleaned.

Valves are set with nitrogen, in our factory, exception of valves for liquid service UV stamp comply with ASME VIII rules, the set pressure adjusted with water (or other liquid).

The test medium is indicated in the "Identity and Test Certificate".

In these cases, it is mandatory to internally dry the valve after testing and opening and flowing it with air or nitrogen to remove any trace of water from the seats.

Montaggio e prova di tenuta alla contropressione di valvole per servizio ossigeno

Per assicurare la tenuta sulle filettature coniche dei tappi di corpo e coperchio, applicare nastro di PTFE, lasciando scoperti i primi 2 filetti, per prevenire la lacerazione del nastro.

Per controllare la tenuta verso ambiente delle giunzioni indicate delle frecce in figura 2, utilizzare il fluido indicatore Snoop della Nupro Company.

Assembly and backpressure tightness test of valves for oxygen service.

Apply PTFE tape on the NPT threads of the plugs of body and bonnet (if any), leaving the first two threads uncovered, to prevent tape tearing.

Use the leakage detector Snoop by Nupro Company, to check the tightness of seals indicated by an arrow in figure 2.

Conservazione

Una volta tarata la molla e controllate le tenute, tappare l'ingresso e l'uscita della valvola per evitare l'ingresso di sporcizia.

Nel caso di valvole per servizio ossigeno, può essere opportuno inserire la valvola in un sacco di polietilene e sigillarlo con nastro adesivo.

Conservation

Once the spring has been adjusted and the tightness of seat and seals checked, close the valve inlet and outlet with plastic plugs, to prevent the inlet of dirty.

Enclosing the valve in a polyethylene bag and seal the bag with adhesive tape is a preferred procedure for valves for oxygen service.

Installazione delle valvole per servizio criogenico

La valvola non dovrebbe essere coibentata, al fine di mantenere la temperatura della molla vicino a quella dell'ambiente e, quindi, di minimizzare l'influenza della temperatura del fluido sulla pressione di taratura.

Si consiglia di non coibentare neppure la parte terminale del tronchetto su cui è istallata la valvola, per una lunghezza di almeno 2,5 diametri.

Per le valvole con soffietto, devono essere presi gli accorgimenti necessari a impedire che l'umidità atmosferica possa condensare e ghiacciare entro il coperchio (il soffietto, in particolare), bloccando così lo stelo entro la guida.

Accorgimenti possibili sono:

- Convogliare lo sfiato del coperchio a un ambiente mantenuto a pressione quasi atmosferica e privo di umidità.
- Applicare al foro di sfiato del coperchio una valvola di non ritorno in modo da consentire il flusso solo dal coperchio all'atmosfera. Questa valvola deve essere idonea all'impiego in bassa temperatura, avere minima pressione di apertura, grande sezione di passaggio e assicurare una tenuta pressoché perfetta.
- Applicare al foro di sfiato del coperchio un trasmettitore di pressione e controllare che il coperchio non venga pressurizzato.
- Applicare al foro di sfiato del coperchio un tappo in plastica che possa essere espulso dalla pressione, in caso di rottura del soffietto.

Gli ultimi due accorgimenti richiedono una costante sorveglianza delle condizioni della valvola.

Consigliamo di adottare una delle altre due soluzioni proposte, quando possibile.

TAI può fornire la valvola di non ritorno, su richiesta.

Installation of valves for cryogenic service.

The valve should be not insulated, in order to keep the spring temperature close to the ambient one and, therefore, to minimize the influence of the medium temperature on the valve set pressure

We suggest not insulating the ending part of the nozzle on which the valve is installed, for a length of 2.5 diameters.

In case of valves with bellows, suitable solutions need to be actuated in order to avoid condensation and freezing of atmospheric moisture inside the bonnet (especially inside the bellows), thus blocking the spindle in the guide.

Suitable solutions are:

- *To pipe the bonnet vent hole to an environment free of moisture, kept at atmospheric pressure, or close to it.*
- *To couple, to the bonnet vent hole, a check valve, which only allows the flow from the bonnet to atmosphere. The check valve shall be suitable for the low temperature service condition. Other characteristics shall be: minimum opening pressure, large flow area, perfect tightness against reverse flow.*
- *To couple, to the bonnet vent hole, a pressure transmitter for checking the pressure inside the bonnet.*
- *To couple, to the bonnet vent hole, a plastic plug that could be ejected by the pressure, in case of bellows failure.*

The last two solutions need a continuous monitoring of the valve condition.

We suggest the application of one of the other two proposed solutions, if possible.

TAI can supply the check valve, on request.

ACCESSORI PER LA LAPPATURA FORNITI DALLA TAI

TAI è in grado di fornire tutto il materiale necessario per la manutenzione delle proprie valvole; TAI può inoltre fornire attrezzature di prova utilizzabili con valvole di sicurezza flangiate, secondo norme ASME/ANSI, UNI, DIN ecc, di qualsiasi costruttore. In particolare:

- Banchi prova per taratura con aria o azoto
- Unità per la prova idrostatica di corpi valvola
- Dispositivi pneumatici per la verifica della pressione di taratura di valvole di sicurezza in esercizio con vapore d'acqua e gas non tossici o pericolosi.

LAPPING ACCESSORIES SUPPLIED BY TAI

TAI can furnish all equipment and expendable materials necessary for service its valves; TAI can also supply test equipments suitable for flanged safety valves, according to ASME/ANSI, UNI, DIN codes, whatsoever the manufacturer, among which:

- Safety valve test benches for setting set pressure with air or nitrogen
- Units for the hydrostatic testing of valve bodies
- Pneumatic setting devices to allow the checking of set pressure of safety valves in operation with steam or non-tossic or dangerous gases.

Cassetta contenente piastra lappatrice e cassetta contenente anelli lappatori

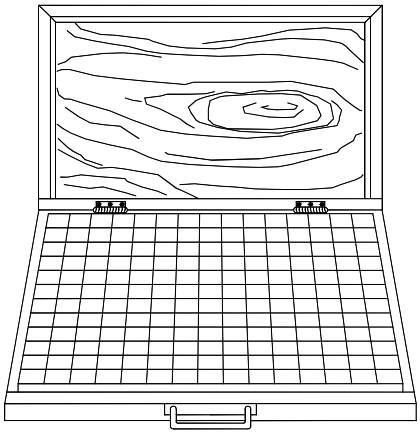


Fig. 21

Box containing lapping plate and box containing lapping rings

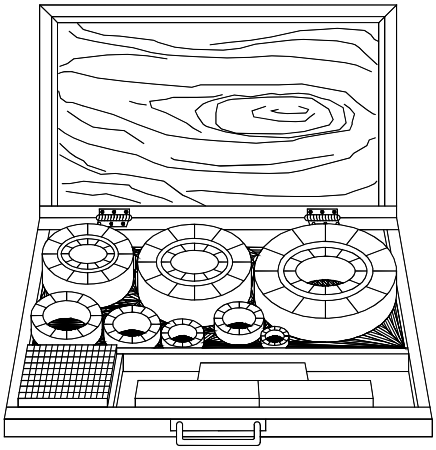


Fig.22

BANCO PROVA VALVOLE DI SICUREZZA

SAFETY VALVE TEST BENCH SUPPLIED TAI

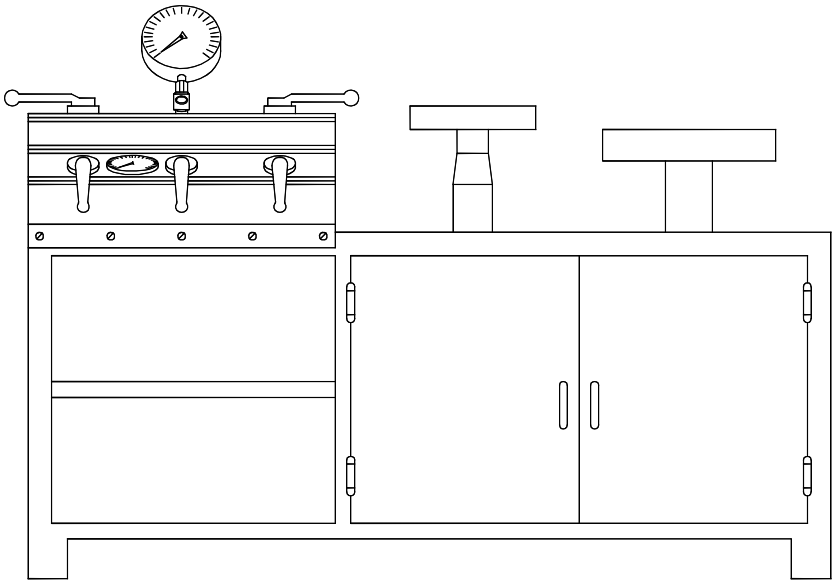


Fig. 23

APPENDICE A
COPPIE DI SERRAGGIO DELLA BULLONERIA

Per il serraggio della bulloneria di corpo/coperchio delle valvole a molla Serie 3000, 3000A, 3000B e 3000W si richiede l'uso di chiave dinamometrica e l'applicazione dei valori di coppia sotto indicati, in funzione del diametro di filettatura e del materiale delle guarnizioni. La filettatura del prigioniero e il piano di appoggio del dado sulla flangia dovrebbero essere lubrificati con Never Seez NS 165.
Qualora non sia consentita l'applicazione di alcun lubrificante, e quindi si avviti a "secco", raddoppiare i valori di coppia dati in tabella, per ottenete circa lo stesso carico assiale nel prigioniero.
Serrare i dadi a croce; cominciare dal punto dove maggiore appare la distanza tra flangia e corpo. Precaricare la bulloneria procedendo passo a passo; applicare inizialmente una coppia non superiore al 30% del valore finale (di tabella).

ANNEX A
BOLT PRELOADING BY TORQUE

Series 3000 - 3000A - 3000B - 3000W valves body-bonnet bolts have to be preloaded by applying to the nuts the torque values given in the following table, using a torque wrench.
Stud threads and nut bearing surfaces (the ones facing the flange) should be lubricated with Never Seez NS 165.
If no lubrication is allowed, torque values, twice the ones given in the table, have to applied to the nuts to obtain approx. the same axial stud preloads.
Tighten bolts in a diagonal sequence starting with the bolt where there is the largest gap between flange and body. The bolt preload shall be applied in suitable steps; in the first one, apply a torque not greater than 30% of the final value (value given in table).

	Guarnizione. in PTFE *PTFE gaskets*		Guarnizione. in grafite *Graphite gaskets*	
Filettatura *Stud bold size*	Coppia *Applied torque*		Coppia *Applied torque*	
	[N m]	[kgf m]	[N m]	[kgf m]
M 12	22 ±10%	2.2 ±10%	27 ±10%	2.7 ±10%
M 16	55 ±10%	5.5 ±10%	69 ±10%	6.9 ±10%
M 20	110 ±10%	11 ±10%	138 ±10%	13.8 ±10%
M 24	188 ±10%	18.8 ±10%	235 ±10%	23.5 ±10%

