Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000

MANUFACTURERS RECORD BOOK (FINAL DOSSIER)

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

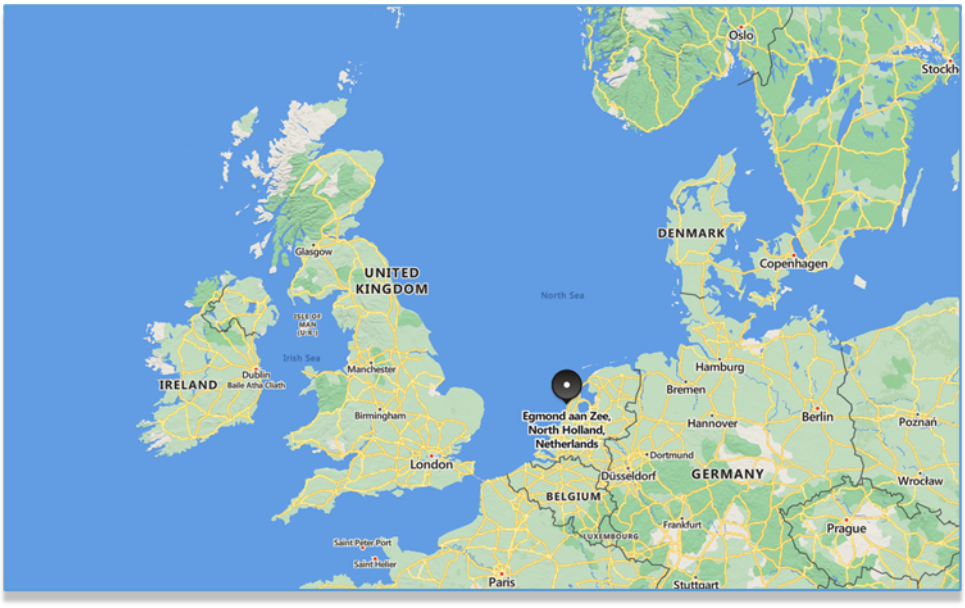


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

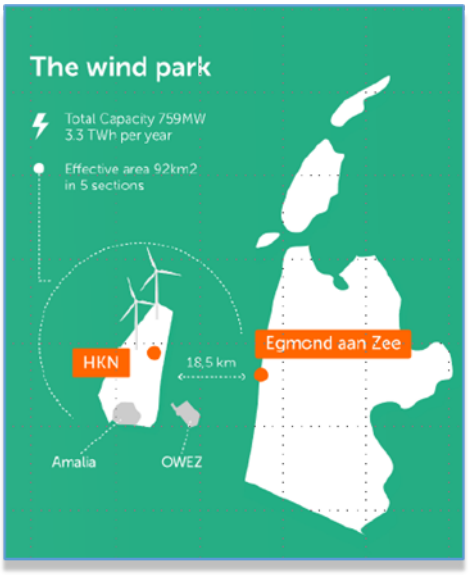


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

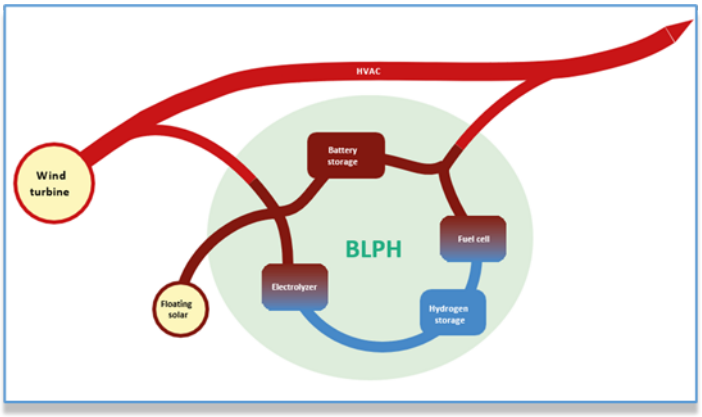


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting

wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000428-MD-LIS-00001	SMIR - SUPPLIER MASTER INFORMATION REGISTER

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

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3.1 DESIGN DOSSIER

3.1.1 Lists

- 1724000428-MD-LIS-00001: SMIR - SUPPLIER MASTER INFORMATION REGISTER
- 1724000428-EL-LIS-00015: ELECTRICAL LOAD LIST
- 1724000428-IN-LIS-00016: I/O LIST
- 1724000428-IN-LIS-00017: INSTRUMENT LIST WITH SET POINTS/CONTROL/ALARM/SHUTDOWN
- 1724000428-EL-LIS-00018: CABLES LIST
- 1724000428-MAC-LIS-00027: ATEX REGISTER
- 1724000428-MAC-LIS-00028: ATEX DOCUMENTATION

3.1.2 Diagrams

- 1724000428-PR-PID-00019: PACKAGE P&ID

3.1.3 Drawings

- 1724000428-MAC-DA-00005: CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
- 1724000428-MAC-DD-00006: EQUIPMENT SECTIONAL DRAWING WITH BILL OF MATERIAL
- 1724000428-MAC-DD-00008: PACKAGE PIPING SCHEMATICS AND BILL OF MATERIALS
- 1724000428-MAC-DG-00009: PACKAGE WIRING DIAGRAM INCLUDING LAYOUT OF PACKAGE CONTROL PANEL
- 1724000428-MAC-CE-00004: PACKAGE CAUSE EFFECT MATRIX /LOGIC DIAGRAMS

3.1.4 Calculation notes

- 1724000428-ST-RE-00010: PACKAGE STRUCTURAL CALCULATION REPORT INCLUDING FIXING POINTS and LIFTING POINTS
- 1724000428-MAC-CA-00032: AIR RECEIVER CALCULATION

3.1.5 Data sheets

- 1724000428-MAC-DS-00011: EQUIPMENT DATA SHEETS INCLUDING MOTORS, AIR COMPRESSOR, DRYERS, ETC.
- 1724000428-MAC-DS-00012: PACKAGE EQUIPMENT NOISE DATA SHEETS INCLUDING AIR COMPRESSOR, DRYERS, ETC.
- 1724000428-MAC-DS-00013: INSTRUMENT DATA SHEETS
- 1724000428-MAC-DS-00014: AIR COMPRESSOR PERFORMANCE CHART

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3.2 CERTIFICATION DOSSIER

3.2.1 Manufacturing procedures

- 1724000428-QC-ITP-00002: INSPECTION TEST PLAN (ITP)
- 1724000428-WEL-LIS-00021: WELDING BOOK (WPS, PQR, WELDERS QUALIFICATIONS, WELDING MAPS, ETC.)
- 1724000428-NDT-PRO-00020: NDT PROCEDURES INCLUDING PERSONNEL QUALIFICATIONS
- 1724000428-MAT-PRO-00022: PAINTING PROCEDURE
- 1724000428-QC-PRO-00023: HYDROSTATIC AND OR PNEUMATIC TEST PROCEDURE
- 1724000428-QC-PRO-00024: FAT (FACTORY ACCEPTANCE TEST) PROCEDURE
- 1724000428-QC-PRO-00031: HANDLING, PRESERVATION AND PACKAGING PROCEDURE

3.2.2 Manufacturing records

- NDT RECORDS & PERSONNEL QUALIFICATONS
- PAINTING RECORDS
- HYDROSTATIC TEST RECORDS
- MATERIALS TEST CERTIFICATES (EN 10204 3.1)
    - BASEFRAME (MAIN BEAMS)
    - PIPING
    - PRESSURE VESSELS
    - VALVES
    - INSTRUMENTATION
- FAT REPORT

3.2.3 Package certification

- PED CERTIFICATION
- EC DECLARATION OF CONFORMITY
- PERFORMANCE TEST REPORT

3.3 FIELD OPERATIONS & MAINTENANCE

3.3.1 General documents

- 1724000428-MAC-SP-00003: SYSTEM/PACKAGE FUNCTIONAL DESCRIPTION
- 1724000428-COM-LIS-00029: SPARE PARTS LIST (2 YEARS AND COMMISSIONING & START-UP)
- 1724000428-MAC-MAN-00030: INSTALLATION, OPERATING AND MAINTENANCE MANUAL (INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE

SUPPLIER MASTER INFORMATION REGISTER

Document Number: 1724000428-MD-LIS-00001

Document Class: 3

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							CONTROL DOCUMENTS								
1	1724000428-MD-LIS-00001	00	1724000428-MD-LIS-00001	00	CED52806	00	SMIR - SUPPLIER MASTER INFORMATION REGISTER	Eng-Mechanical			20/03/2024				A
							QUALITY DOCUMENTS								
2	1724000428-QC-ITP-00002	00	1724000428-QC-ITP-00002	00	CPC52807	00	INSPECTION TEST PLAN (ITP)	QUA			22/03/2024				A
							ENGINEERING DOCUMENTS								
3	1724000428-MAC-SP-00003	00	1724000428-MAC-SP-00003	00	CVV52808	00	SYSTEM/PACKAGE FUNCTIONAL DESCRIPTION	Eng-Mechanical			30/04/2024				I
4	1724000428-MAC-CE-00004	00	1724000428-MAC-CE-00004	00	CVV52809	00	PACKAGE CAUSE EFFECT MATRIX /LOGIC DIAGRAMS	Eng-Mechanical			19/04/2024				I
5	1724000428-MAC-DA-00005	00	1724000428-MAC-DA-00005	00	CGA52810	00	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)	Eng-Mechanical			22/03/2024		X	X	A
6	1724000428-MAC-DD-00006	00	1724000428-MAC-DD-00006	00	CCO52811	00	EQUIPMENT SECTIONAL DRAWING WITH BILL OF MATERIAL	Eng-Mechanical			10/05/2024				I
7	1724000428-MAC-DD-00007	00	1724000428-MAC-DD-00007	00	C3D52812	00	PACKAGE 3D MODEL DRAWING AND ELECTRONIC FILE	Eng-Mechanical			12/04/2024				A
8	1724000428-MAC-DD-00008	00	1724000428-MAC-DD-00008	00	CCO52813	00	PACKAGE PIPING SCHEMATICS AND BILL OF MATERIALS	Eng-Mechanical			10/05/2024		X		A
9	1724000428-MAC-DG-00009	00	1724000428-MAC-DG-00009	00	CEL52814	00	PACKAGE WIRING DIAGRAM INCLUDING LAYOUT OF PACKAGE CONTROL PANEL	Eng-Mechanical			05/04/2024		X	X	A
10	1724000428-ST-RE-00010	00	1724000428-ST-RE-00010	00	CVV52815	00	PACKAGE STRUCTURAL CALCULATION REPORT INCLUDING FIXING POINTS and LIFTING POINTS	Structural			12/04/2024				I
11	1724000428-MAC-DS-00011	00	1724000428-MAC-DS-00011	00	CDS52816	00	EQUIPMENT DATA SHEETS INCLUDING MOTORS, AIR COMPRESSOR, DRYERS, ETC.	Eng-Mechanical			29/03/2024		X		A
12	1724000428-MAC-DS-00012	00	1724000428-MAC-DS-00012	00	CVV52817	00	PACKAGE EQUIPMENT NOISE DATA SHEETS INCLUDING AIR COMPRESSOR, DRYERS, ETC.	Eng-Mechanical			10/05/2024		X		A
13	1724000428-MAC-DS-00013	00	1724000428-MAC-DS-00013	00	CDS52818	00	INSTRUMENT DATA SHEETS	Eng-Mechanical			12/04/2024				I
14	1724000428-MAC-DS-00014	00	1724000428-MAC-DS-00014	00	CVV52819	00	AIR COMPRESSOR PERFORMANCE CHART	Eng-Mechanical			12/04/2024		X		I
15	1724000428-EL-LIS-00015	00	1724000428-EL-LIS-00015	00	CVV52820	00	ELECTRICAL LOAD LIST	Eng-Mechanical			05/04/2024		X	X	A
16	1724000428-IN-LIS-00016	00	1724000428-IN-LIS-00016	00	CVV52821	00	I/O LIST	Eng-Mechanical			05/04/2024		X		A
17	1724000428-IN-LIS-00017	00	1724000428-IN-LIS-00017	00	CLS52822	00	INSTRUMENT LIST WITH SET POINTS/CONTROL/ALARM/SHUTDOWN	Eng-Mechanical			12/04/2024		X		A
18	1724000428-EL-LIS-00018	00	1724000428-EL-LIS-00018	00	CVV52823	00	CABLES LIST	Eng-Mechanical			05/04/2024				I
19	1724000428-PR-PID-00019	00	1724000428-PR-PID-00019	00	CPN52824	00	PACKAGE P&ID	Eng-Mechanical			22/03/2024		X	X	A
20	1724000428-NDT-PRO-00020	00	1724000428-NDT-PRO-00020	00	CVV52825	00	NDT PROCEDURES INCLUDING PERSONNEL QUALIFICATIONS	QUA			12/04/2024				A
21	1724000428-WEL-LIS-00021	00	1724000428-WEL-LIS-00021	00	CWS52826	00	WELDING BOOK (WPS, PQR, WELDERS QUALIFICATIONS, WELDING MAPS, ETC.)	QUA			17/05/2024				A
22	1724000428-MAT-PRO-00022	00	1724000428-MAT-PRO-00022	00	CSV52827	00	PAINTING PROCEDURE	Eng-Mechanical			31/05/2024		X		A
23	1724000428-QC-PRO-00023	00	1724000428-QC-PRO-00023	00	CTP52828	00	HYDROSTATIC AND OR PNEUMATIC TEST PROCEDURE	Eng-Mechanical			12/04/2024				A
24	1724000428-QC-PRO-00024	00	1724000428-QC-PRO-00024	00	CTP52829	00	FAT (FACTORY ACCEPTANCE TEST) PROCEDURE	Eng-Mechanical			12/04/2024				A
							CERTIFICATES								
25	1724000428-QC-DB-00025	00	1724000428-QC-DB-00025	00	CVV52830	00	MANUFACTURERS RECORD BOOK (FINAL DOSSIER)	CERT			18/10/2024				A
26	1724000428-QC-LIS-00026	00	1724000428-QC-LIS-00026	00	CVV52831	00	MANUFACTURERS RECORD BOOK (FINAL DOSSIER) - INDEX	QUA			31/05/2024				A
27	1724000428-MAC-LIS-00027	00	1724000428-MAC-LIS-00027	00	CVV52832	00	ATEX REGISTER	QUA			12/04/2024				A
28	1724000428-MAC-LIS-00028	00	1724000428-MAC-LIS-00028	00	CVV52833	00	ATEX DOCUMENTATION	QUA			19/07/2024				A
							SPARES & MAINTENANCE DATA								
29	1724000428-COM-LIS-00029	00	1724000428-COM-LIS-00029	00	CSP52834	00	SPARE PARTS LIST (2 YEARS AND COMMISSIONING & START-UP)	Eng-Mechanical			31/05/2024				A
30	1724000428-MAC-MAN-00030	00	1724000428-MAC-MAN-00030	00	CMI52835	00	INSTALLATION, OPERATING AND MAINTENANCE MANUAL (INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)	Eng-Mechanical			05/09/2024				I
							HANDLING, SHIPPING & SITE INSTALLATION								
31	1724000428-QC-PRO-00031	00	1724000428-QC-PRO-00031	00	CVV52836	00	HANDLING, PRESERVATION AND PACKAGING PROCEDURE	LOG			05/09/2024				I

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

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1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

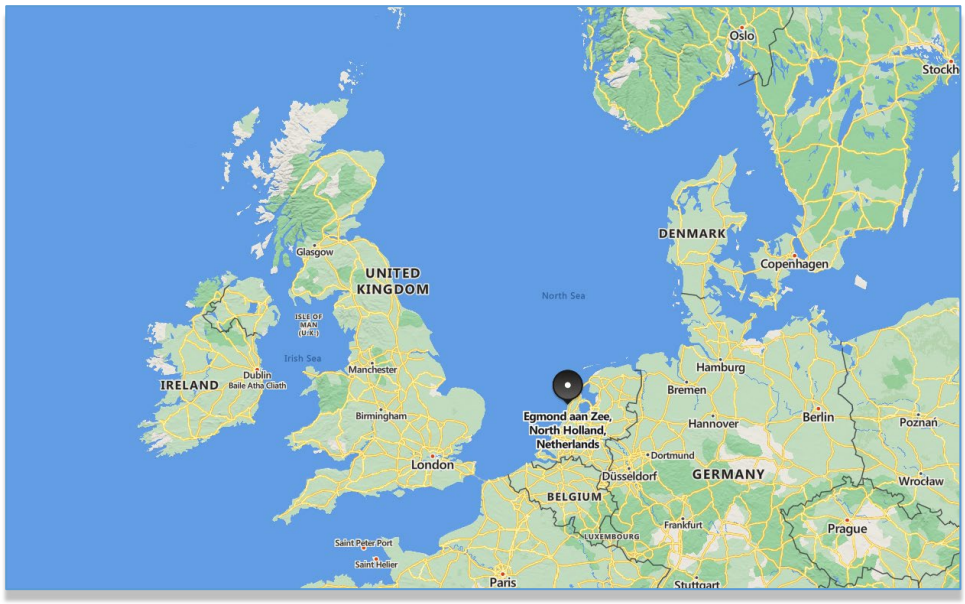


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

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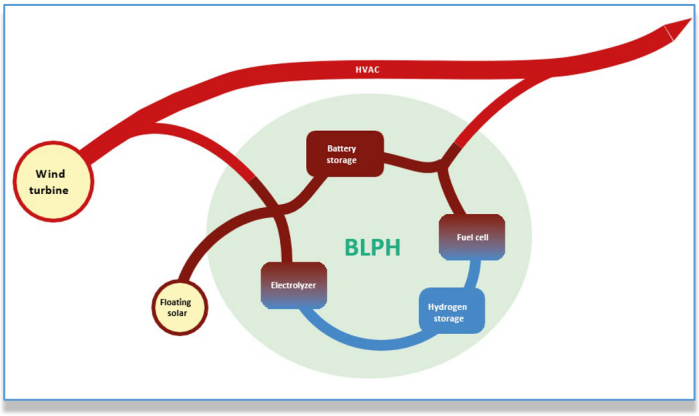


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DS-00011	EQUIPMENT DATA SHEETS INCLUDING MOTORS, AIR COMPRESSOR, DRYERS, ETC.

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

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3 ELECTRICAL LOAD LIST

Equipment	Power factor	Tag	Power supply	Adsorbed Power	Note
Air Compressor	0,72	K-63001A	400V-3Ph+PE 50Hz	67,4 kW	Nominal power 55 kW 100% load power 65,9 kW
					Cooling fan
Air Compressor	0,72	K-63001B	400V-3Ph+PE 50Hz	67,4 kW	Nominal power 55 kW 100% load power 65,9 kW
					Cooling fan
Utilities	1,0		230V-1Ph+N+PE 50Hz	0,5 kW	Not managed by PLC
PLC	1,0	63-LP-001	230V-1Ph+N+PE 50Hz (UPS)	1,0 kW	
Solenoid valve		63-XY-051	24VDC	15 W	power supply is managed directly by the UCP
Solenoid valve		63-XY-052	24VDC	15 W	power supply is managed directly by the UCP
Solenoid valve		63-XY-053	24VDC	15 W	power supply is managed directly by the UCP
Solenoid valve		63-XY-054	24VDC	15 W	power supply is managed directly by the UCP
Differential Pressure Transmitter		63-PDIT-051	24VDC	0.5 W	power supply is managed directly by the UCP
Temperature Transmitter		63-TIT-051	24VDC	0.5 W	power supply is managed directly by the UCP
Differential Pressure Transmitter		63-PDIT-062	24VDC	0.5 W	power supply is managed directly by the UCP
Dew-point Transmitter		63-AIT-051	24VDC	0.5 W	power supply is managed directly by the UCP
Flow Transmitter		63-FIT-051	24VDC	0.5 W	power supply is managed directly by the UCP
Pressure Transmitter		63-PIT-064	24VDC	0.5 W	power supply is managed directly by the UCP
Temperature Transmitter		63-TIT-052	24VDC	0.5 W	power supply is managed directly by the UCP

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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
Giuseppe Cavallo	05/06/2025

MENT AIR PACKAGE

I/O LIST

er: 1724000428-IN-LIS-00016

cument Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
04	12/05/2025	Accepted for Construction (AFC)	GT	MC	TM
03	24/01/2025	Issue for Review (IFR)	GT	MC	TM
02	03/07/2024	Issue for Review (IFR)	GT	MC	TM
01	01/07/2024	Issue for Review (IFR)	GT	MC	TM
00	30/04/2024	Issue for Review (IFR)	GT	MC	TM

COES

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ISSUER:

ISSUER DOCUMENT CODE :

DOCUMENT TITLE :

INPUT-OUTPUT LIST

PROJECT DESCRIPTION :

COES_DRYER

CLIENT :

CUSTOMER'S REFERENCES :

JOB
SYSTEM OR EQUIPMENT
CONTRACT
P. & ID.

Rev.	Date	Purpose of issue	Prepared by	Checked by	Approved by
0.2	05/05/2025	FOR APPROVAL	RM	RM	RM
0.2	11/09/2024	FOR APPROVAL	RM	RM	RM
0.1	01/07/2024	FOR APPROVAL	RM	RM	RM
0.0	21/04/2024	FOR APPROVAL	RM	RM	RM

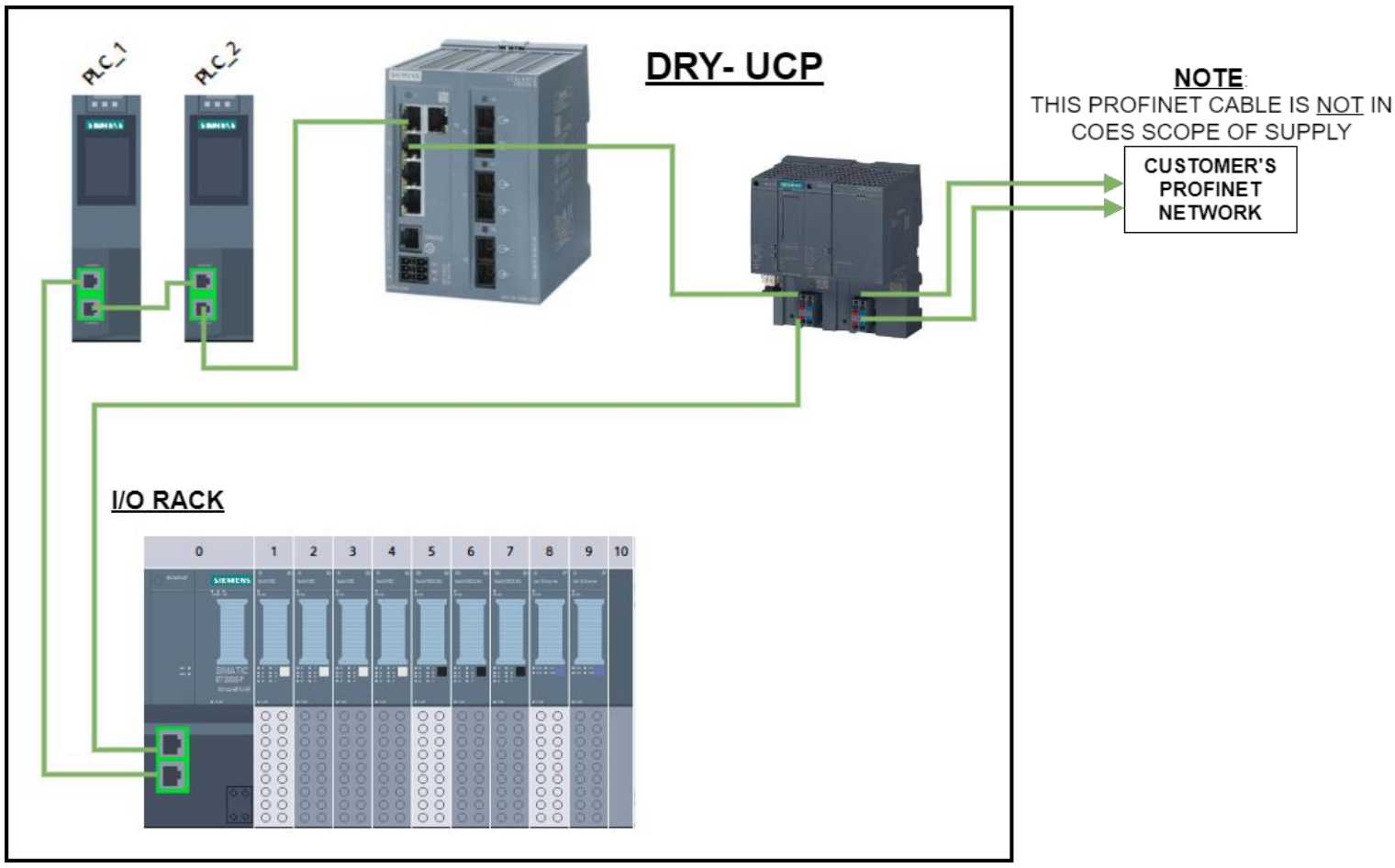
HARDWARE CONFIGURATION

N. SLOT	CODE	DESCRIPTION
IA A-63000 (DRYER LOCAL PANEL)		
CPU + ADDITIONAL COMPONENTS		
CPU_A	6ES7513-1RL00-0AB0 + 6ES7954-8LE03-0AA0	CPU 1513R-1PN SIMATIC S7-1500R, CPU 1513R-1PN, central processing unit with 300 KB work memory for program and 1.5 MB for data, 1st interface: PROFINET RT with 2-port switch +MEMORY CARD 12MB (6ES7954-8LE03-0AA0)
CPU_B	6ES7513-1RL00-0AB0 + 6ES7954-8LE03-0AA0	CPU 1513R-1PN SIMATIC S7-1500R, CPU 1513R-1PN, central processing unit with 300 KB work memory for program and 1.5 MB for data, 1st interface: PROFINET RT with 2-port switch +MEMORY CARD 12MB (6ES7954-8LE03-0AA0)
SWITCH	6GK5205-3BD00-2AB2	SCALANCE XB205-3 manageable Layer 2 IE Switch 5x porte RJ45 da 10/100 Mbit/s 3x porta MM FO SC 1x porta di console, LED di diagnostica, ridondante alimentazione di tensione; certificato IEC 62443-4-2
PN/PN Coupler	6ES7158-3AD10-0XA0	SIMATIC PN/PN Coupler for deterministic data exchange between max.4 PN-Controller per subnet, also from subnet to subnet, PROFIsafe data exchange, I/O-, MSI-, MSO- and data record communication, redundant power supply
RACK I/O		
SLOT 0	6ES7155-6AU01-0CN0 + 6ES7193-6AR00-0AA0	ET 200SP, IM155-6PN/2 HF SIMATIC ET 200SP, PROFINET, 2-port interface module IM 155-6PN/2 High Feature(6ES7155-6AU01-0CN0), 1 slot for BusAdapter, max. 64 I/O modules and 16 ET 200AL modules, S2 redundancy, multi-hotswap, 0.25 ms, isochronous mode, optional PN strain relief, including server module (6ES7193-6PA00-0AA0) + BusAdapter BA 2xRJ45 (6ES7193-6AR00-0AA0)
SLOT 1	6ES7131-6BF01-0AA0 + 6ES7193-6BP00-0DA0	ET 200SP, DI 8x 24V DC Basic, PU □ SIMATIC ET 200SP, Digital input module, DI 8x 24V DC Basic, type 2 (IEC 61131), sink input, (PNP, P-reading) (6ES7131-6BF01-0AA0) and BaseUnit BU15-P16+A0+2D, BU type A0, push-in terminals, without aux. terminals, new load group (6ES7193-6BP00-0DA0)
SLOT 2	6ES7131-6BF01-0AA0 +6ES7193-6BP00-0BA0	ET 200SP, DI 8x 24V DC Basic, PU □ SIMATIC ET 200SP, Digital input module, DI 8x 24V DC Basic, type 2 (IEC 61131), sink input, (PNP, P-reading) (6ES7131-6BF01-0AA0) BaseUnit BU15-P16+A0+2B, BU type A0, Push-in terminals, without AUX terminals, load group bridged to the left (6ES7193-6BP00-0BA0)
SLOT 3	6ES7131-6BF01-0AA0 +6ES7193-6BP00-0BA0	ET 200SP, DI 8x 24V DC Basic, PU □ SIMATIC ET 200SP, Digital input module, DI 8x 24V DC Basic, type 2 (IEC 61131), sink input, (PNP, P-reading) (6ES7131-6BF01-0AA0) BaseUnit BU15-P16+A0+2B, BU type A0, Push-in terminals, without AUX terminals, load group bridged to the left (6ES7193-6BP00-0BA0)
SLOT 4	6ES7131-6BF01-0AA0 +6ES7193-6BP00-0BA0	ET 200SP, DI 8x 24V DC Basic, PU □ SIMATIC ET 200SP, Digital input module, DI 8x 24V DC Basic, type 2 (IEC 61131), sink input, (PNP, P-reading) (6ES7131-6BF01-0AA0) BaseUnit BU15-P16+A0+2B, BU type A0, Push-in terminals, without AUX terminals, load group bridged to the left (6ES7193-6BP00-0BA0)
SLOT 5	6ES7132-6BF01-0AA0 + 6ES7193-6BP00-0DA0	ET 200SP, DQ 8x 24V DC/0,5A Basic, PU □ SIMATIC ET 200SP, Digital output module, DQ 8x 24V DC/0,5A Basic, Source output (PNP,P-switching) (6ES7132-6BF01-0AA0) and BaseUnit BU15-P16+A0+2D, BU type A0, push-in terminals, without aux. terminals, new load group (6ES7193-6BP00-0DA0)
SLOT 6	6ES7132-6BF01-0AA0 +6ES7193-6BP00-0BA0	ET 200SP, DQ 8x 24V DC/0,5A Basic, PU □ SIMATIC ET 200SP, Digital output module, DQ 8x 24V DC/0,5A Basic, Source output (PNP,P-switching) (6ES7132-6BF01-0AA0) BaseUnit BU15-P16+A0+2B, BU type A0, Push-in terminals, without AUX terminals, load group bridged to the left (6ES7193-6BP00-0BA0)
SLOT 7	6ES7132-6BF01-0AA0 +6ES7193-6BP00-0BA0	ET 200SP, DQ 8x 24V DC/0,5A Basic, PU □ SIMATIC ET 200SP, Digital output module, DQ 8x 24V DC/0,5A Basic, Source output (PNP,P-switching) (6ES7132-6BF01-0AA0) BaseUnit BU15-P16+A0+2B, BU type A0, Push-in terminals, without AUX terminals, load group bridged to the left (6ES7193-6BP00-0BA0)
SLOT 8	6ES7134-6GD01-0BA1 + 6ES7193-6BP00-0DA0	ET 200SP, AI 4XI 2-/4-Wire ST, PU 1 SIMATIC ET 200SP, ANALOG INPUT MODULE, AI 4XI 2-/4-WIRE STANDARD (6ES7134-6GD01-0BA1) and BaseUnit BU15-P16+A0+2D, BU type A0, push-in terminals, without aux. terminals, new load group (6ES7193-6BP00-0DA0)
SLOT 9	6ES7134-6GD01-0BA1 +6ES7193-6BP00-0BA0	ET 200SP, AI 4XI 2-/4-Wire ST, PU 1 SIMATIC ET 200SP, ANALOG INPUT MODULE, AI 4XI 2-/4-WIRE STANDARD (6ES7134-6GD01-0BA1) BaseUnit BU15-P16+A0+2B, BU type A0, Push-in terminals, without AUX terminals, load group bridged to the left (6ES7193-6BP00-0BA0)
SLOT 10	/	Modulo Server (Incluso nella 6ES7155-6AU01-0CN0 - Slot 0)

Note: Base unit connection for each I/O Card has been indicated in I/O List sheet.

NETWORK ARCHITECTURE

NR	IP ADDRESS	COMMENT
1	192.168.9.8 / 255.255.255.0	REDUNDANCY CPUs SYSTEM ADDRESS
2	192.168.9.9 / 255.255.255.0	PLC 1 ADDRESS
3	192.168.9.10 / 255.255.255.0	PLC 2 ADDRESS
4	192.168.9.11 / 255.255.255.0	SWITCH ADDRESS
5	192.168.9.12 / 255.255.255.0	INTERFACE MODULE ADDRESS (I/O RACK)
6	192.168.9.13 / 255.255.255.0	COUPLER ADDRESS (IN THE RING)
7	192.168.9.14 / 255.255.255.0	COUPLER ADDRESS(NOT IN THE RING)



IA A-63000 (DRYER LOCAL PANEL)				
CPU RACK				
CPU_1	CPU 1513R-1PN	6ES7513-1RL00-0AB0		
CPU_2	CPU 1513R-1PN	6ES7513-1RL00-0AB0		
I/O RACK				
RACK F1 SLOT 0	ET 200SP, IM155-6PN/2 HF	6ES7155-6AU01-0CN0		
RACK F1 SLOT 1	INPUT MODULE: DI 8x 24V DC Basic	6ES7131-6BF01-0AA0		BASE UNIT: 6ES7193-6BP00-0DA0 (WHITE type +A0, BU15-P16+A0+2D)
RACK F1 SLOT 1 IN 0	%I0.0	(DRYER 1) TOWER A PRESSURE SWITCH	63-PS-054	
RACK F1 SLOT 1 IN 1	%I0.1	(DRYER 1) TOWER B PRESSURE SWITCH	63-PS-056	
RACK F1 SLOT 1 IN 2	%I0.2	(DRYER 2) TOWER A PRESSURE SWITCH	63-PS-058	
RACK F1 SLOT 1 IN 3	%I0.3	(DRYER 2) TOWER B PRESSURE SWITCH	63-PS-060	
RACK F1 SLOT 1 IN 4	%I0.4	COMPRESSOR 1 RUNNING	63-CMPR-RUN-FDBCK-001	
RACK F1 SLOT 1 IN 5	%I0.5	COMPRESSOR 1 COMMON ALARM	63-CMPR-ALARM-FDBCK-001	
RACK F1 SLOT 1 IN 6	%I0.6	COMPRESSOR 2 RUNNING	63-CMPR-RUN-FDBCK-002	
RACK F1 SLOT 1 IN 7	%I0.7	COMPRESSOR 2 COMMON ALARM	63-CMPR-ALARM-FDBCK-002	
RACK F1 SLOT 2	INPUT MODULE: DI 8x 24V DC Basic	6ES7131-6BF01-0AA0		BASE UNIT: 6ES7193-6BP00-0BA0 (BLACK, type A0, BU15-P16+A0+2B)
RACK F1 SLOT 2 IN 0	%I1.0	SOURGE ARRESTER 230VAC_SERVICES OK	63-20FS-12	
RACK F1 SLOT 2 IN 1	%I1.1	SOURGE ARRESTER 230VAC_UPS OK	63-21FS-12	
RACK F1 SLOT 2 IN 2	%I1.2	INTERNAL CABINET THERMOSTAT	63-TH-001	
RACK F1 SLOT 2 IN 3	%I1.3	LOCAL START PUSH BUTTON	63-HS-001	
RACK F1 SLOT 2 IN 4	%I1.4	LOCAL STOP PUSH BUTTON	63-HS-002	
RACK F1 SLOT 2 IN 5	%I1.5	LOCAL ALARM RESET	63-HS-003	
RACK F1 SLOT 2 IN 6	%I1.6	LOCAL REMOTE SELECTOR STATUS	63-HS-004	
RACK F1 SLOT 2 IN 7	%I1.7	SHUTDOWN ALARM FROM SIS - INDICATION ONLY	63-ESD-001	(processed by SIL 2 Relay) & Emergency pushbutton on 63-LP-001
RACK F1 SLOT 3	INPUT MODULE: DI 8x 24V DC Basic	6ES7131-6BF01-0AA0		BASE UNIT: 6ES7193-6BP00-0BA0 (BLACK, type A0, BU15-P16+A0+2B)
RACK F1 SLOT 3 IN 0	%I2.0	VALVE 63-XV-055 OPEN LIMIT SWITCH	63-ZSH-055	
RACK F1 SLOT 3 IN 1	%I2.1	VALVE 63-XV-055 CLOSED LIMIT SWITCH	63-ZSL-055	
RACK F1 SLOT 3 IN 2	%I2.2	VALVE 63-XV-056 OPEN LIMIT SWITCH	63-ZSH-056	
RACK F1 SLOT 3 IN 3	%I2.3	VALVE 63-XV-056 CLOSED LIMIT SWITCH	63-ZSL-056	
RACK F1 SLOT 3 IN 4	%I2.4	VALVE 63-XV-057 OPEN LIMIT SWITCH	63-ZSH-057	
RACK F1 SLOT 3 IN 5	%I2.5	VALVE 63-XV-057 CLOSED LIMIT SWITCH	63-ZSL-057	
RACK F1 SLOT 3 IN 6	%I2.6	VALVE 63-XV-058 OPEN LIMIT SWITCH	63-ZSH-058	
RACK F1 SLOT 3 IN 7	%I2.7	VALVE 63-XV-058 CLOSED LIMIT SWITCH	63-ZSL-058	
RACK F1 SLOT 4	INPUT MODULE: DI 8x 24V DC Basic	6ES7131-6BF01-0AA0		BASE UNIT: 6ES7193-6BP00-0BA0 (BLACK, type A0, BU15-P16+A0+2B)
RACK F1 SLOT 4 IN 0	%I3.0	VALVE 63-XV-059 OPEN LIMIT SWITCH	63-ZSH-059	
RACK F1 SLOT 4 IN 1	%I3.1	VALVE 63-XV-059 CLOSED LIMIT SWITCH	63-ZSL-059	
RACK F1 SLOT 4 IN 2	%I3.2	VALVE 63-XV-060 OPEN LIMIT SWITCH	63-ZSH-060	
RACK F1 SLOT 4 IN 3	%I3.3	VALVE 63-XV-060 CLOSED LIMIT SWITCH	63-ZSL-060	
RACK F1 SLOT 4 IN 4	%I3.4	SPARE		
RACK F1 SLOT 4 IN 5	%I3.5	SPARE		
RACK F1 SLOT 4 IN 6	%I3.6	SPARE		
RACK F1 SLOT 4 IN 7	%I3.7	SPARE		
RACK F1 SLOT 5	OUTPUT MODULE: DQ 8x 24V DC/0,5A	6ES7132-6BF01-0AA0		BASE UNIT: 6ES7193-6BP00-0DA0 (WHITE type +A0, BU15-P16+A0+2D)
RACK F1 SLOT 5 OUT 0	%Q0.0	(DRYER 1) 5-WAY VALVE SOV COMMAND	63-XY-051	
RACK F1 SLOT 5 OUT 1	%Q0.1	(DRYER 1) DEPRESSURIZATION VALVE SOV COMMAND	63-XY-052	
RACK F1 SLOT 5 OUT 2	%Q0.2	(DRYER 2) 5-WAY VALVE SOV COMMAND	63-XY-053	
RACK F1 SLOT 5 OUT 3	%Q0.3	(DRYER 2) DEPRESSURIZATION VALVE SOV COMMAND	63-XY-054	
RACK F1 SLOT 5 OUT 4	%Q0.4	RUNNING STATUS LAMP	63-XL-003	
RACK F1 SLOT 5 OUT 5	%Q0.5	GENERAL ALARM LAMP	63-XA-001	
RACK F1 SLOT 5 OUT 6	%Q0.6	COMPRESSOR 1 REMOTE START/STOP	63-CMPR-START-001	
RACK F1 SLOT 5 OUT 7	%Q0.7	COMPRESSOR 2 REMOTE START/STOP	63-CMPR-START-002	
RACK F1 SLOT 6	OUTPUT MODULE: DQ 8x 24V DC/0,5A	6ES7132-6BF01-0AA0		BASE UNIT: 6ES7193-6BP00-0BA0 (BLACK, type A0, BU15-P16+A0+2B)
RACK F1 SLOT 6 OUT 0	%Q1.0	DRYER 1 ALARM	63-ALARM-DRY-001	
RACK F1 SLOT 6 OUT 1	%Q1.1	DRYER 2 ALARM	63-ALARM-DRY-002	
RACK F1 SLOT 6 OUT 2	%Q1.2	VALVE 63-XV-055 COMMAND	63-XV-055	
RACK F1 SLOT 6 OUT 3	%Q1.3	VALVE 63-XV-056 COMMAND	63-XV-056	
RACK F1 SLOT 6 OUT 4	%Q1.4	VALVE 63-XV-057 COMMAND	63-XV-057	
RACK F1 SLOT 6 OUT 5	%Q1.5	VALVE 63-XV-058 COMMAND	63-XV-058	
RACK F1 SLOT 6 OUT 6	%Q1.6	VALVE 63-XV-059 COMMAND	63-XV-059	
RACK F1 SLOT 6 OUT 7	%Q1.7	VALVE 63-XV-060 COMMAND	63-XV-060	
RACK F1 SLOT 7	OUTPUT MODULE: DQ 8x 24V DC/0,5A	6ES7132-6BF01-0AA0		BASE UNIT: 6ES7193-6BP00-0BA0 (BLACK, type A0, BU15-P16+A0+2B)
RACK F1 SLOT 7 OUT 0	%Q2.0	SPARE		
RACK F1 SLOT 7 OUT 1	%Q2.1	RESET PB FORCE THE OUTPUT SIGNAL 63-XA-003 TO 1 FOR 5 SECOND	RESET_FORCED	
RACK F1 SLOT 7 OUT 2	%Q2.2	SPARE		
RACK F1 SLOT 7 OUT 3	%Q2.3	SPARE		
RACK F1 SLOT 7 OUT 4	%Q2.4	SPARE		
RACK F1 SLOT 7 OUT 5	%Q2.5	SPARE		
RACK F1 SLOT 7 OUT 6	%Q2.6	SPARE		
RACK F1 SLOT 7 OUT 7	%Q2.7	SPARE		
RACK F1 SLOT 8	AN. INPUT MODULE: AI 4xI 2/4 wire 4-20mA	6ES7134-6GD01-0BA1		BASE UNIT: 6ES7193-6BP00-0DA0 (WHITE type +A0, BU15-P16+A0+2D)
RACK F1 SLOT 8 A. IN. 0	%IW4	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER	63-PT-064	
RACK F1 SLOT 8 A. IN. 1	%IW6	TEMPERATURE TRANSMITTER INLET AIR	63-TIT-051	
RACK F1 SLOT 8 A. IN. 2	%IW8	TEMPERATURE TRANSMITTER INSTRUMENT AIR RECIEVER	63-TIT-052	
RACK F1 SLOT 8 A. IN. 3	%IW10	DEW POINT TRANSMITTER	63-AIT-051	
RACK F1 SLOT 9	AN. INPUT MODULE: AI 4xI 2/4 wire 4-20mA	6ES7134-6GD01-0BA1		BASE UNIT: 6ES7193-6BP00-0BA0 (BLACK, type A0, BU15-P16+A0+2B)
RACK F1 SLOT 9 A. IN. 0	%IW12	FLOW TRANSMITTER OUTLET AIR	63-FIT-051	
RACK F1 SLOT 9 A. IN. 1	%IW14	DIFFERENTIAL PRESSURE TRANSMITTER INLET FILTERS	63-PDIT-051	
RACK F1 SLOT 9 A. IN. 2	%IW16	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS	63-PDIT-062	
RACK F1 SLOT 9 A. IN. 3	%IW18	SPARE		
RACK 1 SLOT 9	SERVER MODULE	6ES7193-6PA00-0AA0		

IA A-63000

PROFINET SIGNALS TABLE

Rev 4

N. BYTE	N. BIT	DATA TYPE	TAG	DESCRIPTION	MEANING	SCALING	OFFSET	READ/WRITE	
1000	0	BOOL	RED_FAIL	REDUNDANCY CPU FAILURE	0=ALARM, 1=OK			R	ALARMS
	1	BOOL	CPU_SWITCH	PRIMARY CPU SWITCH	0=ALARM, 1=OK			R	
	2	BOOL	IM_ERR	IM ERROR	0=ALARM, 1=OK			R	
	3	BOOL	PNPN_ERR	PNPN COUPLER ERROR	0=ALARM, 1=OK			R	
	4	BOOL	NET_ERR	NETWORK PN/IE_1 ERROR	0=ALARM, 1=OK			R	
	5	BOOL		SPARE				R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1001	0	BOOL	63-XY-055-H	VALVE 63-XY-055 ALARM	0=ALARM, 1=OK			R	
	1	BOOL	63-XY-056-H	VALVE 63-XY-056 ALARM	0=ALARM, 1=OK			R	
	2	BOOL	63-XY-057-H	VALVE 63-XY-057 ALARM	0=ALARM, 1=OK			R	
	3	BOOL	63-XY-058-H	VALVE 63-XY-058 ALARM	0=ALARM, 1=OK			R	
	4	BOOL	63-XY-059-H	VALVE 63-XY-059 ALARM	0=ALARM, 1=OK			R	
	5	BOOL	63-XY-060-H	VALVE 63-XY-060 ALARM	0=ALARM, 1=OK			R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1002	0	BOOL	63-PS-054-H	ALARM (DRYER 1) TOWER A PRESSURE SWITCH	0=ALARM, 1=OK			R	
	1	BOOL	63-PS-056-H	ALARM (DRYER 1) TOWER B PRESSURE SWITCH	0=ALARM, 1=OK			R	
	2	BOOL	63-PS-058-H	ALARM (DRYER 2) TOWER A PRESSURE SWITCH	0=ALARM, 1=OK			R	
	3	BOOL	63-PS-060-H	ALARM (DRYER 2) TOWER B PRESSURE SWITCH	0=ALARM, 1=OK			R	
	4	BOOL		SPARE				R	
	5	BOOL		SPARE				R	
	6	BOOL	63-CMPR-NO-RUN-FDBCK-001-H	COMPRESSOR 1 - NOT STARTED ALARM	0=ALARM, 1=OK			R	
	7	BOOL	63-CMPR-NO-RUN-FDBCK-002-H	COMPRESSOR 2 - NOT STARTED ALARM	0=ALARM, 1=OK			R	
1003	0	BOOL	63-CMPR-ALARM-FDBCK-001-H	COMPRESSOR 1 - GENERAL ALARM	0=ALARM, 1=OK			R	
	1	BOOL	63-CMPR-ALARM-FDBCK-002-H	COMPRESSOR 2 - GENERAL ALARM	0=ALARM, 1=OK			R	
	2	BOOL	63-20FS-12-H	SOURGE ARRESTER 230VAC_SERVICES - ALARM	0=ALARM, 1=OK			R	
	3	BOOL	63-21FS-12-H	SOURGE ARRESTER 230VAC_UPS - ALARM	0=ALARM, 1=OK			R	
	4	BOOL	63-TH-001-H	INTERNAL CABINET THERMOSTAT - ALARM	0=ALARM, 1=OK			R	
	5	BOOL		SPARE				R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1004	0	BOOL	DRYER_SWITCH	DRYER SWITCHING IN PROGRESS	1 = IN PROGRESS 0 = DONE			R	
	1	BOOL	STOP_REQUEST	STOP TAKEN WAITING UNTIL THE END OF PHASE 5	1 = IN PROGRESS 0 = DONE			R	
	2	BOOL		SPARE				R	
	3	BOOL		SPARE				R	
	4	BOOL		SPARE				R	
	5	BOOL		SPARE				R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1005	0	BOOL		SPARE				R	
	1	BOOL		SPARE				R	
	2	BOOL		SPARE				R	
	3	BOOL		SPARE				R	
	4	BOOL		SPARE				R	
	5	BOOL		SPARE				R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1006	0	BOOL	PRE_FIL_1-H	DIFFERENTIAL PRESSURE EXCEEDED FOR PRE FILTER 1	0=ALARM, 1=OK			R	
	1	BOOL	PRE_FIL_2-H	DIFFERENTIAL PRESSURE EXCEEDED FOR PRE FILTER 2	0=ALARM, 1=OK			R	
	2	BOOL	POST_FIL_1-H	DIFFERENTIAL PRESSURE EXCEEDED FOR POST FILTER 1	0=ALARM, 1=OK			R	
	3	BOOL	POST_FIL_2-H	DIFFERENTIAL PRESSURE EXCEEDED FOR POST FILTER 2	0=ALARM, 1=OK			R	
	4	BOOL	PRE_FIL-H	DIFFERENTIAL PRESSURE EXCEEDED FOR BOTH PRE FILTERS	0=ALARM, 1=OK			R	
	5	BOOL	POST_FIL-H	DIFFERENTIAL PRESSURE EXCEEDED FOR BOTH POST FILTERS	0=ALARM, 1=OK			R	
	6	BOOL	DRY-H	BOTH DRYERS WITH PRESSURE SWITCHES TRIGGERED	0=ALARM, 1=OK			R	
	7	BOOL	CMPR-H	BOTH COMPRESSOR ALARM	0=ALARM, 1=OK			R	
1007	0	BOOL	63-AIT-051-LL	DEW POINT TRANSMITTER - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	1	BOOL	63-AIT-051-L	DEW POINT TRANSMITTER - LOW ALARM (L)	0=ALARM, 1=OK			R	
	2	BOOL	63-AIT-051-H	DEW POINT TRANSMITTER - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	3	BOOL	63-AIT-051-HH	DEW POINT TRANSMITTER - HIGH HIGH ALARM (HH)	0=ALARM, 1=OK			R	
	4	BOOL	63-PT-064-LL	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	5	BOOL	63-PT-064-L	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER - LOW ALARM (L)	0=ALARM, 1=OK			R	
	6	BOOL	63-PT-064-H	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	7	BOOL	63-PT-064-HH	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER - HIGH HIGH ALARM (HH)	0=ALARM, 1=OK			R	
1008	0	BOOL	63-TIT-051-LL	TEMPERATURE TRANSMITTER INLET AIR - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	1	BOOL	63-TIT-051-L	TEMPERATURE TRANSMITTER INLET AIR - LOW ALARM (L)	0=ALARM, 1=OK			R	
	2	BOOL	63-TIT-051-H	TEMPERATURE TRANSMITTER INLET AIR - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	3	BOOL	63-TIT-051-HH	TEMPERATURE TRANSMITTER INLET AIR - HIGH HIGH ALARM (HH)	0=ALARM, 1=OK			R	
	4	BOOL	63-TIT-052-LL	TEMPERATURE TRANSMITTER INSTRUMENT AIR RECIEVER - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	5	BOOL	63-TIT-052-L	TEMPERATURE TRANSMITTER INSTRUMENT AIR RECIEVER - LOW ALARM (L)	0=ALARM, 1=OK			R	
	6	BOOL	63-TIT-052-H	TEMPERATURE TRANSMITTER INSTRUMENT AIR RECIEVER - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	7	BOOL	63-TIT-052-HH	TEMPERATURE TRANSMITTER INSTRUMENT AIR RECIEVER - HIGH HIGH ALARM (HH)	0=ALARM, 1=OK			R	
1009	0	BOOL	63-FIT-051-LL	FLOW TRANSMITTER OUTLET AIR - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	1	BOOL	63-FIT-051-L	FLOW TRANSMITTER OUTLET AIR - LOW ALARM (L)	0=ALARM, 1=OK			R	
	2	BOOL	63-FIT-051-H	FLOW TRANSMITTER OUTLET AIR - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	3	BOOL	63-FIT-051-HH	FLOW TRANSMITTER OUTLET AIR - HIGH HIGH ALARM (HH)	0=ALARM, 1=OK			R	
	4	BOOL	63-PDIT-051-LL	DIFFERENTIAL PRESSURE TRANSMITTER INLET FILTERS - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	5	BOOL	63-PDIT-051-L	DIFFERENTIAL PRESSURE TRANSMITTER INLET FILTERS - LOW ALARM (L)	0=ALARM, 1=OK			R	
	6	BOOL	63-PDIT-051-H	DIFFERENTIAL PRESSURE TRANSMITTER INLET FILTERS - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	7	BOOL	63-PDIT-051-HH	DIFFERENTIAL PRESSURE TRANSMITTER INLET FILTERS - HIGH HIGH ALARM (HH)	0=ALARM, 1=OK			R	
1010	0	BOOL	63-PDIT-052-LL	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	1	BOOL	63-PDIT-052-L	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS - LOW ALARM (L)	0=ALARM, 1=OK			R	
	2	BOOL	63-PDIT-052-H	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	3	BOOL	63-PDIT-052-HH	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS - HIGH HIGH ALARM (HH)	0=ALARM, 1=OK			R	
	4	BOOL		SPARE				R	
	5	BOOL		SPARE				R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1011	0	BOOL	63-AIT-051-BADPV	DEW POINT TRANSMITTER - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	1	BOOL	63-PT-064-BADPV	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	2	BOOL	63-TIT-051-BADPV	TEMPERATURE TRANSMITTER INLET AIR - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	3	BOOL	63-TIT-052-BADPV	TEMPERATURE TRANSMITTER INSTRUMENT AIR RECIEVER - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	4	BOOL	63-FIT-051-BADPV	FLOW TRANSMITTER OUTLET AIR - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	5	BOOL	63-PDIT-051-BADPV	DIFFERENTIAL PRESSURE TRANSMITTER INLET FILTERS - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	6	BOOL	63-PDIT-052-BADPV	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	7	BOOL		SPARE				R	PLANT STATUS
1012	0	BOOL	63-ESD-SIS-001-H	PLANT SHUTDOWN ALARM (SIS)	0=SHUTDOWN ALARM, 1=OK			R	
	1	BOOL	63-ALARM-PLANT	PLANT GENERAL ALARM	0=CUMULATIVE STANDARD ALARM, 1=OK			R	
	2	BOOL	63-PLANT-READY	PLANT READY	0=NOT READY, 1=READY TO START			R	
	3	BOOL	63-PLANT-RUNNING	PLANT RUNNING	0=STOPPED, 1=RUNNING			R	
	4	BOOL	63-PLANT-LOCA-REM	PLANT IN REMOTE MODE	0=LOCAL (PLC), 1=REMOTE (DCS)			R	
	5	BOOL	63-ALARM-DRY-001-DCS	DRYER 1 ALARM	0=ALARM, 1=OK			R	
	6	BOOL	63-ALARM-DRY-002-DCS	DRYER 2 ALARM	0=ALARM, 1=OK			R	
	7	BOOL		SPARE				R	
1013	0	BOOL	63-CMPR-START-001-DCS	COMPRESSOR 1 COMMAND	1=RUN COMMAND (ONLY FOR INFO)			R	
	1	BOOL	63-CMPR-START-002-DCS	COMPRESSOR 2 COMMAND	1=RUN COMMAND (ONLY FOR INFO)			R	
	2	BOOL		SPARE				R	
	3	BOOL		SPARE				R	
	4	BOOL	63-CMPR-RUN-FDBCK-001-DCS	COMPRESSOR 1 RUNNING	1=RUNNING STATUS RECEIVED			R	
	5	BOOL	63-CMPR-RUN-FDBCK-002-DCS	COMPRESSOR 2 RUNNING	1=RUNNING STATUS RECEIVED			R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1014	0	BOOL	63-XY-051-DCS	(DRYER 1) 5-WAY VALVE SOV OPEN COMMAND	1=OPEN COMMAND			R	
	1	BOOL	63-XY-052-DCS	(DRYER 1) DEPRESSURIZATION VALVE SOV OPEN COMMAND	1=OPEN COMMAND			R	
	2	BOOL	63-XY-053-DCS	(DRYER 2) 5-WAY VALVE SOV OPEN COMMAND	1=OPEN COMMAND			R	
	3	BOOL	63-XY-054-DCS	(DRYER 2) DEPRESSURIZATION VALVE SOV OPEN COMMAND	1=OPEN COMMAND			R	
	4	BOOL		SPARE				R	
	5	BOOL		SPARE				R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
	0	BOOL	63-XY-055	VALVE 63-XY-055 COMMAND	1 = COMMAND			R	

1015	1	BOOL	63-XY-056	VALVE 63-XY-056 COMMAND	1 = COMMAND			R	
	2	BOOL	63-XY-057	VALVE 63-XY-057 COMMAND	1 = COMMAND			R	
	3	BOOL	63-XY-058	VALVE 63-XY-058 COMMAND	1 = COMMAND			R	
	4	BOOL	63-XY-059	VALVE 63-XY-059 COMMAND	1 = COMMAND			R	
	5	BOOL	63-XY-060	VALVE 63-XY-060 COMMAND	1 = COMMAND			R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1016	0	BOOL	63-ZSH-055-DCS	VALVE 63-XY-055 OPEN	1 = OPEN			R	
	1	BOOL	63-ZSL-055-DCS	VALVE 63-XY-055 CLOSED	1 = CLOSED			R	
	2	BOOL	63-ZSH-056-DCS	VALVE 63-XY-056 OPEN	1 = OPEN			R	
	3	BOOL	63-ZSL-056-DCS	VALVE 63-XY-056 CLOSED	1 = CLOSED			R	
	4	BOOL	63-ZSH-057-DCS	VALVE 63-XY-057 OPEN	1 = OPEN			R	
	5	BOOL	63-ZSL-057-DCS	VALVE 63-XY-057 CLOSED	1 = CLOSED			R	
	6	BOOL	63-ZSH-058-DCS	VALVE 63-XY-058 OPEN	1 = OPEN			R	
	7	BOOL	63-ZSL-058-DCS	VALVE 63-XY-058 CLOSED	1 = CLOSED			R	
1017	0	BOOL	63-ZSH-059-DCS	VALVE 63-XY-059 OPEN	1 = OPEN			R	
	1	BOOL	63-ZSL-059-DCS	VALVE 63-XY-059 CLOSED	1 = CLOSED			R	
	2	BOOL	63-ZSH-060-DCS	VALVE 63-XY-060 OPEN	1 = OPEN			R	
	3	BOOL	63-ZSL-060-DCS	VALVE 63-XY-060 CLOSED	1 = CLOSED			R	
	4	BOOL		SPARE				R	
	5	BOOL		SPARE				R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1018	/	REAL (IEEE 754)	63-AIT-051-PV	DEW POINT TRANSMITTER - PROCESS VALUE	range -100..20 °C			R	**MEASURES**
1022	/	REAL (IEEE 754)	63-PT-064-PV	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER - PROCESS VALUE	range 0..16 barg			R	
1026	/	REAL (IEEE 754)	63-TIT-051-PV	TEMPERATURE TRANSMITTER INLET AIR - PROCESS VALUE	range 0..100 °C			R	
1030	/	REAL (IEEE 754)	63-TIT-052-PV	TEMPERATURE TRANSMITTER INSTRUMENT AIR RECIEVER - PROCESS VALUE	range 0..100 °C			R	
1034	/	REAL (IEEE 754)	63-FIT-051-PV	FLOW TRANSMITTER OUTLET AIR - PROCESS VALUE	range 0..500 Sm3/h			R	
1038	/	REAL (IEEE 754)	63-PDIT-051-PV	DIFFERENTIAL PRESSURE TRANSMITTER INLET FILTERS - PROCESS VALUE	range 0..1 bar			R	
1042	/	REAL (IEEE 754)	63-PDIT-052-PV	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS - PROCESS VALUE	range 0..1 bar			R	
1046	/	REAL (IEEE 754)	WATCHDOG_REAL	WATCHDOG_TO CHECK COMMUNICATION	INCREMENTED by 1 every second from 0 up to 32767			R	
1050	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 001				R	**PARAMETERS**
1054	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 002				R	
1058	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 003				R	
1062	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 004				R	
1066	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 005				R	
1070	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 006				R	
1074	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 007				R	
1078	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 008				R	
1082	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 009				R	
1086	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 010				R	
1090	/	INT	PRE_FILTER_IN_USE	PRE FILTER CURRENTLY IN USE (1= A , 2 = B)	(1= A , 2 = B)			R	
1092	/	INT	POST_FILTER_IN_USE	PRE FILTER CURRENTLY IN USE (1= A , 2 = B)	(1= A , 2 = B)			R	
1094	/	INT	DRYER_IN_USE	PRE FILTER CURRENTLY IN USE (1= A , 2 = B)	(1= A , 2 = B)			R	
1096	/	INT	COMPRESSOR_USE	PRE FILTER CURRENTLY IN USE (1= A , 2 = B)	(1= A , 2 = B)			R	
1098	/	INT	CURRENT_PHASE	CURRENT PHASE OF PROCESS (0,...,6)	0 = READY TO START ; 1 = INIZIALIZATION, 2 = A: ADS, B: REG ; 3 = A: ADS ,B:PRE ; 4 = A:REG, B:ADS ; 5 = A:PRE, B:ADS ; 6 = FAULT			R	
1100	/	INT		SPARE - INTEGER PARAMETER 001				R	
1102	/	INT	WATCHDOG_INT	WATCHDOG_TO CHECK COMMUNICATION	INCREMENTED by 1 every second from 0 up to 32767			R	
1104	/	INT		SPARE - INTEGER PARAMETER 002				R	
1106	/	INT		SPARE - INTEGER PARAMETER 003				R	
1108	/	INT		SPARE - INTEGER PARAMETER 004				R	
1110	/	TIME (DINT)		SPARE - TIME PARAMETER 001				R	
1114	/	TIME (DINT)		SPARE - TIME PARAMETER 002				R	
1118	/	TIME (DINT)		SPARE - TIME PARAMETER 003				R	
1122	/	TIME (DINT)		SPARE - TIME PARAMETER 004				R	
1126	/	TIME (DINT)		SPARE - TIME PARAMETER 005				R	
1130	/	TIME (DINT)		SPARE - TIME PARAMETER 006				R	
1134	/	TIME (DINT)		SPARE - TIME PARAMETER 007				R	
1138	/	TIME (DINT)		SPARE - TIME PARAMETER 008				R	
1142	/	TIME (DINT)		SPARE - TIME PARAMETER 009				R	
1146	/	TIME (DINT)		SPARE - TIME PARAMETER 010				R	

IA A-63000

PROFINET SIGNALS TABLE

Rev 4

N. BYTE	N. BIT	DATA TYPE	TAG	DESCRIPTION	MEANING	SCALING	OFFSET	READ/WRITE	
	0	BOOL	63-START-PLANT-CMD	REMOTE START COMMAND	1 = START			W	**REMOTE COMMANDS**
	1	BOOL	63-STOP-PLANT-CMD	REMOTE STOP COMMAND	0 = STOP			W	
	2	BOOL	WATCHDOG_BIT	WATCHDOG TO VERIFY CONNECTION STATUS	1= ALWAYS AS OK CONDITION 0= FAULT			W	
	3	BOOL	63-ACK-ALARM	REMOTE ALARMS ACKNOWLEDGE (PULSE 1 SEC)	1 = ACK (PULSE 1 sec)			W	
	4	BOOL	CHANGE_COMPRESSOR	CHANGE WORKING COMPRESSOR (PULSE 1 SEC)	1 = CHANGE (PULSE 1 sec)			W	
	5	BOOL	CHANGE_PRE_FILTER	CHANGE WORKING PRE-FILTER (PULSE 1 SEC)	1 = CHANGE (PULSE 1 sec)			W	
	6	BOOL	CHANGE_POST_FILTER	CHANGE WORKING POST-FILTER(PULSE 1 SEC)	1 = CHANGE (PULSE 1 sec)			W	
1150	7	BOOL	CHANGE_DRYER	CHANGE WORKING DRYER (PULSE 1 SEC)	1 = CHANGE (PULSE 1 sec)			W	
	0	BOOL		SPARE				W	
	1	BOOL		SPARE				W	
	2	BOOL		SPARE				W	
	3	BOOL		SPARE				W	
	4	BOOL		SPARE				W	
	5	BOOL		SPARE				W	
	6	BOOL		SPARE				W	
1151	7	BOOL		SPARE				W	
1152	/	REAL		SPARE - REAL PARAMETER 001				W	**PARAMETERS**
1156	/	REAL		SPARE - REAL PARAMETER 002				W	
1160	/	REAL		SPARE - REAL PARAMETER 003				W	
1164	/	REAL		SPARE - REAL PARAMETER 004				W	
1168	/	REAL		SPARE - REAL PARAMETER 005				W	
1172	/	REAL		SPARE - REAL PARAMETER 006				W	
1176	/	REAL		SPARE - REAL PARAMETER 007				W	
1180	/	REAL		SPARE - REAL PARAMETER 008				W	
1184	/	REAL		SPARE - REAL PARAMETER 009				W	
1188	/	REAL		SPARE - REAL PARAMETER 010				W	
1192	/	INT	PHASE_DURATION_2	SET TIME DURATION PHASE 2	[s] NOT LOWER THAN 240 S			W	
1194	/	INT	PHASE_DURATION_3	SET TIME DURATION PHASE 3	[s] NOT LOWER THAN 60 S			W	
1196	/	INT	PHASE_DURATION_4	SET TIME DURATION PHASE 4	[s] NOT LOWER THAN 240 S			W	
1198	/	INT	PHASE_DURATION_5	SET TIME DURATION PHASE 5	[s] NOT LOWER THAN 60 S			W	
1200	/	INT		SPARE - INTEGER PARAMETER 001				W	
1202	/	INT		SPARE - INTEGER PARAMETER 002				W	
1204	/	INT		SPARE - INTEGER PARAMETER 003				W	
1206	/	INT		SPARE - INTEGER PARAMETER 004				W	
1208	/	INT		SPARE - INTEGER PARAMETER 005				W	
1210	/	INT		SPARE - INTEGER PARAMETER 006				W	
1212	/	TIME (DINT)		SPARE - TIME PARAMETER 001				W	
1216	/	TIME (DINT)		SPARE - TIME PARAMETER 002				W	
1220	/	TIME (DINT)		SPARE - TIME PARAMETER 003				W	
1224	/	TIME (DINT)		SPARE - TIME PARAMETER 004				W	
1228	/	TIME (DINT)		SPARE - TIME PARAMETER 005				W	
1232	/	TIME (DINT)		SPARE - TIME PARAMETER 006				W	
1236	/	TIME (DINT)		SPARE - TIME PARAMETER 007				W	
1240	/	TIME (DINT)		SPARE - TIME PARAMETER 008				W	
1244	/	TIME (DINT)		SPARE - TIME PARAMETER 010				W	

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE

INSTRUMENT LIST

WITH SET POINTS / CONTROL / ALARM / SHUTDOWN

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
Giuseppe Cavallo	30/05/2025

1724000428-IN-LIS-00017

ment Class: 2

		tion (AFC)	GT	MC	TM
		tion (AFC)	GT	MC	TM
04	16/12/2024	Accepted for Construction (AFC)	GT	MC	TM
03	03/09/2024	Issue for Review (IFR)	GT	MC	TM
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Rev.	Date	Description	Prepared	Reviewed	Approved

COES

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Item	TAG	SERVICE	SIGNAL	RANGE	SET POINT	NOTES
Pressure transmitter	63-PIT-064	Instrument Air Receiver pressure	4-20mA	0 / 16 barg	7 bar	L ALARM
Differential pressure transmitter	63-PDIT-051	Pre-filter pressure drop	4-20mA	0 / 1 bar	0.5 bar	H ALARM
Differential pressure transmitter	63-PDIT-062	Post-filter pressure drop	4-20mA	0 / 1 bar	0.5 bar	H ALARM
Pressure gauge	63-PI-053 63-PI-055 63-PI-057 63-PI-059	Air dryer towers pressure	N/A	0 / 16 barg	N/A	
Pressure gauge	63-PI-063	Instrument Air Receiver pressure	N/A	0 / 16 barg	N/A	
Differential pressure gauge	63-PDI-052 63-PDI-061	Air dryer pressure drop	N/A	0 / 2.5 bar	N/A	
Pressure switch	63-PS-054 63-PS-056 63-PS-058 63-PS-060	Air dryer towers pressure	SPST	0 / 12 barg	5 barg	L ALARM
Temperature transmitter	63-TIT-051	Air dryer inlet temperature	4-20mA	0 / 100°C	40°C	H ALARM
Temperature transmitter	63-TIT-052	Instrument Air Receiver temperature	4-20mA	0 / 100°C	40°C	H ALARM

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Item	TAG	SERVICE	SIGNAL	RANGE	SET POINT	NOTES
Temperature gauge	63-TI-053	Instrument Air Receiver temperature	N/A	0 / 100°C	N/A	
Dew point analyzer	63-AIT-051	Outlet dew point	4-20mA	-100 / +20°C	-40°C	H ALARM
Flow transmitter	63-FIT-051	Outlet flowrate	4-20mA	0 / 500 Sm3/h	N/A	MONITORING
Solenoid Valve	63-XY-051 63-XY-052 63-XY-053 63-XY-054 63-XY-055 63-XY-056 63-XY-057 63-XY-058 63-XY-059 63-XY-060	Pneumatic on-off valves actuation	24 VDC	0 / 9 barg	N/A	N/A
Pneumatic on-off valve	63-XV-051 63-XV-052 63-XV-053 63-XV-054	Dryer towers change-over	N/A	0 / 9 barg	N/A	N/A
Pneumatic on-off valve	63-XV-055 63-XV-056	Pre-filters change-over	N/A	0 / 9 barg	N/A	N/A
Pneumatic on-off valve	63-XV-057 63-XV-058	Air Dryer change-over	N/A	0 / 9 barg	N/A	N/A
Pneumatic on-off valve	63-XV-059 63-XV-060	Post-filters change-over	N/A	0 / 9 barg	N/A	N/A

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Pressure Safety valves	63-PSV-001 63-PSV-002 63-PSV-003 63-PSV-004 63-PSV-005	Overpressure protection	N/A	N/A	12 barg	N/A
Flow orifice	63-FO-001 63-FO-002	Purge flowrate	N/A	N/A	N/A	4 mm bore diameter
Flow transmitter orifice	63-FO-051	Outlet flow	N/A	N/A	N/A	31.2 mm bore diameter

Reference document:

P&ID, document no. 1724000428-PR-PID-00019 Sheet 1 of 2. Sheet 2 of 2 is the air compressor's P&ID which is considered a single standard components: details of the installed instruments are not available.

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000

CABLE LIST

lumber: 1724000428-EL-LIS-00018

Document Class: 2

ROSETTI MARINO

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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
Giuseppe Cavallo	27/08/24

00	07/08/2024	Issue for Review (IFR)	SG	GT	TM
Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)

HOLDS LIST

No.	Description
1	
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1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

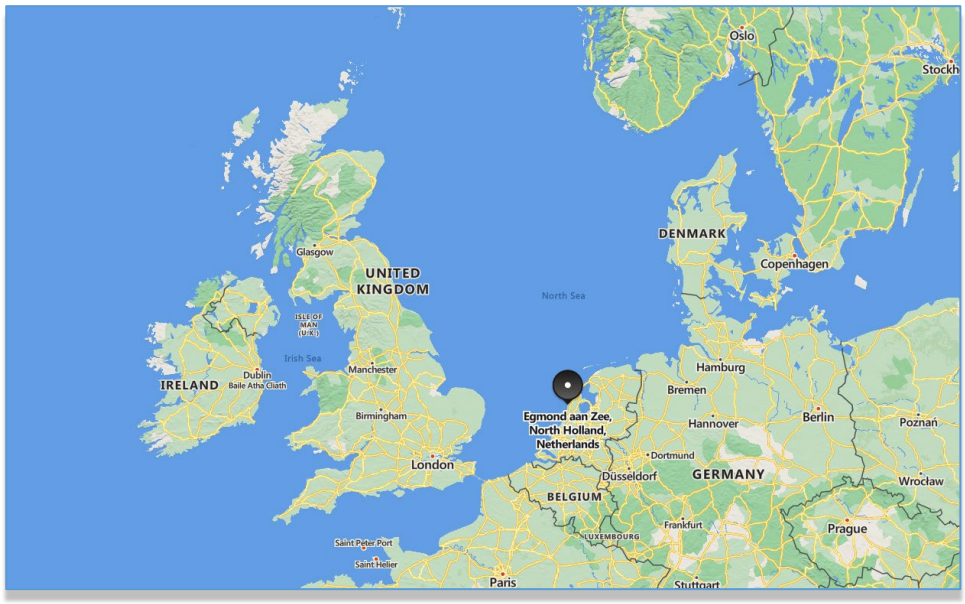


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

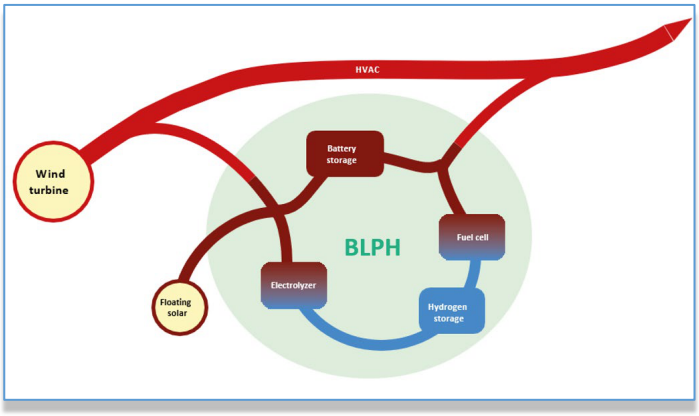


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DS-00011	EQUIPMENT DATA SHEETS INCLUDING MOTORS, AIR COMPRESSOR, DRYERS, ETC.

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

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3 CABLE LIST

CABLE LIST															
Revision index	Service	Cable Tag.	Cable ID	Section	Colour		Screened		Type	Fire Resistant	Flame Retardant	Routing		Cable lenght (meter)	Cable gland type	Cable gland size
					External	Internal	Overal	Indivudual				From	To			
0	ANS	C-63PDIT051	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-PDIT-051	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ANS	C-63PDIT052	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-PDIT-052	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ANS	C-63TT051	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-TT-051	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ANS	C-63AIT051	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-AIT-051	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ANS	C-63FIT051	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-FIT-051	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ANS	* C-63PIT064	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-PIT-064	63-LP-001	N.A.	Double compression	ISO M20x1,5
0	ANS	* C-63TIT052	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-TIT-052	63-LP-001	N.A.	Double compression	ISO M20x1,5
0	ZS	C-63PS054	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-PS-054	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-63PS056	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-PS-056	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-63PS058	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-PS-058	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-63PS060	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-PS-060	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-63ZSL055	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-ZSL-055	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-63ZSH055	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-ZSH-055	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-63ZSL056	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-ZSL-056	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-63ZSH056	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-ZSH-056	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-63ZSL057	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-ZSL-057	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-63ZSH057	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-ZSH-057	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-63ZSL058	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-ZSL-058	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-63ZSH058	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-ZSH-058	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-63ZSL059	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-ZSL-059	63-LP-001	TBA	Double compression	ISO M20x1,5
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0	ZS	C-63ZSL060	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-ZSL-060	63-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-63ZSH060	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-ZSH-060	63-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-63XY055	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-XY-055	63-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-63XY056	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-XY-056	63-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-63XY057	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-XY-057	63-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-63XY058	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-XY-058	63-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-63XY059	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-XY-059	63-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-63XY060	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	63-XY-060	63-LP-001	TBA	Double compression	ISO M20x1,5

Legenda:
SOV = Solenoid Valve
ZS = Switch
ANS = Signal 4-20mA
* = NOT IN COES SCOPE OF SUPPLY

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Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE

ATEX REGISTER

Document Number: 1724000428-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
Giuseppe Cavallo	06/03/25

ıent Class: 2

		ion (AFC)	GT	MC	TM
		ion (AFC)	GT	MC	TM
		FR)	GT	MC	TM
01	27/05/2024	Issue for Review (IFR)	GT	MC	TM
00	19/04/2024	Issue for Review (IFR)	GT	MC	TM
Rev.	Date	Description	Prepared	Reviewed	Approved

COES

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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	04	63-PIT-064	Pressure transmitter	IA Receiver	EMERSON	2051CG4A02A1KS5E1M5D4T1Q4Q8HR7	24CLPC0044336	II 1/2 G Ex db IIC T6..T4 Ga/Gb	1724000428-MAC-DS-00013	KEMA 08ATEX0090X	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	YES
2	04	63-PDIT-051	Differential pressure transmitter	IA Package Pre-filters	EMERSON	2051CD3A02A1KS5E1M5D4T1Q4Q8HR7	24CLPC0044342	II 1/2 G Ex db IIC T6..T4 Ga/Gb	1724000428-MAC-DS-00013	KEMA 08ATEX0090X	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	YES
3	04	63-PDIT-062	Differential pressure transmitter	IA Package Post-filters	EMERSON	2051CD3A02A1KS5E1M5D4T1Q4Q8HR7	24CLPC0044343	II 1/2 G Ex db IIC T6..T4 Ga/Gb	1724000428-MAC-DS-00013	KEMA 08ATEX0090X	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	YES
4	04	63-PI-053	Pressure gauge	IA Package Dryer towers	WIKA	233.30	8975QOD3	II 2G Ex h IIC T6 .. T1 Gb X	1724000428-MAC-DS-00013	Declaration of Conformity by Wika n. 11564220	SAFE	None	1724000428	COES Srl	A-63000	N.A.	YES	YES
5	04	63-PI-055	Pressure gauge	IA Package Dryer towers	WIKA	233.30	8975QOD4	II 2G Ex h IIC T6 .. T1 Gb X	1724000428-MAC-DS-00013	Declaration of Conformity by Wika n. 11564220	SAFE	None	1724000428	COES Srl	A-63000	N.A.	YES	YES
6	04	63-PI-057	Pressure gauge	IA Package Dryer towers	WIKA	233.30	8975QOD5	II 2G Ex h IIC T6 .. T1 Gb X	1724000428-MAC-DS-00013	Declaration of Conformity by Wika n. 11564220	SAFE	None	1724000428	COES Srl	A-63000	N.A.	YES	YES
7	04	63-PI-059	Pressure gauge	IA Package Dryer towers	WIKA	233.30	8975QOD6	II 2G Ex h IIC T6 .. T1 Gb X	1724000428-MAC-DS-00013	Declaration of Conformity by Wika n. 11564220	SAFE	None	1724000428	COES Srl	A-63000	N.A.	YES	YES
8	04	63-PI-063	Pressure gauge	IA Receiver	WIKA	233.30	8975QOD7	II 2G Ex h IIC T6 .. T1 Gb X	1724000428-MAC-DS-00013	Declaration of Conformity by Wika n. 11564220	SAFE	None	1724000428	COES Srl	A-63000	N.A.	YES	YES
9	04	63-PDI-052	Differential pressure gauge	IA Package Dryer towers	WIKA	732.14	1A039T0681U	II 2G Ex h IIC T6 .. T1 Gb X	1724000428-MAC-DS-00013	Declaration of Conformity by Wika n. 14203565.03	SAFE	None	1724000428	COES Srl	A-63000	N.A.	YES	YES
10	04	63-PDI-061	Differential pressure gauge	IA Package Dryer towers	WIKA	732.14	1A039T07W2J	II 2G Ex h IIC T6 .. T1 Gb X	1724000428-MAC-DS-00013	Declaration of Conformity by Wika n. 14203565.03	SAFE	None	1724000428	COES Srl	A-63000	N.A.	YES	YES
11	04	63-PS-054	Pressure switch	IA Package Dryer towers	TE.MA.	PMS8.1	2409781	Ex ia IIC T6 Ga/Gb	1724000428-MAC-DS-00013	Declaration of Conformity by TE.MA	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO
12	04	63-PS-056	Pressure switch	IA Package Dryer towers	TE.MA.	PMS8.1	2409782	Ex ia IIC T6 Ga/Gb	1724000428-MAC-DS-00013	Declaration of Conformity by TE.MA	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO
13	04	63-PS-058	Pressure switch	IA Package Dryer towers	TE.MA.	PMS8.1	2409783	Ex ia IIC T6 Ga/Gb	1724000428-MAC-DS-00013	Declaration of Conformity by TE.MA	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO
14	04	63-PS-060	Pressure switch	IA Package Dryer towers	TE.MA.	PMS8.1	2409784	Ex ia IIC T6 Ga/Gb	1724000428-MAC-DS-00013	Declaration of Conformity by TE.MA	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO
15	04	63-TIT-051	Temperature transmitter	IA Package downstream Pre-filters	EMERSON	644HANDM5Q4HR7XA	24CLTD0026771	II 2 G Ex db IIC T6..T1 Gb II 2 D Ex tb IIIC T130°C Db	1724000428-MAC-DS-00013	DEKRA 19ATEX0076X	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	YES
16	04	63-TIT-052	Temperature transmitter	IA Receiver	EMERSON	644HANDM5Q4HR7XA	24CLTD0026772	II 2 G Ex db IIC T6..T1 Gb II 2 D Ex tb IIIC T130°C Db	1724000428-MAC-DS-00013	DEKRA 19ATEX0076X	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	YES
17	04	63-TI-053	Temperature gauge	IA Receiver	WIKA	S 5550	8975W4MT	II 2G Ex h IIC T6 .. T1 Gb X	1724000428-MAC-DS-00013	Declaration of Conformity by Wika n. 11603046.03	SAFE	None	1724000428	COES Srl	A-63000	N.A.	YES	YES
18	04	63-AIT-051	Dew point analyzer	IA Package downstream Post-filters	GE SENSING	HYGROPROII	2432081	Ex ia IIC T4 Ga	1724000428-MAC-DS-00013	FM22ATEX0011X	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	YES
19	04	63-FIT-051	Flow transmitter	IA Package downstream Post-filters	EMERSON	2051CD2A02A1KS5E1M5D4T1Q4Q8HR7	24CLPC0044345	II 1/2 G Ex db IIC T6..T4 Ga/Gb	1724000428-MAC-DS-00013	KEMA 08ATEX0090X	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	YES
20	04	63-XY-051	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62398/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000428-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO
21	04	63-XY-052	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62398/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000428-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO
22	04	63-XY-053	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62398/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000428-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO
23	04	63-XY-054	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62398/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000428-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO
23	04	63-XY-055	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62398/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000428-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO
23	04	63-XY-056	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62398/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000428-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO
23	04	63-XY-057	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62398/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000428-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO
23	04	63-XY-058	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62398/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000428-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO
23	04	63-XY-059	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62398/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000428-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO
23	04	63-XY-060	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62398/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000428-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000428	COES Srl	A-63000	N.A.	NO	NO

Note: all certificates are collected in document n. 1724000428-MAC-LIS-00028 - "Atex Documentation"

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE
ATEX DOCUMENTATION

Document Number: 1724000428-MAC-LIS-00028

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
Filippo Zanellati	06/05/2025

Document Class: 2

02	29/04/2025	Accepted for Construction (AFC)	GT	MC	TM
01	10/02/2025	Issue for Review (IFR)	GT	MC	TM
00	19/04/2024	Issue for Review (IFR)	GT	MC	TM
Rev.	Date	Description	Prepared	Reviewed	Approved

COES

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CERTIFICATE

(1) EU-Type Examination

(2) **Equipment or protective systems intended for use in potentially explosive atmospheres - Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number: **KEMA 08ATEX0090X** Issue Number: **7**

(4) Product: **Transmitter Model 2051, Type 2051C, 2051L, 2051T, 2051CFA, 2051CFC and 2051CFP**

(5) Manufacturer: **Rosemount Inc.**

(6) Address: **6021 Innovation Blvd, Shakopee, MN 55379, USA**

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) DEKRA Certification B.V., Notified Body number 0344 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential test report number NL/KEM/ExTR07.0072/06.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0 : 2018 **EN 60079-1 : 2014** **EN 60079-26 : 2015**

except in respect of those requirements listed at item 18 of the Schedule.

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:



II 1/2 G Ex db IIC T6...T4 Ga/Gb

Date of certification: 30 January 2024

DEKRA Certification B.V.



L.G. van Schie
Certification Manager

Throughout this document, a point is used as the decimal separator.

PRODUCTS RvA C 001

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T +31 88 96 83000 F +31 88 96 83100 www.dekra-product-safety.com Registered Arnhem 09085396

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate KEMA 08ATEX0090X** Issue No. **7**

(15) **Description**

Transmitter Model 2051, Type 2051C, 2051L, 2051T, 2051CFA, 2051CFC and 2051CFP, are microprocessor based transmitters in type of protection flameproof “d” and used to convert the measured process pressure into digital or analog signals.

Type designation

2051	**C**	**A**	**…**
I	II	III	variants

Designation	Explanation	Value	Explanation
I	Model	2051	Transmitter
II	Type	C T L CFA CFC CFP	Coplanar Inline Liquid Level Annubar Flowmeter Compact Flowmeter Integral Orifice Flowmeter
III	Signal Output	A F W M	4-20 mA w/ HART Foundation fieldbus Profibus PA Low Power 1-5 V Hart

Variants

Static Pressure Ranges	0,1,2,3,4,5, 5A,P9	689 bar maximum pressure
Isolating diaphragm material	2 3 4 5 6 7	316L SST Alloy C-276 Alloy 400 Tantalum Gold Plated Alloy 400 Gold Plated SST
Ex d housing material and entries	A B E F J K	Aluminum ½ NPT Aluminum M20x1.5 Low Copper Aluminum ½ NPT Low Copper Aluminum M20x1.5 SST ½ NPT SST M20x1.5
Display and Interface Options	- M4 M5	No Display LCD Display with Operator interface LCD Display
Temperature option For Models 2051CFA, 2051CFC and 2051CFP only.	0 T R	No temperature option Integral RTD Remote thermowell and RTD
Conduit Electrical Connector	Custom	Not in scope of this certificate
Wireless Options	Custom	Not in scope of this certificate

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate KEMA 08ATEX0090X** Issue No. **7**

Non-standard paint	Custom	Condition as listed in the certificate applies
Note: Other variants may appear in the Type designation, but are not relevant for this certificate.		

Thermal data

The relation between process connection temperature, ambient temperature and temperature class is as follows:

Process connection temperature range [°C]	Ambient temperature range [°C]	Temperature class
-60 to +70	-60 to +70	T6
-60 to +80	-60 to +80	T5
-60 to +120	-60 to +80	T4

Electrical data

Power supply: 9 – 28 Vdc, 9 – 32 Vdc or 10.5 – 42.4 Vdc; 1 W
Output: 4 – 20 mA with digital HART, a fieldbus signal or a low power 1 – 5 Vdc signal

Installation instructions

The manufacturers instructions shall be followed in detail to assure safe operation.

(16) **Report Number**

NL/KEM/ExTR07.0072/06.

(17) **Specific conditions of use**

This device contains a thin wall diaphragm less than 1 mm thick that forms a boundary between Category 1G (process connection) and Category 2G (all other parts of the equipment). The model code and datasheet are to be consulted for details of the diaphragm material. During installation, maintenance and use the environmental conditions to which the diaphragm will be subjected shall be taken into account. The manufacturer's instructions for installation and maintenance shall be followed in detail to assure safety during its expected lifetime.

Flameproof joints are not intended for repair.

Non-standard paint options may cause risk from electrostatic discharge. Avoid installations that could cause electrostatic build-up on painted surfaces, and only clean the painted surfaces with a damp cloth. If paint is ordered a special option code, contact the manufacturer for more information.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at item (9).

(19) **Test documentation**

As listed in Report No. NL/KEM/ExTR07.0072/06.

EU-Konformitätserklärung
EU Declaration of Conformity

Dokument Nr. / ***Document No.*** **11564220** — **Revision** / ***Issue*** **07**

Wir erklären in alleiniger Verantwortung, dass die mit CE gekennzeichneten Produkte
We declare under our sole responsibility that the CE marked products

Typenbezeichnung / ***Type Designation***

23a.50.063 + option ATEX | **23a.50.1*0 + option ATEX**
26a.50.063 + option ATEX | **26a.50.1*0 + option ATEX**
23a.30.063 + option ATEX | **23a.30.1*0 + option ATEX**
26a.30.063 + option ATEX | **26a.30.1*0 + option ATEX**
23a.53.063 + option ATEX | **23a.53.100 + option ATEX**
23a.54.063 + option ATEX | **23a.54.100 + option ATEX**
23a.36.1*0 + option ATEX
PG23LT.063 + option ATEX | **PG23LT.1*0 + option ATEX**
PG23CP.063 + option ATEX | **PG23CP.100 + option ATEX**
PG28.1*0 + option ATEX
PG23HP-S.1*0 + option ATEX | **PG23HP-P.1*0 + option ATEX**

*** Nominal size**
0 = 100mm
6 = 160mm

a Case filling
2 = Without case filling
3 = With case filling

Beschreibung / ***Description***: **Rohrfederdruckmessgerät** / ***Bourdon Tube Pressure Gauge***

gemäß gültigem Datenblatt / *according to the valid data sheet*: PM 02.02, PM 02.04, PM 02.12, PM 02.15, PM 02.22, PM 02.24, PM 02.32, PM 02.28, PM 02.29

mit den nachfolgenden relevanten Harmonisierungsvorschriften der Union übereinstimmen
are in conformity with the following relevant Union harmonisation legislation

Angewandte harmonisierte Normen oder sonstige technische Spezifikationen:
Applied harmonised standards or other technical specifications:

2014/68/EU	Druckgeräterichtlinie (DGRL) (1) *Pressure Equipment Directive (PED)* (1)	
2014/34/EU	Explosionsschutz (ATEX) (2) *Explosion protection (ATEX)* (2)	
Ex	II 2G Ex h IIC T6 … T1 Gb X II 2D Ex h IIIC T85 °C … T450 °C Db X	EN ISO 80079-36 :2016 EN ISO 80079-37 :2016

(1) PS > 200 bar; Modul A, druckhaltendes Ausrüstungsteil
PS > 200 bar; Module A, pressure accessory

(2) Modul A „interne Fertigungskontrolle“. Die Dokumentation ist hinterlegt unter der Nummer 074/24 bei der Notifizierten Stelle der EU, IBExU Institut für Sicherheitstechnik GmbH (EU ID-Nr. 0637).
Module A “Internal Control of Production”. The Documentation is deposited under registration number 074/24 at Notified Body of EU, IBExU Institut für Sicherheitstechnik GmbH (EU ID 0637). .

Unterzeichnet für und im Namen von / *Signed for and on behalf of*

WIKA Alexander Wiegand SE & Co. KG

Klingenberg, 2024-04-24

Sascha Schnellbacher, Vice President
CoE Gauges, Sensors & Instruments

Mariusz Lubomski, Director of Quality
CoE Gauges, Sensors & Instruments

EU-Konformitätserklärung
EU Declaration of Conformity

Dokument Nr.
Document No. **14203565.03**

Wir erklären in alleiniger Verantwortung, dass die mit CE gekennzeichneten Produkte
We declare under our sole responsibility that the CE marked products

Typenbezeichnung
Type Designation

732.14.1*0 + option ATEX	**733.14.1*0 + option ATEX**
762.14.1*0 + option ATEX	**763.14.1*0 + option ATEX**
732.31.1*0 + option ATEX	**733.31.1*0 + option ATEX**
732.51.1*0 + option ATEX	**733.51.1*0 + option ATEX**

*** Nenngröße / *Nominal Size:***
0 = 100 mm
6 = 160 mm

Beschreibung
Description **Differenzdruckmessgerät**
Differential Pressure Gauge

gemäß gültigem Datenblatt
according to the valid data sheet PM 07.13, PM 07.05

mit den nachfolgenden relevanten Harmonisierungsvorschriften der Union übereinstimmen
are in conformity with the following relevant Union harmonisation legislation

Angewandte harmonisierte Normen
Applied harmonised standards

2014/68/EU	Druckgeräterichtlinie (DGRL) (1) *Pressure Equipment Directive (PED) (1)*	
2014/34/EU	Explosionsschutz (ATEX) (2) *Explosion protection (ATEX) (2)*	
	II 2G Ex h IIC T6 ... T1 Gb X II 2D Ex h IIIC T85 °C ... T450 °C Db X	EN ISO 80079-36:2016 EN ISO 80079-37:2016

(1) PS > 200 bar; Modul A, druckhaltendes Ausrüstungsteil
PS > 200 bar; Module A, pressure accessory

(2) Konformitätsbewertungsverfahren „interne Fertigungskontrolle". Die Dokumentation ist hinterlegt bei notifizierter Stelle TÜV NORD CERT GmbH, Essen (Nr. 0044), Aktennummer 35192994.
Conformity assessment procedure "internal control of production". The Documentation is deposited at notified body TÜV NORD CERT GmbH, Essen (no. 0044), reference number 35192994

Unterzeichnet für und im Namen von / *Signed for and on behalf of*

WIKA Alexander Wiegand SE & Co. KG

Klingenberg, 2021-07-06

i.V. A. Häfner

Alfred Häfner, Vice President
Process Instrumentation Pressure

i.A. Dahl Stapf

Roland Stapf, Head of Quality Assurance
Process Instrumentation Corporate Quality

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Kommanditgesellschaft: Sitz Klingenberg – Amtsgericht Aschaffenburg HRA 1819

Komplementärin:
WIKA International SE - Sitz Klingenberg - Amtsgericht Aschaffenburg HRB 10505
Vorstand: Alexander Wiegand
Vorsitzender des Aufsichtsrats: Dr. Max Egli

2 **Appareil ou système de protection destiné à être utilisé en atmosphères explosibles**
Equipment and protective systems intended for use in potentially explosive atmospheres

Directive 2014/34/UE Directive 2014/34/EU

1 **NOTIFICATION ASSURANCE QUALITE PRODUCTION**

PRODUCTION QUALITY ASSURANCE NOTIFICATION

3 Numéro de la notification / *Notification Number:*

INERIS 19ATEXQ403

Indice / *Issue* **01**

La Catégorie de produit est : / *The Product Category* is:

1 ou/*or* 2

5 Fabricant : / *Manufacturer:*

TE.MA Srl
Via Baranchina, 4,
21020 TERNATE (VA), ITALIE

6 Site(s) du fabricant : / *Manufacturer site(s):*

TE.MA Srl
Via Baranchina, 4,
21020 TERNATE (VA), ITALIE

4 La liste des produits (Appareils et Systèmes de protection) couverts par la notification est insérée dans le rapport d'audit référencé en (8) ci-après.

List of Products (Equipment and Protective Systems) covered by this notification is included in the assessment report referenced in (8) here after.

7 L'Ineris, organisme notifié et identifié sous le numéro 0080, conformément aux articles 17 and 21 de la directive 2014/34/UE du Parlement Européen et du Conseil, datée du 26 février 2014, et accrédité par le Cofrac sous le n° 5-0045 dans le cadre de l'activité de certification de produits et services (portée disponible sur www.cofrac.fr), notifie que le fabricant dispose d'un système qualité de la production qui satisfait au Module D, annexe IV de la directive. Ce système qualité conforme au Module D, annexe IV satisfait également au Module E, Annex VII.

Ineris, notified body and identified under number 0080, in accordance with Articles 17 and 21 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, and accredited by Cofrac under number 5-0045 for certification of products and services (scope of accreditation available on the website www.cofrac.fr), notifies that the manufacturer has a production quality system which complies with Module D, Annex IV of the Directive. This quality system in compliance with Module D, Annex IV of the Directive also meets the requirements of Module E, Annex VII.

8 La présente notification repose sur le rapport de l'audit dont la référence est :

This notification is based on the following assessment report number:

N° 207379

Les résultats des réévaluations périodiques du système qualité font partie de la présente notification.

Results of periodical re-assessment of the quality system are a part of this notification.

9 La présente notification est valide jusqu'à la date indiquée ci-après, et peut être retirée si le fabricant ne satisfait plus aux exigences Module D, annexe IV et Module E, annexe VII :

This notification is valid until the following date and can be withdrawn if the manufacturer no longer satisfies the requirements of Module D, Annex IV resp. Module E, Annex VII:

Date de prise d'effet	**2022-11-22**	Effective date
Date de fin de validité	**2025-11-22**	Expiry date

Conformément à l'article 16 de la directive 2014/34/UE, le marquage CE sera suivie du numéro 0080 identifiant l'organisme notifié impliqué dans la phase de contrôle de la production

According to Article 16 of the Directive 2014/34/EU, the CE marking shall be followed by the identification Number 0080 identifying the notified body involved in the production control stage.

Le directeur général de l'Ineris
Par délégation

The Chief Executive Officer of Ineris
By delegation

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Only the entire document including annexes may be reprinted.

IM-1389AK - ID 2161539 v4.0 – Mise en application : 18/10/2022

Institut national de l'environnement industriel et des risques
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www.ineris.fr
Établissement public à caractère industriel et commercial • RCS Compiègne B 381 984 921 - Siret 381 984 921 00019 • 7120B - TVA Intracom FR 73 381 984 921

CERTIFICATE

(1) EU-Type Examination

(2) **Equipment or protective systems intended for use in potentially explosive atmospheres - Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number: **DEKRA 19ATEX0076X** Issue Number: **5**

(4) Product: **Temperature Transmitter, Model 644, 3144P, 148 and 248**
Temperature Sensors, Model 214C, 65, 85 and 185

(5) Manufacturer: **Rosemount Inc.**

(6) Address: **6021 Innovation Blvd, Shakopee, MN 55379, USA**

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) DEKRA Certification B.V., Notified Body number 0344 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential test report number NL/DEK/ExTR19.0050/05.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0 : 2018 **EN 60079-1 : 2014** **EN 60079-31 : 2014**

except in respect of those requirements listed at item 18 of the Schedule.

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:

II 2 G Ex db IIC T6...T1 Gb
II 2 D Ex tb IIIC T130 °C Db

Date of certification: 29 Februari 2024

DEKRA Certification B.V.

R. Schuller
Certification Manager

Throughout this document, a point is used as the decimal separator.

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T +31 88 96 83000 F +31 88 96 83100 www.dekra-product-safety.com Registered Arnhem 09085396

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0076X** Issue No. **5**

(15) **Description**

The Temperature Transmitter, Model 644, 3144P, 148 and 248, accepts inputs from temperature sensors and transmits the data via 4-23 mA current loop or digital communication. The transmitters are in type of protection flameproof enclosures "d" and dust ignition protection by enclosure “t” and can be provided with or without a cemented window meter cover (for optional LCD display) and utilize a Head Mount or Field Mount enclosure for either a Single or Dual Sensor.

The Temperature Sensor, Model 214C, 65 and 185, can be either a DIN style or Adapter style sensor in type of protection flameproof enclosures "d" and dust ignition protection by enclosure “t”. Both sensor types can be connected to a Rosemount temperature transmitter to form a complete assembly. When not assembled to a Rosemount temperature transmitter, the DIN style sensors are to be connected to the Rosemount Connection Head or Dual Entry Connection Head enclosure. The Adapter style sensors can also be connected to a separate enclosure or provided as a standalone for connection to a suitably rated Ex db or Ex tb enclosure.

The Temperature Sensor, Model 85, is an Adapter style sensor in type of protection flameproof enclosures "d". It can be connected to a Rosemount temperature transmitter to form a complete assembly, connected to a separate enclosure or provided as a standalone for connection to a suitably rated Ex db enclosure.

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0076X** Issue No. **5**

Type designation

644	**H**	**A**	**...**
I	II	III	Variants

Designation	Explanation	Value	Explanation
I	Model	644	Temperature Transmitter
II	Transmitter Type	H	Head Mount – Single Sensor
		S	Head Mount – Dual Sensor
		F	Field Mount – Single Sensor
		D	Field Mount – Dual Sensor
III	Transmitter Output	A	4-20 HART
		F	Foundation Fieldbus
		W	Profibus

Variants

Enclosure	D1	Dual Compartment, 2 Entries, M20x1.5, Aluminum
	D2	Dual Compartment, 2 Entries, 1/2NPT, Aluminum
	J1	Universal Head, 3 Entries, M20x1.5, Aluminum
	J2	Universal Head, 3 Entries, 1/2NPT, Aluminum
	J3	Universal Head, 3 Entries, M20x1.5, SST
	J4	Universal Head, 3 Entries, 1/2NPT, SST
	J5	Universal Head, M20x1.5, Aluminum with SST pipe bracket
	J6	Universal Head, 1/2NPT, Aluminum with SST pipe bracket
	J7	Universal Head, M20x1.5, SST with SST pipe bracket
	J8	Universal Head, 1/2NPT, SST with SST pipe bracket
	R1	Rosemount Connection Head, M20x1.5, Aluminum
	R2	Rosemount Connection Head, 1/2NPT, Aluminum
	R3	Rosemount Connection Head, M20x1.5, SST
	R4	Rosemount Connection Head, 1/2NPT, SST
LCD Display	M4	LCD Meter with Local Operator Interface
	M5	LCD Meter
Assembled	XA	Process Ready Assembly of Transmitter and Sensor
Non-standard paint	Custom	Condition as listed in certificate applies
Note: Other variants may appear in the Type designation, but are not relevant for this certificate		

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0076X** Issue No. **5**

3144P A …
I II Variants

Designation	Explanation	Value	Explanation
I	Model	3144P	Temperature Transmitter
II	Transmitter Output	A F	4-20 HART Foundation Fieldbus

Variants

Enclosure	D1 D2 D5 D6 D9 D0	Field Mount, Dual Compartment, Al, ½-14NPT Field Mount, Dual Compartment, Al, M20x1.5 Field Mount, Dual Compartment, SST, ½-14NPT Field Mount, Dual Compartment, SST, M20x1.5 Field Mount, Dual Compartment, Al ULC, ½-14NPT Field Mount, Dual Compartment, Al ULC, M20x1.5
LCD Display	M5	LCD Meter
Assembled	XA	Process Ready Assembly of Transmitter and Sensor
Non-standard paint	Custom	Condition as listed in certificate applies
Note: Other variants may appear in the Type designation, but are not relevant for this certificate		

148 H N …
I II III Variants

Designation	Explanation	Value	Explanation
I	Model	148	Temperature Transmitter
II	Transmitter Type	H	DIN Head Mount
III	Transmitter Output	N	Analog Output

Variants

Enclosure	A G U H	Rosemount Connection Head, Aluminum Rosemount Connection Head, SST Universal Connection Head, 2 Entries, Aluminum Universal Connection Head, 2 Entries, SST
Conduit Entry Size	1 2	M20x1.5 1/2NPT
Assembled	XA	Process Ready Assembly of Transmitter and Sensor
Non-standard paint	Custom	Condition as listed in certificate applies
Note: Other variants may appear in the Type designation, but are not relevant for this certificate		

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0076X** Issue No. **5**

248	**H**	**A**	**...**
I	II	III	Variants

Designation	Explanation	Value	Explanation
I	Model	248	Temperature Transmitter
II	Transmitter Type	H	DIN Head Mount
III	Transmitter Output	A W	4-20 HART Profibus

Variants

Enclosure	A G U H J K	Rosemount Connection Head, Aluminum Rosemount Connection Head, SST Universal Connection Head, 2 Entries, Aluminum Universal Connection Head, 2 Entries, SST Universal Connection Head, 3 Entries, Aluminum Universal Connection Head, 3 Entries, SST
Conduit Entry Size	1 2	M20x1.5 ½NPT
LCD Display	M5	LCD Display
Assembled	XA	Process Ready Assembly of Transmitter and Sensor
Non-standard paint	Custom	Condition as listed in certificate applies
Note: Other variants may appear in the Type designation, but are not relevant for this certificate		

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0076X** Issue No. **5**

214C ...
I Variants

Designation	Explanation	Value	Explanation
I	Model	214C	Temperature Sensor

Variants

Sensor Sheath Material	SM	321 SST
	AK	Alloy 600
	SB	316L
	SS	316 SST
Mounting Style	SL	Spring Loaded Standard Adapter
	SW	Spring Loaded with Contact Indicator
	WA	Welded Standard Adapter
	DF	DIN Style without terminal block
	DT	DIN Style with terminal block
Enclosure	AR1	Rosemount Connection Head – Aluminum
	AR2	Rosemount Connection Head w/Display Cover – Aluminum
	SR1	Rosemount Connection Head – SST
	SR2	Rosemount Connection Head w/Display Cover – SST
	AD1	Dual Entry – Aluminum
	SD1	Dual Entry – SST
	AT1	Aluminum with Terminal Strip
	AJ1	Universal Junction Box, 3 entries – Aluminum
	AJ2	Universal Junction Box w/Display Cover, 3 entries – Aluminum
	Blank	No Enclosure
Conduit Entry	C1	1/2NPT
	C2	M20x1.5
	C3	3/4NPT
Assembled	XA	Process Ready Assembly of Transmitter and Sensor
Non-standard paint	Custom	Condition as listed in certificate applies
Note: Other variants may appear in the Type designation, but are not relevant for this certificate		

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0076X** Issue No. **5**

65 …
I Variants

Designation	Explanation	Value	Explanation
I	Model	65	Temperature Sensor

Variants

Enclosure	C	Rosemount Connection Head, Aluminum, M20x1.5
	D	Rosemount Connection Head, Aluminum, 1/2NPT
	1	Rosemount Connection Head, w/Display Cover, Aluminum, M20x1.5
	2	Rosemount Connection Head, w/Display Cover, Aluminum, 1/2NPT
	G	Rosemount Connection Head, SST, M20x1.5
	H	Rosemount Connection Head, SST, 1/2NPT
	3	Rosemount Connection Head, w/Display Cover, SST, M20x1.5
	4	Rosemount Connection Head, w/Display Cover, SST, 1/2NPT
	7	Dual Entry Connection Head, Aluminum, 3/4NPT
	8	Dual Entry Connection Head, Aluminum, M20x1.5
	9	Dual Entry Connection Head, Aluminum, 1/2NPT
	K	Dual Entry Connection Head, SST, 3/4NPT
	R	Dual Entry Connection Head, SST, M20x1.5
	W	Dual Entry Connection Head, SST, 1/2NPT
	N	No Connection Head
Mounting Style	0,1,2,4	DIN Style
	3	Spring Loaded Adapter
Assembled	XA	Process Ready Assembly of Transmitter and Sensor
Non-standard paint	Custom	Condition as listed in certificate applies
Note: Other variants may appear in the Type designation, but are not relevant for this certificate		

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0076X** Issue No. **5**

85 **...**
I Variants

Designation	Explanation	Value	Explanation
I	Model	85	Temperature Sensor

Variants

Enclosure	C	Rosemount Connection Head, Aluminum, M20x1.5
	D	Rosemount Connection Head, Aluminum, 1/2NPT
	1	Rosemount Connection Head, w/Display Cover, Aluminum, M20x1.5
	2	Rosemount Connection Head, w/Display Cover, Aluminum, 1/2NPT
	G	Rosemount Connection Head, SST, M20x1.5
	H	Rosemount Connection Head, SST, 1/2NPT
	3	Rosemount Connection Head, w/Display Cover, SST, M20x1.5
	4	Rosemount Connection Head, w/Display Cover, SST, 1/2NPT
	N	No Connection Head
Mounting Style	3	Spring Loaded Adapter
	5	Spring Loaded Adapter with Terminal Block
Assembled	XA	Process Ready Assembly of Transmitter and Sensor
Non-standard paint	Custom	Condition as listed in certificate applies
Note: Other variants may appear in the Type designation, but are not relevant for this certificate		

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0076X** Issue No. **5**

185 ...
I Variants

Designation	Explanation	Value	Explanation
I	Model	185	Temperature Sensor

Variants

Enclosure	C	Rosemount Connection Head, Aluminum, M20x1.5
	D	Rosemount Connection Head, Aluminum, 1/2NPT
	1	Rosemount Connection Head, w/Display Cover, Aluminum, M20x1.5
	2	Rosemount Connection Head, w/Display Cover, Aluminum, 1/2NPT
	G	Rosemount Connection Head, SST, M20x1.5
	H	Rosemount Connection Head, SST, 1/2NPT
	3	Rosemount Connection Head, w/Display Cover, SST, M20x1.5
	4	Rosemount Connection Head, w/Display Cover, SST, 1/2NPT
	7	Dual Entry Connection Head, Aluminum, 3/4NPT
	8	Dual Entry Connection Head, Aluminum, M20x1.5
	9	Dual Entry Connection Head, Aluminum, 1/2NPT
	K	Dual Entry Connection Head, SST, 3/4NPT
	R	Dual Entry Connection Head, SST, M20x1.5
	W	Dual Entry Connection Head, SST, 1/2NPT
	N	No Connection Head
Mounting Style	0,1,2,4	DIN Style
	3	Spring Loaded Adapter
Assembled	XA	Process Ready Assembly of Transmitter and Sensor
Non-standard paint	Custom	Condition as listed in certificate applies
Note: Other variants may appear in the Type designation, but are not relevant for this certificate		

Thermal data for all transmitter types

The relation between process temperature at sensor connection, ambient temperature and temperature class / maximum surface temperature “T” is as follows:

Process temperature range at sensor connection[1] [°C]	**Ambient temperature range [°C]**	**Temperature class / Maximum surface temperature “T”**
-60 to +70	-60 to +70	T6
-60 to +80	-60 to +80	T5…T1
-60 to +80	-60 to +80	T130 °C
[1]Sensor connection is where the sensor threads into the transmitter or junction box housing		

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0076X** Issue No. **5**

Thermal data for Adapter Style sensor types

The relation between process temperature, ambient temperature and temperature class / maximum surface temperature "T" is as follows:

Process temperature range [°C][1]	Ambient temperature range [°C][1]	Temperature class / Maximum surface temperature "T"
-60 to +80	-60 to +80	T6
-60 to +95	-60 to +80	T5
-60 to +130	-60 to +80	T4
-60 to +195	-60 to +80	T3
-60 to +290	-60 to +80	T2
-60 to +440	-60 to +80	T1
-60 to +100	-60 to +80	T130 °C

[1]Min. process temperature and min. ambient temperature is limited to -50 °C for the following models:

- Model 214C when enclosure designation "AD1" or "SD1" is selected
- Models 65 and 185 when enclosure designation "7", "8", "9", "K", "R", or "W" is selected

Thermal data for DIN Style sensor types

The relation between process temperature, ambient temperature and temperature class / maximum surface temperature "T" is as follows:

Process temperature range [°C][1]	Ambient temperature range [°C][1]	Temperature class / Maximum surface temperature "T"
-200 to +80	-60 to +80	T6
-200 to +95	-60 to +80	T5
-200 to +130	-60 to +80	T4
-200 to +195	-60 to +80	T3
-200 to +290	-60 to +80	T2
-200 to +440	-60 to +80	T1
-200 to +100	-60 to +80	T130 °C

[1]Min. process temperature and min. ambient temperature is limited to -50 °C for the following models:

- Model 214C when enclosure designation "AD1" or "SD1" is selected
- Models 65 and 185 when enclosure designation "7", "8", "9", "K", "R", or "W" is selected

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0076X** Issue No. **5**

Electrical data

Temperature Transmitters

Power supply (for all transmitter types): 12 – 42.4 Vdc, 1 W
Output (for all transmitter types): 4 – 20 mA with digital HART or a fieldbus signal

Temperature Sensors

35 Vdc, 750 mW

Installation instructions

The manufacturers instructions shall be followed in detail to assure safe operation.

(16) **Report Number**

NL/DEK/ExTR19.0050/05.

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0076X** Issue No. **5**

(17) **Specific conditions of use**

General

Flameproof joints are not intended for repair.

Non-standard paint options may cause risk from electrostatic discharge. Avoid installations that could cause electrostatic build-up on painted surfaces, and only clean the painted surfaces with a damp cloth. If paint is ordered through a special option code, contact the manufacturer for more information.

See instructions for relation between process temperature, ambient temperature and temperature class / maximum surface temperature "T".

Model 214C Temperature Sensor

When provided on their own, the adapter style sensors must be assembled to a suitable Ex db or Ex tb enclosure. When assembled to an Ex db enclosure, the free internal volume shall not be greater than 650 cm^3.

The spring loaded adapter style sensors and DIN style sensors must be installed in a thermowell to maintain Ex tb protection.

The contact indicating adapter style sensor does not meet the requirements for type of protection "tb".

Guard DIN sensors against impacts greater than 4J.

Model 65 and 185 Temperature Sensors

When provided on their own, the adapter style sensors must be assembled to a suitable Ex db or Ex tb enclosure. When assembled to an Ex db enclosure, the free internal volume shall not be greater than 650 cm^3.

The spring loaded adapter style sensors and DIN style sensors must be installed in a thermowell to maintain Ex tb protection.

Guard DIN sensors against impacts greater than 4J.

Model 85 Temperature Sensor

When provided on their own, the adapter style sensors must be assembled to a suitable Ex db enclosure with a free internal volume no greater than 650 cm^3.

Model 644, 148 and 248 Temperature Transmitters with "XA" designation

The spring loaded adapter style sensors and DIN style sensors must be installed in a thermowell to maintain Ex tb protection.

Guard DIN sensors against impacts greater than 4J.

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0076X** Issue No. **5**

Specific conditions of use (continued)

Model 3144P Temperature Transmitter with "XA" designation

The spring loaded adapter style sensors must be installed in a thermowell to maintain Ex tb protection.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at item (9).

(19) **Test documentation**

As listed in Report No. NL/DEK/ExTR19.0050/05.

EU-Konformitätserklärung
EU Declaration of Conformity

Dokument Nr.
Document No. 11603046.03

Wir erklären in alleiniger Verantwortung, dass die mit CE gekennzeichneten Produkte
We declare under our sole responsibility that the CE marked products

Typenbezeichnung
Type Designation

A5550 + option ATEX, A5551 + option ATEX
A5550 + option ATEX, A5551 + option ATEX
A5525 + option ATEX
R5502 + option ATEX, R5503 + option ATEX
R5526 + option ATEX
S5550 + option ATEX, S5551 + option ATEX

Beschreibung
Description

Bimetall-Thermometer
Bimetal thermometer

gemäß gültigem Datenblatt
according to the valid data sheet TM55.01

mit den nachfolgenden relevanten Harmonisierungsvorschriften der Union übereinstimmen
are in conformity with the following relevant Union harmonisation legislation

Angewandte harmonisierte Normen
Applied harmonised standards

2014/34/EU	Explosionsschutz (ATEX) (1) *Explosion protection (ATEX)* (1)	EN ISO 80079-36:2016 EN ISO 80079-37:2016

II 2G Ex h IIC T6...T1 Gb X
II 2D Ex h IIIC T85°C...T450°C Db X

(1) Konformitätsbewertungsverfahren „interne Fertigungskontrolle". Die Dokumentation ist hinterlegt bei benannter Stelle TÜV NORD CERT GmbH, (Reg.-Nr. 0044), Aktennummer 8000550764.
Conformity assessment procedure "Internal Control of Production". The Documentation is deposited at notified body TÜV NORD CERT GmbH, Essen (Reg.-No. 0044), reference number 8000550764.

Unterzeichnet für und im Namen von / *Signed for and on behalf of*

WIKA Alexander Wiegand SE & Co. KG

Klingenberg, 2021-10-11

P. Koll, Vice President
Division Gauges (GA)

M. Lubomski, Head of Quality Management
Division Gauges (GA)

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Komplementärin:
WIKA International SE - Sitz Klingenberg - Amtsgericht Aschaffenburg HRB 10505
Vorstand: Alexander Wiegand
Vorsitzender des Aufsichtsrats: Prof. Dr. Roderich C. Thümmel

1 TYPE EXAMINATION CERTIFICATE

2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU**

3 **Type Examination Certificate No:** **FM22ATEX0011X**

4 **Equipment or protective system: (Type Reference and Name)** **HYGROPRO II Series Moisture Transmitter**

5 **Name of Applicant:** **Panametrics LLC**

6 **Address of Applicant:** **1100 Technology Park Drive**
Billerica, MA 01821
USA

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. 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:

PR461736 dated 1st November 2022

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 60079-11:2012 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 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 3 G Ex ic IIC T4 Gc -20˚C ≤ Ta ≤ +60˚C

Martin Crowe
Certification Manager, FM Approvals Europe Ltd.

Issue date: 02nd November 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 Type Examination Certificate No. FM22ATEX0011X

13 **Description of Equipment or Protective System:**

The HYGROPRO II Series is a 4- wire loop-powered moisture transmitter, which is designed to measure humidity, temperature and pressure with a calibrated, removeable transducer element or probe. In addition to the analog output, the equipment also provides digital data by way of HART (on the analog output) and an independent RS485 output.

The equipment is housed within a plated, zinc alloy housing. The face of this metallic enclosure features a UV resistant silicone keypad and a polymeric window for viewing the internal LCD display.

The equipment is designed to operate over an ambient temperature range of -20˚C ≤Ta ≤+60˚C and from a nominal supply of 12 to 28Vdc and 25mA. The process temperature range is also -20˚C to +60˚C and it is isolated from the equipment using a single 316L stainless steel process sealing device based on a glass-to metal straight ¾"-16 threaded feedthrough. The enclosure has been evaluated for IP66/67. The equipment is designed with the following parameters:

Energy Limitation Parameters:
Loop Supply: Ui = 28 V, Ii = 100 mA, P_i = 700 mW, C_i = 0 µF, L_i = 0 uH.
RS485: Ui = 4 V, Ii = 250mA, P_i = 250mW, C_i = 0 µF, L_i = 0 uH.

14 **Specific Conditions of Use:**

1. *The Product shall be supplied from a resistively limited barrier or associated apparatus.*
2. *When the manufacturer of the equipment has not identified the type of protection to be used for installation on the label, the user shall, on installation, mark the label with the type of protection used. Once the type of protection has been marked it shall not be changed.*

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 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 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 FM Approvals Europe Ltd.

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 Type Examination Certificate No. FM22ATEX0011X

18 **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
02nd November 2022	Original Issue.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals Europe Limited, One Georges Quay Plaza, Dublin. Ireland. D02 E440
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Blueprint Report

Panametrics LLC (1000000179)

Class No 3610

Original Project I.D. 461736

Certificate I.D. FM22ATEX0011X

Drawing No.	Revision Level	Drawing Title	Last Report
136m2871	B	DISPLAY HEAD,2.7 X1.4 DISP, 6BUTTON, ASSY	PR461736
139m0185	C	HYGROPRO II, IS, PROBE,PRESS & SEAL, ASSY	PR461736
144m7135	D	MOUNT .75-16,1.5 OD X 2 LG, 8POS-GTM	PR461736
152m9300	B	HYGROPRO II, IS, ASSEMBLY WITH PROBE	PR461736
152m9733	A	HYGROPRO II,IS,PROBE, FUNCTIONAL, ASSY	PR461736
170M3541	-	IS Block Diagram HygroPro	PR461736
752-605	A	HYGROPRO II, IS, CERTIFICATION (1)	PR461736
752-607	-	HYGROPRO II INSTALLATION CONTROL DRAWING	PR461736
CSS-0019	A	HygroPro Safety Manual	PR461736

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[1] # EU-TYPE EXAMINATION CERTIFICATE

[2] **Equipment and Protective System intended for use in potentially explosive atmospheres Directive 2014/34/EU – Annex III**

[3] Certificate Number: **EPT 12 ATEX 0784** **Issue 2**

[4] Equipment: **Solenoid valves and Electromagnetic devices**

Series: **L, C, D, E, F, G, VL, VC, VD, VE, VF, VG, H, VH** ($-20 \leq T_{amb} \leq +xx$)

Manufacturer: **NADI S.r.l.**

[6] Address: Via Risorgimento, 10 – 20017 Mazzo di Rho (MI) – Italy

[7] This equipment and its accepted variations are specified in the annex to this Certificate.

[8] Eurofins Product Testing Italy S.r.l., Notified Body n. 0477 in accordance with Article 21 of the Directive 2014/34/EU of the European Parliament and of the Council 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 of the Directive.
The examination and test results are recorded in the confidential Report N° EPT.19.REL.01/1319026

[9] Compliance with the essential health and safety requirements is assured through the verification of them and by compliance with the harmonized standards :

EN 60079-0:2012+A11:2013, EN 60079-1:2014, EN 60079-31:2014,
EN 60079-26:2015, EN ISO 80079-36:2016, EN ISO 80079-37:2016
and with the standard **EN 60079-0:2018**

[10] If the sign "X" is placed after the Certificate number, it indicates that the equipment is subject to the special conditions for safe use specified in the annex to this Certificate.

[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, the exam and the tests of the specified equipment.
Further requirements of the Directive 2014/34/EU apply to the manufacture and supply of this equipment. These requirements are not object of this Certificate.

[12] The equipment shall include the symbols Ⓔx **II 1G/2GD** and at least one of the following strings:

Ex h IIC (or IIB+H2 *) TX Ga **$-20°C \leq T_{amb} \leq +xx°C$**
Ex db IIC (or IIB+H2 *) TX Ga/Gb
Ex tb IIIC TX°C Db
* See the equipment description for more details

Place and date of issue:
Torino, 2019-08-28

CE

Dionisio Bucchieri
Directive Responsible

Paolo Trisoglio
Managing Director

Eurofins Product Testing Italy
eurofins
Notified Body N. 0477

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO
PRD N° 119B
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

This Certificate has 4 pages and it is reproducible only in its entirety. Conditions of validity are reported below.

[13] [14] **ANNEX**
EU-TYPE EXAMINATION CERTIFICATE N. EPT 12 ATEX 0784 Issue 2

[15] **Equipment description**

The solenoid valves and electromagnetic devices are divided into the following series, identifiable through the first alphabetical letters of the product code:
Solenoid valves: **L, C, D, E, F, G, VL, VC, VD, VE, VF, VG**
Electromagnetic devices series: **H, VH**
They are used to control the flow of flammable and/or inert gas or liquids in a potential explosive atmosphere.

The solenoid valve is composed of a flameproof enclosure (which contains the electromagnetic device) and a valve.
The electromagnetic device is composed of a flameproof enclosure (which contains the solenoid).

The flameproof enclosure is made of light alloy GAlSi4.5MnMg colored anodized (colored) or painted (if painted the paint used has a maximum thickness of 200 µm) and silicone gaskets.
The body of the valve can be made of brass UNI 5705/ UNI 4893, nickel-plated brass UNI 5705/ UNI 4893, bronze UNI 7013 (only for gas group IIB+H2), stainless steel AISI 303/AISI 304/AISI 316/AISI 316L, Al light alloys (not permitted for inflammable gas or liquids), or Carbon steel while the seals materials can be NBR, viton, urepan, PTFE, rulon, metallic, neoprene, EPDM, HNBR, kalrez or special.

The equipment is suitable for groups IIC, IIB+H2 and group IIIC. It has respectively the type of protection "Ex db", "Ex h" and "Ex tb".

Electrical characteristics

Maximum voltage: from 6 V to 400 Vdc or 400 Vac
Rated frequency: 50 or 60 Hz
Maximum power dissipation: 11W or 26W

Degree of protection: IP 67 (1m of depth 40 min, according to EN 60079-0 and IEC 60529)
Ambient temperature. from -20 to +40 °C (or from -20°C to +60 °C)

The temperature class and maximum surface temperature depends on the ambient temperature and on the nominal power of the solenoid valve coil according to the following table:

Maximum ambient temperature	P≤11W	P≤26W
+40°C	T6 and T65°C	T5 and T87°C
+60°C	T5 and T85°C	T4 and T107°C

Cable entries

The cable entry devices used on the enclosures must be suitably ATEX certified. They must be chosen according to the type of protection, the type of thread, the degree of protection of the equipment and with suitable operative temperatures as detailed in the following table.

Range of ambient temperature of the equipment	Operative temperature for cable glands
From -20°C to +40 °C	From -20°C to +65 °C
From -20°C to +60 °C	From -20°C to +85 °C

Screws
None

[13] [14]

ANNEX
EU-TYPE EXAMINATION CERTIFICATE N. EPT 12 ATEX 0784 Issue 2

The solenoid valves are identified by the code:	①	00÷99	②	00÷99	③	④	⑤	⑥
The electromagnetic devices are identified by the code:	H	②	0000÷9999	⑤	⑥			
While customized codes are identified by the code:	V	①	②	0000÷9999		④	⑤	⑥

Where:

DIGITS	①	②	③	④	⑤	⑥

Device type

L	2 way solenoid valves
C	3 way solenoid valves
D	5 way solenoid valve
E	2 way manual reset sol. valves
F	3 way manual reset sol. valves
G	5 way manual reset sol. valves
H	Electromagnetic devices

Body material

T	Brass UNI-5705/ UNI-4893
N	Nickel plated brass UNI5703 / UNI4893
B	Bronze UNI 7013 (Gas group IIB+H2)
H	Stainless steel AISI 303 UNI -X10CrNiS1810 AISI 304 UNI -X10CrNiS1810
I	Stainless steel AISI 316 UNI -X5CrNiMo1712 AISI315L UNI –X2CrNiMo1712
L	Al Light Alloys
C	Carbon steel

Connection types
(See safety instructions document)

Seals material

0	NBR (Buna N)
1	VITON
2	UREPAN
3	PTFE o RULON
4	Metallic
5	Neoprene
6	EPDM
7	HNBR
8	KALREZ
9	SPECIAL

Protection degree

C	Ex-db h IIC IP67 Ex tb IIIC

Options

	No option
W	Stable Manual Operator
X	Instable Manual Operator
Y	Transmission pin
/Ap	High pressure version
/SG	Degreasing for O2
/LT	ATEX Housing for Tamb -60°C
/C	Antinoise Condenser
/V	Varistor (spikes suppressor)
/LC	Low consumption coil
/SF	Silicone Lubricants free

Numbers "**00÷99**" and "**0000÷9999**" aren't relevant for the types of protection, details contained in manufacturer's documents.

[13] [14] **ANNEX**
EU-TYPE EXAMINATION CERTIFICATE N. EPT 12 ATEX 0784 Issue 2

Warning label
After de-energizing delay 15 min before opening.
Joints cannot be repaired

Routine tests
None

[16] **Assessment Report n° EPT.19.REL.01/1319026**
This EU-Type Examination Certificate is released after the positive result of the conformity assessment of the Council Directive 2014/34/EU and to harmonized technical standards listed in this Certificate; performed by the Notified Body Eurofins Product Testing Italy S.r.l., and reported in the Assessment Report above cited.

[17] **Special condition of use**
Not present

[18] **Essential Health and Safety Requirements**
Assured by compliance with harmonized standards.

[19] **Descriptive documents**
The equipment object of this Certificate is described by the following documents that are scheduled documents and therefore they cannot be modified without the explicit authorization of the Notified Body.

Document	Name	Rev	Date
Safety instructions	3860	5	2019/02
Drawing	3870	1	2019/02/19
Drawing	3870A	1	2019/02/19
Drawing	3870B	0	2003/01/09
Marking plate Atex	3880	3	2019/02/19

[20] **Terms and conditions**
The product liability rests with the Manufacturer, his representative or, in the absence of a representative, with the importer, in accordance with the General Product Safety Directive 2001/95/EC.
The following conditions may render this certificate invalid:
- changes in the design or construction of the product;
- changes or amendments to the 2014/34/EU Directive;
- changes or amendments in the standards which form the basis for documenting compliance with the essential requirements of the 2014/34/EU Directive.

[21] **Certificate History**
This Certificate is at its first issue and replace the EC-TYPE EXAMINATION CERTIFICATE n. EUM1 12 ATEX 0784 and its Supplement n. 1.

Issue	Description	Issue date
0	First issue	2012-09-07
1	Change of o-rings material and standard update	2015-06-06
2	Standard update (EN 60079-0, EN 60079-26, EN ISO 80079-36, EN ISO 80079-37)	2019-08-28

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PRD N° 119B
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Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Dionisio Bucchieri
Directive Responsible

End of Certificate

TE.MA. S.r.l
21020 Ternate (Va) - Via Baranchina, 4
Tel. 0332/960787 r.a. - Fax. 0332/961089
E.Mail: info@temavasconi.com
Web-site: www.temavasconi.com
P.I. 03316460967

Quality System Certified UNI EN ISO 9001:2015

DICHIARAZIONE CE DI CONFORMITÀ*/CE CONFORMITY DECLARATION*

Noi: **TE.MA. Srl**
We: **Via Baranchina, 4**
21020 Ternate - Varese

Dichiariamo sotto la nostra responsabilità che:
Declare under our own responsability that:

- TMS8 SERIES TERMOSTATI IN ESECUZIONE A SICUREZZA INTRINSECA
  Intrinsically safe temperature switches TMS8 series
- PMS8 SERIES PRESSOSTATI IN ESECUZIONE A SICUREZZA INTRINSECA
  Intrinsically safe pressure switches PMS8 series
- DPMS8 SERIES PRESSOSTATI DIFFERENZIALI IN ESECUZIONE A SICUREZZA INTRINSECA
  Intrinsically safe differential pressure switches DPMS8 series

descritti in questa dichiarazione sono conformi sono:
indicated in this declaration, are:
"DISPOSITIVI SEMPLICI" secondo la norma EN 60079-11:2012 (Costruzioni elettriche per atmosfere potenzialmente esplosive. Modo di protezione a sicurezza intrinseca "i"), paragrafo 5.7.
"SIMPLE APPARATUS" according to the EN 60079-11: 2012 Standard (Electrical apparatus for potentially explosive atmospheres - Intrinsic safety "i"), clause 5.7

La conformità è dimostrata dall'osservanza delle seguenti norme armonizzate
Confomity is obtained according to the following standards: EN IEC 60079-0: 2018; EN 60079-11 :2012

Marcatura */ Marking :*
Ex ia IIC T6 T4 Ga (GAS) / Ex ia IIIC T85°C T135°C Da (DUST)
T6/T85°C=temperatura ambiente (ambient temperature) -40°C+55°C
T4/T135°C=temperatura ambiente (ambient temperature) -40°C+90°C

Electrical characteristics: Ui = 30 V, Ii = 100mA, Ci =0, Li =0

CONDIZIONI ADDIZIONALI / *ADDITIONAL CONDITIONS*

Questi dispositivi non contengono proprie sorgenti efficaci in grado di provocare un'esplosione; essi possono essere utilizzati in ambienti con pericolo di esplosione con presenza di gas (gruppi IIA, IIB e IIC) e polveri combustibili (IIA, IIIB, IIC).
These devices do not contain own ignition sources which may cause an explosion; they can be used in hazardous area with risk of explosion with presence of gas (group IIA, IIB, IIC) and combustible dust (IIIA, IIIB, IIIC)

I termostati della serie TMS8 in esecuzione Ex ia devono essere alimentati mediante apparecchiature associate certificate in conformità alle norme EN 60079-0 e EN-60079-11 che rispettino i seguenti limiti: Uo = 30 V, Io = 100 mA, Po = 750 mW

Ex ia thermal switches TMS8 series must be supplied by certified associated apparatus according to EN 60079-0 and EN-60079-11 with the following electrical characteristics: Uo = 30 V, Io = 100 mA, Po = 750 mW

Notifica sistema qualità e Organismo Notificato:
Qualità system notification and Notified body nr.: ***INERIS 19ATEXQ403 (Ex Notified Body n. 0080)***

Ternate, 12.07.2023

TE.MA Srl
Fabrizio Vasconi

DRAWING NO. 1724000428-PR-PID-00019 REV. 04

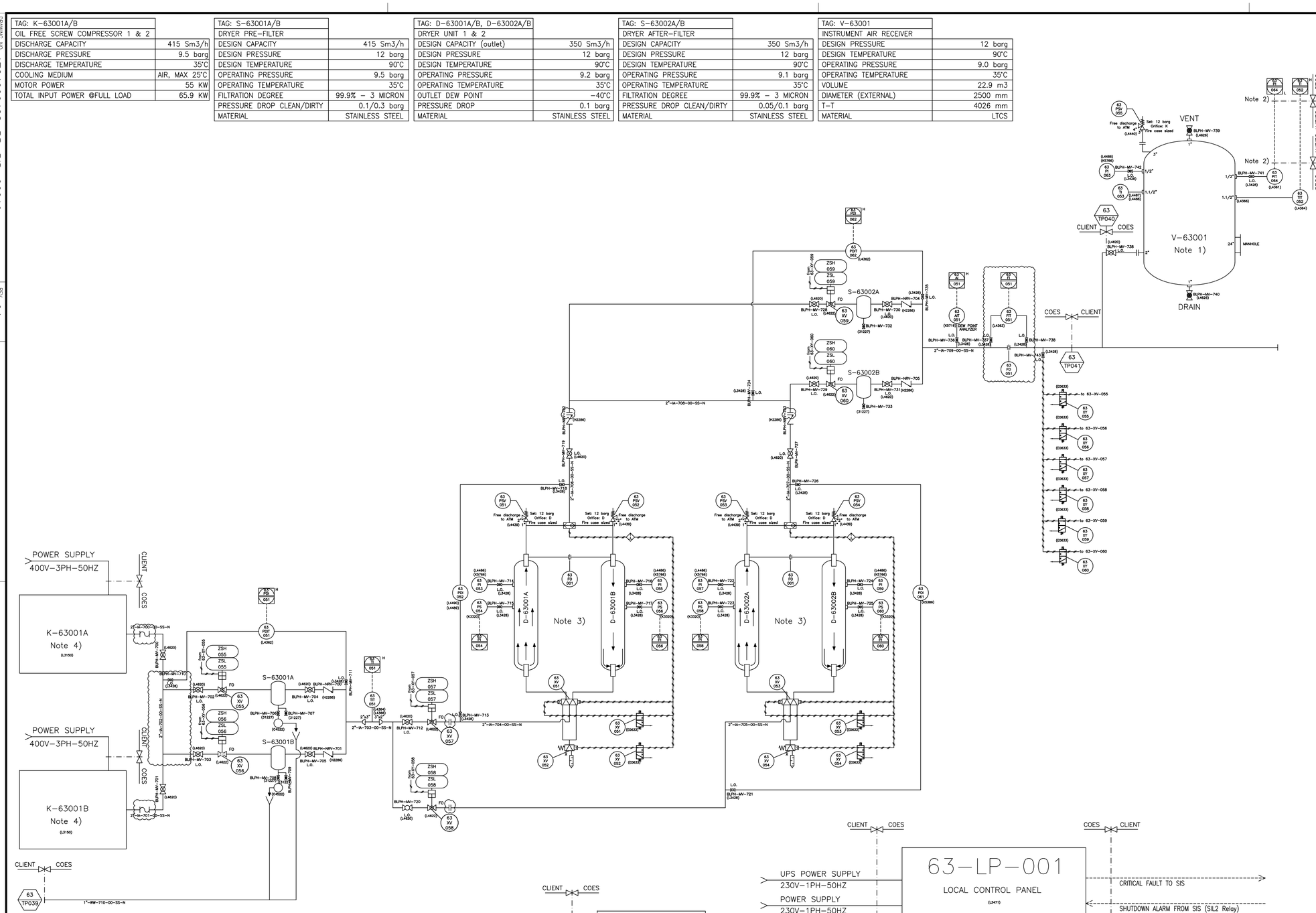
TAG: K-63001A/B	
OIL FREE SCREW COMPRESSOR 1 & 2	
DISCHARGE CAPACITY	415 Sm3/h
DISCHARGE PRESSURE	9.5 barg
DISCHARGE TEMPERATURE	35°C
COOLING MEDIUM	AIR, MAX 25°C
MOTOR POWER	55 KW
TOTAL INPUT POWER @FULL LOAD	65.9 KW

TAG: S-63001A/B	
DRYER PRE-FILTER	
DESIGN CAPACITY	415 Sm3/h
DESIGN PRESSURE	12 barg
DESIGN TEMPERATURE	90°C
OPERATING PRESSURE	9.5 barg
OPERATING TEMPERATURE	35°C
FILTRATION DEGREE	99.9% – 3 MICRON
PRESSURE DROP CLEAN/DIRTY	0.1/0.3 barg
MATERIAL	STAINLESS STEEL

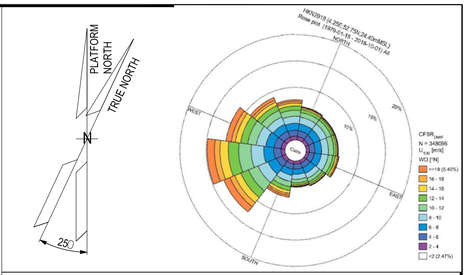
TAG: D-63001A/B, D-63002A/B	
DRYER UNIT 1 & 2	
DESIGN CAPACITY (outlet)	350 Sm3/h
DESIGN PRESSURE	12 barg
DESIGN TEMPERATURE	90°C
OPERATING PRESSURE	9.2 barg
OPERATING TEMPERATURE	35°C
OUTLET DEW POINT	-40°C
PRESSURE DROP	0.1 barg
MATERIAL	STAINLESS STEEL

TAG: S-63002A/B	
DRYER AFTER-FILTER	
DESIGN CAPACITY	350 Sm3/h
DESIGN PRESSURE	12 barg
DESIGN TEMPERATURE	90°C
OPERATING PRESSURE	9.1 barg
OPERATING TEMPERATURE	35°C
FILTRATION DEGREE	99.9% – 3 MICRON
PRESSURE DROP CLEAN/DIRTY	0.05/0.1 barg
MATERIAL	STAINLESS STEEL

TAG: V-63001	
INSTRUMENT AIR RECEIVER	
DESIGN PRESSURE	12 barg
DESIGN TEMPERATURE	90°C
OPERATING PRESSURE	9.0 barg
OPERATING TEMPERATURE	35°C
VOLUME	22.9 m3
DIAMETER (EXTERNAL)	2500 mm
T-T	4026 mm
MATERIAL	LTCS



CONNECTIONS			
POS.	TYPE	MATERIAL	SERVICE
TP039	ø 1" ANSI B16.5 150 R.F.	SS 316/316L	DRAIN DISCHARGE
TP041	ø 2" ANSI B16.5 150 R.F.	SS 316/316L	INSTRUMENT AIR OUTLET
TP040	ø 2" ANSI B16.5 150 R.F.	SS 316/316L	AIR RECEIVER



NOTES

1) INSTRUMENT AIR RECEIVER IS SUPPLIED LOOSE
2) CABLE, CABLE GLANDS AND CABLE TRAY PROVIDED BY COES. WIRING CONNECTION TO THE PLC SHALL BE EXECUTED BY CLIENT.
3) AUTOMATIC SWITCH-OVER DIRECTLY MANAGED BY PLC.
4) REFER TO SHEET NO. 002 FOR DETAILED AIR COMPRESSOR P&ID.
5) FOR THE EXCHANGED SERIAL SIGNALS SEE VENDOR'S DOCUMENT "I/O LIST" NUMBER 1724000428-IN-LIS-00016
6) FOR THE OPERATING PHILOSOPHY SEE VENDOR'S DOCUMENT "SYSTEM/PACKAGE FUNCTIONAL DESCRIPTION" NUMBER 1724000428-MAC-SP-00003

LEGEND

- SKID MOUNTED INSTRUMENT
- TIE-IN POINT
- SKID PLC SIGNAL
- PROCESS LINE
- INSTRUMENT AIR / IMPULSE LINE
- ELECTRICAL / INSTRUMENT SIGNAL
- SOFTWARE SIGNAL
- AUTOMATIC DRAIN TRAP
- 5-WAY PNEUMATIC VALVE
- THREADED BALL VALVE
- 3-WAY PNEUMATIC VALVE
- FLANGED BALL VALVE
- 3-WAY SELF ACTUATED VALVE
- PRESSURE RELIEF VALVE
- SOLENOID VALVE
- SILENCER
- EXPANSION JOINT

HOLDS

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
Giuseppe Cavallo	23/04/25

coes

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
05	02/04/25	GT	MC	TM	ACCEPTED FOR CONSTRUCTION (AFC)
04	28/10/24	GT	MC	TM	ACCEPTED FOR CONSTRUCTION (AFC)
03	05/09/24	GT	MC	TM	ACCEPTED FOR CONSTRUCTION (AFC)
02	04/07/24	GT	MC	TM	ISSUE FOR REVIEW (IFR)
00	21/03/24	GT	MC	TM	ISSUE FOR REVIEW (IFR)

CROSSWIND | ROSETTI MARINO

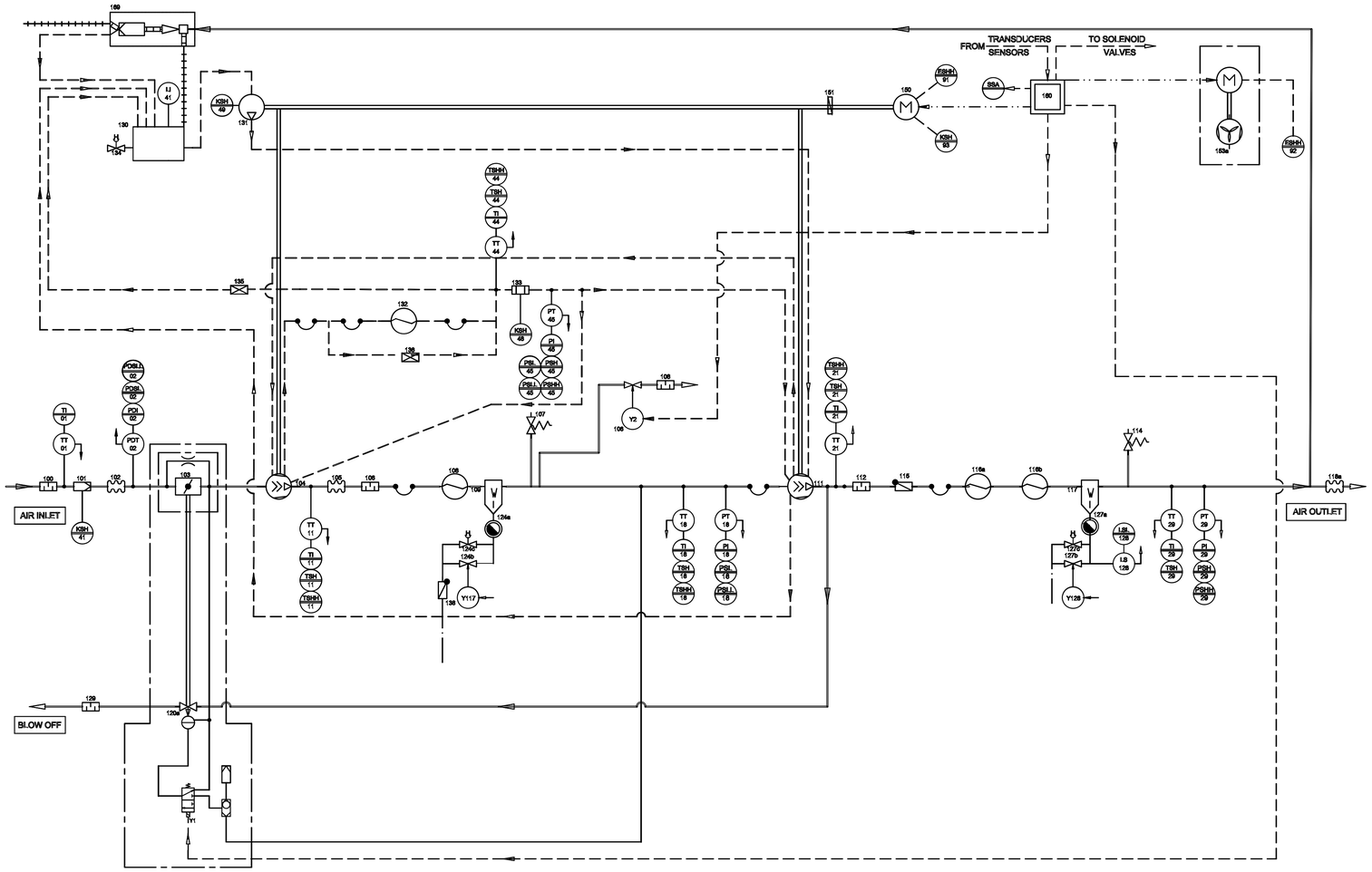
TITLE : BASE LOAD POWER HUB (BLPH)
PACKAGE P&ID
INSTRUMENT AIR PACKAGE

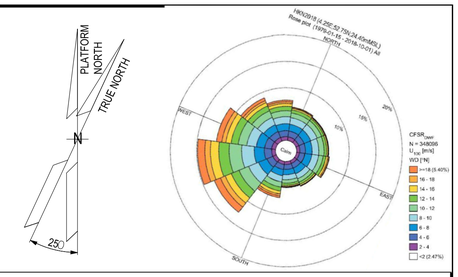
CONTRACT NO./TITLE	CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK	SCALE	N/A
DRAWN GT	CHECKED MC	APPROVED TM	DATE 28/10/24
A1	DRAWING NO. 1724000428-PR-PID-00019	SHEET 001	REV. 04

File Name : 1724000428-PR-PID-00019

DRAWING NO. 1724000428-PR-PID-00019

REV. 04





NOTES

LEGEND

HOLDS

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
05	02/04/25	GT	MC	TM	ACCEPTED FOR CONSTRUCTION (AFC)
04	28/10/24	GT	MC	TM	ACCEPTED FOR CONSTRUCTION (AFC)
03	05/09/24	GT	MC	TM	ACCEPTED FOR CONSTRUCTION (AFC)
02	04/07/24	GT	MC	TM	ISSUE FOR REVIEW (IFR)
00	21/03/24	GT	MC	TM	ISSUE FOR REVIEW (IFR)

CROSSWIND

ROSETTI MARINO

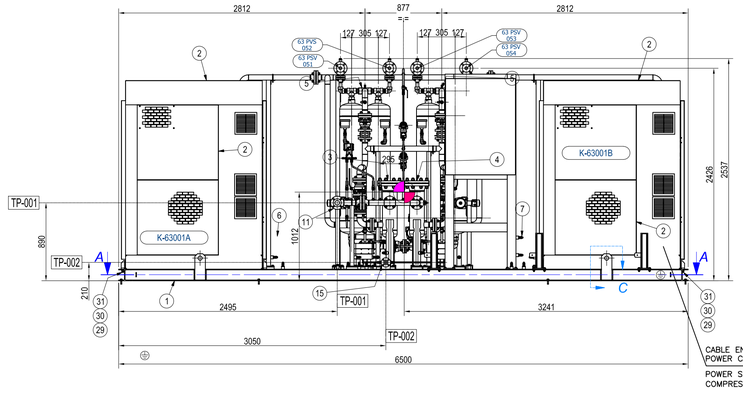
TITLE :

BASE LOAD POWER HUB (BLPH)
PACKAGE P&ID
INSTRUMENT AIR PACKAGE

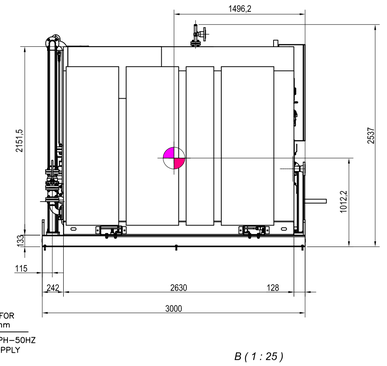
CONTRACT NO./TITLE	CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE	N/A
DRAWN	GT	CHECKED	MC	APPROVED	TM	DATE	28/10/24
A1	DRAWING NO. 1724000428-PR-PID-00019			SHEET	002	REV.	04

File Name : 1724000428-PR-PID-00019

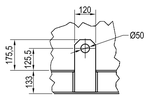
DRAWING NO. 1724000428-MAC-DA-00005 REV. 03



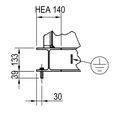
VIEW FROM B



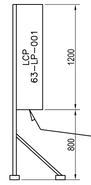
B (1 : 25)



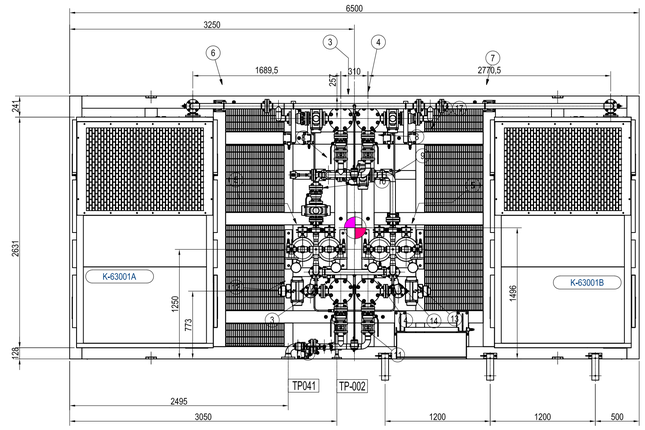
DETAIL C (1 : 12.5)

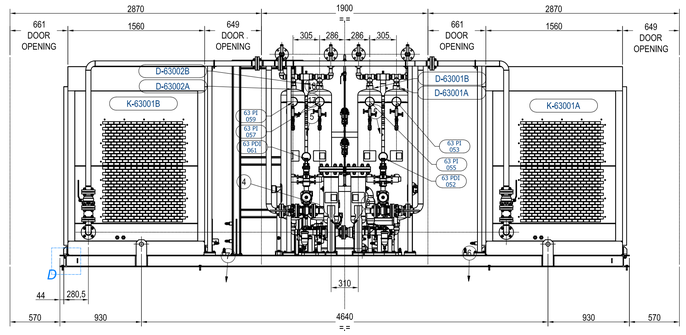


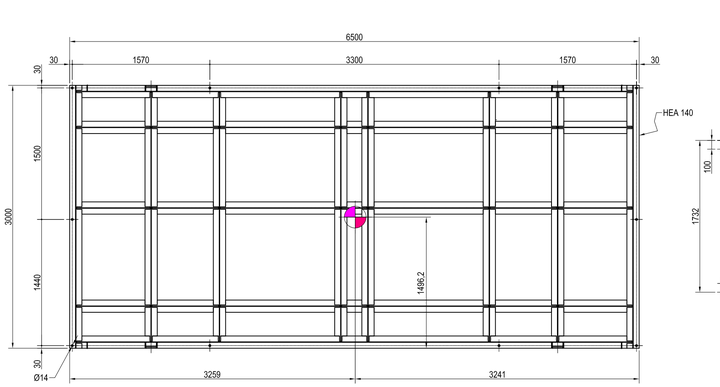
DETAIL D (1 : 12.5)



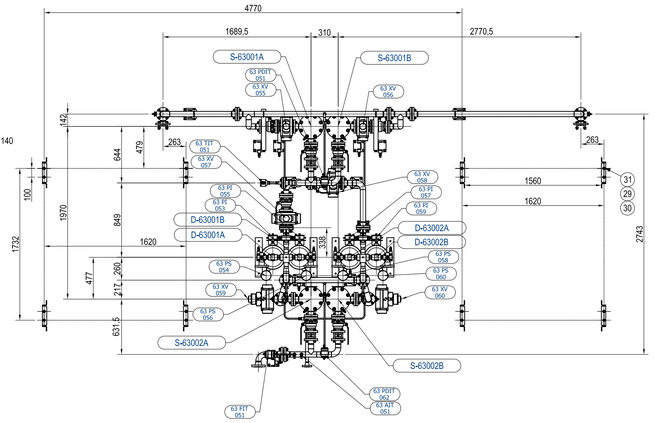
GLAND PLATE CABLE ENTRY SUITABLE
POWER SUPPLY 230V (UPS)
POWER SUPPLY 230V (Normal)
LOCAL CONTROL PANEL POWER SUPPLY



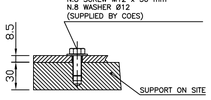




SECTION A-A (1 : 25)



N.8 SCREW M12 x 30 mm
N.8 WASHER Ø12
(SUPPLIED BY COES)

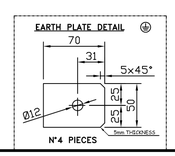


MAX ALLOWABLE LOADS AT B.L. CONNECTIONS						
	FORCES [kN]			MOMENTS [kNm]		
	VL	P	VC	MC	MT	ML
A	1.8	1.5	1.8	0.3	0.4	0.2
B	2	2	2	0.8	0.8	0.8

TAG NUMBER OF EQUIPMENTS	
TAG	DESCRIPTION
K-63001A/B	OIL FREE SCREW COMPRESSOR 1&2
S-63001A/B	DRYER PRE-FILTER
D-63001A/B	DRYER UNIT 1
D-63002A/B	DRYER UNIT 2
S-63002A/B	DRYER AFTER-FILTER
V-63001	INSTRUMENT AIR RECEIVER

CONNECTIONS			
POS.	TYPE	SERVICE	MATERIAL
TP002	ø 1" ANSI 150# R.F.	DRAIN DISCHARGE	SS 316/316L
TP041	ø 2" ANSI 150# R.F.	INSTRUMENT AIR OUTLET	SS 316/316L

EARTH PLATE DETAIL



N°4 PIECES

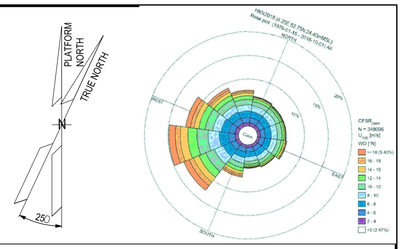
FOUNDATION LOADS TABLE			
	LIFTING	EMPTY	OPERATION
VERTICAL (kN)	10.8	10.8	10.8
MAX SHEAR Y (kN)	N.A.	4.76	4.76
MAX SHEAR X (kN)	N.A.	6.68	6.68
MAX MOMENT Y (kNm)	N.A.	0.04	0.04
MAX MOMENT X (kNm)	N.A.	0.18	0.18



PACKAGE NAMEPLATE

MANUFACTURER	COES SRL – STEZZANO (BG)		
SERVICE	INSTRUMENT AIR PACKAGE		
YEAR	2024	SERIAL NUMBER	I240007
WEIGHT	11000 kg	ITEM	A-63000
DISCHARGE AIR PROCESS DATA			
FLOW	350 Sm3/h	PRESSURE	9.1 barg
TEMPERATURE	35°C	DEW POINT	-40°C
DESIGN DATA			
PRESSURE	12 barg	TEMPERATURE	-29 / +90°C

CE 0425 2014/68/EU – Cat. II



NOTES

1. SKID TOTAL WEIGHT: 5000 kg
2. FOR EQUIPMENT WEIGHT REFER TO EQUIPMENT DS, DOC. NO. 1724000428-MAC-DS-00011
3. FOR DESIGN PARAMETERS & CODES REFER TO EQUIPMENT DS, DOC. NO. 1724000428-MAC-DS-00011
4. FOR WELDING DETAILS REFER TO WELDING SPECIFICATION, DOC. NO. 1724000428-WEL-LIS-00021
5. FOR PAINTING DETAILS REFER TO PAINTING SPECIFICATION, DOC. NO. 1724000428-MAT-PRO-00022
6. NO LUBRICATION REQUIRED
7. FOR LOAD DETAILS REFER TO STRUCTURAL CALCULATION, DOC. NO. 1724000428-ST-RE-00010

LEGEND

HOLDS

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
Giuseppe Cavallo	03/01/24

coes

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
03	17/12/24	GT	MC	TM	ACCEPTED FOR CONSTRUCTION (AFC)
02	06/08/24	GT	MC	TM	ISSUE FOR REVIEW (IFR)
01	08/05/24	GT	MC	TM	ISSUE FOR REVIEW (IFR)
00	21/03/24	GT	MC	TM	ISSUE FOR REVIEW (IFR)

CROSSWIND

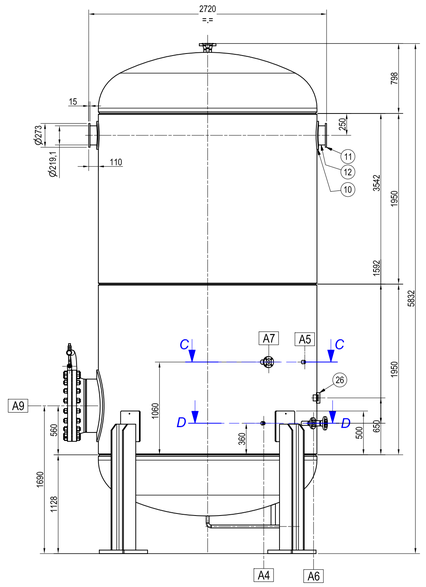
ROSETTI MARINO

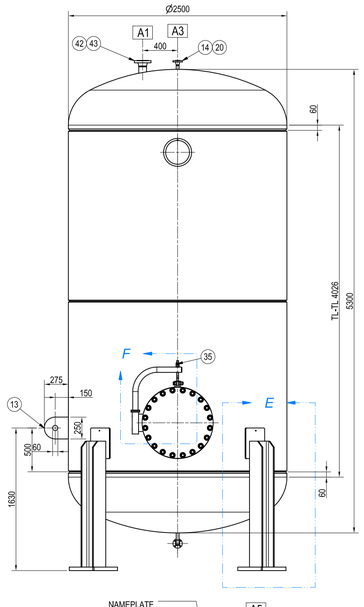
TITLE :
BASE LOAD POWER HUB (BLPH)
PACKAGE GENERAL ARRANGEMENT
INSTRUMENT AIR PACKAGE

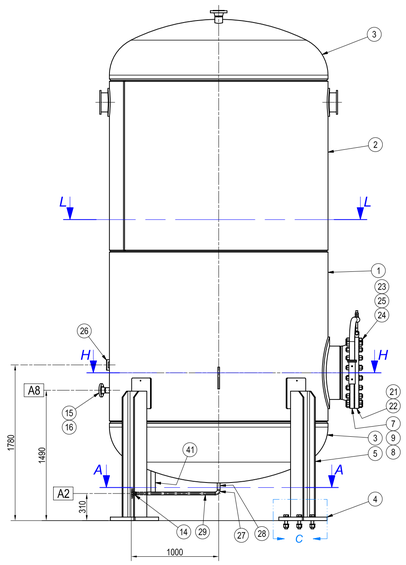
CONTRACT NO./TITLE	CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK		SCALE	N/A
DRAWN GT	CHECKED MC	APPROVED TM	DATE	17/12/24
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File Name : 1724000428-MAC-DA-00005

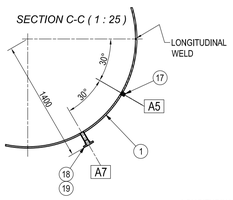
DRAWING NO. 1724000428-MAC-DD-00006 REV. 04

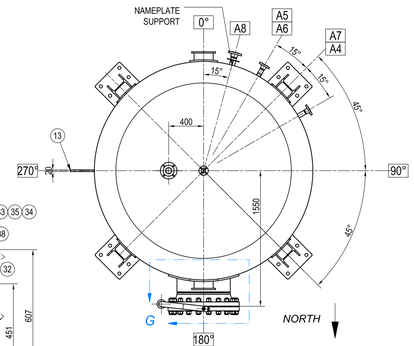




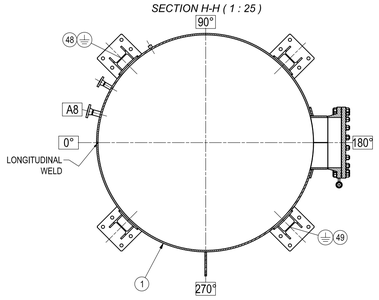


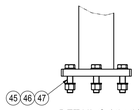
SECTION C-C (1 : 25)





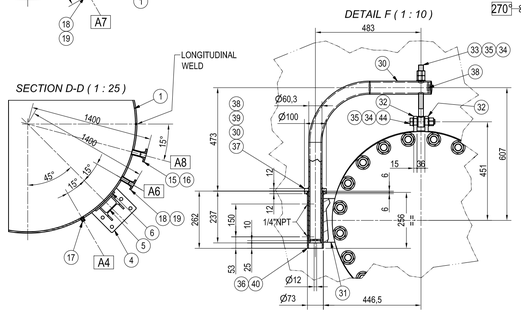
SECTION H-H (1 : 25)

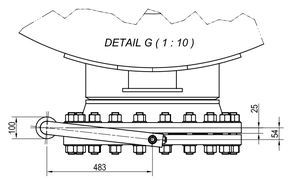


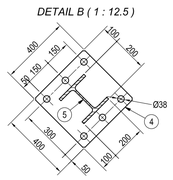


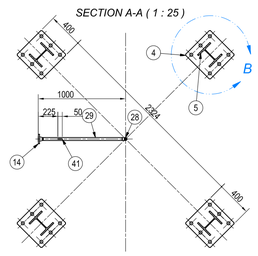
DETAIL C (1 : 10)

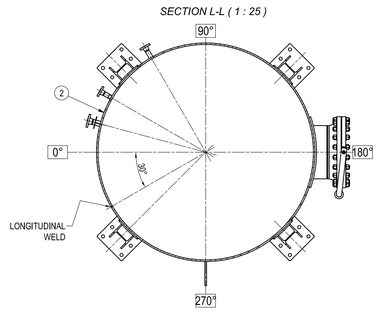
DETAIL F (1 : 10)











NAMEPLATE DETAIL

MANUFACTURER	COES SRL - STEZZANO (BG)
EQUIPMENT	AIR RECEIVER V-63001
SERIAL NUMBER	S240119 YEAR 2024
DESIGN CODE	ASME VIII Div. 1 Ed. 2021 / PED 2014/68/UE
CONFORMITY	Category IV
FLUID	AIR
DESIGN PRESSURE	12 barg
DESIGN TEMPERATURE	-29 / + 90°C
TEST PRESSURE	17.2 barg
CORROSION ALLOWANCE	1.5 mm
WEIGHT	7450 kg
VOLUME	23100 l

CE 0425

ELENCO PARTI / BILL OF MATERIAL

POS	QTY	DESCRIPTION	MATERIAL	WGT	TEST	COD. COES
1	1	SHELL øe2500 Thk. 18 L=1950 (Manhole 24" side)	SA 516 Gr.70	2096,5	B	L3714
2	1	SHELL øe2500 Thk. 18 L=1950	SA 516 Gr.70	2138,5	B	L3715
3	2	ELL. HEAD ø/2464 Thk. 18mm (Thk. 15.3mm min.)	SA 516 Gr.70	2053,1	B	L3728
4	4	PLATE 400x400 thk=40 - N° 6 holes Ø38	SA 516 Gr.70	192,7	C	L3998
5	5760,000 mm	PROFILE HEB 200 L=1440	S 355 J2	351,6	C	F7552
6	4	PAD 350x300 thk=15	SA 516 Gr.70	49,9	B	L3999
7	1	FLANGE W.N.24" Sch. 40 150# RF	SA 350 Gr. LF2 Cl.1	135,9	B	H5869
8	1	PAD thk=18 for Man Hole 24"	SA 516 Gr.70	32,2	B	L3729
9	1	SHELL øe610 Thk. 18 L=200	SA 516 Gr.70	45,6	B	L3730
10	2	PAD Øe=320 Øi=222 thk=18 for Trunnion	SA 516 Gr.70	11,8	B	L4000
11	2	DISK Ø273 thk=15	SA 516 Gr.70	13,8	C	D2222
12	200,000 mm	PIPE SMLSS 8 Sch.80	SA 333 Gr. 6	12,6	C	D9560
13	1	LIFTING LUG A=250 E=150 HOLE Ø60 THK=20	SA 516 Gr.70	9,3	B	L3717
14	2	FLANGE W.N.1" Sch. XXS 150# RF	SA 350 Gr. LF2 Cl.1	2,6	B	L3726
15	1	FLANGE W.N.2" Sch. 160 150# RF	SA 350 Gr. LF2 Cl.1	3,1	B	F7664
16	100,000 mm	PIPE SMLSS 2 Sch.160	SA 333 Gr. 6	1,1	B	C1399
17	2	COUPLING 1/2" NPT-F 6000#	SA 350 Gr. LF2 Cl.1	0,7	B	K1337
18	2	FLANGE W.N.1 1/2" Sch. 160 150# RF	SA 350 Gr. LF2 Cl.1	4,1	B	K1808
19	200,000 mm	PIPE SMLSS 1 1/2 Sch.160	SA 333 Gr. 6	1,4	B	H0405
20	65,000 mm	PIPE SMLSS 1 Sch.XXS	SA 333 Gr. 6	0,4	B	D9604
21	1	GKT SPIRAL WOUND 24" 150# Thk. 4.5mm	316L+GRAPHITE	4,7	C	C3128
22	1	FLANGE BLIND B16.5 24" 150# RF	SA 350 Gr. LF2 Cl.1	184,8	B	F1221
23	40	WASHER 1 1/4	C.S.	2,9	C	C6198
24	20	STUD-BOLT 1.1/4" UN x 190	SA 320 Gr.L7	23,7	B	L4002
25	40	NUT 1 1/4 UN	SA 194 Gr.7	13,2	B	J2834
26	1	SUPPORT NAMEPLATE 140x120 Thk.4mm	SA 516 Gr.70	0,5	B	E4247
27	1	ELBOW L.R. 90° 1" Sch. XXS	SA 420 WPL6	0,3	B	D9605
28	98,675 mm	PIPE SMLSS 1 Sch.XXS	SA 333 Gr. 6	0,5	B	D9604
29	902,528 mm	PIPE SMLSS 1 Sch.XXS	SA 333 Gr. 6	4,9	B	D9604
30	1	BENDING PIPE SMLSS 2" SCH. 40 L=1130 (DAVIT 24" 150#)	SA 333 Gr. 6	8,5	C	L4020
31	1	PLATE 200x52.5 thk=18 (DAVIT 24" 150#)	SA 516 Gr.70	1,3	B	L4001
32	2	PLATE 50x70 Thk. 15 mm FOR DAVIT 24"	SA 516 Gr.70	0,7	B	L4230
33	1	LIFTING EYE M22x260	SA 350 Gr. LF2 Cl.1	1	C	L4375
34	3	WASHER A 22	C 40	0,1	C	3393
35	3	NUT M22 UNI 5587	SA 194 Gr.7	0,3	C	L1368
36	1	ROD Øe=100 Øi=74 Thk=12	SA 516 Gr.70	0,3	C	L4016
37	1	ROD Øe=100 Øi=61 Thk=12	SA 516 Gr.70	0,5	C	L4376
38	1	DISK Øe=48 thk=6	SA 516 Gr.70	0,1	C	L4377
39	1	DISK Øe=48 Øi=12 thk=6	SA 516 Gr.70	0,1	C	L4378
40	256,000 mm	PIPE SMLSS 2 1/2 Sch.40 L=256	SA 333 Gr. 6	2,2	C	G6831
41	242,500 mm	PLATE 50x6 L=242,5	SA 516 Gr.70	0,6	B	L4380
42	90,000 mm	PIPE SMLSS 3 Sch.160	SA 333 Gr. 6	1,9	B	F8721
43	1	FLANGE W.N.3" Sch. 160 150# RF	SA 350 Gr. LF2 Cl.1	5,8	B	F7680
44	1	SCREW - M22 x 100 - UNI 5739	SA 320 Gr.L7	0,4	C	L0436
45	24	SCREW - M33 x 140 - UNI 5739	Cl. 8.8	1,9	C	L6140
46	48	WASHER A 33	C 40	5,8	C	F2511
47	24	NUT M33 UNI 5587	Cl. 8	0,4	C	L6139
48	1	EARTHING POINT HILTI STUD	SS	-	C	
49	1	EARTHING POINT WELDED PLATE	SS316	-	C	

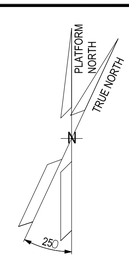
MATERIAL TEST SYMB. (according to EN 10204)

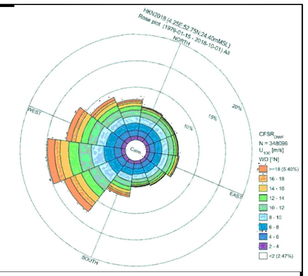
A	Tested material (3.2)
B	Material with certificate of manufacturer (3.1)
C	Material without certificate
D	Material with certificate of manufacturer (2.2)

POS	DESCRIPTION	PIPE CONN.
A1	PSV	WN 3" 150# RF SCH. 160
A2	DRAIN	WN 1" 150# RF SCH. XXS
A3	VENT	WN 1" 150# RF SCH. XXS
A4	PRESSURE GAUGE PG	COUPLING 1/2" NPTF 6000#
A5	PRESSURE TRANSMITTER PT	COUPLING 1/2" NPTF 6000#
A6	TEMPERATURE GAUGE TG	WN 1.1/2" 150# RF SCH. 160
A7	TEMPERATURE TRANSMITTER TT	WN 1.1/2" 150# RF SCH. 160
A8	IN/OUT	WN 2" 150# RF SCH. 160
A9	MAN HOLE	WN 24" 150# RF SCH. 40

DESIGN DATA

Code	Applicable codes and standards		ASME VIII Div.1 Ed. 2021 / PED 2014/68/EU		
	Third party		ICIM GROUP		
	STAMP		No		
	NATIONAL BOARD		No		
	CRN REGISTRATION		N.A.		
Pressure	Design pressure internal		12	barg	
	Working pressure		9	barg	
	Hydrotest pressure vertical		17,2	barg	
	Hydrotest pressure horizontal		N.A.	barg	
	Static head in design		0,6	barg	
	MAWP		14,14	barg	at temperature of 90 °C
Temperat.	Design temperature		90	°C	
	Working temperature		35	°C	
	M.D.M.T. @ MAWP		-29	°C	
	Test temperature min.		10	°C	
Miscellaneous	Corrosion allowance		1,5	mm	
	Out of roundness		1%		
	Insulation		-	mm	
	Capacity		23100,0	ℓ	
	Tollerance on thickness	Plates	0.25 (>4); 6% (<=4)	mm	
		Pipes	-12.5	%	
		Forgings	=0/1	mm	
Fluid	Nature		AIR		
	Physical state		GAS		Group 2
	Specific weight		1,29	kg/Nm³	
Weldings	Joint efficiency (E)		0.85		
	Rad. Cat/class		RT 3		
	Test Coupons		NO		
	Radiographic Examination		SPOT	note:	
Heat treatement and testing	Head assembly in 1 piece		N.A.		
	Heat treatment		NO	note:	
	Liquid penetrant Examination (PT)		YES	note:	
	Ultrasonic Examination (UT)		NO	note:	
	Impact test		NO	note:	Exempt Para. UCS-66 / YES PED 2014/68/EU Annex 1
	External Finishing		According to Coating Specification no. 1724000428-MAT-PRO-00022		
	Internal Finishing		According to Coating Specification no. 1724000428-MAT-PRO-00022		
Ext. Loads	Wind		YES	note:	Project Spec. 123A90-DDL-ST-SP-90017
	Seismic		YES	note:	Project Spec. 123A90-DDL-ST-SP-90017
Weight	Empty		7450,0	kg	
	Hydrotest condition		30550,0	kg	





NOTES

NOTE:

1. QUANTITIES IN MATERIAL LIST FOR No. 1 VESSEL.
2. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
3. ALL THICKNESSES SHOWN ARE MINIMUM AFTER FORMING.
4. TOLERANCE OF VESSELS: ACCORDING TO COES PROCEDURE CTP03684 Rev.2
5. FLANGES DRILLED HOLES SHALL STRADDLE MAIN CENTER AXIS OF VESSEL.
6. FLANGES FACE FINISHING: 125-250 AARH.
   FLANGES AND BLIND FLANGES <= 24" ACC TO ASME B16.5 (2020).
7. VENT HOLES ON REINF. PAD: 1/4" NPT/F EACH PAD OR SEGMENT
   PERFORM TEST AT 1 bar(g) WITH AIR AND SOAPY SOLUTION.
8. ALL NOZZLES WITHOUT INTERNAL PROJECTION, TO BE FLUSHED WITH INSIDE SURFACE OF THE VESSEL. THE INSIDE EDGE OF ALL NOZZLES TO BE ROUNDED.
9. FOR WELDING DETAILS REFER TO THE RELATED WELDING BOOK, DOCUMENT NO. 1724000428-WEL-LIS-00021.
10. BUTTWELDING FITTINGS ACCORDING TO ASME B16.9 (2018)
11. THREADED FITTINGS ACCORDING TO ASME B16.11 (2021)
12. QUANTITY 1: SEE ORIENTATION PLAN.

LEGEND

HOLDS

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

Giuseppe Cavallo 12/02/25

COES

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
04	07/02/25	GT	GT	TM	ISSUE FOR INFORMATION (IFI)
03	02/01/25	STC	GT	TM	ISSUE FOR INFORMATION (IFI)
02	07/10/24	STC	GT	TM	ISSUE FOR INFORMATION (IFI)
01	05/07/24	STC	GT	TM	ISSUE FOR INFORMATION (IFI)
00	29/05/24	STC	GT	TM	ISSUE FOR INFORMATION (IFI)

CROSSWIND

ROSETTI MARINO

TITLE :

BASE LOAD POWER HUB (BLPH)
EQUIPMENT SECTIONAL DRAWING WITH BILL OF MATERIAL
INSTRUMENT AIR RECEIVER V-63000

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK		SCALE 1:35	
DRAWN STC	CHECKED GT	APPROVED TM	DATE 07/02/2025
A1	DRAWING NO. 1724000428-MAC-DD-00006	SHEET 001	REV. 04

File Name : 1724000428-MAC-DD-00006

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000

PACKAGE PIPING SCHEMATICS AND BILL OF MATERIALS

Document Number: 1724000428-MAC-DD-00008

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
Giuseppe Cavallo	17/12/24

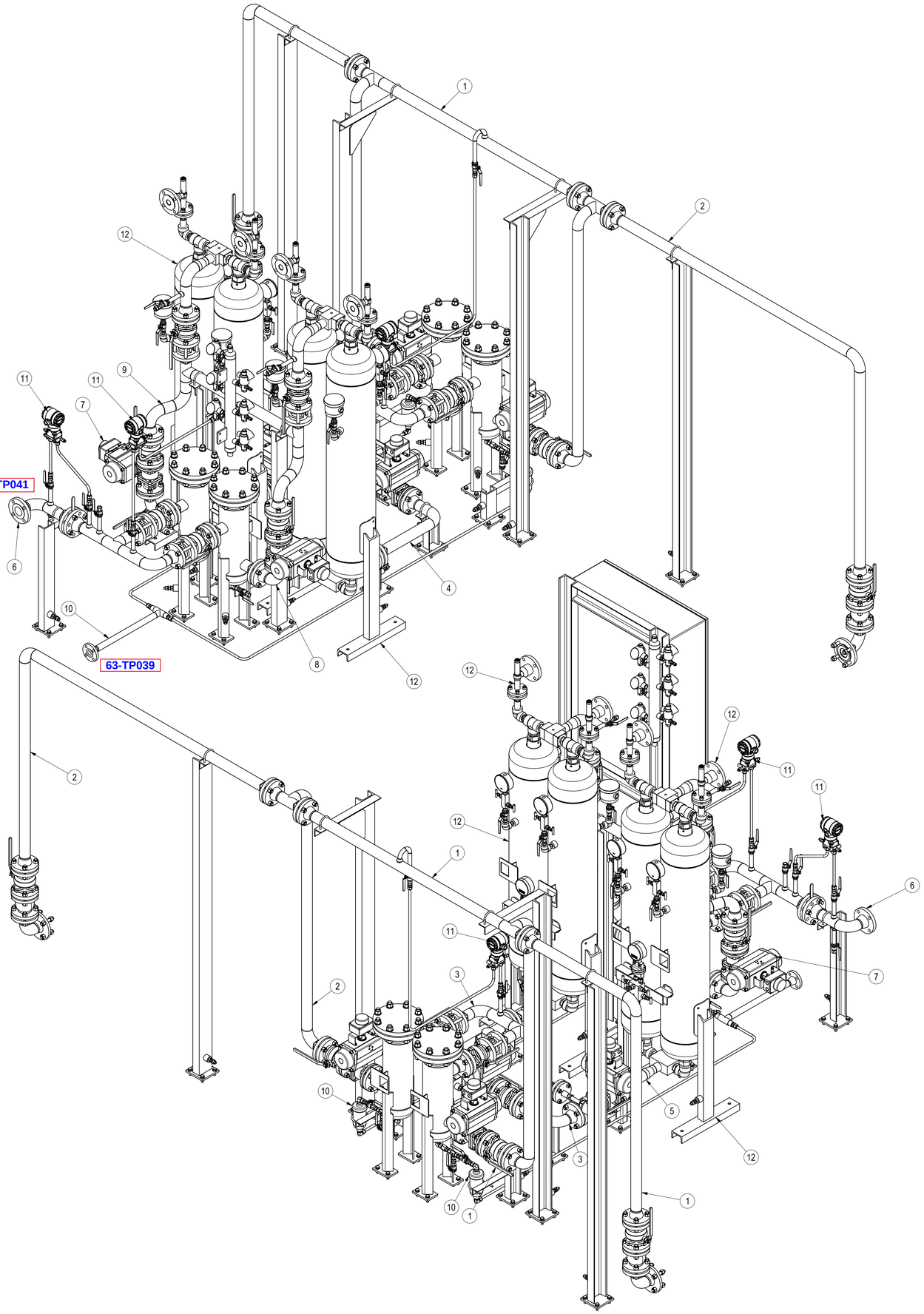
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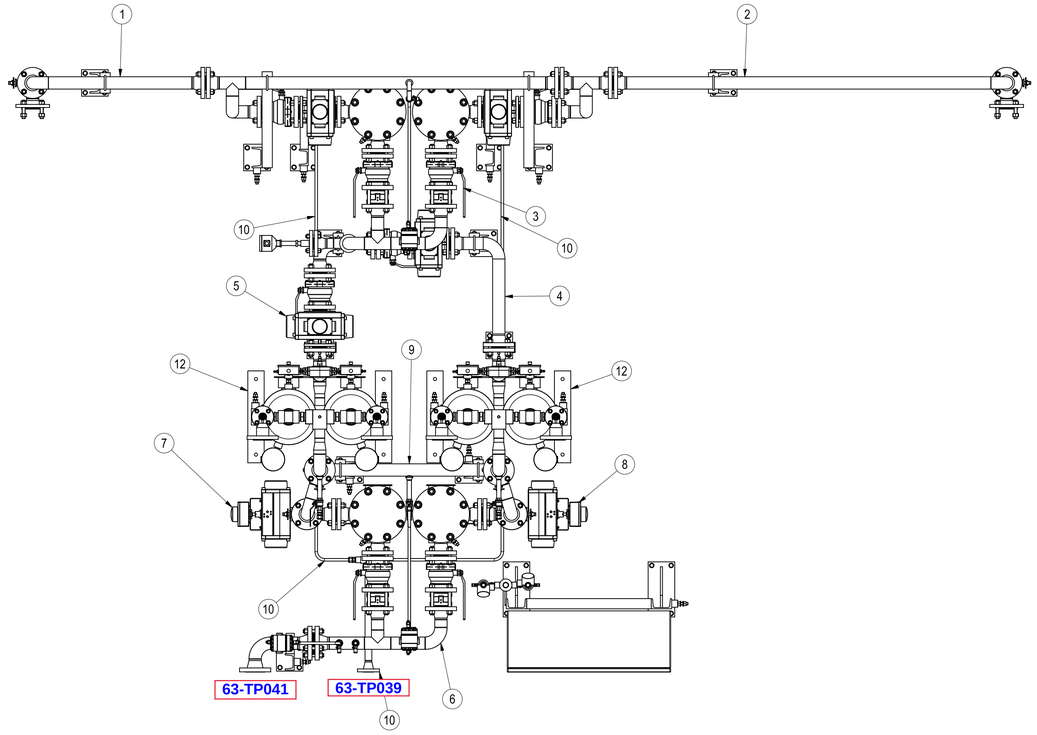
01	16/12/2024	Accepted For Construction (AFC)	GT	MC	TM
00	04/09/2024	Issue for Review (IFR)	GT	MC	TM
Rev.	Date	Description	Prepared	Reviewed	Approved

COES

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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	1	PIPING 01		138	CCO54154	L4678
2	1	PIPING 02		134,9	CCO54154	L4679
3	1	PIPING 03		61,4	CCO54154	L4680
4	1	PIPING 04		81,4	CCO54154	L4681
5	1	PIPING 05		72,5	CCO54154	L4682
6	1	PIPING 06		55,9	CCO54154	L4683
7	1	PIPING 07		76,1	CCO54154	L4684
8	1	PIPING 08		76,1	CCO54154	L4685
9	1	PIPING 09		52,1	CCO54154	L4686
10	1	PIPING 10		18,2	CCO54154	L4687
11	1	PIPING ACCESSORIES		4,2	CCO54154	L4688
12	2	AIR DRYER ASSEMBLY Ø273 - HME 42/S		361,8	CCO54159	L5162





GENERAL NOTE

BALL VALVES ARE INTENDED FULL BORE

REV	DATE	DESCRIPTION	PREPARED	APPROVED
1	16/12/2024	REVISION	STC	GT
0	20/08/2024	ISSUE	STC	GT

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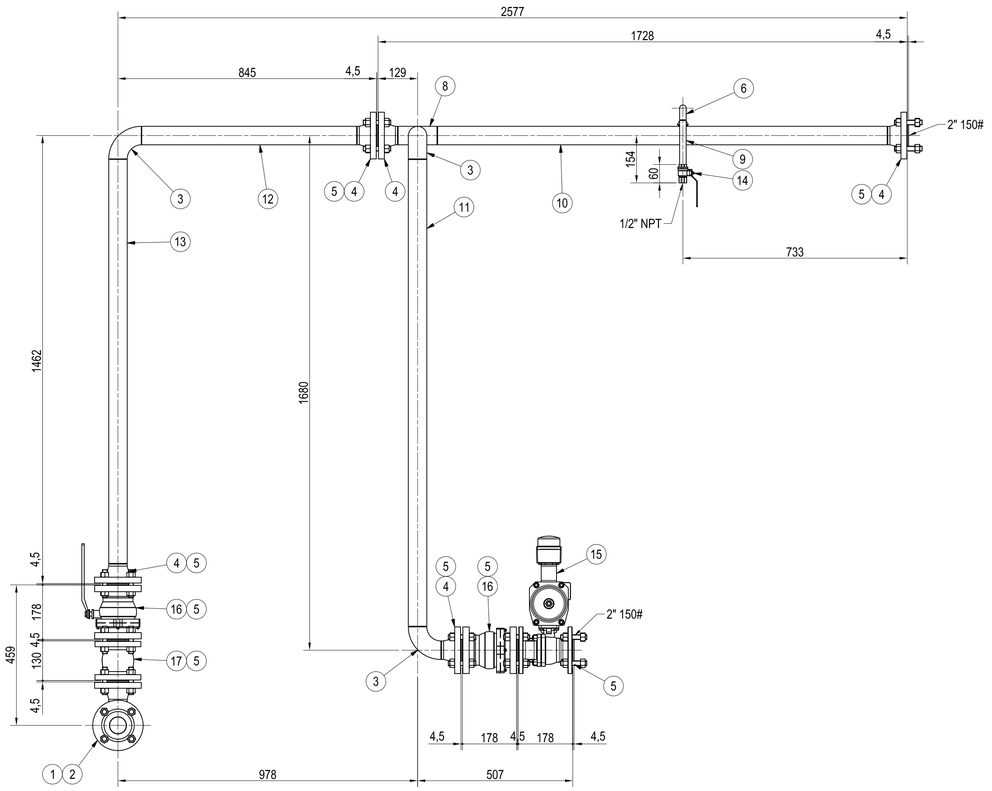
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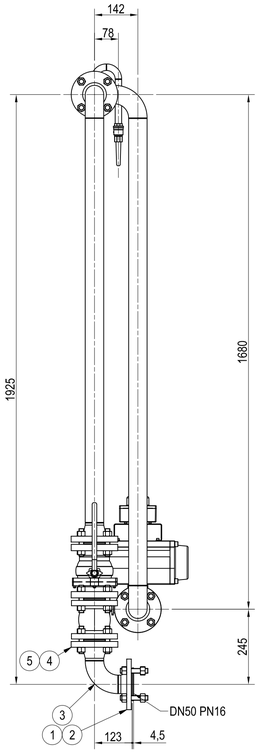
ROSETTI MARINO
SKID AIR BLPH NETHERLAND
- PIPING -
COES CODE L4677

DISEGNO N° / DRAWING N°: CCO54154

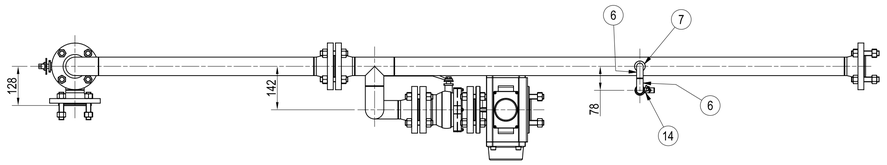
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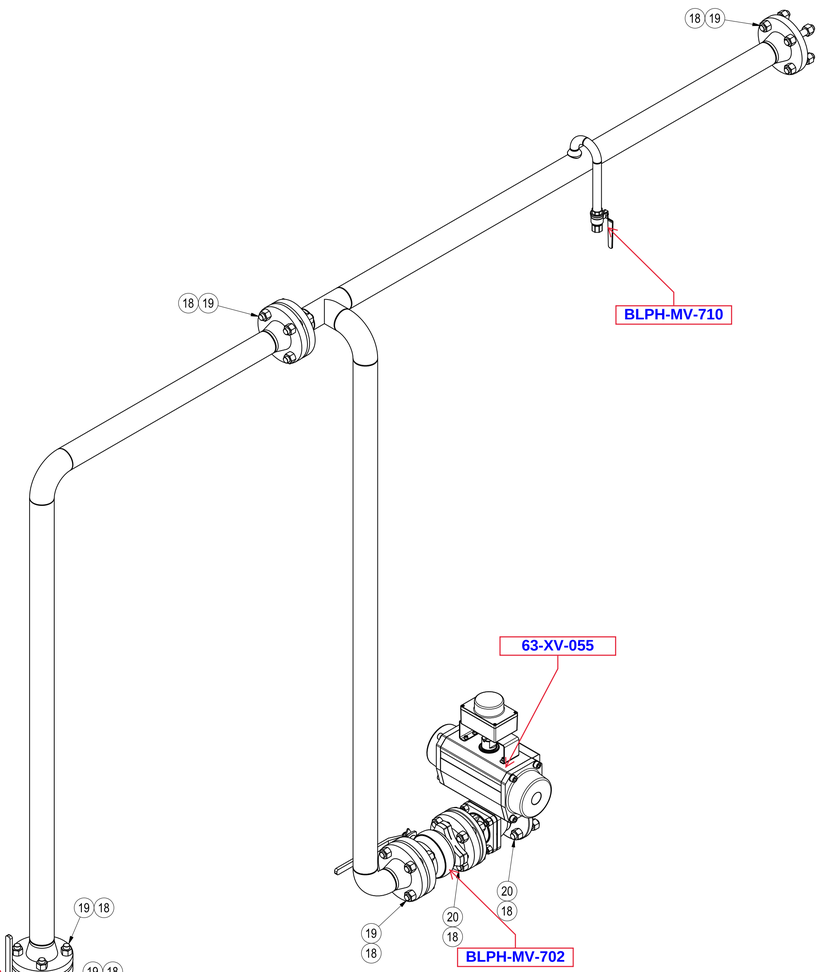
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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	1	GKT SPIRAL WOUND DN 50 PN16 Thk. 4.5mm	316L+GRAPHITE	0,2		E3404
2	1	FLANGE W.N. UNI EN 1092-1 DN50 PN16	SA 182 F316/316L	2,5		D7132
3	4	ELBOW L.R. 90° 2" Sch.10S	SA 403 WP316/316L	1,9		D3795
4	6	FLANGE W.N.2" Sch. 10S 150# RF	SA 182 F316/316L	16,5		D3502
5	8	GKT SPIRAL WOUND 2" 150# Thk. 4.5mm	316L+GRAPHITE	1,2		C2416
6	2	ELBOW L.R. 90° 1/2" Sch.40S	SA 403 WP316/316L	0,2		D4195
7	1	WELDOLET DN 2 1/2 - 2" x 1/2" Sch.40S	SA 182 F316/316L	0,1		F5757
8	1	TEE 2" Sch.10S	SA 403 WP316/316L	0,6		D6574
9	150,000 mm	PIPE SMLSS 1/2" Sch.40S	SA 312 TP316/316L	0,2		C5215
10	1467,900 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	5,9		D3488
11	1523,600 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	6,2		D3488
12	701,561 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	2,8		D3488
13	1319,000 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	5,3		D3488
14	1	BALL VALVE 1/2"NPTF ATEX	SA 351 CF8M	0,3		L3428
15	1	SPLIT BODY BALL VALVE 2" 150#RF WITH ACTUATOR+ FC	SA 351 CF8M	54,2		L4622
16	2	SPLIT BODY BALL VALVE Ø2" 150# CODE 68J00010	SA 351 CF8M	23,8		L4620
17	1	COMPENSATORE 2" 150# RF L=130 AISI 316/316L	AISI 316/316L	7,8	L5472	L5472
18	72	NUT 5/8 UNC	SA 194 Gr.8M	3,1	-	C6123
19	28	STUD-BOLT 5/8" UNC x 90	SA 193 B8M Cl.1	3,9	-	C6117
20	8	STUD-BOLT 5/8" UNC x 85	SA 193 B8M Cl.1	1,1	-	D3181



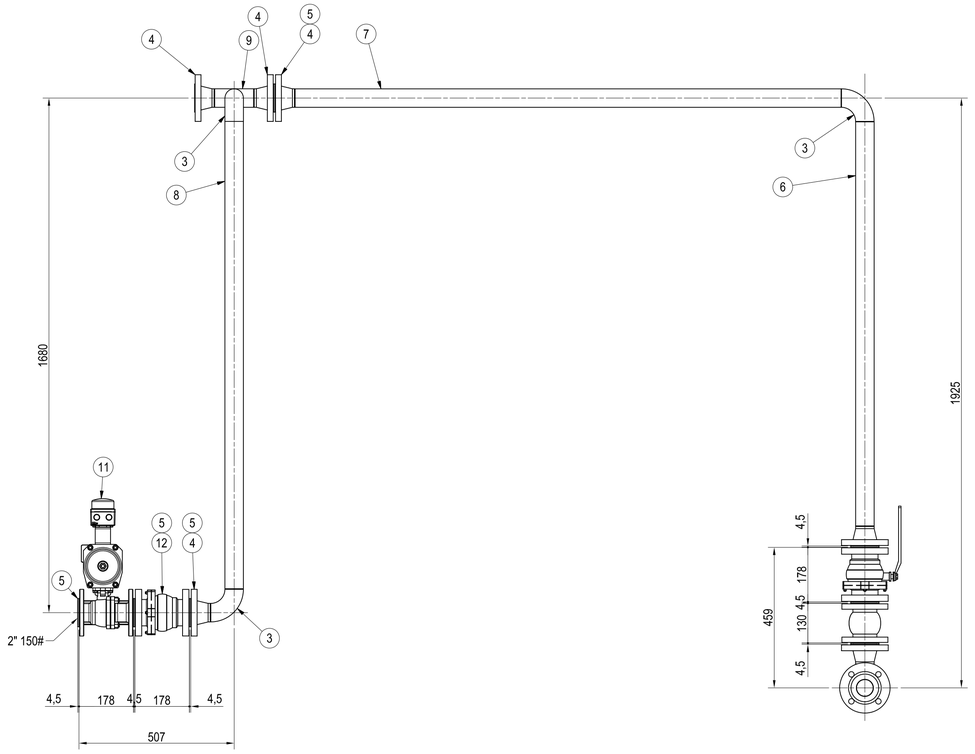


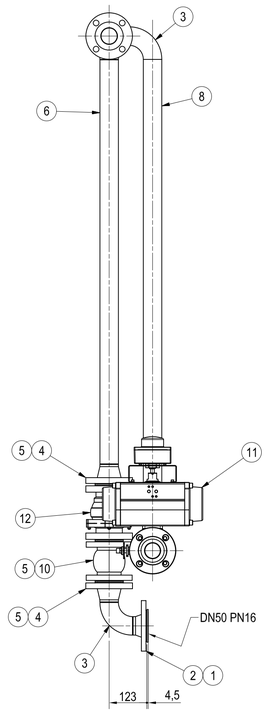
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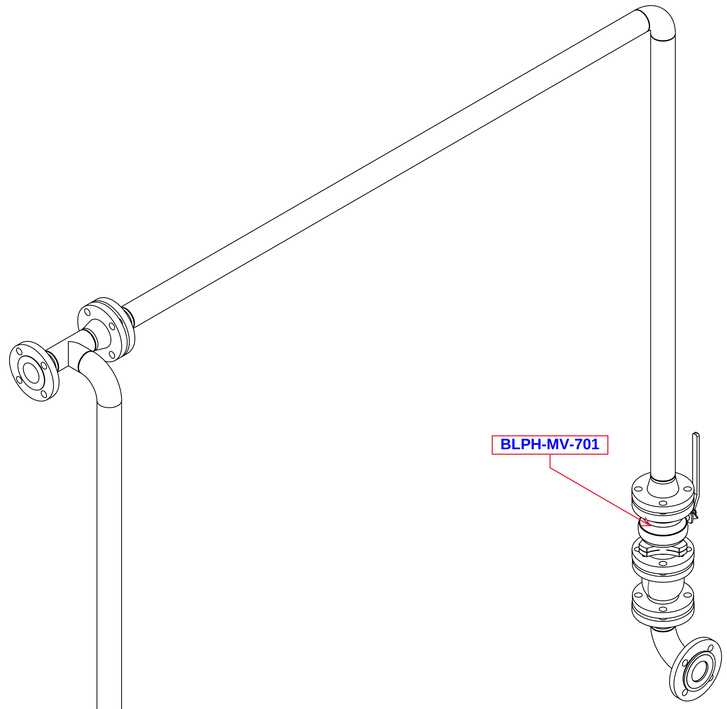
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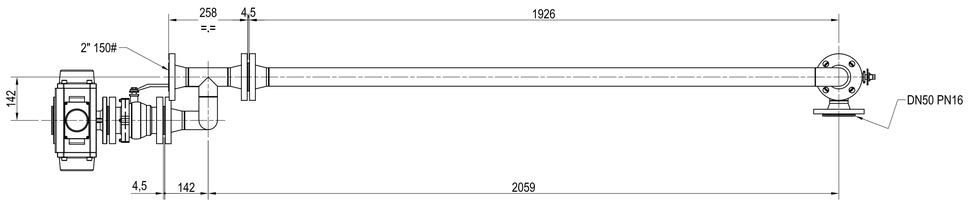
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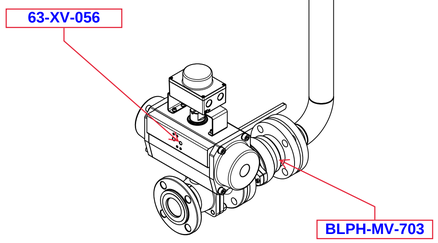
ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	1	GKT SPIRAL WOUND DN 50 PN16 Thk. 4.5mm	316L+GRAPHITE	0,2		E3404
2	1	FLANGE W.N. UNI EN 1092-1 DN50 PN16	SA 182 F316/316L	2,5		D7132
3	4	ELBOW L.R. 90° 2" Sch.10S	SA 403 WP316/316L	1,9		D3795
4	6	FLANGE W.N.2" Sch. 10S 150# RF	SA 182 F316/316L	16,5		D3502
5	7	GKT SPIRAL WOUND 2" 150# Thk. 4.5mm	316L+GRAPHITE	1,1		C2416
6	1319,000 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	5,3		D3488
7	1782,639 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	7,2		D3488
8	1525,600 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	6,2		D3488
9	1	TEE 2" Sch.40S	SA 403 WP316/316L	0,9		26255
10	1	COMPENSATORE 2" 150# RF L=130 AISI 316/316L	AISI 316/316L	7,8	L5472	L5472
11	1	SPLIT BODY BALL VALVE 2" 150#RF WITH ACTUATOR+ FC	SA 351 CF8M	54,2		L4622
12	2	SPLIT BODY BALL VALVE Ø2" 150# CODE 68J00010	SA 351 CF8M	23,8		L4620











1	16/12/2024	REVISION	STC	GT
0	20/08/2024	ISSUE	STC	GT
REV	DATE	DESCRIPTION	PREPARED	APPROVED

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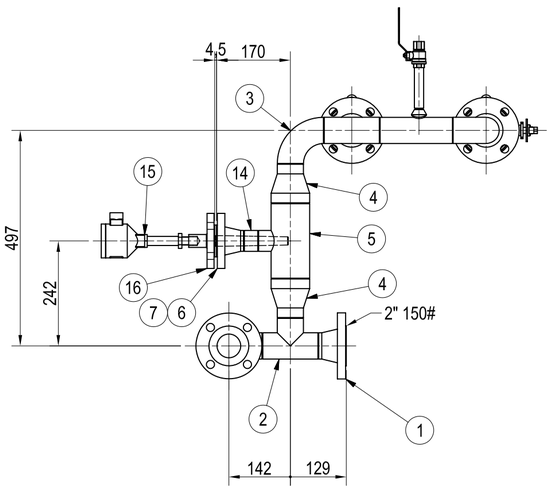
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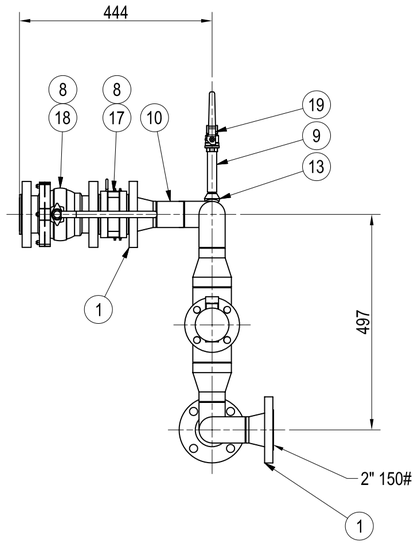
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SKID AIR BLPH NETHERLAND
- PIPING 02 -
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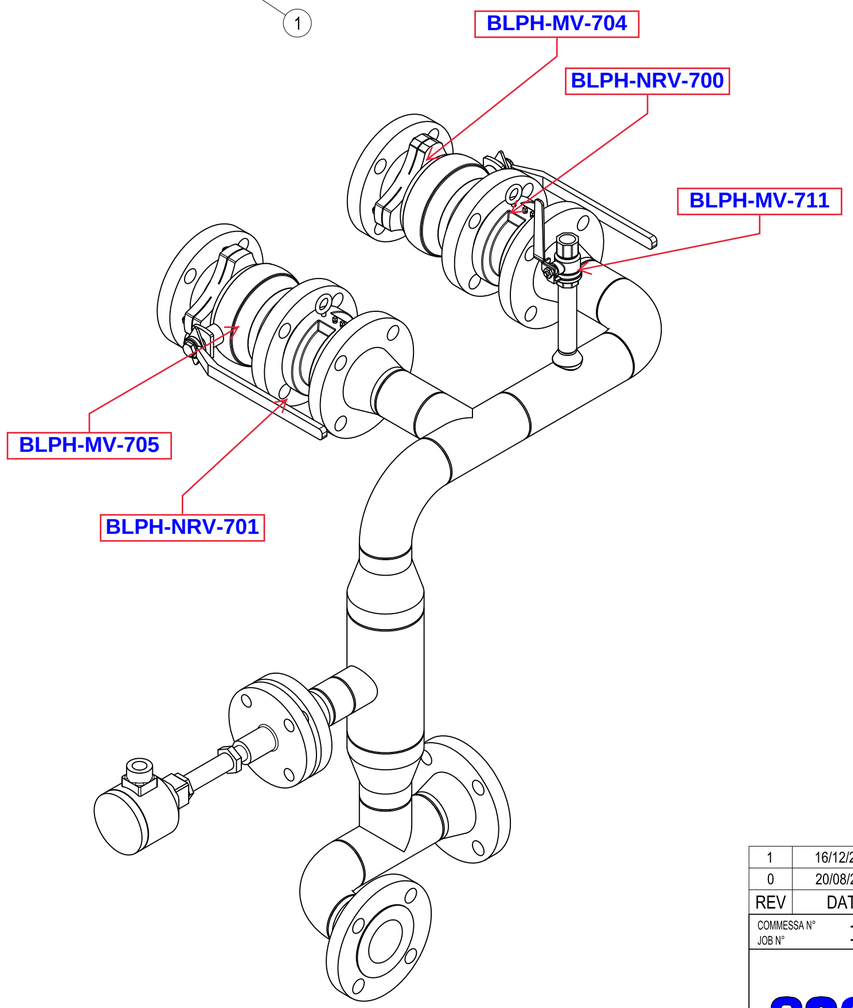
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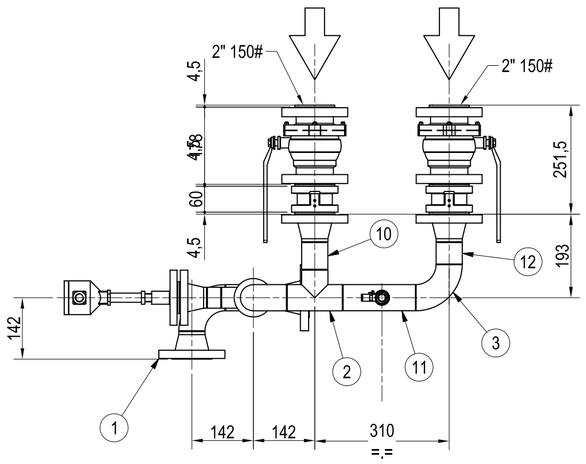
This dwg is the property of COES S.r.l. and is solely for the use of the party to which it is handed over





ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	4	FLANGE W.N.2" Sch. 10S 150# RF	SA 182 F316/316L	11		D3502
2	2	TEE 2" Sch.10S	SA 403 WP316/316L	1,2		D6574
3	3	ELBOW L.R. 90° 2" Sch.10S	SA 403 WP316/316L	1,5		D3795
4	2	CONC_REDUCTION 3" x 2" Sch.10S	SA 403 WP316/316L	1		E1464
5	1	REDUC. TEE 3" x 1 1/2" Sch.40S	SA 403 WP316/316L	2,1		D2331
6	1	FLANGE W.N.1 1/2" Sch. 40S 150# RF	SA 182 F316/316L	1,9		C4193
7	1	GKT SPIRAL WOUND 1.1/2" 150# Thk. 4.5mm	316L+GRAPHITE	0,1		C3127
8	6	GKT SPIRAL WOUND 2" 150# Thk. 4.5mm	316L+GRAPHITE	0,9		C2416
9	100,000 mm	PIPE SMLSS 1/2" Sch.40S	SA 312 TP316/316L	0,1		C5215
10	61,700 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,2		D3488
11	166,800 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,7		D3488
12	49,500 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,2		D3488
13	1	WELDOLET DN 2 1/2 - 2" x 1/2" Sch.40S	SA 182 F316/316L	0,1		F5757
14	30,872 mm	PIPE SMLSS 1 1/2" Sch.40S	SA 312 TP316/316L	0,1		C4194
15	1	TEMPERATURE ELEMENT 1/2"NPT L=170	AISI 316/316L	3,4		L4364
16	1	THERMOWELL 114CM0100FAB2SC070AQ8XW 1.1/2" 150# x 1/2" NPTF L=170	AISI 316L	2,3	L4366	L4366
17	2	CHECK VALVE 2" 150# (DUAL PLATE TYPE)	AISI 316	3,8		H2286
18	2	SPLIT BODY BALL VALVE Ø2" 150# CODE 68J00010	SA 351 CF8M	23,8		L4620
19	1	BALL VALVE 1/2"NPTF ATEX	SA 351 CF8M	0,3		L3428





1	16/12/2024	REVISION		STC	GT
0	20/08/2024	ISSUE		STC	GT
REV	DATE	DESCRIPTION		PREPARED	APPROVED
COMMESSA N° JOB N°	166/24	SERIAL N°	FORMATO SIZE A2	SCALA SCALE	1 : 10

coes

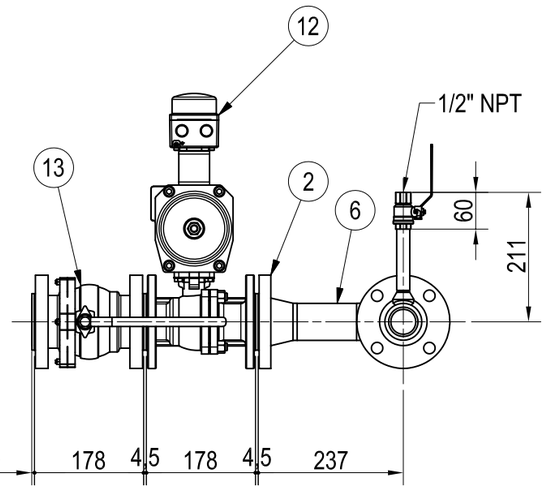
ROSETTI MARINO
SKID AIR BLPH NETHERLAND
- PIPING 03 -
COES CODE L4680

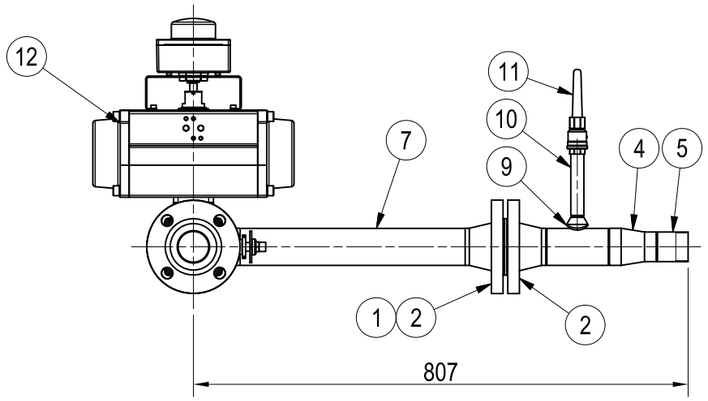
DISEGNO N° DRAWING N°
CCO54154

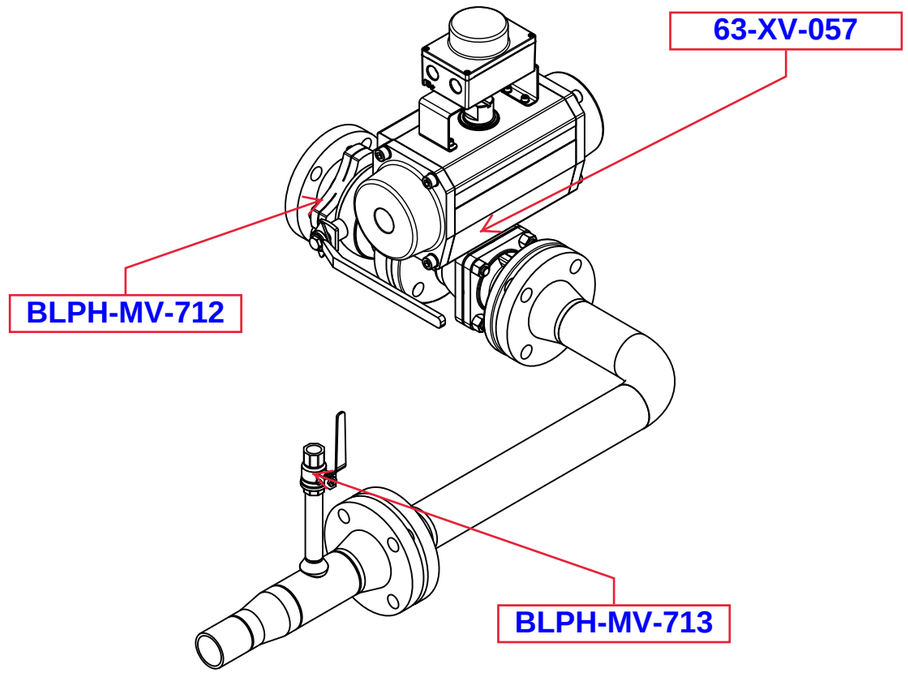
FOGLIO SHEET 4 DI OF 14

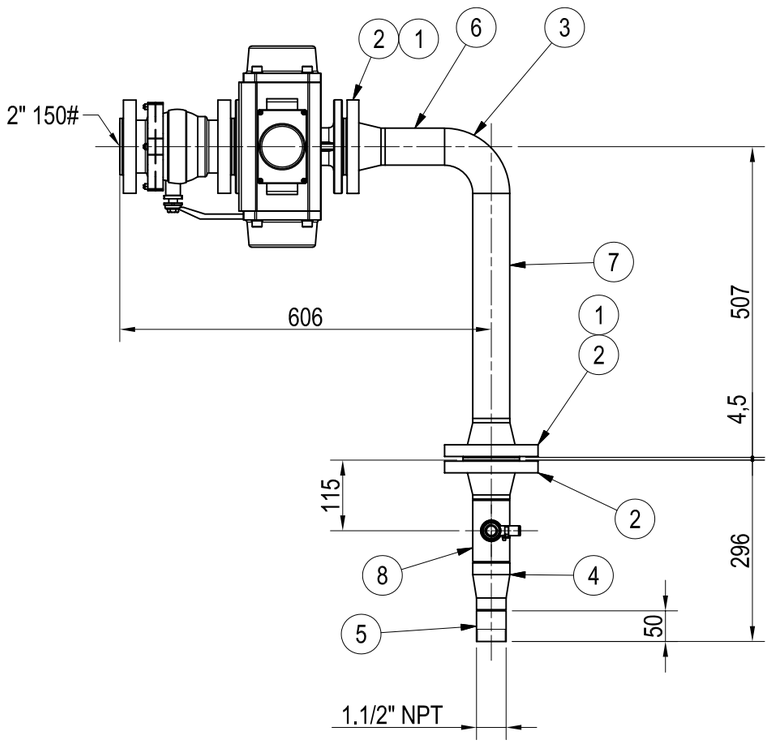
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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	4	GKT SPIRAL WOUND 2" 150# Thk. 4.5mm	316L+GRAPHITE	0,6		C2416
2	3	FLANGE W.N.2" Sch. 10S 150# RF	SA 182 F316/316L	8,3		D3502
3	1	ELBOW L.R. 90° 2" Sch.10S	SA 403 WP316/316L	0,5		D3795
4	1	CONC_REDUCTION 2" x 1 1/2" Sch.40S	SA 403 WP316/316L	0,4		26253
5	50,000 mm	PIPE SMLSS 1 1/2" Sch.40S	SA 312 TP316/316L	0,2		C4194
6	96,900 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,4		D3488
7	367,000 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	1,5		D3488
8	100,000 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,4		D3488
9	1	WELDOLET DN 2 1/2 - 2" x 1/2" Sch.40S	SA 182 F316/316L	0,1		F5757
10	100,000 mm	PIPE SMLSS 1/2" Sch.40S	SA 312 TP316/316L	0,1		C5215
11	1	BALL VALVE 1/2"NPTF ATEX	SA 351 CF8M	0,3		L3428
12	1	SPLIT BODY BALL VALVE 2" 150#RF WITH ACTUATOR+ FC	SA 351 CF8M	54,2		L4622
13	1	SPLIT BODY BALL VALVE Ø2" 150# CODE 68J00010	SA 351 CF8M	11,9		L4620









1	16/12/2024	REVISION	STC	GT
0	20/08/2024	ISSUE	STC	GT
REV	DATE	DESCRIPTION	PREPARED	APPROVED

COMMESSA N° JOB N°	166/24	SERIAL N°	FORMATO SIZE	A3	SCALA SCALE 1 : 10

coes

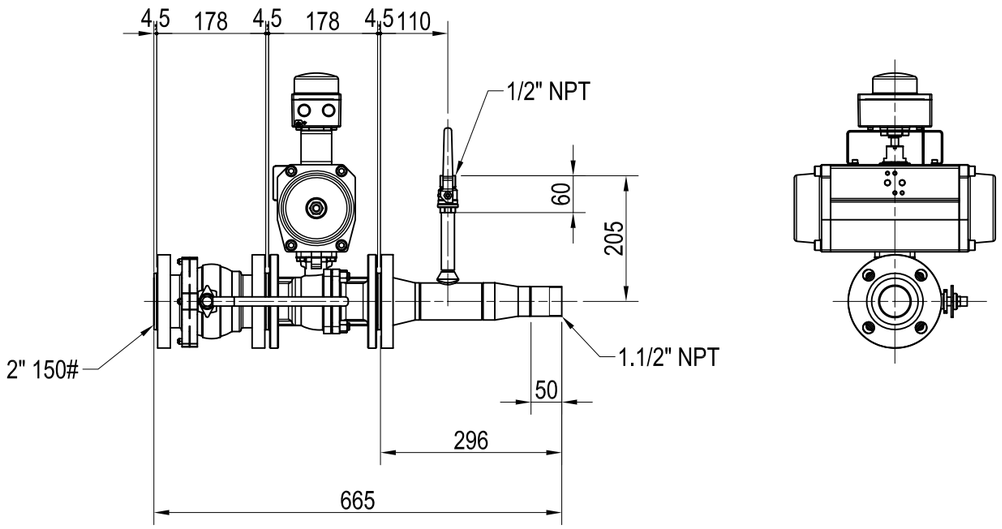
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SKID AIR BLPH NETHERLAND
- PIPING 04 -
COES CODE L4681

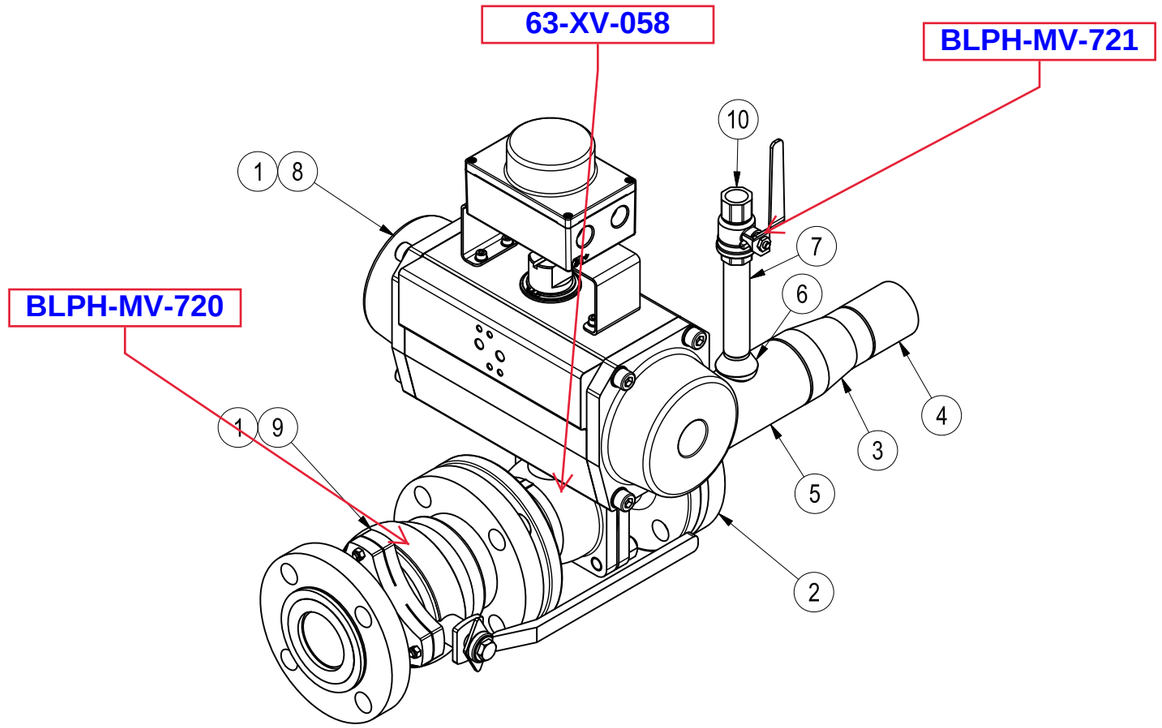
DISEGNO N° DRAWING N°
CCO54154

FOGLIO SHEET 5 | DI OF 14

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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	3	GKT SPIRAL WOUND 2" 150# Thk. 4.5mm	316L+GRAPHITE	0,5		C2416
2	1	FLANGE W.N.2" Sch. 10S 150# RF	SA 182 F316/316L	2,8		D3502
3	1	CONC_REDUCTION 2" x 1 1/2" Sch.40S	SA 403 WP316/316L	0,4		26253
4	50,000 mm	PIPE SMLSS 1 1/2" Sch.40S	SA 312 TP316/316L	0,2		C4194
5	100,000 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,4		D3488
6	1	WELDOLET DN 2 1/2 - 2" x 1/2" Sch.40S	SA 182 F316/316L	0,1		F5757
7	100,000 mm	PIPE SMLSS 1/2" Sch.40S	SA 312 TP316/316L	0,1		C5215
8	1	SPLIT BODY BALL VALVE 2" 150#RF WITH ACTUATOR+ FC	SA 351 CF8M	54,2		L4622
9	1	SPLIT BODY BALL VALVE Ø2" 150# CODE 68J00010	SA 351 CF8M	11,9		L4620
10	1	BALL VALVE 1/2"NPTF ATEX	SA 351 CF8M	0,3		L3428





1	16/12/2024	REVISION	STC	GT
0	20/08/2024	ISSUE	STC	GT
REV	DATE	DESCRIPTION	PREPARED	APPROVED

COMMESSA N° JOB N°	166/24	SERIAL N°	FORMATO SIZE	A3	SCALA SCALE	1 : 10

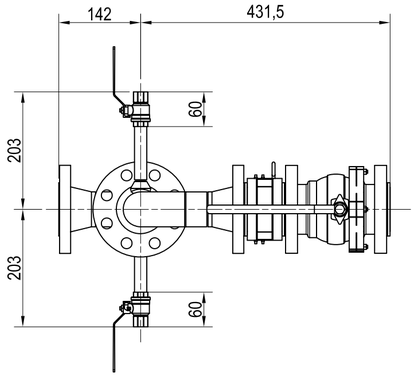
coes

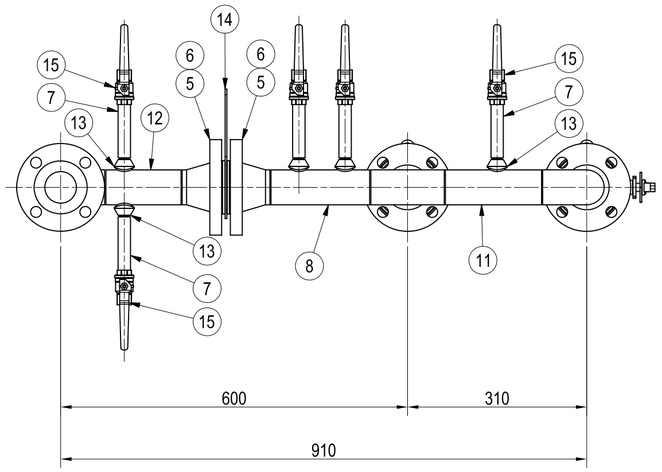
ROSETTI MARINO
SKID AIR BLPH NETHERLAND
- PIPING 05 -
COES CODE L4682

DISEGNO N° DRAWING N°
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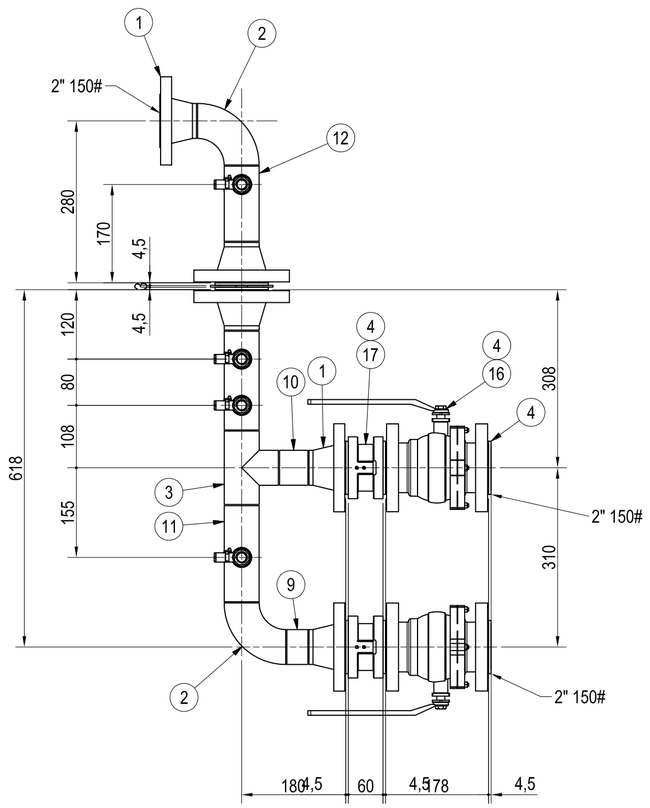
FOGLIO SHEET 6 | DI OF 14

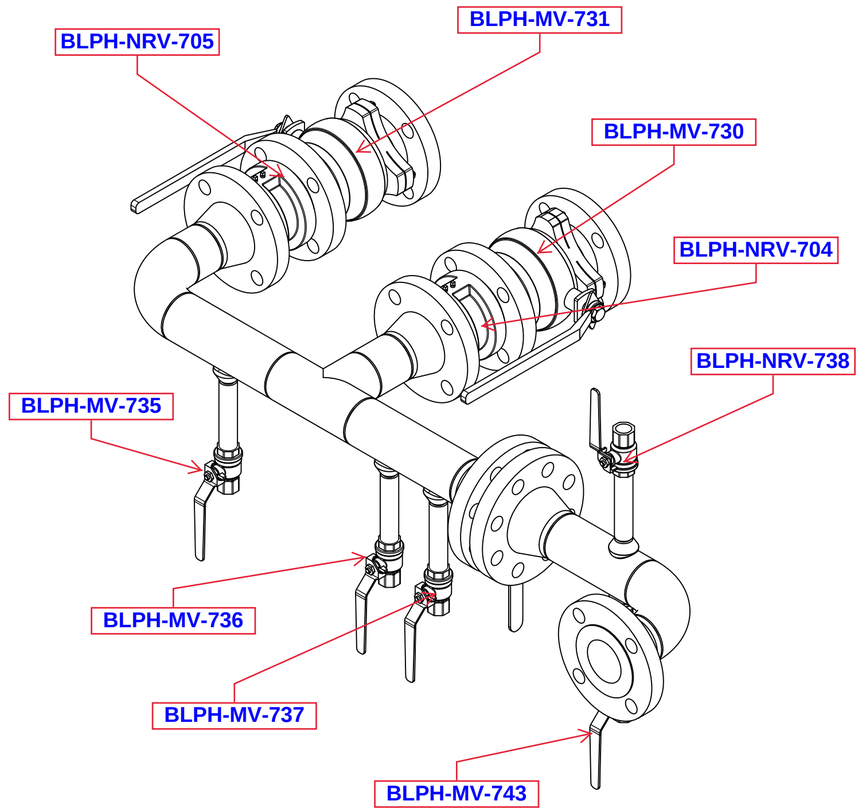
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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	3	FLANGE W.N.2" Sch. 10S 150# RF	SA 182 F316/316L	8,3		D3502
2	2	ELBOW L.R. 90° 2" Sch.10S	SA 403 WP316/316L	1		D3795
3	1	TEE 2" Sch.10S	SA 403 WP316/316L	0,6		D6574
4	6	GKT SPIRAL WOUND 2" 150# Thk. 4.5mm	316L+GRAPHITE	0,9		C2416
5	2	FLANGE W.N. 2" Sch.10S 300# RF	SA 182 F316L	6,9		F2255
6	2	GKT SPIRAL WOUND 2" 300# Thk. 4.5mm	316L+GRAPHITE	0,3		D2662
7	500,000 mm	PIPE SMLSS 1/2" Sch.40S	SA 312 TP316/316L	0,7		C5215
8	170,650 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,7		D3488
9	36,300 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,1		D3488
10	49,000 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,2		D3488
11	166,300 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,7		D3488
12	129,950 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,5		D3488
13	5	WELDOLET DN 2 1/2 - 2" x 1/2" Sch.40S	SA 182 F316/316L	0,4		F5757
14	1	DISK ORIFICE Ø2" 300# Thk.5	AISI 316/316L	0,3	L5178	L5178
15	5	BALL VALVE 1/2"NPTF ATEX	SA 351 CF8M	1,3		L3428
16	2	SPLIT BODY BALL VALVE Ø2" 150# CODE 68J00010	SA 351 CF8M	23,8		L4620
17	2	CHECK VALVE 2" 150#	AISI 316	3,8		H2286



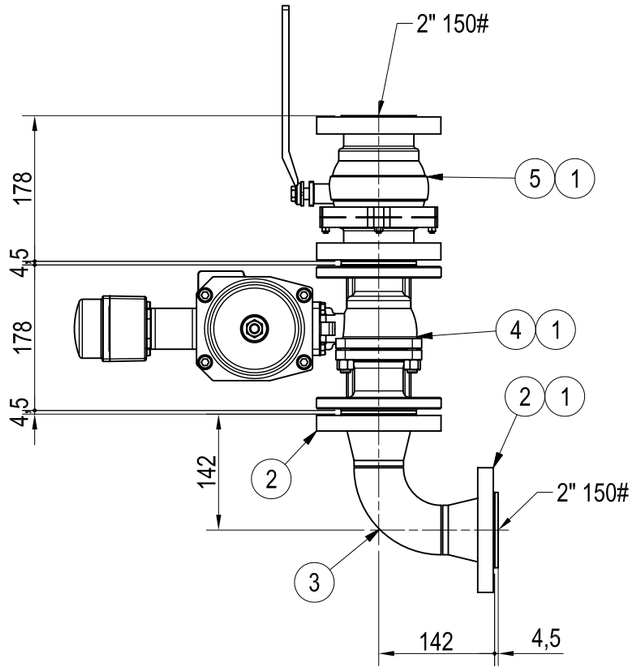


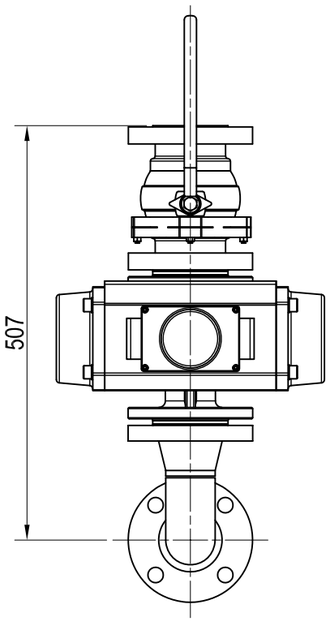
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0	20/08/2024	ISSUE	STC	GT

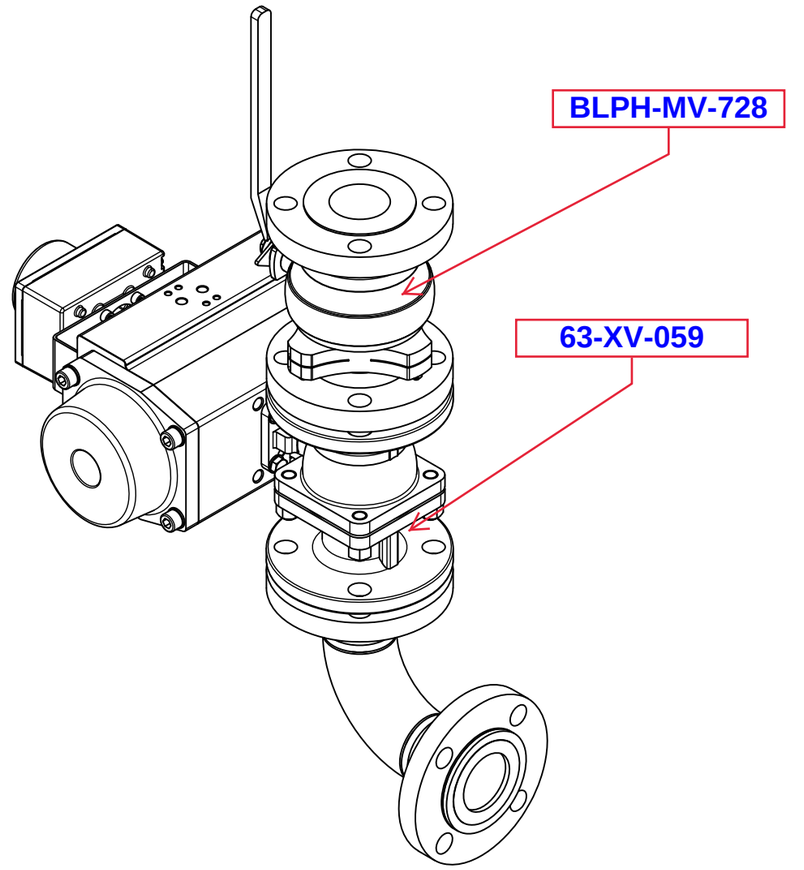
COMMESSA N° / JOB N°	166/24	SERIAL N°	FORMATO / SIZE A2		SCALA / SCALE 1 : 7.5
coes	ROSETTI MARINO SKID AIR BLPH NETHERLAND - PIPING 06 - COES CODE L4683			DISEGNO N° / DRAWING N°	CCO54154
				FOGLIO / SHEET 7	DI / OF 14

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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	3	GKT SPIRAL WOUND 2" 150# Thk. 4.5mm	316L+GRAPHITE	0,5		C2416
2	2	FLANGE W.N.2" Sch. 10S 150# RF	SA 182 F316/316L	5,5		D3502
3	1	ELBOW L.R. 90° 2" Sch.10S	SA 403 WP316/316L	0,5		D3795
4	1	SPLIT BODY BALL VALVE 2" 150#RF WITH ACTUATOR+ FC	SA 351 CF8M	54,2		L4622
5	1	SPLIT BODY BALL VALVE Ø2" 150# CODE 68J00010	SA 351 CF8M	11,9		L4620







1	16/12/2024	REVISION	STC	GT
0	20/08/2024	ISSUE	STC	GT
REV	DATE	DESCRIPTION	PREPARED	APPROVED

COMMESSA N° JOB N°	166/24	SERIAL N°	FORMATO SIZE	A3	SCALA SCALE	1 : 7.5

coes

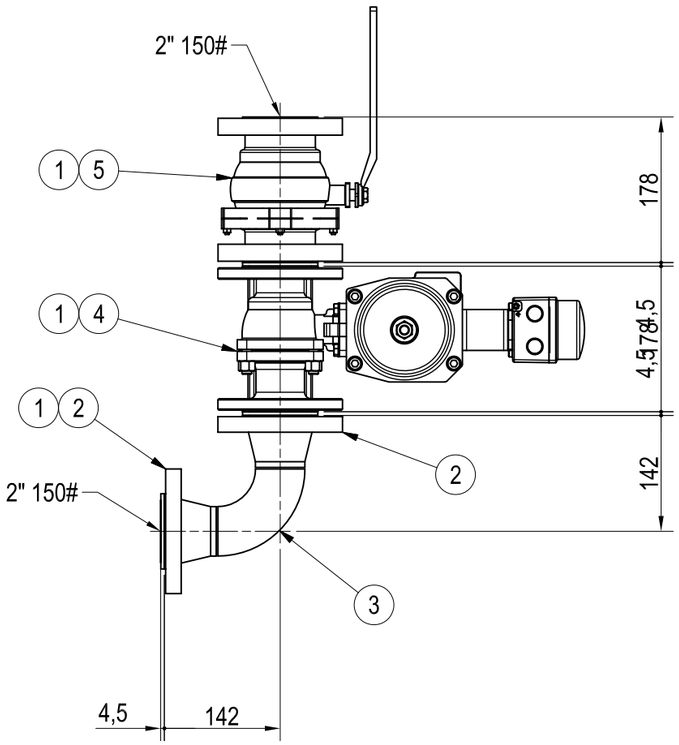
ROSETTI MARINO
SKID AIR BLPH NETHERLAND
- PIPING 07 -
COES CODE L4684

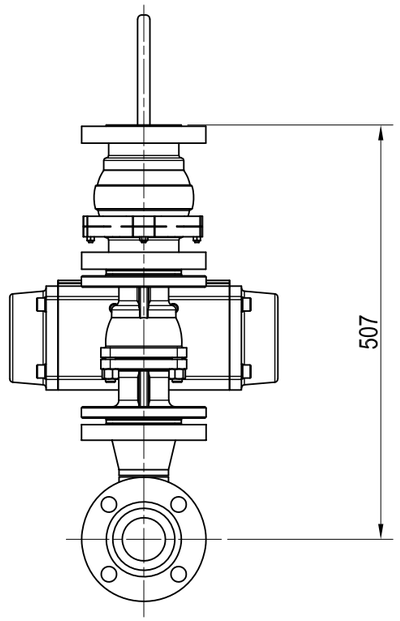
DISEGNO N°
DRAWING N°
CCO54154

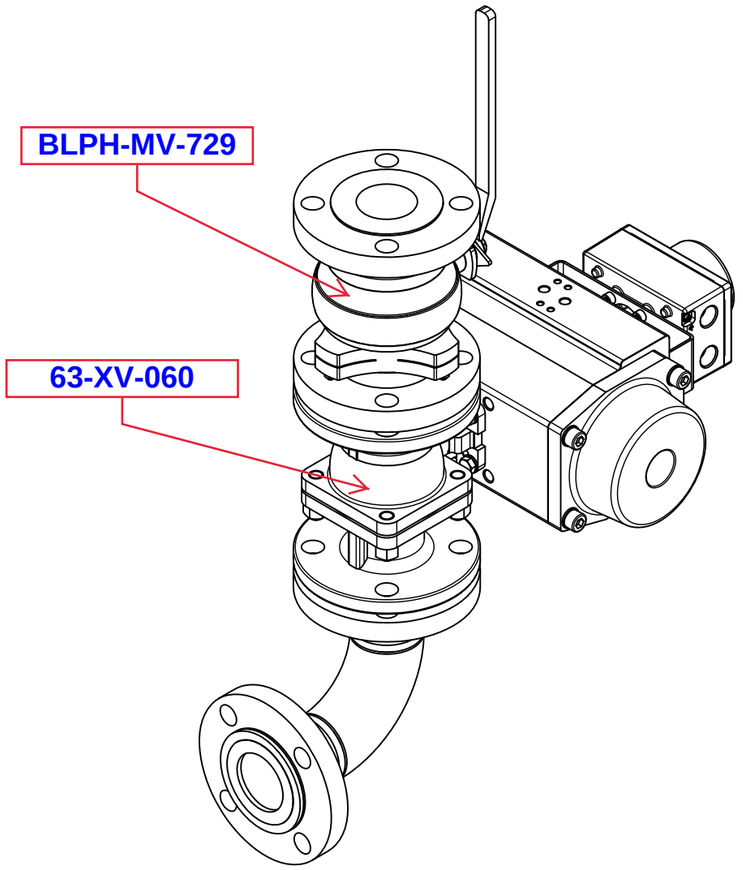
FOGLIO SHEET 8 | DI OF 14

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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	3	GKT SPIRAL WOUND 2" 150# Thk. 4.5mm	316L+GRAPHITE	0,5		C2416
2	2	FLANGE W.N.2" Sch. 10S 150# RF	SA 182 F316/316L	5,5		D3502
3	1	ELBOW L.R. 90° 2" Sch.10S	SA 403 WP316/316L	0,5		D3795
4	1	SPLIT BODY BALL VALVE 2" 150#RF WITH ACTUATOR+ FC	SA 351 CF8M	54,2		L4622
5	1	SPLIT BODY BALL VALVE Ø2" 150# CODE 68J00010	SA 351 CF8M	11,9		L4620







1	16/12/2024	REVISION	STC	GT
0	20/08/2024	ISSUE	STC	GT
REV	DATE	DESCRIPTION	PREPARED	APPROVED

COMMESSA N° JOB N°	166/24	SERIAL N°	FORMATO SIZE	A3	SCALA SCALE	1 : 7.5

coes

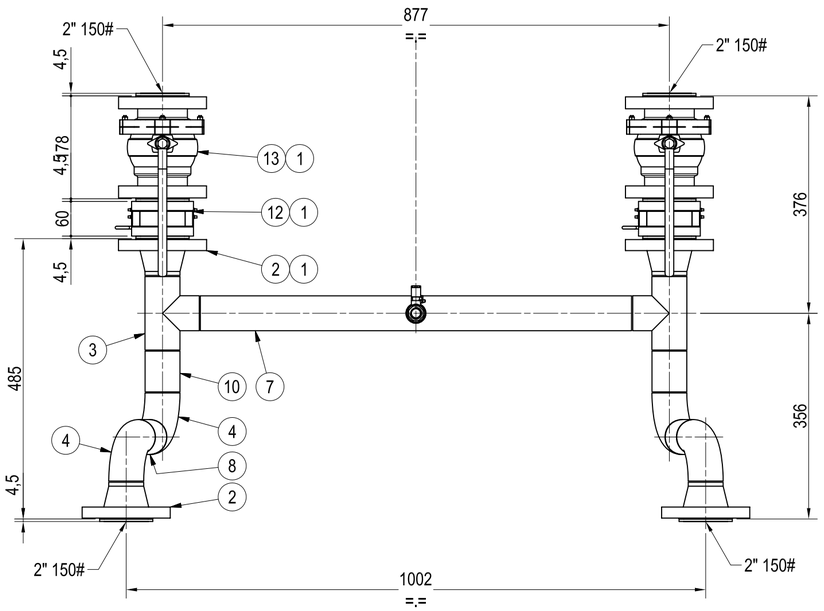
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- PIPING 08 -
COES CODE L4685

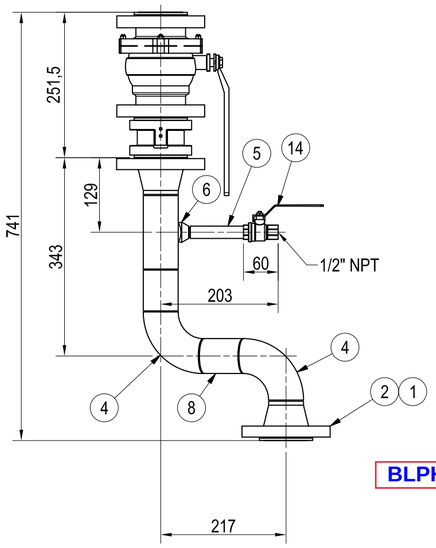
DISEGNO N° DRAWING N°
CCO54154

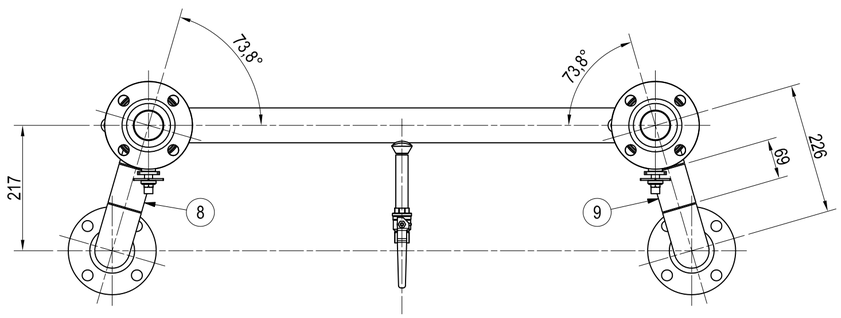
FOGLIO SHEET 9 DI OF 14

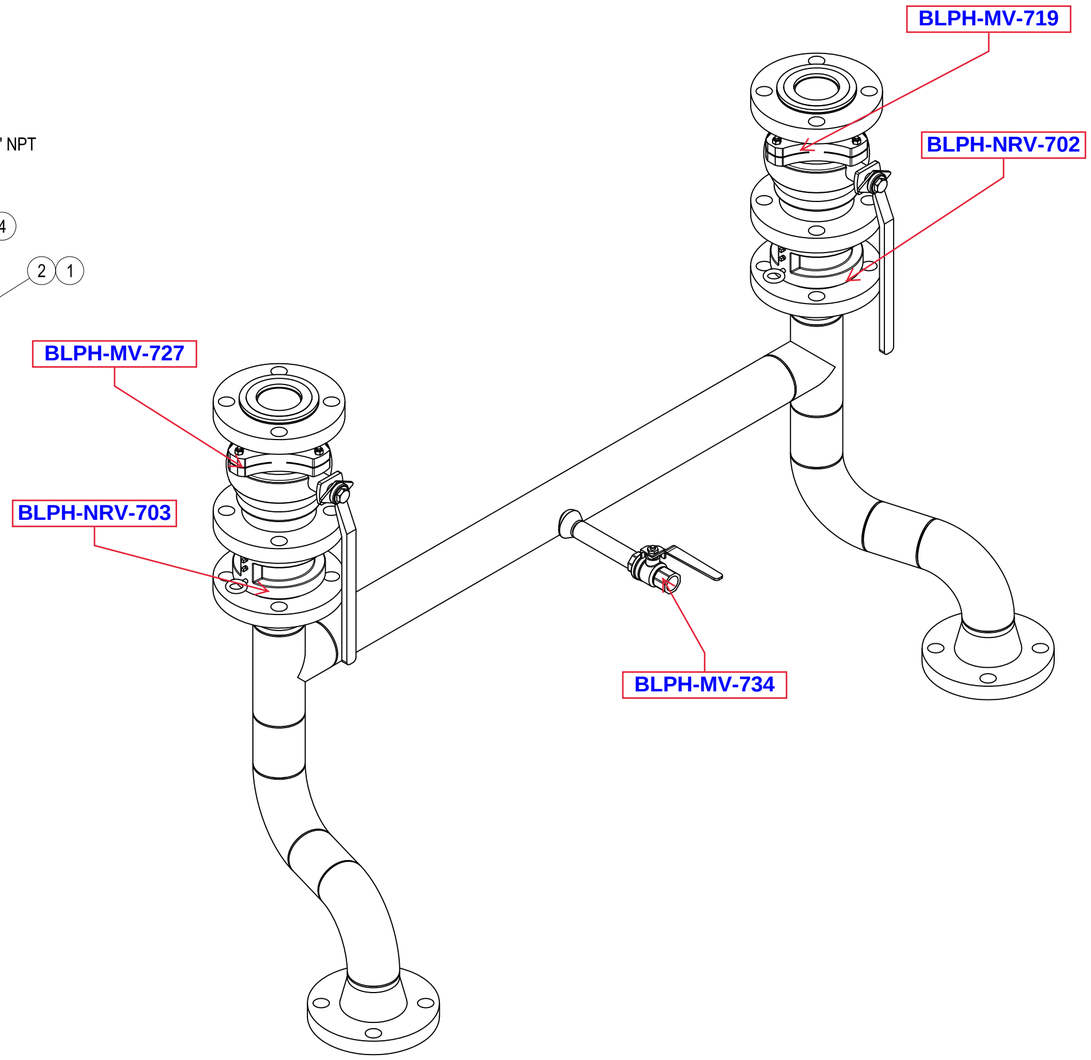
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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	8	GKT SPIRAL WOUND 2" 150# Thk. 4.5mm	316L+GRAPHITE	1,2		C2416
2	4	FLANGE W.N.2" Sch. 10S 150# RF	SA 182 F316/316L	11		D3502
3	2	TEE 2" Sch.10S	SA 403 WP316/316L	1,2		D6574
4	4	ELBOW L.R. 90° 2" Sch.10S	SA 403 WP316/316L	1,9		D3795
5	100,000 mm	PIPE SMLSS 1/2" Sch.40S	SA 312 TP316/316L	0,1		C5215
6	1	WELDOLET DN 2 1/2 - 2" x 1/2" Sch.40S	SA 182 F316/316L	0,1		F5757
7	745,800 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	3		D3488
8	69,312 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,3		D3488
9	69,312 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,3		D3488
10	70,416 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,3		D3488
11	70,416 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316L	0,3		D3488
12	2	CHECK VALVE 2" 150#	AISI 316	3,8		H2286
13	2	SPLIT BODY BALL VALVE Ø2" 150# CODE 68J00010	SA 351 CF8M	23,8		L4620
14	1	BALL VALVE 1/2"NPTF ATEX	SA 351 CF8M	0,3		L3428









VERTICAL PIPE FLOW DOWN INSTALLATION IS ACCEPTABLE

REV	DATE	DESCRIPTION	PREPARED	APPROVED
1	16/12/2024	REVISION	STC	GT
0	20/08/2024	ISSUE	STC	GT

COMMESSA N° / JOB N°	166/24	SERIAL N°	FORMATO / SIZE A2	SCALA / SCALE	1 : 7.5

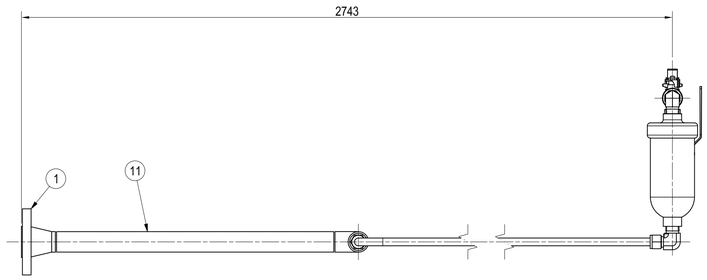
coes

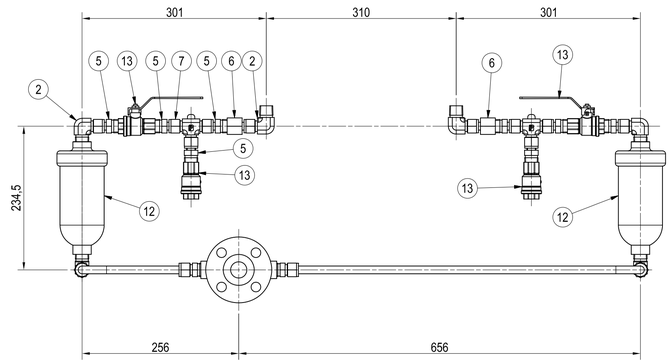
ROSETTI MARINO
SKID AIR BLPH NETHERLAND
- PIPING 09 -
COES CODE L4686

DISEGNO N° / DRAWING N°
CCO54154

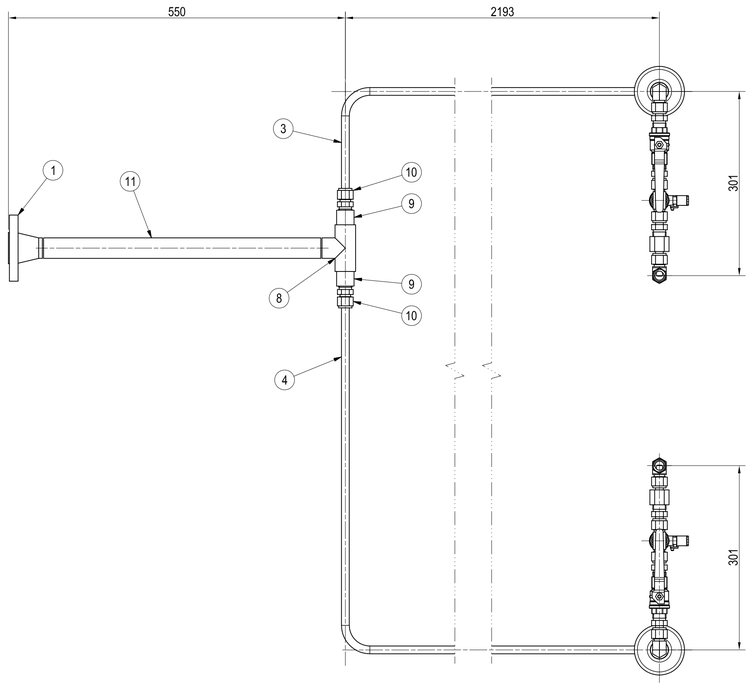
FOGLIO / SHEET 10 | DI / OF 14

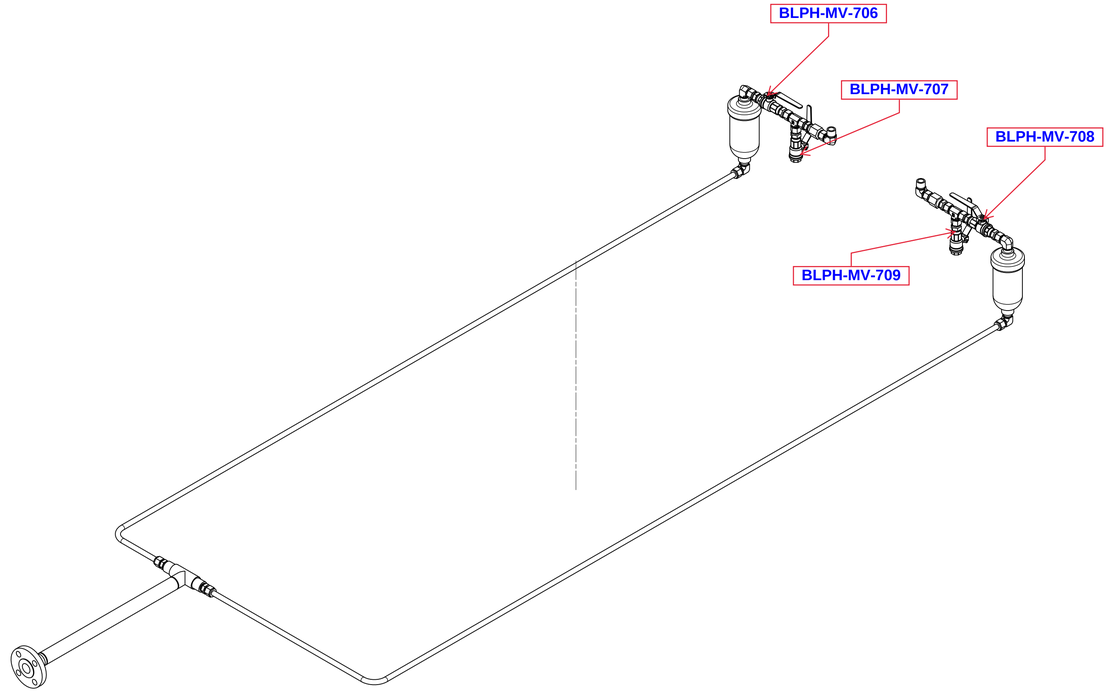
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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	1	FLANGE W.N.1" Sch. 40S 150# RF	SA 182 F316/316L	1,1		C4933
2	6	ELBOW 90° CONNECTOR Ø1/2 x 1/2 NPT/M	AISI 316	0,8	P-8-8-GM	G7466
3	2343,000 mm	TUBING 1/2" x 1,65	AISI 316	1,1		D1577
4	2743,000 mm	TUBING 1/2" x 1,65	AISI 316	1,2		D1577
5	8	MALE ADAPTER Ø1/2 x 1/2 NPT/M	AISI 316	0,6	P-8-8-AM	G7465
6	2	FEMALE ADAPTER Ø1/2 x 1/2 NPT/F	AISI 316	0,2	P-8-8-AF-L	H1524
7	2	TEE Ø1/2	AISI 316	0,4	P-8-UT	G7589
8	1	TEE 1" Sch.40S	SA 403 WP316/316L	0,2		C4929
9	2	HALF COUPLING 1/2" NPT 3000#	SA 182 F316/316L	0,2		C1452
10	2	MALE CONNECTOR Ø1/2 x 1/2 NPT/M	AISI 316	0,2	P-8-8-DM	G5521
11	452,528 mm	PIPE SMLSS 1" Sch.40S	SA 312 TP316L	1,2		11603
12	2	AUTOMATIC STEAM DISCHARGE	INOX	10		C4522
13	4	BALL VALVE 1/2"NPTF	AISI 316	1		31227





REV	DATE	DESCRIPTION	PREPARED	APPROVED
1	16/12/2024	REVISION	STC	GT
0	20/08/2024	ISSUE	STC	GT

COMMESSA N° / JOB N°: 166/24 | SERIAL N° | FORMATO / SIZE: A1 | SCALA / SCALE: 1 : 5

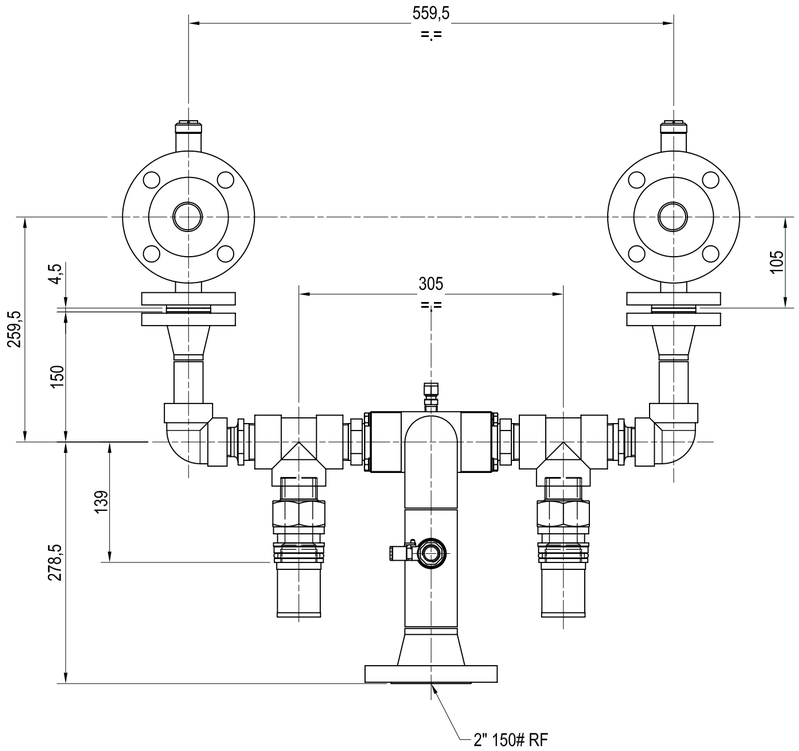
coes

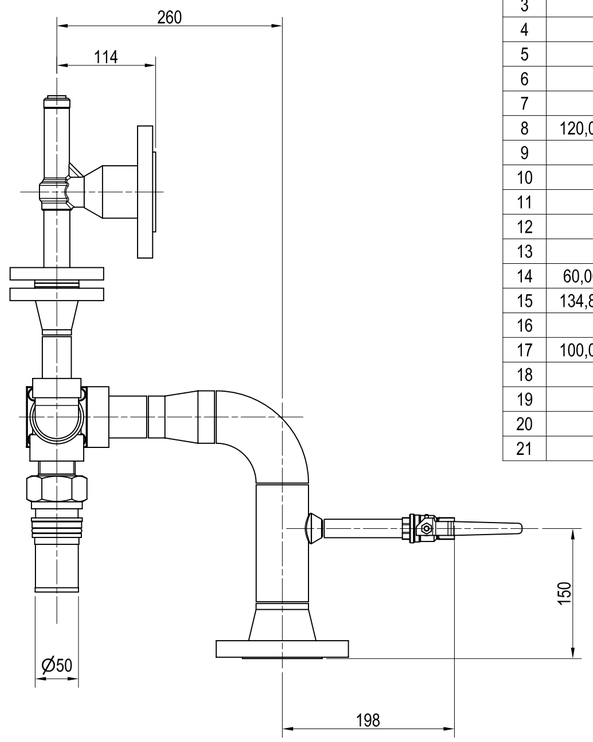
ROSETTI MARINO
SKID AIR BLPH NETHERLAND
- PIPING 10 -
COES CODE L4687

DISEGNO N° / DRAWING N°: CCO54154

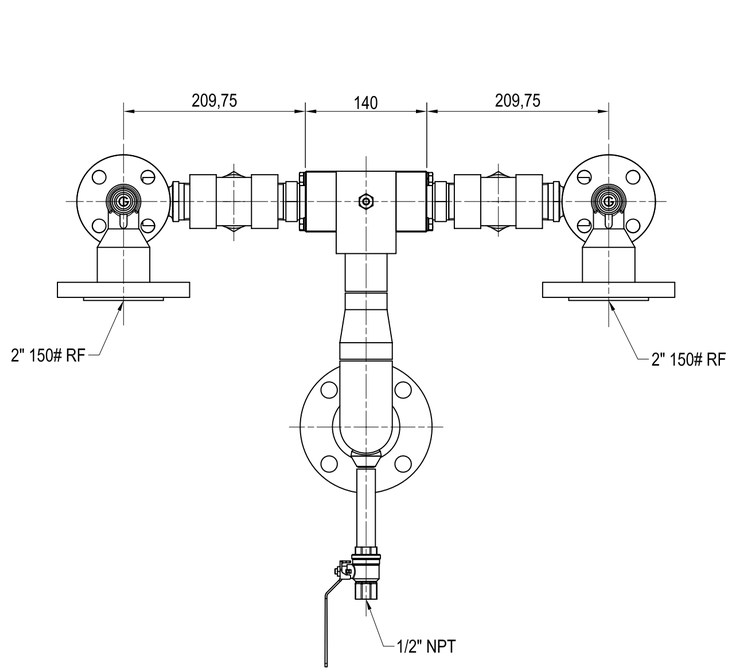
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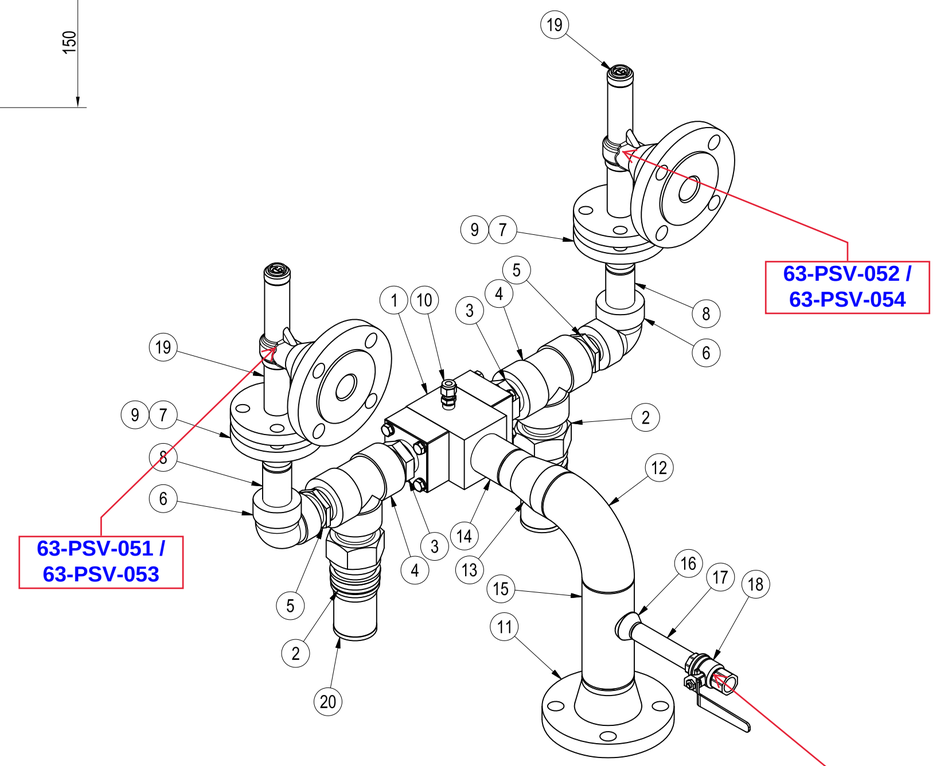
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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	1	ASSIEME VALVOLA A 3 VIE A SPOLA	ALUMINIUM	1,9	8503	8503
2	2	RACCORDO INFERIORE HM 32/42	C45	2,2	CCO01603	8437
3	2	EX. NIPPLE 1 1/4 NPT "3000#	SA 182 F316L	0,4		
4	2	TEE THREADED 1 1/4" NPT-F 3000#	SA 182 F316/316L	2,8		
5	2	REDUC. EX. NIPPLE 1 1/4"" x 1"	SA 182 F316/316L	0,4		
6	2	ELBOW THREADED 90° 1" 3000#	SA 182 F316/316L	1,6		C5184
7	2	FLANGE W.N.1" Sch. 40S 150# RF	SA 182 F316/316L	2,3		C4933
8	120,000 mm	PIPE SMLSS 1" Sch.40S	SA 312 TP316/316L	0,3		11603
9	2	GKT SPIRAL WOUND 1" 150# Thk. 4.5mm	316L+GRAPHITE	0,1		C3052
10	1	MALE CONNECTOR Ø8 "x" 1/4 NPT/M	AISI 316	0		
11	1	FLANGE W.N.2" Sch. 10S 150# RF	SA 182 F316/316L	2,8		D3502
12	1	ELBOW L.R. 90° 2" Sch.10S	SA 403 WP316/316L	0,5		D3795
13	1	CONC_REDUCTION 2" x 1 1/2" Sch.40S	SA 403 WP316/316L	0,4		26253
14	60,000 mm	PIPE SMLSS 1 1/2" Sch.10S	SA 312 TP316/316L	0,2		D0842
15	134,834 mm	PIPE SMLSS 2" Sch.10S	SA 312 TP316/316L	0,5		D3488
16	1	WELDOLET DN 2 1/2 - 2" x 1/2" Sch.40S	SA 182 F316L	0,1		
17	100,000 mm	PIPE SMLSS 1/2" Sch.40S	SA 312 TP316/316L	0,1		C5215
18	1	BALL VALVE 1/2"NPTF ATEX	SA 351 CF8M	0,3		L3428
19	2	PSV AIR G10-API IN=1" 150# OUT=2" 150# - 12 bar	AISI 316/316L	11,6		L4439
20	2	FILTRO A CESTELLO G1.1/4"	INOX	0,3		9946
21	2	"O" RING 6187 d=47 C=5.33	NBR 70 SHORE A	0		4590





No. 2 PIECES

1	16/12/2024	REVISION	STC	GT
0	20/08/2024	ISSUE	STC	GT
REV	DATE	DESCRIPTION	PREPARED	APPROVED

COMMESSA N° / JOB N°	166/24	SERIAL N°	FORMATO / SIZE A2	SCALA / SCALE	1 : 5

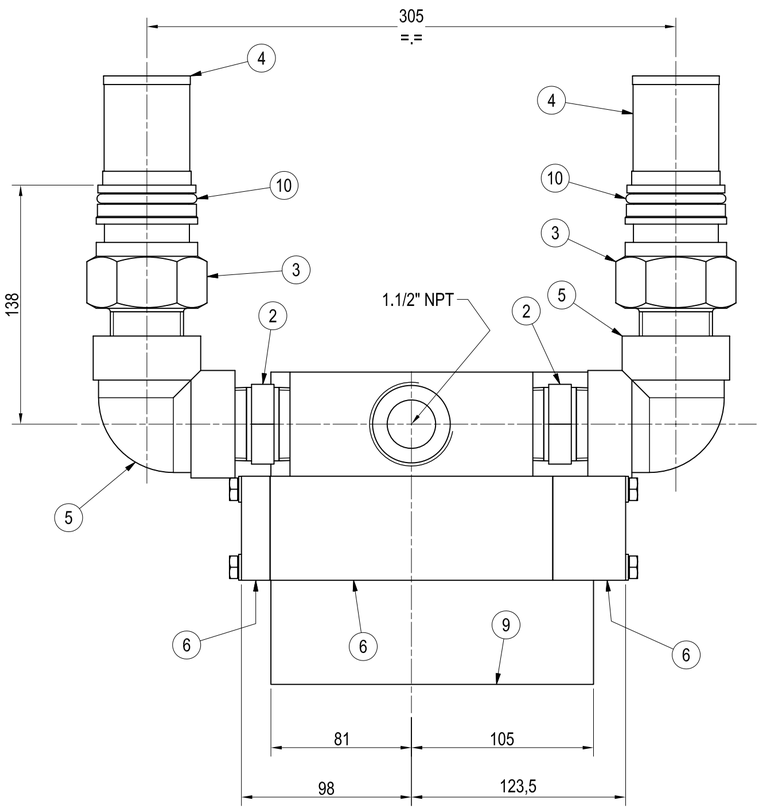
coes

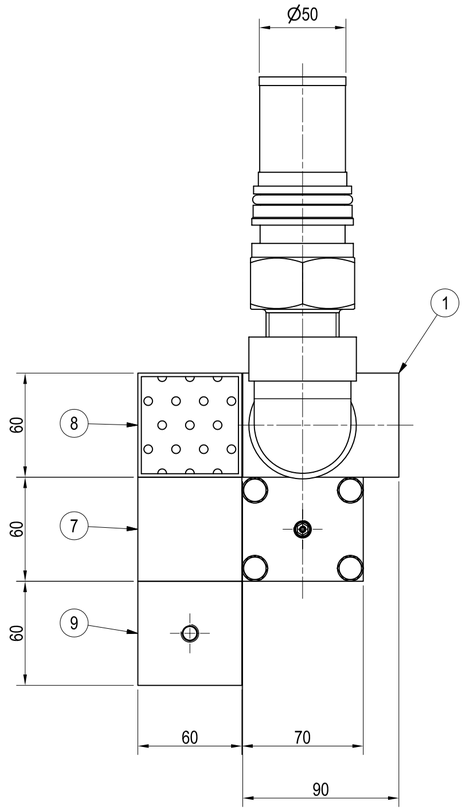
ROSETTI MARINO
AIR SKID - BLPH NETHERLAND
PIPING 11 - ATTACCO SUPERIORE DRYER
COES CODE L4690

DISEGNO N° / DRAWING N°
CCO54154

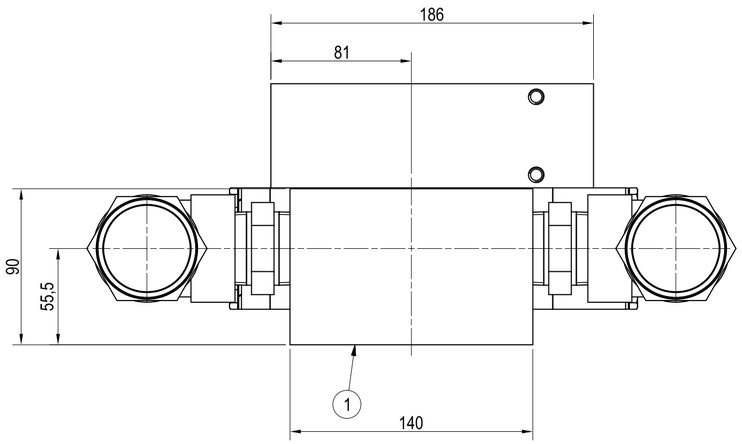
FOGLIO / SHEET 12 DI / OF 14

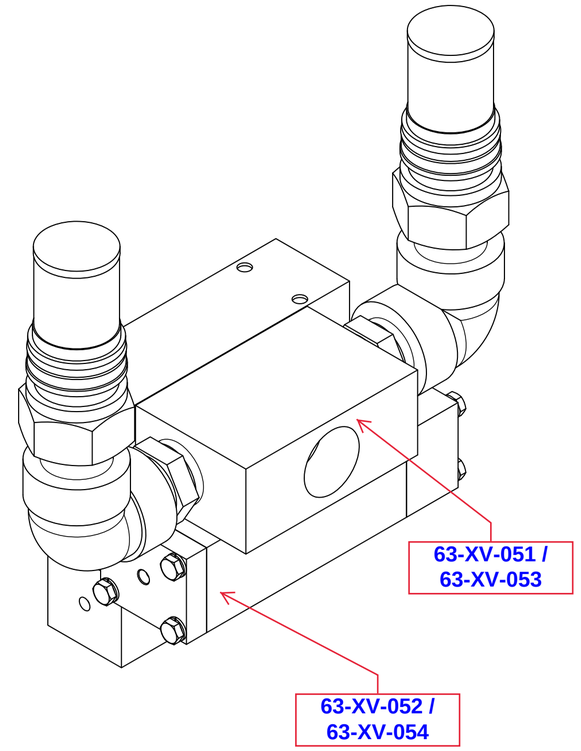
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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	1	MANIFOLD DISTRIBUTORE PNEUMATICO	ALUMINIUM 2011	1,4	CCO02601	8445
2	2	EX. NIPPLE 1 1/4 NPT "3000#	SA 182 F316L	0,4		
3	2	RACCORDO INFERIORE HM 32/42	C45	2,2	CCO01603	8437
4	2	FILTRO A CESTELLO G1.1/4"	INOX	0,3		9946
5	2	ELBOW THREADED 90° 1 1/4" 3000#	SA 182 F316/316L	2		D6496
6	1	VALVOLA A 5 VIE DN 1" DOPPIO IMPULSO		2	D7848	D7848
7	1	COLLETTORE DECOMPRESSIONE HME 35	ALUMINIUM 2011	1,3	CCO01200	8443
8	1	SILENZIATORE PER VALVOLA DI DEPRESS. DN 1" HME 32/35/42	S 275 JR	0,8	CCO01030	7890
9	1	VALVOLA DI DEPRESSURIZZAZIONE DN 1"	S 275 JR	1,9	CCO01205	7889
10	2	"O" RING 6187 d=47 C=5.33	NBR 70 SHORE A	0		4590





1	16/12/2024	REVISION	STC	GT
0	20/08/2024	ISSUE	STC	GT
REV	DATE	DESCRIPTION	PREPARED	APPROVED

COMMESSA N° / JOB N°: 166/24 | SERIAL N° | FORMATO / SIZE: A2 | SCALA / SCALE: 1 : 2.5

coes

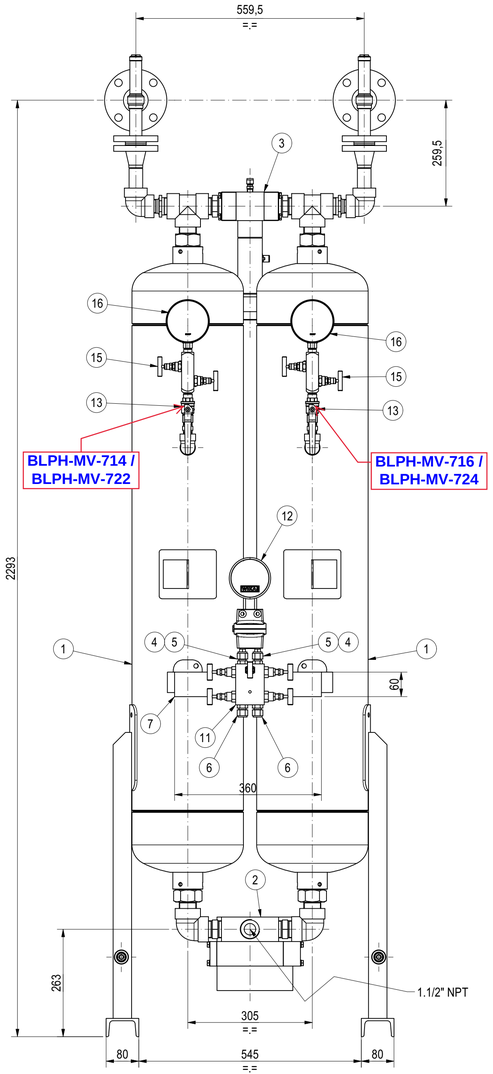
ROSETTI MARINO
AIR SKID - BLPH NETHERLAND
PIPING 12 - ATTACCO INFERIORE DRYER
COES CODE L5191

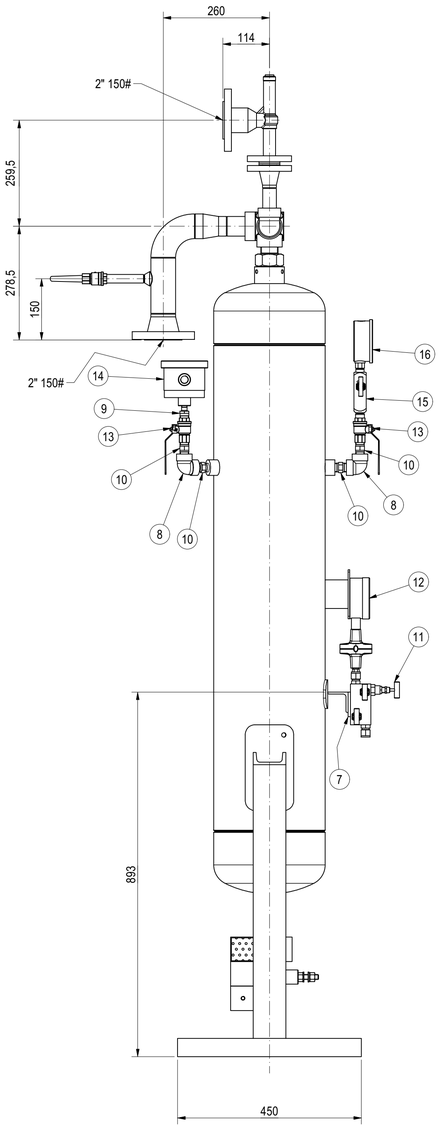
DISEGNO N° / DRAWING N°: CCO54154

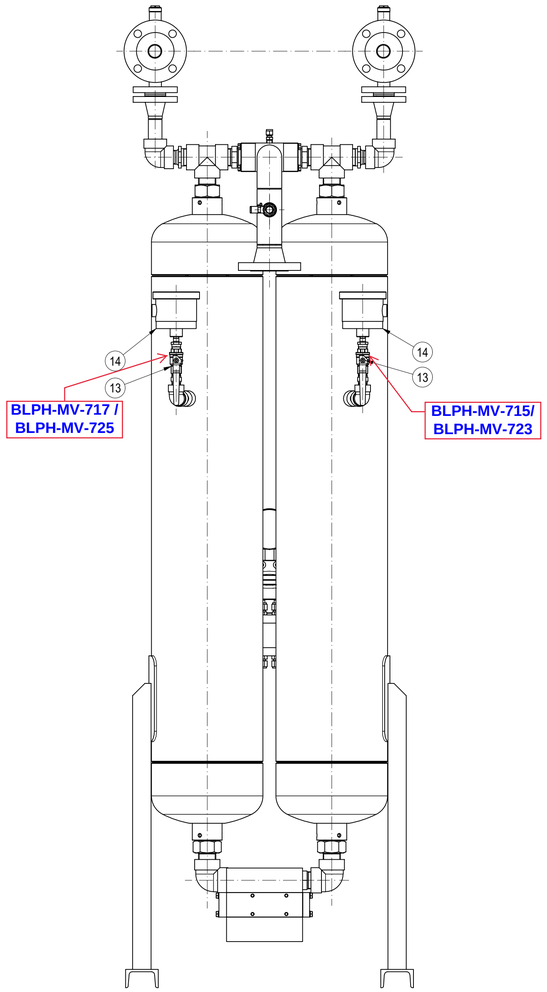
FOGLIO / SHEET: 13 | DI / OF: 14

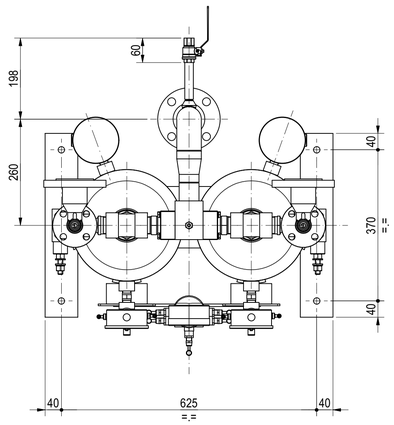
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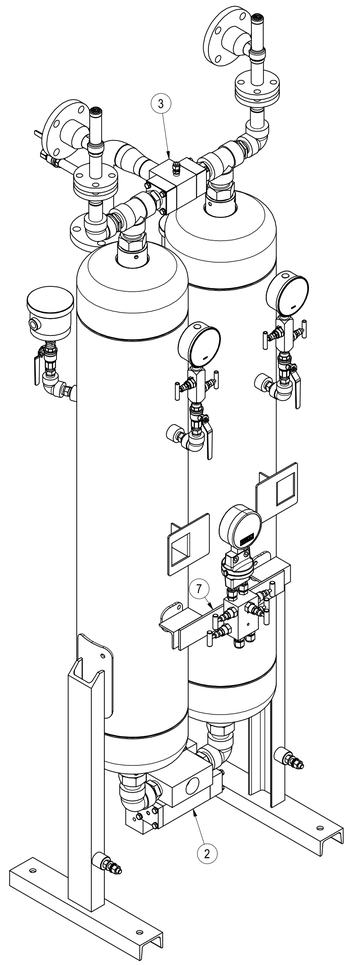
ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	2	VESSEL ø273 - DRYER HME 42/S	AISI316/316L	14,3	CCO54156	L4694
2	1	PIPING 12		12,4	CCO54154	L5191
3	1	PIPING 11		28,9	CCO54154	L4690
4	2	MALE ADAPTER Ø1/2 x 1/4 NPT/M	AISI 316L	0,1		J7739
5	2	MALE CONNECTOR Ø1/2 x 1/4 G	AISI 316	0,2		K4400
6	2	MALE CONNECTOR Ø1/2 x 1/2 NPT/M	AISI 316	0,2	P-8-8-DM	G5521
7	360,000 mm	PLATE 60 x 6 L=360,000 mm	SA 240 TP316L	1		F0630
8	4	ELBOW THREADED 90° 1/2" 3000#	SA 182 F316/316L	1,3		C1656
9	2	REDUC. EX. NIPPLE 1/2"" x 1/4"	SA 182 F316/316L	0,1		C5214
10	8	EX. NIPPLE 1/2 NPT "3000#	SA 182 F316L	0,4		C1605
11	1	MANIFOLD 5 WAY - IV504		1,4		L4489
12	1	DIFF. MANOMETER MOD.732.51.100 Ø100 sc.: 0:1.6bar	1.4571-316Ti	4,9		L4490
13	4	BALL VALVE 1/2"NPTF ATEX	SA 351 CF8M	1		L3428
14	2	PRESSURE SWITCH PMS8.1 - 1/4"NPTF - 0:16bar	INOX	4,6		K3320
15	2	MANIFOLD 2 WAY Mod. IV20 1/2"NPT-M/F	AISI 316	1,8		K5766
16	2	PRESSURE GAUGE Ø100 1/2" NPT Scale 0 : 16 bar	AISI 316	6		L4486











0	20/08/2024	ISSUE			STC	GT
REV	DATE	DESCRIPTION			PREPARED	APPROVED
COMMESSA N° JOB N°	166/24	SERIAL N°	FORMATO SIZE	A1	SCALA SCALE	1 : 7.5
coes	ROSETTI MARINO AIR SKID - BLPH NETHERLAND VESSEL DRYER HM/42 ASSEMBLY COES CODE L5162				DISEGNO N° DRAWING N°	CCO54159
					FOGLIO SHEET 1	DI OF 1

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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
Giuseppe Cavallo	05/06/2025

PACKAGE A-63000

RING DIAGRAM

AGE CONTROL PANEL 63-LP-001

24000428-MAC-DG-00009

ent Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
05	13/05/2025	Accepted for Construction (AFC)	GT	MC	TM
04	24/01/2025	Accepted for Construction (AFC)	GT	MC	TM
03	13/12/2024	Accepted for Construction (AFC)	GT	MC	TM
02	22/10/2024	Accepted for Construction (AFC)	GT	MC	TM
01	01/07/2024	Issue for Review (IFR)	GT	MC	TM
00	10/05/2024	Issue for Review (IFR)	GT	MC	TM

COES

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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

	PREPARED	CHECKED AND APPROVED	CUSTOMER APPROVAL	DATE	DESCRIPTION
	ASSOLARI O.	TIRABOSCHI T.		08.05.2024	FIRST ISSUE
A	ASSOLARI O.	TIRABOSCHI T.		30.05.2024	ACCORDING TO CUSTOMER COMMENTS
B	ASSOLARI O.	TIRABOSCHI T.		01.08.2024	ACCORDING TO CUSTOMER COMMENTS
C	ASSOLARI O.	TIRABOSCHI T.		04.09.2024	AS-BUILT
D	ASSOLARI O.	TIRABOSCHI T.		18.11.2024	COMMENTS AFTER COMMISSIONING
E	ASSOLARI O.	BERETTA L.		04.02.2025	COMMENTS AFTER COMMISSIONING
F	ASSOLARI O.	BERETTA L.		12.05.2025	COMMENTS AFTER COMMISSIONING

	PREPARED	CHECKED AND APPROVED	CUSTOMER APPROVAL	DATE	DESCRIPTION
G					
H					
I					
L					
M					
N					

TEST CERTIFICATE N	2024.135

ELECTRICAL CABINET	=PLANT +LOCATION	WORK ORDER SERIAL NUMBER

TITLE

COMMAND AND CONTROL SWITCHBOARDS DRYER
GENERATION PACKAGE 63-LP-001
WIRING DIAGRAM

REF. Netherlands

TECHNICAL AND CONSTRUCTIVE FEATURES

ELECTRICAL

RATED VOLTAGE:

RATED FREQUENCY:
50Hz

RATED CURRENT:
32A

AUXILIARY CIRCUIT SUPPLY:
230Vac~ 24Vdc

SHORT CIRCUIT CURRENT:
10kA

EARTH BUSBAR SECTION:
Cu 20x5 mm²

REFERENCE STANDARDS:
IEC 61439-1

MECHANICALS

DEGREE OF PROTECTION (INT.):
IP20

DEGREE OF PROTECTION (EXT.):
IP66

INTERNAL PAINTING:
STEEL

EXTERNAL PAINTING:
STEEL

SEGREGATION FORM:
--

PAINTING PROCEDURE:

DOCUMENT NUMBER:
1724000428-MAT-PRO-00022

INSTALLATION CONDITIONS

ENVIRONMENT TEMPERATURE:
-5° - 41°C

RELATIVE HUMIDITY:
90%

ALTITUDE:
<= 1000mt s.l.m.

INSTALLATION:
FOR EXTERNAL

CABLE INCOMING:
FROM LOW

CABLE OUTGOING:
FROM LOW

WIRING

COLORS

POWER CIRCUITS:
BLACK

ac AUXILIARY CIRCUITS:
BLACK

dc AUXILIARY CIRCUITS:
BLACK

CIRCUITS NOT ISOLATED BY GENERAL DEVICE:
ORANGE

EARTH CIRCUITS:
YELLOW/GREEN

SECTIONS

POWER CIRCUITS:
MINIMUM 2,5mm²

AUXILIARY CIRCUITS:
MINIMUM 1,5mm²

ELECTRONIC CIRCUITS:
MINIMUM 0,5mm²

CURRENT MEASURE CIRCUITS:
2,5mm²

VOLTAGE MEAUSURE CIRCUITS:
2,5mm²

CABLE TYPE:
FS17

TERMINALS

AUXILIARY:
2,5mm²

VOLTAGE MEAUSURE CIRCUITS:
6mm² WITH DISCONNECTING SLIDE-LINK

CURRENT MEASURE CIRCUITS:
6mm² WITH DISCONNECTING SLIDE-LINK AND SHORT-CIRCUIT CROSS CONNECT.

THE COLORS OF THE WIRE DON'T SPECIFIED ARE;
THE SECTIONS OF THE WIRE DON'T SPECIFIED ARE mm²;

COES S.r.l.
Via Pontida , 265
24040 Stezzano (BG)-Italy

Tel. +39 035 2050 511 Fax +39 035 2050 532
www.coessrl.com coes@coessrl.com

LEVELS	DRAWING N.	PLANT	PAGE
COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	d241025-WD		02
	WORK ORDER N. 2024.4814_001	LOCATION	NEXT 03
DESCRIPTION: COVER			TOTAL 54

LETTER	TYPE OF COMPONENT	EXAMPLE	MARK
A	ASSEMBLED	LASER MASER REGULATOR	A
		TRANSISTOR AMPLIFIER INTEGRATED CIRCUITS AMPLIFIER MAGNETIC AMPLIFIER VALVE AMPLIFIER	AD AJ - AP AM - AT AV - AR
B	TRASDUCER OF QUANTITY NON-ELECTIC TO ELECTRIC OR VICEVERSA	PHOTOELECTRIC CELL ELECTRIC DYNAMOMETER CRISTAL TRASDUCER MICROPHONE PICK-UP LOUDSPEAKER SYNCRONOUS TRANSMITTER	B
		TRANSDUCER OR ANALOGIC SENSOR OR NUMERIC WITH MULTIPLE STEPS (USABLE FOR INDICATION OR THE MEASURE): PRESSURE TRANSDUCER POSITION TRANSDUCER ROTATION TRANSDUCER (TACHOMETRIC GENERATOR) TEMPERATURE TRANSDUCER VELOCITY TRANSDUCER	 BP BQ BR BT BV
C	CAPACITORS	CAPACITORS	C
D	BYNARY ELEMENTS DEVICE OF DELAY DEVICE OF STORAGE	DEVICE AND INTEGRATED CIRCUITS DIGITAL: DELAY LINE ELEMENT BISTABLE ELEMENT MONOSTABLE RECORDER MEMORY MAGNETIC RECORDER ON TAPE OR ON DISC	D
E	MATERIALS SUNDRIES	DEVICE NOT SPECIFIED IN THIS TABLE	E
		HEATER ILLUMINATION LAMP VENTILATOR	EH EL EV
F	PROTECTION DEVICE	OVER-VOLTAGE DEVICE SOURGE ARRESTER	F
		DEVICE OF PROTECTION WITH CURRENT THRESHOLD WITH INSTANTANEOUS ACTION DEVICE OF PROTECTION WITH CURRENT THRESHOLD WITH DELAYED ACTION DEVICE OF PROTECTION WITH CURRENT THRESHOLD WITH INSTANTANEOUS ACTION AND DELAYED FUSE DEVICE OF PROTECTION WITH VOLTAGE THRESHOLD	 FA FR FS FU FV
G	GENERATOR POWER SUPPLY	ROTATING GENERATOR QUARZ OSCILLATOR	G
		BATTERY OF ACCUMULATORS CONVERTER OF FREQUENCY ROTATING OR STATIC POWER SUPPLY	GB GF GS
H	SEGNALLING DEVICE	ACUSTIC SIGNAL OPTICAL / LUMINOUS INDICATOR	HA HL
K	RELAY CONTACTOR	RELÈ ISTANTANEO CON TUTTO O NIENTE O CONTATTORI ISTANTANEO RELÈ BISTABILI O CONTATTORI INTERBLOCCATI (RELÈ CON TUTTO O NIENTE CON ACCOPPIATORE MECCANICO O MAGNETE PERMANENTE) CONTATTORI RELÈ POLARIZZATO RELÈ REED RELÈ TEMPO CON TUTTO O NIENTE (TIMER)	 KA KL KM KP KR KT
L	INDUCTOR, REACTOR	INDUCTOR, RECTOR, COIL	L
M	MOTOR	MOTOR	M
N	ANALOG CIRCUIT INTEGRATED	OPERATIONAL AMPLIFIER ANALOG/DIGITAL HYBRID APPARATUS	N

LETTER	TYPE OF COMPONENT	EXAMPLE	MARK
P	TEST DEVICE AND INSTRUMENT	DEVICE OF MEASURE INDICATOR RECORDERS AND INTEGRATORS GENERATOR OF SIGNALS	P
		AMPEROMETER COUNTER OF IMPULSES WATTMETER APPARATUS RECORDER CLOCK / COUNTER OF HOURS OF SERVICE VOLTMETER	PA PC PJ PS PT PV
Q	MANOEUVRE APPARATUS FOR POWER CIRCUITS	SWITCH AUTOMATIC MOTOR PROTECTION DISCONNETTING SWITCH	QF QM QS
R	RESISTOR	FIXED OR VARIABLE (RHEOSTAT) RESISTOR	R
		POTENTIOMETER DERIVATIVE RESISTOR WITH INTRINSIC VARIATION DEPENDENT OF TEMPERATURE (THERMISTOR) RESISTOR WITH INTRINSIC VARIATION DEPENDENT OF VOLTAGE (VARISTOR)	RP RS RT RV
S	COMMAND OR CONTROL APPARATUS	SELECTOR OR COMMUTATOR PUSH BUTTON (INTO DEVICE ELECTRONIC OF COMMAND WITH PROXIMITY) SENSORS WITH ALL OR NOTHING NUMERIC (WITH STEP SINGLE) OF NATURE MECCANIC AND ELECTRONIC: - SENSOR OF LEVEL OF LIQUID - SENSOR OF PRESSURE - SENSOR OF POSITION (INTO OF PROXIMITY) - SENSOR OF ROTATION - SENSOR OF TEMPERATURE	SA SB SL SP SQ SR ST
T	TRANSFORMER	CURRENT TRANSFORMER COMMAND CIRCUITS POWER SUPPLY TRANSFORMER POWER TRANSFORMER MAGNETIC STABILIZER VOLTAGE TRANSFORMER	TA TC TM TS TV
U	MODULATOR CONVERTER	DISCRIMINATOR DEMODULATOR FREQUENCY CONVERTER ENCODER CONVERTER INVERTER TELEGRAPHIC TRANSLATOR	U
V	ELECTRONIC TUBE SEMICONDUCTOR	ELECTRONIC TUBE GAS DISCHARGE TUBE DIODE TRANSISTOR THYRISTOR	V
		RECTIFIER FOR COMMAND CIRCUITS POWER SUPPLY	VC
W	TRANSMISSION WAYS WAVE GUIDES AERIALS	WIRE CABLE BUS BAR WAVE GUIDE WAVE GUIDE DIRECTIONAL COUPLER DIPOLE PARABOLIC AERIAL	W
X	TERMINAL OUTLET PLUG	CONNECTING BUS BAR TEST PLUG PLUG OUTLET TERMINAL BOARD	XB XJ XP XS XT
Y	APPARATUS MECHANICS ELECTRICALLY OPERATED	ELECTROMAGNET ELECTROMAGNETIC BRAKE ELECTROMAGNETIC FRICTION MAGNETIC MANDREL OR TABLE ELECTROMAGNETIC VALVE	YA YB YC YH YV
Z	TRANSFORMER, IMPEDANCE ADAPTOR EQUALIZER, BAND LIMITER	EQUALIZER OF LINE COMPRESSOR CRYSTAL FILTER	Z

REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

PLANT
COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM

DESCRIPTION
MARKS OF IDENTIFIERS ACC. TO IEC 204-2

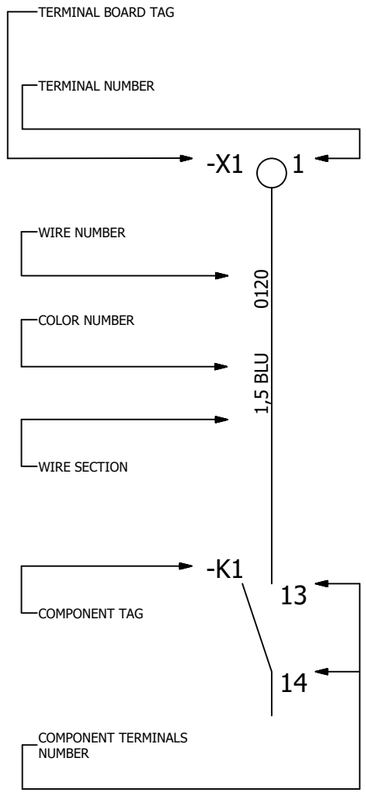
PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= DRYER	03
DATE	APPROVED	LOCATION	NEXT
08.05.2024		+ QE	04
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4814_001	d241025-WD		54

TABLE SYMBOLS

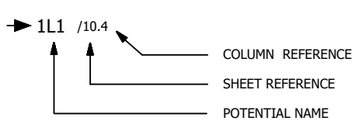
DEFINITION OF IDENTIFIERS (CEI3-34)		
CODE 1	PLANT	=
CODE 2	LOCATION	+
CODE 3	TAG	-
CODE 4	TERMINAL	:

NUMERATION WIRES AND TERMINALS

(CEI 16-1)



POTENTIAL CHAIN



SYMBOL	DESCRIPTION
	TERMINAL
	COLLECTOR BUS-BAR CONNECTION
	FUSE TERMINAL
	FUSE TERMINAL WITH LED
	PUSH BUTTONS
COLOR	HEAD
COLOR	GENERICS
COLOR	LUMINOUS
	SELECTORS
NC	POSITION 0/1
NO	POSITION 1/0/2 FIXED
	POSITION 1/0/2 IMPULSIVE
COLOR	LUMINOUS
	WITH KEY
COLOR COLOR	LED - LAMP
COLOR	LIGHTING BODY FOR OPERATOR LIGHT
	ISOLATED BARRIER (SWITCH AMPLIFIER)
	ISOLATED BARRIER (TEMPERATURE REPEATER)

SYMBOL	DESCRIPTION
	AUXILIARY RELAY POWER RELAY
	TIMED RELAY DELAYED TO EXCITATION
	TIMED RELAY DELAYED TO THE DROP-OUT
	RELAY STEP BY STEP
	POWER CONTACT
	OPEN AND CLOSE AUXILIARY CONTACT
	EXCHANGE AUXILIARY CONTACT
	NORMALLY OPEN NORMALLY CLOSE AUXILIARY CONTACT DELAYED ON OPENING
	NORMALLY OPEN NORMALLY CLOSE AUXILIARY CONTACT DELAYED ON CLOSING
RC	OVERVOTAGE LIMITER

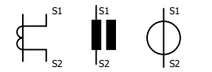
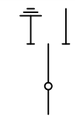
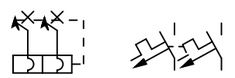
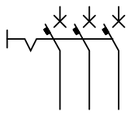
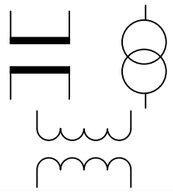
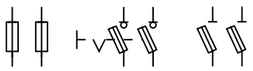
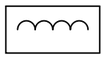
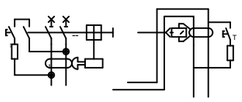
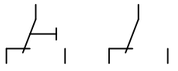
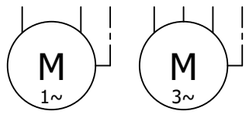
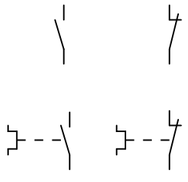
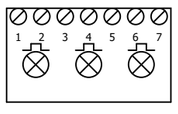
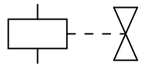
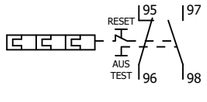
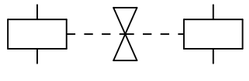
SYMBOL	DESCRIPTION
	TOROIDAL TRANSFORMER
NETWORK ANALIZER	NETWORK ANALIZER
	GENERIC PROTECTION COMMON: -VOLTMETRIC -AMMETRIC -TRANSDUCER
V	VOLTMETER
A	AMMETER
	COMMUTATOR: VOTMETRIC
	AMMETRIC
...n	DIODE MODULE
	Ac/Dc POWER SUPPLY
	BIT PLC
	PIN NUMBER
	PIN DESCRIPTION
	TAG CARD
	REF. SHEET.COLUMN
	PLC ADRESS
	SYMBOLIC ADRESS
	PLC BIT COMMENT
	TAG CARD
	PIN DESCRIPTION
	PLC ADRESS
	SHEET REFERENCE
	COLUMN REFERENCE
	PLC BIT COMMENT

SYMBOL	DESCRIPTION
	HORN
	RESISTOR
	OUTLET SOCKET
	FAN
	MECHANICAL INTERLOCKED
	KEY FREE WITH CLOSED DOOR
	KEY FREE
	KEY LOCKED
	CONNECTOR
	LIMIT SWITCH
P>	AIR PRESSURE SWITCH
L	LEVEL SWITCH
F	SENSOR FILTER
T f	THERMOSTAT
	REED MAGNETIC PROXIMITY SENSOR

REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 04
DESCRIPTION: COMMON SYMBOLS	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 05
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

TABLE SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SWITCH DISCONNETING SWITCH		GEARED MOTOR DEVICE		LINE/EARTH DISCONNECTING SWITCH MEDIUM VOLTAGE		CURRENT TRANSFORMER
	SWITCH: MAGNETOTHERMAL MAGNETOTERMAL+DIFFERENTIAL		OPENING COIL		LINE/EARTH DISCONNECTING SWITCH MEDIUM VOLTAGE		VOLTAGE TRANSFORMER
			CLOSING COIL				
			MINIMUM VOLTAGE COIL				
	AUTOMATIC SWITCH		CAPACITOR POLARIZD CAPACITOR		MEDIUM VOLTAGE SWITCH		POWER TRANSFORMER
	DISCONNETTING SWITCH WITH FUSE		REACTOR		EARTH DISCONNETTING SWITCH MEDIUM VOLTAGE		
	DIFFERENTIAL SWITCH MINIMUM DIFFERENTIAL		THERMIC PROBE PT100		CAPACITIVE LIVE LINE INDICATOR		
	SOURGE ARRESTER		THERMOCOUPLE				
	EXCHANGE AUXILIARY CONTACT OF: -POSITION -SIGNALLING FOR SWITCH-DISCONNECTOR		ASYNCHRONOUS MOTOR SINGLE-PHASE THREE-PHASE				
	NORMALLY OPEN/CLOSE AUXILIARY CONTACT FOR: -SWITCH-DISCONNECTING SWITCH -AUTOMATIC/MAGNETOTH. SWITCH -THERMAL RELAY		THREE-PHASE FLASHING-LIGHT				
			SIMPLE SOLENOID VALVE				
	RELAY THERMAL WITH AUXILIARY CONTACTS		DOUBLE SOLENOID VALVE				

REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

PLANT COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED ASSOLARI O.	CHECKED TIRABOSCHI T.	PLANT = DRYER	PAGE 05
	DATE 08.05.2024	APPROVED	LOCATION + QE	NEXT 06
DESCRIPTION COMMON SYMBOLS	WORK ORDER N 2024.4814_001	DRAWING N d241025-WD		TOTAL SHEETS 54

INDEX PAGES

PAGE	DATE	PREPARED	DESCRIPTION	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.
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F	12.05.2025	O.A.			
E	04.02.2025	O.A.			
D	18.11.2024	O.A.			
C	04.09.2024	O.A.			
B	01.08.2024	O.A.			
A	30.05.2024	O.A.			

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PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
DESCRIPTION: INDEX PAGES	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	TOTAL SHEETS: 54
			PAGE: 06
			NEXT: 07

INDEX PAGES

PAGE	DATE	PREPARED	DESCRIPTION	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.
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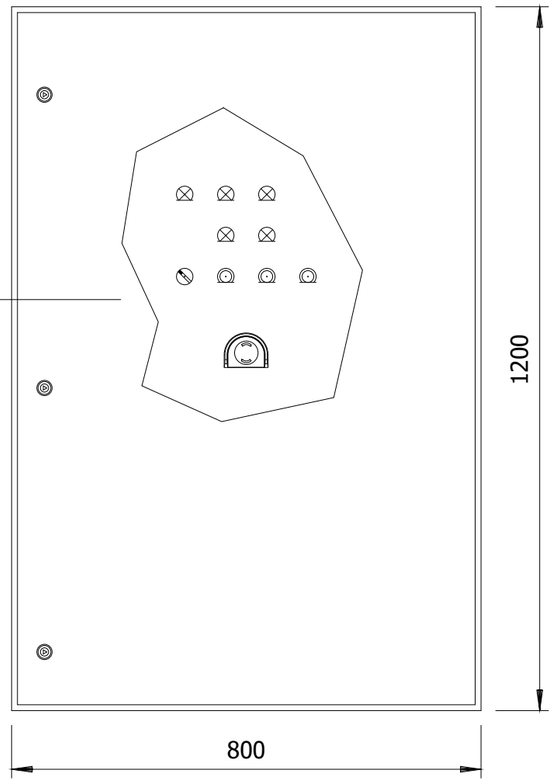
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C	04.09.2024	O.A.			
B	01.08.2024	O.A.			
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 07
DESCRIPTION: INDEX PAGES	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 08
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

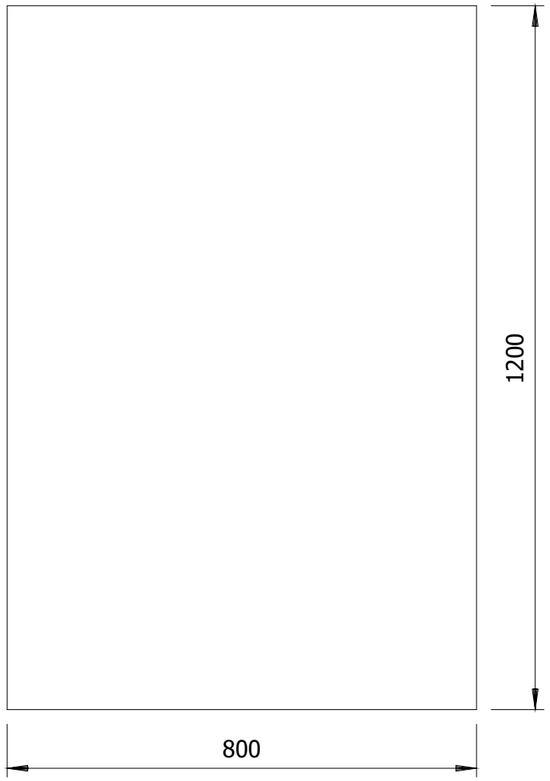
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63-LP-001

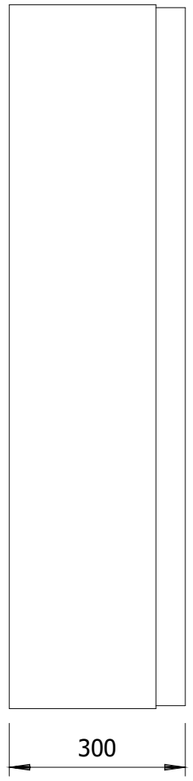
FRONT



FRONT WITHOUT DOOR

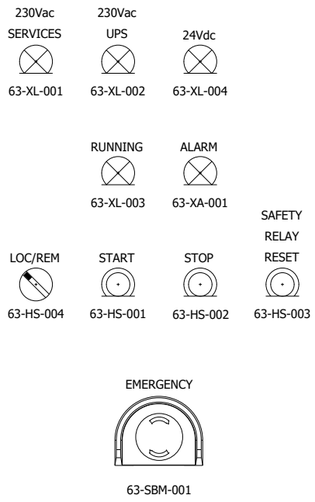


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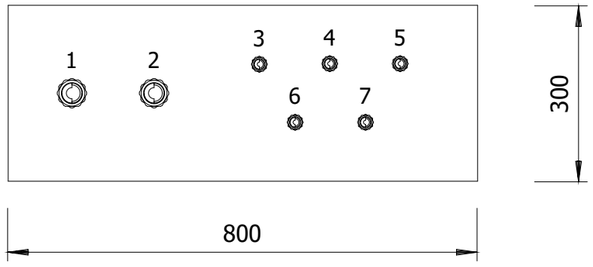


OPERATORS

EXAMPLE



FRONT BOTTTOM



1 =M40 CABLE "83017-CEL-1"

2 =M40 CABLE "83017-CEL-2"

3 =M20 CABLE "84311-CEL"

4 =M20 CABLE "83110-CEL"

5 =M20 CABLE "C-63-XS-001/B400-SIS-001"

6 =M20 CABLE "C-63-XA-003/B400-SIS-001"

7 =M20 CABLE "63-LP-001/B400-NET-001"

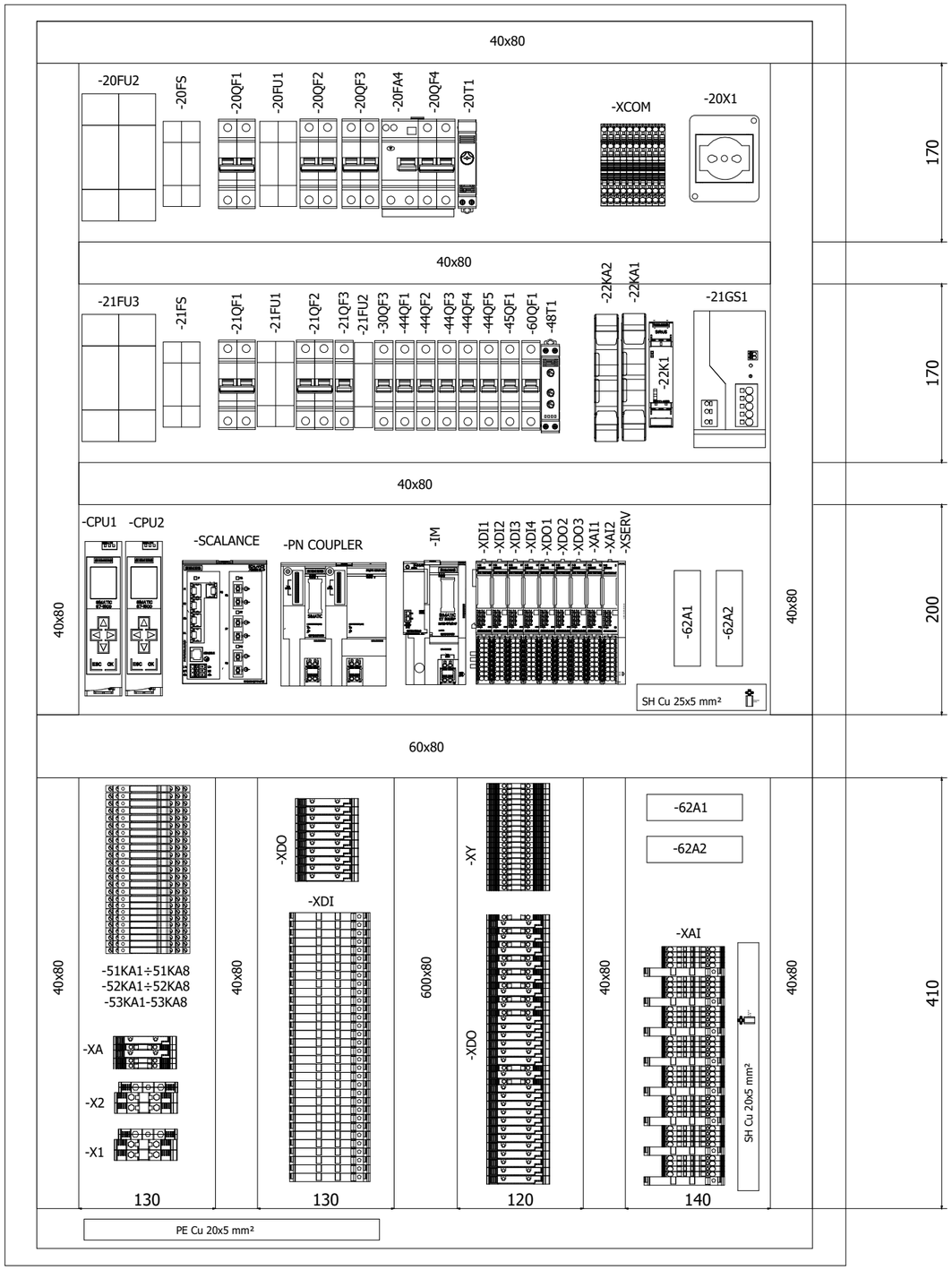
REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			
A	30.05.2024	O.A.			

coes 20th 1997 - 2017

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 08
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 09
DESCRIPTION: EXTERNAL VIEWS	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

63-LP-001

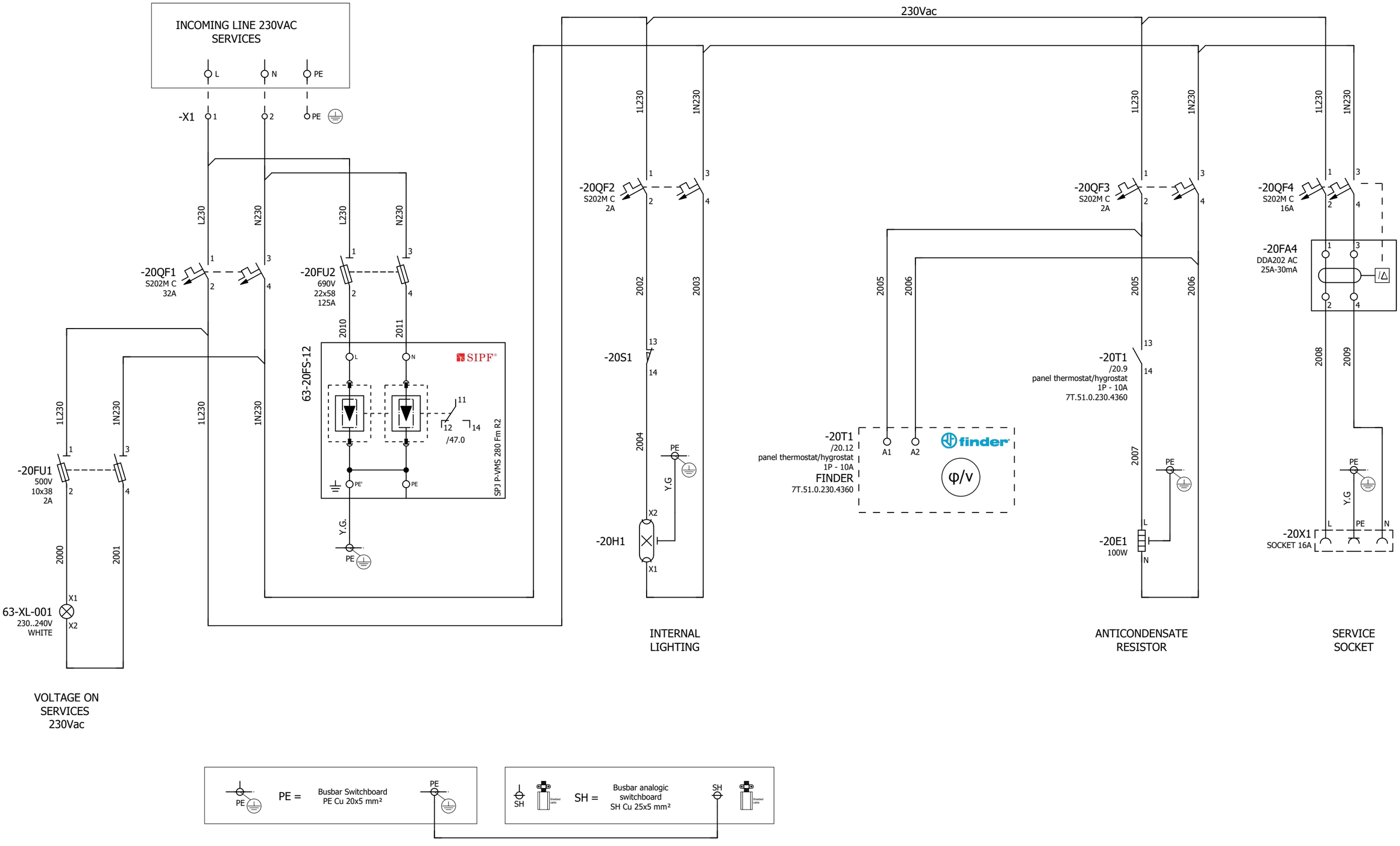
INTERNAL



C	04.09.2024	O.A.			
A	30.05.2024	O.A.			
REV.	DATE	PREPARED	REV.	DATE	PREPARED

coes 20th coes 1997 - 2017

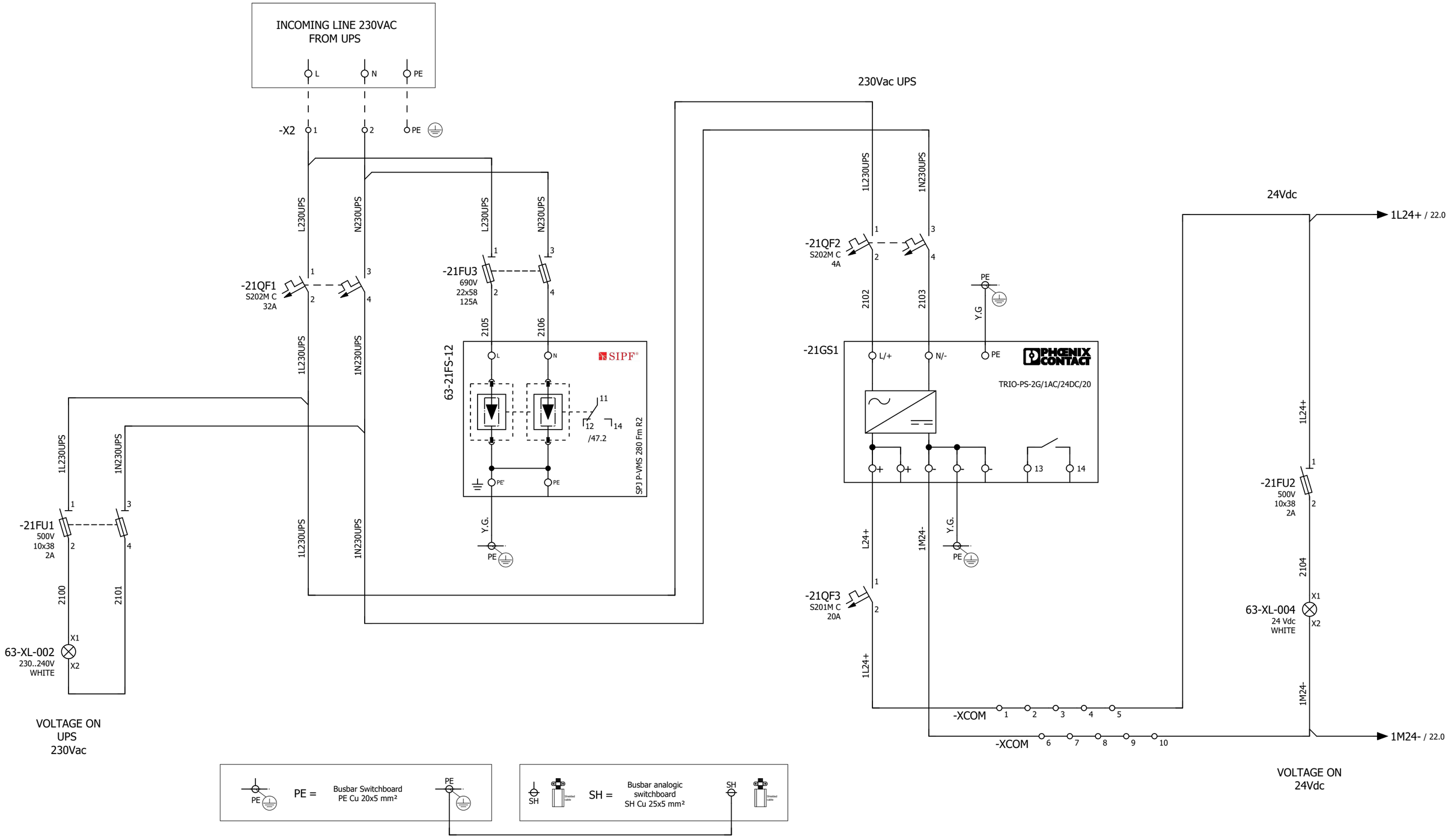
PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 09
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 10
DESCRIPTION: INTERNAL VIEWS	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54



REV.	DATE	PREPARED	REV.	DATE	PREPARED
C	04.09.2024	O.A.			
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
DESCRIPTION: INCOMING LINE 230Vac SERVICES	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	TOTAL SHEETS: 54

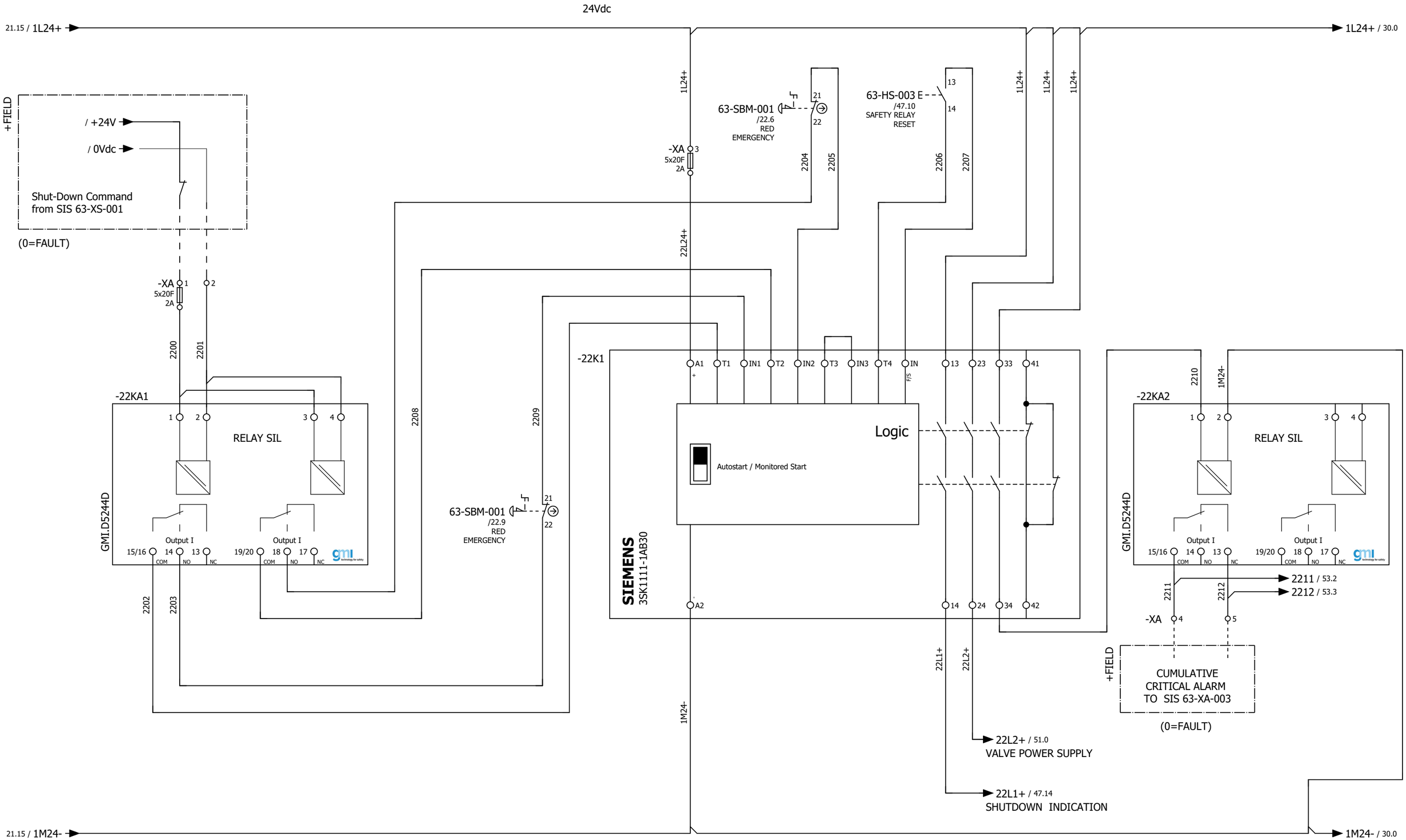
PAGE	NEXT
10	11



REV.	DATE	PREPARED	REV.	DATE	PREPARED
C	04.09.2024	O.A.			
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
DESCRIPTION: INCOMING LINE 230Vac FROM UPS	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	TOTAL SHEETS: 54

PAGE	NEXT
11	12



REV.	DATE	PREPARED	REV.	DATE	PREPARED
F	12.05.2025	O.A.			
C	04.09.2024	O.A.			
A	30.05.2024	O.A.			

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PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: SAFETY RELAY 24Vdc	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	

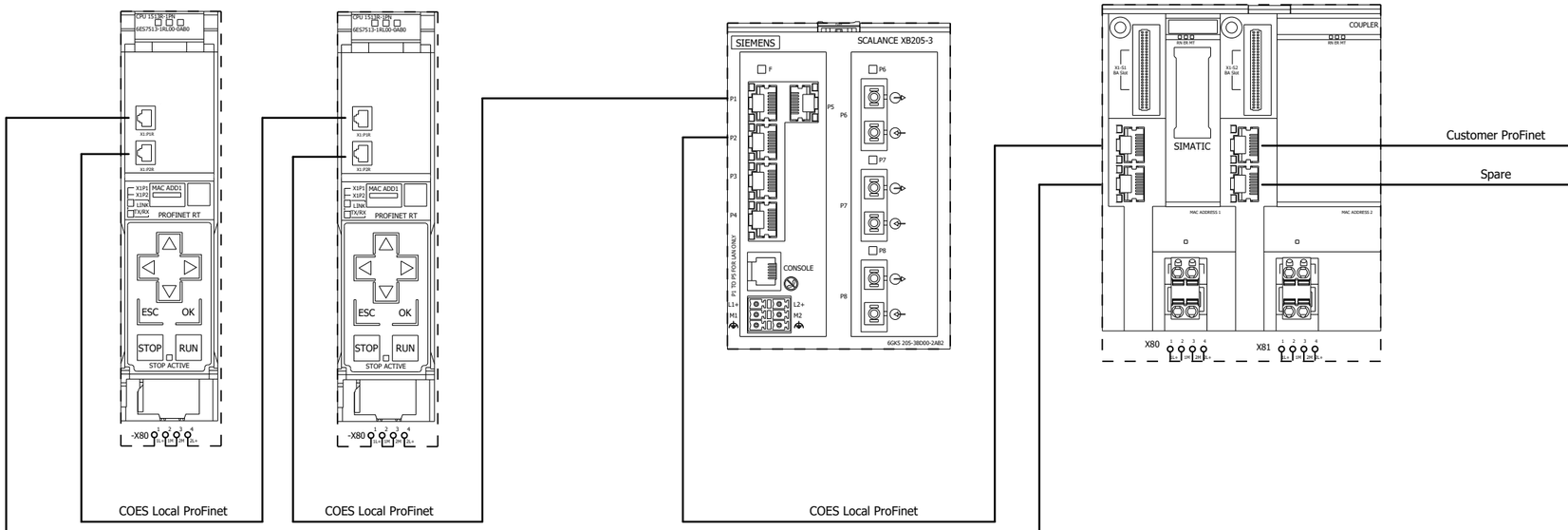
PAGE	NEXT	TOTAL SHEETS
12	13	54

CPU 1

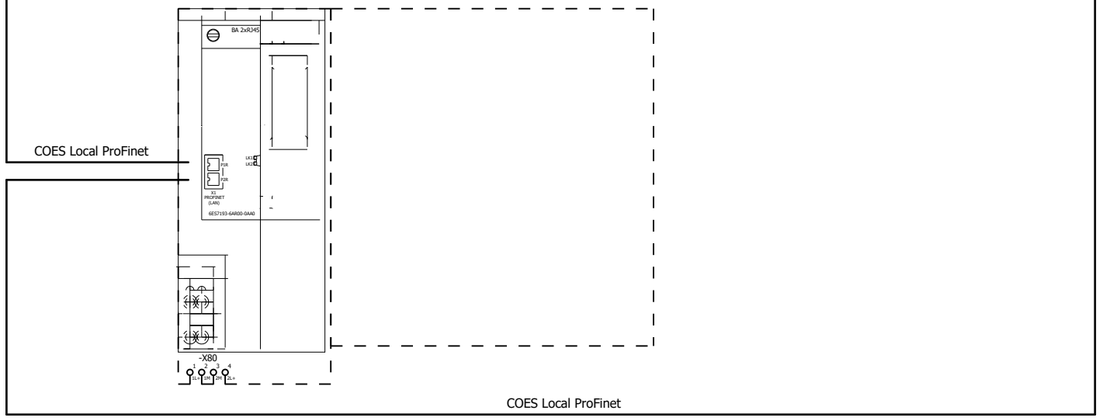
CPU 2

SCALANCE

PN/PN COUPLER



I/O RACK



NOTE:
this ProFinet cable
is not in COES'S
scope of supply

CUSTOMER'S
PROFINET
NETWORK

FIELD

DRYER UCP

REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

PLANT
COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM

DESCRIPTION
NETWORK ARCHITECTURE

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= DRYER	13
DATE	APPROVED	LOCATION	NEXT
08.05.2024		+ QE	14
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4814_001	d241025-WD		54

22.15 / 1L24+
22.15 / 1M24-
24Vdc
1L24+ / 44.0
1M24- / 44.0

-CPU1
/35.0

-CPU2
/35.9

1513R-1 PN
6ES7513-1RL00-0AB0
X50
MCD
PUSH
RUN
STOP
MRES
X1P1
X1P2
LINK
TX/RX
MAC ADD1
PROFINET (LAN)
X1
P1R
P2R
X80
DC24V
1L+ 1M 2M 2L+
-X80

-30QF3
S201M C
2A
1L24+
1M24-
3002

-IM
/36.1
BA 2xRJ45
SIEMENS
SIMATIC ET200SP
IM155-6PN/2 HF
6ES7193-6AR00-0AA0
6ES7155-6AU01-0CN0
MAC ADDRESS
X80
24VDC
-X80
SLOT 0

-XDI1
/37.1
-XDI2
/37.8
-XDI3
/38.1
-XDI4
/38.8
DI 8x24VDC
BA
DIAG
6ES7131-6BF01-0AA0
6ES7193-6BP00-0DA0
6ES7131-6BF01-0BA0
6ES7193-6BP00-0BA0
SLOT 1
SLOT 2
SLOT 3
SLOT 4

-XDO1
/40.1
-XDO2
/40.8
-XDO3
/41.1
DQ 8x24VDC/0,5A
6ES7132-6BF01-0AA0
6ES7132-6BF01-0BA0
SLOT 5
SLOT 6
SLOT 7

-XAI1
/42.1
-XAI2
/42.8
AI 4xI 2-/4-wire
AI ST
6ES7134-6GD01-0BA1
6ES7193-6BP00-0DA0
6ES7193-6BP00-0BA0
SLOT 8
SLOT 9

-XSER
SLOT 10

I/O RACK

-PN COUPLER
/43.1
COUPLER
X1-S1
BA Slot
X1-S2
BA Slot
SIMATIC
X1 PROFINET (LAN)
X2 PROFINET (LAN)
MAC ADDRESS 1
MAC ADDRESS 2
X80
X81

REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			

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PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: PLC CONFIGURATION	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	TOTAL SHEETS: 54

PAGE: 14
NEXT: 15

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

-CPU1
/30.0
/44.10
SIE.6ES7513-1RL00-0AB0
SIE.6ES7954-8LF03-0AA0

S7-1500 SIEMENS
CPU 1513 R

X1P1 R: PN /61.1
X1P2 R: PN /61.2

-X80:1 1L+ /44.10 POWER SUPPLY CPU 1513R-1PN - CPU1
-X80:2 1M /44.10
-X80:3 2M /44.10
-X80:4 2L+ /44.11

6ES7513-1RL00-0AB0

-CPU2
/30.1
/44.13
SIE.6ES7513-1RL00-0AB0
SIE.6ES7954-8LF03-0AA0

S7-1500 SIEMENS
CPU 1513 R

X1P1 R: PN /61.5
X1P2 R: PN /61.6

-X80:1 1L+ /44.13 POWER SUPPLY CPU 1513R-1PN - CPU2
-X80:2 1M /44.13
-X80:3 2M /44.13
-X80:4 2L+ /44.13

6ES7513-1RL00-0AB0

REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

coes 20th coes 1997 - 2017

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 15
DESCRIPTION: SUMMARY CPU	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 16
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

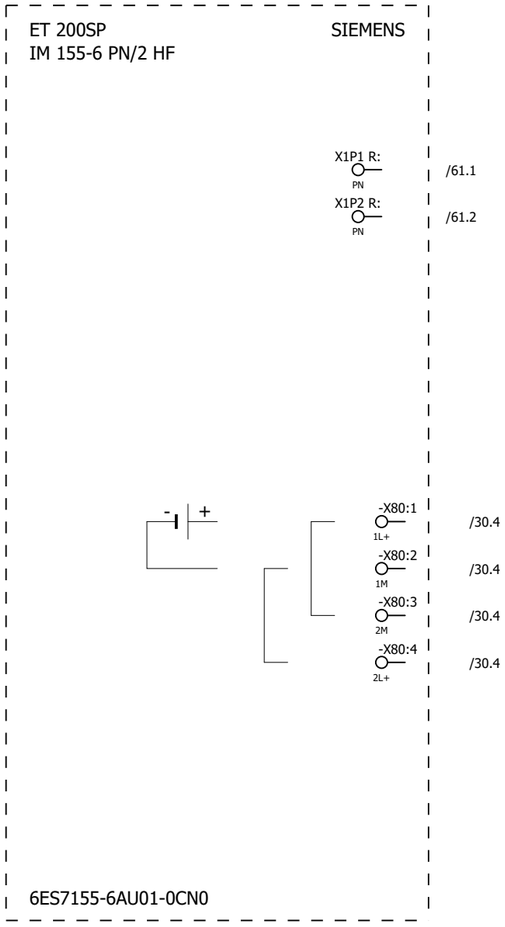
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

/30.4

-IM

SIE.6ES7155-6AU01-0CN0

SIE.6ES7193-6AR00-0AA0



REV.	DATE	PREPARED	REV.	DATE	PREPARED

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 16
DESCRIPTION: SUMMARY CARDS I/O RACK	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 17
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

6ES7131-6BF01-0AA0
6ES7193-6BP00-0DA0

-XDI1
/30.5

%I0.0	/46.0	63-PS-054	(DRYER 1) TOWER A PRESSURE SWITCH		
%I0.1	/46.2	63-PS-056	(DRYER 1) TOWER B PRESSURE SWITCH		
%I0.2	/46.4	63-PS-058	(DRYER 2) TOWER A PRESSURE SWITCH		
%I0.3	/46.6	63-PS-060	(DRYER 2) TOWER B PRESSURE SWITCH		
%I0.4	/46.8	63-CMPR-RUN-FDBCK-001	COMPRESSOR 1 RUNNING		
%I0.5	/46.10	63-CMPR-ALARM-FDBCK-001	COMPRESSOR 1 COMMON ALARM		
%I0.6	/46.12	63-CMPR-RUN-FDBCK-002	COMPRESSOR 2 RUNNING		
%I0.7	/46.14	63-CMPR-ALARM-FDBCK-002	COMPRESSOR 2 COMMON ALARM		
L+ 24VDC	/44.1		POWER SUPPLY WHITE CARD DIGITAL INPUT -XDI1		
M 0VDC	/44.1				
SH					

SIEMENS

6ES7131-6BF01-0AA0
6ES7193-6BP00-0BA0

-XDI2
/30.6

%I1.0	/47.0	63-20FS-12	SOURGE ARRESTER 230VAC_SERVICES OK		
%I1.1	/47.2	63-21FS-12	SOURGE ARRESTER 230VAC_UPS OK		
%I1.2	/47.4	63-TH-001	INTERNAL CABINET THERMOSTAT		
%I1.3	/47.6	63-HS-001	LOCAL START PUSH BUTTON		
%I1.4	/47.8	63-HS-002	LOCAL STOP PUSH BUTTON		
%I1.5	/47.10	63-HS-003	LOCAL ALARM RESET		
%I1.6	/47.12	63-HS-004	LOCAL REMOTE SELECTOR STATUS		
%I1.7	/47.14	63-ESD-001	SHUTDOWN ALARM FROM SIS - INDICATION ONLY		
L+ 24VDC					
M 0VDC					
SH					

SIEMENS

REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

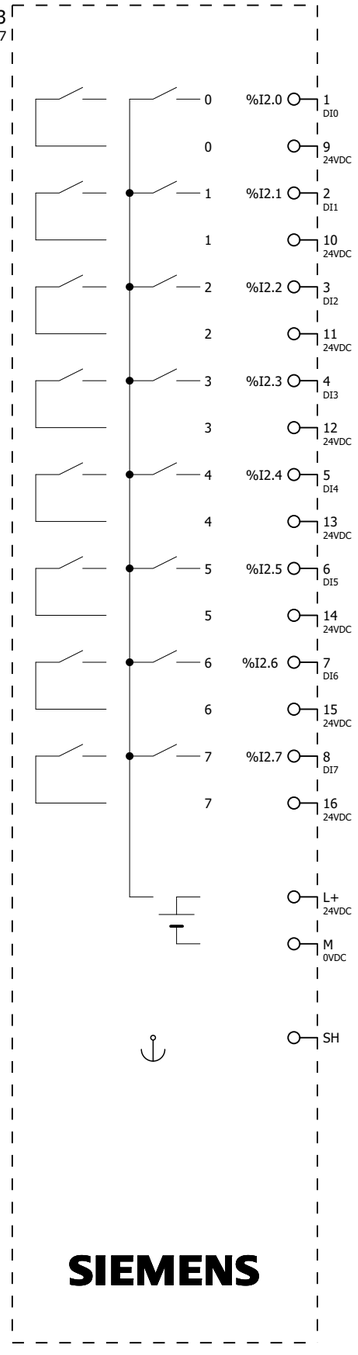
coes 20th 1997 - 2017

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 17
DESCRIPTION: SUMMARY CARDS I/O RACK	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 18
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

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6ES7131-6BF01-0AA0
6ES7193-6BP00-0BA0

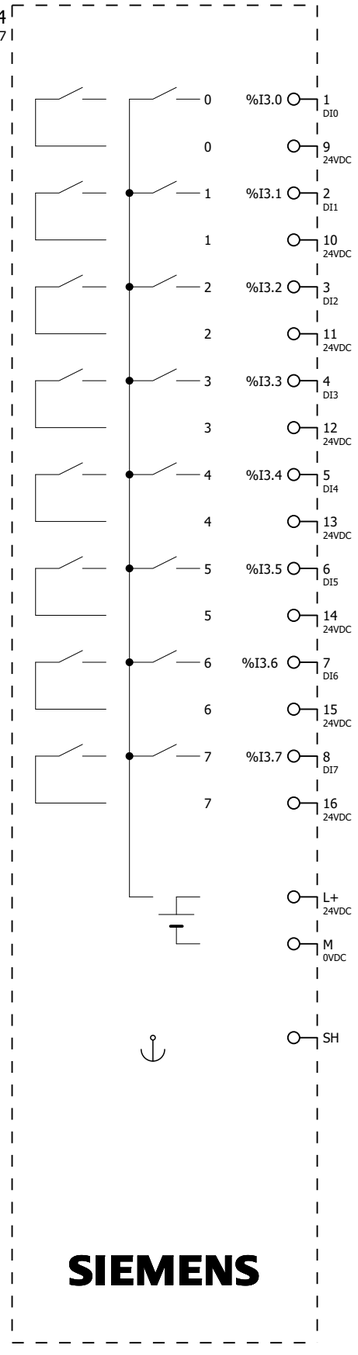
-XDI3
/30.7



/48.0	63-ZSH-055	VALVE 63-XV-055 OPEN LIMIT SWITCH		
/48.2	63-ZSL-055	VALVE 63-XV-055 CLOSED LIMIT SWITCH		
/48.4	63-ZSH-056	VALVE 63-XV-056 OPEN LIMIT SWITCH		
/48.6	63-ZSL-056	VALVE 63-XV-056 CLOSED LIMIT SWITCH		
/48.8	63-ZSH-057	VALVE 63-XV-057 OPEN LIMIT SWITCH		
/48.10	63-ZSL-057	VALVE 63-XV-057 CLOSED LIMIT SWITCH		
/48.12	63-ZSH-058	VALVE 63-XV-058 OPEN LIMIT SWITCH		
/48.14	63-ZSL-058	VALVE 63-XV-058 CLOSED LIMIT SWITCH		

6ES7131-6BF01-0AA0
6ES7193-6BP00-0BA0

-XDI4
/30.7



/49.0	63-ZSH-059	VALVE 63-XV-059 OPEN LIMIT SWITCH		
/49.2	63-ZSL-059	VALVE 63-XV-059 CLOSED LIMIT SWITCH		
/49.4	63-ZSH-060	VALVE 63-XV-060 OPEN LIMIT SWITCH		
/49.6	63-ZSL-060	VALVE 63-XV-060 CLOSED LIMIT SWITCH		
/49.8		SPARE		
/49.10		SPARE		
/49.12		SPARE		
/49.14		SPARE		

REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			

coes 20th 1997 - 2017

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 18
DESCRIPTION: SUMMARY CARDS I/O RACK	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 19
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

6ES7132-6BF01-0AA0
6ES7193-6BP00-0DA0

-XDO1
/30.8

%Q0.0	/51.0	63-XY-051	(DRYER 1) 5-WAY VALVE SOV COMMAND		
%Q0.1	/51.2	63-XY-052	(DRYER 1) DEPRESSURIZATION VALVE SOV COMMAND		
%Q0.2	/51.4	63-XY-053	(DRYER 2) 5-WAY VALVE SOV COMMAND		
%Q0.3	/51.6	63-XY-054	(DRYER 2) DEPRESSURIZATION VALVE SOV COMMAND		
%Q0.4	/51.8	63-XL-003	RUNNING STATUS LAMP		
%Q0.5	/51.10	63-XA-001	GENERAL ALARM LAMP		
%Q0.6	/51.12	63-CMPR-START-001	COMPRESSOR 1 REMOTE START/STOP		
%Q0.7	/51.14	63-CMPR-START-002	COMPRESSOR 2 REMOTE START/STOP		
L+ 24VDC	/44.3		POWER SUPPLY WHITE CARD DIGITAL OUTPUT -XDO1		
M 0VDC	/44.3				
SH					

SIEMENS

6ES7132-6BF01-0AA0
6ES7193-6BP00-0BA0

-XDO2
/30.8

%Q1.0	/52.0	63-ALARM-DRY-001	DRYER 1 ALARM		
%Q1.1	/52.2	63-ALARM-DRY-002	DRYER 2 ALARM		
%Q1.2	/52.4	63-XV-055	VALVE 63-XV-055 COMMAND		
%Q1.3	/52.6	63-XV-056	VALVE 63-XV-056 COMMAND		
%Q1.4	/52.8	63-XV-057	VALVE 63-XV-057 COMMAND		
%Q1.5	/52.10	63-XV-058	VALVE 63-XV-058 COMMAND		
%Q1.6	/52.12	63-XV-059	VALVE 63-XV-059 COMMAND		
%Q1.7	/52.14	63-XV-060	VALVE 63-XV-060 COMMAND		
L+ 24VDC					
M 0VDC					
SH					

SIEMENS

REV.	DATE	PREPARED	REV.	DATE	PREPARED
E	04.02.2025	O.A.			
B	01.08.2024	O.A.			
A	30.05.2024	O.A.			

coes 20th 1997 - 2017

PLANT
COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM

DESCRIPTION
SUMMARY CARDS I/O RACK

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= DRYER	19
DATE	APPROVED	LOCATION	NEXT
08.05.2024		+ QE	20
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4814_001	d241025-WD		54

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

6ES7132-6BF01-0AA0
6ES7193-6BP00-0BA0

-XDO3
/30.9

0	%Q2.0	1 DQ0	/53.0	SPARE
0		9 M		
1	%Q2.1	2 DQ1	/53.2	RESED_FORCED
1		10 M		
2	%Q2.2	3 DQ2	/53.4	SPARE
2		11 M		
3	%Q2.3	4 DQ3	/53.6	SPARE
3		12 M		
4	%Q2.4	5 DQ4	/53.8	SPARE
4		13 M		
5	%Q2.5	6 DQ5	/53.10	SPARE
5		14 M		
6	%Q2.6	7 DQ6	/53.12	SPARE
6		15 M		
7	%Q2.7	8 DQ7	/53.14	SPARE
7		16 M		
		L+ 24VDC		
		M 0VDC		
		SH		

SIEMENS

REV.	DATE	PREPARED	REV.	DATE	PREPARED
F	12.05.2025	O.A.			
B	01.08.2024	O.A.			

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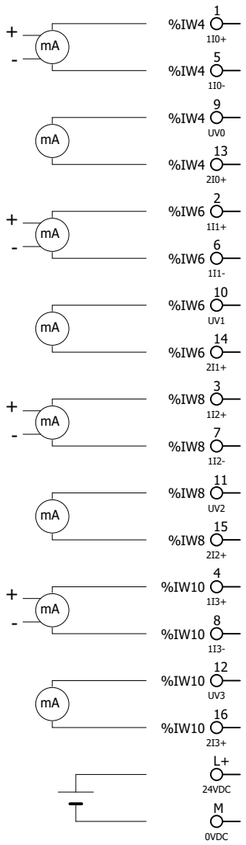
PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 20
DESCRIPTION: SUMMARY CARDS I/O RACK	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 21
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

/30.9

-XAI1

SIE.6ES7134-6GD01-0BA1
SIE.6ES7193-6BP00-0DA0

ET 200SP SIEMENS
AI 4xI 2-/4-wire ST



/54.1			
/54.1			
/54.2	63_PT_064	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER	
/54.2			
/54.5			
/54.5			
/54.6	63_TIT_051	TEMPERATURE TRANSMITTER INLET AIR	
/54.6			
/54.9			
/54.9			
/54.10	63_TIT_052	TEMPERATURE TRANSMITTER INSTRUMENT AIR RECIEVER	
/54.10			
/54.13			
/54.13			
/54.14	63_AIT_051	DEW POINT TRANSMITTER	
/54.14			
/44.6		POWER SUPPLY WHITE CARD ANALOG INPUT -XAI1	
/44.7			

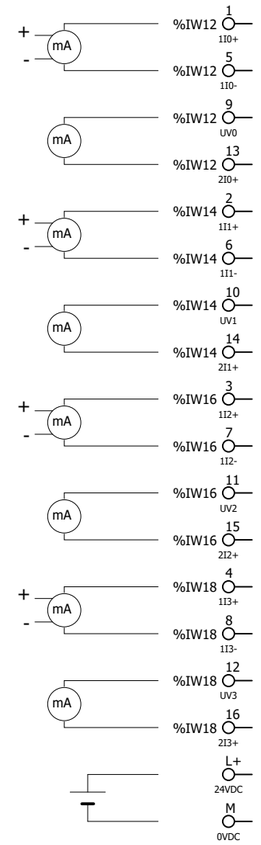
6ES7134-6GD01-0BA1

/30.10

-XAI2

SIE.6ES7134-6GD01-0BA1
SIE.6ES7193-6BP00-0BA0

ET 200SP SIEMENS
AI 4xI 2-/4-wire ST



/55.1			
/55.1			
/55.2	63_FIT_051	FLOW TRANSMITTER OUTLET AIR	
/55.2			
/55.5			
/55.5			
/55.6	63_PDIT_051	DIFFERENTIAL PRESSURE TRANSMITTER INLET FILTERS	
/55.6			
/55.9			
/55.9			
/55.10	63_PDIT_062	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS	
/55.10			
/55.13			
/55.13			
/55.14	_XAI_45	SPARE	
/55.14			

6ES7134-6GD01-0BA1

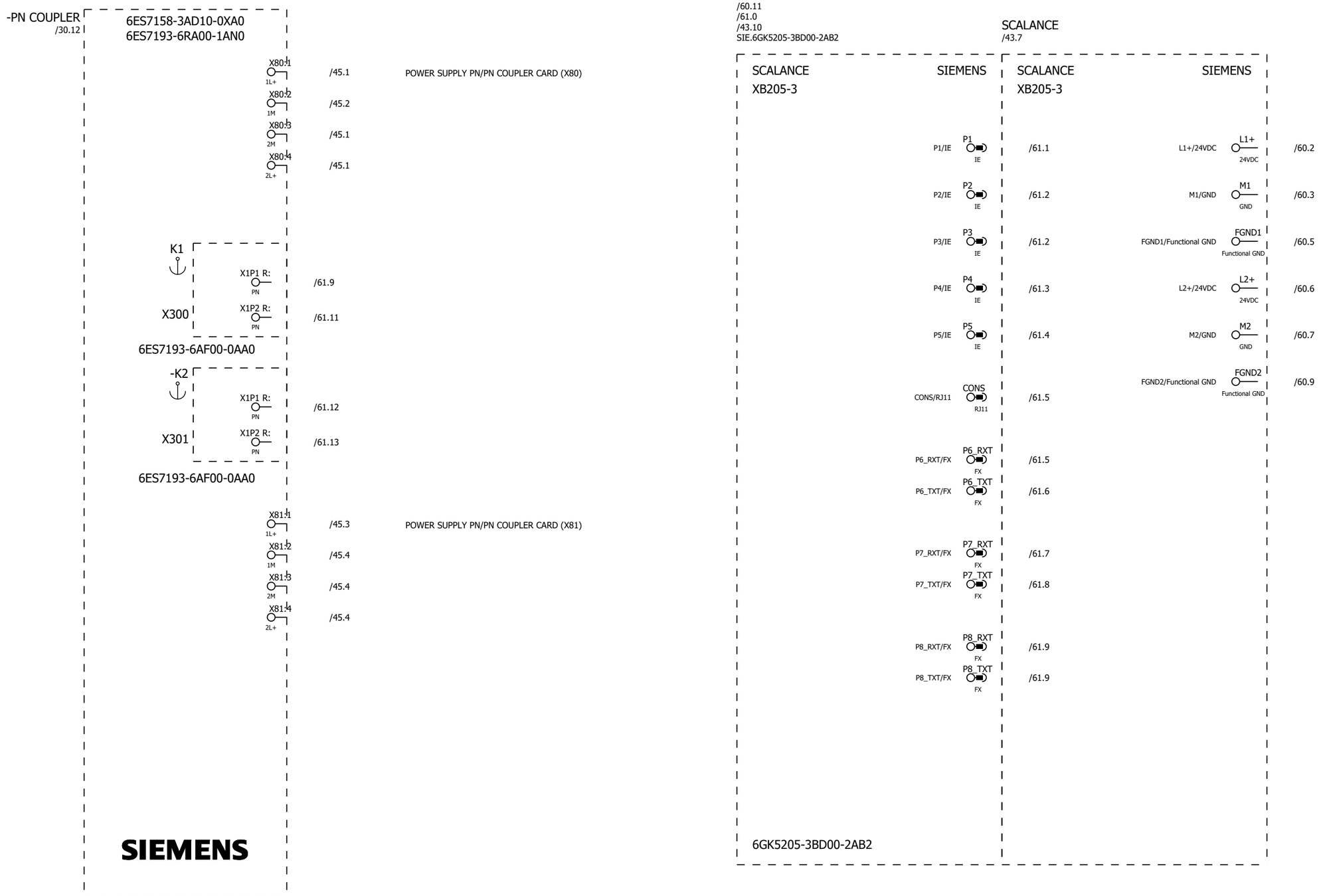
REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

coes 20th coes 1997 - 2017

PLANT
COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM

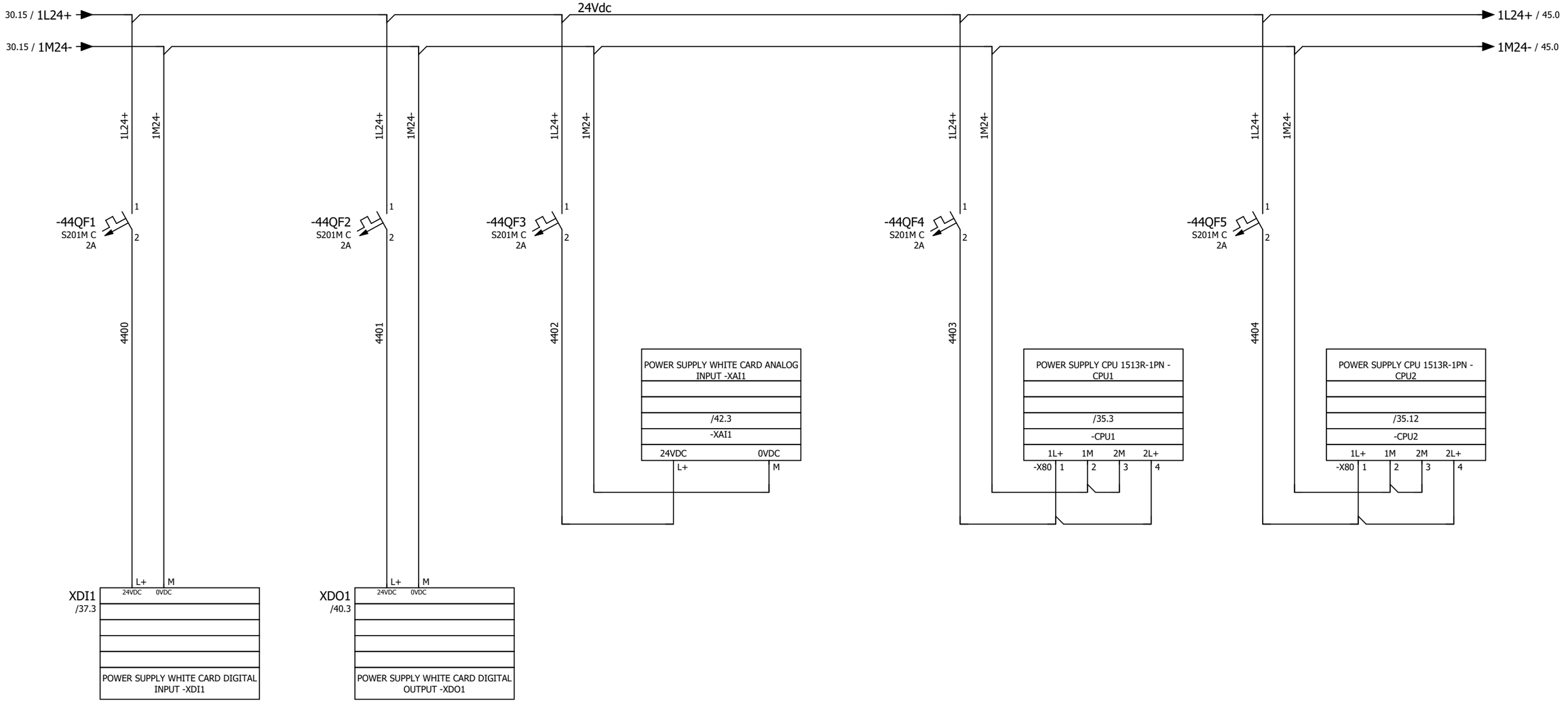
DESCRIPTION
SUMMARY CARDS I/O RACK

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= DRYER	21
DATE	APPROVED	LOCATION	NEXT
08.05.2024		+ QE	22
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4814_001	d241025-WD		54



REV.	DATE	PREPARED	REV.	DATE	PREPARED

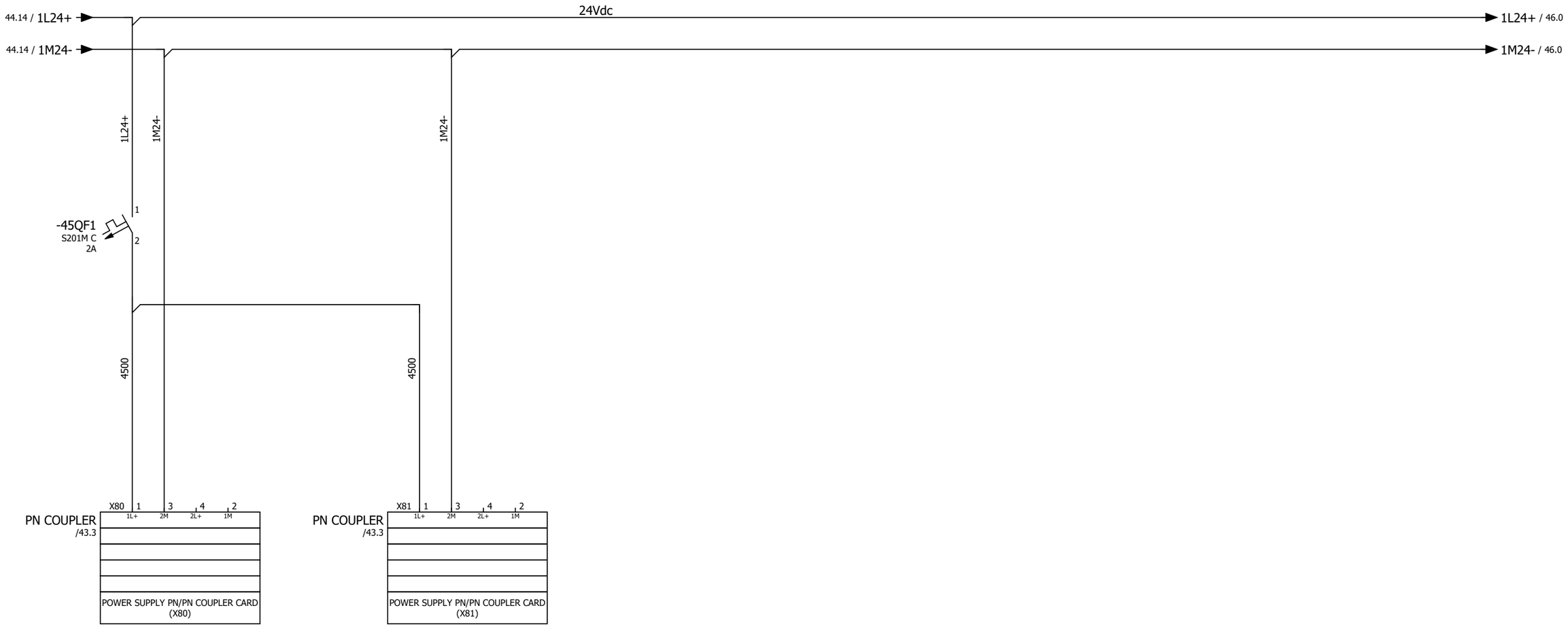
PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: SUMMARY CARD PN COUPLER AND SWITCH SCALANCE	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	TOTAL SHEETS: 54
			PAGE: 22
			NEXT: 23



REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: POWER SUPPLY CPU AND CARDS I/O RACK	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	TOTAL SHEETS: 54

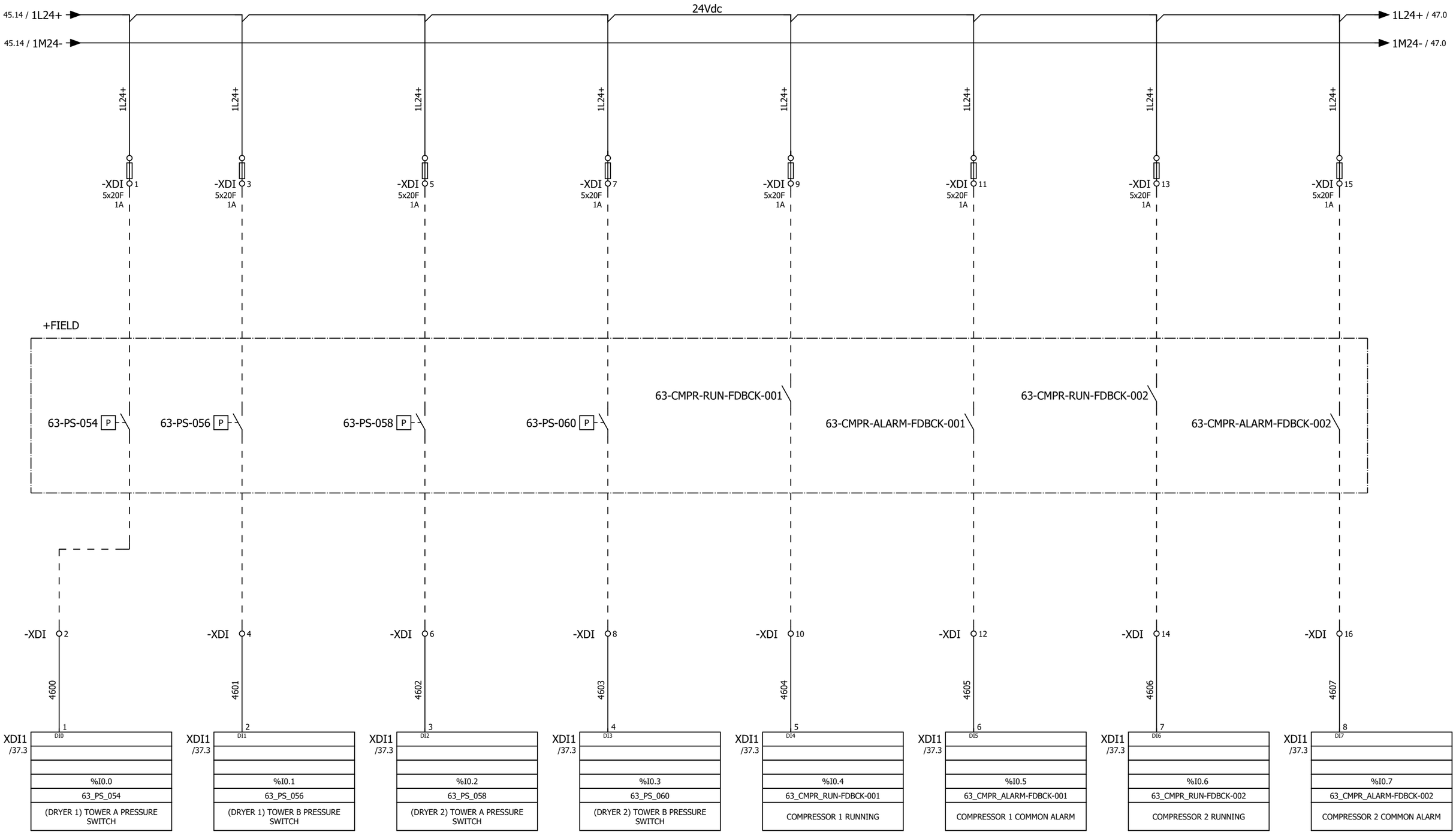
PAGE: 23
NEXT: 24



REV.	DATE	PREPARED	REV.	DATE	PREPARED

coes 20th coes 1997 - 2017

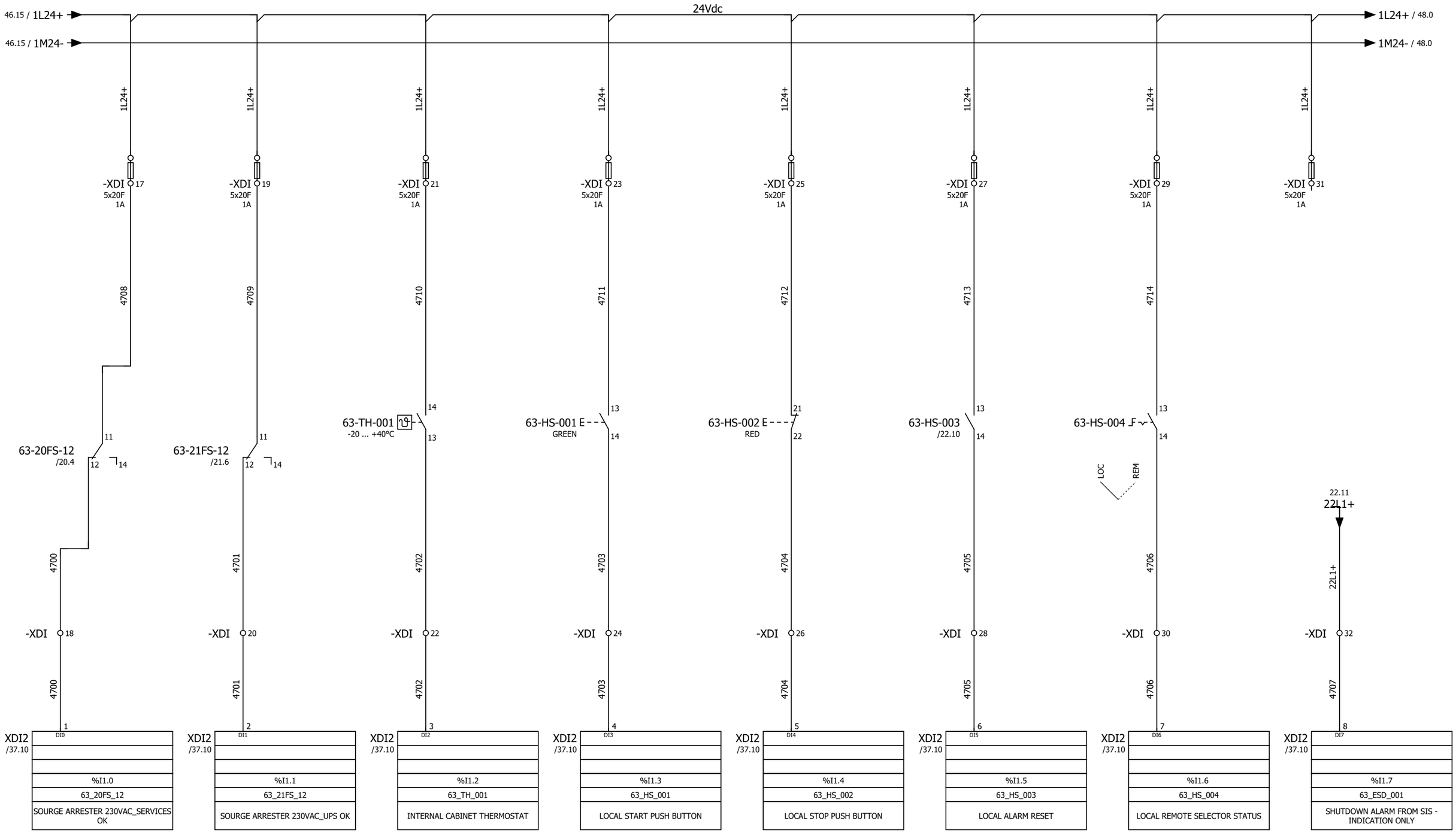
PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 24
DESCRIPTION: POWER SUPPLY PN/PN COUPLER	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 25
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54



REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: DIGITAL INPUT I/O RACK	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	TOTAL SHEETS: 54
			PAGE: 25
			NEXT: 26

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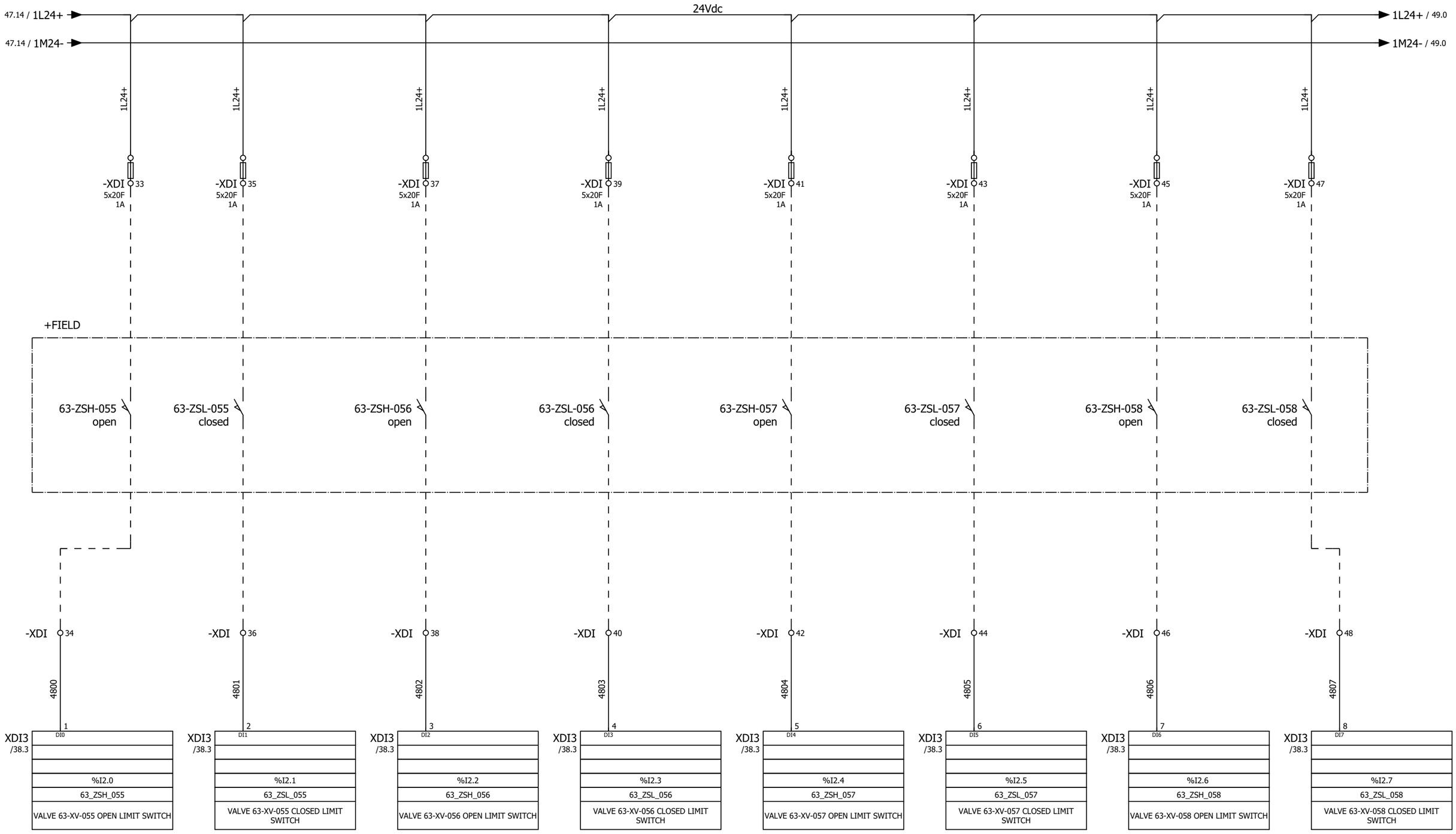


REV.	DATE	PREPARED	REV.	DATE	PREPARED
C	04.09.2024	O.A.			
A	30.05.2024	O.A.			

PLANT
COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM

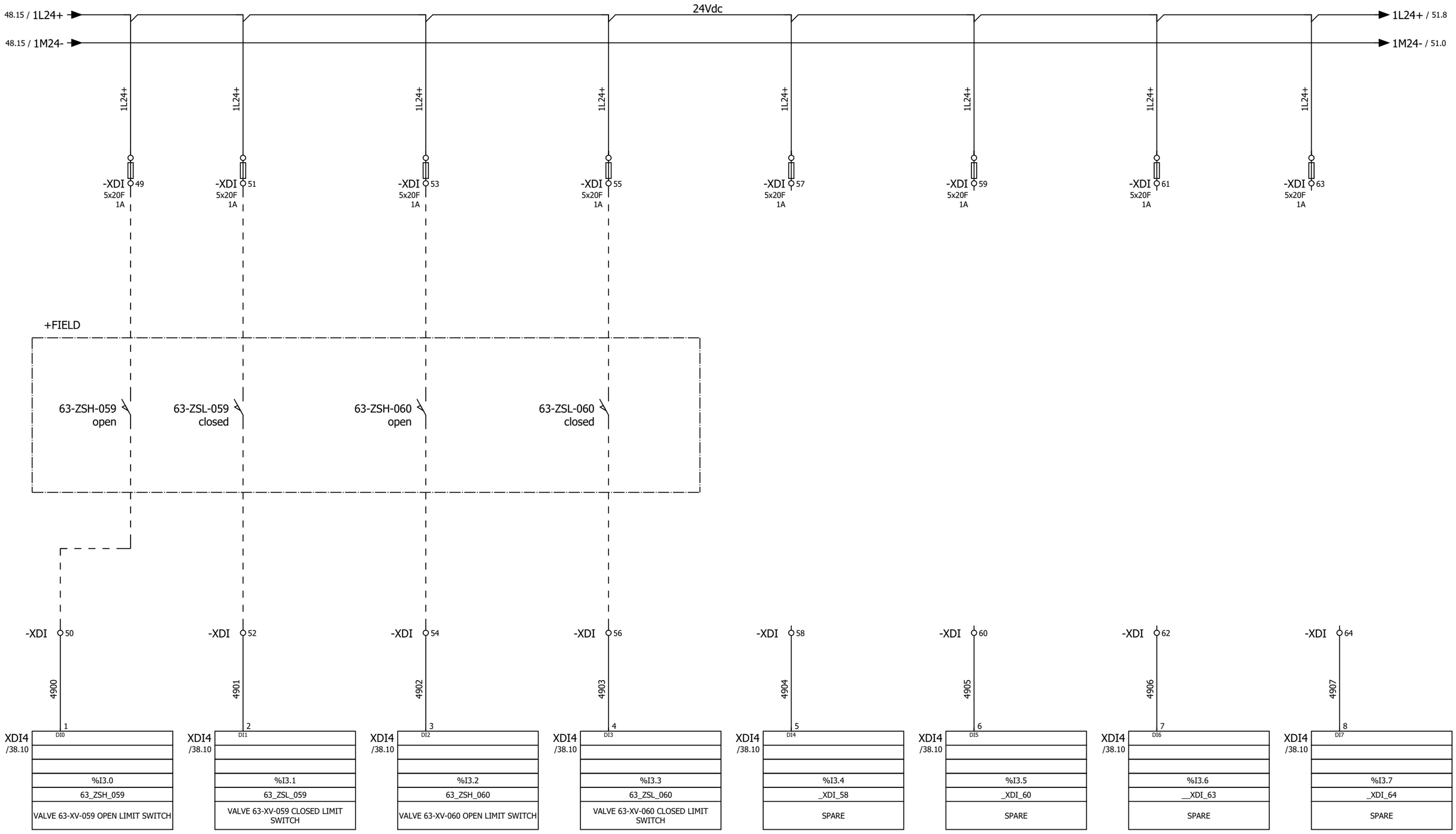
DESCRIPTION
DIGITAL INPUT I/O RACK

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= DRYER	26
DATE	APPROVED	LOCATION	NEXT
08.05.2024		+ QE	27
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4814_001	d241025-WD		54



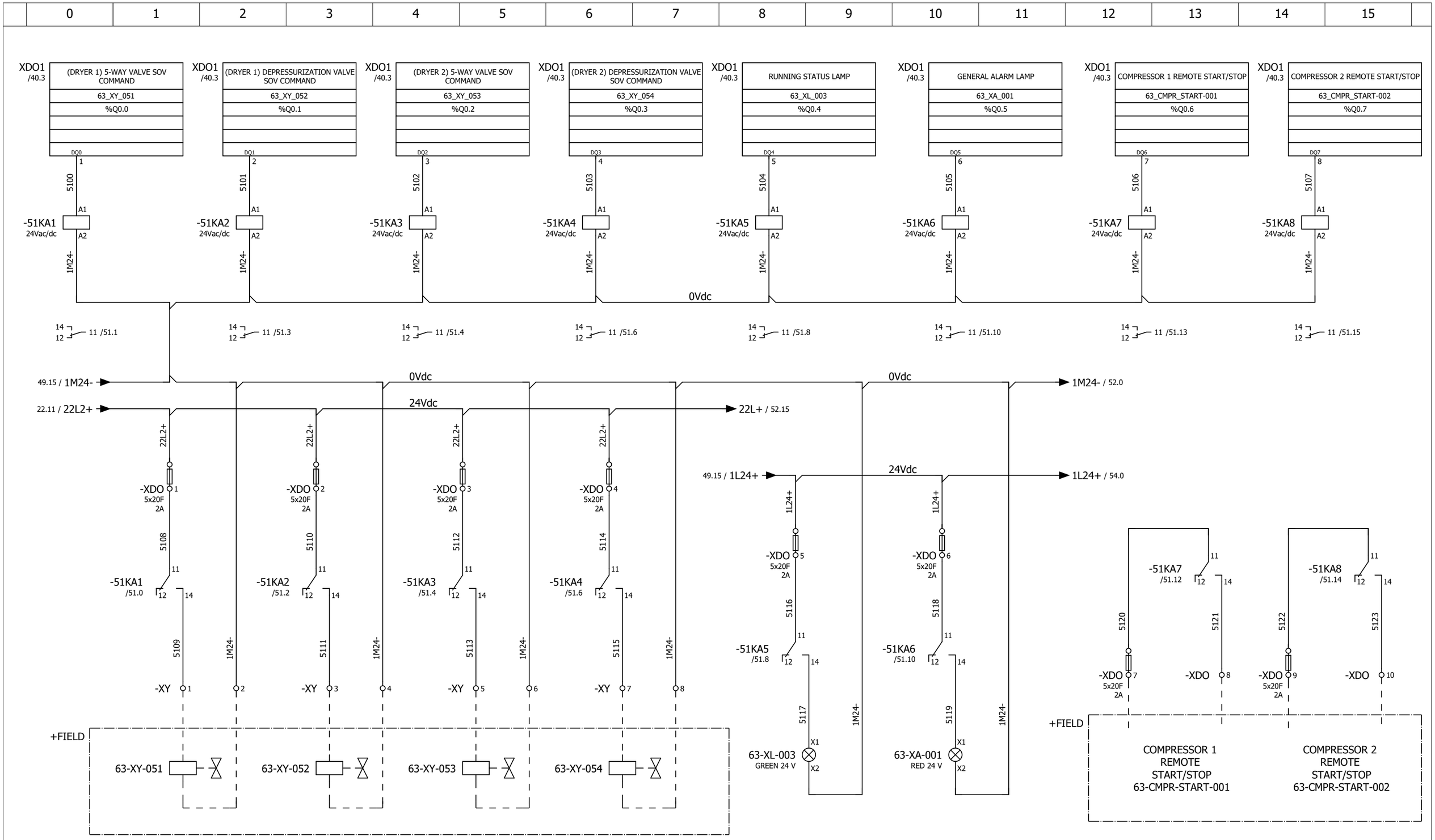
REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: DIGITAL INPUT I/O RACK	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	TOTAL SHEETS: 54
			PAGE: 27
			NEXT: 28



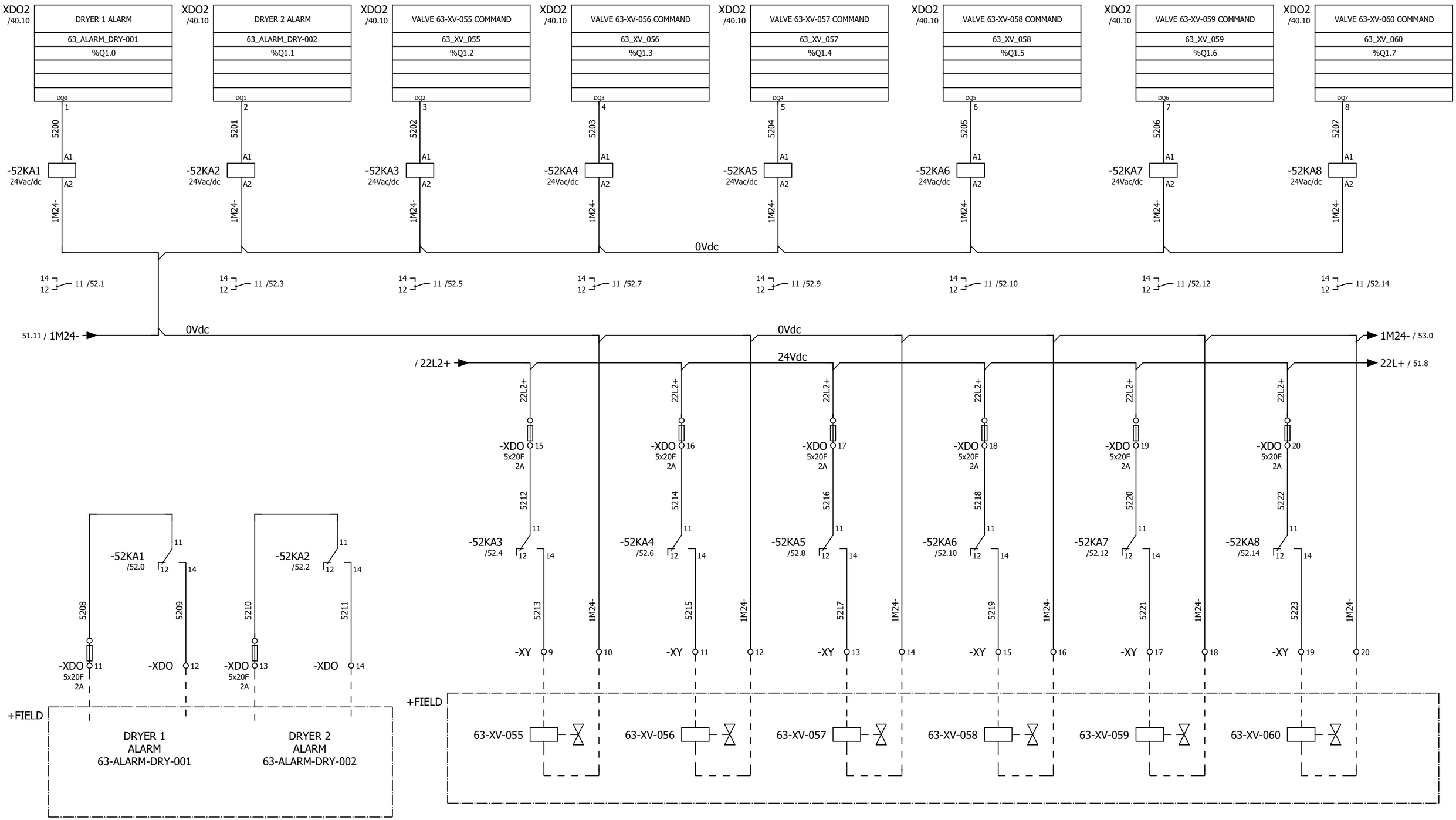
REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
DESCRIPTION: DIGITAL INPUT I/O RACK	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	TOTAL SHEETS: 54
			PAGE: 28
			NEXT: 29



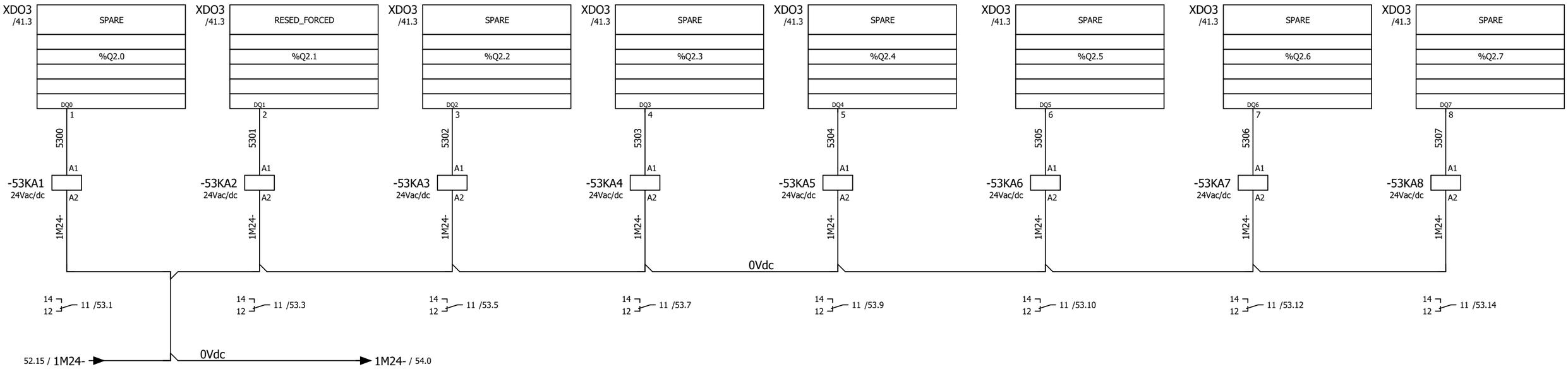
REV.	DATE	PREPARED	REV.	DATE	PREPARED
E	04.02.2025	O.A.			
A	30.05.2024	O.A.			

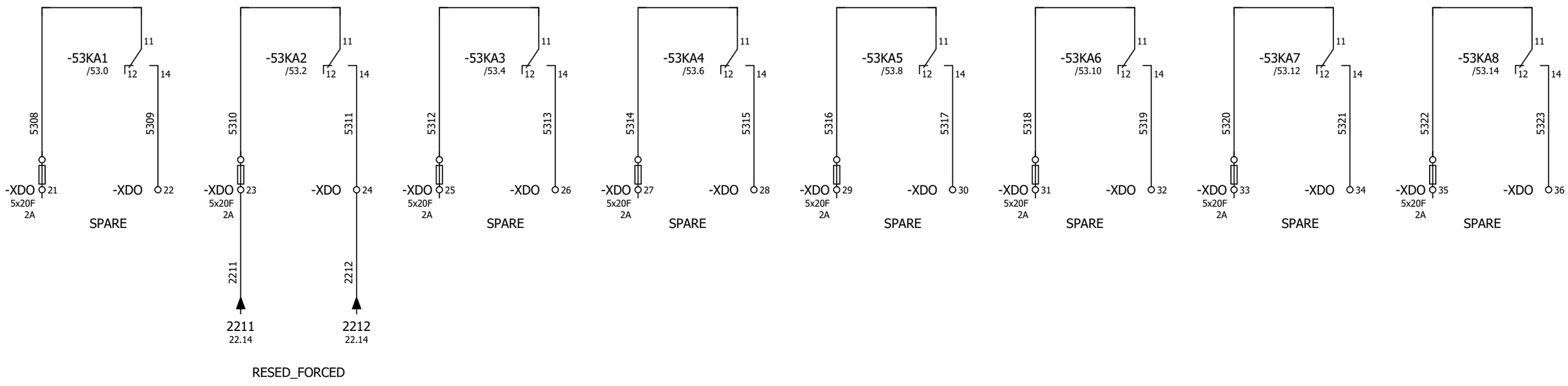
PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: DIGITAL OUTPUT I/O RACK	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	TOTAL SHEETS: 54
			PAGE: 29
			NEXT: 30



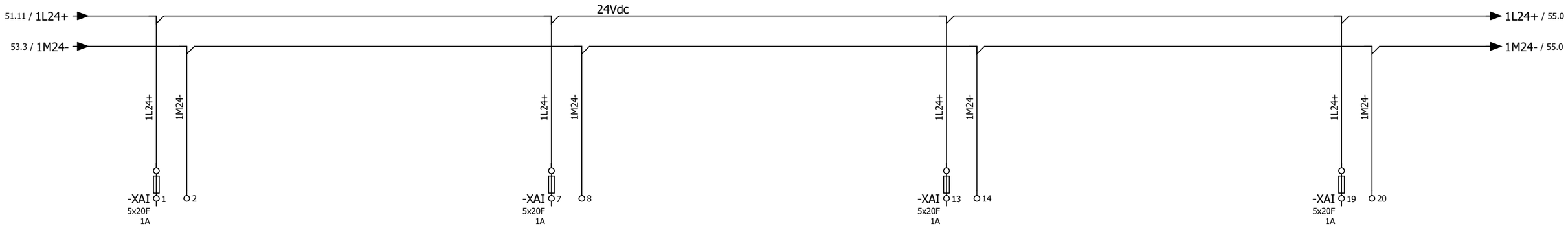
REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			
A	30.05.2024	O.A.			

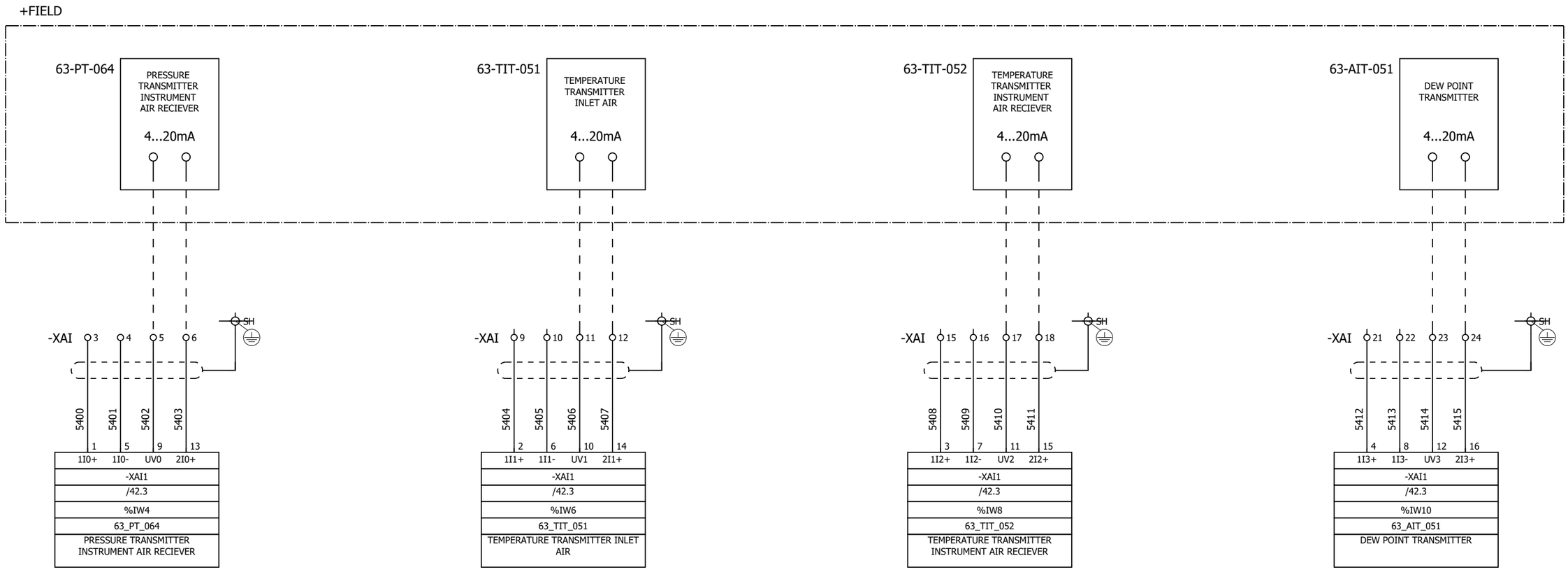
PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 30
DESCRIPTION: DIGITAL OUTPUT I/O RACK	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 31
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54





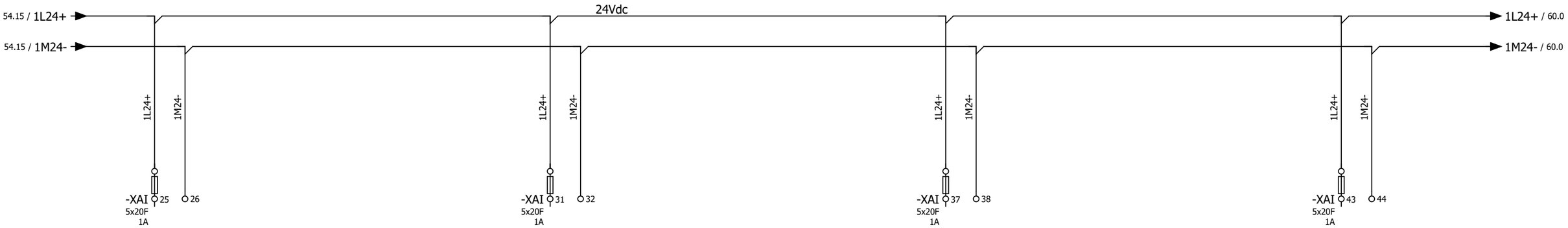
F	12.05.2025	O.A.				PLANT		PREPARED		CHECKED		PLANT		PAGE	
						COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM		ASSOLARI O.		TIRABOSCHI T.		= DRYER		31	
								DATE		APPROVED		LOCATION		NEXT	
B	01.08.2024	O.A.				DESCRIPTION		08.05.2024				+ QE		5432	
						DIGITAL OUTPUT I/O RACK		WORK ORDER N		DRAWING N				TOTAL SHEETS	
REV.	DATE	PREPARED	REV.	DATE	PREPARED			2024.4814_001		d241025-WD				54	

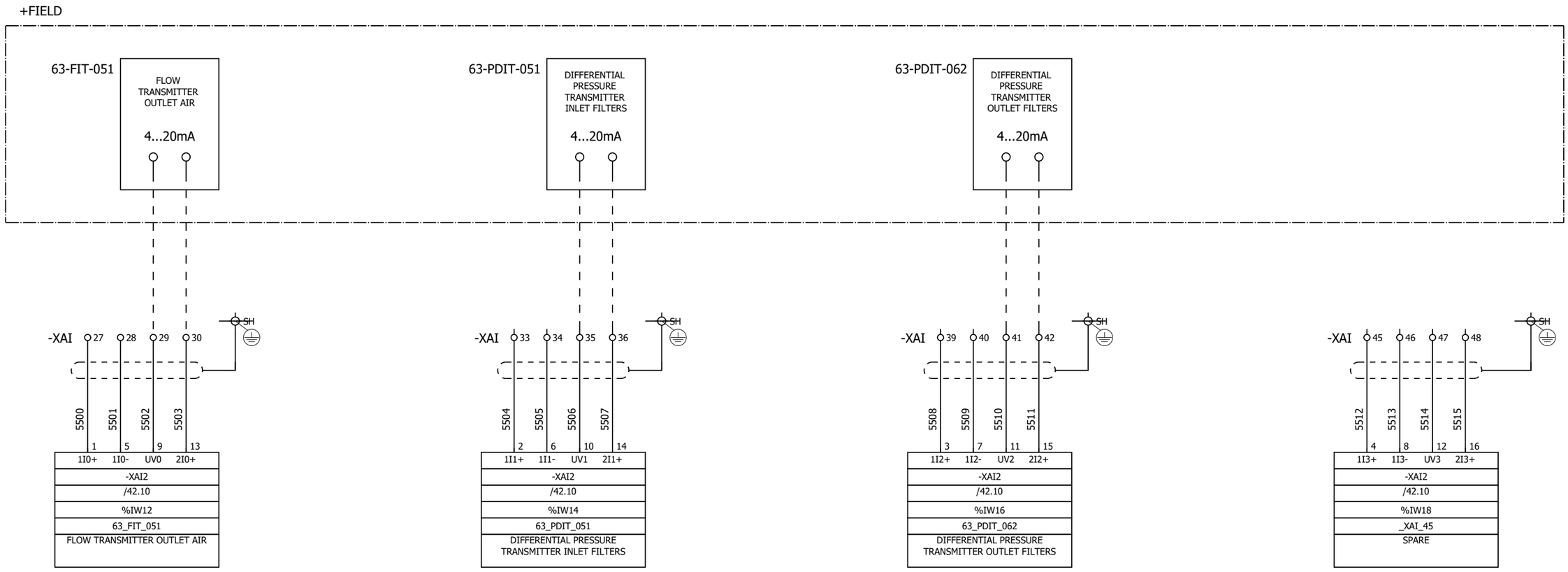




REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: ANALOG INPUT I/O RACK	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	TOTAL SHEETS: 54
			PAGE: 32
			NEXT: 33



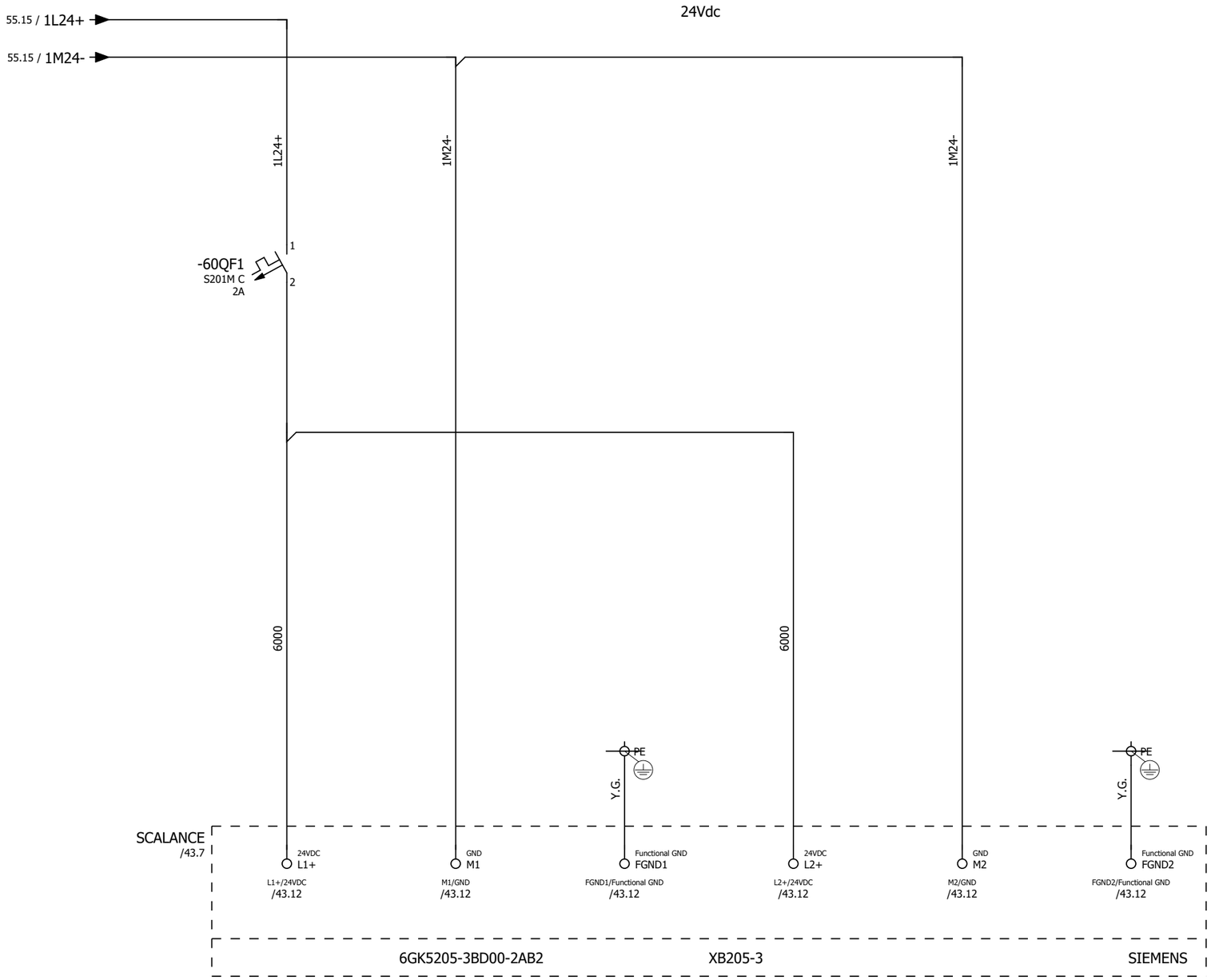


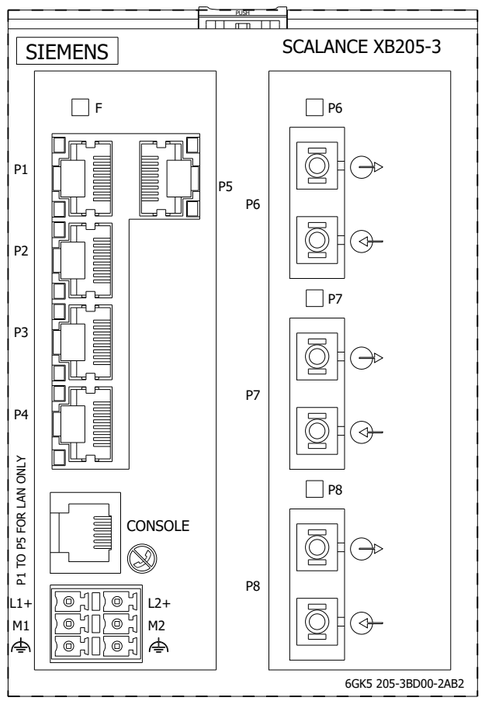
REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

PLANT
COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM

DESCRIPTION
ANALOG INPUT I/O RACK

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= DRYER	33
DATE	APPROVED	LOCATION	NEXT
08.05.2024		+ QE	34
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4814_001	d241025-WD		54



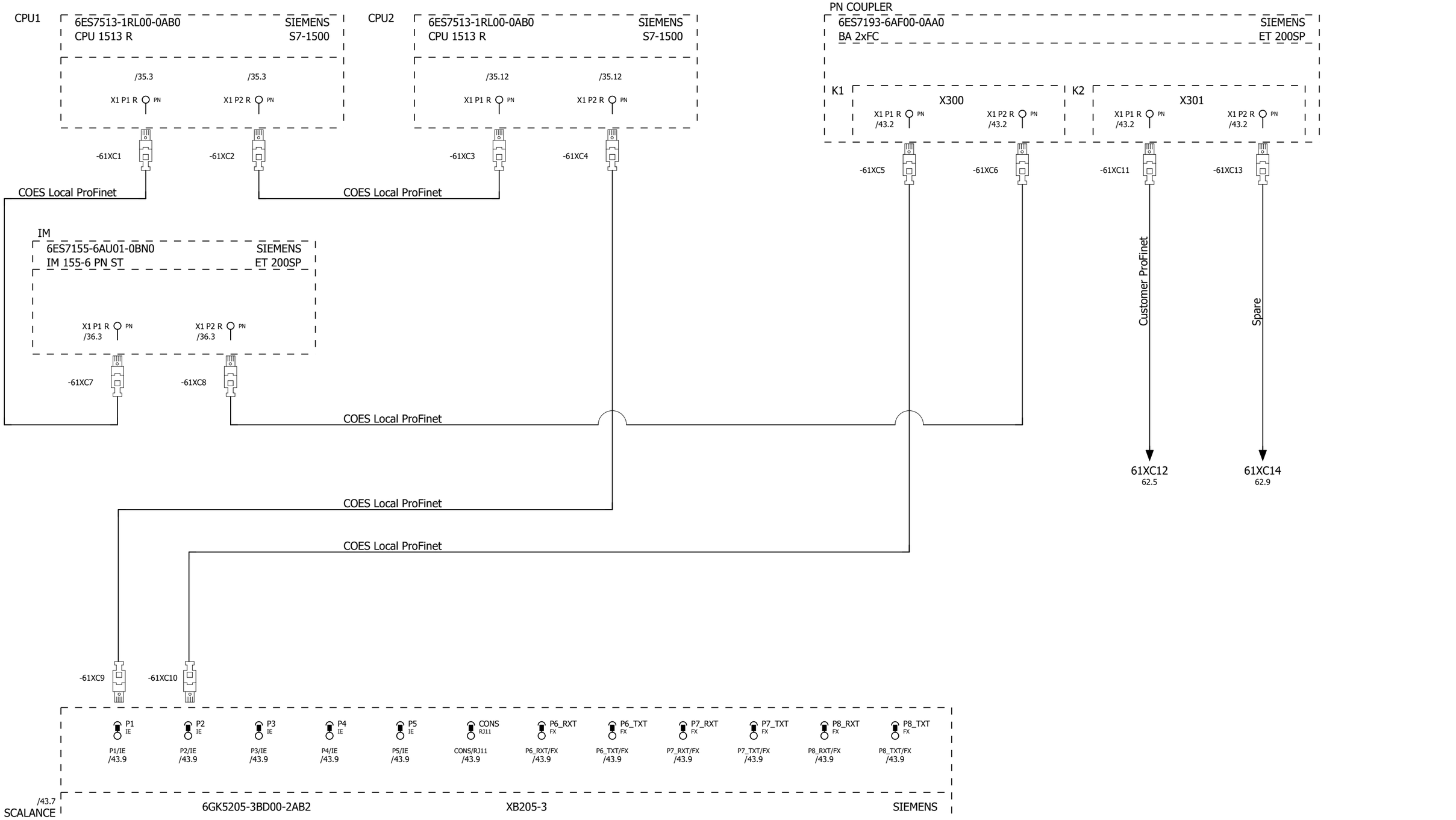


REV.	DATE	PREPARED	REV.	DATE	PREPARED

PLANT
COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM

DESCRIPTION
AUXILIARY CIRCUIT SWTCH 5 PORT PROFINET

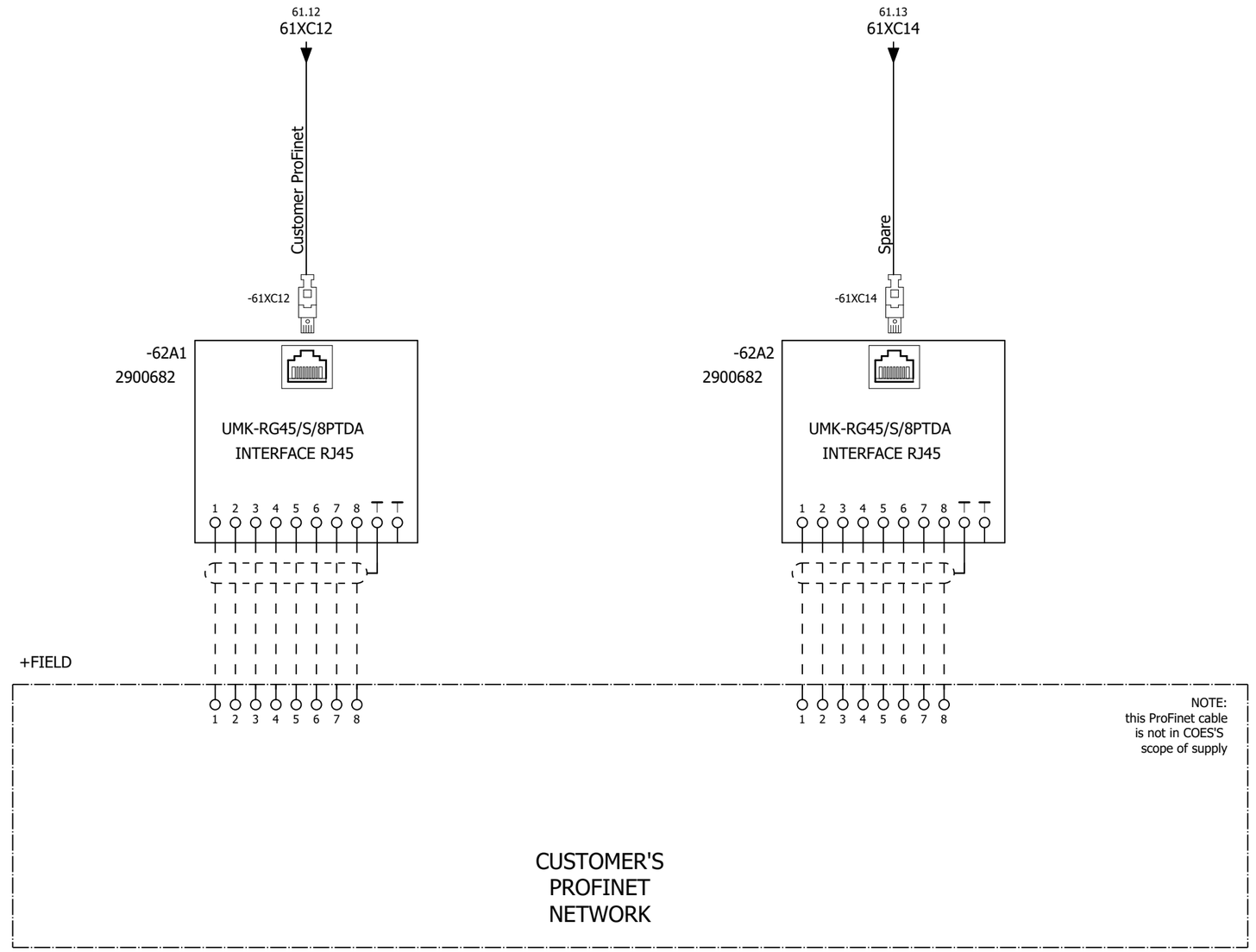
PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= DRYER	34
DATE	APPROVED	LOCATION	NEXT
08.05.2024		+ QE	35
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4814_001	d241025-WD		54



REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: CONNECTION ProfiNet INTERNAL SWITCHBOARD	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	TOTAL SHEETS: 54

PAGE: 35
NEXT: 36



REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: CONNECTION ProfiNet INTERNAL SWITCHBOARD	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	TOTAL SHEETS: 54
			PAGE: 36
			NEXT: 37

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

TERMINAL STRIP

=DRYER+QE-X1

SWITCHBOARD	DESTIN. DEVICE	SHEET AND COLUMN	/20.2	/20.2	/20.3
		CONNECT.	1	3	
		DEVICE IDENT. CODE	-20QF1	-20QF1	-PE
		WIRING	L230	N230	
	TERMINAL JUM	TERM. TYPE	WDU 10	WDU 10	WPE 10
			-	-	-
		TERM. NUM.	1	2	PE
PLANT	DESTIN. DEVICE	CONNECT.			
		DEVICE IDENT. CODE	-L	-N	

REV.	DATE	PREPARED	REV.	DATE	PREPARED

PLANT COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED ASSOLARI O.	CHECKED TIRABOSCHI T.	PLANT = DRYER	PAGE 37
	DATE 08.05.2024	APPROVED	LOCATION + QE	NEXT 38
DESCRIPTION TERMINAL BOARD -X1	WORK ORDER N 2024.4814_001	DRAWING N d241025-WD		TOTAL SHEETS 54

TERMINAL STRIP

=DRYER+QE-X2

SWITCHBOARD	DESTIN. DEVICE	SHEET AND COLUMN	/21.3	/21.3	/21.4
		CONNECT.	1	3	
		DEVICE IDENT. CODE	-21QF1	-21QF1	-PE
		WIRING	L230UPS	N230UPS	
	TERMINAL JUM	TERM. TYPE	WDU 10	WDU 10	WPE 10
			-	-	-
		TERM. NUM.	1	2	PE
PLANT	DESTIN. DEVICE	CONNECT.			
		DEVICE IDENT. CODE	-L	-N	

REV.	DATE	PREPARED	REV.	DATE	PREPARED

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 38
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 39
DESCRIPTION: TERMINAL BOARD -X2	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

TERMINAL STRIP

=DRYER+QE-XA

Section	Group	Field	1	2	3	4	5	6
SWITCHBOARD	DESTIN. DEVICE	SHEET AND COLUMN	/22.1	/22.2	/21.14	/22.10	/22.13	/22.13
SWITCHBOARD	DESTIN. DEVICE	CONNECT.			1	13	15/16	14
SWITCHBOARD	DESTIN. DEVICE	DEVICE IDENT. CODE			-21FU2	-22K1	-22KA2	-22KA2
SWITCHBOARD	DESTIN. DEVICE	WIRING			1L24+	1L24+	2211	2212
SWITCHBOARD	TERMINAL JUM	TERM. TYPE	WSI 6	WDU 2.5	WSI 6		WDU 2.5	WDU 2.5
SWITCHBOARD	TERMINAL JUM		-	-	-		-	-
SWITCHBOARD	TERMINAL JUM	TERM. NUM.	1	2	3		4	5
PLANT	DESTIN. DEVICE	CONNECT.	1	2	A1			
PLANT	DESTIN. DEVICE	DEVICE IDENT. CODE	-22KA1	-22KA1	-22K1			

REV.	DATE	PREPARED	REV.	DATE	PREPARED
C	04.09.2024	O.A.			
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 39
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 40
DESCRIPTION: TERMINAL BOARD -XA	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

TERMINAL STRIP

=DRYER+QE-XDI

TERM. NUM.	SWITCHBOARD – DESTIN. DEVICE: SHEET AND COLUMN	CONNECT.	DEVICE IDENT. CODE	WIRING	TERMINAL JUM: TERM. TYPE	PLANT – DESTIN. DEVICE: CONNECT.	DEVICE IDENT. CODE
1	/46.1		+FIELD-63-PS-054		KDKS 1/35 DB	1	-45QF1
2	/46.1		+FIELD-63-PS-054			1	-XDI1
3	/46.2		+FIELD-63-PS-056		KDKS 1/35 DB		
4	/46.2		+FIELD-63-PS-056			2	-XDI1
5	/46.4		+FIELD-63-PS-058		KDKS 1/35 DB		
6	/46.4		+FIELD-63-PS-058			3	-XDI1
7	/46.6		+FIELD-63-PS-060		KDKS 1/35 DB		
8	/46.6		+FIELD-63-PS-060			4	-XDI1
9	/46.8		+FIELD-63-CMPR-RUN-FDBCK-001		KDKS 1/35 DB		
10	/46.8		+FIELD-63-CMPR-RUN-FDBCK-001			5	-XDI1
11	/46.10		+FIELD-63-CMPR-ALARM-FDBCK-001		KDKS 1/35 DB		
12	/46.10		+FIELD-63-CMPR-ALARM-FDBCK-001			6	-XDI1
13	/46.12		+FIELD-63-CMPR-RUN-FDBCK-002		KDKS 1/35 DB		
14	/46.12		+FIELD-63-CMPR-RUN-FDBCK-002			7	-XDI1
15	/46.14		+FIELD-63-CMPR-ALARM-FDBCK-002		KDKS 1/35 DB		
16	/46.14		+FIELD-63-CMPR-ALARM-FDBCK-002			8	-XDI1
17	/47.0	11	-63-20FS-12	4708	KDKS 1/35 DB		
18	/47.0	12	-63-20FS-12	4700		1	-XDI2
19	/47.2	11	-63-21FS-12	4709	KDKS 1/35 DB		
20	/47.2	12	-63-21FS-12	4701		2	-XDI2
21	/47.4	14	-63-TH-001	4710	KDKS 1/35 DB		
22	/47.4	13	-63-TH-001	4702		3	-XDI2
23	/47.6	13	-63-HS-001	4711	KDKS 1/35 DB		
24	/47.6	14	-63-HS-001	4703		4	-XDI2
25	/47.8	21	-63-HS-002	4712	KDKS 1/35 DB		
26	/47.8	22	-63-HS-002	4704		5	-XDI2
27	/47.10	13	-63-HS-003	4713	KDKS 1/35 DB		
28	/47.10	14	-63-HS-003	4705		6	-XDI2
29	/47.12	13	-63-HS-004	4714	KDKS 1/35 DB		
30	/47.12	14	-63-HS-004	4706		7	-XDI2
31					KDKS 1/35 DB		
32	/22.10	14	-22K1	22L1+		8	-XDI2
33	/48.1		+FIELD-63-ZSH-055		KDKS 1/35 DB		
34	/48.1		+FIELD-63-ZSH-055			1	-XDI3
35	/48.2		+FIELD-63-ZSL-055		KDKS 1/35 DB		
36	/48.2		+FIELD-63-ZSL-055			2	-XDI3
37	/48.4		+FIELD-63-ZSH-056		KDKS 1/35 DB		
38	/48.4		+FIELD-63-ZSH-056			3	-XDI3
39	/48.6		+FIELD-63-ZSL-056		KDKS 1/35 DB		
40	/48.6		+FIELD-63-ZSL-056			4	-XDI3

REV.	DATE	PREPARED	REV.	DATE	PREPARED

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM

DESCRIPTION: TERMINAL BOARD -XDI

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= DRYER	40
DATE	APPROVED	LOCATION	NEXT
08.05.2024		+ QE	41
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4814_001	d241025-WD		54

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

TERMINAL STRIP

=DRYER+QE-XDI

TERM. NUM.	SWITCHBOARD – DESTIN. DEVICE: SHEET AND COLUMN	CONNECT.	DEVICE IDENT. CODE	WIRING	TERMINAL JUM: TERM. TYPE	PLANT – DESTIN. DEVICE: CONNECT.	DEVICE IDENT. CODE
41	/48.8		+FIELD-63-ZSH-057		KDKS 1/35 DB		
42	/48.8		+FIELD-63-ZSH-057			5	-XDI3
43	/48.10		+FIELD-63-ZSL-057		KDKS 1/35 DB		
44	/48.10		+FIELD-63-ZSL-057			6	-XDI3
45	/48.12		+FIELD-63-ZSH-058		KDKS 1/35 DB		
46	/48.12		+FIELD-63-ZSH-058			7	-XDI3
47	/48.14		+FIELD-63-ZSL-058		KDKS 1/35 DB		
48	/48.14		+FIELD-63-ZSL-058			8	-XDI3
49	/49.1		+FIELD-63-ZSH-059		KDKS 1/35 DB		
50	/49.1		+FIELD-63-ZSH-059			1	-XDI4
51	/49.2		+FIELD-63-ZSL-059		KDKS 1/35 DB		
52	/49.2		+FIELD-63-ZSL-059			2	-XDI4
53	/49.4		+FIELD-63-ZSH-060		KDKS 1/35 DB		
54	/49.4		+FIELD-63-ZSH-060			3	-XDI4
55	/49.6		+FIELD-63-ZSL-060		KDKS 1/35 DB		
56	/49.6		+FIELD-63-ZSL-060			4	-XDI4
57					KDKS 1/35 DB		
58						5	-XDI4
59					KDKS 1/35 DB		
60						6	-XDI4
61					KDKS 1/35 DB		
62						7	-XDI4
63					KDKS 1/35 DB	5	-XDO
64						8	-XDI4

REV.	DATE	PREPARED	REV.	DATE	PREPARED

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM

DESCRIPTION: TERMINAL BOARD -XDI

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= DRYER	41
DATE	APPROVED	LOCATION	NEXT
08.05.2024		+ QE	42
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4814_001	d241025-WD		54

TERMINAL STRIP

=DRYER+QE-XDO

TERM. NUM.	SWITCHBOARD – SHEET AND COLUMN	SWITCHBOARD – CONNECT.	SWITCHBOARD – DEVICE IDENT. CODE	WIRING	TERM. TYPE	TERMINAL JUM	PLANT – CONNECT.	PLANT – DEVICE IDENT. CODE
1	/51.1	11	-51KA1	5108	WSI 6	•	24	-22K1
2	/51.3	11	-51KA2	5110	WSI 6	•		
3	/51.4	11	-51KA3	5112	WSI 6	•		
4	/51.6	11	-51KA4	5114	WSI 6	•		
5	/51.8	11	-51KA5	5116	WSI 6	•	63	-XDI
6	/51.10	11	-51KA6	5118	WSI 6	•	1	-XAI
7	/51.12				WSI 6	-	11	-51KA7
8	/51.13	14	-51KA7	5121	WDU 2.5	-		
9	/51.14				WSI 6	-	11	-51KA8
10	/51.15	14	-51KA8	5123	WDU 2.5	-		
11	/52.0				WSI 6	-	11	-52KA1
12	/52.1	14	-52KA1	5209	WDU 2.5	-		
13	/52.2				WSI 6	-	11	-52KA2
14	/52.3	14	-52KA2	5211	WDU 2.5	-		
15	/52.5	11	-52KA3	5212	WSI 6	•		
16	/52.7	11	-52KA4	5214	WSI 6	•		
17	/52.9	11	-52KA5	5216	WSI 6	•		
18	/52.10	11	-52KA6	5218	WSI 6	•		
19	/52.12	11	-52KA7	5220	WSI 6	•		
20	/52.14	11	-52KA8	5222	WSI 6	•		
21					WSI 6	-	11	-53KA1
22	/53.1	14	-53KA1	5309	WDU 2.5	-		
23					WSI 6	-	11	-53KA2
24	/53.3	14	-53KA2	5311	WDU 2.5	-		
25					WSI 6	-	11	-53KA3
26	/53.5	14	-53KA3	5313	WDU 2.5	-		
27					WSI 6	-	11	-53KA4
28	/53.7	14	-53KA4	5315	WDU 2.5	-		
29					WSI 6	-	11	-53KA5
30	/53.9	14	-53KA5	5317	WDU 2.5	-		
31					WSI 6	-	11	-53KA6
32	/53.10	14	-53KA6	5319	WDU 2.5	-		
33					WSI 6	-	11	-53KA7
34	/53.12	14	-53KA7	5321	WDU 2.5	-		
35					WSI 6	-	11	-53KA8
36	/53.14	14	-53KA8	5323	WDU 2.5	-		

REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM

DESCRIPTION: TERMINAL BOARD -XDO

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= DRYER	42
DATE: 08.05.2024	APPROVED	LOCATION: + QE	NEXT: 43
WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

TERMINAL STRIP

=DRYER+QE-XY

SWITCHBOARD – DESTIN. DEVICE: SHEET AND COLUMN	SWITCHBOARD – DESTIN. DEVICE: CONNECT.	SWITCHBOARD – DESTIN. DEVICE: DEVICE IDENT. CODE	SWITCHBOARD – DESTIN. DEVICE: WIRING	TERMINAL JUM: TERM. TYPE	TERMINAL JUM (jumper)	TERMINAL JUM: TERM. NUM.	PLANT – DESTIN. DEVICE: CONNECT.	PLANT – DESTIN. DEVICE: DEVICE IDENT. CODE
/51.1	14	-51KA1	5109	WDU 2.5	-	1		+FIELD-63-XY-051
/51.0	A2	-51KA1	1M24-	WDU 2.5	•	2		+FIELD-63-XY-051
/51.2	A2	-51KA2	1M24-					
/51.3	14	-51KA2	5111	WDU 2.5	-	3		+FIELD-63-XY-052
				WDU 2.5	•	4		+FIELD-63-XY-052
/51.4	14	-51KA3	5113	WDU 2.5	-	5		+FIELD-63-XY-053
				WDU 2.5	•	6		+FIELD-63-XY-053
/51.6	14	-51KA4	5115	WDU 2.5	-	7		+FIELD-63-XY-054
/51.9	X2	-63-XL-003	1M24-	WDU 2.5	•	8		+FIELD-63-XY-054
/52.5	14	-52KA3	5213	WDU 2.5	-	9		+FIELD-63-XV-055
/52.0	A2	-52KA1	1M24-	WDU 2.5	•	10		+FIELD-63-XV-055
/52.2	A2	-52KA2	1M24-					
/52.7	14	-52KA4	5215	WDU 2.5	-	11		+FIELD-63-XV-056
				WDU 2.5	•	12		+FIELD-63-XV-056
/52.9	14	-52KA5	5217	WDU 2.5	-	13		+FIELD-63-XV-057
				WDU 2.5	•	14		+FIELD-63-XV-057
/52.10	14	-52KA6	5219	WDU 2.5	-	15		+FIELD-63-XV-058
				WDU 2.5	•	16		+FIELD-63-XV-058
/52.12	14	-52KA7	5221	WDU 2.5	-	17		+FIELD-63-XV-059
				WDU 2.5	•	18		+FIELD-63-XV-059
/52.14	14	-52KA8	5223	WDU 2.5	-	19		+FIELD-63-XV-060
/53.0	A2	-53KA1	1M24-	WDU 2.5	•	20		+FIELD-63-XV-060
/53.2	A2	-53KA2	1M24-					

REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 43
DESCRIPTION: TERMINAL BOARD -XY	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 44
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

TERMINAL STRIP

=DRYER+QE-XAI

	1	2		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
SWITCHBOARD – DESTIN. DEVICE – SHEET AND COLUMN		/52.0	/52.2	/54.1	/54.1	/54.2	/54.2					/54.6	/54.6					/54.10	/54.10	
SWITCHBOARD – DESTIN. DEVICE – CONNECT.		A2	A2	1	5	9	13													
SWITCHBOARD – DESTIN. DEVICE – DEVICE IDENT. CODE		-52KA1	-52KA2	-XAI1	-XAI1	-XAI1	-XAI1					+FIELD-63-TIT-051	+FIELD-63-TIT-051					+FIELD-63-TIT-052	+FIELD-63-TIT-052	
SWITCHBOARD – DESTIN. DEVICE – WIRING		1M24-	1M24-	5400	5401	5402	5403					0Vdc	0Vdc					0Vdc	0Vdc	
TERMINAL JUM – TERM. TYPE	KDKS 1/35 DB			WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	KDKS 1/35 DB		WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	KDKS 1/35 DB		WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	KDKS 1/35 DB
TERMINAL JUM	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TERMINAL JUM – TERM. NUM.	1	2		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
PLANT – DESTIN. DEVICE – CONNECT.	6									2	6	10	14			3	7	11	15	
PLANT – DESTIN. DEVICE – DEVICE IDENT. CODE	-XDO					+FIELD-63-PT-064	+FIELD-63-PT-064			-XAI1	-XAI1	-XAI1	-XAI1			-XAI1	-XAI1	-XAI1	-XAI1	

	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
SWITCHBOARD – DESTIN. DEVICE – SHEET AND COLUMN				/54.14	/54.14			/55.1	/55.1	/55.2	/55.2					/55.6	/55.6			
SWITCHBOARD – DESTIN. DEVICE – CONNECT.								1	5	9	13									
SWITCHBOARD – DESTIN. DEVICE – DEVICE IDENT. CODE				+FIELD-63-AIT-051	+FIELD-63-AIT-051			-XAI2	-XAI2	-XAI2	-XAI2					+FIELD-63-PDIT-051	+FIELD-63-PDIT-051			
SWITCHBOARD – DESTIN. DEVICE – WIRING				0Vdc	0Vdc			5500	5501	5502	5503					0Vdc	0Vdc			
TERMINAL JUM – TERM. TYPE		WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	KDKS 1/35 DB		WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	KDKS 1/35 DB		WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	KDKS 1/35 DB		WDU 2.5
TERMINAL JUM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TERMINAL JUM – TERM. NUM.	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
PLANT – DESTIN. DEVICE – CONNECT.		4	8	12	16									2	6	10	14			3
PLANT – DESTIN. DEVICE – DEVICE IDENT. CODE		-XAI1	-XAI1	-XAI1	-XAI1					+FIELD-63-FIT-051	+FIELD-63-FIT-051			-XAI2	-XAI2	-XAI2	-XAI2			-XAI2

REV.	DATE	PREPARED	REV.	DATE	PREPARED
C	04.09.2024	O.A.			

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PLANT	PREPARED	CHECKED	PLANT	PAGE
COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	ASSOLARI O.	TIRABOSCHI T.	= DRYER	44
DESCRIPTION	DATE	APPROVED	LOCATION	NEXT
TERMINAL BOARD -XAI	08.05.2024		+ QE	45
	WORK ORDER N	DRAWING N		TOTAL SHEETS
	2024.4814_001	d241025-WD		54

TERMINAL STRIP

=DRYER+QE-XAI

Section	Group	Field									
SWITCHBOARD	DESTIN. DEVICE	SHEET AND COLUMN		/55.10	/55.10		/60.3				
SWITCHBOARD	DESTIN. DEVICE	CONNECT.					M1				
SWITCHBOARD	DESTIN. DEVICE	DEVICE IDENT. CODE		+FIELD-63-PDIT-062	+FIELD-63-PDIT-062		-SCALANCE				
SWITCHBOARD	DESTIN. DEVICE	WIRING		0Vdc	0Vdc		1M24-				
SWITCHBOARD	TERMINAL JUM	TERM. TYPE	WDU 2.5	WDU 2.5	WDU 2.5	KDKS 1/35 DB		WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5
SWITCHBOARD	TERMINAL JUM		-	-	-		-	-	-	-	-
SWITCHBOARD	TERMINAL JUM	TERM. NUM.	40	41	42	43	44	45	46	47	48
PLANT	DESTIN. DEVICE	CONNECT.	7	11	15	1		4	8	12	16
PLANT	DESTIN. DEVICE	DEVICE IDENT. CODE	-XAI2	-XAI2	-XAI2	-60QF1		-XAI2	-XAI2	-XAI2	-XAI2

REV.	DATE	PREPARED	REV.	DATE	PREPARED
C	04.09.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 45
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 46
DESCRIPTION: TERMINAL BOARD -XAI	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

TERMINAL STRIP

=DRYER+QE-XCOM

Section	Group	Field	1	2	3	4	5	6	7	8	9	10
SWITCHBOARD	DESTIN. DEVICE	SHEET AND COLUMN	/21.9					/21.10				
		CONNECT.	2					-				
		DEVICE IDENT. CODE	-21QF3					-21GS1				
		WIRING	1L24+					1M24-				
	TERMINAL JUM	TERM. TYPE	ZDK 4-2 V	ZDK 4-2 V	ZDK 4-2 V	ZDK 4-2 V	ZDK 4-2 V	ZDK 4-2 V	ZDK 4-2 V	ZDK 4-2 V	ZDK 4-2 V	ZDK 4-2 V
			•	•	•	•	•	•	•	•	•	•
		TERM. NUM.	1	2	3	4	5	6	7	8	9	10
PLANT	DESTIN. DEVICE	CONNECT.					1					X2
		DEVICE IDENT. CODE					-21FU2					-63-XL-004

REV.	DATE	PREPARED	REV.	DATE	PREPARED
C	04.09.2024	O.A.			

PLANT
COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM

DESCRIPTION
TERMINAL BOARD -XCOM

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= DRYER	46
DATE	APPROVED	LOCATION	NEXT
08.05.2024		+ QE	47
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4814_001	d241025-WD		54

COMPONENT LIST

COMPONENT TAG	QUANTITY	DESCRIPTION	ARTICLE CODE	CONSTRUCTOR	SHEET
-63-20FS-12	1	SPJ P-VMS 280 Fm R surge arrester Type 2 single-phase for L-(PE)N systems	SPJ316227	SIPF	20
-63-21FS-12	1	SPJ P-VMS 280 Fm R surge arrester Type 2 single-phase for L-(PE)N systems	SPJ316227	SIPF	21
-63-HS-001	1	Green flush complete pushbutton Ø22 spring return 1NO "unmarked"	SE.XB4BA31	SCHNEIDER	47
-63-HS-002	1	Red flush complete pushbutton Ø22 spring return 1NC "unmarked"	SE.XB4BA42	SCHNEIDER	47
-63-HS-003	1	Blue flush complete pushbutton Ø22 spring return 1NO	SE.XB4BA61	SCHNEIDER	22
-63-HS-003	1	Harmony XB4/XB5 1NO contact	SE.ZBE101	SCHNEIDER	22
-63-HS-004	1	Black selector switch Ø22 2-position stay put 1NO+1NC 600V	SE.XB4BD25	SCHNEIDER	47
-63-SBM-001	1	Red Ø40 Emergency stop, switching off Ø22 latching turn release 2NC+1NO	SE.XB4BS84441	SCHNEIDER	22
-63-SBM-001	1	Round guard for Ø 40 Emergency stop, plastic, yellow, 63.5 mm	SE.ZB4BZ1905	SCHNEIDER	22
-63-TH-001	1	Panel thermostat, 1 contacts NO (-20...+40)°C	FIN.7T.81.0.000.2301	FINDER	47
-63-XA-001	1	Red complete pilot light Ø22 plain lens with integral LED 24V	SE.XB4BVB4	SCHNEIDER	51
-63-XL-001	1	White complete pilot light Ø22 plain lens with integral LED 230...240V	SE.XB4BVM1	SCHNEIDER	20
-63-XL-002	1	White complete pilot light Ø22 plain lens with integral LED 230...240V	SE.XB4BVM1	SCHNEIDER	21
-63-XL-003	1	Green complete pilot light Ø22 plain lens with integral LED 24V	SE.XB4BVB3	SCHNEIDER	51
-63-XL-004	1	White complete pilot light Ø22 plain lens with integral LED 24V	SE.XB4BVB1	SCHNEIDER	21
-62A1	1	UMK-RJ45/S/8PTDA - VARIOFACE module for connecting a RJ45 socket with spring-cage double connection terminal blocks in direct plug-in method.	PXC.2900682	PHOENIX CONTACT	62
-62A2	1	UMK-RJ45/S/8PTDA - VARIOFACE module for connecting a RJ45 socket with spring-cage double connection terminal blocks in direct plug-in method.	PXC.2900682	PHOENIX CONTACT	62
-CPU1	1	SIMATIC S7-1500R CPU 1513R-1 PN, 300KB program/1,5MB data	SIE.6ES7513-1RL00-0AB0	SIEMENS	35
-CPU1	1	SIMATIC S7 MEMORY CARD, 24 MB	SIE.6ES7954-8LF03-0AA0	SIEMENS	35
-CPU2	1	SIMATIC S7-1500R CPU 1513R-1 PN, 300KB program/1,5MB data	SIE.6ES7513-1RL00-0AB0	SIEMENS	35
-CPU2	1	SIMATIC S7 MEMORY CARD, 24 MB	SIE.6ES7954-8LF03-0AA0	SIEMENS	35
-20E1	1	HEATER 100W 230VAC 90X80X110	HJSHT100	ALFA PLASTIC	20
-20FA4	1	Residual current device DDA202 type AC 25A 30mA - 2P	ABB.2CSB202001R1250	ABB	20
-20FU1	1	FUSE HOLDER 2P 10X38 , 32A 690V	LOV.FB01F2P	LOVATO	20
-20FU1	2	CYLINDRICAL FUSE C10G2 10x38, GG, 2A, 500V AC	KMC10G2	EATON BUSSMAN	20
-20FU2	1	FUSE HOLDER TYPE 2P 22x58 690VAC - 100/125A	Q25802	ETI	20
-20FU2	2	FUSE gL/gG 22x58 125A	gl258125	OMEGA	20
-21FU1	1	FUSE HOLDER 2P 10X38 , 32A 690V	LOV.FB01F2P	LOVATO	21

REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM

DESCRIPTION: COMPONENT LIST

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= DRYER	47
DATE	APPROVED	LOCATION	NEXT
08.05.2024		+ QE	48
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4814_001	d241025-WD		54

COMPONENT LIST

COMPONENT TAG	QUANTITY	DESCRIPTION	ARTICLE CODE	CONSTRUCTOR	SHEET
-21FU1	2	CYLINDRICAL FUSE C10G2 10x38, GG, 2A, 500V AC	KMC10G2	EATON BUSSMAN	21
-21FU2	1	FUSE HOLDER 1P 10X38 , 32A 690V	LOV.FB01F1P	LOVATO	21
-21FU2	1	CYLINDRICAL FUSE C10G2 10x38, GG, 2A, 500V AC	KMC10G2	EATON BUSSMAN	21
-21FU3	1	FUSE HOLDER TYPE 2P 22x58 690VAC - 100/125A	Q25802	ETI	21
-21FU3	2	FUSE gL/gG 22x58 125A	gl258125	OMEGA	21
-21GS1	1	TRIO-PS-2G/1AC/24DC/20 Primary-switched TRIO POWER power supply input: 100VAC...240VAC single-phase, output: 24 V DC/20 A	PXC.2903151	PHOENIX CONTACT	21
-20H1	1	Plafoniera lineare a led, 110÷240V AC, 50/60HZ,600 lm, 368mm	050PEL3C	NEW ELFIN	20
-IM	1	ET 200SP PROFINET INTERFACE MODULE IM155-6PN/2 HF , INCLUDING SERVER MODULE (6ES7193-6PA00-0AA0	SIE.6ES7155-6AU01-0CN0	SIEMENS	36
-IM	1	SIMATIC ET 200SP, BUSADAPTER BA 2X RJ45, 2 RJ45 SOCKETS FOR PROFINET	SIE.6ES7193-6AR00-0AA0	SIEMENS	36
-22K1	1	SIRIUS safety relay Basic unit Standard series Relay enabling circuits 3 NO contacts plus Relay signaling circuit 1 NC contact Us = 24 V AC/DC screw terminal	SIE.3SK1111-1AB30	SIEMENS	22
-22KA1	1	SIL 2 - SIL 3 Digital Relay Output Loop Powered DIN-Rail and terminal board Models D5244D - 2 channels relay output ,provides 2 port isolation (input/output) Supply 24Vdc	GMI.D5244D	gmi	22
-22KA2	1	SIL 2 - SIL 3 Digital Relay Output Loop Powered DIN-Rail and terminal board Models D5244D - 2 channels relay output ,provides 2 port isolation (input/output) Supply 24Vdc	GMI.D5244D	gmi	22
-51KA1	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	51
-51KA2	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	51
-51KA3	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	51
-51KA4	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	51
-51KA5	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	51
-51KA6	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	51
-51KA7	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	51
-51KA8	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	51
-52KA1	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	52
-52KA2	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	52
-52KA3	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	52
-52KA4	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	52
-52KA5	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	52
-52KA6	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	52
-52KA7	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	52
-52KA8	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	52

REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM

DESCRIPTION: COMPONENT LIST

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= DRYER	48
DATE	APPROVED	LOCATION	NEXT
08.05.2024		+ QE	49
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4814_001	d241025-WD		54

COMPONENT LIST

COMPONENT TAG	QUANTITY	DESCRIPTION	ARTICLE CODE	CONSTRUCTOR	SHEET
-53KA1	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	53
-53KA2	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	53
-53KA3	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	53
-53KA4	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	53
-53KA5	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	53
-53KA6	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	53
-53KA7	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	53
-53KA8	1	PLC-RSC- 24UC/21 PLC-INTERFACE, consisting of basic terminal block PLC-BSC.../21 with screw connection and plug-in miniature relay with power contact, for assembly on DIN rail NS 35/7,5, 1 changeover contact, input voltage 24 V AC/DC	PXC.2966184	PHOENIX CONTACT	53
-PN COUPLER	1	SIMATIC PN/PN Coupler for deterministic data exchange between max.4 PN-Controller per subnet, , PROFIsafe data exchange, I/O-, MSI-, MSO- and data record communication, redundant power supply, PN-connection via SIMATIC BusAdapter (BA)	SIE.6ES7158-3AD10-0XA0	SIEMENS	43
-PN COUPLER	1	5 pcs. strain relief for PROFINET cable at SIMATIC BusAdapter	SIE.6ES7193-6RA00-1AN0	SIEMENS	43
-20QF1	1	Miniature Circuit Breaker - S202M - 2P - C - 32 A	ABB.2CDS272001R0324	ABB	20
-20QF2	1	Miniature Circuit Breaker - S202M - 2P - C - 2 A	ABB.2CDS272001R0024	ABB	20
-20QF3	1	Miniature Circuit Breaker - S202M - 2P - C - 2 A	ABB.2CDS272001R0024	ABB	20
-20QF4	1	Miniature Circuit Breaker - S202M - 2P - C - 16 A	ABB.2CDS272001R0164	ABB	20
-21QF1	1	Miniature Circuit Breaker - S202M - 2P - C - 32 A	ABB.2CDS272001R0324	ABB	21
-21QF2	1	Miniature Circuit Breaker - S202M - 2P - C - 4 A	ABB.2CDS272001R0044	ABB	21
-21QF3	1	Miniature Circuit Breaker - S201M - 1P - C - 20 A	ABB.2CDS271001R0204	ABB	21
-30QF3	1	Miniature Circuit Breaker - S201M - 1P - C - 2 A	ABB.2CDS271001R0024	ABB	30
-44QF1	1	Miniature Circuit Breaker - S201M - 1P - C - 2 A	ABB.2CDS271001R0024	ABB	44
-44QF2	1	Miniature Circuit Breaker - S201M - 1P - C - 2 A	ABB.2CDS271001R0024	ABB	44
-44QF3	1	Miniature Circuit Breaker - S201M - 1P - C - 2 A	ABB.2CDS271001R0024	ABB	44
-44QF4	1	Miniature Circuit Breaker - S201M - 1P - C - 2 A	ABB.2CDS271001R0024	ABB	44
-44QF5	1	Miniature Circuit Breaker - S201M - 1P - C - 2 A	ABB.2CDS271001R0024	ABB	44
-45QF1	1	Miniature Circuit Breaker - S201M - 1P - C - 2 A	ABB.2CDS271001R0024	ABB	45
-60QF1	1	Miniature Circuit Breaker - S201M - 1P - C - 2 A	ABB.2CDS271001R0024	ABB	60
-20S1	1	Limit switch ausiliary contacts 1NO+1NC	PIZ.FR505	PIZZATO	20
-SCALANCE	1	SCALANCE XB205-3	SIE.6GK5205-3BD00-2AB2	SIEMENS	43
-20T1	1	Panel thernostat/hygrostat, 1 pole, 10 A - NO - (+10...+60)°C / (50...90)% - Nominal voltage 110...230 VAC/DC	FIN.7T.51.0.230.4360	FINDER	20

REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			
A	30.05.2024	O.A.			

coes 20th 1997 - 2017

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER
	DATE: 08.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: COMPONENT LIST	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD	

COMPONENT LIST

COMPONENT TAG	QUANTITY	DESCRIPTION	ARTICLE CODE	CONSTRUCTOR	SHEET
-20X1	1	Shuko/Italian std. socket 2P+T 16A (two module white system series)	GW20246	GEWISS	20
-20X1	1	Wall mounting modular box IP40 (2 modules)	GW27002	GEWISS	20
-XAI1	1	ET 200SP, AI 4XI 2-/4-WIRE ST, PU 1	SIE.6ES7134-6GD01-0BA1	SIEMENS	42
-XAI1	1	BASEUNIT TYPE A0, BU15-P16+A0+2D	SIE.6ES7193-6BP00-0DA0	SIEMENS	42
-XAI2	1	ET 200SP, AI 4XI 2-/4-WIRE ST, PU 1	SIE.6ES7134-6GD01-0BA1	SIEMENS	42
-XAI2	1	BASEUNIT TYPE A0, BU15-P16+A0+2B	SIE.6ES7193-6BP00-0BA0	SIEMENS	42
-61XC1	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	61
-61XC2	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	61
-61XC3	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	61
-61XC4	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	61
-61XC5	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	61
-61XC6	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	61
-61XC7	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	61
-61XC8	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	61
-61XC9	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	61
-61XC10	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	61
-61XC11	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	61
-61XC12	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	62
-61XC13	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	61
-61XC14	1	RJ45 connector	PXC.1419001	PHOENIX CONTACT	62
-XDI1	1	SIMATIC ET 200SP DI 8x 24V DC Basic ,sink input	SIE.6ES7131-6BF01-0AA0	SIEMENS	37
-XDI1	1	BASEUNIT TYPE A0, BU15-P16+A0+2D	SIE.6ES7193-6BP00-0DA0	SIEMENS	37
-XDI2	1	SIMATIC ET 200SP DI 8x 24V DC Basic ,sink input	SIE.6ES7131-6BF01-0AA0	SIEMENS	37
-XDI2	1	BASEUNIT TYPE A0, BU15-P16+A0+2B	SIE.6ES7193-6BP00-0BA0	SIEMENS	37
-XDI3	1	SIMATIC ET 200SP DI 8x 24V DC Basic ,sink input	SIE.6ES7131-6BF01-0AA0	SIEMENS	38
-XDI3	1	BASEUNIT TYPE A0, BU15-P16+A0+2B	SIE.6ES7193-6BP00-0BA0	SIEMENS	38
-XDI4	1	SIMATIC ET 200SP DI 8x 24V DC Basic ,sink input	SIE.6ES7131-6BF01-0AA0	SIEMENS	38
-XDI4	1	BASEUNIT TYPE A0, BU15-P16+A0+2B	SIE.6ES7193-6BP00-0BA0	SIEMENS	38

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

COMPONENT LIST

COMPONENT TAG	QUANTITY	DESCRIPTION	ARTICLE CODE	CONSTRUCTOR	SHEET
-XDO1	1	SIMATIC ET 200SP, DQ 8x 24V DC/0,5A Basic, Source output	SIE.6ES7132-6BF01-0AA0	SIEMENS	40
-XDO1	1	BASEUNIT TYPE A0, BU15-P16+A0+2D	SIE.6ES7193-6BP00-0DA0	SIEMENS	40
-XDO2	1	SIMATIC ET 200SP, DQ 8x 24V DC/0,5A Basic, Source output	SIE.6ES7132-6BF01-0AA0	SIEMENS	40
-XDO2	1	BASEUNIT TYPE A0, BU15-P16+A0+2B	SIE.6ES7193-6BP00-0BA0	SIEMENS	40
-XDO3	1	SIMATIC ET 200SP, DQ 8x 24V DC/0,5A Basic, Source output	SIE.6ES7132-6BF01-0AA0	SIEMENS	41
-XDO3	1	BASEUNIT TYPE A0, BU15-P16+A0+2B	SIE.6ES7193-6BP00-0BA0	SIEMENS	41

REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS DRYER - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = DRYER	PAGE: 51
DESCRIPTION: COMPONENT LIST	DATE: 08.05.2024	APPROVED:	LOCATION: + QE	NEXT: 52
	WORK ORDER N: 2024.4814_001	DRAWING N: d241025-WD		TOTAL SHEETS: 54

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
F.MURA	29-07-2025

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000

PACKAGE CAUSE EFFECT MATRIX /LOGIC DIAGRAMS

Document Number: 1724000428-MAC-CE-00004

Document Class: 3

02	24/07/2025	Issue for Information (IFI)	GT	MC	TM
01	05/02/2025	Issue for Information (IFI)	GT	MC	TM
00	30/07/2024	Issue for Review (IFR)	GT	MC	TM
Rev.	Date	Description	Prepared	Reviewed	Approved

COES

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COVER

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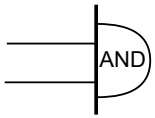
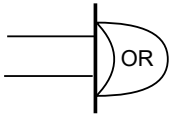
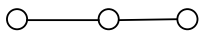
DOCUMENT NUMBER:

"63-LP-001 LOGIC DIAGRAM"

DRAWN BY:	CHECKED BY:	APPROVED:
R. BERETTA	R. MANZONI	R. MANZONI

REVISION	DATE	SHEET N.
0	26/07/2024	COVER
1	30/01/2025	SHEET N.
2	30/04/2025	9
3		

0	1	2	3	4	5	6	7	8

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	LOGIC GATE: "AND" INPUT A B / OUTPUT Q 0 0 0 0 1 0 1 0 0 1 1 1		LOGIC GATE: "OR" INPUT A B / OUTPUT Q 0 0 0 0 1 1 1 0 1 1 1 1
	LOGIC GATE: "NOT" INPUT A / OUTPUT Q 0 1 1 0	LOGIC CONTROL FOR VALVES (with delay timer)	THIS BLOCK CONTAINS ALL THE LOGIC OF CONTROL OF THE FEEDBACKS FROM THE LIMIT SWITCHES AFTER THE CHANGE OF THE COMMAND FOR THE VALVE GENERATED BY THE PLC.
	LOGIC GATE: "SET & RESET" WHEN THE "SET" BLOCK RECEIVES 1, THE OUTPUT WILL BE SETTED. WHEN THE "RESET" BLOCK RECEIVES 1, THE OUTPUT WILL BE RESETTED.	**ALARM LOGIC**	THIS BLOCK MANAGES THE ALARMS. WHEN IT RECEIVES A SIGNAL WITH "0", IT MANAGES THE ALARM AND IT SENDS THE INFO TO THE DCS AND TO THE HMI.
	SIGNAL THROUGH COMMUNICATION PROTOCOL		

coes 20th 1997 - 2017	CUSTOMER: **ROSETTI MARINO**	DOCUMENT NUMBER: **"63 - LP - 001 LOGIC DIAGRAM"**			REV	DATE
					0	26/07/2024
					1	30/01/2025
	SUPPLIER: **COES**	DRAWN BY:	CHECKED BY:	APPROVED:	2	30/04/2025
		R. BERETTA	R. MANZONI	R. MANZONI	3	

SHEET N.
LEGEND
SHEET N.
9

0	1	2	3	4	5	6	7	8

INPUTS					PLC SEQUENCE MODE	OUTPUTS				
DESCRIPTION	FIELD		LCP	PCS		PCS	LCP	FIELD		DESCRIPTION
63-HS-004 LOCAL REMOTE SELECTOR STATUS 0=LOCAL 1=REMOTE										THE PACKAGES WORK ONLY IN REMOTE 63-PLANT-LOCA-REM
START SIGNAL FROM 63-START-PLANT-CMD 0= NO ACT 1= START					AND					
63 -HS-001 LCP START PUSHBUTTON 0=NO_ACT; 1=START					OR					AUTOMATIC SEQUENCE STARTED 63-PLANT-RUNNING
63-HS-004 LOCAL REMOTE SELECTOR STATUS 0=LOCAL 1=REMOTE					AND AUTO-SEQUENCE-STARTED 4.2					THE PACKAGES WORK ONLY IN LOCAL 63-PLANT-LOCA-REM
DRYER D-63001 MASTER					AND S R 4.5 AUTO-SEQUENCE-STOPPING					63-XL-003 LCP RUNNING STATUS LAMP
DRYER D-63002 MASTER					AND S R 4.5 AUTO-SEQUENCE-STOPPING					

coes 20th coes 1997 - 2017	CUSTOMER: **ROSETTI MARINO**	DOCUMENT NUMBER: **"63-LP-001 LOGIC DIAGRAM"**	
	SUPPLIER: **COES**	DRAWN BY: R. BERETTA	CHECKED BY: R. MANZONI
			APPROVED: R. MANZONI

REV	DATE	SHEET N.
0	26/07/2024	3
1	30/01/2025	SHEET N.
2	30/04/2025	9
3		

0	1	2	3	4	5	6	7	8

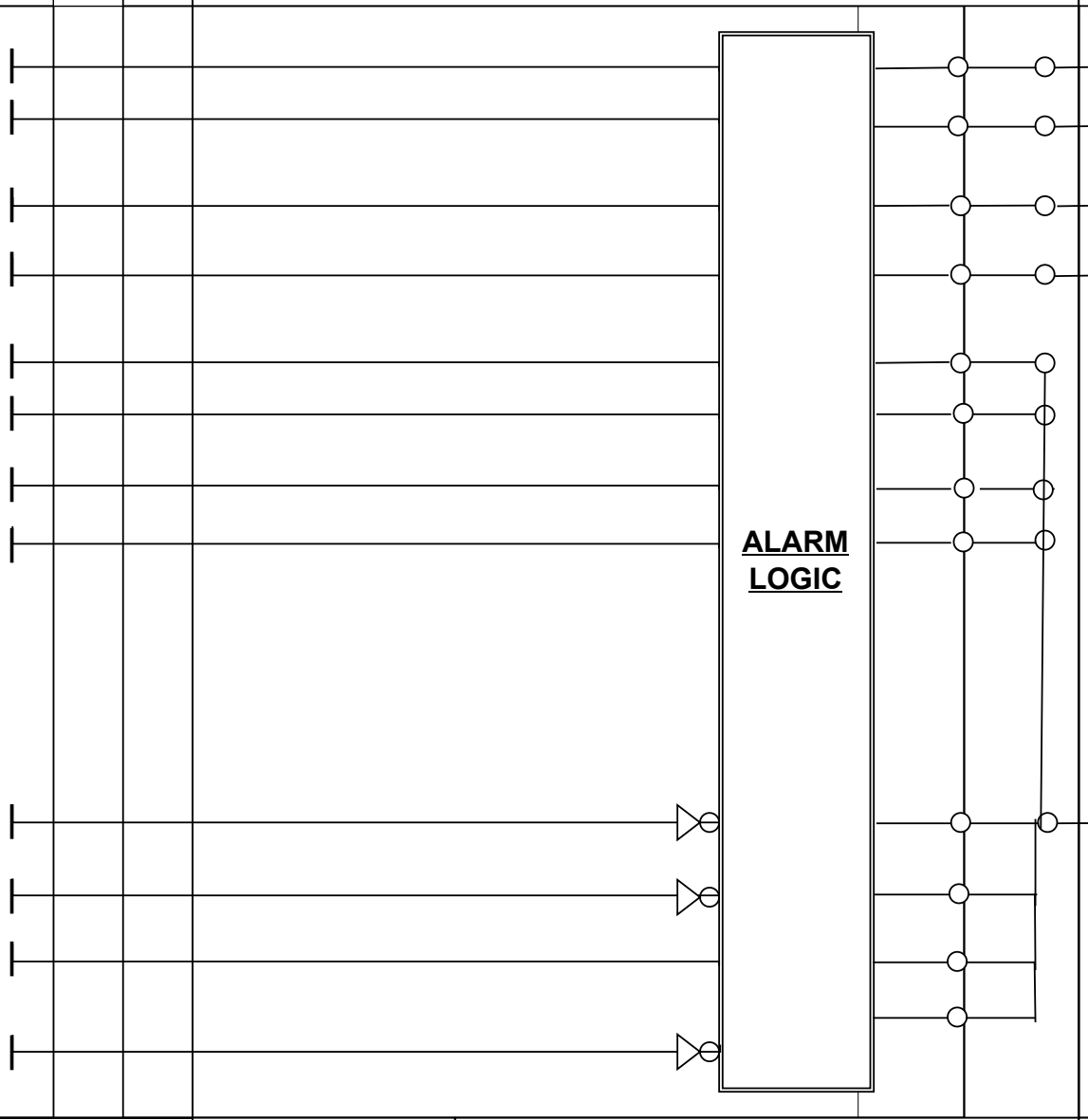
INPUTS					PLC SEQUENCE MODE	OUTPUTS				
DESCRIPTION	FIELD	LCP	SIS	PCS		PCS	LCP	FIELD	SIS	DESCRIPTION
63-XS-001 SHUT-DOWN COMMAND FROM SIS (0= Fault) (NOT DIRECTLY CONNECTED TO PLC)					NOTE: THIS LOGIC "OR" IS NOT INSIDE THE PLC BUT IS MADE BY A SIL SAFETY RELAY.					SHUTDOWN ALARM FROM SIS 63-ESD-01 (0=FAULT) (CONNECTED TO PLC)
63-SBM-001 LCB-EMERGENCY PUHSBUTTON 0=EMERGENCY 1=NO ACT (NOT DIRECTLY CONNECTED TO PLC)										CUMULATIVE CRITICAL ALARM TO SIS 63-XA-003 (0=FAULT) (CONNECTED TO PLC)
STOP SIGNAL FROM 63-STOP-PLANT-CMD 0=STOP 1=NO ACT					3.4 AUTO-SEQUENCE-STARTED					
63 -HS-002 LCP STOP PUSHBUTTON 0=STOP; 1=NO_ACT					OR, AND, AUTO-SEQUENCE-STOPPING 3.5					
SHUTDOWN ALARM FROM SIS 63-ESD-01 (0=FAULT) (CONNECTED TO PLC)					OR					
AT LEAST 1 ALARM PRESENT IN THE SYSTEM 0 = OK; 1 = ALARM					OR					63-XA-001 LCP GENERAL ALARM LAMP
AT LEAST 1 ALARM PRESENT IN THE SYSTEM THAT CAUSE THE SWITCHING BETWEEN 2 PACKAGES 0 = OK; 1 = ALARM										

CUSTOMER: **ROSETTI MARINO**	DOCUMENT NUMBER: **"63-LP-001 LOGIC DIAGRAM"**			REV	DATE
				0	26/07/2024
SUPPLIER: **COES**	DRAWN BY:	CHECKED BY:	APPROVED:	1	30/01/2025
	R. BERETTA	R. MANZONI	R. MANZONI	2	30/04/2025
				3	

SHEET N.
4
SHEET N.
9

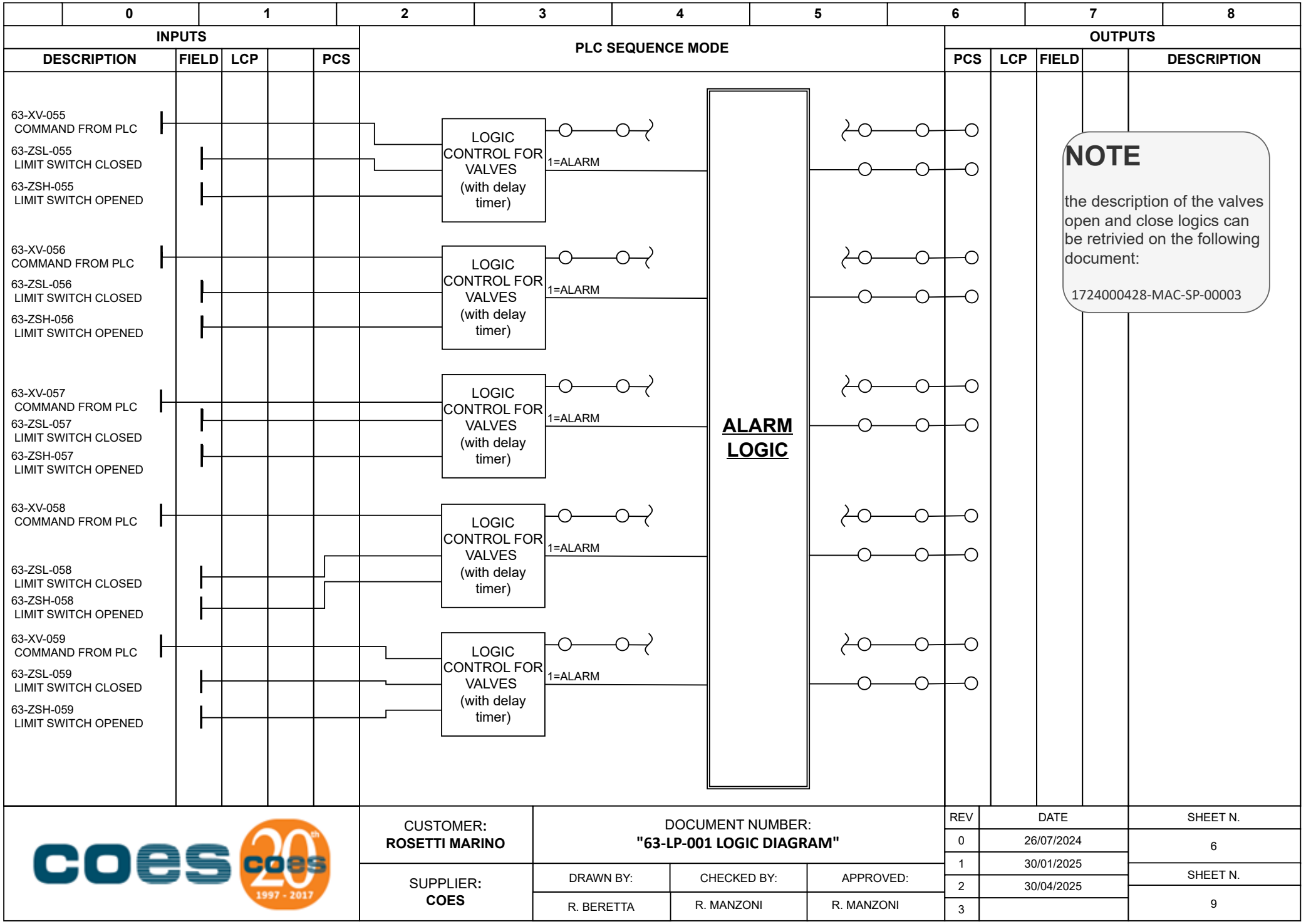
0	1	2	3	4	5	6	7	8

	FIELD	LCP		PCS	PLC SEQUENCE MODE	OUTPUTS PCS	LCP	FIELD		DESCRIPTION
63-PS-054 (DRYER 1) TOWER A PRESSURE SWITCH										63-ALARM-DRY-001 DRYER 1 ALARM
63-PS-056 (DRYER 1) TOWER B PRESSURE SWITCH										63-ALARM-DRY-001 DRYER 1 ALARM
63-PS-058 (DRYER 1) TOWER A PRESSURE SWITCH										63-ALARM-DRY-002 DRYER 2 ALARM
63-PS-060 (DRYER 1) TOWER A PRESSURE SWITCH										63-ALARM-DRY-002 DRYER 2 ALARM
63-CMPR-ALARM-FDBCK-001 COMPRESSOR 1 COMMON ALARM										
63-CMPR-ALARM-FDBCK-002 COMPRESSOR 2 COMMON ALARM										
63-20FS-12 SOURGE ARRESTER 230VAC_SERVICES OK										63-XA-001 LCP GENERAL ALARM LAMP
63-21FS-12 SOURGE ARRSTER 230VAC_UPS OK										
63-TH-001 INTERNAL CABINET THERMOSTAT										
SHUTDOWN ALARM FROM SIS 63-ESD-01 (0=FAULT) (CONNECTED TO PLC)										



coes	CUSTOMER: **ROSETTI MARINO**	DOCUMENT NUMBER: **"63-LP-001 LOGIC DIAGRAM"**			
	SUPPLIER: **COES**	DRAWN BY:	CHECKED BY:	APPROVED:	
		R. BERETTA	R. MANZONI	R. MANZONI	

REV	DATE	SHEET N.
0	26/07/2024	5
1	30/01/2025	
2	30/04/2025	SHEET N.
3		9

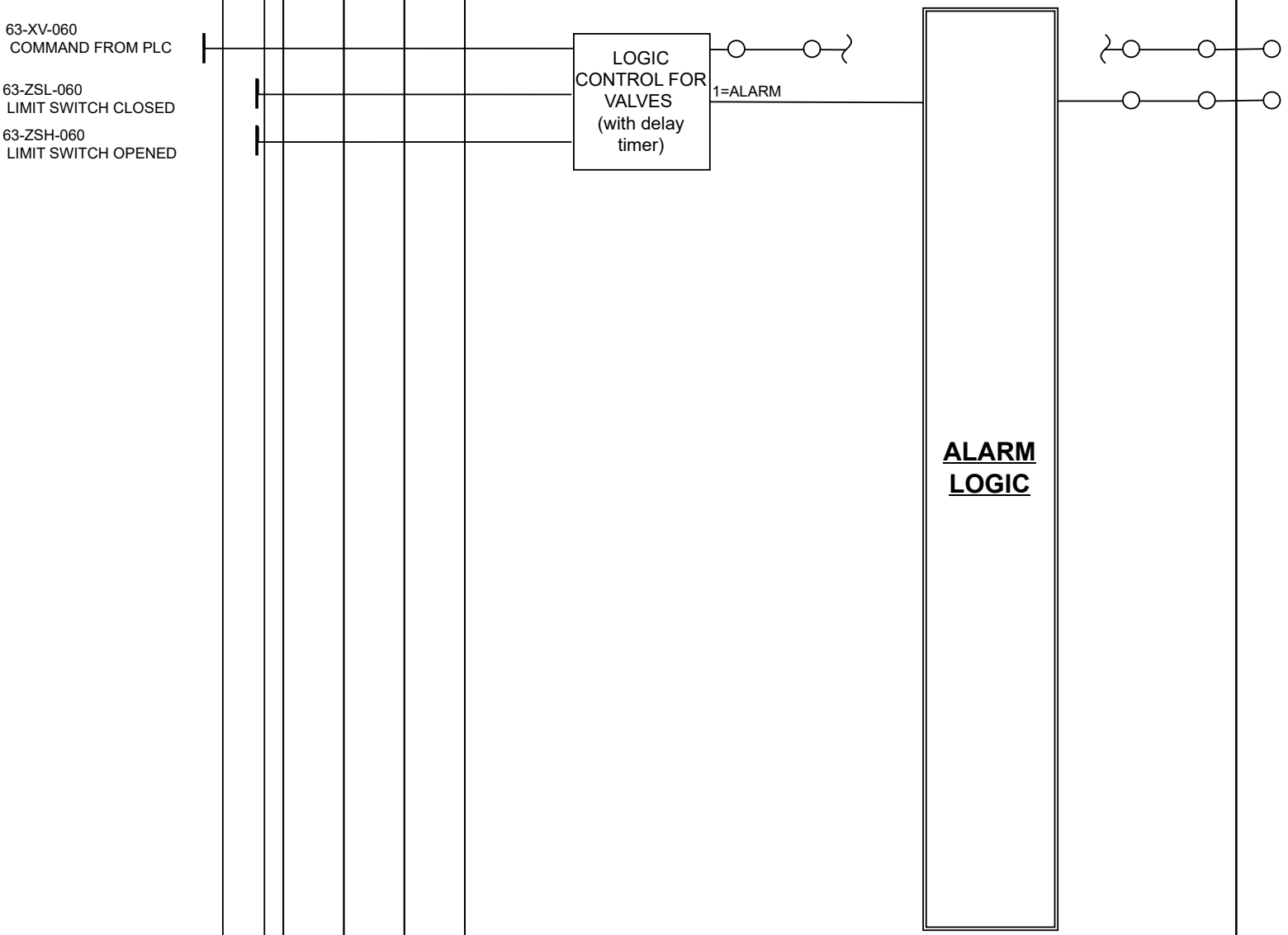


CUSTOMER: **ROSETTI MARINO**	DOCUMENT NUMBER: **"63-LP-001 LOGIC DIAGRAM"**			
SUPPLIER: **COES**	DRAWN BY:	CHECKED BY:	APPROVED:	
	R. BERETTA	R. MANZONI	R. MANZONI	

REV	DATE	SHEET N.
0	26/07/2024	6
1	30/01/2025	SHEET N.
2	30/04/2025	9
3		

0	1	2	3	4	5	6	7	8

INPUTS					PLC SEQUENCE MODE	OUTPUTS				
DESCRIPTION	FIELD	LCP		PCS		PCS	LCP	FIELD		DESCRIPTION



NOTE

the description of the valves open and close logics can be retrivied on the following document:

1724000428-MAC-SP-00003

CUSTOMER: **ROSETTI MARINO**	DOCUMENT NUMBER: **"63-LP-001 LOGIC DIAGRAM"**		
SUPPLIER: **COES**	DRAWN BY:	CHECKED BY:	APPROVED:
	R. BERETTA	R. MANZONI	R. MANZONI

REV	DATE	SHEET N.
0	26/07/2024	7
1	30/01/2025	SHEET N.
2	30/04/2025	9
3		

0	1	2	3	4	5	6	7	8

INPUTS					PLC SEQUENCE MODE	OUTPUTS				
DESCRIPTION	FIELD	LCP		PCS		PCS	LCP	FIELD		DESCRIPTION
63-PT-064 PRESSURE TRANSMITTER INSTRUMENT AIR RECEIVER					Threshold L 63-PT-064-L ≤ 1=ALARM					63-PT-064 PRESSURE TRANSMITTER INSTRUMENT AIR RECEIVER VALUE
										63-PT-064 ALARM L SIGNAL
63-TIT-051 TEMPERATURE TRANSMITTER INLET AIR					Threshold H 63-TIT-051-H ≥ 1=ALARM					63-TIT-051 TEMPERATURE INLET AIR VALUE
										63-TIT-051 ALARM H SIGNAL
63-TIT-052 TEMPERATURE TRANSMITTER INSTRUMENT AIR RECEIVER					**ALARM LOGIC**					63-TIT-052 TEMPERATURE TRANSMITTER INSTRUMENT AIR RECEIVER VALUE
63-AIT-051 DEW POINT TRANSMITTER					Threshold H 63-AIT-051-H ≥ 1=ALARM					63-AIT-051 DEW POINT TRASMITTER VALUE
										63-AIT-051 ALARM H SIGNAL

coes 20th 1997 - 2017	CUSTOMER: **ROSETTI MARINO**	DOCUMENT NUMBER: **"63-LP-001 LOGIC DIAGRAM"**			
	SUPPLIER: **COES**	DRAWN BY:	CHECKED BY:	APPROVED:	
		R. BERETTA	R. MANZONI	R. MANZONI	

REV	DATE	SHEET N.
0	26/07/2024	8
1	30/01/2025	SHEET N.
2	30/04/2025	9
3		

0	1	2	3	4	5	6	7	8

INPUTS					PLC SEQUENCE MODE	OUTPUTS				
DESCRIPTION	FIELD	LCP		PCS		PCS	LCP	FIELD		DESCRIPTION
63-FIT-051 FLOW TRANSMITTER OUTLET AIR										63-FIT-051 FLOW TRANSMITTER OUTLET AIR VALUE
63-PDIT-051 DIFFERENTIAL PRESSURE TRANSMITTER INLET FILTERS					Threshold H 63-PDIT-051-H ≥ 1=ALARM					63-PDIT-051 DIFFERENTIAL PRESSURE TRANSMITTER INLET FILTERS VALUE 63-PDIT-051 ALARM H SIGNAL
63-PDIT-062 DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS					Threshold H 63-PDIT-062-H ≥ 1=ALARM					63-PDIT-062 DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS VALUE 63-PDIT-062 ALARM H SIGNAL

ALARM LOGIC

coes 20th 1997 - 2017

CUSTOMER:	DOCUMENT NUMBER:		
ROSETTI MARINO	**"63-LP-001 LOGIC DIAGRAM"**		
SUPPLIER:	DRAWN BY:	CHECKED BY:	APPROVED:
COES	R. BERETTA	R. MANZONI	R. MANZONI

REV	DATE	SHEET N.
0	26/07/2024	9
1	30/01/2025	SHEET N.
2	30/04/2025	9
3		

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000
PACKAGE STRUCTURAL CALCULATION REPORT
INCLUDING FIXING POINTS and LIFTING POINTS

Document Number: 1724000428-ST-RE-00010

Document 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
Giuseppe Cavallo	07/07/24

Rev.	Date	Description	Prepared	Reviewed	Approved
01	21/06/2024	Issue for Information (IFI)	GT	MC	TM
00	30/04/2024	Issue for Information (IFI)	GT	MC	TM

COES

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Revision / Change Log

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

HOLDS LIST

No.	Description
1	
2	
3	
4	

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None

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

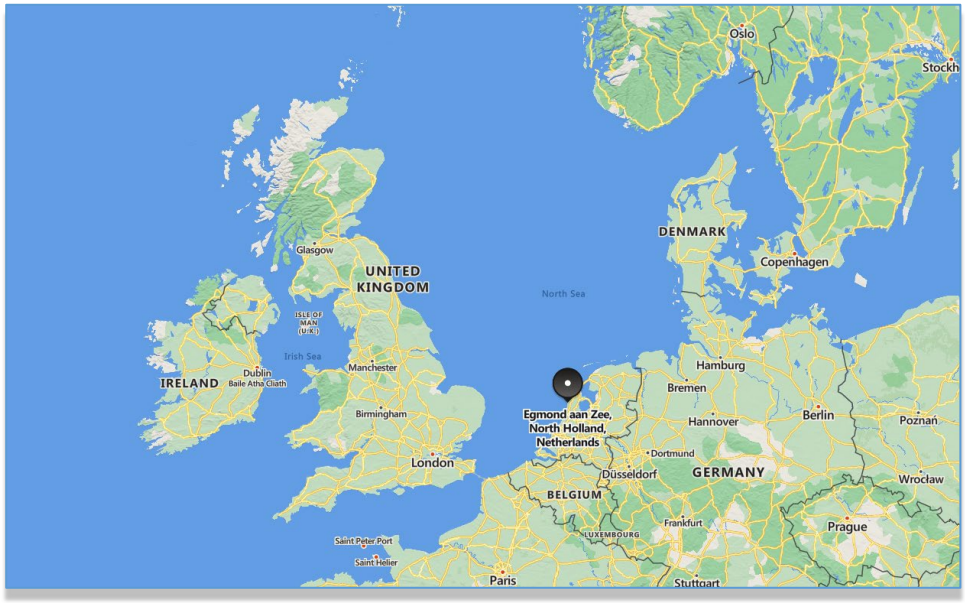


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

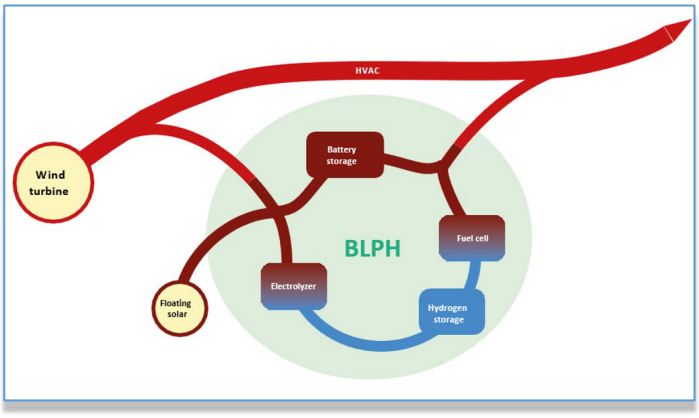


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

3 STRUCTURAL CALCULATION

This report deals with the structural design of the instrument air package (see Figure 1) in the following conditions:

- Lifting conditions
- Operating conditions: static + action of wind
- Transportation conditions, including wind action

3.1 CODES AND STANDARDS

The design of the structure is carried out in accordance with the following Codes and Standards:

- UNI EN 1990 “EUROCODE 0 – Basis of Structural Design”
- UNI EN 1991 "EUROCODE 1 – Actions on structures”
- UNI EN 1993 “EUROCODE 3 – Design of steel structures”

3.2 MATERIALS OF CONSTRUCTION

According with Bill of Material contained in technical drawings, the material of construction for the main structure elements is S 355 J2 (EN 10025-2), having the following mechanical properties:

MATERIAL	**Steel S355 J2** (EN 10025-2)	
Elastic modulus	E	210000 [MPa]
Poisson	ν	0.29
Density	Ro	7870 [Kg/m3]
Yield strength	Fty	350 [MPa]
Ultimate strength	Ftu	420 [MPa]

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3.3 LIFTING ANALYSIS

Is considered as the load of the materials forming a permanent part of the structure unit. It is defined as the load of structures and equipment on operating conditions:

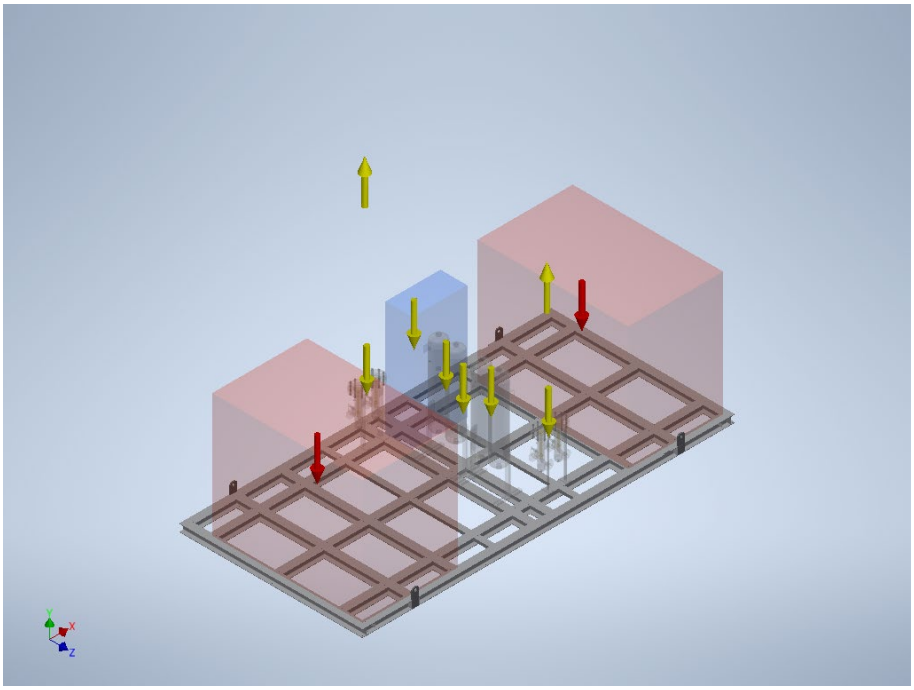
Item	Weight (kg)	Weight (N)
Compressor_1	2775	27222,75
Compressor_2	2775	27222,75
Dryer_1	500	4905
Dryer_2	500	4905
Pre-filter group	250	2452,5
Post-filter group	250	2452,5
Control Panel (UCP)	350	3433,5
Baseframe	2000	19620
TOTAL (including piping and valves)	11000	107910

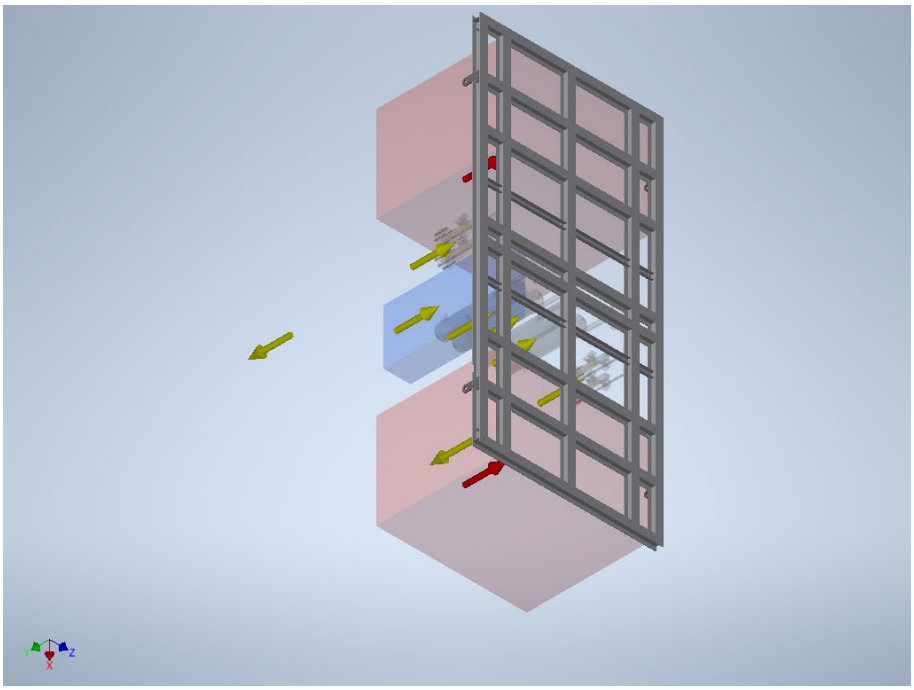
Each load has been applied as concentrated in each center of gravity.

The padeye has been also calculated, as shown in section 3.4.

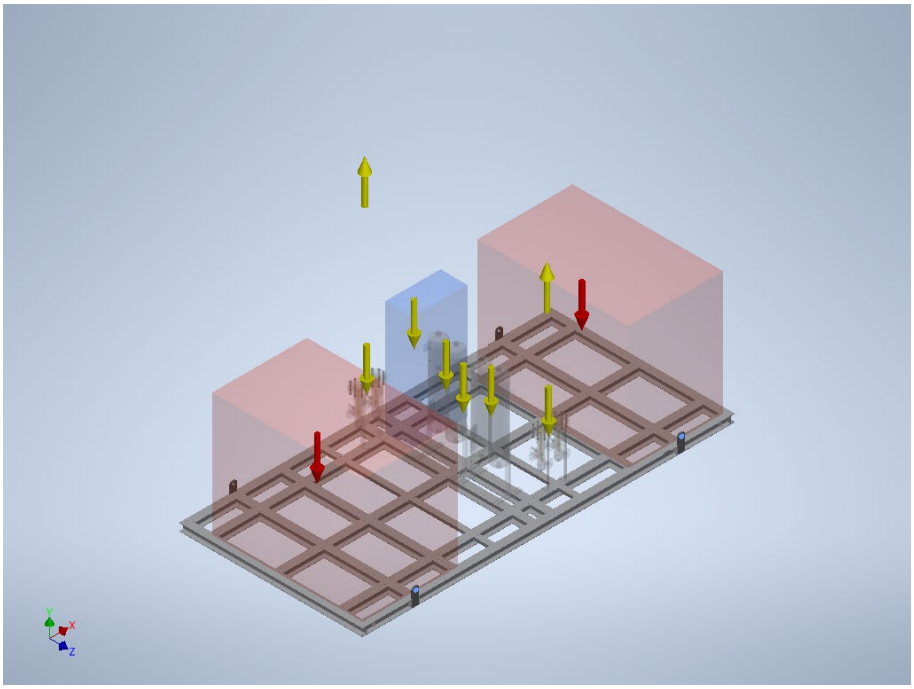
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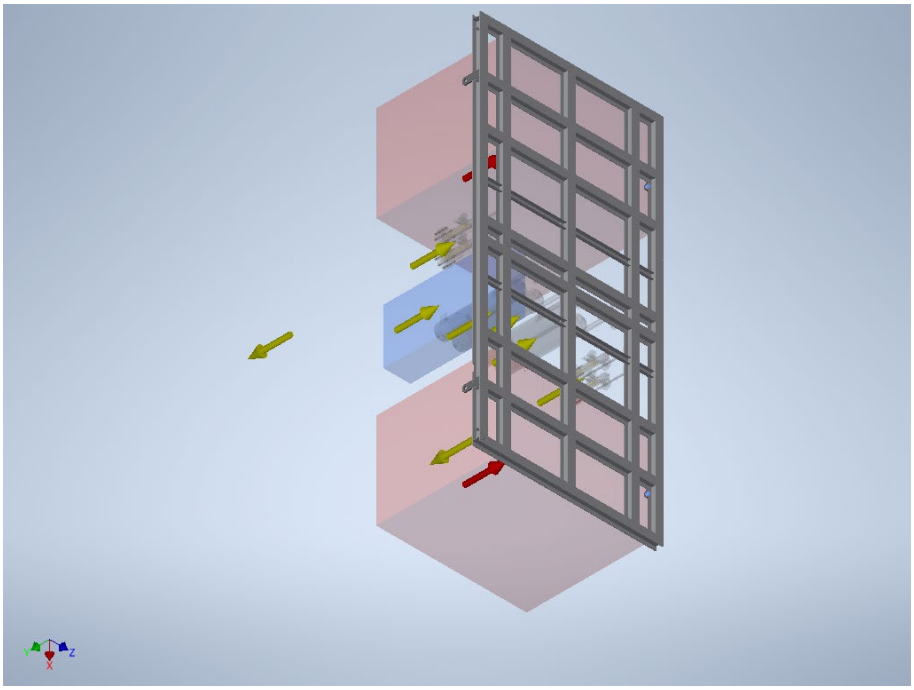
Gravity



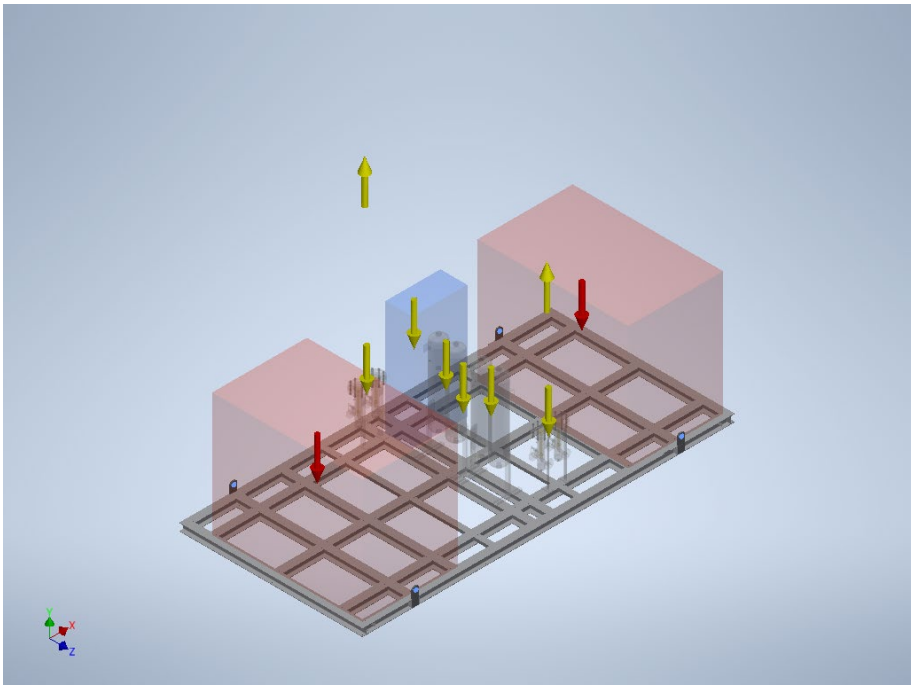


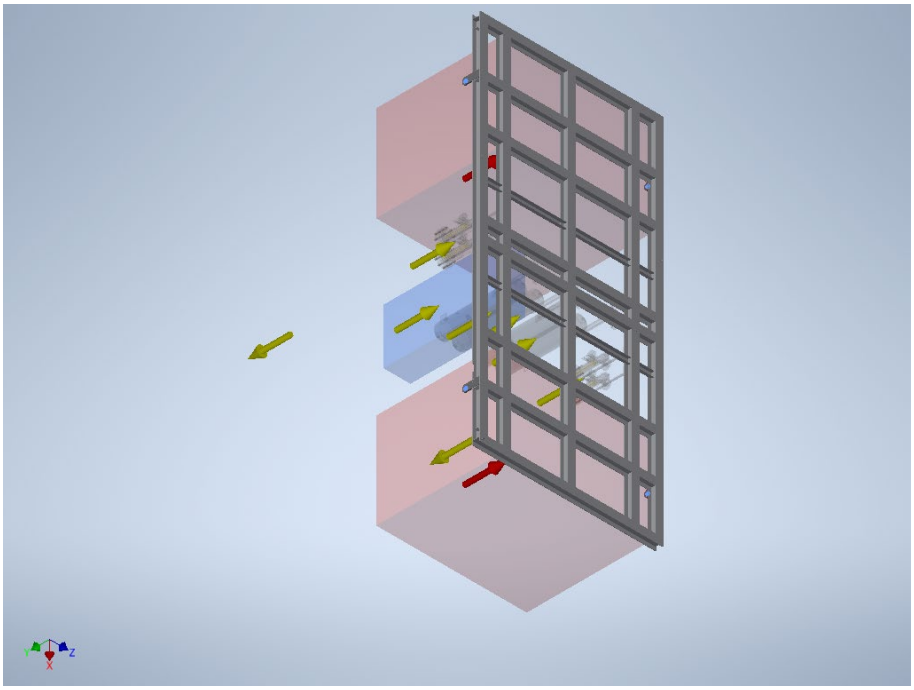
Lifting load_1 (applied according to the lifting sketch)



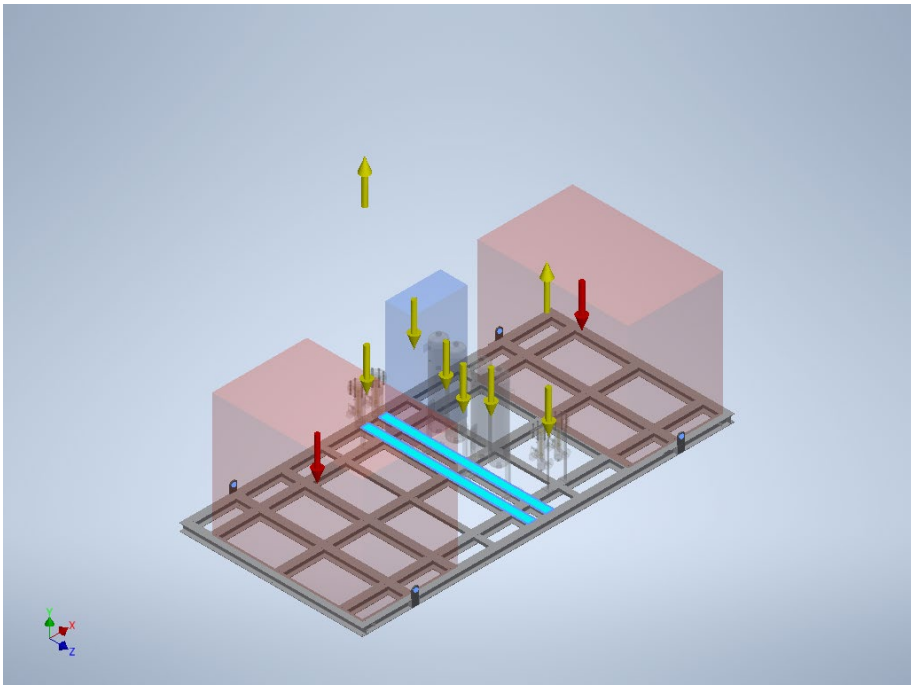


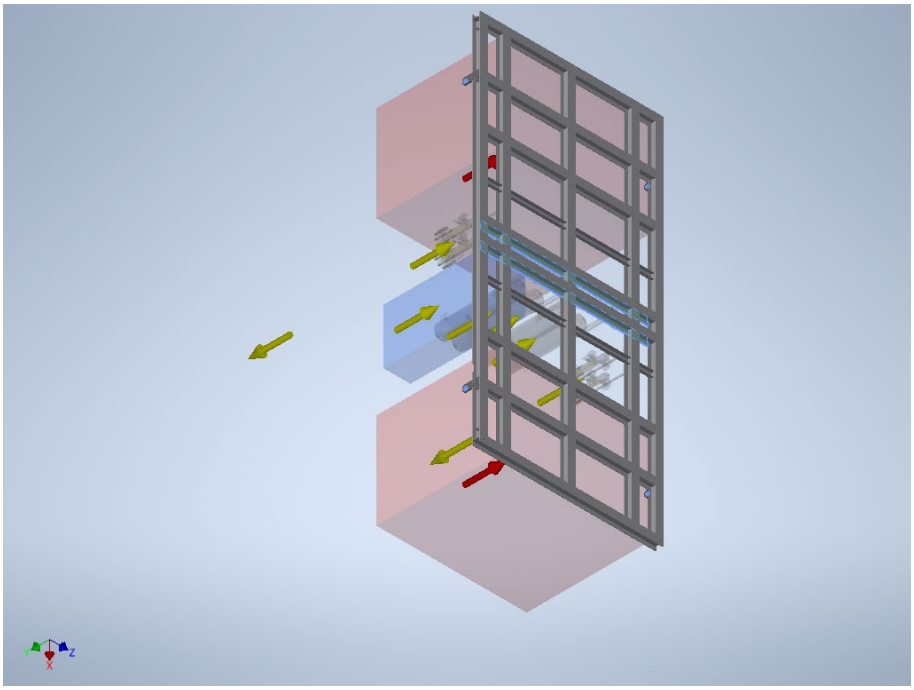
Lifting load_2 (applied according to the lifting sketch)



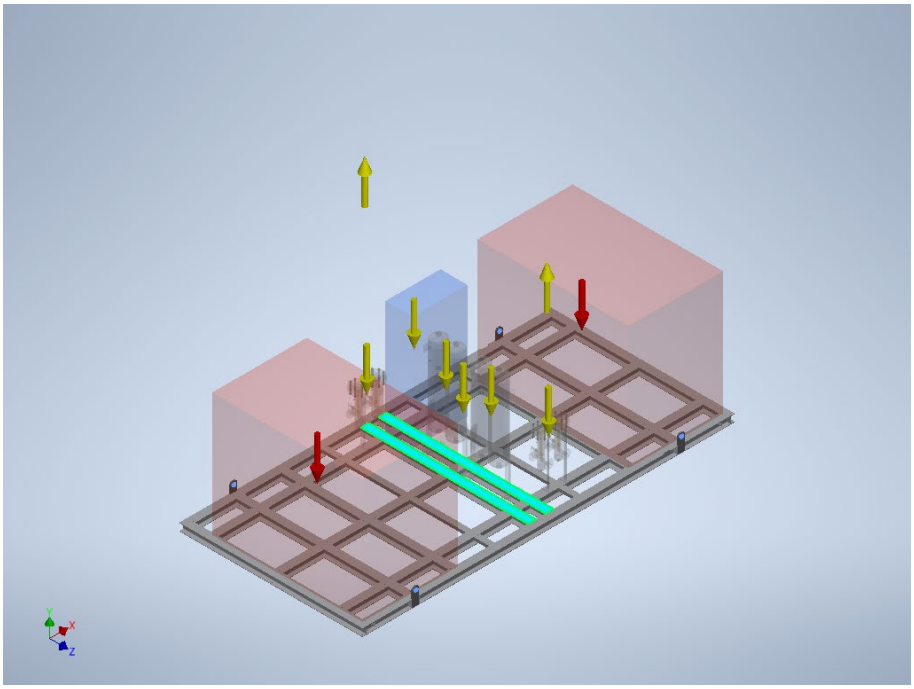


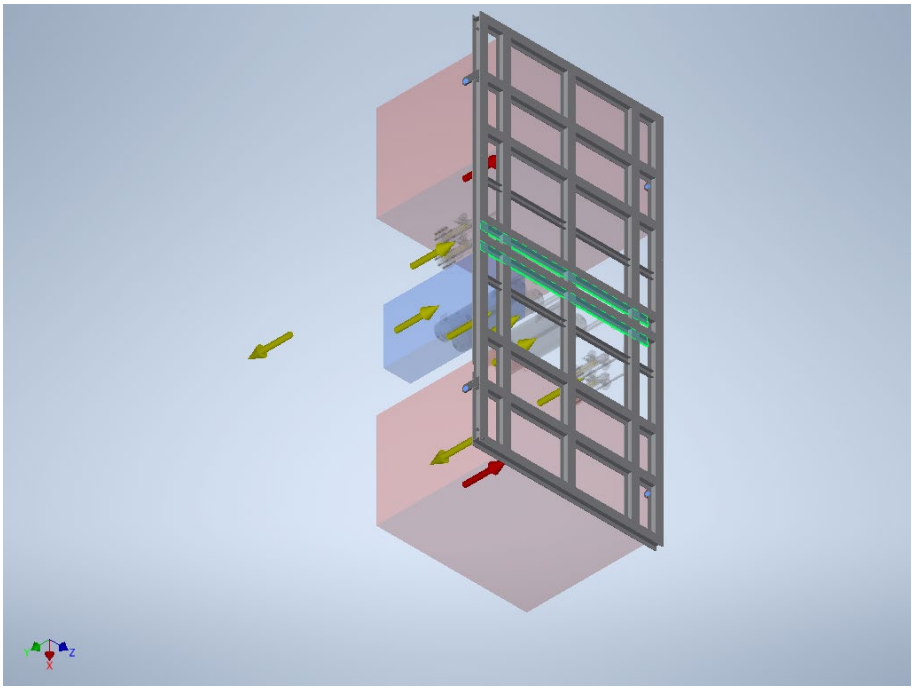
Dryer_1



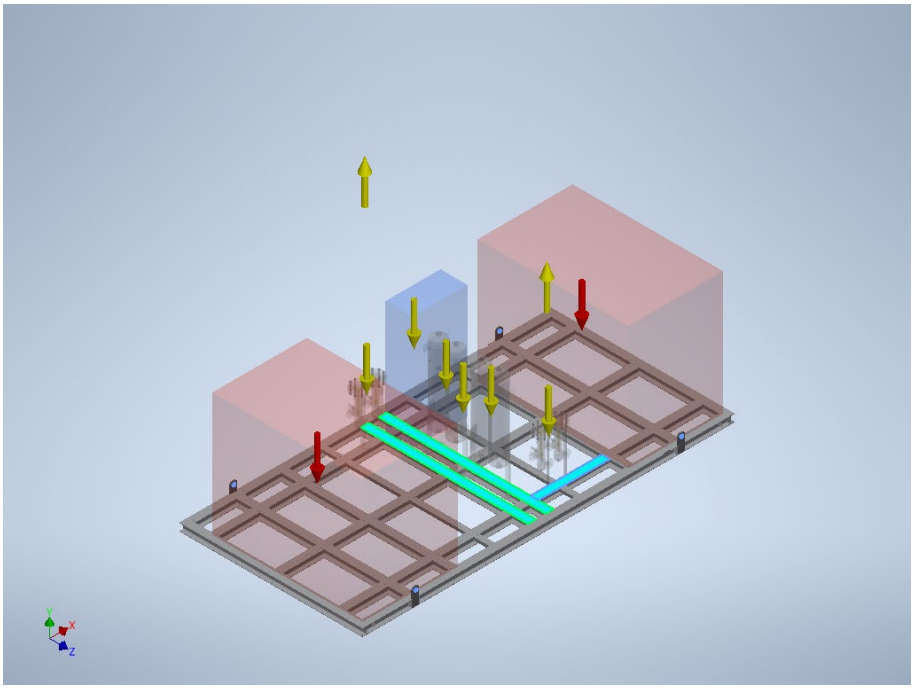


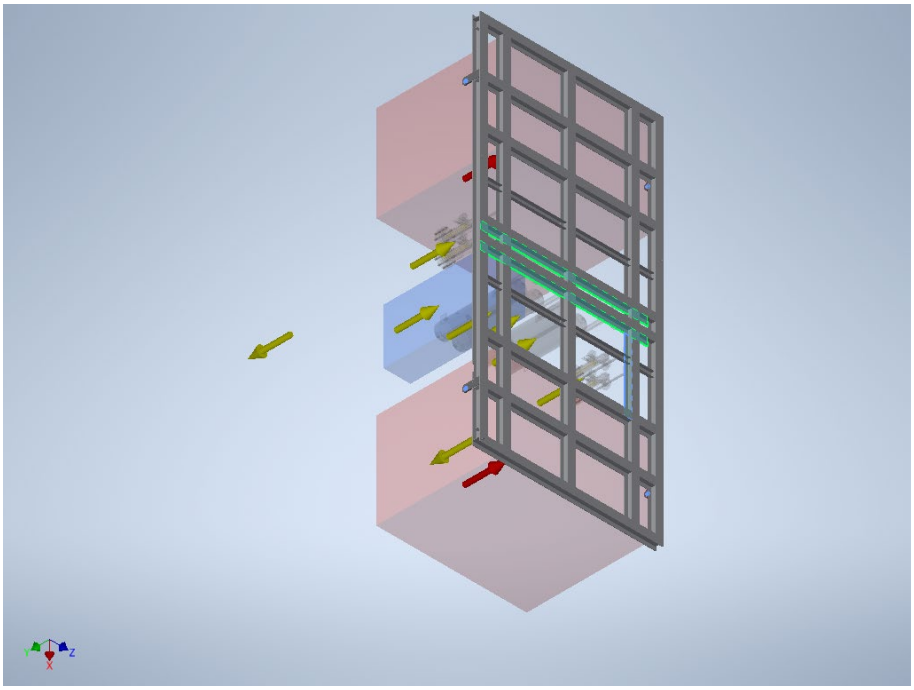
Dryer_2



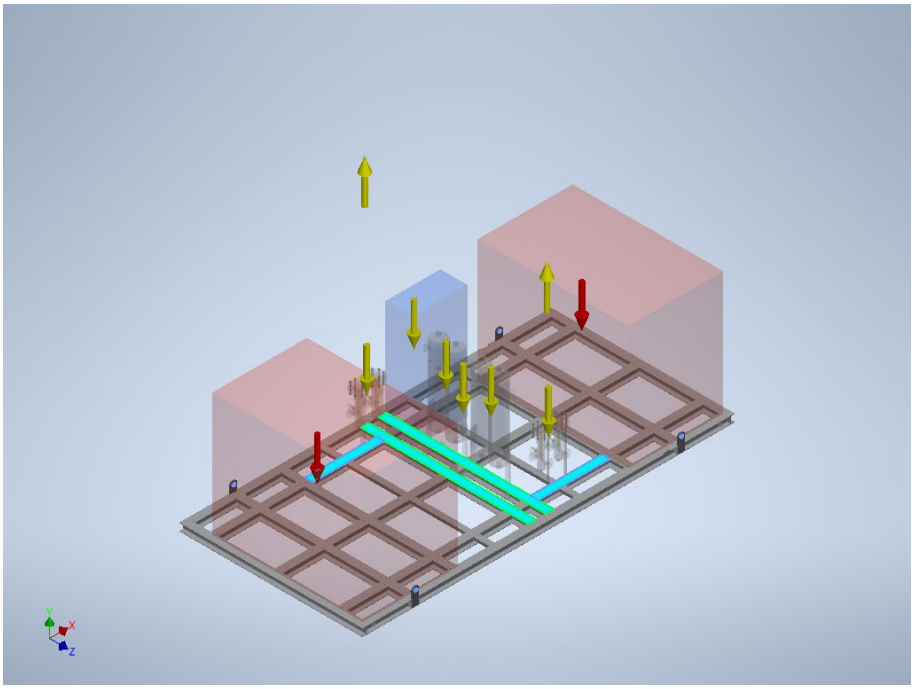


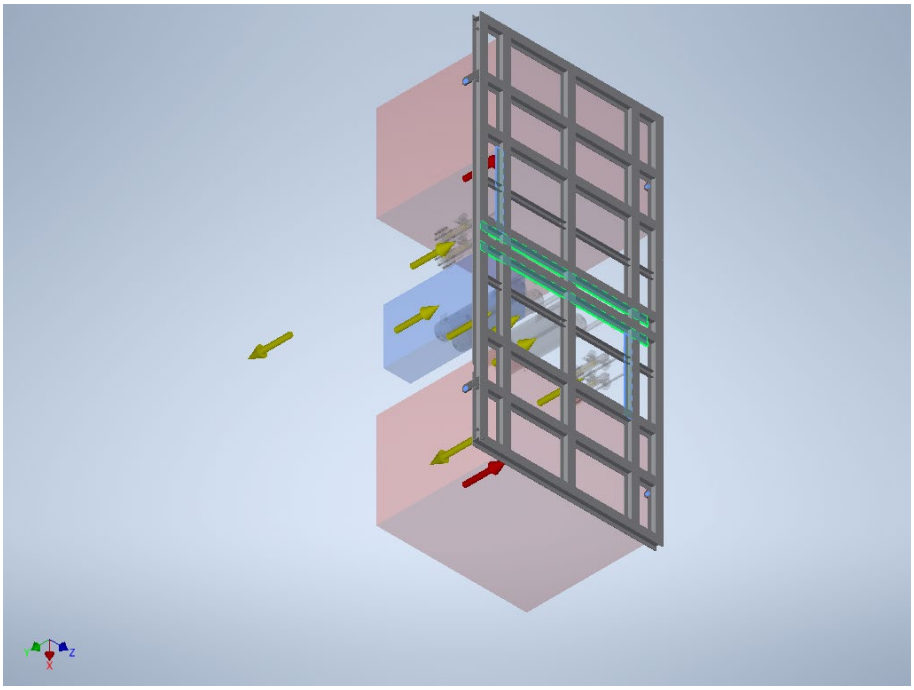
Post-filter group



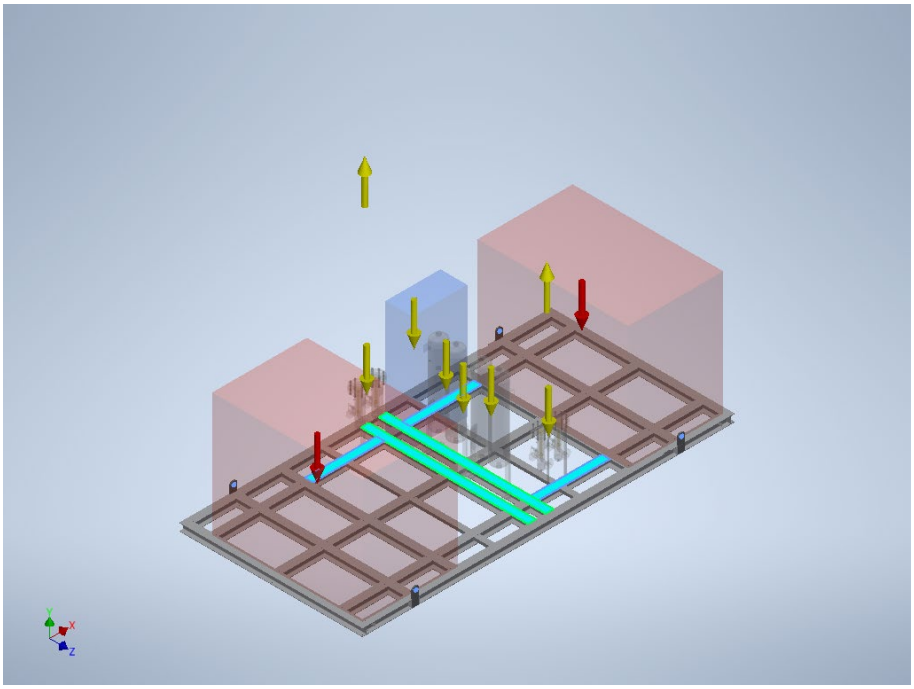


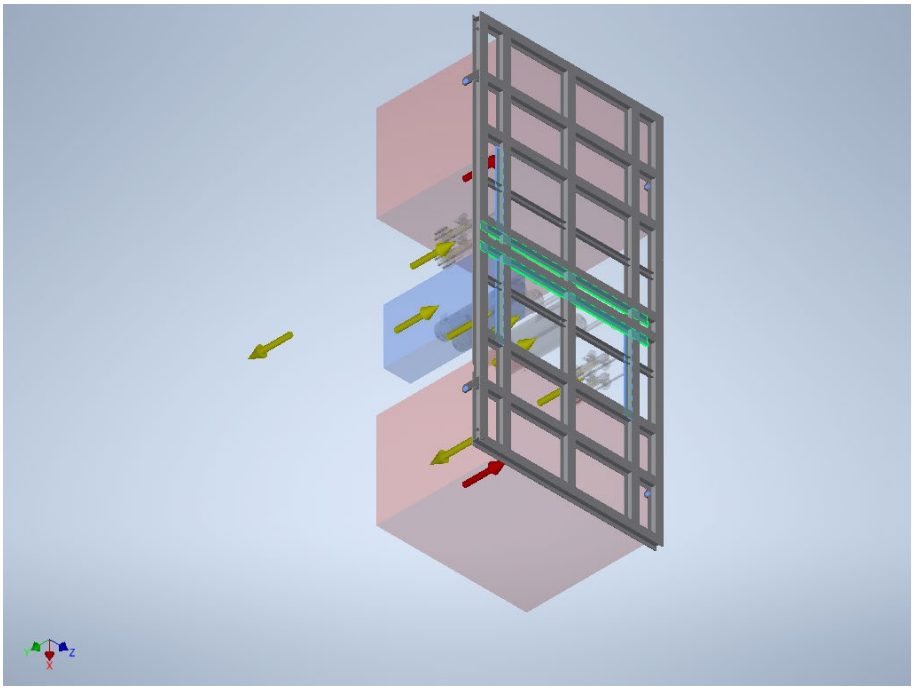
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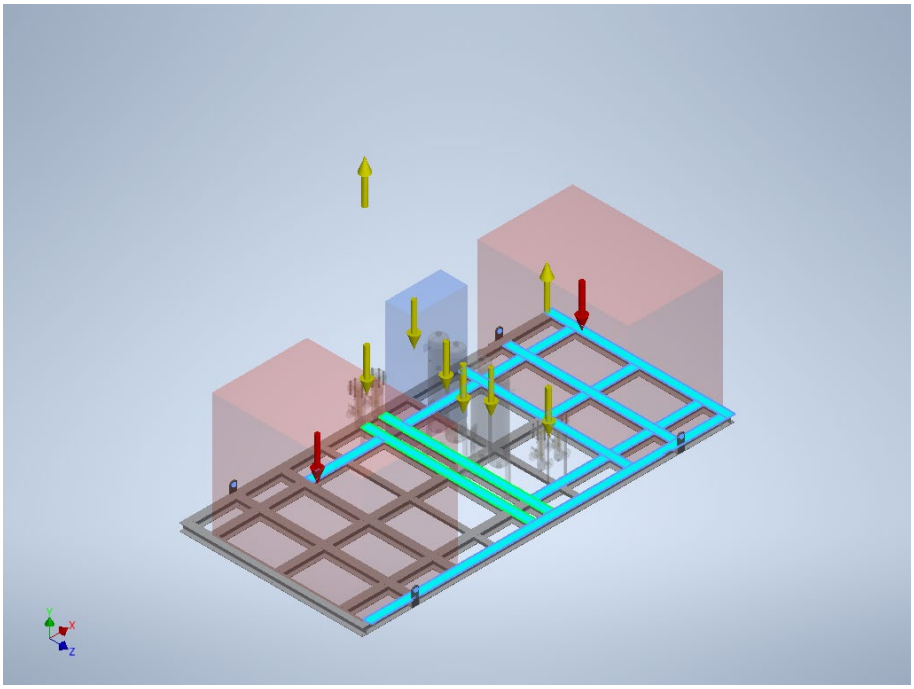


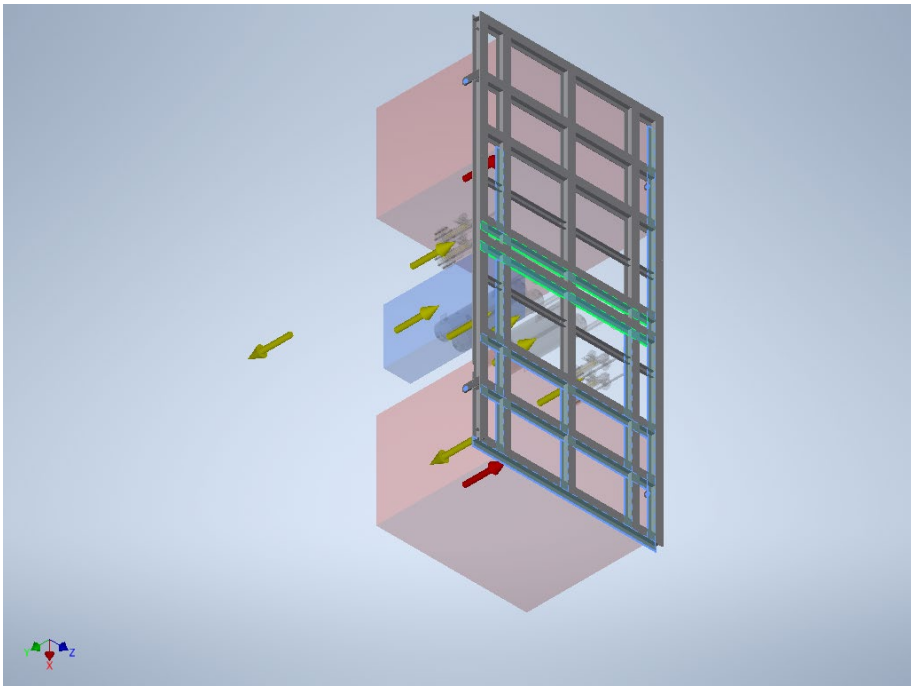
Local Control Panel (LCP)



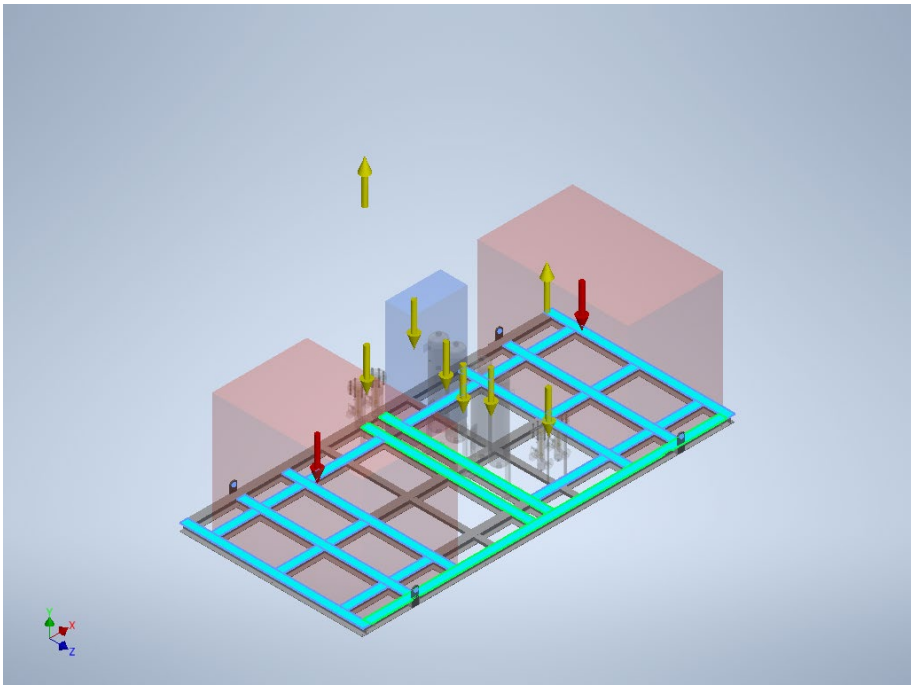


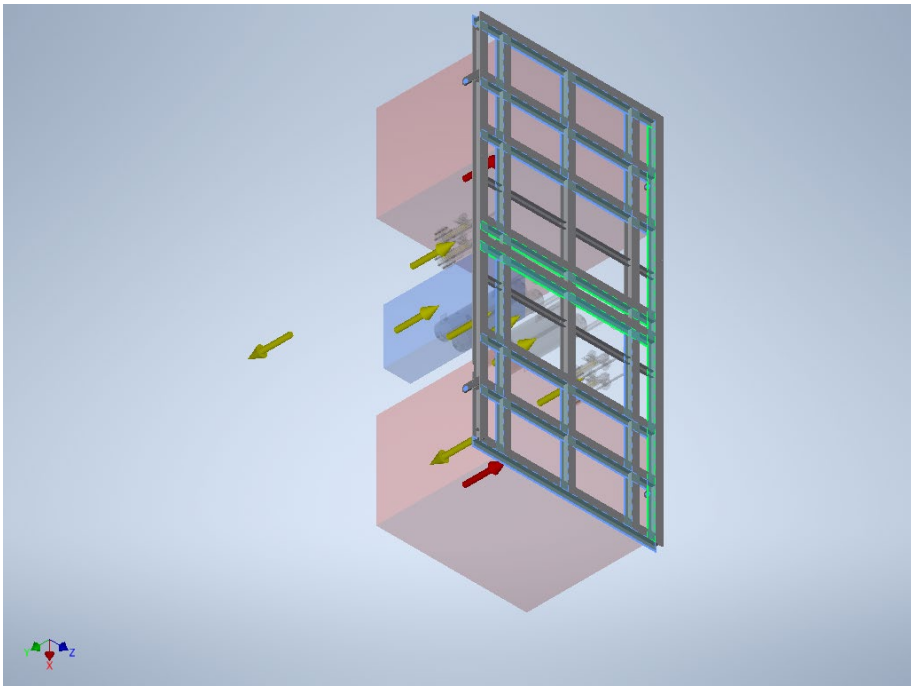
Air Compressor_1



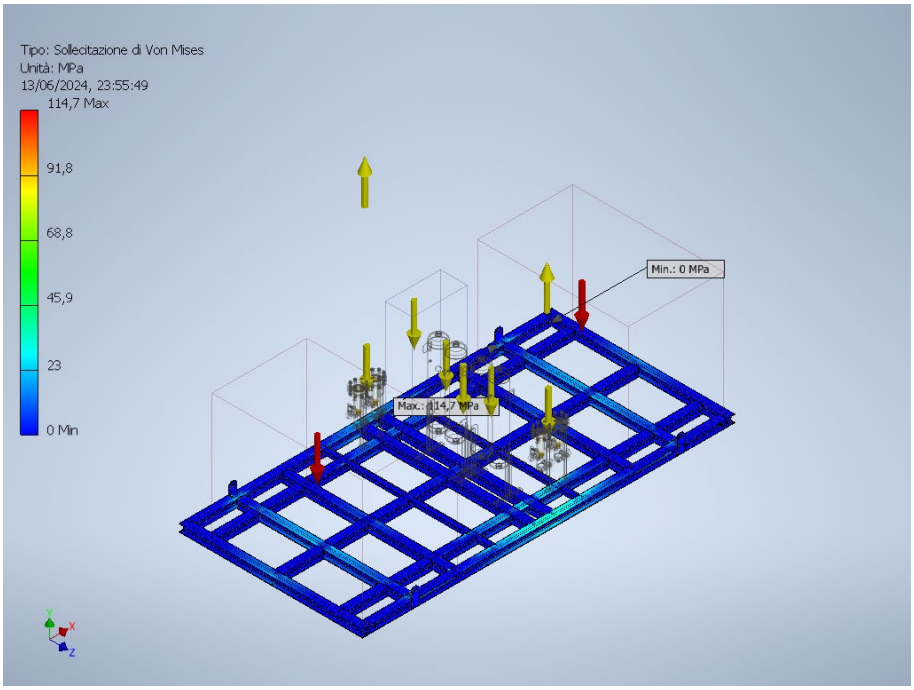


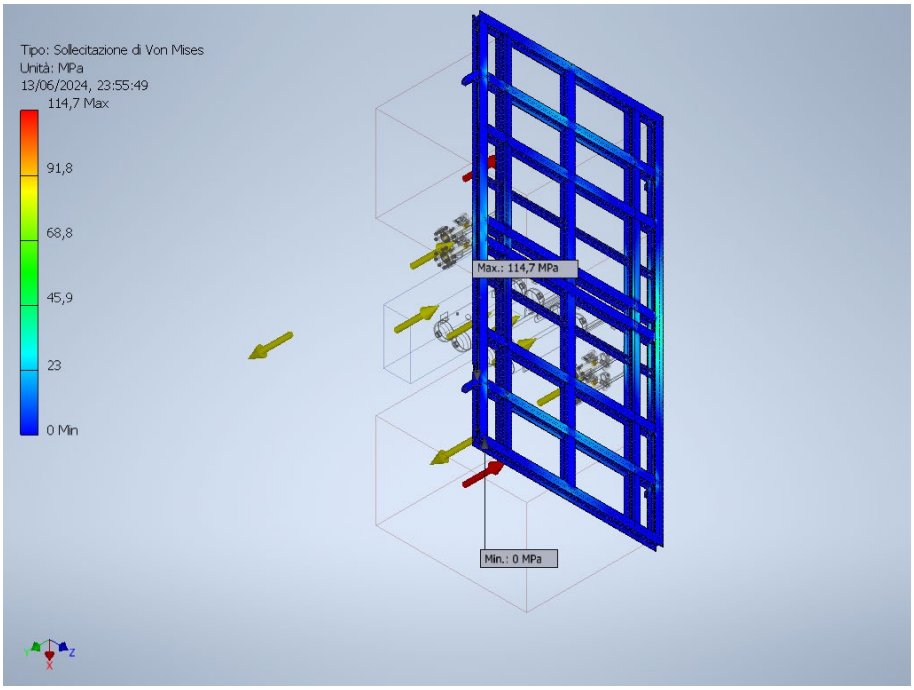
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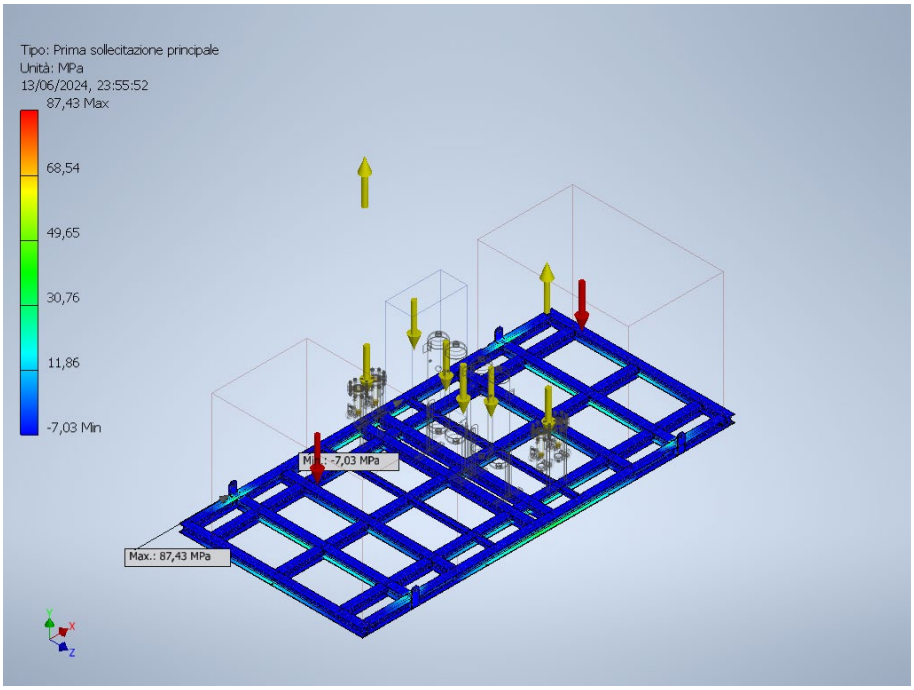


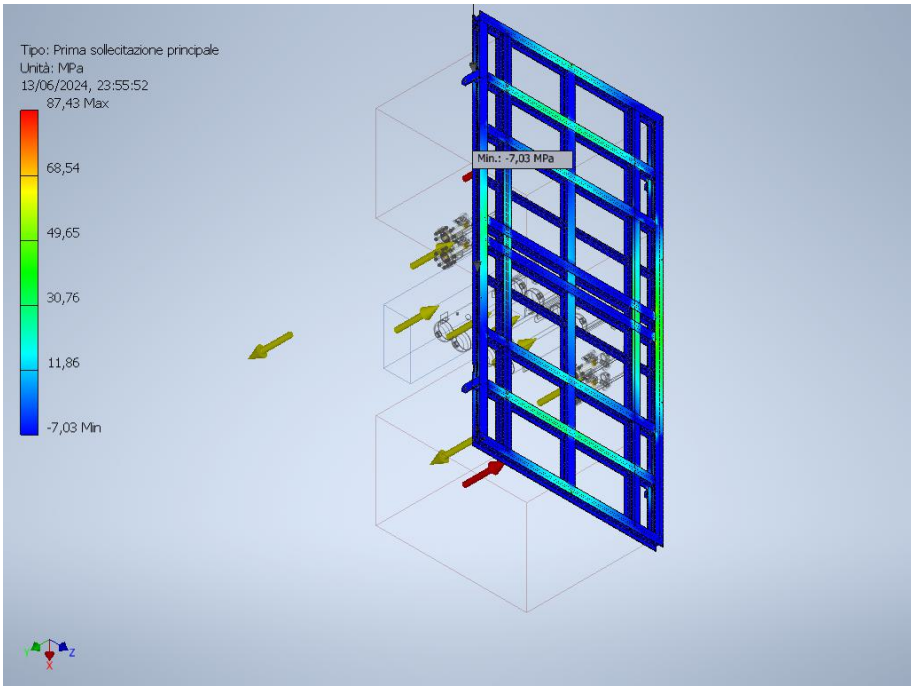
Von Mises stress



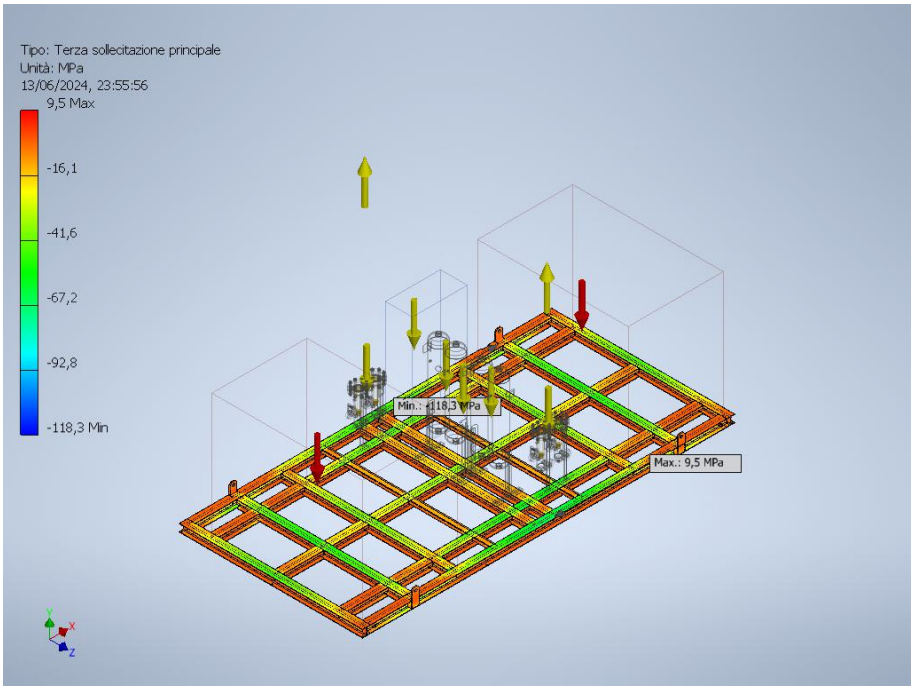


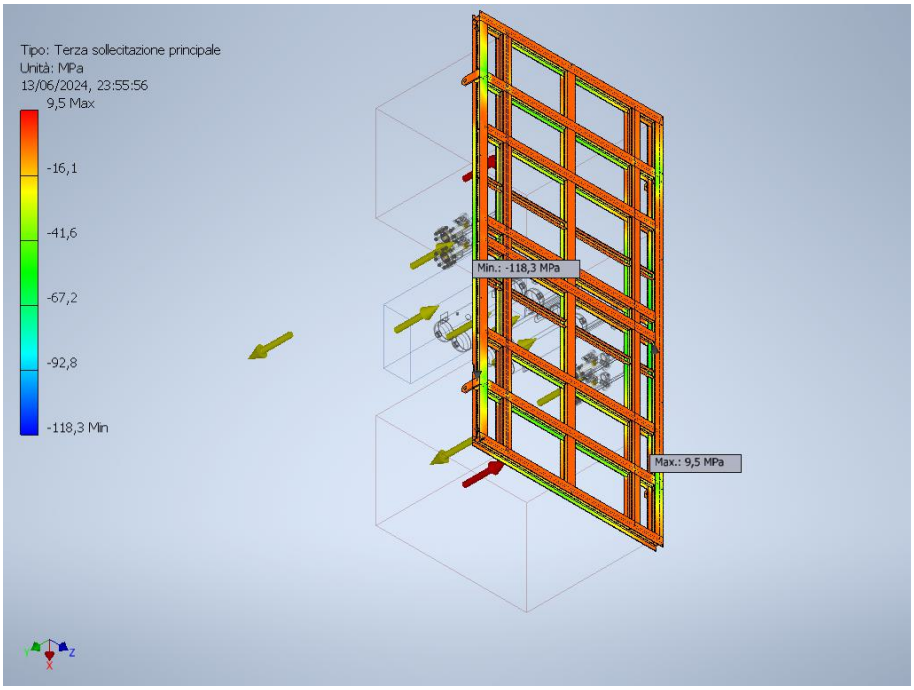
First principal stress



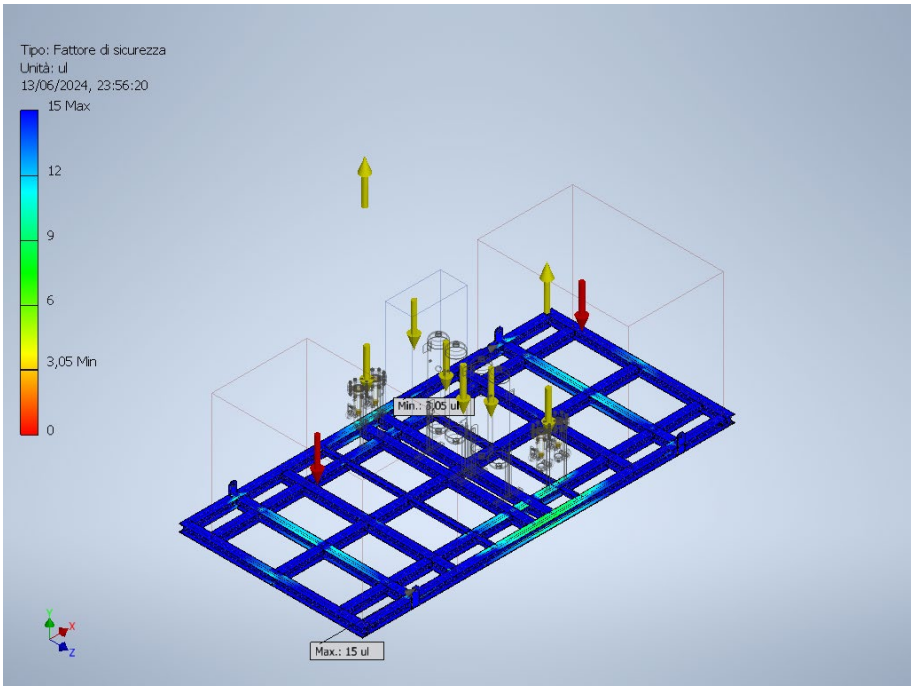


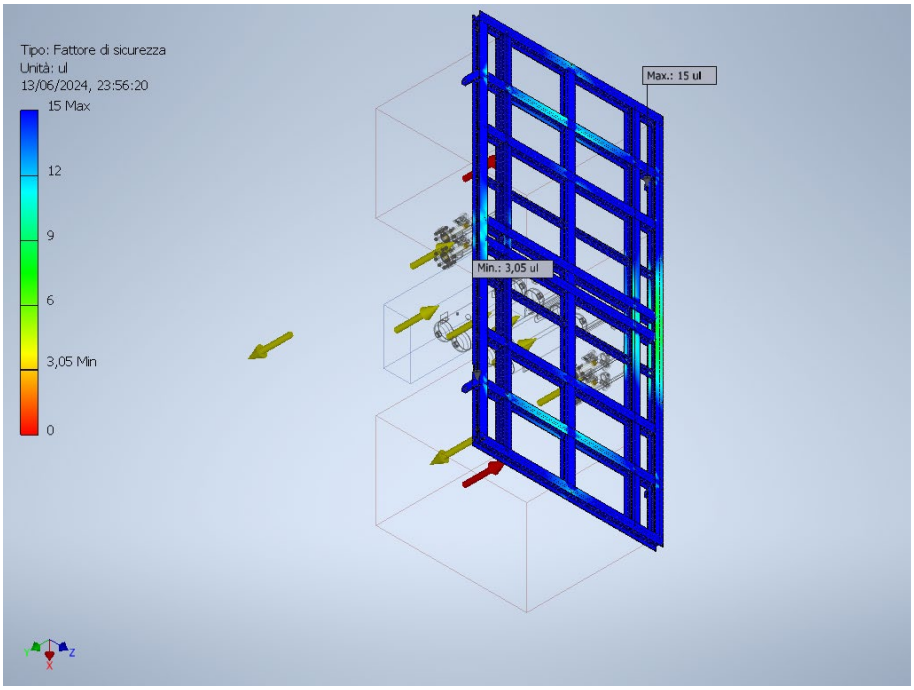
Third principal stress





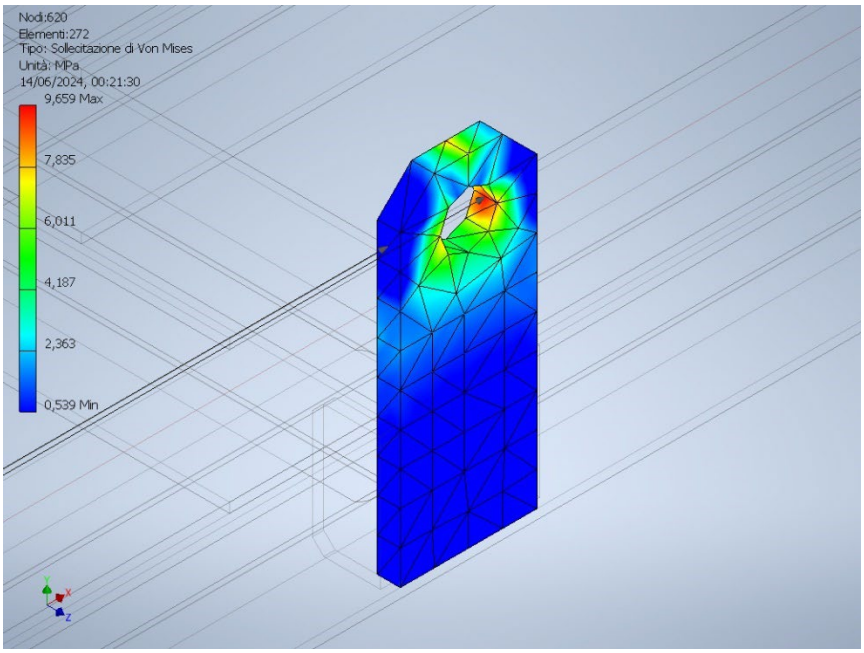
Safety factor

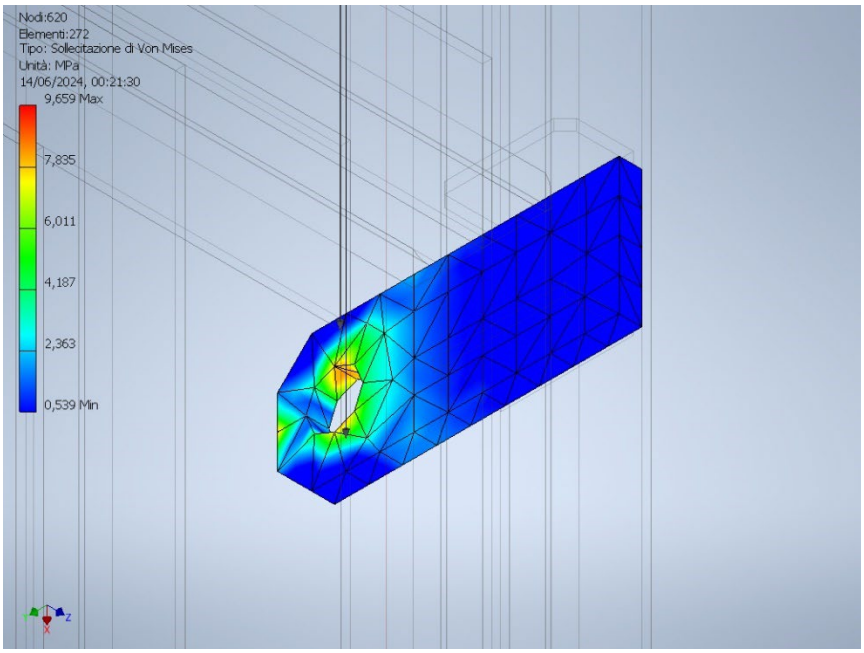




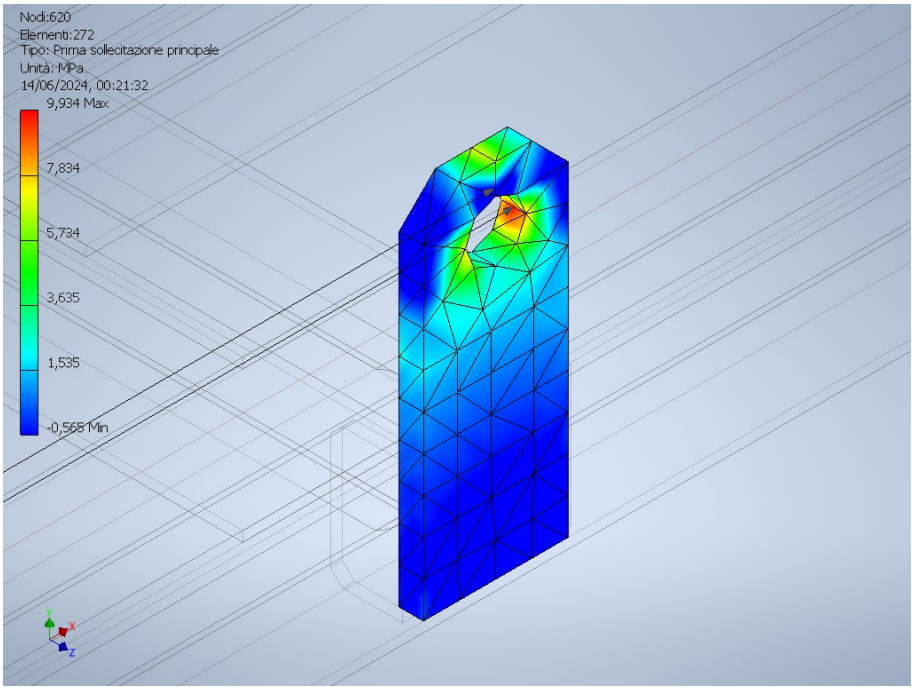
3.4 PADEYE ANALYSIS

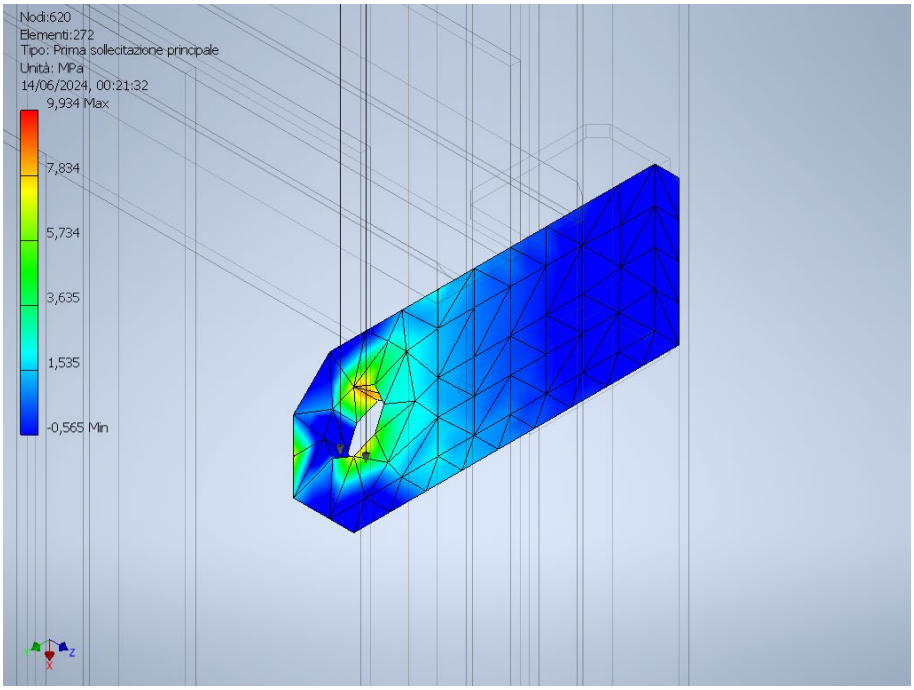
Von Mises stress



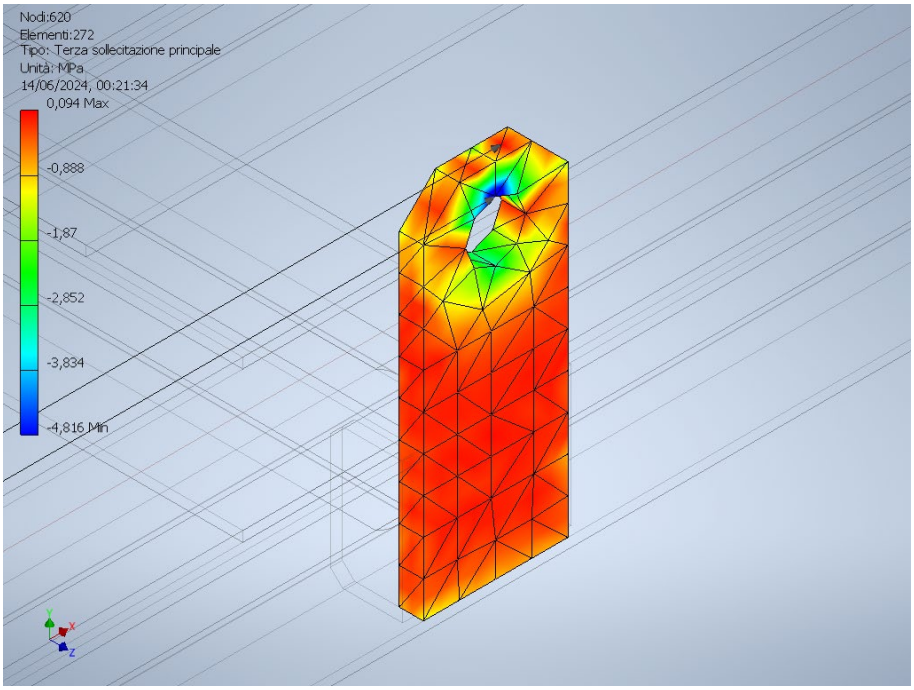


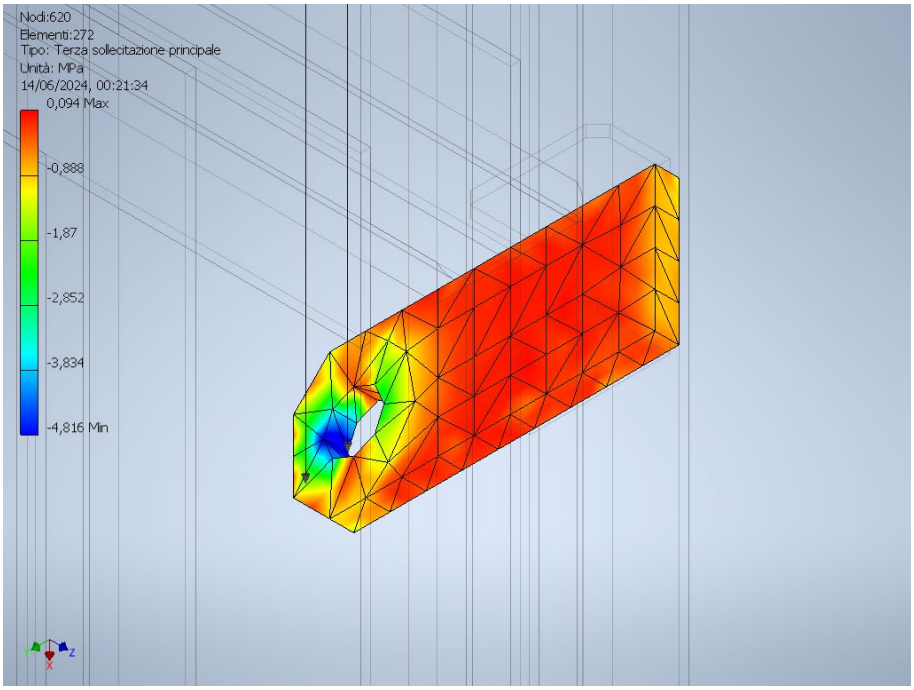
First principal stress



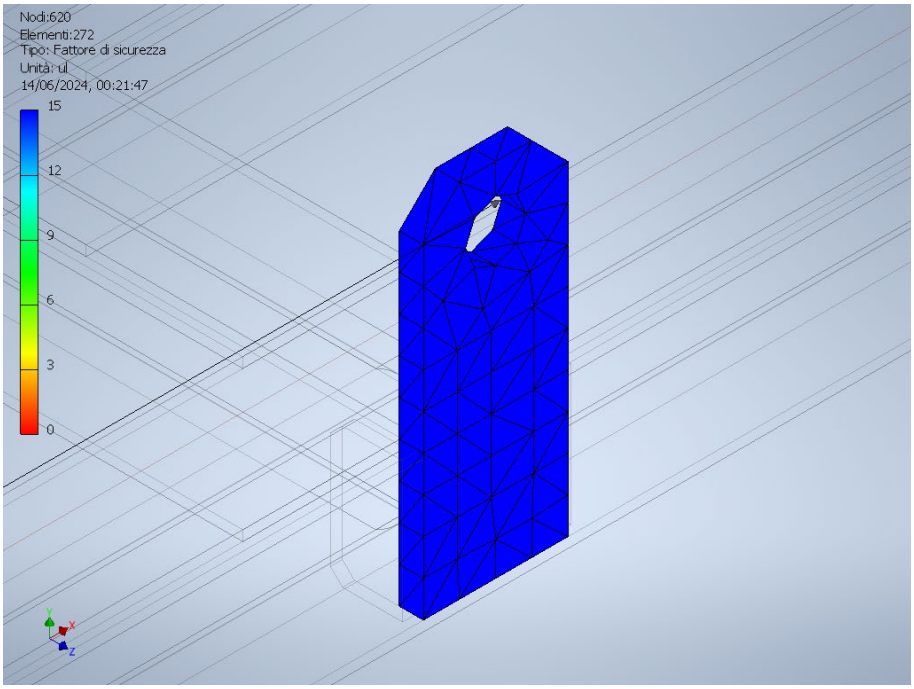


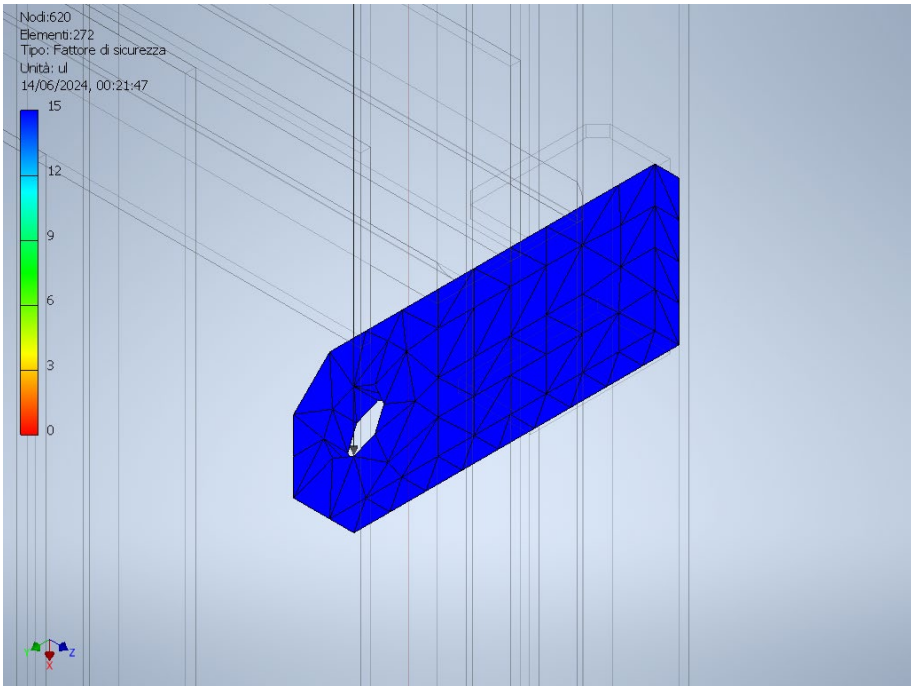
Third principal stress





Safety factor





3.5 STATIC ANALYSIS

Is considered as the load of the materials forming a permanent part of the structure unit. It is defined as the load of structures and equipment on operating conditions:

Item	Weight (kg)	Weight (N)
Compressor_1	2775	27222,75
Compressor_2	2775	27222,75
Dryer_1	500	4905
Dryer_2	500	4905
Pre-filter group	250	2452,5
Post-filter group	250	2452,5
Control Panel (UCP)	350	3433,5
Baseframe	2000	19620
TOTAL (including piping and valves)	11000	107910

Action of wind is considered for this calculation.

Wind Loads are defined in project specification "STRUCTURAL DESIGN BASIS" document No. 123A90-DDL-ST-SP-90017 Rev.0

Design Wind Speed: 40 m/s – 50ys return period.

Peak velocity pressure:

$q_p(z)=[1+7\cdot l_v(z)]\cdot 1/2\cdot\rho\cdot v_m^2(z)=c_e(z)\cdot q_b$

where:

ρ = 1.25 kg/m^3 (air density)

$c_e(z) = q_p(z)/ q_b$ (exposure factor)

$q_b = 1/2\cdot\rho\cdot v_b^2$ = 1.0 kPa (basic velocity pressure)

According to EN 1991, Figure 4.2 Paragraph 4.5

$c_e(z)$ = 3.8

$q_p(z)$ **= 3.8 kPa (peak velocity pressure)**

Wind Force

According to EN 1991, Section 5.3 Expression (5.3), wind force F_w may be determined as:

$F_w = c_s c_d \cdot c_f \cdot q_p(z) \cdot A_{ref}$

where

$c_s c_d = 1$ (structural factor defined in Section 6)

$c_f = 1.26$ (force coefficient, given in Section 7, formula 7.11)

$q_p(z) = 3.8$ kPa (peak velocity pressure)

$A_{ref\text{-}X}$ = (Reference area, X-Direction)

$A_{ref\text{-}Z}$ = (Reference area, Z-Direction)

$F_{w\text{-}X} = 27086$ N

$F_{w\text{-}Z} = 17096$ N

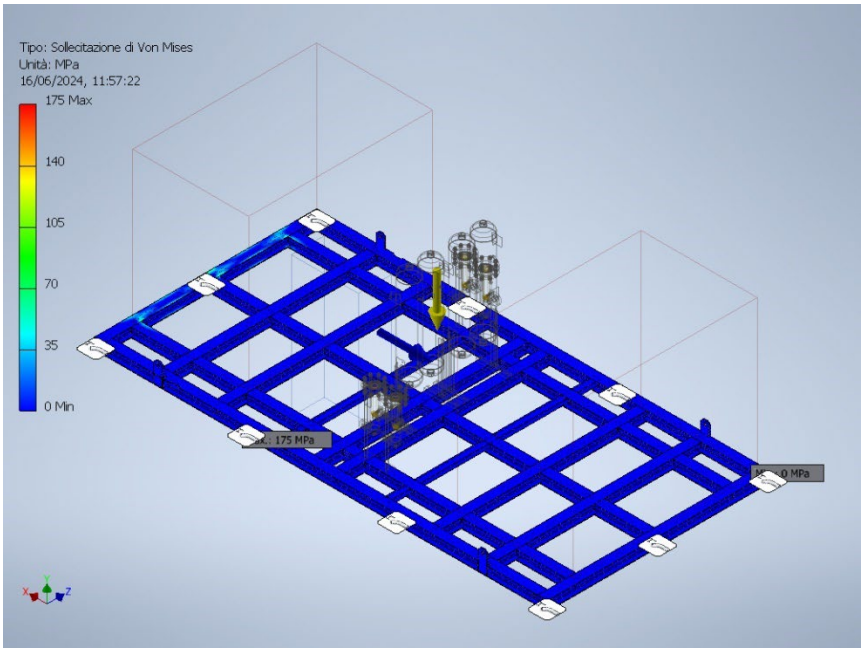
Calculation cases are:

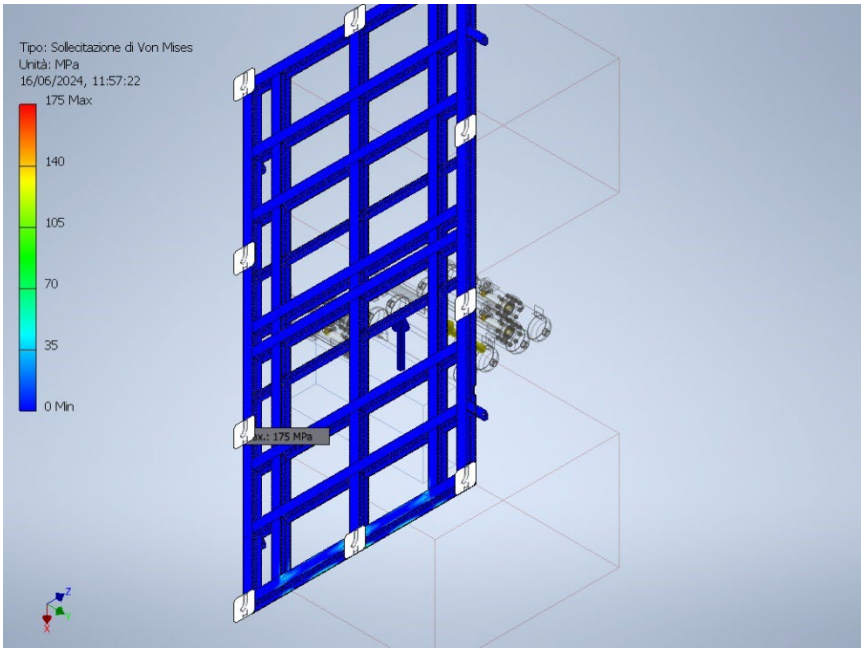
- Permanent load + Wind action along X- direction
- Permanent load + Wind action along X+ direction
- Permanent load + Wind action along Z- direction
- Permanent load + Wind action along Z+ direction

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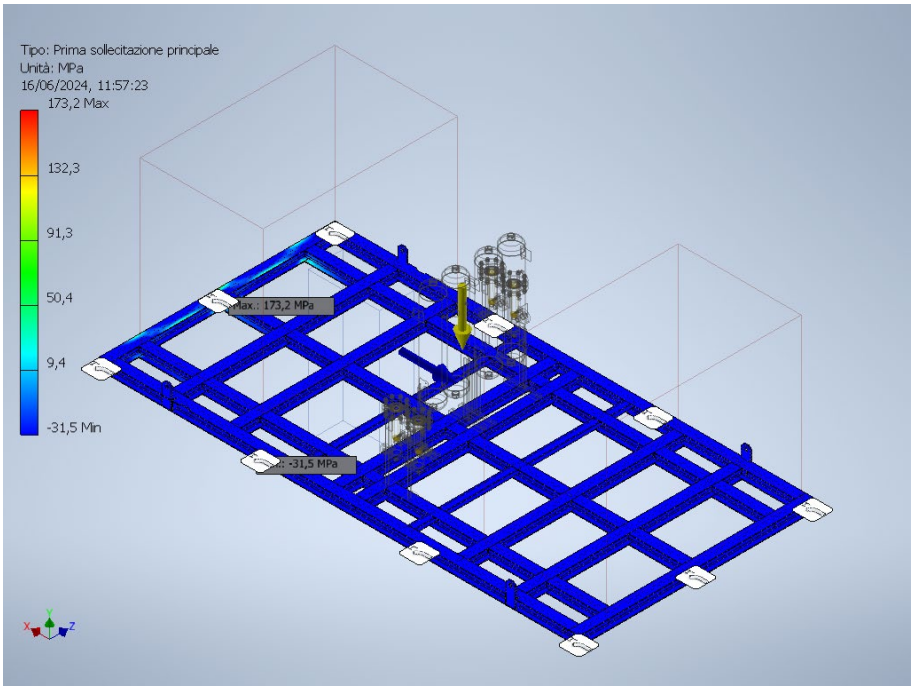
3.5.1 PERMANENT LOAD + WIND (X- DIRECTION)

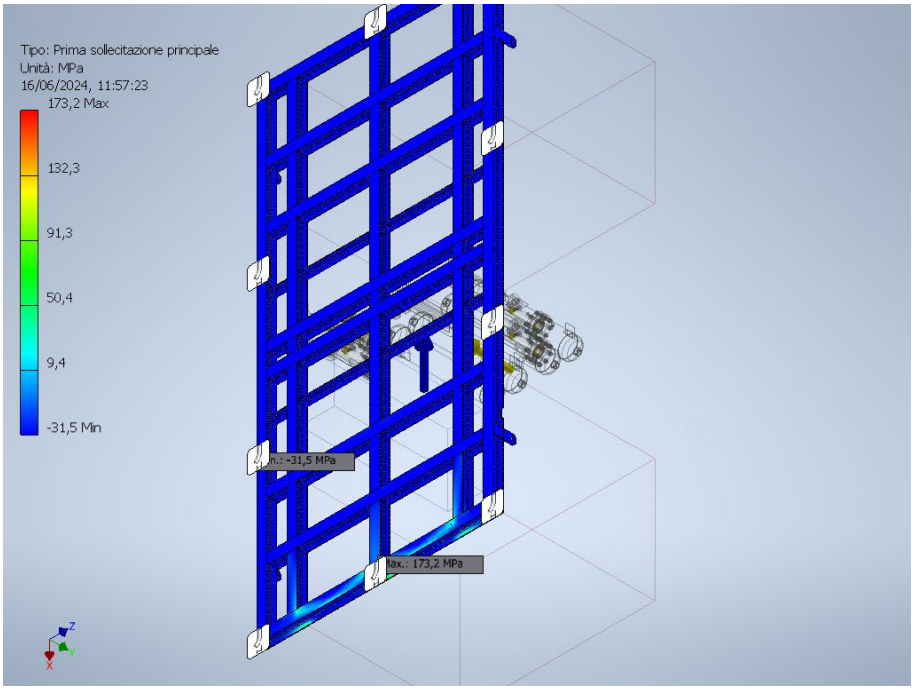
Von Mises stress



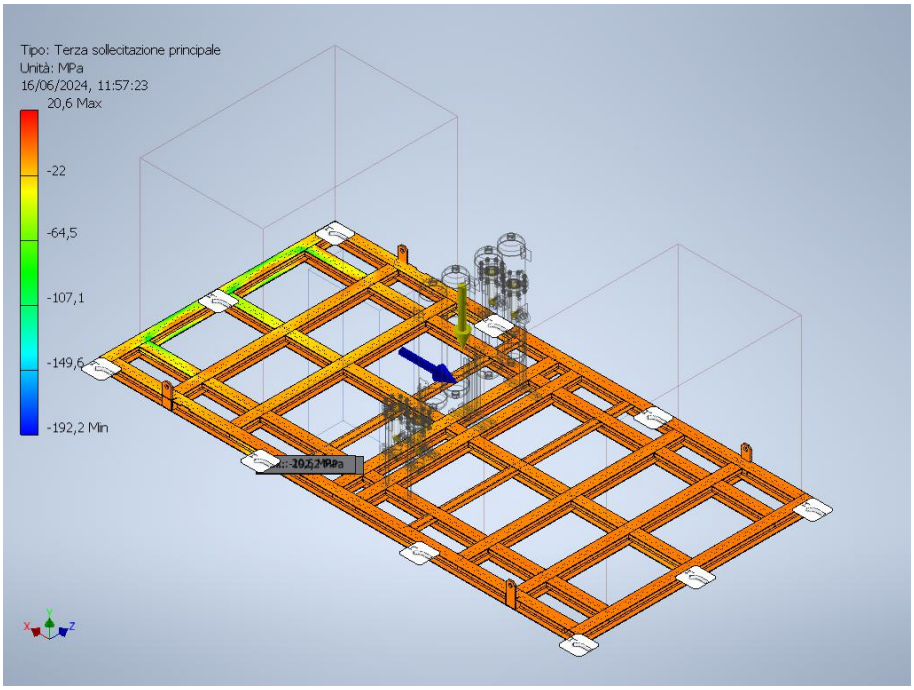


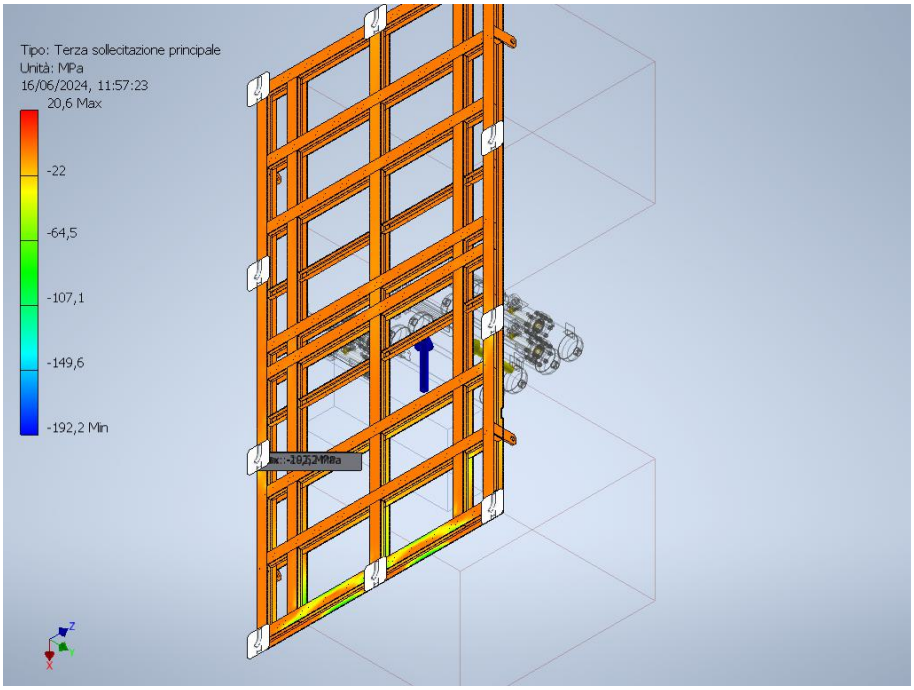
First principal stress



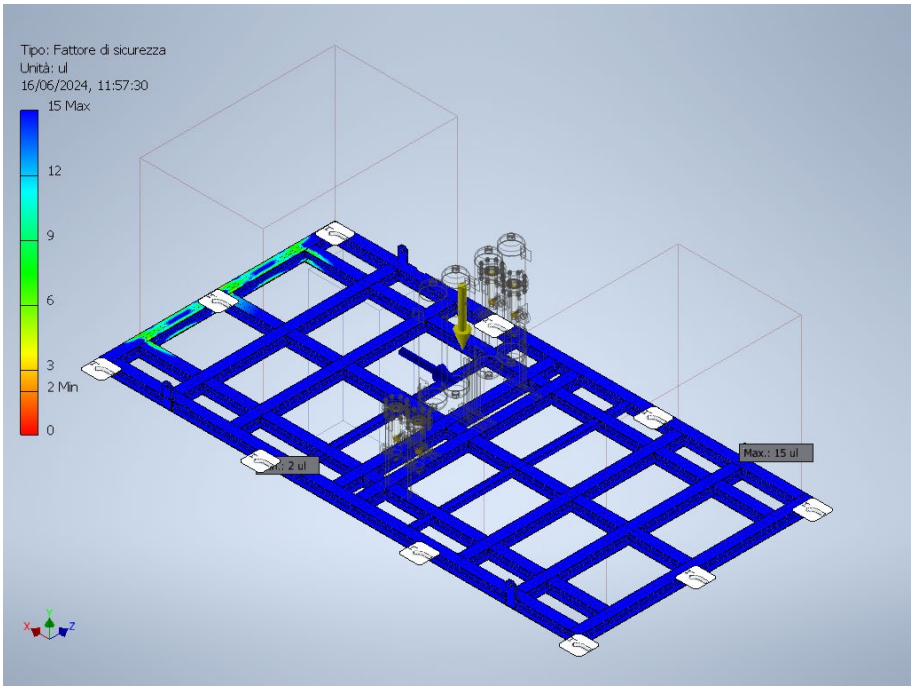


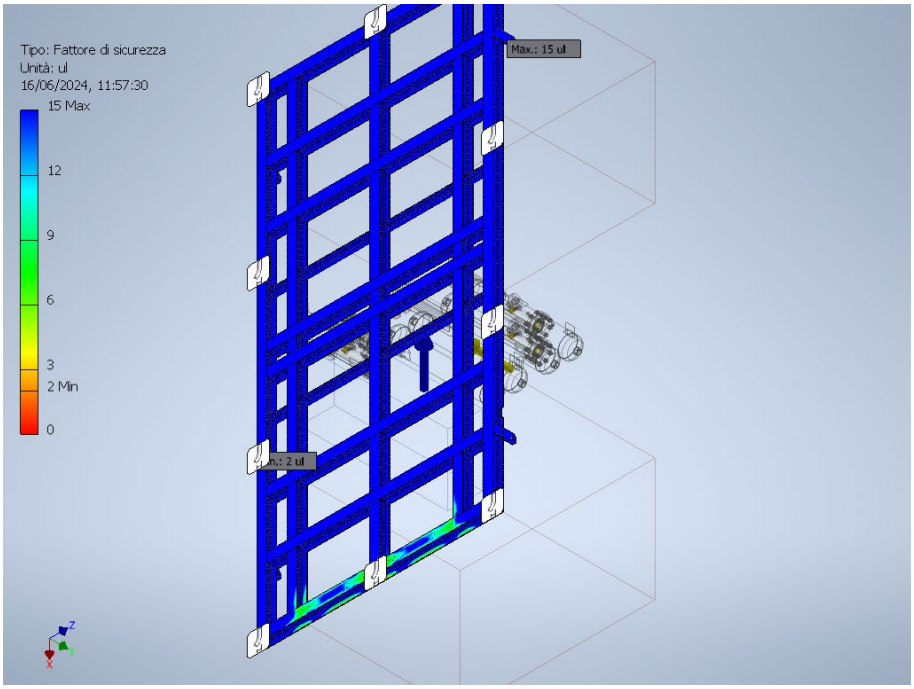
Third principal stress





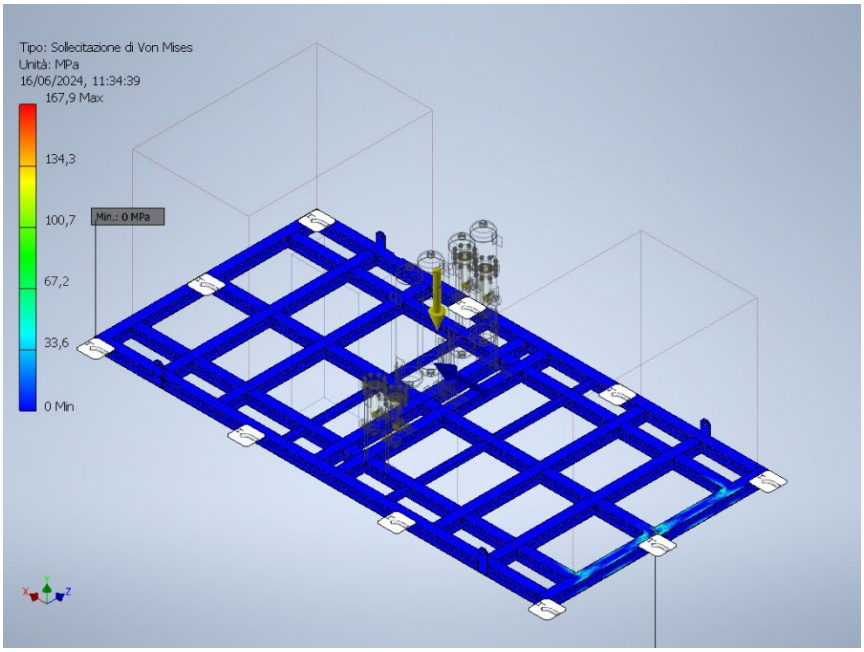
Safety factor

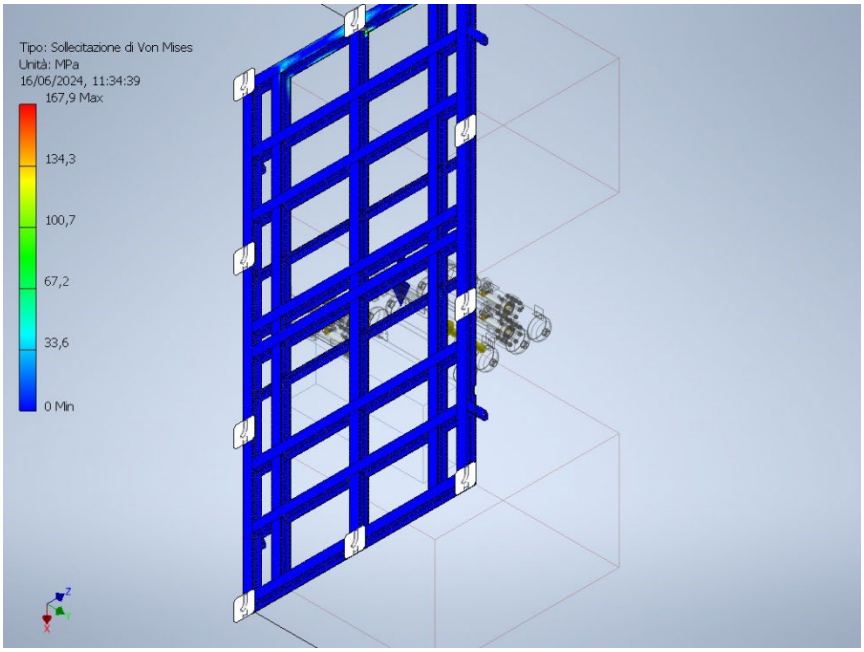




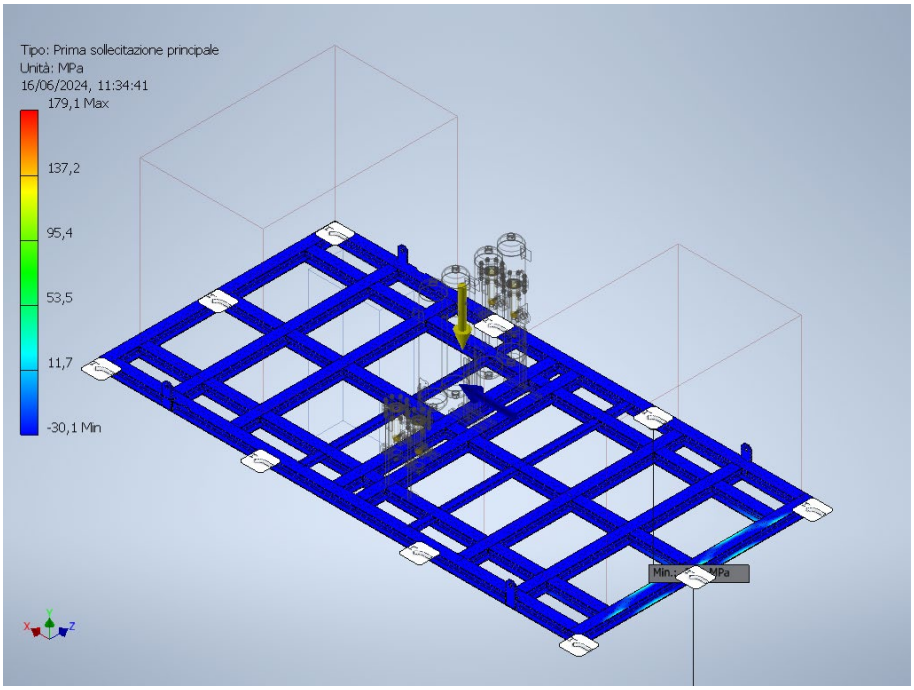
3.5.2 PERMANENT LOAD + WIND (X+ DIRECTION)

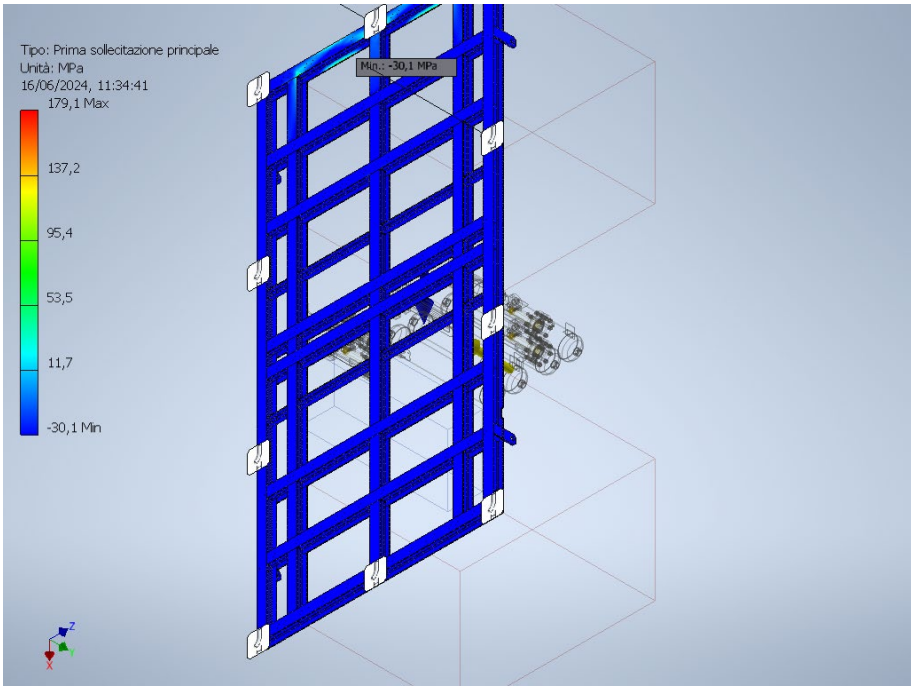
Von Mises stress



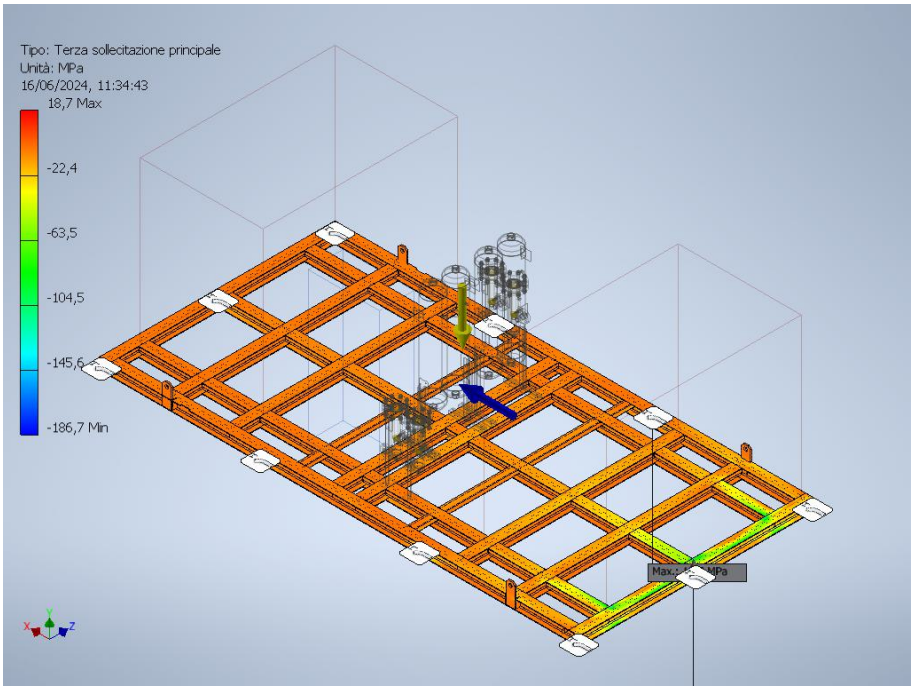


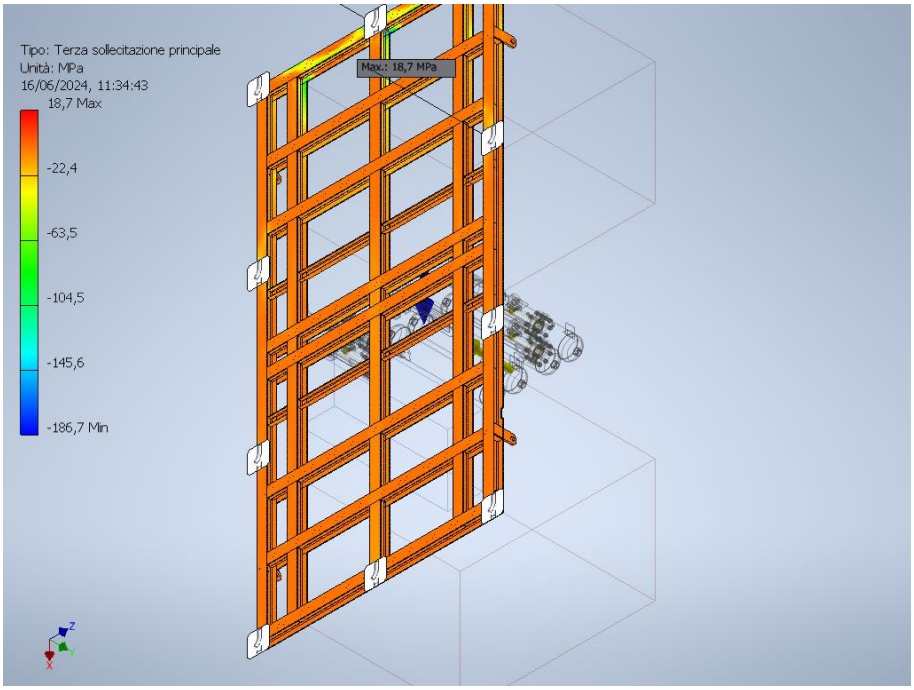
First principal stress



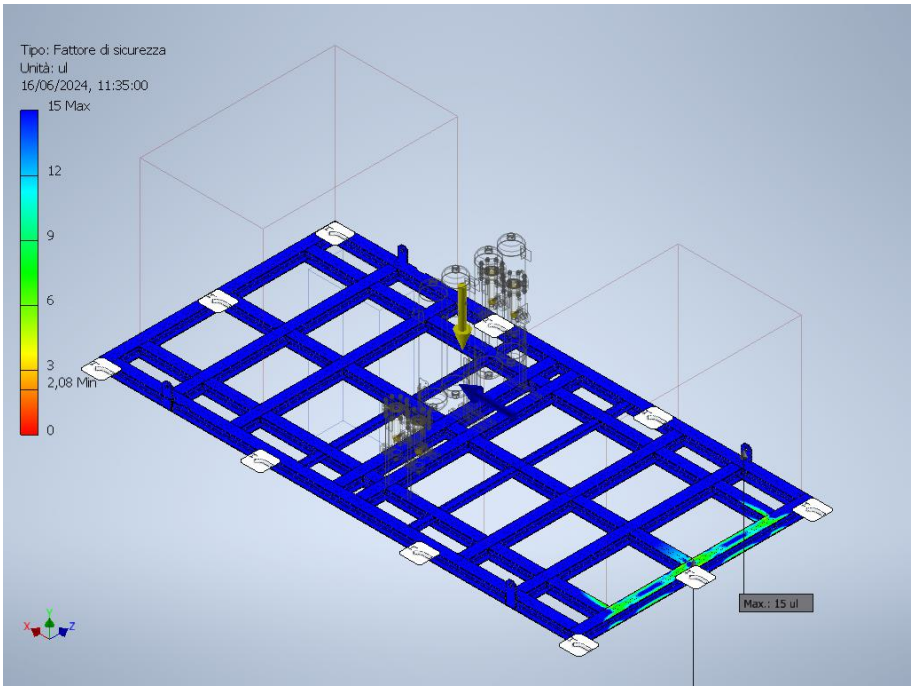


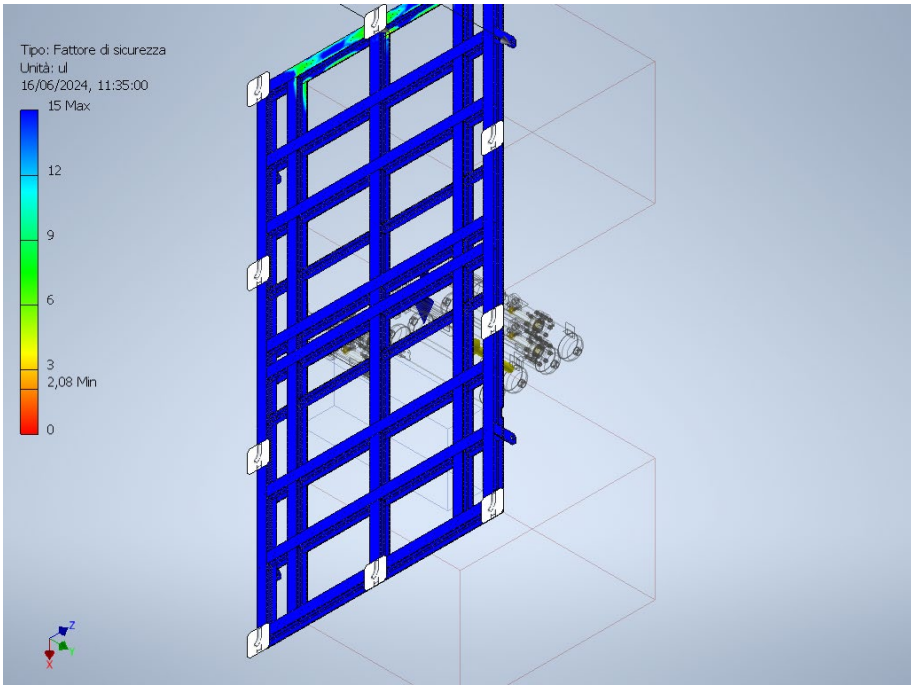
Third principal stress





Safety factor

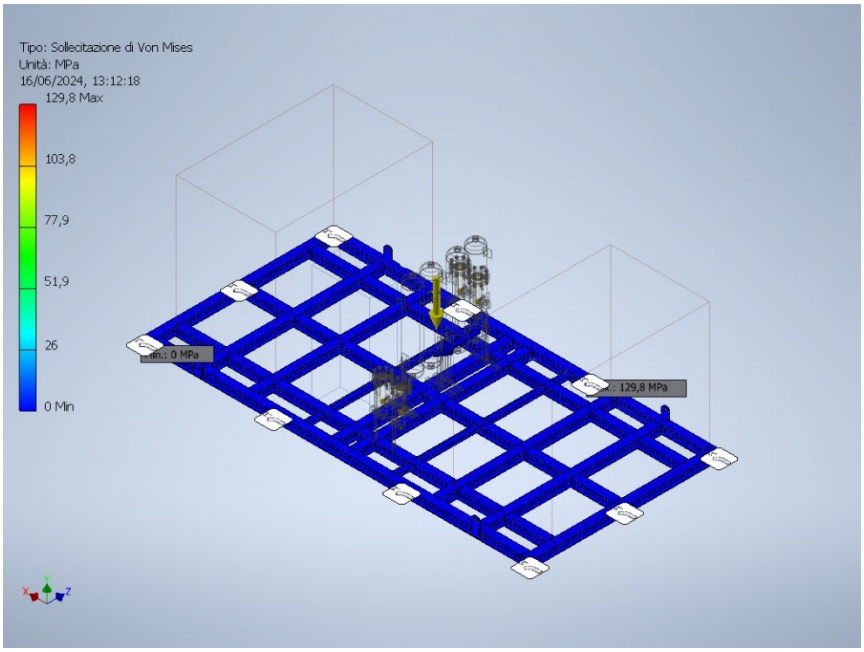


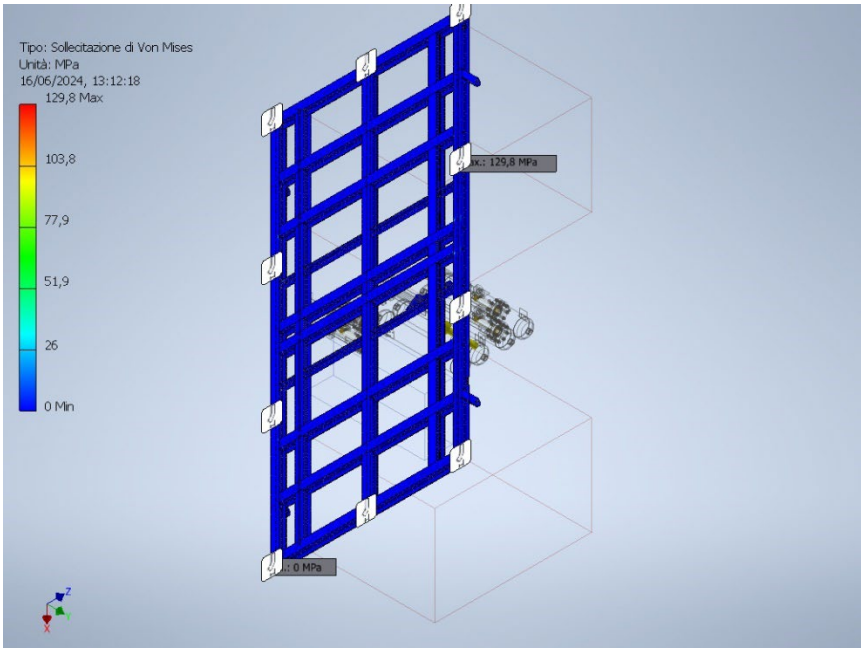


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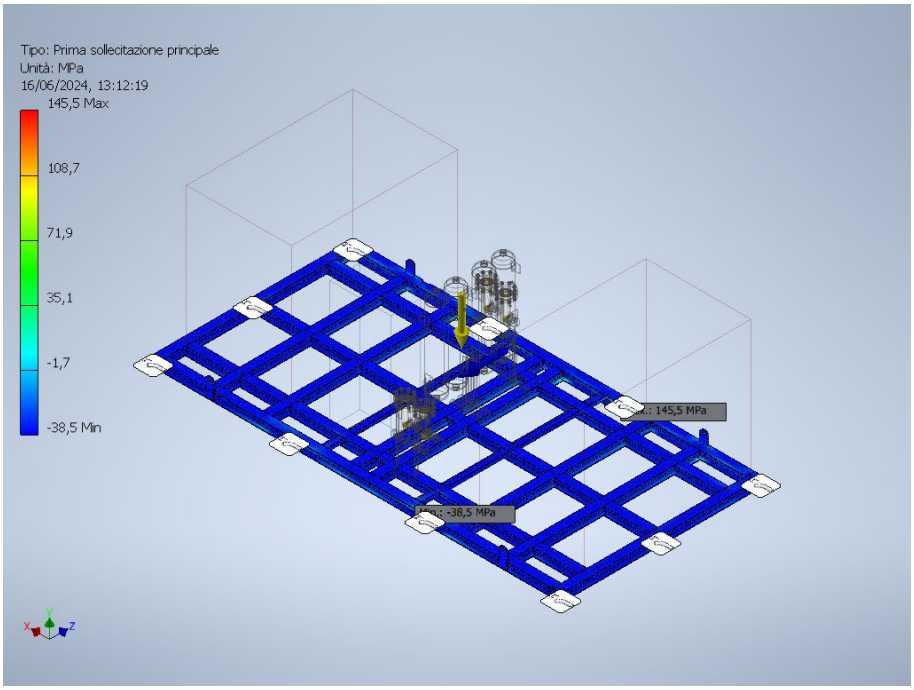
3.5.3 PERMANENT LOAD + WIND (Z- DIRECTION)

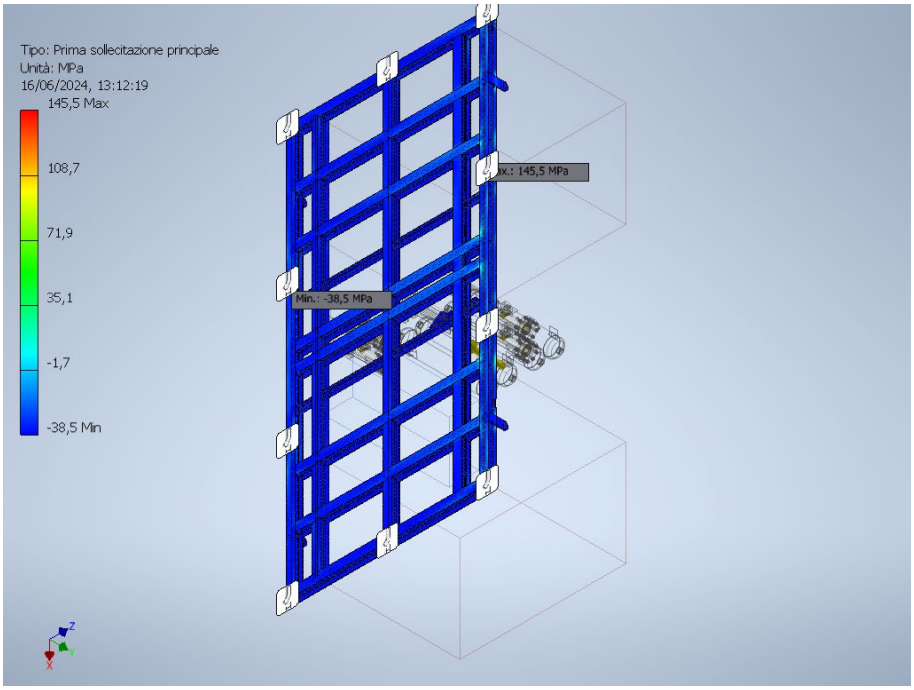
Von Mises stress



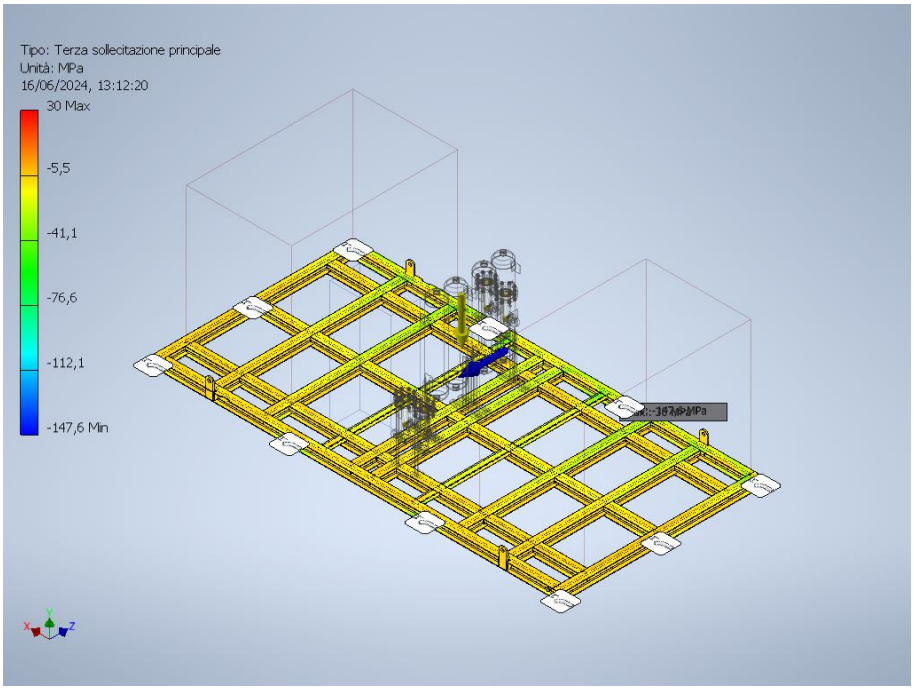


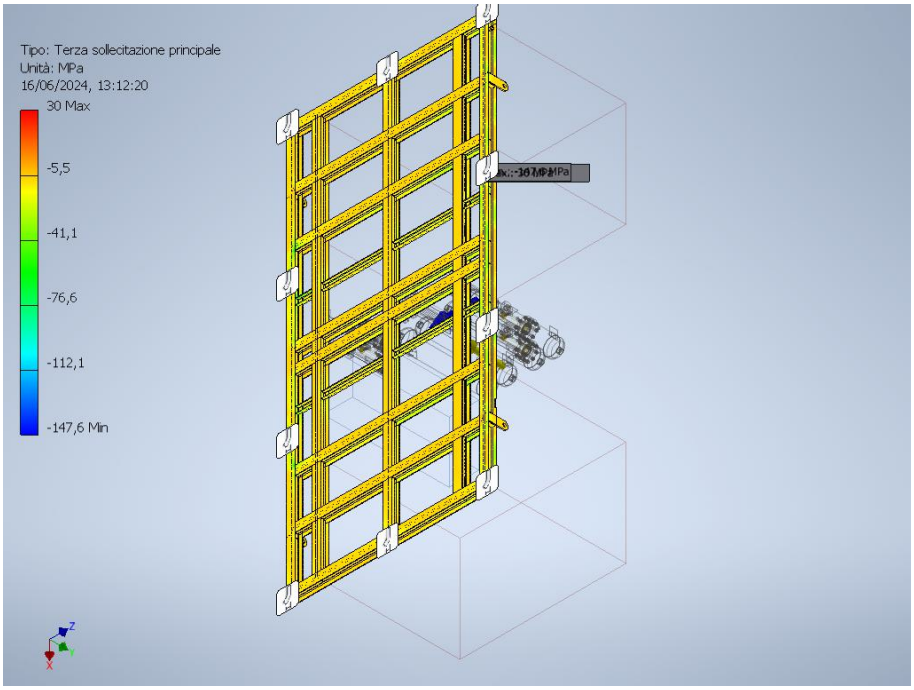
First principal stress



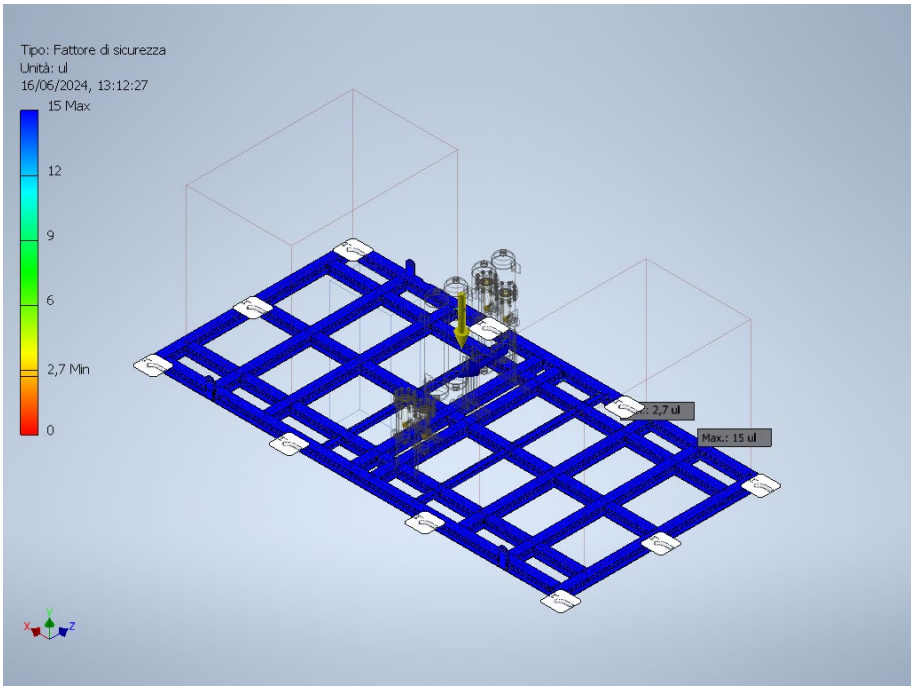


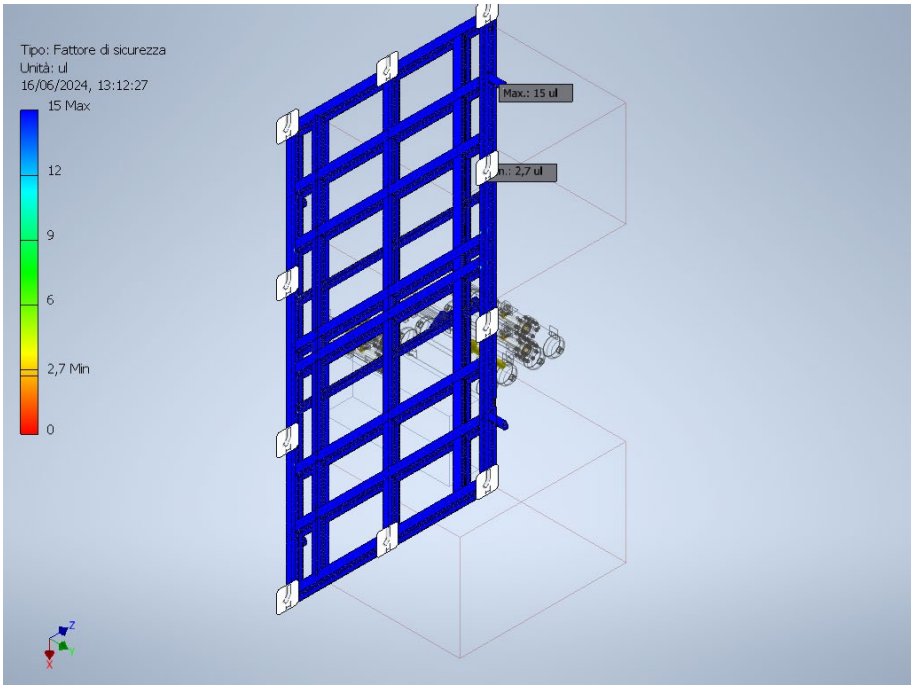
Third principal stress





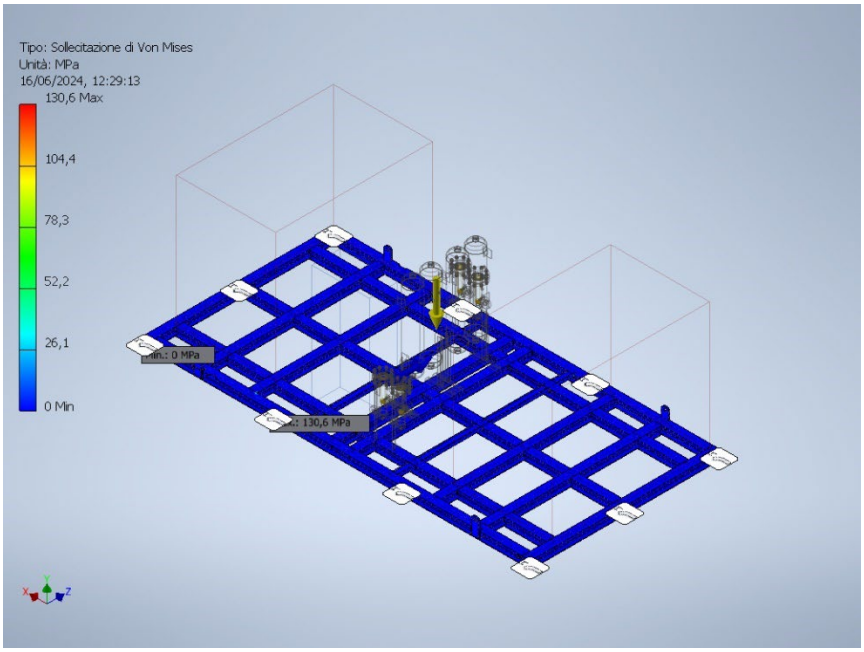
Safety factor

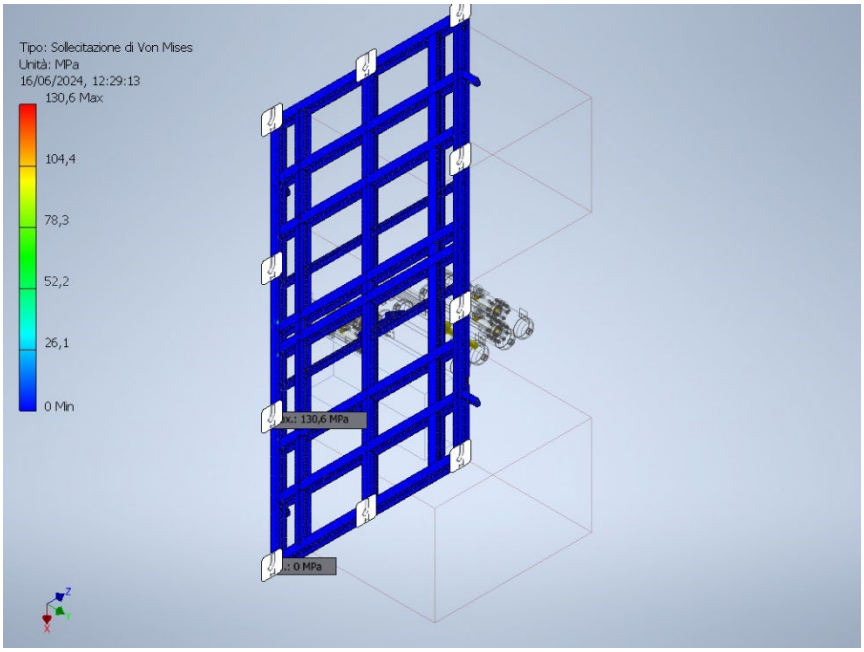




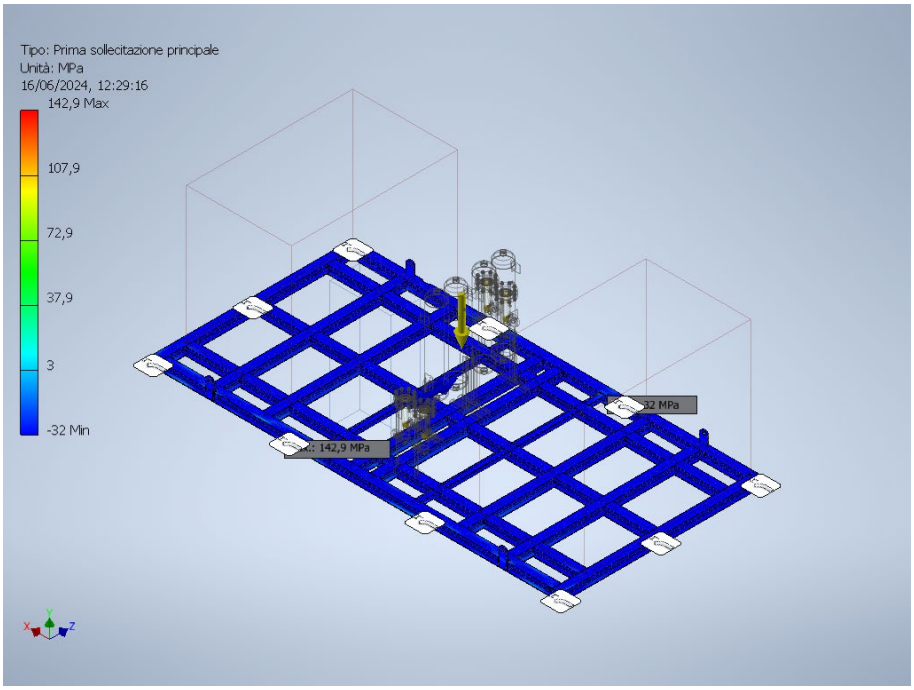
3.5.4 PERMANENT LOAD + WIND (Z+ DIRECTION)

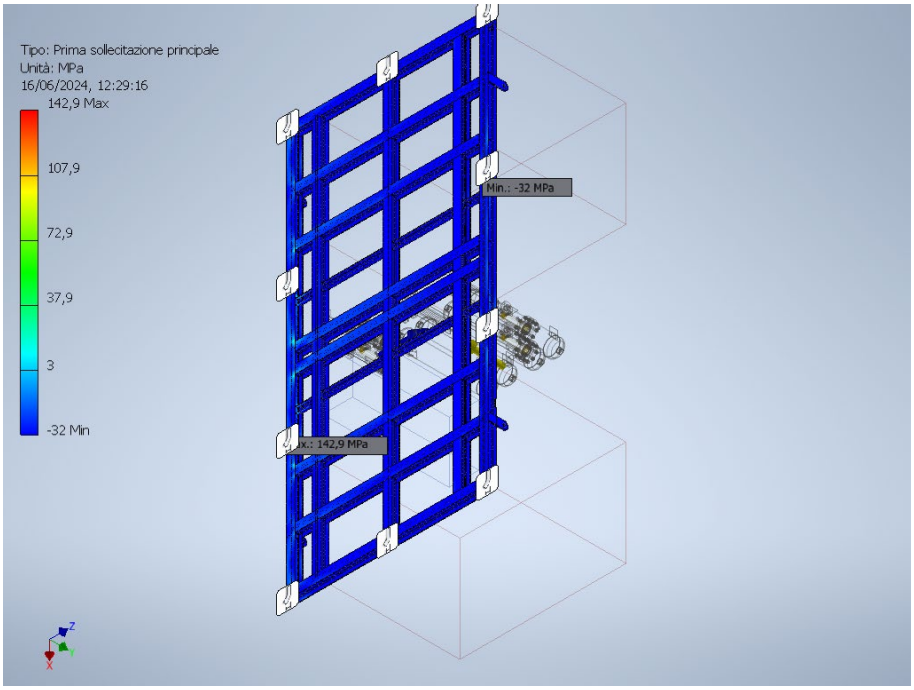
Von Mises stress





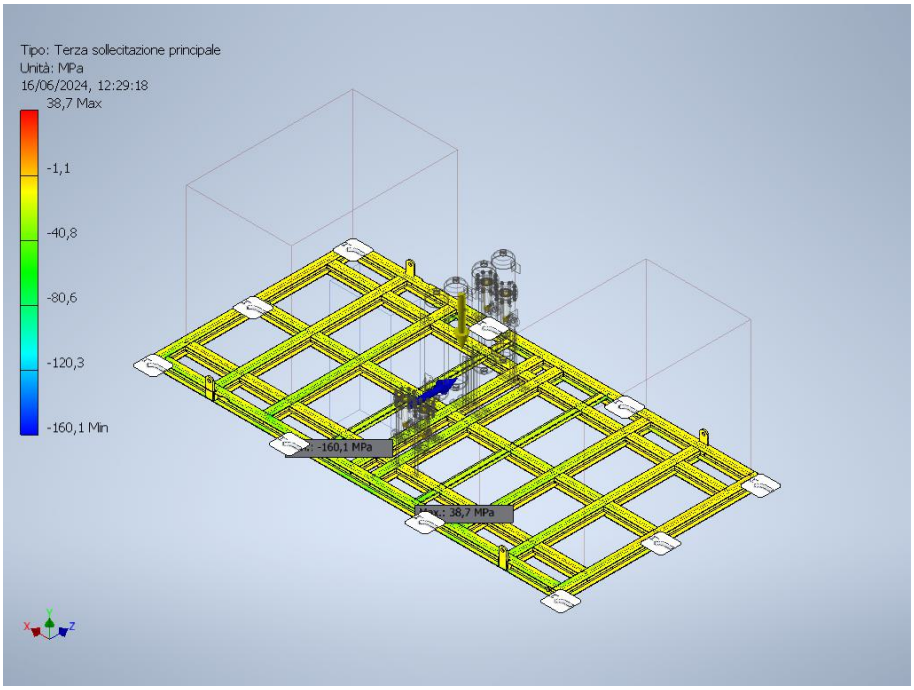
First principal stress

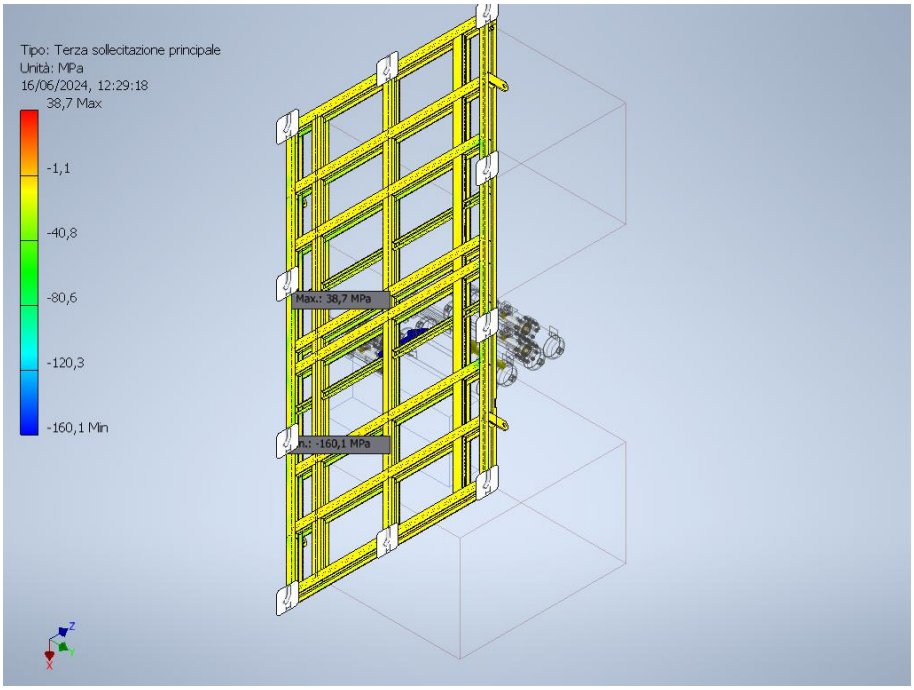




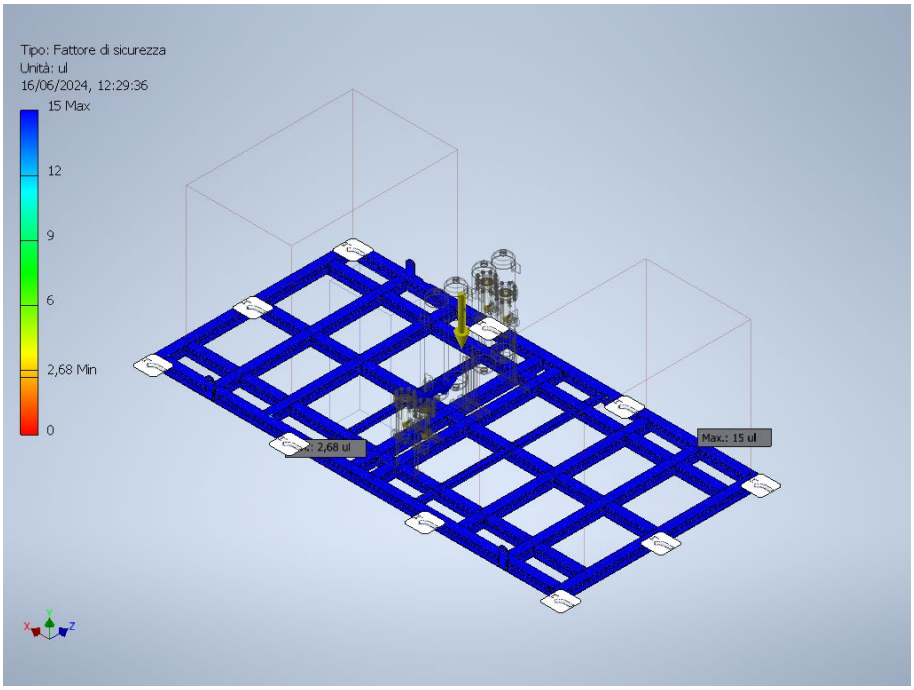
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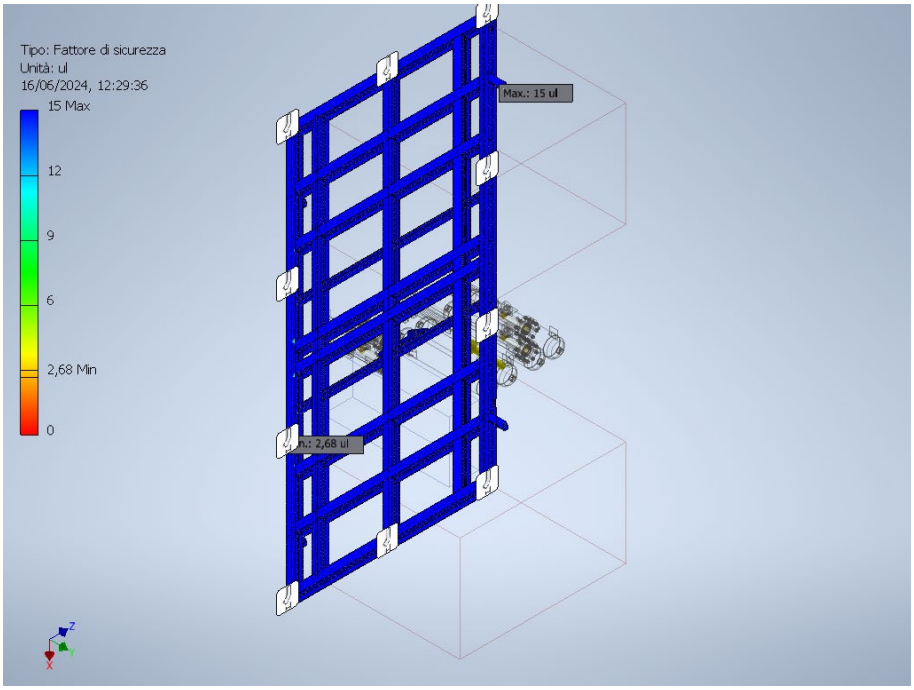
Third principal stress





Safety factor





3.6 TRANSPORTATION ANALYSIS

Transportation load has been considered as an horizontal acceleration equal to 0.7g.

The transportation load has been combined with the action of wind as calculated in the previous section. Calculation cases are:

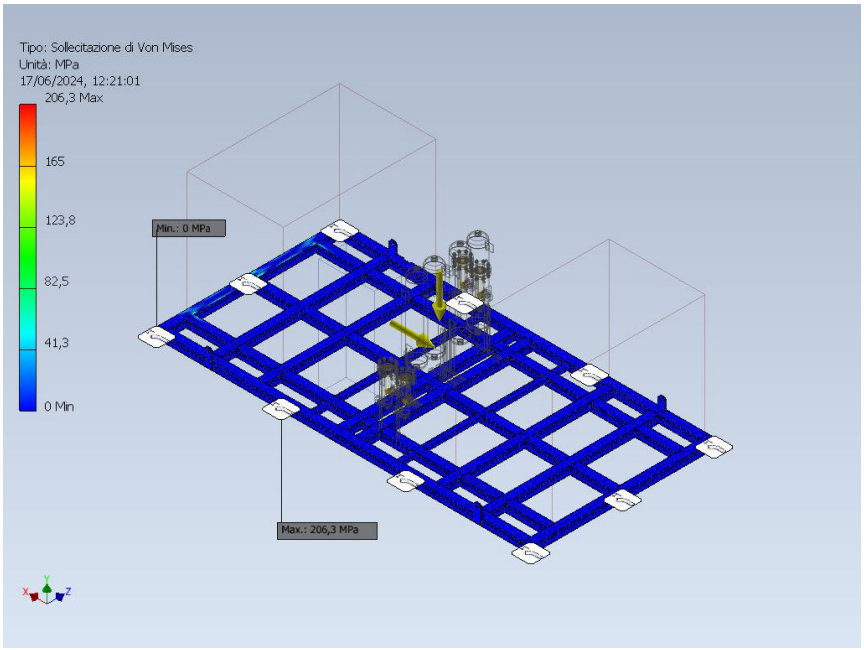
- Transportation load + Wind action along X- direction
- Transportation load + Wind action along X+ direction
- Transportation load + Wind action along Z- direction
- Transportation load + Wind action along Z+ direction

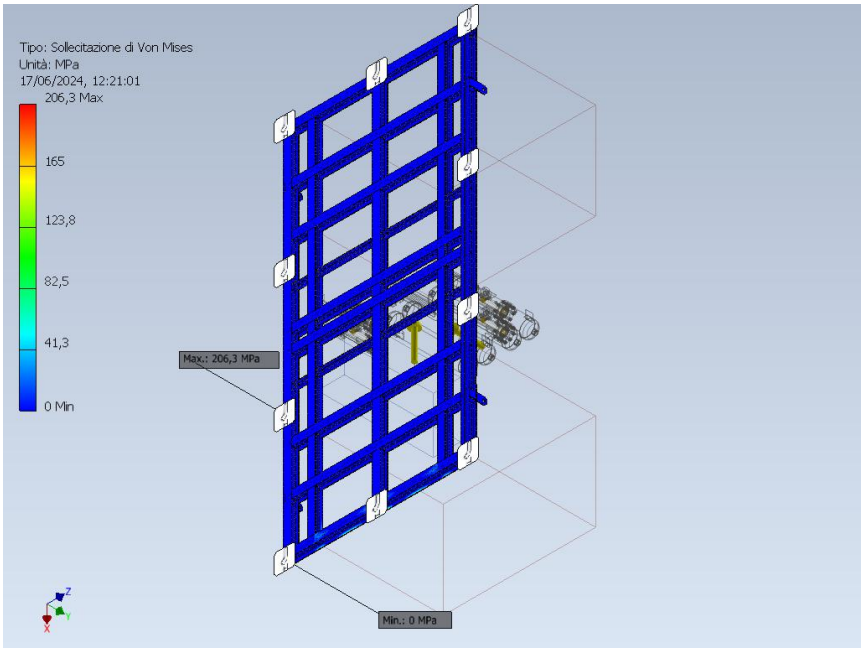
To be more conservative, transportation load and wind actions have been considered acting in the same direction for each calculation case.

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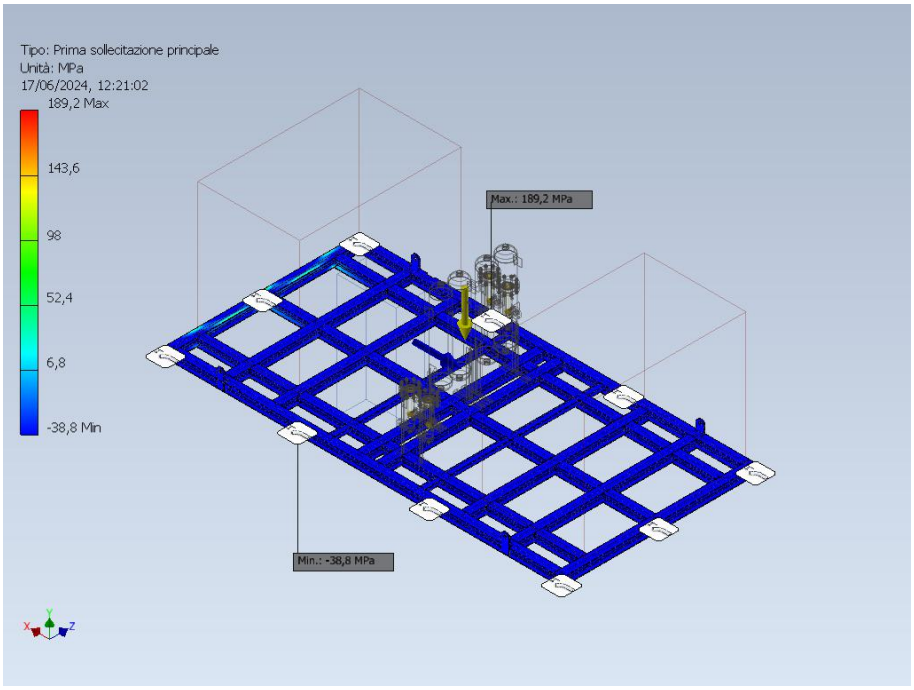
3.6.1 TRANSPORTATION LOAD + WIND (X- DIRECTION)

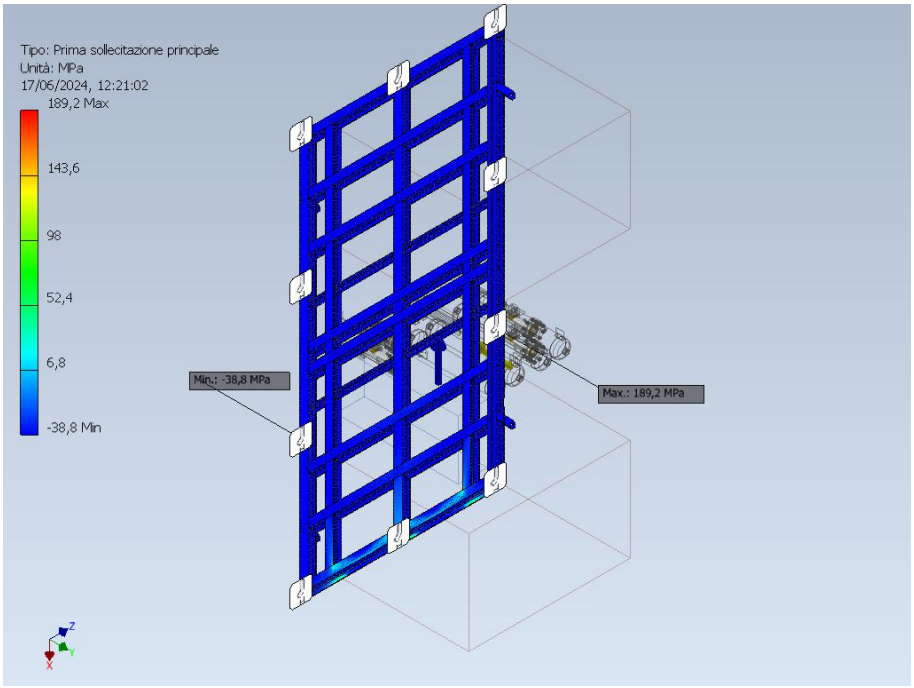
Von Mises stress



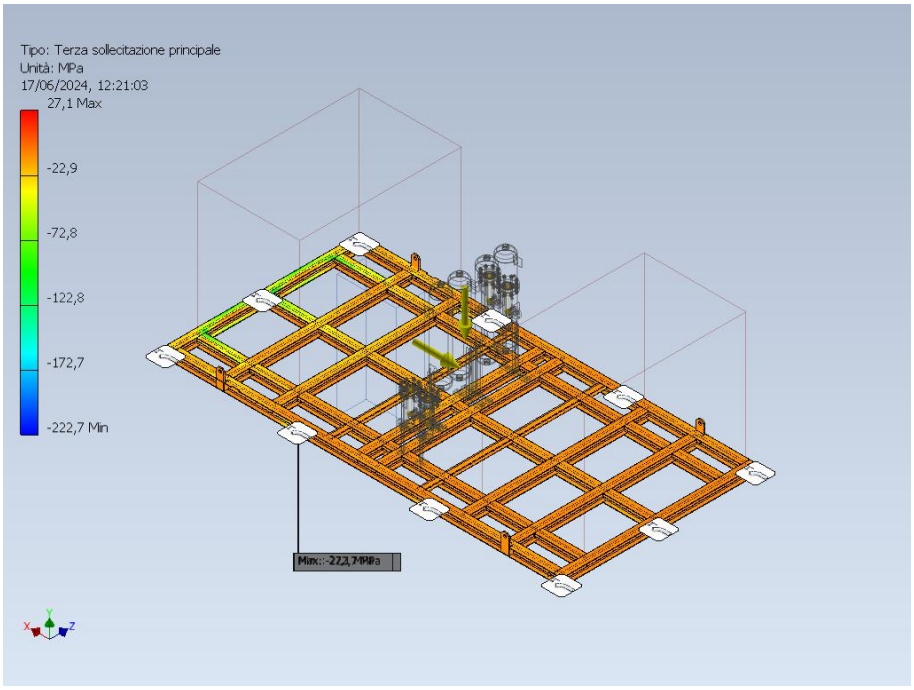


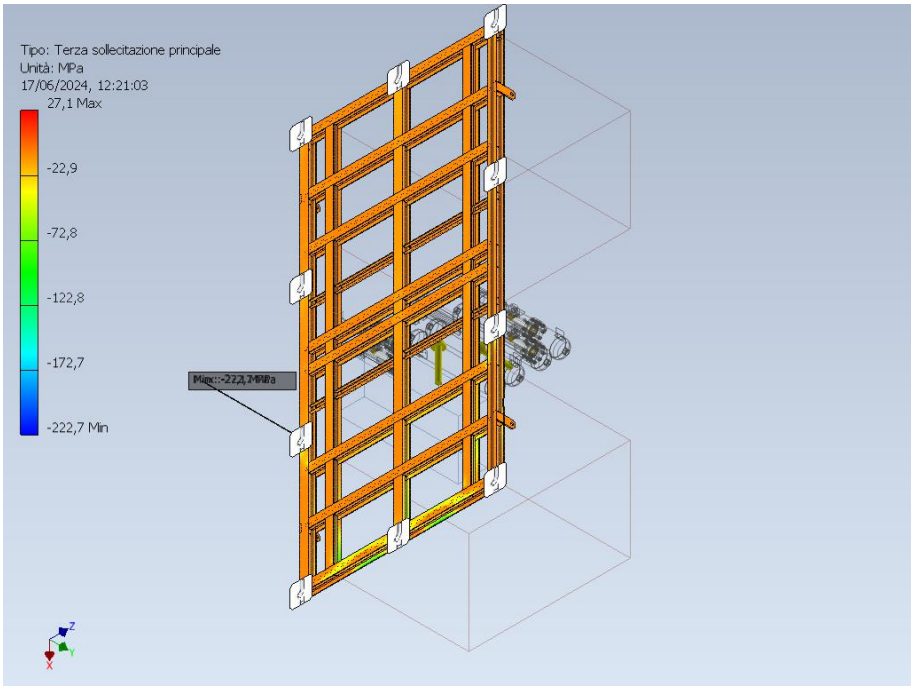
First principal stress



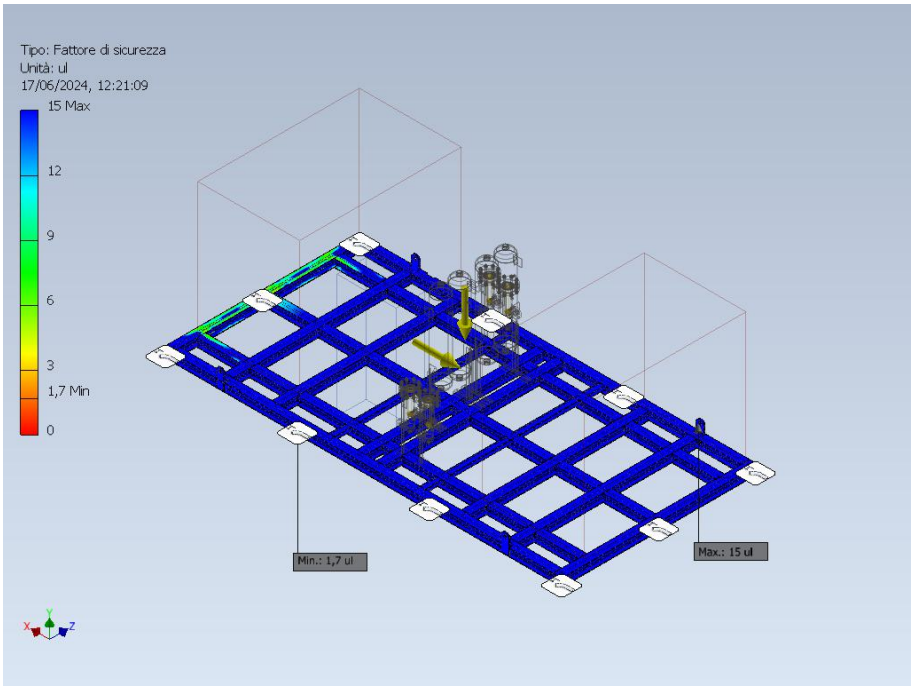


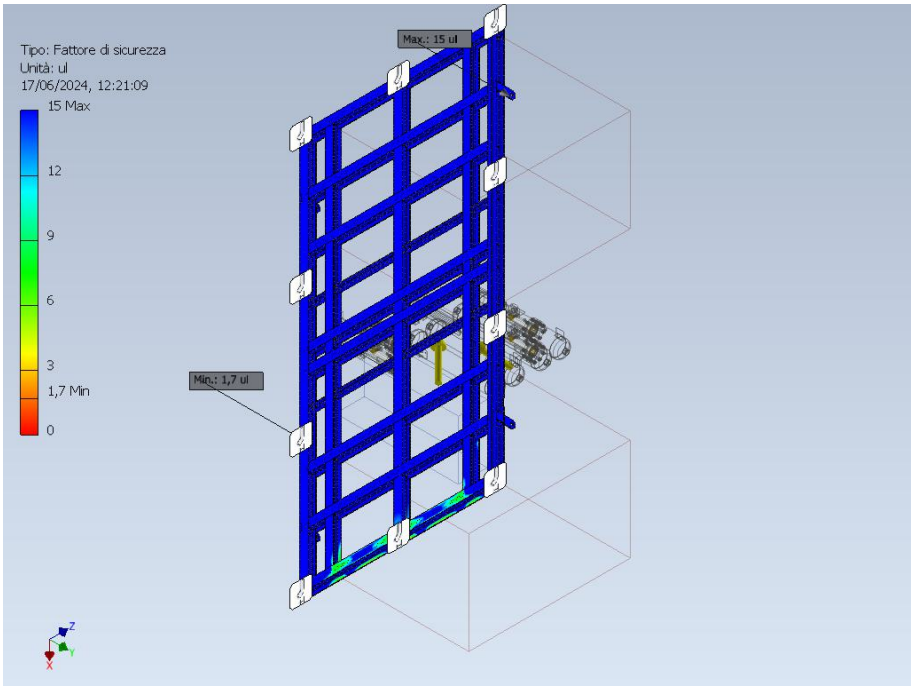
Third principal stress





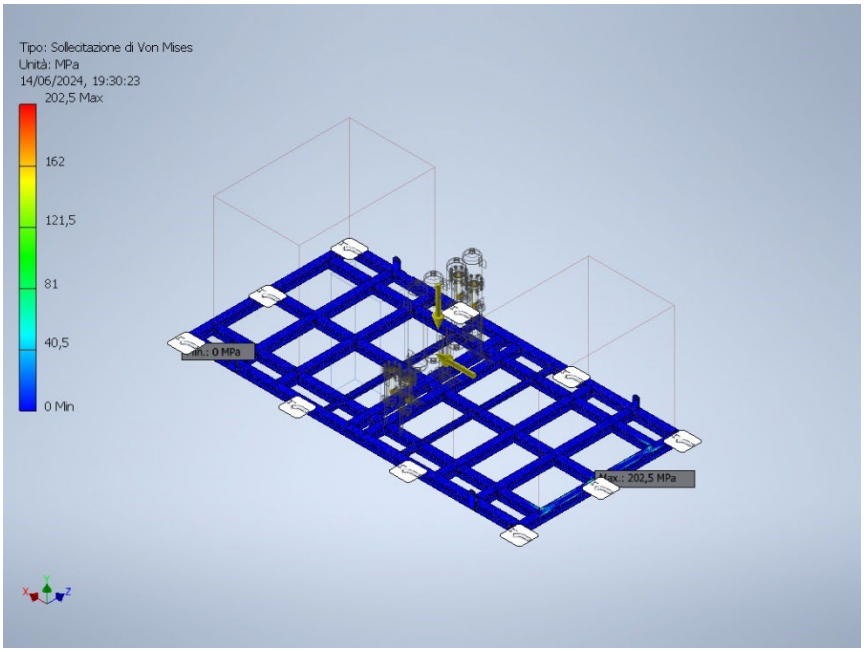
Safety factor

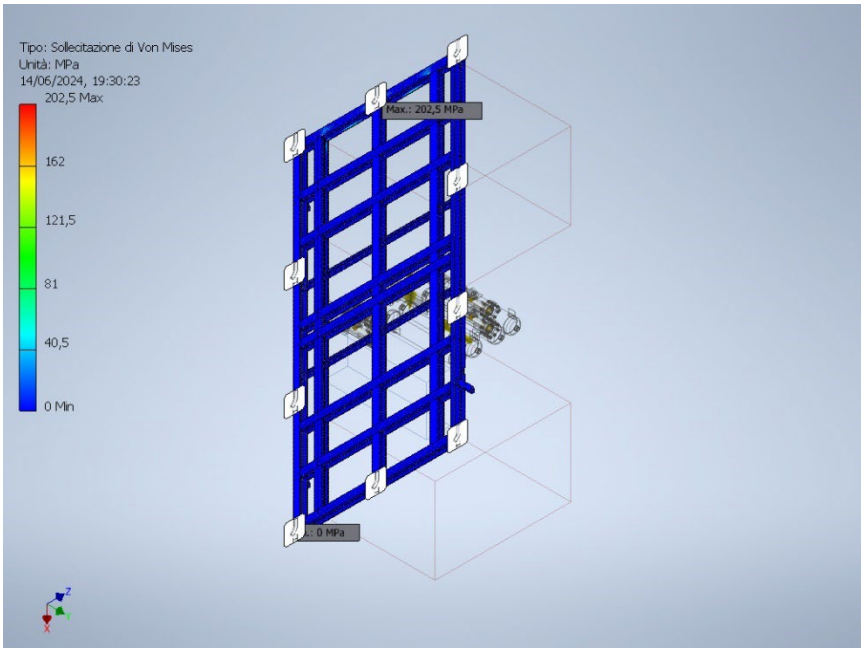




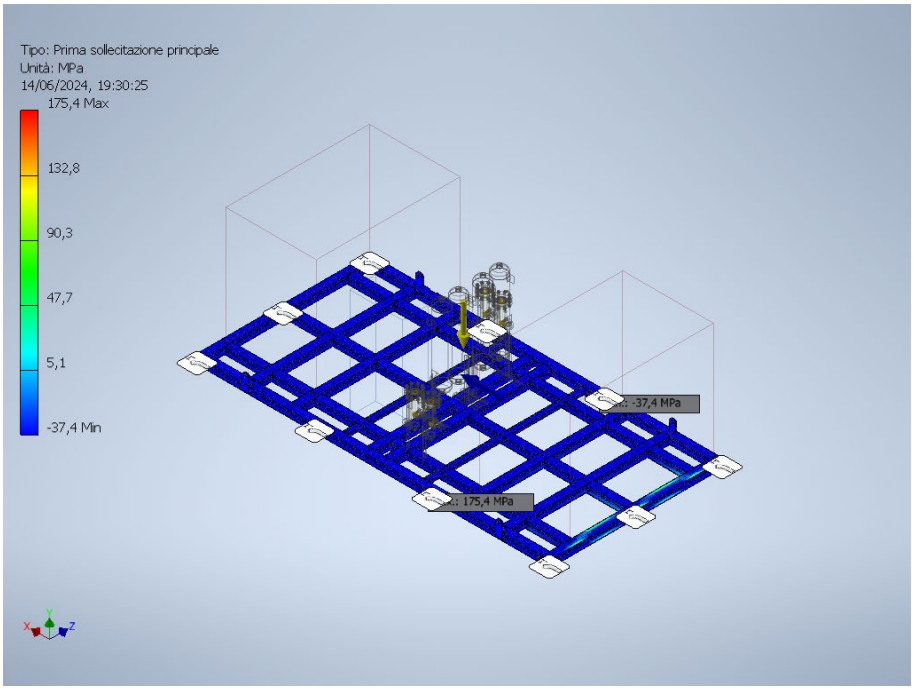
3.6.2 TRANSPORTATION LOAD + WIND (X+ DIRECTION)

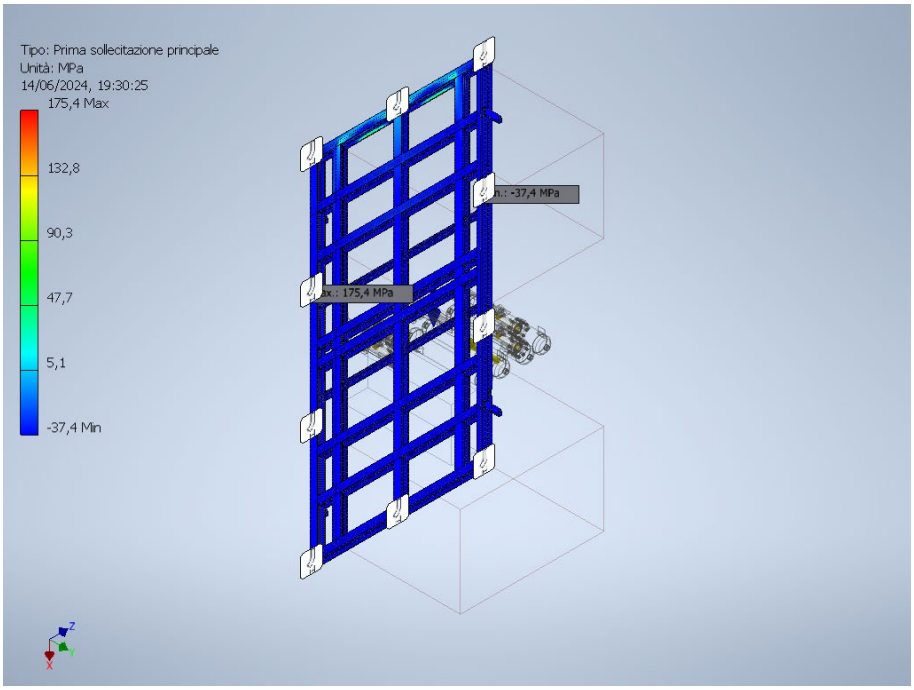
Von Mises stress



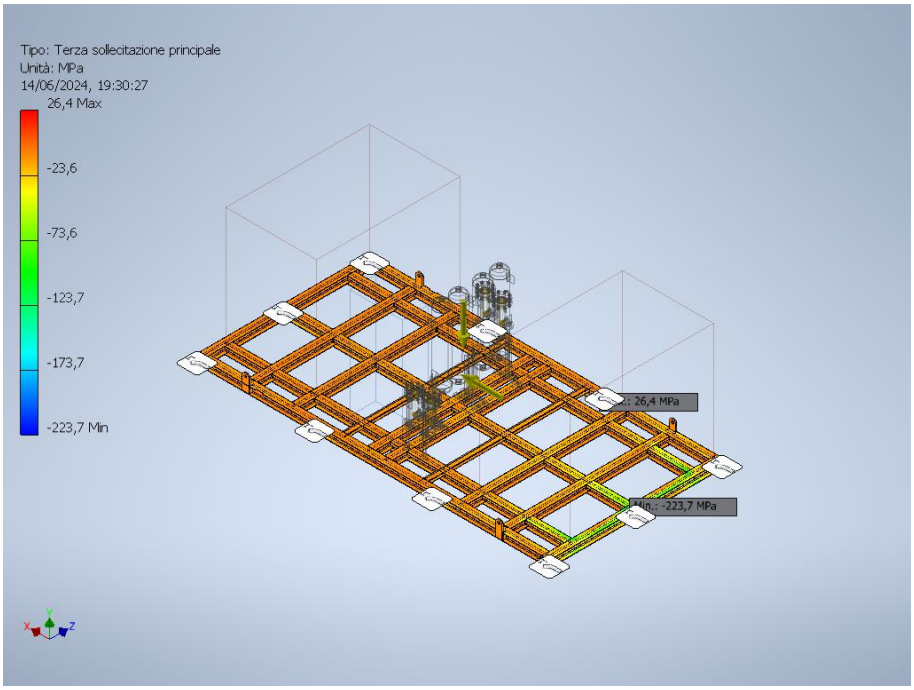


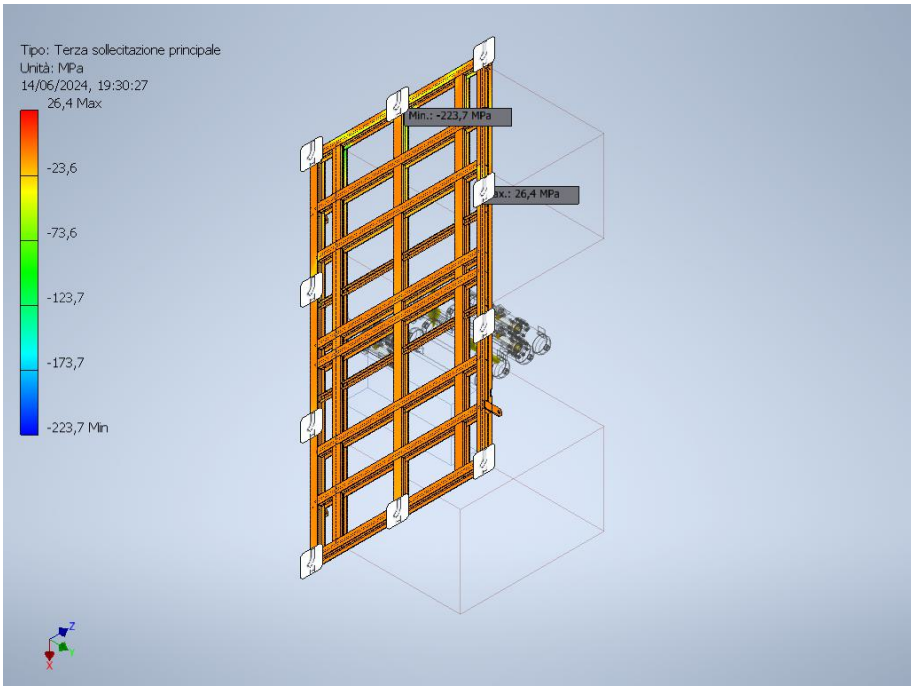
First principal stress



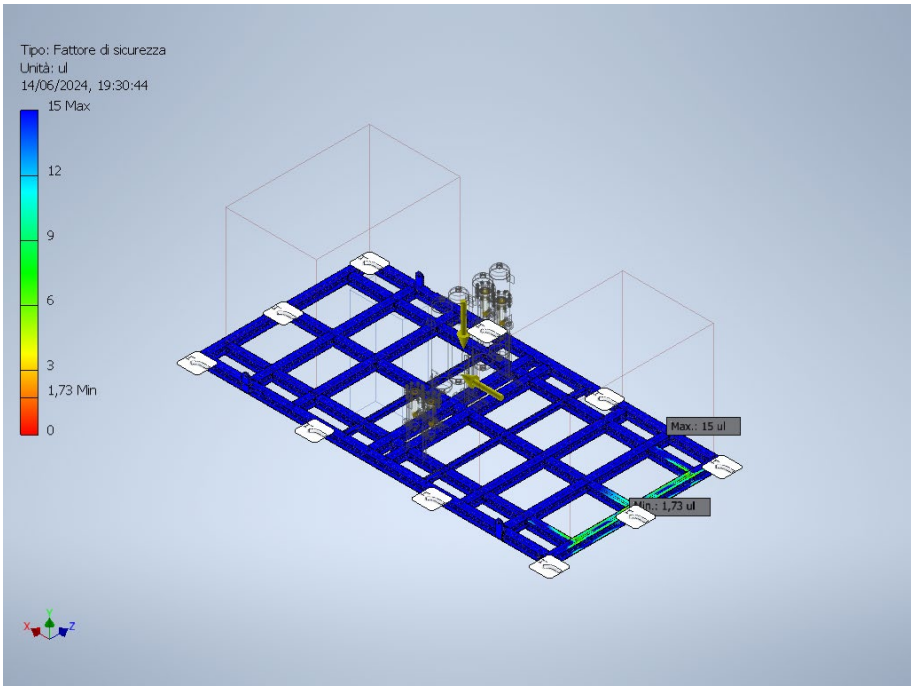


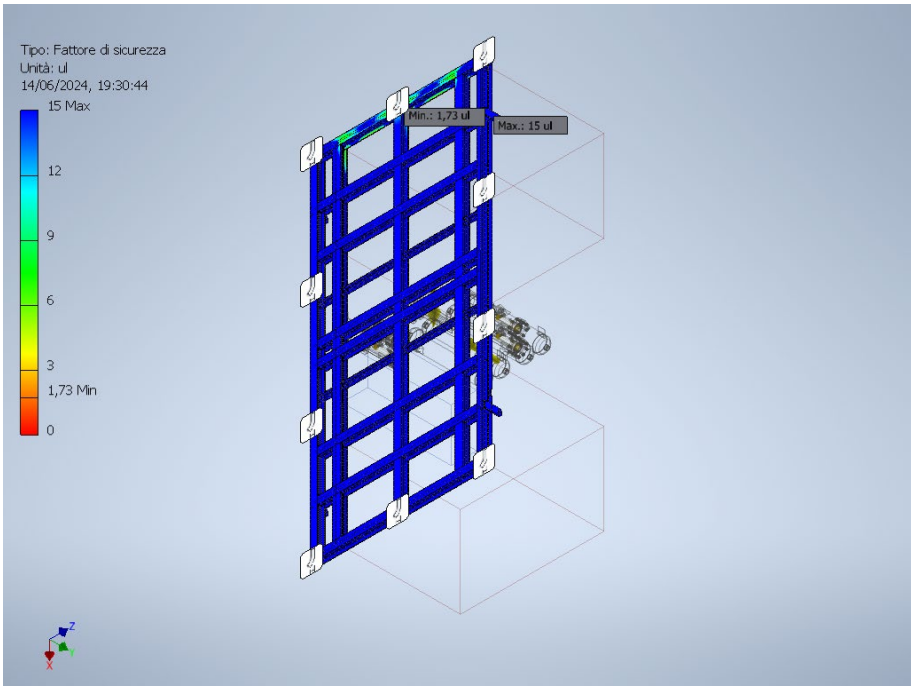
Third principal stress





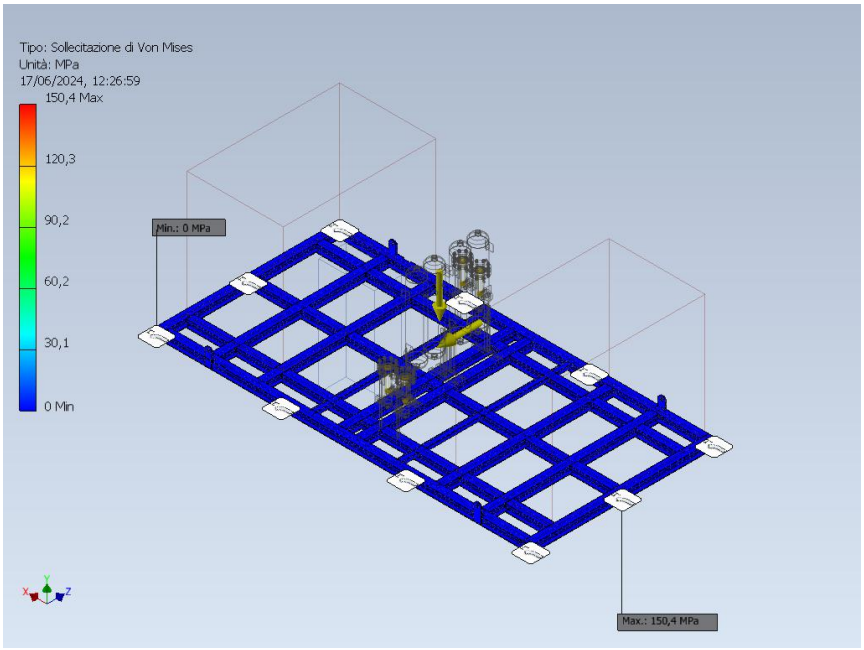
Safety factor

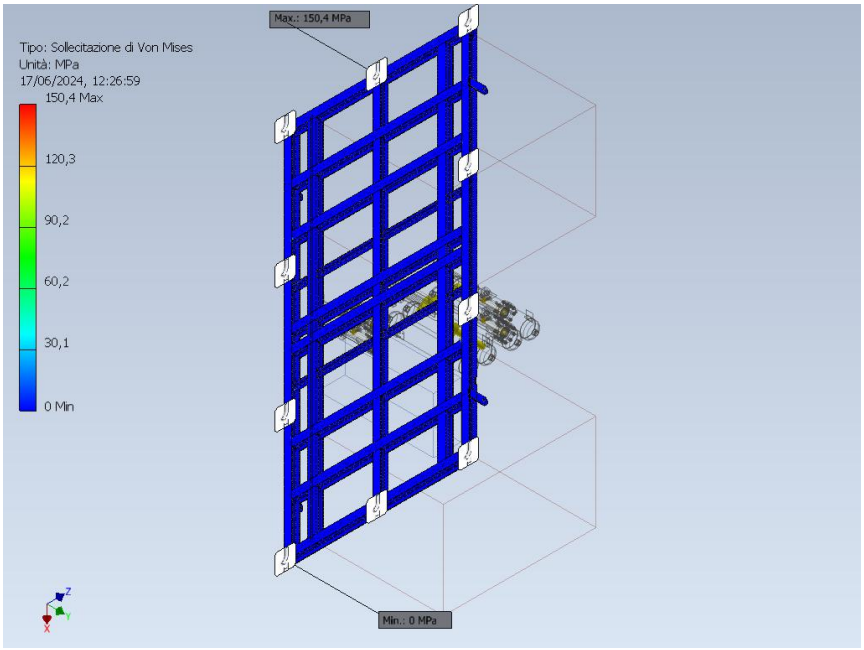




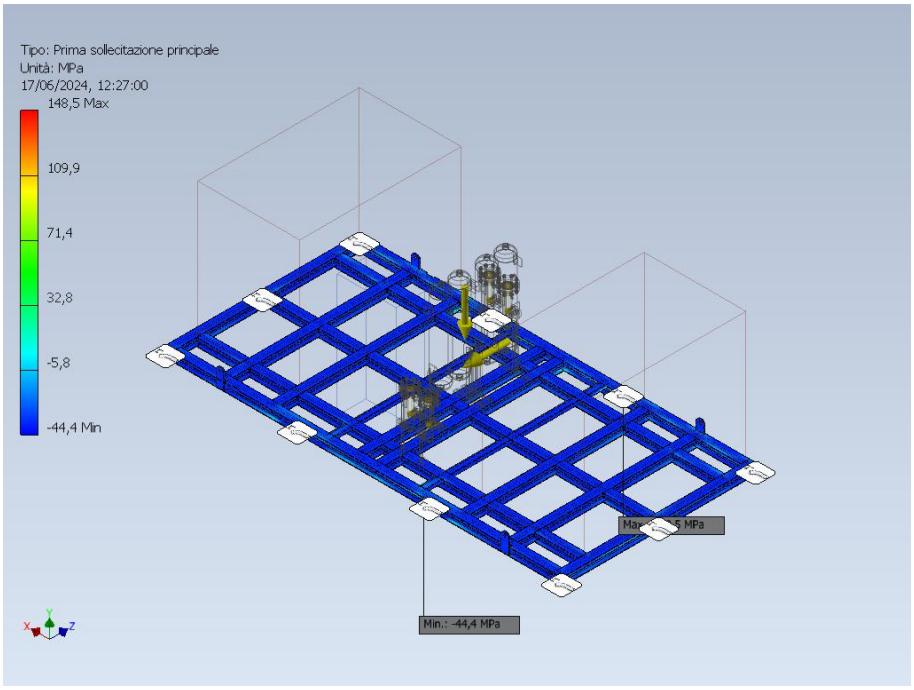
3.6.3 TRANSPORTATION LOAD + WIND (Z- DIRECTION)

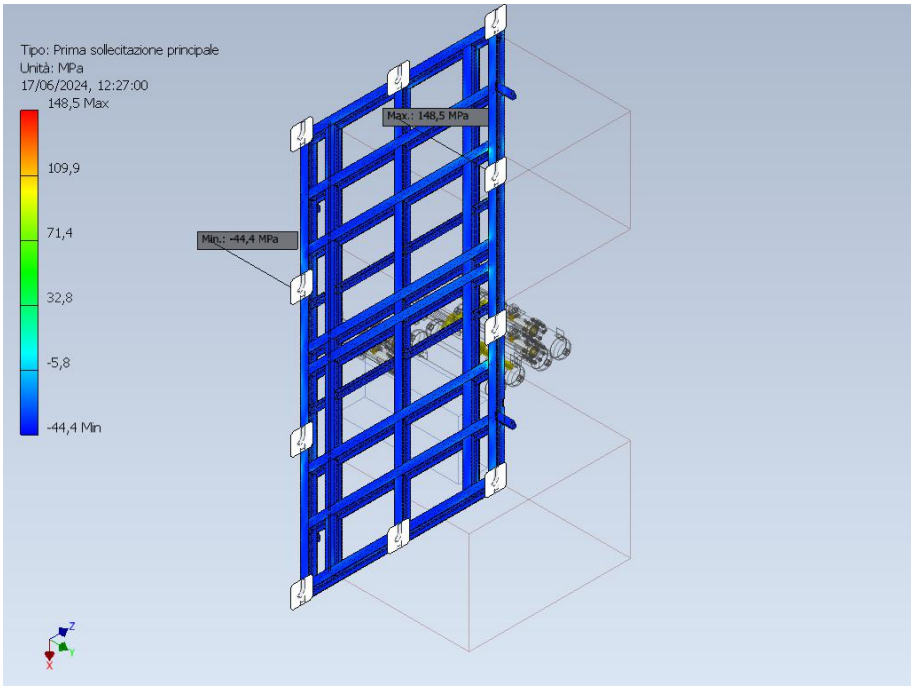
Von Mises stress



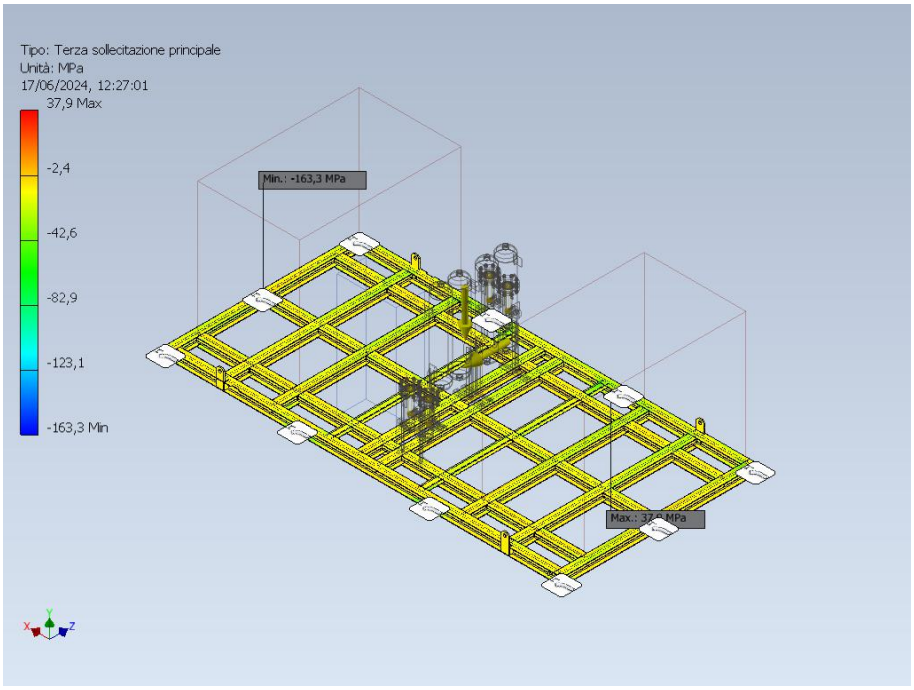


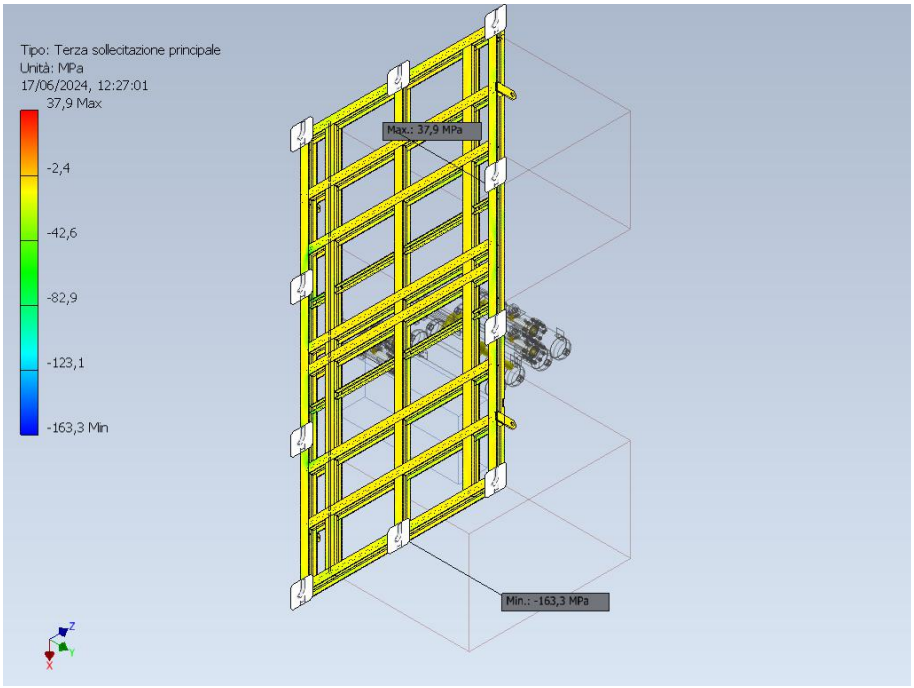
First principal stress



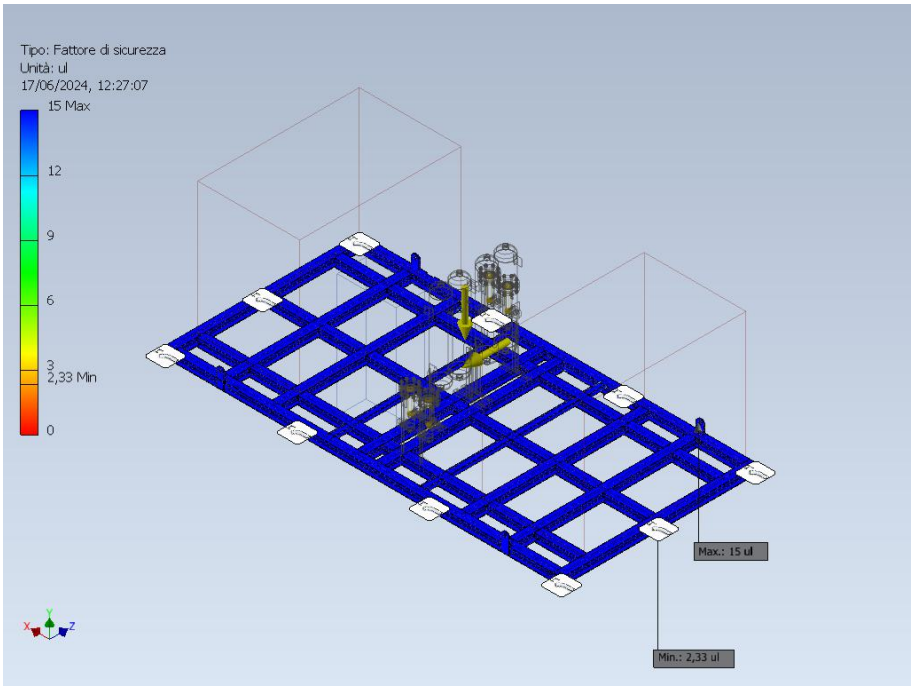


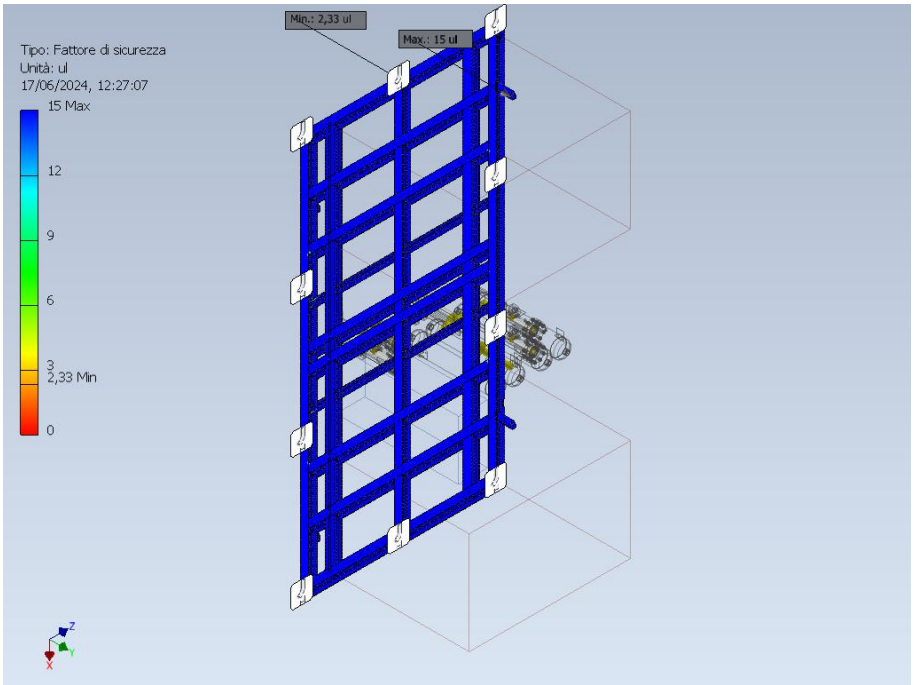
Third principal stress





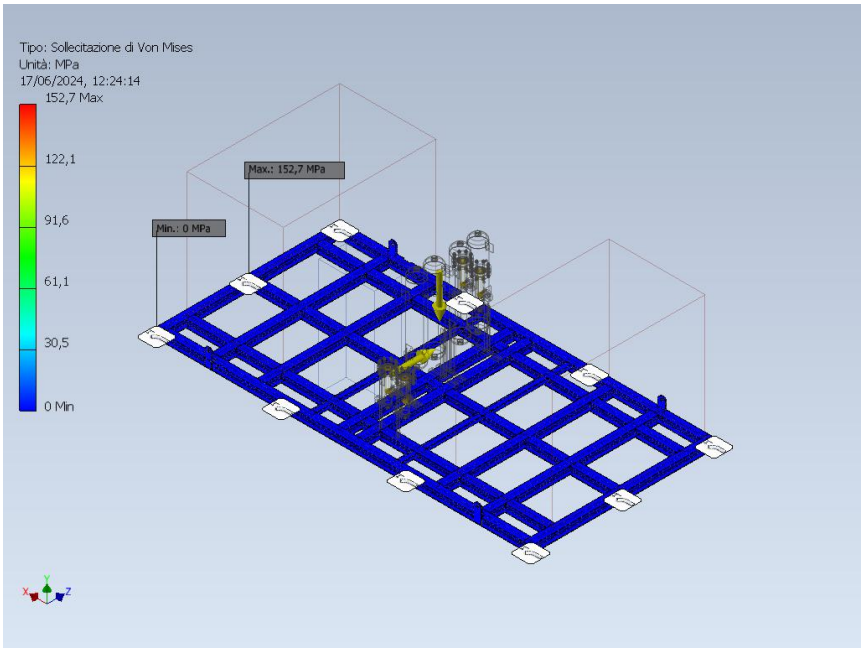
Safety factor

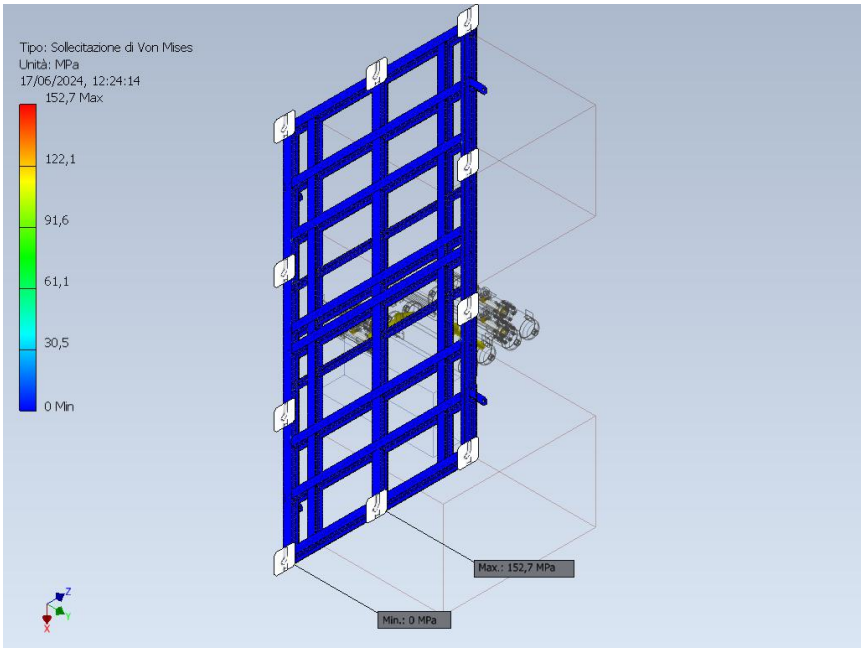




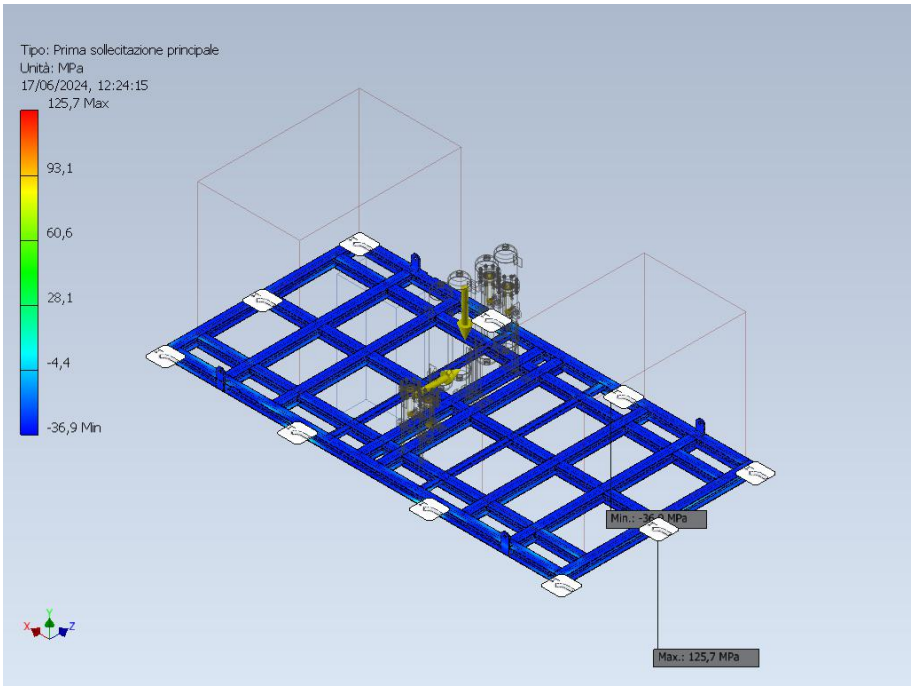
3.6.4 TRANSPORTATION LOAD + WIND (Z+ DIRECTION)

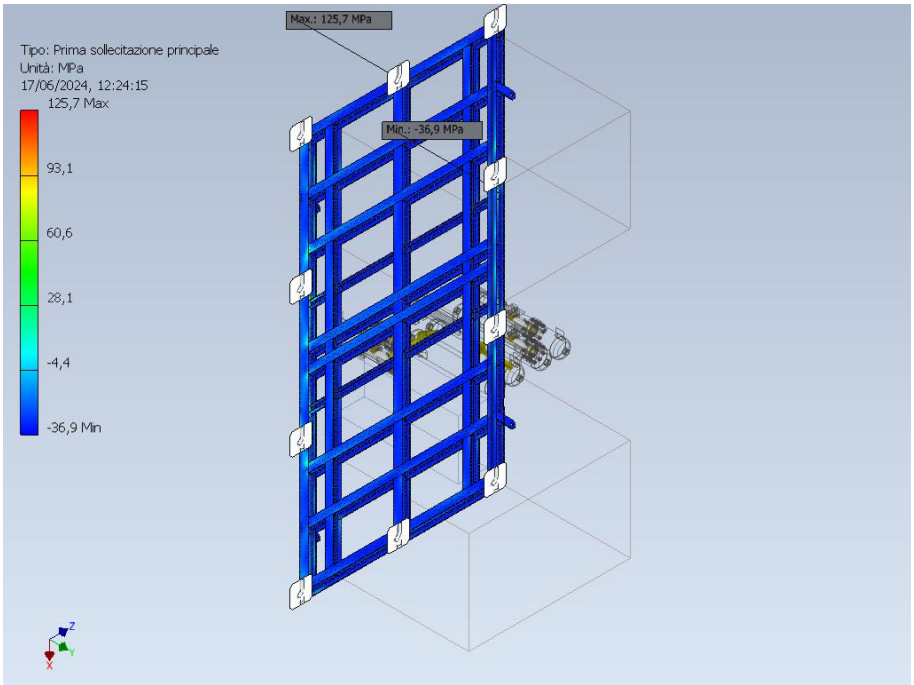
Von Mises stress



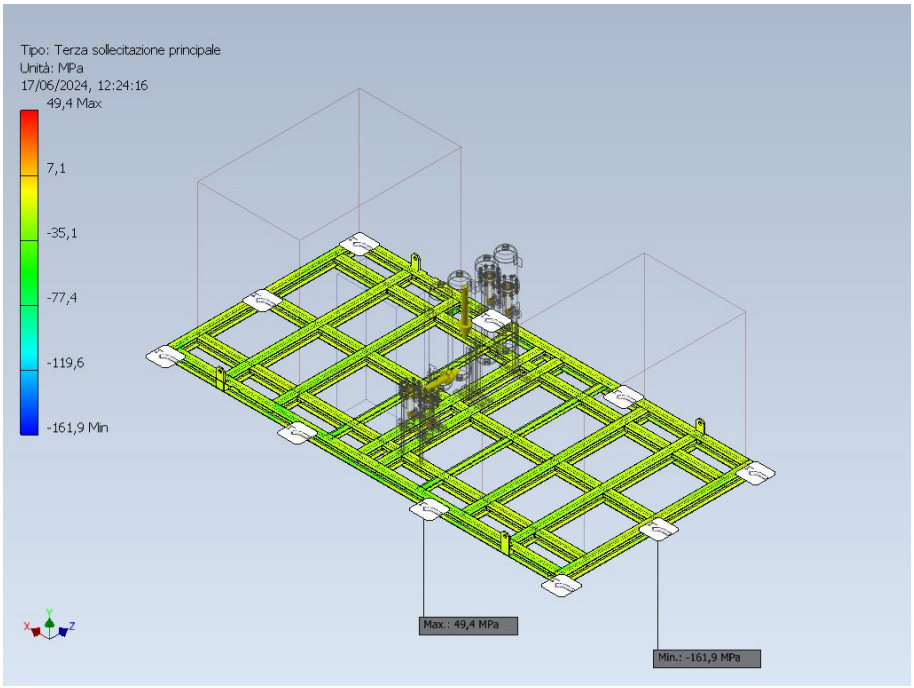


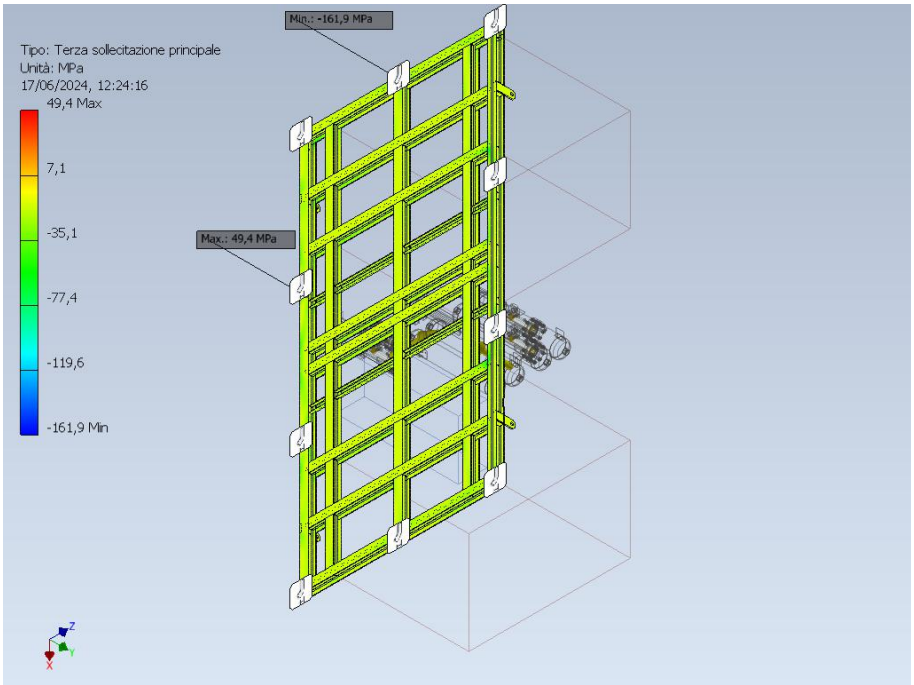
First principal stress



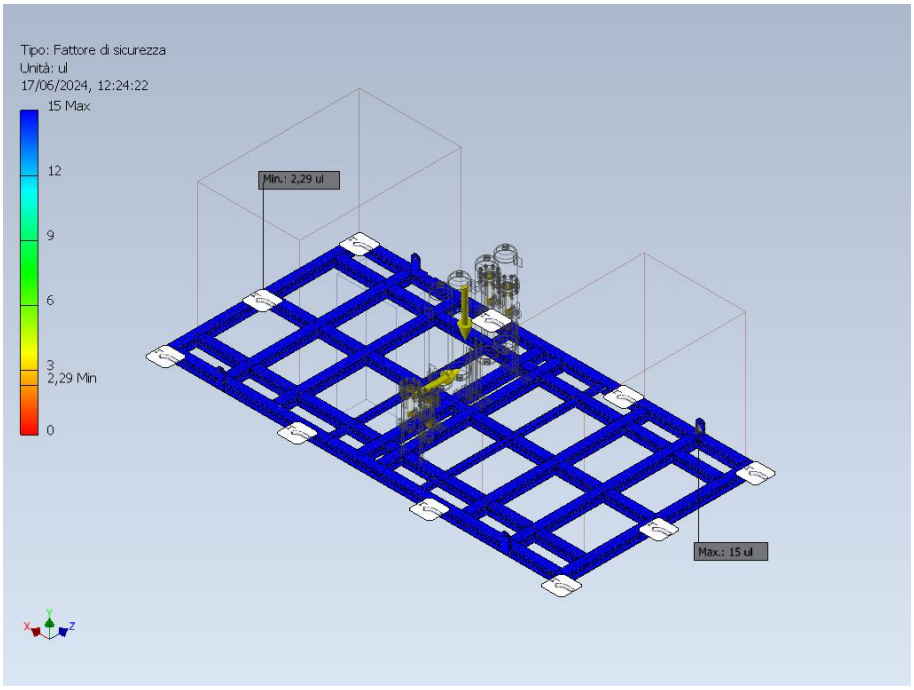


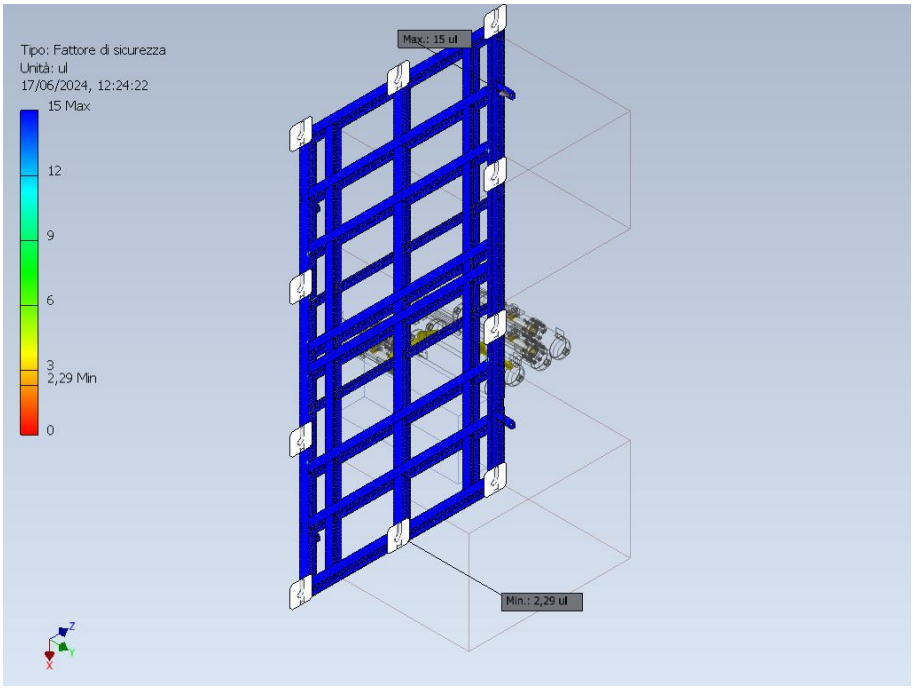
Third principal stress





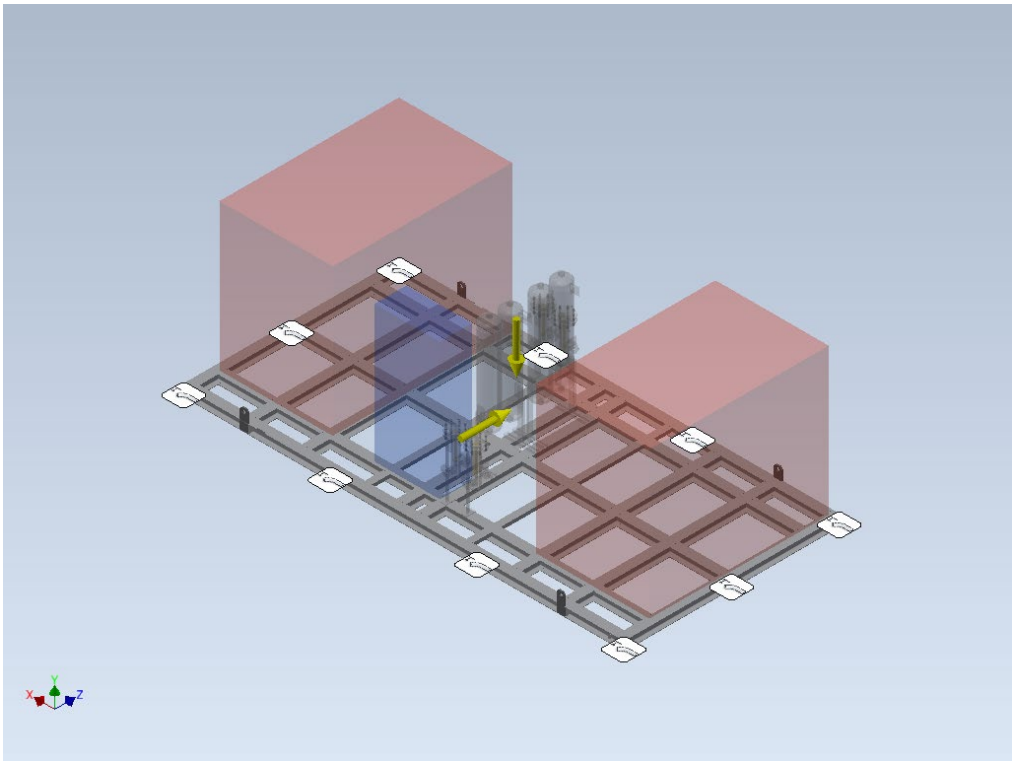
Safety factor





3.7 ANCHOR BOLTS CHECK

The skid is constrained to the main structure in no.10 points, by mean of M12 x 80 mm screws, in ASTM A 320 Gr. L7 steel.



The following tables show the valueas of the support reactions for each constraint in the Static + Wind load combination case and in the Transportation + Wind load combination case.

STATIC + WIND X+ DIRECTION				
Nome vincolo	Forza di reazione [N]		Momento di reazione [Nm]	
	Intensità	Componente (X,Y,Z)	Intensità	Componente (X,Y,Z)
Vincolo di fissaggio:1	4949,250	4757,380	60,994	-28,840
		-655,639		-36,985
		1196,910		38,996
Vincolo di fissaggio:2	13991,200	-11341,300	181,661	180,866
		6671,800		16,956
		-4755,790		-0,733
Vincolo di fissaggio:3	2899,660	-1730,870	64,379	64,293
		2149,980		-3,296
		-888,649		-0,466
Vincolo di fissaggio:4	1916,650	-1528,140	17,192	4,607
		628,246		8,698
		-971,424		-14,096
Vincolo di fissaggio:5	10503,400	-10424,800	20,309	0,542
		1282,690		-0,966
		0,000		-20,279
Vincolo di fissaggio:6	1907,020	-1512,500	18,162	-4,237
		630,081		-9,872
		975,730		-14,644
Vincolo di fissaggio:7	3027,210	-1885,820	64,231	-63,945
		2166,980		-2,865
		954,930		-5,336
Vincolo di fissaggio:8	14376,900	-11828,200	188,898	-185,329
		6677,420		-34,094
		4711,770		-13,164
Vincolo di fissaggio:9	4877,170	4615,520	55,942	26,237
		-675,540		37,945
		-1423,850		31,642
Vincolo di fissaggio:10	6890,600	3957,950	75,623	-0,663
		-5636,940		8,835
		199,719		75,102

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	4,76	X	0,18
Y	6,68	Y	0,04
Z	4,71	Z	0,08

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-11,83	X	-0,19
Y	-5,64	Y	-0,04
Z	-4,76	Z	-0,02

STATIC + WIND X- DIRECTION				
Nome vincolo	Forza di reazione		Momento di reazione	
	Intensità	Componente (X,Y,Z)	Intensità	Componente (X,Y,Z)
Vincolo di fissaggio:1	1694,230	1306,830	17,087	4,237
		605,484		-8,415
		-892,188		14,254
Vincolo di fissaggio:2	3247,940	1891,640	60,067	59,521
		2281,940		-1,260
		-1328,000		7,985
Vincolo di fissaggio:3	14030,100	11825,000	203,171	199,768
		6545,650		-29,833
		-3763,880		21,941
Vincolo di fissaggio:4	5182,310	-5013,880	61,622	-27,814
		-646,018		41,178
		1140,160		-36,443
Vincolo di fissaggio:5	6970,480	-4144,800	77,861	2,820
		-5604,300		4,180
		0,000		-77,697
Vincolo di fissaggio:6	4854,550	-4655,030	58,551	29,854
		-658,940		-35,960
		-1209,610		-35,269
Vincolo di fissaggio:7	14169,700	11956,100	200,965	-200,452
		6560,910		12,802
		3845,270		6,489
Vincolo di fissaggio:8	3287,690	2003,800	61,235	-60,965
		2271,300		-3,860
		1278,610		4,257
Vincolo di fissaggio:9	1812,240	1430,970	16,456	-4,350
		611,817		8,006
		928,551		13,703
Vincolo di fissaggio:10	10396,200	10318,800	19,851	-0,324
		1266,490		-0,650
		0,000		19,838

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	11,96	X	0,20
Y	6,56	Y	0,04
Z	3,85	Z	0,02

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-5,01	X	-0,20
Y	-5,60	Y	-0,04
Z	-3,76	Z	-0,08

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STATIC + WIND Z+ DIRECTION				
Nome vincolo	Forza di reazione		Momento di reazione	
	Intensità	Componente (X,Y,Z)	Intensità	Componente (X,Y,Z)
Vincolo di fissaggio:1	4243,93	3523,13	19,69	6,47
		852,01		8,63
		-2207,38		16,48
Vincolo di fissaggio:2	13945,50	182,17	55,77	-26,76
		4277,29		-20,98
		-13272,10		44,20
Vincolo di fissaggio:3	11360,80	1141,69	50,63	24,10
		3819,92		29,27
		-10638,20		-33,56
Vincolo di fissaggio:4	4916,70	-4204,56	19,40	7,17
		918,67		-3,58
		-2377,33		-17,67
Vincolo di fissaggio:5	8127,90	-6164,71	90,47	6,67
		2935,14		-32,25
		-4409,55		-84,27
Vincolo di fissaggio:6	1606,29	1377,87	50,37	-15,47
		324,61		47,50
		759,13		-6,48
Vincolo di fissaggio:7	6361,49	-3812,44	206,35	-180,29
		-1350,11		92,62
		4910,30		38,68
Vincolo di fissaggio:8	6035,97	3803,36	192,11	-154,43
		-1668,83		-101,32
		4379,77		-52,84
Vincolo di fissaggio:9	1891,63	-1793,52	49,46	-14,86
		172,32		-46,98
		576,09		4,30
Vincolo di fissaggio:10	8003,82	5945,88	86,61	6,44
		2892,79		27,63
		-4509,93		81,83

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	5,95	X	0,02
Y	4,28	Y	0,09
Z	4,91	Z	0,08

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-6,16	X	-0,18
Y	-1,67	Y	-0,10
Z	-13,27	Z	-0,08

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STATIC + WIND Z- DIRECTION				
Nome vincolo	Forza di reazione		Momento di reazione	
	Intensità	Componente (X,Y,Z)	Intensità	Componente (X,Y,Z)
Vincolo di fissaggio:1	1718,850	-1596,250	47,538	15,438
		205,977		44,751
		-603,325		4,342
Vincolo di fissaggio:2	5572,190	3620,300	200,141	175,914
		-1704,920		86,304
		-3877,610		-40,773
Vincolo di fissaggio:3	6771,460	-4091,990	210,426	171,794
		-1332,830		-110,001
		-5227,980		51,633
Vincolo di fissaggio:4	1760,270	1578,480	50,984	14,802
		281,633		-48,336
		-726,376		-6,627
Vincolo di fissaggio:5	8051,320	-6118,360	88,046	-6,545
		2923,570		26,554
		4340,760		-83,691
Vincolo di fissaggio:6	4738,160	-4014,390	19,626	-6,156
		903,778		3,687
		2349,040		-18,267
Vincolo di fissaggio:7	11596,100	904,238	46,016	-17,514
		3875,360		-28,879
		10891,900		-31,252
Vincolo di fissaggio:8	13477,400	-51,752	58,133	6,632
		4214,900		23,844
		12801,300		52,602
Vincolo di fissaggio:9	4453,900	3748,990	19,987	-6,693
		872,450		-8,404
		2240,790		16,854
Vincolo di fissaggio:10	8084,300	6018,690	88,641	-6,285
		2904,480		-31,684
		4549,220		82,546

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	6,02	X	0,18
Y	4,21	Y	0,09
Z	12,80	Z	0,08

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-6,12	X	-0,02
Y	-1,70	Y	-0,11
Z	-5,23	Z	-0,08

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TRANSPORTATION + WIND X+ DIRECTION				
Nome vincolo	Forza di reazione		Momento di reazione	
	Intensità	Componente (X,Y,Z)	Intensità	Componente (X,Y,Z)
Vincolo di fissaggio:1	6699,080	-2659,620	55,082	-54,696
		-3261,280		2,685
		5212,310		-5,924
Vincolo di fissaggio:2	22744,800	-20711,000	209,280	204,727
		7543,060		42,482
		-5610,780		8,951
Vincolo di fissaggio:3	9394,000	-7736,280	142,781	141,971
		5243,880		11,469
		-948,113		9,958
Vincolo di fissaggio:4	8095,720	-7429,950	65,512	15,405
		2255,900		39,220
		-2290,730		-50,163
Vincolo di fissaggio:5	13265,900	-13181,400	22,406	0,665
		1493,600		-1,672
		-60,844		-22,334
Vincolo di fissaggio:6	7993,760	-7351,920	70,490	-14,228
		2252,810		-45,349
		2185,040		-52,056
Vincolo di fissaggio:7	9769,780	-8183,080	145,102	-142,870
		5270,000		-25,334
		844,291		-0,962
Vincolo di fissaggio:8	23392,900	-21452,400	217,533	-208,646
		7536,120		-61,318
		5497,910		-5,238
Vincolo di fissaggio:9	6791,900	-2848,390	52,717	51,053
		-3273,390		1,471
		-5225,080		-13,056
Vincolo di fissaggio:10	15965,600	-10763,600	14,628	0,882
		-11785,200		12,448
		391,223		-7,632

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-2,66	X	0,20
Y	7,54	Y	0,04
Z	5,50	Z	0,01

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-21,45	X	-0,21
Y	-11,79	Y	-0,06
Z	-5,61	Z	-0,05

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TRANSPORTATION + WIND X- DIRECTION				
Nome vincolo	Forza di reazione		Momento di reazione	
	Intensità	Componente (X,Y,Z)	Intensità	Componente (X,Y,Z)
Vincolo di fissaggio:1	7803,940	7151,210	67,964	14,595
		2232,540		-41,592
		-2185,700		51,732
Vincolo di fissaggio:2	9831,320	8054,730	133,894	131,919
		5397,730		-22,466
		-1625,040		4,492
Vincolo di fissaggio:3	22915,400	21202,500	230,017	222,493
		7391,700		-56,540
		-4575,230		14,421
Vincolo di fissaggio:4	6490,930	2313,180	54,596	-53,684
		-3239,900		6,845
		5126,830		7,204
Vincolo di fissaggio:5	15817,300	10582,400	11,491	0,964
		-11753,700		10,178
		227,301		5,245
Vincolo di fissaggio:6	6588,810	2796,170	56,731	55,491
		-3243,800		6,430
		-5007,150		9,888
Vincolo di fissaggio:7	23275,100	21576,400	227,655	-224,489
		7406,530		37,742
		4618,620		-2,653
Vincolo di fissaggio:8	9973,080	8284,330	136,738	-136,308
		5387,650		9,862
		1343,650		-4,494
Vincolo di fissaggio:9	7935,240	7306,910	65,384	-14,557
		2233,820		40,082
		2141,750		49,564
Vincolo di fissaggio:10	13131,700	13049,400	21,472	-0,410
		1466,810		-0,247
		-62,622		21,467

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	21,58	X	0,22
Y	7,41	Y	0,04
Z	5,13	Z	0,05

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	2,31	X	-0,22
Y	-11,75	Y	-0,06
Z	-5,01	Z	0,00

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TRANSPORTATION + WIND Z+ DIRECTION				
Nome vincolo	Forza di reazione		Momento di reazione	
	Intensità	Componente (X,Y,Z)	Intensità	Componente (X,Y,Z)
Vincolo di fissaggio:1	13883,500	6453,080	126,358	58,952
		5752,580		54,751
		-10863,500		97,434
Vincolo di fissaggio:2	17457,900	-1544,810	99,318	-84,267
		3856,120		-24,649
		-16956,400		46,427
Vincolo di fissaggio:3	14858,100	2907,540	66,228	-27,866
		3406,230		43,345
		-14167,100		-41,603
Vincolo di fissaggio:4	14370,700	-7318,380	127,968	61,847
		5828,200		-57,780
		-10908,300		-95,980
Vincolo di fissaggio:5	10525,400	-4873,780	169,644	-14,530
		8495,030		-46,376
		-3855,380		-162,534
Vincolo di fissaggio:6	10889,000	8427,610	62,175	1,310
		-2678,740		-4,779
		-6353,730		61,977
Vincolo di fissaggio:7	13231,500	-5826,380	75,024	-12,838
		-8235,110		63,320
		-8562,040		38,135
Vincolo di fissaggio:8	14079,900	5690,480	71,236	-1,386
		-8554,510		-49,256
		-9627,180		-51,444
Vincolo di fissaggio:9	11158,100	-8522,300	61,205	4,661
		-2768,530		9,644
		-6648,980		-60,260
Vincolo di fissaggio:10	10539,900	4607,480	164,298	-17,410
		8470,170		33,026
		-4256,380		160,000

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	8,43	X	0,06
Y	8,50	Y	0,06
Z	-3,86	Z	0,16

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-8,52	X	-0,08
Y	-8,55	Y	-0,06
Z	-16,96	Z	-0,16

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TRANSPORTATION + WIND Z- DIRECTION					MAX			
Nome vincolo	Forza di reazione		Momento di reazione		Forza di reazione [kN]		Momento di reazione [kNm]	
	Intensità	Componente (X,Y,Z)	Intensità	Componente (X,Y,Z)		Componente (X,Y,Z)		Componente (X,Y,Z)
Vincolo di fissaggio:1	10845,000	-8188,600	63,143	-2,352	X	8,75	X	0,06
		-2738,080		-8,180	Y	8,49	Y	0,05
		6562,220		-62,567	Z	16,31	Z	0,16
Vincolo di fissaggio:2	14501,800	5323,580	69,511	27,864				
		-8624,450		46,969				
		10372,100		-43,004				
Vincolo di fissaggio:3	13092,900	-6201,440	78,799	3,979				
		-8177,300		-65,558				
		8130,000		43,539				
Vincolo di fissaggio:4	11172,000	8746,000	59,448	-5,691				
		-2714,230		4,337				
		6399,520		59,016				
Vincolo di fissaggio:5	10469,500	-4814,140	165,599	17,294				
		8488,660		30,534				
		3791,630		-161,838				
Vincolo di fissaggio:6	14240,800	-7107,780	127,704	-58,323				
		5809,460		52,173				
		10887,100		-100,919				
Vincolo di fissaggio:7	15136,600	2652,550	62,604	37,084				
		3467,010		-37,355				
		14493,500		-33,891				
Vincolo di fissaggio:8	16834,800	-1782,720	90,580	58,605				
		3785,420		33,132				
		16306,600		60,601				
Vincolo di fissaggio:9	14009,200	6658,210	131,162	-59,149				
		5777,160		-64,046				
		10888,100		97,995				
Vincolo di fissaggio:10	10628,000	4712,820	168,349	14,953				
		8485,690		-45,626				
		4328,570		161,357				

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-8,19	X	-0,06
Y	-8,62	Y	-0,07
Z	3,79	Z	-0,16

The bolt strength has been verified with respect to the combined tension and shear effects, according to Eurocode EC3.

	Bolt Class	Bolt diameter	Fx [kN]	Fy [kN]	Fz [kN]
Static + wind Max	8.8	M12	11,96	6,68	12,80
Transportation + wind Max	8.8	M12	21,58	8,50	16,31
Static + wind min	8.8	M12	-11,83	-5,64	-13,27
Transportation + wind min	8.8	M12	-21,45	-11,79	-16,96

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Bolt verification Procedure (according to EC3)

Type	Bolt						Nominal Tensile Strength	Yield strength	Resistance factor	Partial Safety factor
	Bolt Class	Bolt diameter	A_{bolt}	A_{res}	A_{res}/A_{bolt}	k2 for normal bolts	f_{tb}	f_{yb}	α_v	γ_{M2}
		[mm]	[mm2]	[mm2]			[MPa]	[MPa]		
Static + wind Max	8.8	M12	113	84,3	0,746	0,9	895	585	0,6	1,25
Transportation + wind Max	8.8	M12	113	84,3	0,746	0,9	895	585	0,6	1,25
Static + wind min	8.8	M12	113	84,3	0,746	0,9	895	585	0,6	1,25
Transportation + wind min	8.8	M12	113	84,3	0,746	0,9	895	585	0,6	1,25

Bolt verification Procedure (according to EC3)

Type	Bolt Class	Bolt diameter	Tension demand $F_{t,Ed}$	Shear demand $F_{v,Ed}$	Tension resistance $F_{t,Rd}$	Shear resistance $F_{v,Rd}$
		[mm]	[kN]	[kN]	[kN]	[kN]
Static + wind Max	8.8	M12	6,68	12,80	54,32	36,22
Transportation + wind Max	8.8	M12	8,50	21,58	54,32	36,22
Static + wind min	8.8	M12	5,64	11,83	54,32	36,22
Transportation + wind min	8.8	M12	11,79	16,96	54,32	36,22

Bolt verification Procedure (according to EC3)

Type	Bolt Class	Bolt diameter	Tension check $F_{t,Ed}/F_{t,Rd} < 1$	Shear check $F_{v,Ed}/F_{v,Rd} < 1$	Combined Shear and tension check $F_{v,Ed}/F_{v,Rd} + F_{t,Ed}/1,4\,F_{t,Rd} \leq 1,0$
		[mm]			
Static + wind Max	8.8	M12	Ok	Ok	Ok
Transportation + wind Max	8.8	M12	Ok	Ok	Ok
Static + wind min	8.8	M12	Ok	Ok	Ok
Transportation + wind min	8.8	M12	Ok	Ok	Ok

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3.8 CONCLUSIONS

The analysis shown that the stresses are below the allowable ones, in each of the load combination cases.

- the maximum calculated Von Mises Stress is equal to 206,296 MPa

- the maximum calculated First Principal Stress is equal to 189,243 MPa

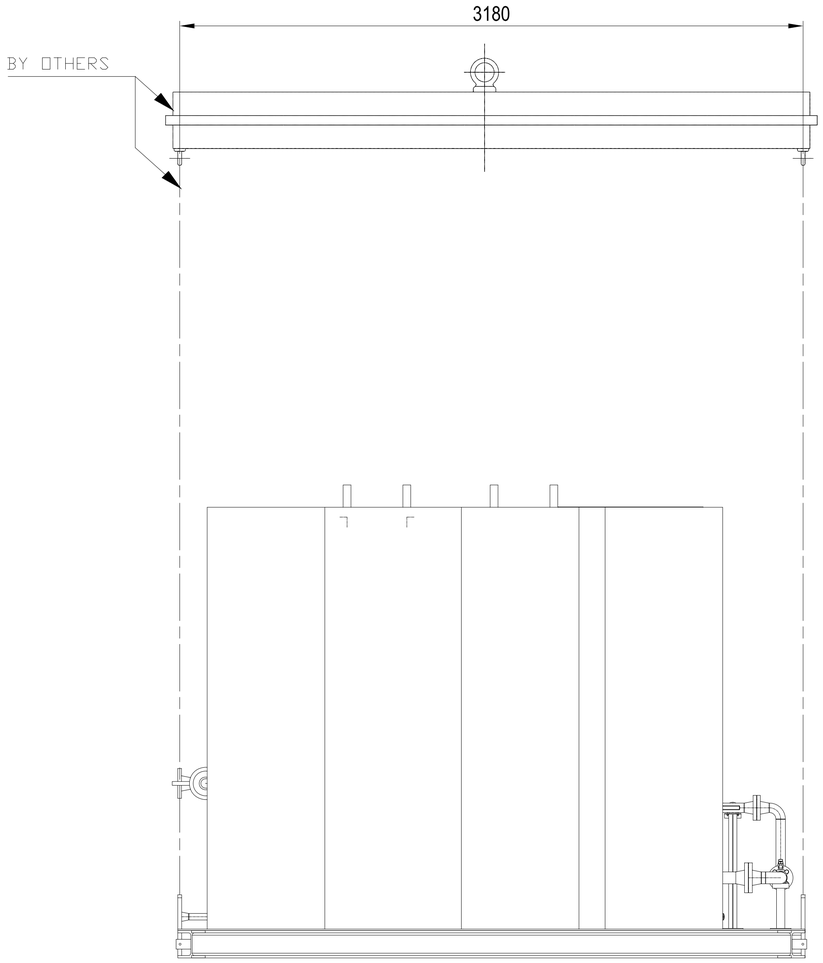
- the maximum calculated Third Principal Stress is equal to 49,3885 MPa

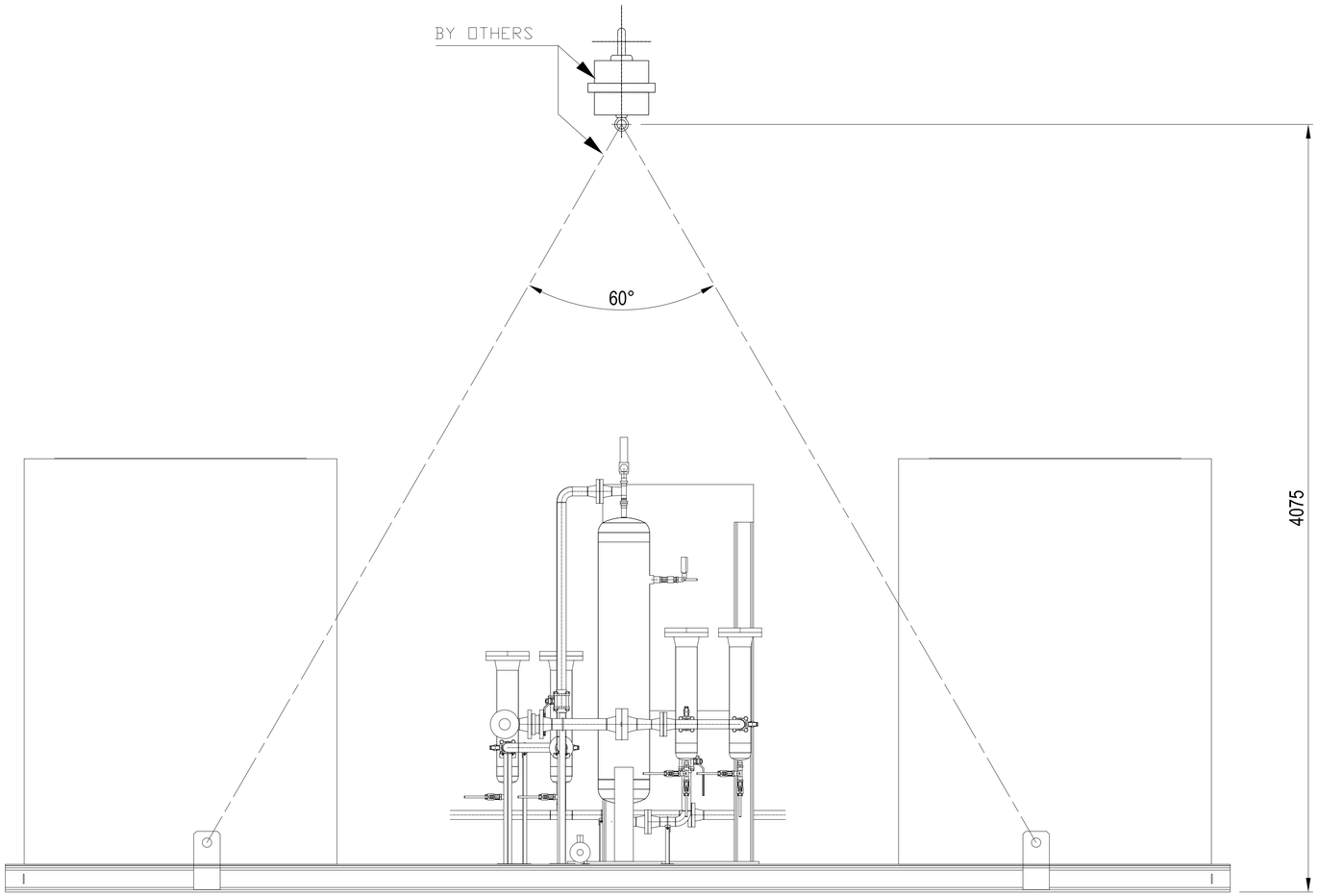
The displacement can be considered negligible.

Safety factor is 1,69.

The actual design of the structure can be considered acceptable.

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0	30/04/2024	FIRST ISSUE	GT	TM
REV	DATE	DESCRIPTION	PREPARED	APPROVED

COMMESSA N° / JOB N° 166/24 | SERIAL N° | FORMATO / SIZE A1 | SCALA / SCALE 1 : 20

coes

SKID ARIA BLPH NETHERLAND
LIFTING SKETCH

DISEGNO N° / DRAWING N° CVV52815.1

FOGLIO / SHEET 1 | DI / OF 1

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Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE
AIR RECEIVER CALCULATION

Document Number: 1724000428-MAC-CA-00032

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
Giuseppe Cavallo	23/04/2025

Rev.	Date	Description	Prepared	Reviewed	Approved
		(AFC)	GT	MC	TM
02	05/09/2024	Accepted for Construction (AFC)	GT	MC	TM
01	07/07/2024	Issue for Review (IFR)	GT	MC	TM
00	29/05/2024	Issue for Review (IFR)	GT	MC	TM

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Nozzle Calcs.: Vent 106
Nozzle Calcs.: PSV 109

DESIGN CALCULATION

In Accordance with ASME Section VIII Division 1

ASME Code Version : 2023

Analysis Performed by : Coes S.r.l.

Job File : ...\Air Receiver R2.pvdb

Date of Analysis : Apr 2,2025 4:53pm

PV Elite 26 SP1, March 2024

Vessel Design Summary:

ASME Code, Section VIII Division 1, 2023

Diameter Spec : 2500.000 mm OD		
Vessel Design Length, Tangent to Tangent	4020.00	mm
Distance of Bottom Tangent above Grade	0.00	mm
Specified Datum Line Distance	60.00	mm
Internal Design Temperature	90	°C
Internal Design Pressure	12.000	barg
External Design Temperature	0	°C
Maximum Allowable Working Pressure	14.14	barg
Shop Test Pressure	17.160	barg
Required Minimum Design Metal Temperature	-29.0	°C
Warmest Computed Minimum Design Metal Temperature	-29.0	°C
Wind Design Code	Euro Code	
Earthquake Design Code	G-Loading	

Materials of Construction:

Component Type	Material	Class	Thickness	UNS #	Normalized	Impact Tested
Shell	SA-516 70	...	...	K02700	No	Yes
Head	SA-516 70	...	...	K02700	No	Yes
Nozzle	SA-333 6	...	...	K03006	No	Yes
Nozzle	SA-350 LF2	1	...	K03011	No	Yes
Nozzle	SA-516 70	...	...	K02700	No	No
Re-Pad	SA-516 70	...	...	K02700	No	No
Nozzle Flg	SA-350 LF2	1	...	K03011	No	Yes
Leg Baseplate	SA-516 70	...	...	K02700	No	No
Leg Bolting	SA-307 B	...	...		No	No

Normalized is determined based on the UCS-66 material curve selection and Figure UCS-66.
Impact Tested is based on material selection and material data properties.

Element Pressures and MAWP (barg & mm):

Element Description or Type	Design Pressure + Stat. head	Ext. Press.	Element M.A.W.P	Total Corrosion Allowance	Str. Flg. Gov.	In Creep Range
Ellipse	12.600	0.00	14.800	1.5000	No	No
Cylinder	12.600	0.00	14.810	1.5000	N/A	No
Cylinder	12.600	0.00	14.810	1.5000	N/A	No
Ellipse	12.600	0.00	14.800	1.5000	No	No

Element Types and Properties:

Element Type	"To" Elev mm	Element Length mm	Nominal Thickness mm	Finished Thickness mm	Reqd Thk Internal mm	Reqd Thk External mm	Long Eff	Circ Eff
Ellipse	0.0	60.0	18.0	15.3	12.8	...	1.00	0.85

Cylinder	1950.0	1950.0	18.0	17.9	14.9	...	0.85	0.85
Cylinder	3900.0	1950.0	18.0	17.9	14.9	...	0.85	0.85
Ellipse	3960.0	60.0	18.0	15.3	12.8	...	1.00	0.85

Loads for Foundation/Support Design:

Total Wind Shear on top of all Legs	2319.	kgf
Total Earthquake Shear on top of all Legs	4809.	kgf
Total Wind Moment at top of all Legs	3977.	kgm
Total Earthquake Moment at top of all Legs	7473.	kgm
Wind Load Case Test Moment on Support	1313.	kgm
Test Case Wind Shear on Support	765.	kgf
Max. Wind Shear on one Leg (top & bottom)	858.	kgf
Max. Earthq. Shear on one Leg (top & bottom)	1778.	kgf
Max. Wind Moment at base of one Leg	1235.	kgm
Max. Earthquake Moment at base of one Leg	2560.	kgm
Max. Vertical Load (Wt. + Wind) on one Leg	3179.	kgf
Max. Vertical Load (Wt. + Eq.) on one Leg	4463.	kgf

For the Pressure Test Case:

Max. Wind Shear on one Leg (top & bottom)	283.	kgf
Max. Wind Moment at base of one Leg	407.	kgm
Max. Vertical Load (Wt. + Wind) on one Leg	8114.	kgf
Max. Vertical Load (Wt. + Eq.) on one Leg	7632.	kgf

The Wind and Seismic loads were not load factored in this analysis.

Wind and Earthquake moments include the effects of user defined forces and moments if any exist in the job and were specified to act (compute loads and stresses) during these cases. Also included are moment effects due to eccentric weights if any are present in the input.

Local Stress Analysis Results:

Description	Analysis Type	Max Stress Ratio	High Stress Location	Pass Fail
Trunnion	WRC-107/537	0.053	n/a	Passed
LEGS	WRC-107/537	0.661	n/a	Passed
LEGS	WRC-107/537	0.568	n/a	Passed

Weights:

Fabricated	- Bare W/O Removable Internals	7419.1	kg
Shop Test	- Fabricated + Water (Full)	30527.4	kg
Shipping	- Fab. + Rem. Intls.+ Shipping App.	7419.1	kg
Erected	- Fab. + Rem. Intls.+ Insul. (etc)	7419.1	kg
Empty	- Fab. + Intls. + Details + Wghts.	7419.1	kg
Operating	- Empty + Operating Liquid (No CA)	7419.1	kg
Field Test	- Empty Weight + Water (Full)	30527.4	kg

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Nozzle Calculation Summary (barg & mm):

Description	MAWP	Ext	MAPNC	UG-45	[tr]	Weld Path	Areas or Stresses
Drain	14.8	...	...	OK	4.45	OK	No Calc[*]
PG	14.81	...	...	OK	4.62	OK	No Calc[*]
PT	14.81	...	...	OK	4.62	OK	No Calc[*]
TG	14.81	...	...	OK	4.72	OK	No Calc[*]
TT	14.81	...	...	OK	4.72	OK	No Calc[*]
IN/OUT	14.81	...	...	OK	4.92	OK	No Calc[*]
MAN HOLE	14.14	...	...	...		OK	Passed
Vent	14.8	...	...	OK	4.45	OK	No Calc[*]
PSV	14.8	...	...	OK	6.30	OK	Passed

Nozzle MAWP Summary:

Minimum MAWP Nozzles	:	14.14 Nozzle	: MAN HOLE
Minimum MAWP Shells/Flanges	:	14.14 Element	:
Minimum MAPnc Shells/Flanges	:	16.83 Element	:
Computed Vessel M.A.W.P.	:	14.14 barg	

[*] - This was a small opening and the areas were not computed or
the MAWP of this connection could not be computed because
the longitudinal bending stress was greater than the hoop stress.

Note: MAWPs (Internal Case) shown above are at the High Point.

Multiple output lines for the same nozzle indicates required Code calculations in both the longitudinal and circumferential planes of reinforcement where applicable.

Check the Spatial Relationship between the Nozzles:

From Node	Nozzle Description	Y Coordinate mm	Layout Angle deg	Dia. Limit mm
10	Drain	0.000	0.000	61.001
20	PG	360.000	-15.000	70.800
20	PT	1060.000	15.000	70.800
20	TG	360.000	15.000	80.960
20	TT	1060.000	-15.000	80.960
20	IN/OUT	360.000	180.000	93.025
20	MAN HOLE	560.000	270.000	1153.200
50	Vent	0.000	0.000	61.001
50	PSV	0.000	0.000	122.840

The nozzle spacing is computed by the following:

= sqrt(ll² + lc²) where

ll - Arc length along the inside vessel surface in the long. directioN
lc - Arc length along the inside vessel surface in the circ. direction

If any interferences/violations are found, they will be noted below.

No interference violations have been detected!

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Nozzle Schedule:

Description	Nominal or Actual Size	Schd or FVC Type	Flg Type	Nozzle O/Dia in	Wall Thk mm	Reinforcing Pad Diameter	Reinforcing Pad Thk mm	Cut Length mm	Flg Class
Drain	1.000 in	XXS	WNF	1.315	9.093	...	...	115.36	150
Vent	1.000 in	XXS	WNF	1.315	9.093	...	...	115.36	150
PG	1.500 in	Actual	None	1.500	8.382	...	...	50.77	...
PT	1.500 in	Actual	None	1.500	8.382	...	...	50.77	...
TG	1.500 in	160	WNF	1.900	7.137	...	...	93.09	150
TT	1.500 in	160	WNF	1.900	7.137	...	...	93.09	150
IN/OUT	2.000 in	160	WNF	2.375	8.738	...	...	50.99	150
PSV	3.000 in	XXS	WNF	3.500	15.240	...	...	126.38	150
MAN HOLE	24.000 in	Actual	WNF	24.000	18.000	810.00	18.00	131.15	150

General Notes for the above table:

The cut length is the outside projection + inside projection + drop + in-plane shell thickness. This value does not include weld gaps, nor does it account for shrinkage.

In the case of oblique nozzles, the outside diameter must be increased. The re-pad width around the nozzle is calculated as follows:
Width of Pad = (Pad Outside Dia. (per above) - Nozzle Outside Dia.)/2

For hub nozzles, the thickness and diameter shown are those of the smaller and thinner sectioN

Nozzle Material and Weld Fillet Leg Size Details (mm):

Description	Material	Shl Grve Weld	Noz Shl/Pad Weld	Pad OD Weld	Pad Grve Weld	Inside Weld
Drain	SA-333 6	12.750	10.000	...	...	...
Vent	SA-333 6	12.750	10.000	...	...	...
PG	SA-350 LF2	14.850	10.000	...	...	...
PT	SA-350 LF2	14.850	10.000	...	...	...
TG	SA-333 6	14.850	10.000	...	...	...
TT	SA-333 6	14.850	10.000	...	...	...
IN/OUT	SA-333 6	14.850	10.000	...	...	...
PSV	SA-333 6	12.750	9.000	...	...	...
MAN HOLE	SA-516 70	14.850	15.000	18.000	18.000	...

Note: The Outside projections below do not include the flange thickness.

Nozzle Miscellaneous Data:

Description	Elev/Distance From Datum mm	Layout Angle deg	Proj Outside mm	Proj Inside mm	Installed in Component
Drain	...	0.0	100.00	0.00	Node: 10
Vent	...	0.0	100.00	0.00	Node: 50
PG	300.000	-15.0	32.78	0.00	Node: 20
PT	1000.000	15.0	32.78	0.00	Node: 20
TG	300.000	15.0	75.00	0.00	Node: 20
TT	1000.000	-15.0	75.00	0.00	Node: 20
IN/OUT	300.000	180.0	32.78	0.00	Node: 20
PSV	...	0.0	100.00	0.00	Node: 50
MAN HOLE	500.000	270.0	75.00	0.00	Node: 20

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Bill of Materials:

QTY	DESCRIPTION	MATERIAL
2	ELLIPTICAL HEAD: 2.0 X 1, 18.0mm THK X 2469.4mm ID X 60.0mm	SA-516 70
4	LEGS, SHAPE: HE200B 1440.0mm	...
4	BASEPLATES: 400.0mm X 400.0mm X 40.0mm	SA-516 70
24	BASEPLATE BOLTS: 33.0mm	SA-307 B
4	LEG RE-PADS: 300.000mm X 350.000mm X 18.000mm	SA-516 70
2	TRUNNIONS:	SA-516 70
2	TRUNNION PADS: 320.0mm OD X 219.1mm ID X 18.0mm THK	
1	CLASS 150 GR 1.1, 24.0" BLIND FLANGE(S)	SA-350 LF2
1	CYLINDRICAL SEGMENT 18.0mm THK X 3763.3mm X 1950.0mm	SA-516 70
1	CYLINDRICAL SEGMENT 18.0mm THK X 3741.8mm X 1950.0mm	SA-516 70
1	CYLINDRICAL SEGMENT 18.0mm THK X 236.6mm X 1950.0mm	SA-516 70
1	CYLINDRICAL SEGMENT 18.0mm THK X 3755.5mm X 1950.0mm	SA-516 70
1	CYLINDRICAL SEGMENT 18.0mm THK X 3986.2mm X 1950.0mm	SA-516 70
1	CYLINDRICAL SEGMENT 18.0mm THK X 0.0mm X 1950.0mm	SA-516 70
1	NAMEPLATE	...

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Minimum Design Metal Temperature Results Summary (°C):

Description	Notes	Curve	Basic MDMT	Reduced MDMT	UG-20(f) MDMT	Thickness ratio	Gov Thk mm	E*	PWHT reqd
	[10]	!	-29	-31	-29	0.958	15.300	1.00	No
	[7]	!	-29	-40	-29	0.806	18.000	1.00	No
	[8]	!	-29	-39	-29	0.813	17.850	0.85	No
	[8]	!	-29	-39	-29	0.813	17.850	0.85	No
	[10]	!	-29	-31	-29	0.958	15.300	1.00	No
	[7]	!	-29	-40	-29	0.806	18.000	1.00	No
Drain	[1]	!	-46	-104		0.015	7.957	1.00	No
Nozzle Flg	[5]	!	-46	-65					
PG	[1]	!	-46	-104		0.025	8.382	1.00	No
PT	[1]	!	-46	-104		0.025	8.382	1.00	No
TG	[1]	!	-46	-104		0.054	6.245	1.00	No
Nozzle Flg	[5]	!	-46	-65					
TT	[1]	!	-46	-104		0.054	6.245	1.00	No
Nozzle Flg	[5]	!	-46	-65					
IN/OUT	[1]	!	-46	-104		0.052	7.645	1.00	No
Nozzle Flg	[5]	!	-46	-65					
MAN HOLE	[1]	B	-11	-29	-29	0.693	17.850	1.00	No
Nozzle Flg	[5]	B	-46	-48					
Vent	[1]	!	-46	-104		0.014	7.957	1.00	No
Nozzle Flg	[5]	!	-46	-67					
PSV	[1]	!	-46	-104		0.028	13.335	1.00	No
Nozzle Flg	[5]	!	-46	-65					
Nozl. Bolting	[22]		-48			1.000	63.500	1.00	No
Warmest MDMT:			-11	-29					

Required Minimum Design Metal Temperature -29.0 °C
Warmest Computed Minimum Design Metal Temperature -29.0 °C

Notes:
[!] - This was an impact tested material.
[1] - Governing Nozzle Weld.
[4] - ASME Flange MDMT Calcs; Thickness ratio per UCS-66(b)(1)(-c).
[5] - ASME Flange MDMT Calcs; Thickness ratio per UCS-66(b)(1)(-b).
[6] - MDMT Calculations at the Shell/Head Joint.
[7] - MDMT Calculations for the Straight Flange.
[8] - Cylinder/Cone/Flange Junction MDMT.
[9] - Calculations in the Spherical Portion of the Head.
[10] - Calculations in the Knuckle Portion of the Head.
[11] - Calculated (Body Flange) Flange MDMT.
[12] - Calculated Flat Head MDMT per UCS-66.3
[13] - Tubesheet MDMT, shell side, if applicable
[14] - Tubesheet MDMT, tube side, if applicable
[15] - Nozzle Material
[16] - Shell or Head Material
[17] - Impact Testing required
[18] - Impact Testing not required, see UCS-66(b)(3)
[20] - Cylinder/Cone Junction MDMT based on Longitudinal Stress considerations
[21] - Body Flange Bolting Material
[22] - Nozzle Flange Bolting Material
[23] - Stiffening Ring to Shell Weld
[24] - Saddle to Shell Weld

UG-84(b)(2) was not considered.
UCS-66(g) was not considered.
UCS-66(i) was not considered.

Notes:
Impact test temps were not entered in and not considered in the analysis.
UCS-66(i) applies to impact tested materials not by specification and
UCS-66(g) applies to materials impact tested per UG-84.1 General Note (c).
The Basic MDMT includes the (30F) PWHT credit if applicable.

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Class From To : Basic Element Checks.

Class From To: Check of Additional Element Data

There were no geometry errors or warnings.

PV Elite performs all calculations internally in Imperial Units to remain compliant with the ASME Code and any built in assumptions in the ASME Code formulas. The finalized results are reflected to show the set of selected units for this analysis.



One or more nozzles in this model was specified using the actual thickness basis and a standard flange is also specified. In many cases a matching nominal diameter cannot be determined and the weight of the flange and optional blind flange cannot be determined. When actual thickness basis is specified, you must calculate the weight of the assembly (by hand) and enter it into the 'Overriding Weight' field in the nozzle dialog when there is a standard flange specified. However, for FVC nozzles that have their nominal diameter specified in the FVC dialog, entering the overriding weight for that nozzle is not required.

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Units used in this Analysis (barg_UniCode):

Name	System Unit	Constant	User Unit
Length	Feet	304.8000	mm
Force	Pounds	0.4536	kgf
Mass	Pounds	0.4536	kg
Area	sq. inches	6.4516	cm^2
Moment	ft. lbs.	0.1383	kgm
Stress	lbs./sq.iN	0.0069	N/mm^2
Temperature	Degrees F	0.5556	°C
Pressure	psig	0.0689	barg
Elast. Modulus	lbs./sq.iN	6.8946	kPa
Pipe Density	lbs./cu.iN	0.0277	kg/cm^3
Ins. Density	lbs./cu.ft.	0.1600E-04	kg/cm^3
Fluid Density	lbs./cu.ft.	0.1600E-04	kg/cm^3
Wind Speed	miles/hr	1.6093	km/hr
Tray Weight	lbs./sq.ft.	0.0005	kg/cm^2
Inertia	iN^4	41.6231	cm^4
G Load	G's	1.0000	g's
Wind Load	lbs./sq.ft.	4.8825	kg/m^2
Elevation	Feet	304.8000	mm
Volume	iN^3	16.3900	cm³
Diameter	inches	25.4000	mm
Thickness	inches	25.4000	mm

PV Elite Vessel Analysis Program: Input Data

Design Internal Pressure (for Hydrotest)	12	barg
Design Internal Temperature	90.0	°C
Projection of Nozzle from Vessel Top	0	mm
Projection of Nozzle from Vessel Bottom	0	mm
Minimum Design Metal Temperature	-29.0	°C
Type of Construction	Welded	
Special Service	Air/Water/Steam	
Degree of Radiography	RT-3	
Use Higher Longitudinal Stresses (Flag)	Y	
Select t for Internal Pressure (Flag)	N	
Select t for External Pressure (Flag)	N	
Select t for Axial Stress (Flag)	N	
Select Location for Stiff. Rings (Flag)	N	
Consider Vortex Shedding	N	

Shop Pressure Test:

Type of Pressure Test	1.43 * MAWP (PED)
Pressure Test Position	Vertical
Test Performed in Corroded Condition	No

Load Case 1	NP+EW+WI+FW+BW
Load Case 2	NP+EW+EE+FS+BS
Load Case 3	NP+OW+WI+FW+BW
Load Case 4	NP+OW+EQ+FS+BS
Load Case 5	NP+HW+HI
Load Case 6	NP+HW+HE
Load Case 7	IP+OW+WI+FW+BW
Load Case 8	IP+OW+EQ+FS+BS
Load Case 9	EP+OW+WI+FW+BW
Load Case 10	EP+OW+EQ+FS+BS
Load Case 11	HP+HW+HI
Load Case 12	HP+HW+HE
Load Case 13	IP+WE+EW

Load Case 14	IP+WF+CW	
Load Case 15	IP+VO+OW	
Load Case 16	IP+VE+EW	
Load Case 17	NP+VO+OW	
Load Case 18	FS+BS+IP+OW	
Load Case 19	FS+BS+EP+OW	
Load Case 20	BL+IP+OW	
Wind Design Code	European Code	
Design Wind Speed	144	Km/hr
Seismic Design Code	G Loading	
Seismic Importance Factor	1.000	
G Loading Coefficient Gx	0.000	
G Loading Coefficient Gz	0.700	
G Loading Coefficient Gy	0.000	
Percent Seismic for Hydrotest	0.000	
Design Pressure + Static Head	Y	
Consider MAP New and Cold in Noz. Design	N	
Consider External Loads for Nozzle Des.	Y	
Use ASME VIII-1 Appendix 1-9	N	
Perform Blast Load Analysis	No	
Material Database Year	Current w/Addenda or Code Year	

Configuration Directives:

g0 is taken as min(g0, attached shell thk)	No
Do not use Nozzle MDMT Interpretation VIII-1 01-37	No
Use Table G instead of exact equation for "A"	Yes
Shell Head Joints are Tapered	Yes
Compute "K" in corroded condition	Yes
Use Code Case 2286	No
Use the MAWP to compute the MDMT	Yes
For thickness ratios <= 0.35, MDMT will be -155F (-104C)	Yes
For PWHT & P1 Materials the MDMT can be < -55F (-48C)	No
Using Metric Material Databases, ASME II D	No
Calculate B31.3 type stress for Nozzles with Loads	Yes
Reduce the MDMT due to lower membrane stress	Yes
Consider Longitudinal Stress in MDMT Calculations	Yes

Complete Listing of Vessel Elements and Details:

Element#	1/4	
Element From Node	10	
Element To Node	20	
Element Type	Elliptical	
Description		
Distance "FROM" to "TO"	60	mm
Element Outside Diameter	2500	mm
Element Thickness	15.3	mm
Internal Corrosion Allowance	1.5	mm
Nominal Thickness	18	mm
External Corrosion Allowance	0	mm
Design Internal Pressure	12	barg
Design Temperature Internal Pressure	90	°C
Design External Pressure	0	barg
Design Temperature External Pressure	0	°C
Effective Diameter Multiplier	1.2	

Material Name	SA-516 70 [Impact Tested]	
Allowable Stress, Ambient	137.9	N/mm^2
Allowable Stress, Operating	137.9	N/mm^2
Allowable Stress, Hydrotest	179.3	N/mm^2
Material Density	0.00775	kg/cm^3
P Number Thickness	30.988	mm
Yield Stress, Operating	240.7	N/mm^2
UCS-66 Chart Curve Designation	Impact Tested	
External Pressure Chart Name	CS-2	
UNS Number	K02700	
Product Form	Plate	
Efficiency, Longitudinal Seam	1.0	
Efficiency, Circumferential Seam	0.85	
Elliptical Head Factor	2.0	
Weld is pre-Heated	No	
Element From Node	10	
Detail Type	Nozzle	
Detail ID	Drain	
Dist. from "FROM" Node / Offset dist	0	mm
Nozzle Diameter	1	iN
Nozzle Schedule	XXS	
Nozzle Class	150	
Layout Angle	0.0	
Blind Flange (Y/N)	N	
Weight of Nozzle (Used if > 0)	1.8274	kgf
Grade of Attached Flange	GR 1.1	
Nozzle Matl	SA-333 6 [Impact Tested]	

Element#	2/4	
Element From Node	20	
Element To Node	40	
Element Type	Cylinder	
Description		
Distance "FROM" to "TO"	1950	mm
Element Outside Diameter	2500	mm
Element Thickness	17.85	mm
Internal Corrosion Allowance	1.5	mm
Nominal Thickness	18	mm
External Corrosion Allowance	0	mm
Design Internal Pressure	12	barg
Design Temperature Internal Pressure	90	°C
Design External Pressure	0	barg
Design Temperature External Pressure	0	°C
Effective Diameter Multiplier	1.2	
Material Name	SA-516 70 [Impact Tested]	
Efficiency, Longitudinal Seam	0.85	
Efficiency, Circumferential Seam	0.85	
Weld is pre-Heated	No	
Element From Node	20	
Detail Type	Nozzle	
Detail ID	PG	
Dist. from "FROM" Node / Offset dist	300	mm
Nozzle Diameter	1.5	iN
Nozzle Schedule	None	
Nozzle Class	None	
Layout Angle	-15.0	
Blind Flange (Y/N)	N	
Weight of Nozzle (Used if > 0)	0.2889	kgf
Grade of Attached Flange	None	
Nozzle Matl	SA-350 LF2 [Impact Tested]	

Element From Node	20	
Detail Type	Nozzle	
Detail ID	PT	
Dist. from "FROM" Node / Offset dist	1000	mm
Nozzle Diameter	1.5	iN
Nozzle Schedule	None	
Nozzle Class	None	
Layout Angle	15.0	
Blind Flange (Y/N)	N	
Weight of Nozzle (Used if > 0)	0.2889	kgf
Grade of Attached Flange	None	
Nozzle Matl	SA-350 LF2 [Impact Tested]	

Element From Node	20	
Detail Type	Nozzle	
Detail ID	TG	
Dist. from "FROM" Node / Offset dist	300	mm
Nozzle Diameter	1.5	iN
Nozzle Schedule	160	
Nozzle Class	150	
Layout Angle	15.0	
Blind Flange (Y/N)	N	
Weight of Nozzle (Used if > 0)	2.9477	kgf
Grade of Attached Flange	GR 1.1	
Nozzle Matl	SA-333 6 [Impact Tested]	

Element From Node	20	
Detail Type	Nozzle	
Detail ID	TT	
Dist. from "FROM" Node / Offset dist	1000	mm
Nozzle Diameter	1.5	iN
Nozzle Schedule	160	
Nozzle Class	150	
Layout Angle	-15.0	
Blind Flange (Y/N)	N	
Weight of Nozzle (Used if > 0)	0.6421	kgf
Grade of Attached Flange	GR 1.1	
Nozzle Matl	SA-333 6 [Impact Tested]	

Element From Node	20	
Detail Type	Nozzle	
Detail ID	IN/OUT	
Dist. from "FROM" Node / Offset dist	300	mm
Nozzle Diameter	2	iN
Nozzle Schedule	160	
Nozzle Class	150	
Layout Angle	180.0	
Blind Flange (Y/N)	N	
Weight of Nozzle (Used if > 0)	0	kgf
Grade of Attached Flange	GR 1.1	
Nozzle Matl	SA-333 6 [Impact Tested]	

Element From Node	20	
Detail Type	Nozzle	
Detail ID	MAN HOLE	
Dist. from "FROM" Node / Offset dist	500	mm
Nozzle Diameter	24	iN
Nozzle Schedule	None	
Nozzle Class	150	
Layout Angle	270.0	
Blind Flange (Y/N)	Y	
Weight of Nozzle (Used if > 0)	373.42	kgf
Grade of Attached Flange	GR 1.1	

Nozzle Matl	SA-516 70	
Element From Node	20	
Detail Type	Leg	
Detail ID	LEGS	
Dist. from "FROM" Node / Offset dist	350	mm
Diameter at Leg Centerline	2722	mm
Leg Orientation	2	
Number of Legs	4	
Section Identifier	HE200B	
Length of Legs	1440	mm

Element#	3/4	
Element From Node	40	
Element To Node	50	
Element Type	Cylinder	
Description		
Distance "FROM" to "TO"	1950	mm
Element Outside Diameter	2500	mm
Element Thickness	17.85	mm
Internal Corrosion Allowance	1.5	mm
Nominal Thickness	18	mm
External Corrosion Allowance	0	mm
Design Internal Pressure	12	barg
Design Temperature Internal Pressure	90	°C
Design External Pressure	0	barg
Design Temperature External Pressure	0	°C
Effective Diameter Multiplier	1.2	
Material Name	SA-516 70 [Impact Tested]	
Efficiency, Longitudinal Seam	0.85	
Efficiency, Circumferential Seam	0.85	
Weld is pre-Heated	No	

Element#	4/4	
Element From Node	50	
Element To Node	60	
Element Type	Elliptical	
Description		
Distance "FROM" to "TO"	60	mm
Element Outside Diameter	2500	mm
Element Thickness	15.3	mm
Internal Corrosion Allowance	1.5	mm
Nominal Thickness	18	mm
External Corrosion Allowance	0	mm
Design Internal Pressure	12	barg
Design Temperature Internal Pressure	90	°C
Design External Pressure	0	barg
Design Temperature External Pressure	0	°C
Effective Diameter Multiplier	1.2	
Material Name	SA-516 70 [Impact Tested]	
Efficiency, Longitudinal Seam	1.0	
Efficiency, Circumferential Seam	0.85	
Elliptical Head Factor	2.0	
Weld is pre-Heated	No	

Element From Node	50	
Detail Type	Nozzle	
Detail ID	Vent	
Dist. from "FROM" Node / Offset dist	0	mm
Nozzle Diameter	1	iN

Nozzle Schedule	XXS	
Nozzle Class	150	
Layout Angle	0.0	
Blind Flange (Y/N)	N	
Weight of Nozzle (Used if > 0)	1.8274	kgf
Grade of Attached Flange	GR 1.1	
Nozzle Matl	SA-333 6 [Impact Tested]	
Element From Node	50	
Detail Type	Nozzle	
Detail ID	PSV	
Dist. from "FROM" Node / Offset dist	500	mm
Nozzle Diameter	3	iN
Nozzle Schedule	XXS	
Nozzle Class	150	
Layout Angle	0.0	
Blind Flange (Y/N)	N	
Weight of Nozzle (Used if > 0)	9.0928	kgf
Grade of Attached Flange	GR 1.1	
Nozzle Matl	SA-333 6 [Impact Tested]	

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XY Coordinate Calculations:

From	To	X (Horiz.) mm	Y (Vert.) mm	DX (Horiz.) mm	DY (Vert.) mm
10	20	...	60	...	60
20	40	...	2010	...	1950
40	50	...	3960	...	1950
50	60	...	4020	...	60

PV Elite includes an 1/8 inch (3.175mm) raised face and gasket thicknesses for girth flanges and tubesheet thicknesses where applicable in the Tangent to Tangent length calculatioN The calculated dimensions are based on the given element lengths. Due to variability in manufacturing (weld gaps etc.), the Tangent to Tangent length may not be exact.

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Internal Pressure Results Summary:

Element Thickness, Pressure, Diameter and Allowable Stress :

From	To	Int. Press + Liq. Hd barg	Nominal Thickness mm	Total Corr Allowance mm	Element Diameter mm	Allowable Stress(SE) N/mm^2	Element#
10	20	12.6	18	1.5	2500	137.9	1
20	40	12.6	18	1.5	2500	117.21	2
40	50	12.6	18	1.5	2500	117.21	3
50	60	12.6	18	1.5	2500	137.9	4

Element Required Thickness and MAWP :

From	To	Design Pressure barg	M.A.W.P. Corroded barg	M.A.P. New & Cold barg	Minimum Thickness mm	Required Thickness mm	Element#
10	20	12	14.8	17.07	15.3	12.8107	1
20	40	12	14.81	16.83	17.85	14.8801	2
40	50	12	14.81	16.83	17.85	14.8801	3
50	60	12	14.8	17.07	15.3	12.8107	4
Minimum			14.14	16.83			

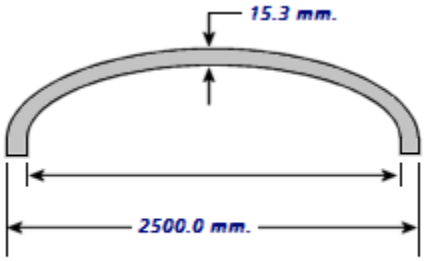
MAWP: 14.14 barg, limited by: Nozzle Reinforcement.

Elements Suitable for Design Internal Pressure.

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Internal Pressure Calculation Results:

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Internal Pressure Results for: Element # 1

Elliptical Head Design Information:			
Design Pressure P	12.600 barg	Int. Design Temperature	90 °C
Material	SA-516 70	Ext. Design Temperature	0 °C
Length	60.000 mm	External Pressure Chart	CS-2
		UNS Number	K02700
Int. Corr. All. c	1.5000 mm	Allowable Stress (ope) S	137.9 N/mm^2
Ext. Corr. All. ce	0.0000 mm	Allowable Stress (amb) Sa	137.9 N/mm^2
Outside Diameter Do	2500.000 mm	Actual Stress	112.8 N/mm^2
Spec. MiN Thk t or e	15.3000 mm	Spec. Nominal Thk.	18.000 mm
Surface Area	72764.6 cm^2	SG of Contents	0.000
Element Volume	2258882.5 cm³	Weight of Contents	0.0 kgf
Empty Weight	1098.5 kgf	Operating Weight	1098.5 kgf
		Comp. All. Ope. Stress	113.5 N/mm^2
		Aspect Ratio	2.00

Radiography Information:			
Spot Radiography per UW-11(a,5,b) Type 1		Seamless	
Circ. Joint Efficiency	85 %	Long. Joint Efficiency E	100 %

Tolerance for Formed Heads per UG-81(a):
Head inner surface maximum deviation outside the specified shape, 1.25% of D: 31.025 mm
Head inner surface maximum deviation inside the specified shape, 0.625% of D: 15.513 mm

Required Thickness due to Internal Pressure [tr]:
= (P*Do*Kcor)/(2*S*E+2*P*(Kcor-0.1)) per Appendix 1-4 (c)
= (12.6*2500*0.998)/(2*137.9*1+2*12.6*(0.998-0.1))
= 11.3107 + 1.5000 = 12.8107 mm

Max. Allowable Working Pressure at given Thickness, corroded [MAWP]:
Less Operating Hydrostatic Head Pressure of 0.600 barg
= (2*S*E*t)/(Kcor*Do-2*t*(Kcor-0.1)) per Appendix 1-4 (c)
= (2*137.9*1*13.8)/(0.998*2500-2*13.8*(0.998-0.1))
= 15.4 - 0.6 = 14.8 barg

Maximum Allowable Pressure, New and Cold [MAPNC]:
= (2*S*E*t)/(K*Do-2*t*(K-0.1)) per Appendix 1-4 (c)
= (2*137.9*1*15.3)/(1*2500-2*15.3*(1-0.1))

= 17.07 barg

Actual stress at given pressure and thickness, corroded [Sact]:
= (P*(Kcor*Do-2*t*(Kcor-0.1)))/(2*E*t)
= (12.6*(0.998*2500-2*13.8*(0.998-0.1)))/(2*1*13.8)
= 112.821 N/mm^2

Straight Flange Required Thickness:
= (P*Ro)/(S*E+0.4*P) + ca per Appendix 1-1 (a)(1)
= (12.6*1250)/(137.9*1+0.4*12.6)+1.5
= 12.880 mm

Straight Flange Maximum Allowable Working Pressure:
Less Operating Hydrostatic Head Pressure of 0.600 barg
= (S*E*t)/(Ro-0.4*t) per Appendix 1-1 (a)(1)
= (137.9 * 1 * 16.5)/(1250 - 0.4 * 16.5)
= 18.3 - 0.6 = 17.7 barg

Factor K, corroded condition [Kcor]:
= (2 + (Inside Diameter/(2 * Inside Head Depth))^2)/6
= (2 + (2472/(2 * 618.9))^2)/6
= 0.998385

Percent Elong. per UCS-79, VIII-1-01-57 (75*tnom/Rf)*(1-Rf/Ro) 3.155 %

MDMT Calculations in the Knuckle Portion:

Note: This Element/Detail was specified as being Impact Tested.

MDMT Calculations in the Head Straight Flange:

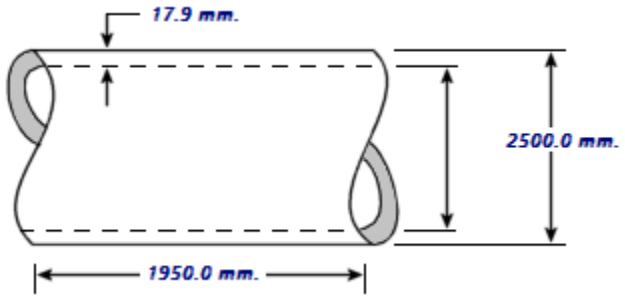
Note: This Element/Detail was specified as being Impact Tested.

Tolerance for Formed Heads per UG-81(a):
Head inner surface maximum deviation outside the specified shape, 1.25% of D: 31.025 mm
Head inner surface maximum deviation inside the specified shape, 0.625% of D: 15.513 mm

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Internal Pressure Calculation Results:

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Internal Pressure Results for: Element # 2

Cylindrical Shell Design Information:			
Design Pressure P	12.600 barg	Int. Design Temperature	90 °C
Material	SA-516 70	Ext. Design Temperature	0 °C
Length	1950.000 mm	External Pressure Chart	CS-2
		UNS Number	K02700
Int. Corr. All. c	1.5000 mm	Allowable Stress (ope) S	137.9 N/mm^2
Ext. Corr. All. ce	0.0000 mm	Allowable Stress (amb) Sa	137.9 N/mm^2
Outside Diameter Do	2500.000 mm	Actual Stress	112.7 N/mm^2
Spec. MiN Thk t or e	17.8500 mm	Spec. Nominal Thk.	18.000 mm
Surface Area	153171.0 cm^2	SG of Contents	0.000
Element Volume	9302281.0 cm³	Weight of Contents	0.0 kgf
Empty Weight	2121.5 kgf	Operating Weight	2121.5 kgf
		Comp. All. Ope. Stress	118.8 N/mm^2

Radiography Information:			
Spot Radiography per UW-11(a,5,b) Type 1		Spot Radiography per UW-11(b) Type 1	
Circ. Joint Efficiency	85 %	Long. Joint Efficiency E	85 %

Required Thickness due to Internal Pressure [tr]:
= (P*Ro) / (S*E+0.4*P) per Appendix 1-1 (a)(1)
= (12.6*1250)/(137.9*0.85+0.4*12.6)
= 13.3801 + 1.5000 = 14.8801 mm

Max. Allowable Working Pressure at given Thickness, corroded [MAWP]:
Less Operating Hydrostatic Head Pressure of 0.600 barg
= (S*E*t)/(Ro-0.4*t) per Appendix 1-1 (a)(1)
= (137.9*0.85*16.35)/(1250-0.4*16.35)
= 15.41 - 0.6 = 14.81 barg

Maximum Allowable Pressure, New and Cold [MAPNC]:
= (S*E*t)/(Ro-0.4*t) per Appendix 1-1 (a)(1)
= (137.9*0.85*17.85)/(1250-0.4*17.85)
= 16.83 barg

Actual stress at given pressure and thickness, corroded [Sact]:
= (P*(Ro-0.4*t))/(E*t)
= (12.6*((1250-0.4*16.35))/(0.85*16.35)

= 112.743 N/mm^2

% Elongation per Table UG-79-1 (50*tnom/Rf*(1-Rf/Ro)) 0.725 %

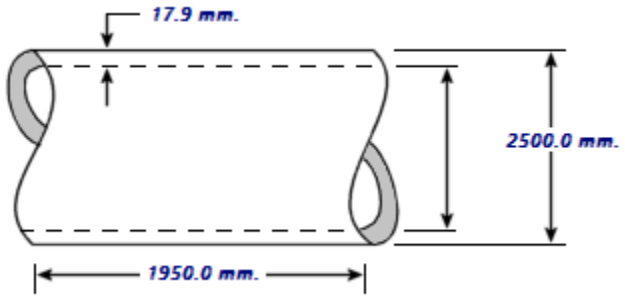
Minimum Design Metal Temperature Results:

Note: This Element/Detail was specified as being Impact Tested.

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Internal Pressure Calculation Results:

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Internal Pressure Results for: Element # 3

Cylindrical Shell Design Information:			
Design Pressure P	12.600 barg	Int. Design Temperature	90 °C
Material	SA-516 70	Ext. Design Temperature	0 °C
Length	1950.000 mm	External Pressure Chart	CS-2
		UNS Number	K02700
Int. Corr. All. c	1.5000 mm	Allowable Stress (ope) S	137.9 N/mm^2
Ext. Corr. All. ce	0.0000 mm	Allowable Stress (amb) Sa	137.9 N/mm^2
Outside Diameter Do	2500.000 mm	Actual Stress	112.7 N/mm^2
Spec. MiN Thk t or e	17.8500 mm	Spec. Nominal Thk.	18.000 mm
Surface Area	153171.0 cm^2	SG of Contents	0.000
Element Volume	9302281.0 cm³	Weight of Contents	0.0 kgf
Empty Weight	2121.5 kgf	Operating Weight	2121.5 kgf
		Comp. All. Ope. Stress	118.8 N/mm^2

Radiography Information:			
Spot Radiography per UW-11(a,5,b) Type 1		Spot Radiography per UW-11(b) Type 1	
Circ. Joint Efficiency	85 %	Long. Joint Efficiency E	85 %

Required Thickness due to Internal Pressure [tr]:
= (P*Ro) / (S*E+0.4*P) per Appendix 1-1 (a)(1)
= (12.6*1250)/(137.9*0.85+0.4*12.6)
= 13.3801 + 1.5000 = 14.8801 mm

Max. Allowable Working Pressure at given Thickness, corroded [MAWP]:
Less Operating Hydrostatic Head Pressure of 0.600 barg
= (S*E*t)/(Ro-0.4*t) per Appendix 1-1 (a)(1)
= (137.9*0.85*16.35)/(1250-0.4*16.35)
= 15.41 - 0.6 = 14.81 barg

Maximum Allowable Pressure, New and Cold [MAPNC]:
= (S*E*t)/(Ro-0.4*t) per Appendix 1-1 (a)(1)
= (137.9*0.85*17.85)/(1250-0.4*17.85)
= 16.83 barg

Actual stress at given pressure and thickness, corroded [Sact]:
= (P*(Ro-0.4*t))/(E*t)
= (12.6*((1250-0.4*16.35))/(0.85*16.35)

= 112.743 N/mm^2

% Elongation per Table UG-79-1 (50*tnom/Rf*(1-Rf/Ro)) 0.725 %

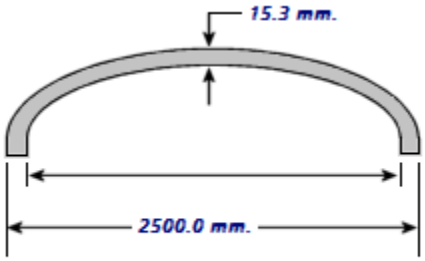
Minimum Design Metal Temperature Results:

Note: This Element/Detail was specified as being Impact Tested.

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Internal Pressure Calculation Results:

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Internal Pressure Results for: Element # 4

Elliptical Head Design Information:			
Design Pressure P	12.600 barg	Int. Design Temperature	90 °C
Material	SA-516 70	Ext. Design Temperature	0 °C
Length	60.000 mm	External Pressure Chart	CS-2
		UNS Number	K02700
Int. Corr. All. c	1.5000 mm	Allowable Stress (ope) S	137.9 N/mm^2
Ext. Corr. All. ce	0.0000 mm	Allowable Stress (amb) Sa	137.9 N/mm^2
Outside Diameter Do	2500.000 mm	Actual Stress	112.8 N/mm^2
Spec. MiN Thk t or e	15.3000 mm	Spec. Nominal Thk.	18.000 mm
Surface Area	72764.6 cm^2	SG of Contents	0.000
Element Volume	2258882.5 cm³	Weight of Contents	0.0 kgf
Empty Weight	1098.5 kgf	Operating Weight	1098.5 kgf
		Comp. All. Ope. Stress	113.5 N/mm^2
		Aspect Ratio	2.00

Radiography Information:			
Spot Radiography per UW-11(a,5,b) Type 1		Seamless	
Circ. Joint Efficiency	85 %	Long. Joint Efficiency E	100 %

Tolerance for Formed Heads per UG-81(a):

Head inner surface maximum deviation outside the specified shape, 1.25% of D: 31.025 mm
Head inner surface maximum deviation inside the specified shape, 0.625% of D: 15.513 mm

Required Thickness due to Internal Pressure [tr]:
= (P*Do*Kcor)/(2*S*E+2*P*(Kcor-0.1)) per Appendix 1-4 (c)
= (12.6*2500*0.998)/(2*137.9*1+2*12.6*(0.998-0.1))
= 11.3107 + 1.5000 = 12.8107 mm

Max. Allowable Working Pressure at given Thickness, corroded [MAWP]:
Less Operating Hydrostatic Head Pressure of 0.600 barg
= (2*S*E*t)/(Kcor*Do-2*t*(Kcor-0.1)) per Appendix 1-4 (c)
= (2*137.9*1*13.8)/(0.998*2500-2*13.8*(0.998-0.1))
= 15.4 - 0.6 = 14.8 barg

Maximum Allowable Pressure, New and Cold [MAPNC]:
= (2*S*E*t)/(K*Do-2*t*(K-0.1)) per Appendix 1-4 (c)
= (2*137.9*1*15.3)/(1*2500-2*15.3*(1-0.1))

= 17.07 barg

Actual stress at given pressure and thickness, corroded [Sact]:
= (P*(Kcor*Do-2*t*(Kcor-0.1)))/(2*E*t)
= (12.6*(0.998*2500-2*13.8*(0.998-0.1)))/(2*1*13.8)
= 112.821 N/mm^2

Straight Flange Required Thickness:
= (P*Ro)/(S*E+0.4*P) + ca per Appendix 1-1 (a)(1)
= (12.6*1250)/(137.9*1+0.4*12.6)+1.5
= 12.880 mm

Straight Flange Maximum Allowable Working Pressure:
Less Operating Hydrostatic Head Pressure of 0.600 barg
= (S*E*t)/(Ro-0.4*t) per Appendix 1-1 (a)(1)
= (137.9 * 1 * 16.5)/(1250 - 0.4 * 16.5)
= 18.3 - 0.6 = 17.7 barg

Factor K, corroded condition [Kcor]:
= (2 + (Inside Diameter/(2 * Inside Head Depth))^2)/6
= (2 + (2472/(2 * 618.9))^2)/6
= 0.998385

Percent Elong. per UCS-79, VIII-1-01-57 (75*tnom/Rf)*(1-Rf/Ro) 3.155 %

MDMT Calculations in the Knuckle Portion:

Note: This Element/Detail was specified as being Impact Tested.

MDMT Calculations in the Head Straight Flange:

Note: This Element/Detail was specified as being Impact Tested.

Tolerance for Formed Heads per UG-81(a):
Head inner surface maximum deviation outside the specified shape, 1.25% of D: 31.025 mm
Head inner surface maximum deviation inside the specified shape, 0.625% of D: 15.513 mm

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Hydrostatic Test Pressure Results:

UG99(b)	= 1.30 * M.A.W.P. * Sa/S	18.383 barg
UG99b(b)(35)	= 1.30 * Design Pres * Sa/S	15.600 barg
UG99(c)	= 1.30 * M.A.P. - Head(Hyd)	21.626 barg
UG100	= 1.10 * M.A.W.P. * Sa/S	15.555 barg
PED	= max(1.43*DP, 1.25*DP*ratio)	17.160 barg
PED&UG99(b)(35)	= max(1.43*DP, 1.3*DP*ratio)	17.160 barg
App 27-4	= M.A.W.P.	14.141 barg

Pressure per the PED:
= max(1.43 * Design Pressure, 1.25 * Design Pressure * Stress ratio)
= max(1.43 * 12, 1.25 * 12 * 1)
= max(17.16, 15)
= 17.160 barg

Vertical Test performed per: PED

Please note that Nozzle, Shell, Head, Flange, etc MAWPs are all considered when determining the hydrotest pressure for those test types that are based on the MAWP of the vessel.

Stresses on Elements due to Test Pressure (N/mm^2 & barg):

From	To	Stress	Allowable	Ratio	Pressure
10	20	142.8	179.3	0.797	17.68
20	40	144.3	179.3	0.805	17.61
40	50	142.7	179.3	0.796	17.42
50	60	139.2	179.3	0.776	17.23

Stress ratios for Nozzle and Pad Materials (N/mm^2):

Description	Pad/Nozzle	Ambient	Operating	Ratio
Drain	Nozzle	117.90	117.90	1.000
PG	Nozzle	137.90	137.90	1.000
PT	Nozzle	137.90	137.90	1.000
TG	Nozzle	117.90	117.90	1.000
TT	Nozzle	117.90	117.90	1.000
IN/OUT	Nozzle	117.90	117.90	1.000
MAN HOLE	Nozzle	137.90	137.90	1.000
MAN HOLE	Pad	137.90	137.90	1.000
Vent	Nozzle	117.90	117.90	1.000
PSV	Nozzle	117.90	117.90	1.000
Minimum				1.000

Stress ratios for Pressurized Vessel Elements (N/mm^2):

Description	Ambient	Operating	Ratio
	137.90	137.90	1.000
	137.90	137.90	1.000
	137.90	137.90	1.000
	137.90	137.90	1.000
Minimum			1.000

Hoop Stress in Nozzle Wall during Pressure Test (N/mm^2):

Description	Ambient	Operating	Ratio
Drain	2.54	153.30	0.017
PG	3.29	179.27	0.018
PT	3.28	179.27	0.018
TG	5.24	153.28	0.034
TT	5.22	153.28	0.034
IN/OUT	5.37	153.30	0.035
MAN HOLE	29.03	179.27	0.162
Vent	2.47	153.30	0.016
PSV	4.34	153.30	0.028

Elements Suitable for Test Pressure.

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External Pressure Results Summary:

External Pressure Calculation Results:

ASME Code, Section VIII Division 1, 2023

External Pressure Calculations:

From	To	Section Length mm	Outside Diameter mm	Corroded Thickness mm	Factor A	Factor B N/mm^2
10	20	No Calc	2500	13.8	0.00076667	76.7114
20	40	4431.57	2500	16.35	0.00038682	38.6729
40	50	4431.57	2500	16.35	0.00038682	38.6729
50	60	No Calc	2500	13.8	0.00076667	76.7114

External Pressure Calculations:

From	To	External Actual T. mm	External Required T. mm	External Design Pressure barg	External M.A.W.P. barg
10	20	15.3	No Calc	...	4.705
20	40	17.85	No Calc	...	3.372
40	50	17.85	No Calc	...	3.372
50	60	15.3	No Calc	...	4.705
Minimum					3.372

External Pressure Calculations:

From	To	Actual Length Bet. Stiffeners mm	Allowable Length Bet. Stiffeners mm	Ring Inertia Required cm^4	Ring Inertia Available cm^4
10	20	No Calc	No Calc	No Calc	No Calc
20	40	4431.57	No Calc	No Calc	No Calc
40	50	4431.57	No Calc	No Calc	No Calc
50	60	No Calc	No Calc	No Calc	No Calc

Elements Suitable for External Pressure.

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Element and Detail Weights:

From	To	Element Metal Wgt. kg	Element ID Volume cm³	Corroded Metal Wgt. kg	Corroded ID Volume cm³	Extra due Misc % kg
10	20	1098.49	2258882	1006.95	2266775	...
20	40	2121.49	9302281	1945.87	9324945	...
40	50	2121.49	9302281	1945.87	9324945	...
50	60	1098.49	2258882	1006.95	2266775	...
Total		6439	23122326.00	5905	23183442.00	0

Weight of Details:

From	Type	Weight of Detail kg	X Offset, Dtl. Cent. mm	Y Offset, Dtl. Cent. mm	Z Offset Dtl. Cent. mm	Description
10	Nozl	1.82742	...	-719.7	...	Drain
20	Nozl	0.28886	1205.99	300	323.144	PG
20	Nozl	0.28886	1205.99	1000	-323.144	PT
20	Nozl	2.94774	1226.39	300	-328.61	TG
20	Nozl	0.64212	1226.39	1000	328.61	TT
20	Nozl	3.8853	-1248.53	300	...	IN/OUT
20	Nozl	373.425	...	500	1269.65	MAN HOLE
20	Legs	549.199	...	-370	...	LEGS
50	Nozl	1.82742	...	719.7	...	Vent
50	Nozl	9.09278	500	666.815	...	PSV
40	Trun	35.7523	...	1750	...	Trunnions

Total Weight of Each Detail Type:

Nozzles	394.2
Legs	549.2
Trunnions	35.8
Sum of the Detail Weights	979.2 kg

Weight Summation Results: (kg)

	Fabricated	Shop Test	Shipping	Erected	Empty	Operating
Main Elements	6440.0	6440.0	6440.0	6440.0	6440.0	6440.0
Nozzles	394.2	394.2	394.2	394.2	394.2	394.2
Legs	549.2	549.2	549.2	549.2	549.2	549.2
Trunnions	35.8	35.8	35.8	35.8	35.8	35.8
Test Liquid	...	23108.2	...	...	...	...
Totals	7419.1	30527.4	7419.1	7419.1	7419.1	7419.1

Weight Summary:

Fabricated Wt.	- Bare Weight without Removable Internals	7419.1 kg
Shop Test Wt.	- Fabricated Weight + Water (Full)	30527.4 kg
Shipping Wt.	- Fab. Weight + removable Intls.+ Shipping App.	7419.1 kg
Erected Wt.	- Fab. Wt + or - loose items (trays,platforms etc.)	7419.1 kg
Ope. Wt. no Liq	- Fab. Weight + Internals. + Details + Weights	7419.1 kg
Operating Wt.	- Empty Weight + Operating Liq. Uncorroded	7419.1 kg
Field Test Wt.	- Empty Weight + Water (Full)	30527.4 kg

Weights used in Vortex Shedding Calculations:

Mass of the Upper 1/3 of the Vertical Vessel (operating)	2295.2 kg
Mass of the Upper 1/3 of the Vertical Vessel (filled w/water)	9483.9 kg
Mass of the Upper 1/3 of the Vertical Vessel (empty)	2502.0 kg

Surface Areas of Elements:

From	To	Outside Surface Area cm^2	Inside Surface Area cm^2
10	20	72764.6	70755.4
20	40	153171	150966
40	50	153171	150966
50	60	72764.6	70755.4
Total		451871.4	443442.2 cm^2
Total		486.4	477.3 ft²

Element and Detail Weights:

From	To	Total Ele. Empty Wgt. kg	Total. Ele. Oper. Wgt. kg	Total. Ele. Hydro. Wgt. kg	Total Dtl. Offset Mom. kgm	Oper. Wgt. No Liquid kg
10	20	1100.32	1100.32	3357.82	...	1100.32
20	Legs	449.251	449.251	2117.87	473.372	449.251
Legs	40	2053.72	2053.72	9681.7	...	2053.72
40	50	2157.25	2157.25	11453.8	...	2157.25
50	60	1109.41	1109.41	3366.92	...	1109.41

Cumulative Vessel Weight

From	To	Cumulative Ope Wgt. No Liquid kg	Cumulative Oper. Wgt. kg	Cumulative Hydro. Wgt. kg
10	20	...	...	...
20	Legs	-1100.32	-1100.32	-3357.82
Legs	40	5320.38	5320.38	24502.5
40	50	3266.66	3266.66	14820.8
50	60	1109.41	1109.41	3366.92

The cumulative operating weights no liquid in the column above are the cumulative operating weights minus the operating liquid weight minus any weights absent in the empty conditioN

Cumulative Vessel Moment

From	To	Cumulative Empty Mom. kgm	Cumulative Oper. Mom. kgm	Cumulative Hydro. Mom. kgm
10	20	...	...	...
20	Legs	473.372	473.372	473.372
Legs	40	...	...	...
40	50	...	...	...
50	60	...	...	...

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Nozzle Flange MAWP Results: (barg & °C)

Nozzle Description	Flange Rating Ope.	Flange Rating Ambient	Design Temp	Class	Grade/ Group	Equiv. Press	Max Pressure UG-44(b)	Max Pressure 50%	Max Pressure DNV
Drain	18.00	19.60	90	150	GR 1.1	...	...	...	...
TG	18.00	19.60	90	150	GR 1.1	...	...	...	...
TT	18.00	19.60	90	150	GR 1.1	...	...	...	...
IN/OUT	18.00	19.60	90	150	GR 1.1	...	...	...	...
MAN HOLE	18.00	19.60	90	150	GR 1.1	...	...	...	...
Vent	18.00	19.60	90	150	GR 1.1	...	...	...	...
PSV	18.00	19.60	90	150	GR 1.1	...	...	...	...
Min Rating	18.000	19.600, [for Core Elements]				...	...	...	...

Flange Pressure Ratings are per ASME B16.5 2020 Metric Edition

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Natural Frequency [fn]:

```
  = 1 / ( 2 * pi * sqrt( wyy /( 386 * |( wy )| )))
  = 1/( 2 * pi * sqrt( 150.5/( 386 * |( 1779 )| ))) Imperial units
  = 10.750 Hz.
```

where:

```
 wy = SumOf( weight * deflection )
 wyy = SumOf( weight * deflection^2 )
```

The Natural Frequencies for the vessel have been computed iteratively by solving a system of matrices. These matrices describe the mass and the stiffness of the vessel. This is the generalized eigenvalue/ eigenvector problem and is referenced in some mathematical texts.

The Natural Frequency for the Vessel (Empty.) is 33.6429 Hz.

Natural Frequency [fn]:
```
  = 1 / ( 2 * pi * sqrt( wyy /( 386 * |( wy )| )))
  = 1/( 2 * pi * sqrt( 150.5/( 386 * |( 1779 )| ))) Imperial units
  = 10.750 Hz.
```

where:
```
 wy = SumOf( weight * deflection )
 wyy = SumOf( weight * deflection^2 )
```

The Natural Frequency for the Vessel (Ope...) is 33.6429 Hz.

Natural Frequency [fn]:
```
  = 1 / ( 2 * pi * sqrt( wyy /( 386 * |( wy )| )))
  = 1/( 2 * pi * sqrt( 13696/( 386 * |( 37124 )| ))) Imperial units
  = 5.148 Hz.
```

where:
```
 wy = SumOf( weight * deflection )
 wyy = SumOf( weight * deflection^2 )
```

The Natural Frequency for the Vessel (Filled) is 16.1681 Hz.

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Wind Load Calculation Results:

Wind Code: European Eurocode ENV 1991-2-4: 1995

Input Echo - User Input Values:

Terrain Category I Flat Unobstructed			
Terrain Factor	kt	0.170	
Effective Height - Table 8.1	Zmin	6.562	m
Effective Height - Table 8.1	Zo	0.033	m
Reference Wind Velocity	Vref	144.000	Km/hr
Air Density per Section 7.1	Rho	1.250	kg/m³
Wind Direction Factor	Cdir	1.000	
Temperature Factor	Ctmp	1.000	
Altitude Factor	Calt	1.000	
Peak Factor	g	3.500	
Topography Coefficient	Ct	1.000	
Wind Force Coefficient	Cf	0.700	
Vessel Base Height (site)	Hb	0.000	mm
Total Vessel Height	h	4873.693	mm

Sample Calculation for the First Element:

Reference Wind Velocity - paragraph 7.2 [Vref]
= Vref0 * Cd * Ctmp * Calt
= 144 * 1 * 1 * 1
= 144 Km/hr

Reference Wind Pressure - paragarph 7.1 [qref]
= 0.50 * Rho(kg/m^3) * Vref² - Metric Units
= 0.00261 * Vref² - Imperial Units
= 0.00261(based on mph units) * 144²
= 20.9 psf
In chosen units:
= 102 kg/m^2

Dynamic Coefficient - per Section 9 [Cd]
Average Diameter = 2500 mm
H/D = 4020/2500 = 1.608

From Section 9:
Cd = 1.05

Roughness Coefficient- paragraph 8.2 [cr(z)]
Wind Height for first element = 396.3 mm
Because Wind Height < 20 m
Cr(z) = Kt * Ln ((HgtMin + Base Height) / Zo)
= 0.17 * Ln ((2000 + 0)/10)
= 0.901

Exposure Coefficient - paragraph 8.5 [Ce]
Because Cd >= 1.0:
= Cr(z)² * (1 + 2 * gpeak * Kt / (Cr(z) * Ct))
= 0.901² * (1 + 2 * 3.5 * 0.17/(0.901 * 1))
= 1.883

Force on the First Element - paragraph 6.1 [Rf]
= qref * Ce * Cd * Cf * Area
= 102 * 1.883 * 1.05 * 0.7 * 1.671
= 235.9 kgf

Summary:

Element	Hgt z	qref	Ce(z)	Cr(z)	Area	Force

	mm	kg/m^2			cm^2	kgf
Node 10 - 20	396.307	102.031	1.883	0.901	16706.5	235.933
Node 20 - 40	1652.350	102.031	1.883	0.901	58500.0	826.151
Node 40 - 50	3602.350	102.031	2.192	1.001	58500.0	961.823
Node 50 - 60	4873.693	102.031	2.359	1.052	16706.5	295.555

Wind Vibration Calculations

This evaluation is based on work by Kanti Mahajan and Ed Zorilla

Nomenclature

```
 Cf  - Correction factor for natural frequency
  D  - Average outer insulated diameter of vessel, mm
 Df  - Damping Factor < 0.75 Unstable,  > 0.95 Stable
 Dr  - Average outer insulated of top half of vessel, mm
  f  - Natural frequency of vibration (Hertz)
 f1  - Natural frequency of bare vessel based on a unit value of (D/L²)(10⁴)
  L  - Total height of structure mm
 Lc  - Total length of conical section(s) of vessel, mm
 tb  - Uncorroded plate thickness at bottom of vessel, mm
 V30 - Design Wind Speed provided by user, Km/hr
 Vc  - Critical wind velocity, Km/hr
 Vw  - Maximum wind speed at top of structure, Km/hr
 W   - Total corroded weight of structure, kgf
 Ws  - Cor. vessel weight excl. weight of parts which do not effect stiff. kgf
  Z  - Maximum amplitude of vibration at top of vessel, mm
 Dl  - Logarithmic decrement ( taken as 0.03 for Welded Structures )
 Vp  - Vib. Chance, <= 0.32037E-06 (High); 0.32037E-06 < 0.40047E-06 (Probable)
 P30 - wind pressure 30 feet above the base
```

Check other Conditions and Basic Assumptions:

```
 :: Total Cone Length / Total Length < 0.5
 :: 0/4020 = 0

 :: [ D / L² ] * 10⁴ < 8 (English Units, ft.)
 :: [ 8.202/13.19² ] * 10⁴ = 471.5 [Geometry Violation]
```

Compute the vibration possibility. If Vp > 0.40047E-06 no chance. [Vp]:

```
  = W / ( L * Dr²)
  = 6885/( 4020 * 2500² )
  = 0.27402E-06
```

Compute the damping factor Df which is a measure of instability [Df]:

```
  = W * Dl/ ( L * Dr² )
  = 6885 * 0.03/( 4020 * 2500² )
  = 0.513
```

Compute the critical wind velocity [Vc]:

```
  = 3.4 * f * Dr
  = 3.4 * 33.64 * 8.202
  = 938.203 mile/hr  [1509.851 Km/hr]
```

Compute the velocity at the top of the tower [Vw]:

```
  = V30 * ( L / ( 30 + BaseHeight ))^0.143
  = 144 * ( 4020/( 30 + 0 ))^0.143
  = 128.034 Km/hr
```

Compute the maximum gust velocity using the gust response factor Gh [Vg]:

```
  = Vw * Gh
  = 128 * 1
  = 128.034 Km/hr
```

Since Vc is greater than Vg the dynamic deflection Z, does not need to be computed.

The Natural Frequency for the Vessel (Ope...) is 33.6429 Hz.

Wind Load Calculation:

From	To	Wind Height mm	Wind Diameter mm	Wind Area cm^2	Wind Pressure kg/m^2	Element Wind Load kgf
10	20	396.307	3000	16706.5	141.222	235.933
20	40	1652.35	3000	58500	141.222	826.151
40	50	3602.35	3000	58500	164.414	961.823
50	60	4873.69	3000	16706.5	176.91	295.555

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Earthquake Load Calculation Results:

Input Values for G Loading:

Horizontal Acceleration factor	(GX)	0.000
Horizontal Acceleration factor	(GZ)	0.700
Vertical Acceleration factor	(GY)	0.000

Computed Results:

The Natural Frequency for the Vessel (Ope...) is 33.6429 Hz.

Earthquake Load Calculation:

From	To	Earthquake Height mm	Earthquake Weight kgf	Element Ope Load kgf	Element Emp Load kgf	Element Vertical Load kgf
10	20	30	1100.32	770.224	770.224	...
20	Legs	410	449.251	314.476	314.476	...
Legs	40	1210	2053.72	1437.6	1437.6	...
40	50	2985	2157.25	1510.07	1510.07	...
50	60	3990	1109.41	776.589	776.589	...

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The following table is for the Operating Case.

Wind/Earthquake Shear, Bending:

From	To	Distance to Support mm	Cumulative Wind Shear kgf	Earthquake Shear kgf	Wind Bending kgm	Earthquake Bending kgm
10	20	646.343	...	...	...	...
20	Legs	175	235.933	770.224	69.9184	228.255
Legs	40	800	2319.46	4808.96	3977.43	7472.83
40	50	2575	1257.38	2286.66	1601.73	3216.87
50	60	3846.34	295.555	776.589	87.5876	230.141

Note:
The Wind Shears/Moments and the Earthquake Shears/Moments calculated and printed in the Wind/Earthquake Shear and Bending report have been factored by the input Scalar/Load reductions factors of;
Wind: 1.000; Earthquake: 1.000.

Note:
Review the Vessel Design Summary for the cumulative shear force and bending moment on the support.

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Wind Deflection Calculations:

The following table is for Wind Deflection; Operating Case.

Wind Load Deflection:

From	To	Cumulative Shear kgf	Centroid Deflection mm	Elem. End Deflection mm	Elem. Ang. Rotation
10	20	...	0.72274	0.72274	0.00075225
20	Legs	235.933	0.72278	0.72288	0.000753
Legs	40	2319.46	0.7241	0.72623	0.00075531
40	50	1257.38	0.72952	0.73311	0.00075599
50	60	295.555	0.73323	0.73334	0.00075599

Critical Wind Velocity for Tower Vibration:

From	To	1st Crit. Wind Speed Km/hr	2nd Crit. Wind Speed Km/hr
10	20	1811.82	11323.9
20	40	1811.82	11323.9
40	50	1811.82	11323.9
50	60	1811.82	11323.9

Allowable deflection at the Tower Top (Ope)(6.000"/100ft. Criteria)
Allowable deflection : 20.100 Actual deflection : 0.733 mm

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Longitudinal Stress Constants:

From	To	Metal Area New cm^2	Metal Area Corroded cm^2	Section Modulus New mm³	Section Modulus Corroded mm³
10	20	1194.31	1077.87	73736184	66627120
20	40	1391.93	1275.73	85761792	78696800
40	50	1391.93	1275.73	85761792	78696800
50	60	1194.31	1077.87	73736184	66627120

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Longitudinal Allowable Stresses:

From	To	Tensile N/mm^2	Hydrotest Tensile N/mm^2	Compressive N/mm^2	Hydrotest Compressive N/mm^2
10	20	140.658	182.886	-113.503	-116.76
20	Legs	140.658	182.855	-118.775	-121.343
Legs	40	140.658	182.855	-118.775	-121.343
40	50	140.658	182.886	-118.775	-121.343
50	60	140.658	182.886	-113.503	-116.76

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Longitudinal Stress Report

Longitudinal Operating and Empty Stresses are computed in the corroded conditioN Stresses due to loads in the hydrostatic test cases have been computed in the new and cold conditioN

Longitudinal Pressure Stresses due to:

From	To	Longitudinal Stress Internal Pressure N/mm^2	Longitudinal Stress External Pressure N/mm^2	Longitudinal Stress Hydrotest Pressure N/mm^2
10	20	56.1865	...	68.9008
20	40	47.2859	...	58.8863
40	50	47.2859	...	58.8863
50	60	56.1865	...	68.9008

Longitudinal Stresses due to Weight Loads for these Conditions:

From	To	Wght. Str. Empty N/mm^2	Wght. Str. Operating N/mm^2	Wght. Str. Hydrotest N/mm^2	Wght. Str. Emp. Mom. N/mm^2	Wght. Str. Opr. Mom. N/mm^2
10	20	...	...	...	...	...
20	Legs	0.084584	0.084584	0.23658	0.058988	0.058988
Legs	40	-0.40899	-0.40899	-0.37485	...	...
40	50	-0.25112	-0.25112	-0.23015	...	...
50	60	-0.10094	-0.10094	-0.091097	...	...

Longitudinal Stresses due to Weight Loads and Bending for these Conditions:

From	To	Wght. Str. Hyd. Mom. N/mm^2	Bend. Str. Oper. Wind N/mm^2	Bend. Str. Oper. Equ. N/mm^2	Bend. Str. Hyd. Wind N/mm^2	Bend. Str. Hyd. Equ. N/mm^2
10	20	...	...	...	...	...
20	Legs	0.054129	0.0087127	0.028444	0.0026383	...
Legs	40	...	0.49564	0.93121	0.15009	...
40	50	...	0.1996	0.40086	0.060441	...
50	60	...	0.012892	0.033874	0.0038441	...

Longitudinal Stresses due to these Conditions:

From	To	Vortex Shedding Operating Case N/mm^2	Vortex Shedding Empty Case N/mm^2	Vortex Shedding Test Case N/mm^2	Earthquake Empty Case N/mm^2
10	20	...	...	...	...
20	Legs	...	...	...	0.028444
Legs	40	...	...	...	0.93121
40	50	...	...	...	0.40086
50	60	...	...	...	0.033874

Longitudinal Stresses due to Applied Axial Forces:

		Longitudinal Stress	Longitudinal Stress

From	To	Y Forces Wind N/mm^2	Y Forces Seismic N/mm^2
10	20	...	...
20	Legs	...	...
Legs	40	...	...
40	50	...	...
50	60	...	...

Longitudinal Stresses due to User Forces and Moments:

From	To	Wind For/Mom Corroded N/mm^2	Earthquake For/Mom Corroded N/mm^2	Wind For/Mom No Corrosion N/mm^2	Earthquake For/Mom No Corrosion N/mm^2
10	20	...	...	...	...
20	Legs	...	...	...	...
Legs	40	...	...	...	...
40	50	...	...	...	...
50	60	...	...	...	...

Bending Stresses due to Blast Load:

From	To	Bending Stress N/mm^2
10	20	...
20	Legs	...
Legs	40	...
40	50	...
50	60	...

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Stress Combination Load Cases for Vertical Vessels:

Load Case Definition Key

```
IP = Longitudinal Stress due to Internal  Pressure
EP = Longitudinal Stress due to External  Pressure
HP = Longitudinal Stress due to Hydrotest Pressure
NP = No Pressure
EW = Longitudinal Stress due to Weight (No Liquid)
OW = Longitudinal Stress due to Weight (Operating)
HW = Longitudinal Stress due to Weight (Hydrotest)
WI = Bending Stress due to Wind Moment (Operating)
EQ = Bending Stress due to Earthquake Moment (Operating)
EE = Bending Stress due to Earthquake Moment (Empty)
HI = Bending Stress due to Wind Moment (Hydrotest)
HE = Bending Stress due to Earthquake Moment (Hydrotest)
WE = Bending Stress due to Wind Moment (Empty) (no CA)
WF = Bending Stress due to Wind Moment (Filled) (no CA)
CW = Longitudinal Stress due to Weight (Empty) (no CA)
VO = Bending Stress due to Vortex Shedding Loads ( Ope )
VE = Bending Stress due to Vortex Shedding Loads ( Emp )
VF = Bending Stress due to Vortex Shedding Loads ( Test No CA. )
FW = Axial Stress due to Vertical Forces for the Wind Case
FS = Axial Stress due to Vertical Forces for the Seismic Case
BW = Bending Stress due to Lat. Forces for the Wind Case, Corroded
BS = Bending Stress due to Lat. Forces for the Seismic Case, Corroded
BN = Bending Stress due to Lat. Forces for the Wind Case, UnCorroded
BU = Bending Stress due to Lat. Forces for the Seismic Case, UnCorroded
BL = Bending Stress due to Blast Loads, Corroded
```

General Notes:

Case types HI and HE are in the Un-Corroded conditioN

Case types WE, WF, and CW are in the Un-Corroded conditioN

A blank stress and stress ratio indicates that the corresponding stress comprising those components that did not contribute to that type of stress.

An asterisk (*) in the final column denotes overstress.

Analysis of Load Case 1 : NP+EW+WI+FW+BW

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	0.00	140.66	0.00	113.50	0.0000	0.0000
20	0.15	140.66		118.78	0.0011	
20	0.09	140.66	-0.90	118.78	0.0006	0.0076
40		140.66	-0.45	118.78		0.0038
50		140.66	-0.11	113.50		0.0010

Analysis of Load Case 2 : NP+EW+EE+FS+BS

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	0.00	140.66	0.00	113.50	0.0000	0.0000
20	0.17	140.66	-0.00	118.78	0.0012	0.0000
20	0.52	140.66	-1.34	118.78	0.0037	0.0113
40	0.15	140.66	-0.65	118.78	0.0011	0.0055
50		140.66	-0.13	113.50		0.0012

Analysis of Load Case 3 : NP+OW+WI+FW+BW

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	0.00	140.66	0.00	113.50	0.0000	0.0000
20	0.15	140.66		118.78	0.0011	
20	0.09	140.66	-0.90	118.78	0.0006	0.0076
40		140.66	-0.45	118.78		0.0038
50		140.66	-0.11	113.50		0.0010

Analysis of Load Case 4 : NP+OW+EQ+FS+BS

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	0.00	140.66	0.00	113.50	0.0000	0.0000
20	0.17	140.66	-0.00	118.78	0.0012	0.0000
20	0.52	140.66	-1.34	118.78	0.0037	0.0113
40	0.15	140.66	-0.65	118.78	0.0011	0.0055
50		140.66	-0.13	113.50		0.0012

Analysis of Load Case 5 : NP+HW+HI

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	0.00	182.89	0.00	116.76	0.0000	0.0000
20	0.29	182.86		121.34	0.0016	
20		182.86	-0.52	121.34		0.0043
40		182.89	-0.29	121.34		0.0024
50		182.89	-0.09	116.76		0.0008

Analysis of Load Case 6 : NP+HW+HE

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	0.00	182.89	0.00	116.76	0.0000	0.0000
20	0.29	182.86		121.34	0.0016	
20		182.86	-0.37	121.34		0.0031
40		182.89	-0.23	121.34		0.0019
50		182.89	-0.09	116.76		0.0008

Analysis of Load Case 7 : IP+OW+WI+FW+BW

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	56.19	140.66		113.50	0.3995	
20	47.44	140.66		118.78	0.3373	
20	47.37	140.66		118.78	0.3368	
40	47.23	140.66		118.78	0.3358	
50	56.10	140.66		113.50	0.3988	

Analysis of Load Case 8 : IP+OW+EQ+FS+BS

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	56.19	140.66		113.50	0.3995	
20	47.46	140.66		118.78	0.3374	
20	47.81	140.66		118.78	0.3399	
40	47.44	140.66		118.78	0.3372	
50	56.12	140.66		113.50	0.3990	

Analysis of Load Case 9 : EP+OW+WI+FW+BW

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio

10	0.00	140.66	0.00	113.50	0.0000	0.0000
20	0.15	140.66		118.78	0.0011	
20	0.09	140.66	-0.90	118.78	0.0006	0.0076
40		140.66	-0.45	118.78		0.0038
50		140.66	-0.11	113.50		0.0010

Analysis of Load Case 10 : EP+OW+EQ+FS+BS

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	0.00	140.66	0.00	113.50	0.0000	0.0000
20	0.17	140.66	-0.00	118.78	0.0012	0.0000
20	0.52	140.66	-1.34	118.78	0.0037	0.0113
40	0.15	140.66	-0.65	118.78	0.0011	0.0055
50		140.66	-0.13	113.50		0.0012

Analysis of Load Case 11 : HP+HW+HI

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	68.90	182.89		116.76	0.3767	
20	59.18	182.86		121.34	0.3236	
20	58.66	182.86		121.34	0.3208	
40	58.72	182.89		121.34	0.3211	
50	68.81	182.89		116.76	0.3763	

Analysis of Load Case 12 : HP+HW+HE

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	68.90	182.89		116.76	0.3767	
20	59.18	182.86		121.34	0.3236	
20	58.51	182.86		121.34	0.3200	
40	58.66	182.89		121.34	0.3207	
50	68.81	182.89		116.76	0.3762	

Analysis of Load Case 13 : IP+WE+EW

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	56.19	140.66		113.50	0.3995	
20	47.43	140.66		118.78	0.3372	
20	46.88	140.66		118.78	0.3333	
40	47.03	140.66		118.78	0.3344	
50	56.09	140.66		113.50	0.3987	

Analysis of Load Case 14 : IP+WF+CW

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	56.19	140.66		113.50	0.3995	
20	47.36	140.66		118.78	0.3367	
20	46.91	140.66		118.78	0.3335	
40	47.06	140.66		118.78	0.3345	
50	56.10	140.66		113.50	0.3988	

Analysis of Load Case 15 : IP+VO+OW

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	56.19	140.66		113.50	0.3995	
20	47.43	140.66		118.78	0.3372	
20	46.88	140.66		118.78	0.3333	

40	47.03	140.66		118.78	0.3344
50	56.09	140.66		113.50	0.3987

Analysis of Load Case 16 : IP+VE+EW

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	56.19	140.66		113.50	0.3995	
20	47.43	140.66		118.78	0.3372	
20	46.88	140.66		118.78	0.3333	
40	47.03	140.66		118.78	0.3344	
50	56.09	140.66		113.50	0.3987	

Analysis of Load Case 17 : NP+VO+OW

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	0.00	140.66	0.00	113.50	0.0000	0.0000
20	0.14	140.66		118.78	0.0010	
20		140.66	-0.41	118.78		0.0034
40		140.66	-0.25	118.78		0.0021
50		140.66	-0.10	113.50		0.0009

Analysis of Load Case 18 : FS+BS+IP+OW

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	56.19	140.66		113.50	0.3995	
20	47.43	140.66		118.78	0.3372	
20	46.88	140.66		118.78	0.3333	
40	47.03	140.66		118.78	0.3344	
50	56.09	140.66		113.50	0.3987	

Analysis of Load Case 19 : FS+BS+EP+OW

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	0.00	140.66	0.00	113.50	0.0000	0.0000
20	0.14	140.66		118.78	0.0010	
20		140.66	-0.41	118.78		0.0034
40		140.66	-0.25	118.78		0.0021
50		140.66	-0.10	113.50		0.0009

Analysis of Load Case 20 : BL+IP+OW

From Node	Tensile Stress	All. Tens. Stress	Comp. Stress	All. Comp. Stress	Tens. Ratio	Comp. Ratio
10	56.19	140.66		113.50	0.3995	
20	47.43	140.66		118.78	0.3372	
20	46.88	140.66		118.78	0.3333	
40	47.03	140.66		118.78	0.3344	
50	56.09	140.66		113.50	0.3987	

Absolute Maximum of the all of the Stress Ratio's 0.3995

Element From : 10 to : 20
Governing Load Case 7 : IP+OW+WI+FW+BW

Element Description	Long Pressure Stress	Weight + Axial Load Stress	Eccentric Moment Stress	Wind or Earthquake Stress	Combined Stress	Which Side
Element # 1	56.2	...	...	...	56.2	+ Tens

Element # 1	56.2	...	...	...	...	- Comp
Element # 2	47.3	0.1	0.1	...	47.4	+ Tens
Element # 2	47.3	0.1	-0.1	-0.0	...	- Comp
Element # 2	47.3	-0.4	...	0.5	47.4	+ Tens
Element # 2	47.3	-0.4	...	-0.5	...	- Comp
Element # 3	47.3	-0.3	...	0.2	47.2	+ Tens
Element # 3	47.3	-0.3	...	-0.2	...	- Comp
Element # 4	56.2	-0.1	...	...	56.1	+ Tens
Element # 4	56.2	-0.1	...	-0.0	...	- Comp

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Shop/Field Installation Options :

Note : The CG is computed from the first Element From Node

Center of Gravity of the Nozzles	664.533 mm
Center of Gravity of the Legs	-310.000 mm
Center of Gravity of the Trunnions	3760.000 mm
Center of Gravity of Bare Shell New and Cold	2010.000 mm
Center of Gravity of Bare Shell Corroded	2010.000 mm
Vessel CG in the Operating Condition	1756.981 mm
Vessel CG in the Fabricated (Shop/Empty) Condition	1775.203 mm
Vessel CG in the Test Condition	1952.937 mm

Rigging Analysis Results:

- Lifting weight based on the user selected calculated empty weight

Total Effective Length of Vessel for this analysis		4020.00 mm
Total vessel weight (No Liquid)	Twt	7419.15 kgf
Impact weight multiplication factor	Imp	1.50
Design lifting weight, DWT = Imp * Twt		11128.72 kgf
Elevation of the Tailing Lug (bottom)		0.00 mm
Elevation of the Lifting Lug (top)		3760.00 mm
Design Reaction force at the tailing lug		5874.54 kgf
Design Reaction force at the Trunnions		5254.19 kgf
CG distance during field lifting operation		1775.20 mm
CG distance from tailing lug		1775.20 mm
CG distance from the nearer lifting lug/trunnion		1775.20 mm
Compressive Allowable Increase Factor		1.00

Critical Values: (N/mm^2, mm)

	Max Stress	Elevation	Allowables	
Bending	0.14	2010.00	101.12	(UG-23)
Shear	0.35	3570.00	96.53	(0.7*S)

The compressive bending allowable stress is the minimum of the tensile allowable and the compressive allowable times the specified compressive allowable increase factor.

Forces and Moments at selected elevations (not all analysis points shown):

Distance mm	Bending Moment kgm	Bending Stress N/mm^2	Shear Force kgf	Shear Stress N/mm^2
0.00	0.0	0.0	31.3	0.0
450.00	195.0	0.0	642.3	0.0
1620.00	1199.6	0.1	1698.9	0.1
2790.00	677.7	0.1	3500.0	0.2
3960.00	1078.4	0.1	507.3	0.0

Unity Check (Actual Stress / Allowable Stress):

Maximum Unity Check is 0.00147 at elevation 3960 mm - Must be <=1

Note: The rigging analysis is performed using a uniformly distributed load.

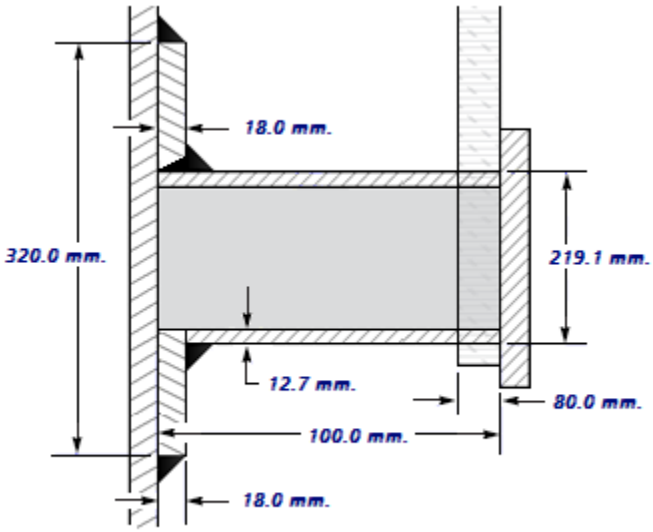
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Trunnion Analysis:

Input Data:

Trunnion Material		SA-516 70	
Trunnion Yield Stress	Sy	262.01	N/mm^2
Trunnion Outside Diameter	Tod	219.100	mm
Trunnion Thickness	Tthk	12.7000	mm
Trunnion Length	Tl	100.0000	mm
Reinforcing Pad Used		Yes	
Pad Outside Diameter	Dp	320.000	mm
Pad Thickness	Thkp	18.0000	mm
Pad Edge Fillet Weld Thk	Tfp	18.0000	mm
Bail/Sling Width	Tt	80.0000	mm
Sling Angle from Horizontal		0.0	deg
Occasional Load Factor	Occfac	1.0	
Number of Lugs in Group		2	



Trunnion may be inserted or abutting

Trunnion Force and Stress Results for different Lift Angles (kgf&N/mm^2):

Bending Stress Allowable:	172.9	N/mm^2
Shear Stress Allowable:	104.8	N/mm^2
Bearing Stress Allowable:	196.5	N/mm^2

Angle	Trunnion Lifting Load	Bending Stress	Shear Stress	Bearing Stress	Unity Check	Pass Fail
0	2627.1	3.8	3.1	1.5	0.052	Pass
5	2715.7	4.0	3.2	1.5	0.054	Pass
10	2800.3	4.1	3.3	1.6	0.056	Pass
15	2882.5	4.2	3.4	1.6	0.057	Pass
20	2963.5	4.3	3.5	1.7	0.059	Pass
25	3044.7	4.5	3.6	1.7	0.060	Pass
30	3127.2	4.6	3.7	1.7	0.062	Pass
35	3212.4	4.7	3.8	1.8	0.064	Pass
40	3301.8	4.8	3.9	1.8	0.065	Pass
45	3397.3	5.0	4.0	1.9	0.067	Pass
50	3501.0	5.1	4.2	2.0	0.069	Pass
55	3616.0	5.3	4.3	2.0	0.072	Pass

60	3746.3	5.5	4.5	2.1	0.074	Pass
65	3897.5	5.7	4.6	2.2	0.077	Pass
70	4078.2	6.0	4.9	2.3	0.081	Pass
75	4301.8	6.3	5.1	2.4	0.085	Pass
80	4590.3	6.7	5.5	2.6	0.091	Pass
85	4984.1	7.3	5.9	2.8	0.099	Pass
90	5564.4	8.1	6.6	3.1	0.110	Pass

Trunnion Calculation Results:

Trunnion Lifting Load [Tlf]:
= Resultant Load * Impact Factor
= 3710 * 1.5
= 5564.4 kgf

Trunnion Section Modulus [Z]:
= pi(Tod^4 - Tid^4) / (32 * Tod)
= pi(219.1^4 - 193.7^4)/(32 * 219.1)
= 401810.6 mm³

Trunnion Bending Moment [Tmom]:
= (Tl - 0.5 * Tt)/9.807 * Tlf
= (100 - 0.5 * 80)/9.807 * 5564
= 333.9 kgm

Trunnion Calculated Bending Stress [Sbc]:
= Tmom * 9.807/Z
= 333.9 * 9.807/401811
= 8.15 N/mm^ [Passed] Sbc < min(0.66 * SY * Occfac, 0.75 * Sy) (172.93)

Trunnion Cross Section Area [Txsa]:
= pi/4(Tod² - Tid²)
= pi/4(219.1² - 193.7²)
= 82.3 cm^2

Trunnion Calculated Shear Stress [Ssc]:
= Tlf/Txsa
= 5564/82.35
= 6.63 N/mm^ [Passed] Ssc < 0.4 * Sy * Occfac (104.80)

Trunnion Unity Check [Uchk]:
= Sbc/Sba + Ssc/Ssa
= 8.148/172.9 + 6.626/104.8
= 0.110 [Passed]

Weld Section Modulus at Edge of Trunnion [Sw]:
= pi(Tod/2)²
= pi(219.1/2)²
= 37702.9 mm²

Shear Stress in Weld due to Bending Moment [fs]:
= Tmom/Sw
= 333.9/37703
= 8.855 kgf/mm

Required Fillet Weld Leg Size at Edge of Trunnion [Wsr]:
= max(10mm, fs/(0.4 * Sy))
= max(10mm, 8.855/(0.4 * 262))
= 10.000 mm

Trunnion Bearing Contact Area [Tbca]:
= Tod * Tt
= 219.1 * 80

= 175.3 cm^2

Trunnion Bearing Stress [Sbec]:
= Tlf/Tbca
= 5564/175.3
= 3.11 N/mm^ [Passed] Sbec < min(0.75 * SY * Occfac, 0.9 * Sy) (196.51)

Summary of Results:

Trunnion Unity Check Value: 0.1103 Must be less than or equal to 1

Comparison of Stress Values versus Allowables: (N/mm^2)

Type of Stress	Actual	Allowable	Pass/Fail
Bending Stress	8.15	172.93	Pass
Shear Stress	6.63	104.80	Pass
Bearing Stress	3.11	196.51	Pass

Results of WRC-107/537 Analysis on the Trunnion:

This following Stress Analysis assumes that the Trunnion
passes through the pad and is welded to the shell via a groove weld.
Additionally the re-pad is welded to the shell at the outside
edge via a fillet weld.

In the local stress results below, the 'Nozzle' is the 'Trunnion'.

WRC 107/537 Stress Analysis for the Lifting Lug to Shell Junction in the new and Cold Condition (no corrosion applied).

Attachment dimensions (C11P, C22P etc.) may be modified accounting for attachment welds where applicable.

Input Echo, WRC107/537 Item 1, Description: Trunnion

Diameter Basis for Vessel	Vbasis	ID	
Cylindrical or Spherical Vessel	Cylsph	Cylindrical	
Internal Corrosion Allowance	Cas	0.0000	mm
Vessel Diameter	Dv	2464.300	mm
Vessel Thickness	Tv	17.850	mm
Design Temperature	T1	37.8	C
Attachment Type	Type	Round	
Diameter Basis for Nozzle	Nbasis	ID	
Corrosion Allowance for Nozzle	Can	0.0000	mm
Nozzle Diameter	Dn	219.100	mm
Nozzle Thickness	Tn	12.700	mm
Nozzle Cold S.I. Allowable	SNmc	137.90	N/mm^2
Nozzle Hot S.I. Allowable	SNmh	137.90	N/mm^2
Thickness of Reinforcing Pad	Tpad	18.000	mm
Diameter of Reinforcing Pad	Dpad	356.000	mm
Design Internal Pressure	Dp	0.000	barg
Include Pressure Thrust		No	

External Forces and Moments in WRC 107/537 Convention:

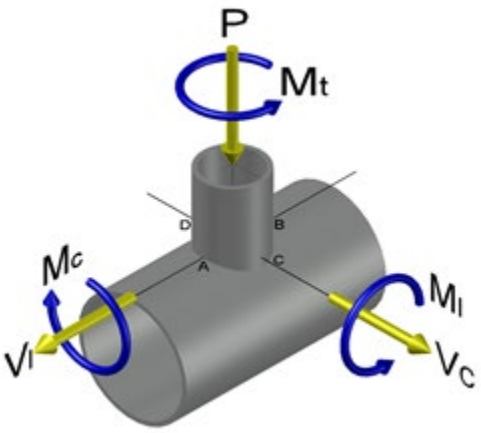
Radial Load	(SUS)	P	0.0	kgf
Longitudinal Shear	(SUS)	Vl	5564.4	kgf
Circumferential Shear	(SUS)	Vc	0.0	kgf
Circumferential Moment	(SUS)	Mc	0.0	kgm

Longitudinal Moment	(SUS)	Ml	333.9	kgm
Torsional Moment	(SUS)	Mt	0.0	kgm

Use Interactive Control		No
WRC107 Version	Version	March 1979

Include Pressure Stress Indices per Div. 2	No
Compute Pressure Stress per WRC-368	No
Local Loads applied at end of Nozzle/Attachment	No

WRC Bulletin 537 provides equations for the dimensionless curves found in bulletin 107. As noted in the foreword to bulletin 537, "537 is equivalent to WRC 107". Where 107 is printed in the results below, "537" can be interchanged with "107".



WRC 107/537 has dimensional limitations that can be found in the bulletin's Foreword and which can also be inferred by review of the non-dimensional curve limits.

Stress Attenuation Diameter (for Insert Plates) per WRC 297:
```
  = NozzleOD + 2 * 1.65 * sqrt( Rmean( t - ca ) )
  = 244.5 + 2 * 1.65 * sqrt( 1241.075 ( 17.85 - 0 ) )
  = 735.670 mm
```

WRC 107 Stress Calculation for SUStained loads:

Radial Load	P	0.0	kgf
Circumferential Shear	VC	0.0	kgf
Longitudinal Shear	VL	5564.4	kgf
Circumferential Moment	MC	0.0	kgm
Longitudinal Moment	ML	333.9	kgm
Torsional Moment	MT	0.0	kgm

Dimensionless Parameters used : Gamma = 34.87

Dimensionless Loads for Cylindrical Shells at Attachment Junction:

Curves read for 1979	Beta	Figure	Value	Location
N(PHI) / (P/Rm)	0.086	4C	6.264	(A,B)
N(PHI) / (P/Rm)	0.086	3C	5.722	(C,D)
M(PHI) / (P)	0.086	2C1	0.109	(A,B)
M(PHI) / (P)	0.086	1C	0.142	(C,D)
N(PHI) / (MC/(Rm**2 * Beta))	0.086	3A	0.839	(A,B,C,D)
M(PHI) / (MC/(Rm * Beta))	0.086	1A	0.100	(A,B,C,D)
N(PHI) / (ML/(Rm**2 * Beta))	0.086	3B	2.913	(A,B,C,D)
M(PHI) / (ML/(Rm * Beta))	0.086	1B	0.050	(A,B,C,D)

N(x) / (P/Rm)	0.086	3C	5.722	(A,B)
N(x) / (P/Rm)	0.086	4C	6.264	(C,D)
M(x) / (P)	0.086	1C1	0.148	(A,B)
M(x) / (P)	0.086	2C	0.109	(C,D)
N(x) / (MC/(Rm**2 * Beta))	0.086	4A	1.174	(A,B,C,D)
M(x) / (MC/(Rm * Beta))	0.086	2A	0.056	(A,B,C,D)
N(x) / (ML/(Rm**2 * Beta))	0.086	4B	0.830	(A,B,C,D)
M(x) / (ML/(Rm * Beta))	0.086	2B	0.081	(A,B,C,D)

Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Attachment Junction (N/mm^2)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Bend. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. ML	-2.0	-2.0	2.0	2.0	0.0	0.0	0.0	0.0
Circ. Bend. ML	-7.1	7.1	7.1	-7.1	0.0	0.0	0.0	0.0
Tot. Circ. Str.	-9.1	5.1	9.1	-5.1	0.0	0.0	0.0	0.0
Long. Memb. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb. ML	-0.6	-0.6	0.6	0.6	0.0	0.0	0.0	0.0
Long. Bend. ML	-11.5	11.5	11.5	-11.5	0.0	0.0	0.0	0.0
Tot. Long. Str.	-12.1	11.0	12.1	-11.0	0.0	0.0	0.0	0.0
Shear VC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear VL	0.0	0.0	0.0	0.0	-4.0	-4.0	4.0	4.0
Shear MT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tot. Shear	0.0	0.0	0.0	0.0	-4.0	-4.0	4.0	4.0
Str. Int.	12.1	11.0	12.1	11.0	7.9	7.9	7.9	7.9

Dimensionless Parameters used : Gamma = 69.53

Dimensionless Loads for Cylindrical Shells at Pad Edge:

Curves read for 1979	Beta	Figure	Value	Location
N(PHI) / (P/Rm)	0.125	4C	10.669	(A,B)
N(PHI) / (P/Rm)	0.125	3C	7.675	(C,D)
M(PHI) / (P)	0.125	2C1	0.049	(A,B)
M(PHI) / (P)	0.125	1C	0.084	(C,D)
N(PHI) / (MC/(Rm**2 * Beta))	0.125	3A	2.700	(A,B,C,D)
M(PHI) / (MC/(Rm * Beta))	0.125	1A	0.082	(A,B,C,D)
N(PHI) / (ML/(Rm**2 * Beta))	0.125	3B	7.865	(A,B,C,D)
M(PHI) / (ML/(Rm * Beta))	0.125	1B	0.032	(A,B,C,D)
N(x) / (P/Rm)	0.125	3C	7.675	(A,B)
N(x) / (P/Rm)	0.125	4C	10.669	(C,D)
M(x) / (P)	0.125	1C1	0.086	(A,B)
M(x) / (P)	0.125	2C	0.050	(C,D)

N(x) / (MC/(Rm**2 * Beta))	0.125	4A	4.622	(A,B,C,D)
M(x) / (MC/(Rm * Beta))	0.125	2A	0.041	(A,B,C,D)
N(x) / (ML/(Rm**2 * Beta))	0.125	4B	2.699	(A,B,C,D)
M(x) / (ML/(Rm * Beta))	0.125	2B	0.043	(A,B,C,D)

Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Edge of Reinforcing Pad (N/mm^2)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Bend. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. ML	-7.5	-7.5	7.5	7.5	0.0	0.0	0.0	0.0
Circ. Bend. ML	-12.5	12.5	12.5	-12.5	0.0	0.0	0.0	0.0
Tot. Circ. Str.	-20.0	5.1	20.0	-5.1	0.0	0.0	0.0	0.0
Long. Memb. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb. ML	-2.6	-2.6	2.6	2.6	0.0	0.0	0.0	0.0
Long. Bend. ML	-17.1	17.1	17.1	-17.1	0.0	0.0	0.0	0.0
Tot. Long. Str.	-19.6	14.5	19.6	-14.5	0.0	0.0	0.0	0.0
Shear VC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear VL	0.0	0.0	0.0	0.0	-5.5	-5.5	5.5	5.5
Shear MT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tot. Shear	0.0	0.0	0.0	0.0	-5.5	-5.5	5.5	5.5
Str. Int.	20.0	14.5	20.0	14.5	10.9	10.9	10.9	10.9

WRC 107/537 Stress Summations:

Vessel Stress Summation at Attachment Junction (N/mm^2)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Pm (SUS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Pl (SUS)	-2.0	-2.0	2.0	2.0	0.0	0.0	0.0	0.0
Circ. Q (SUS)	-7.1	7.1	7.1	-7.1	0.0	0.0	0.0	0.0
Long. Pm (SUS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Pl (SUS)	-0.6	-0.6	0.6	0.6	0.0	0.0	0.0	0.0
Long. Q (SUS)	-11.5	11.5	11.5	-11.5	0.0	0.0	0.0	0.0
Shear Pm (SUS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pl (SUS)	0.0	0.0	0.0	0.0	-4.0	-4.0	4.0	4.0
Shear Q (SUS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pm (SUS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Pm+Pl (SUS)	2.0	2.0	2.0	2.0	7.9	7.9	7.9	7.9
Pm+Pl+Q (Total)	12.1	11.0	12.1	11.0	7.9	7.9	7.9	7.9

Vessel Stress Summation Comparison (N/mm^2):

Type of Stress Int.	Max. S.I.	S.I. Allowable	Result
Pm (SUS)	0.00	137.90	Passed
Pm+Pl (SUS)	7.93	206.85	Passed
Pm+Pl+Q (TOTAL)	12.10	413.70	Passed

The Pm+Pl+Q allowable above was based on the rules of ASME VIII-2 Part 4, 4.1.6.3 (a)&(b) or per ASME VIII-2, 5.5.6.1(1)&(2) Part 5 as applicable.

The Pm+Pl+Q allowable was based on a temperature range cycling from ambient to design temperature.

WRC 107/537 Stress Summations:

Vessel Stress Summation at Reinforcing Pad Edge (N/mm^2)

Type of Stress	Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Pm (SUS)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Pl (SUS)		-7.5	-7.5	7.5	7.5	0.0	0.0	0.0	0.0
Circ. Q (SUS)		-12.5	12.5	12.5	-12.5	0.0	0.0	0.0	0.0
Long. Pm (SUS)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Pl (SUS)		-2.6	-2.6	2.6	2.6	0.0	0.0	0.0	0.0
Long. Q (SUS)		-17.1	17.1	17.1	-17.1	0.0	0.0	0.0	0.0
Shear Pm (SUS)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pl (SUS)		0.0	0.0	0.0	0.0	-5.5	-5.5	5.5	5.5
Shear Q (SUS)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pm (SUS)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pm+Pl (SUS)		7.5	7.5	7.5	7.5	10.9	10.9	10.9	10.9
Pm+Pl+Q (Total)		20.0	14.5	20.0	14.5	10.9	10.9	10.9	10.9

Vessel Stress Summation Comparison (N/mm^2):

Type of Stress Int.	Max. S.I.	S.I. Allowable	Result
Pm (SUS)	0.00	137.90	Passed
Pm+Pl (SUS)	10.93	206.85	Passed
Pm+Pl+Q (TOTAL)	19.98	413.70	Passed

The Pm+Pl+Q allowable above was based on the rules of ASME VIII-2 Part 4, 4.1.6.3 (a)&(b) or per ASME VIII-2, 5.5.6.1(1)&(2) Part 5 as applicable.

The Pm+Pl+Q allowable was based on a temperature range cycling from ambient to design temperature.

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RESULTS FOR LEGS : Operating Case Description: LEGS

Legs attached to: node 20

Section Properties : I Beam HE200B

European Structural Steel Data

Overall Leg Length		1440.000	mm
Effective Leg Length	Leglen	1240.000	mm
Distance Leg Up Side of Vessel		350.000	mm
Number of Legs	Nleg	4	
Cross Sectional Area for HE200B	Aleg	78.100	cm^2
Section Inertia (strong axis)		5695.972	cm^4
Section Inertia (weak axis)		2002.990	cm^4
Section Modulus (strong axis)		570002.312	mm³
Section Modulus (weak axis)		200000.812	mm³
Radius of Gyration (strong axis)		85.400	mm
Radius of Gyration (weak axis)		50.700	mm

Leg Orientation - Weak Axis

Overturning Moment at top of Legs		7472.8	kgm
Total Weight Load at top of Legs	W	6869.9	kgf
Total Shear force at top of Legs		4809.0	kgf
Additional force in Leg due to Bracing	Fadd	0.0	kgf
Occasional Load Factor	Occfac	1.333	
Effective Leg End Condition Factor	k	1.000	

Note: The Legs are Not Cross Braced

The Leg Shear Force includes Wind, Seismic, and Applied Load Effects.

Pad Width along Circumference	C11P	300.000	mm
Pad Length along Vessel Axis	C22P	350.000	mm
Pad Thickness	Tpad	18.000	mm

Maximum Shear at top of one Leg [Vleg]:
= (max(Wind, Seismic, Blast) + applied forces)(Imax / Itot)
= (4809)(5696/15407)
= 1777.87 kgf

Axial Compression, Leg furthest from the Neutral Axis [Sma]:
= W/Nleg + (Mleg/(Nlegm*Rn))/Aleg
= 67370/4 + (73277640/(2 * 1361))/7810
= 5.60 N/mm^2

Axial Compression, Leg closest to the Neutral Axis [Sva]:
= (W / Nleg) / Aleg
= (6870/4)/78.1
= 2.16 N/mm^2

Allowable Compressive Stress for the Selected Leg (KL/r < Cc) [Sa]:
= Occfac(1-(kl/r)²/(2*Cc²))Fy/(5/3+3(Kl/r)/(8*Cc)-(Kl/r³)/(8*Cc³)
= 1.333(1-(24.46)²/(2*127.2²))248.2/(5/3+3(24.46)/(8*127.2)-(24.46³)/(8*127.2³)
= 186.87 N/mm^2

Bending at the Bottom of the Leg closest to the NA. [S]:
= (Vleg * Leglen / Smdwa)
= (1778 * 1240/200001)
= 108.10 N/mm^2

Allowable Bending Stress[Sb]:
= (0.6 * Fy * Occfac)
= (0.6 * 248.2 * 1.333)
= 198.53 N/mm^2

AISC Unity Check [Sc](must be <= to 1 and > 0) :
= (Sma/Sa)+(0.85*S)/((1-Sma/Spex)*Sb)
= (5.604/186.9)+(0.85 *108.1)/((1 -5.604/2334) *198.5)
= 0.4939

WRC 107 Stress Analysis for Leg to Shell Junction, Ope Condition

Rectangular Attachment Parameter	C11	200.000	mm
Rectangular Attachment Parameter	C22	330.950	mm

Input Echo, WRC107/537 Item 1, Description: LEGS

Diameter Basis for Vessel	Vbasis	ID	
Cylindrical or Spherical Vessel	Cylsph	Cylindrical	
Internal Corrosion Allowance	Cas	1.5000	mm
Vessel Diameter	Dv	2464.300	mm
Vessel Thickness	Tv	17.850	mm
Design Temperature	T1	90.0	C
Vessel Material		SA-516 70	
Vessel UNS Number		K02700	
Vessel Cold S.I. Allowable	Smc	137.90	N/mm^2
Vessel Hot S.I. Allowable	Smh	137.90	N/mm^2

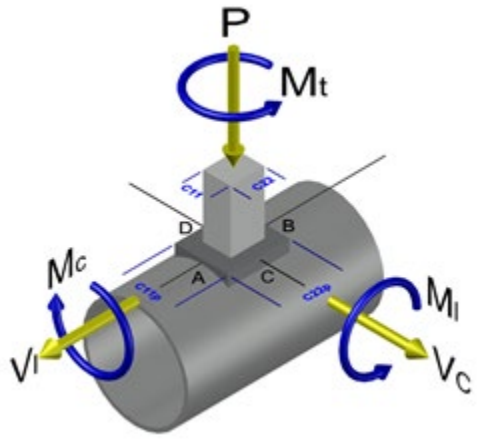
See ASME VIII Div. 1, UG-23(e), for determination of the SPS allowable.

Attachment Type	Type	Rectangular	
Parameter C11	C11	200.00	mm
Parameter C22	C22	330.95	mm
Thickness of Reinforcing Pad	Tpad	18.000	mm
Pad Parameter C11P	C11p	300.000	mm
Pad Parameter C22P	C22p	350.000	mm
Design Internal Pressure	Dp	12.000	barg
Include Pressure Thrust		No	
Vessel Centerline Direction Cosine	Vx	0.000	
Vessel Centerline Direction Cosine	Vy	1.000	
Vessel Centerline Direction Cosine	Vz	0.000	
Nozzle Centerline Direction Cosine	Nx	1.000	
Nozzle Centerline Direction Cosine	Ny	0.000	
Nozzle Centerline Direction Cosine	Nz	0.000	
Global Force (SUS)	Fx	0.0	kgf
Global Force (SUS)	Fy	1717.5	kgf
Global Force (SUS)	Fz	0.0	kgf
Global Moment (SUS)	Mx	0.0	kgm
Global Moment (SUS)	My	0.0	kgm
Global Moment (SUS)	Mz	190.6	kgm
Internal Pressure (SUS)	P	12.00	barg
Include Pressure Thrust		No	
Global Force (OCC)	Fx	1777.9	kgf
Global Force (OCC)	Fy	2745.3	kgf

Global Force (OCC)	Fz	0.0	kgf
Global Moment (OCC)	Mx	0.0	kgm
Global Moment (OCC)	My	0.0	kgm
Global Moment (OCC)	Mz	1407.0	kgm
Occasional Internal Pressure (OCC)	Pvar	0.00	barg

Use Interactive Control		No
WRC107 Version	Version	March 1979
Include Pressure Stress Indices per Div. 2		No
Compute Pressure Stress per WRC-368		No
Local Loads applied at end of Nozzle/Attachment		No

WRC Bulletin 537 provides equations for the dimensionless curves found in bulletin 107. As noted in the foreword to bulletin 537, "537 is equivalent to WRC 107". Where 107 is printed in the results below, "537" can be interchanged with "107".



WRC 107/537 has dimensional limitations that can be found in the bulletin's Foreword and which can also be inferred by review of the non-dimensional curve limits.

WRC 107 Stress Calculation for SUStained loads:

Radial Load	P	0.0	kgf
Circumferential Shear	VC	0.0	kgf
Longitudinal Shear	VL	1717.5	kgf
Circumferential Moment	MC	0.0	kgm
Longitudinal Moment	ML	-190.6	kgm
Torsional Moment	MT	0.0	kgm

Dimensionless Parameters used : Gamma = 36.41

Dimensionless Loads for Cylindrical Shells at Attachment Junction:

Curves read for 1979	Beta	Figure	Value	Location
N(PHI) / (P/Rm)	0.129	4C	6.103	(A,B)
N(PHI) / (P/Rm)	0.129	3C	4.905	(C,D)
M(PHI) / (P)	0.096	2C1	0.096	(A,B)
M(PHI) / (P)	0.096	1C	0.129	(C,D)
N(PHI) / (MC/(Rm**2 * Beta))	0.095	3A	0.995	(A,B,C,D)
M(PHI) / (MC/(Rm * Beta))	0.103	1A	0.096	(A,B,C,D)
N(PHI) / (ML/(Rm**2 * Beta))	0.112	3B	3.808	(A,B,C,D)
M(PHI) / (ML/(Rm * Beta))	0.108	1B	0.045	(A,B,C,D)
N(x) / (P/Rm)	0.114	3C	5.271	(A,B)

N(x) / (P/Rm)	0.114	4C	6.278	(C,D)
M(x) / (P)	0.116	1C1	0.117	(A,B)
M(x) / (P)	0.116	2C	0.079	(C,D)
N(x) / (MC/(Rm**2 * Beta))	0.095	4A	1.435	(A,B,C,D)
M(x) / (MC/(Rm * Beta))	0.123	2A	0.049	(A,B,C,D)
N(x) / (ML/(Rm**2 * Beta))	0.112	4B	1.103	(A,B,C,D)
M(x) / (ML/(Rm * Beta))	0.122	2B	0.065	(A,B,C,D)

Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Attachment Junction (N/mm^2)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Bend. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. ML	1.0	1.0	-1.0	-1.0	0.0	0.0	0.0	0.0
Circ. Bend. ML	3.1	-3.1	-3.1	3.1	0.0	0.0	0.0	0.0
Tot. Circ. Str.	4.2	-2.1	-4.2	2.1	0.0	0.0	0.0	0.0
Long. Memb. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb. ML	0.4	0.4	-0.4	-0.4	0.0	0.0	0.0	0.0
Long. Bend. ML	4.0	-4.0	-4.0	4.0	0.0	0.0	0.0	0.0
Tot. Long. Str.	4.4	-3.6	-4.4	3.6	0.0	0.0	0.0	0.0
Shear VC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear VL	0.0	0.0	0.0	0.0	-0.7	-0.7	0.7	0.7
Shear MT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tot. Shear	0.0	0.0	0.0	0.0	-0.7	-0.7	0.7	0.7
Str. Int.	4.4	3.6	4.4	3.6	1.5	1.5	1.5	1.5

Dimensionless Parameters used : Gamma = 75.95

Dimensionless Loads for Cylindrical Shells at Pad Edge:

Curves read for 1979	Beta	Figure	Value	Location
N(PHI) / (P/Rm)	0.142	4C	10.883	(A,B)
N(PHI) / (P/Rm)	0.142	3C	7.125	(C,D)
M(PHI) / (P)	0.127	2C1	0.045	(A,B)
M(PHI) / (P)	0.127	1C	0.079	(C,D)
N(PHI) / (MC/(Rm**2 * Beta))	0.127	3A	2.968	(A,B,C,D)
M(PHI) / (MC/(Rm * Beta))	0.137	1A	0.077	(A,B,C,D)
N(PHI) / (ML/(Rm**2 * Beta))	0.134	3B	8.258	(A,B,C,D)
M(PHI) / (ML/(Rm * Beta))	0.134	1B	0.028	(A,B,C,D)
N(x) / (P/Rm)	0.135	3C	7.497	(A,B)
N(x) / (P/Rm)	0.135	4C	11.159	(C,D)
M(x) / (P)	0.137	1C1	0.076	(A,B)
M(x) / (P)	0.137	2C !	0.041	(C,D)
N(x) / (MC/(Rm**2 * Beta))	0.127	4A	5.223	(A,B,C,D)

```
M(x)   / ( MC/(Rm    * Beta) )   0.153   2A        0.035   (A,B,C,D)
N(x)   / ( ML/(Rm**2 * Beta) )   0.134   4B        3.025   (A,B,C,D)
M(x)   / ( ML/(Rm    * Beta) )   0.141   2B        0.034   (A,B,C,D)
```

Note - The ! mark next to the figure name denotes curve value exceeded.

Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Edge of Reinforcing Pad (N/mm^2)

Type of Stress	Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb.	P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Bend.	P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb.	MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb.	MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb.	ML	4.1	4.1	-4.1	-4.1	0.0	0.0	0.0	0.0
Circ. Bend.	ML	7.1	-7.1	-7.1	7.1	0.0	0.0	0.0	0.0
Tot. Circ. Str.		11.2	-3.0	-11.2	3.0	0.0	0.0	0.0	0.0
Long. Memb.	P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend.	P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb.	MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend.	MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb.	ML	1.5	1.5	-1.5	-1.5	0.0	0.0	0.0	0.0
Long. Bend.	ML	8.1	-8.1	-8.1	8.1	0.0	0.0	0.0	0.0
Tot. Long. Str.		9.7	-6.6	-9.7	6.6	0.0	0.0	0.0	0.0
Shear	VC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear	VL	0.0	0.0	0.0	0.0	-1.5	-1.5	1.5	1.5
Shear	MT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tot. Shear		0.0	0.0	0.0	0.0	-1.5	-1.5	1.5	1.5
Str. Int.		11.2	6.6	11.2	6.6	2.9	2.9	2.9	2.9

WRC 107 Stress Calculation for OCCasional loads:

Radial Load	P	1777.9	kgf
Circumferential Shear	VC	0.0	kgf
Longitudinal Shear	VL	2745.3	kgf
Circumferential Moment	MC	0.0	kgm
Longitudinal Moment	ML	-1407.0	kgm
Torsional Moment	MT	0.0	kgm

Dimensionless Parameters used : Gamma = 36.41

Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Attachment Junction (N/mm^2)

Type of Stress	Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb.	P	-2.5	-2.5	-2.5	-2.5	-2.0	-2.0	-2.0	-2.0
Circ. Bend.	P	-8.5	8.5	-8.5	8.5	-11.4	11.4	-11.4	11.4
Circ. Memb.	MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb.	MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Circ. Memb. ML	7.6	7.6	-7.6	-7.6	0.0	0.0	0.0	0.0
Circ. Bend. ML	23.2	-23.2	-23.2	23.2	0.0	0.0	0.0	0.0
Tot. Circ. Str.	19.9	-9.6	-41.8	21.6	-13.4	9.4	-13.4	9.4
Long. Memb. P	-2.1	-2.1	-2.1	-2.1	-2.5	-2.5	-2.5	-2.5
Long. Bend. P	-10.3	10.3	-10.3	10.3	-7.0	7.0	-7.0	7.0
Long. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb. ML	2.9	2.9	-2.9	-2.9	0.0	0.0	0.0	0.0
Long. Bend. ML	29.7	-29.7	-29.7	29.7	0.0	0.0	0.0	0.0
Tot. Long. Str.	20.1	-18.6	-45.1	35.0	-9.6	4.5	-9.6	4.5
Shear VC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear VL	0.0	0.0	0.0	0.0	-1.2	-1.2	1.2	1.2
Shear MT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tot. Shear	0.0	0.0	0.0	0.0	-1.2	-1.2	1.2	1.2
Str. Int.	20.1	18.6	45.1	35.0	13.8	9.7	13.8	9.7

Dimensionless Parameters used : Gamma = 75.95
Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Edge of Reinforcing Pad (N/mm^2)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb. P	-9.3	-9.3	-9.3	-9.3	-6.1	-6.1	-6.1	-6.1
Circ. Bend. P	-17.6	17.6	-17.6	17.6	-31.0	31.0	-31.0	31.0
Circ. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. ML	30.3	30.3	-30.3	-30.3	0.0	0.0	0.0	0.0
Circ. Bend. ML	52.3	-52.3	-52.3	52.3	0.0	0.0	0.0	0.0
Tot. Circ. Str.	55.5	-13.7	-109.5	30.3	-37.2	24.9	-37.2	24.9
Long. Memb. P	-6.4	-6.4	-6.4	-6.4	-9.6	-9.6	-9.6	-9.6
Long. Bend. P	-29.6	29.6	-29.6	29.6	-16.1	16.1	-16.1	16.1
Long. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb. ML	11.4	11.4	-11.4	-11.4	0.0	0.0	0.0	0.0
Long. Bend. ML	59.8	-59.8	-59.8	59.8	0.0	0.0	0.0	0.0
Tot. Long. Str.	35.2	-25.3	-107.3	71.6	-25.6	6.5	-25.6	6.5
Shear VC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear VL	0.0	0.0	0.0	0.0	-2.4	-2.4	2.4	2.4
Shear MT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tot. Shear	0.0	0.0	0.0	0.0	-2.4	-2.4	2.4	2.4
Str. Int.	55.5	25.3	109.5	71.6	37.6	25.2	37.6	25.2

WRC 107/537 Stress Summations:

Vessel Stress Summation at Attachment Junction (N/mm^2)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Pm (SUS)	42.5	43.7	42.5	43.7	42.5	43.7	42.5	43.7
Circ. Pm (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Pm(TOTAL)	42.5	43.7	42.5	43.7	42.5	43.7	42.5	43.7
Circ. Pl (SUS)	1.0	1.0	-1.0	-1.0	0.0	0.0	0.0	0.0
Circ. Pl (OCC)	5.1	5.1	-10.1	-10.1	-2.0	-2.0	-2.0	-2.0
Circ. Pl(TOTAL)	6.2	6.2	-11.1	-11.1	-2.0	-2.0	-2.0	-2.0
Circ. Q (SUS)	3.1	-3.1	-3.1	3.1	0.0	0.0	0.0	0.0
Circ. Q (OCC)	14.7	-14.7	-31.7	31.7	-11.4	11.4	-11.4	11.4
Circ. Q (TOTAL)	17.9	-17.9	-34.9	34.9	-11.4	11.4	-11.4	11.4
Long. Pm (SUS)	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3
Long. Pm (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Pm(TOTAL)	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3
Long. Pl (SUS)	0.4	0.4	-0.4	-0.4	0.0	0.0	0.0	0.0
Long. Pl (OCC)	0.8	0.8	-5.0	-5.0	-2.5	-2.5	-2.5	-2.5
Long. Pl(TOTAL)	1.1	1.1	-5.4	-5.4	-2.5	-2.5	-2.5	-2.5
Long. Q (SUS)	4.0	-4.0	-4.0	4.0	0.0	0.0	0.0	0.0
Long. Q (OCC)	19.4	-19.4	-40.1	40.1	-7.0	7.0	-7.0	7.0
Long. Q (TOTAL)	23.4	-23.4	-44.1	44.1	-7.0	7.0	-7.0	7.0
Shear Pm (SUS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pm (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pm(TOTAL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pl (SUS)	0.0	0.0	0.0	0.0	-0.7	-0.7	0.7	0.7
Shear Pl (OCC)	0.0	0.0	0.0	0.0	-1.2	-1.2	1.2	1.2
Shear Pl(TOTAL)	0.0	0.0	0.0	0.0	-1.9	-1.9	1.9	1.9
Shear Q (SUS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Q (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Q (TOTAL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pm (SUS)	42.5	43.7	42.5	43.7	42.5	43.7	42.5	43.7
Pm (SUS+OCC)	42.5	43.7	42.5	43.7	42.5	43.7	42.5	43.7
Pm+Pl (SUS)	43.5	44.7	41.5	42.7	42.5	43.7	42.5	43.7
Pm+Pl (SUS+OCC)	48.7	49.9	31.4	32.6	40.7	41.9	40.7	41.9
Pm+Pl+Q (Total)	66.6	33.0	28.3	67.5	29.3	53.3	29.3	53.3

Vessel Stress Summation Comparison (N/mm^2):

Type of Stress Int.	Max. S.I.	S.I. Allowable	Result
Pm (SUS)	43.71	137.90	Passed
Pm (SUS+OCC)	43.71	165.48	Passed
Pm+Pl (SUS)	44.74	206.85	Passed
Pm+Pl (SUS+OCC)	49.88	248.22	Passed
Pm+Pl+Q (TOTAL)	67.47	481.39	Passed

The Pm+Pl+Q allowable above was based on the rules of ASME VIII-2 Part 4, 4.1.6.3 (a)&(b) or per ASME VIII-2, 5.5.6.1(1)&(2) Part 5 as applicable.

The Pm+Pl+Q allowable was based on a temperature range cycling from ambient to design temperature.

WRC 107/537 Stress Summations:

Vessel Stress Summation at Reinforcing Pad Edge (N/mm^2)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Pm (SUS)	90.0	91.2	90.0	91.2	90.0	91.2	90.0	91.2
Circ. Pm (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Pm(TOTAL)	90.0	91.2	90.0	91.2	90.0	91.2	90.0	91.2
Circ. Pl (SUS)	4.1	4.1	-4.1	-4.1	0.0	0.0	0.0	0.0
Circ. Pl (OCC)	20.9	20.9	-39.6	-39.6	-6.1	-6.1	-6.1	-6.1
Circ. Pl(TOTAL)	25.0	25.0	-43.7	-43.7	-6.1	-6.1	-6.1	-6.1
Circ. Q (SUS)	7.1	-7.1	-7.1	7.1	0.0	0.0	0.0	0.0
Circ. Q (OCC)	34.6	-34.6	-69.9	69.9	-31.0	31.0	-31.0	31.0
Circ. Q (TOTAL)	41.7	-41.7	-77.0	77.0	-31.0	31.0	-31.0	31.0
Long. Pm (SUS)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Long. Pm (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Pm(TOTAL)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Long. Pl (SUS)	1.5	1.5	-1.5	-1.5	0.0	0.0	0.0	0.0
Long. Pl (OCC)	5.0	5.0	-17.8	-17.8	-9.6	-9.6	-9.6	-9.6
Long. Pl(TOTAL)	6.5	6.5	-19.4	-19.4	-9.6	-9.6	-9.6	-9.6
Long. Q (SUS)	8.1	-8.1	-8.1	8.1	0.0	0.0	0.0	0.0
Long. Q (OCC)	30.2	-30.2	-89.4	89.4	-16.1	16.1	-16.1	16.1
Long. Q (TOTAL)	38.4	-38.4	-97.5	97.5	-16.1	16.1	-16.1	16.1
Shear Pm (SUS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pm (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pm(TOTAL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pl (SUS)	0.0	0.0	0.0	0.0	-1.5	-1.5	1.5	1.5
Shear Pl (OCC)	0.0	0.0	0.0	0.0	-2.4	-2.4	2.4	2.4
Shear Pl(TOTAL)	0.0	0.0	0.0	0.0	-3.8	-3.8	3.8	3.8
Shear Q (SUS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Q (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Q (TOTAL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pm (SUS)	90.0	91.2	90.0	91.2	90.0	91.2	90.0	91.2
Pm (SUS+OCC)	90.0	91.2	90.0	91.2	90.0	91.2	90.0	91.2
Pm+Pl (SUS)	94.1	95.3	85.9	87.1	90.0	91.2	90.0	91.2
Pm+Pl (SUS+OCC)	115.0	116.2	46.2	47.4	84.1	85.3	84.1	85.3
Pm+Pl+Q (Total)	156.7	74.5	71.9	124.4	53.2	116.3	53.2	116.3

Vessel Stress Summation Comparison (N/mm^2):

Type of Stress Int.	Max. S.I.	S.I. Allowable	Result
Pm (SUS)	91.15	137.90	Passed
Pm (SUS+OCC)	91.15	165.48	Passed
Pm+Pl (SUS)	95.25	206.85	Passed
Pm+Pl (SUS+OCC)	116.18	248.22	Passed
Pm+Pl+Q (TOTAL)	156.68	481.39	Passed

The Pm+Pl+Q allowable above was based on the rules of ASME VIII-2 Part 4, 4.1.6.3 (a)&(b) or per ASME VIII-2, 5.5.6.1(1)&(2) Part 5 as applicable.

The Pm+Pl+Q allowable was based on a temperature range cycling from ambient to design temperature.

Bolting Size Requirement for Leg Baseplates :

Baseplate Material		SA-516 70	
Baseplate Allowable Stress	SBA	137.90	N/mm^2
Baseplate Length	B	400.0000	mm
Baseplate Width	D	400.0000	mm
Baseplate Thickness	BTHK	40.0000	mm
Leg Dimension Along Baseplate Length	d	199.9996	mm
Leg Dimension Along Baseplate Width	b	199.9996	mm
Dist. from the Leg Edge to Bolt Hole Center	z	50.0000	mm
Bolt Material		SA-307 B	
Bolt Allowable Tensile Stress	STBA	48.26	N/mm^2
Bolt Allowable Shear Stress	SBShear	28.96	N/mm^2
Anchor Bolt Nominal Diameter	BOD	33.0000	mm
Number of Anchor Bolts in Tension per Leg	NB	3	
Total Number of Anchors Bolt per Leg	NBT	6	
Bolt Corrosion Allowance	bca	0.0000	mm
Ultimate 28-day Concrete Strength	FCPRIME	20.685	N/mm^2

Leg Baseplate and Bolting Analysis, including Moments

Shear Stress in a Single Bolt [taub]:
  = Shear Force/(Bolt Area * Number of Bolts)
  = 4809/(6.302 * 24)
  = 3.1 N/mm^2. Must be less than 29.0 N/mm^2.

I-Beam Leg

Base Plate Available Area [AA]:
  = B * D
  = 400 * 400
  = 1600.000 cm^2

Clearance Between The Bolt And The Leg Edge [BCL]:
  = z - BOD / 2
  = 50 - 33/2
  = 33.500 mm

Moment at Baseplate [MOMENT]:
  = Vleg * Lleg
  = 1778 * 1440
  = 2560.182 kgm

Axial Load on the baseplate [P]:
  = 1854.787 kgf, based on governing load combinatioN

Eccentricity [e]:
  = MOMENT * Conv_Factor / P
  = 2560 * 9807/1855
  = 1380.283 mm, > D/6 [Plate Uplift Condition]

Clearance [a]:
  = (D - d)/2
  = (400 - 200)/2
  = 100.000 mm

Modular Ratio of Steel/Concrete [n]:
  = ES/EC
  = 203402/21526
  = 9.449

Dimension [F]:
  = 0.5 * d + z
  = 0.5 * 200 + 50
  = 150.000 mm

Dimension [K1]:
= 3(e - 0.5 * D)
= 3(1380 - 0.5 * 400)
= 3540.848 mm

Value [K2]:
= 6 * n * Ast/B(F + e)
= 6 * 9.449 * 18.91/400 (150 + 1380)
= 4100.733 cm^2

Distance [K3]:
= -K2(0.5 * D + F)
= -4101 (0.5 * 400 + 150)
= -1435255.750 mm³

Solving For The Effective Bearing Length Using Iteration [Y]:
:: Y³ + K1 * Y² + K2 * Y + K3 = 0
:: Y³ + 3541 * Y² + 4101 * Y - 1435255 = 0
= 149.330 mm

Term [NUM]:
= D/2 - Y/3 - e
= 400/2 - 149.3/3 - 1380
= -1230.059 mm

Term [DENOM]:
= D/2 - Y/3 + F
= 400/2 - 149.3/3 + 150
= 300.223 mm

Total Bolt Tension Force [T]:
= - P * NUM/DENOM
= - 1855 * -1230/300.2
= 7599.346 kgf

Overturning Moment Due To Bolt In Tension [Mt]:
= T(0.5 * D + F - Y)
= 7599 (0.5 * 400 + 150 - 149.3)
= 1524.988 kgm

Bearing Pressure [FC]:
= 2(P + T)/(Y * B)
= 2(1855 + 7599)/(149.3 * 400)
= 31.04 barg [<= FCPRIME (206.84)]

Equivalent Bearing Pressure [f1]:
= FC(Y - a)/Y
= 31.04 (149.3 - 100)/149.3
= 10.254 barg

Overturning Moment Due To Bearing Pressure [Mc]:
= (a² * B/6) * (f1 + 2 * FC)
= (100² * 400/6) * (10.25 + 2 * 31.04)
= 491.793 kgm

The Baseplate Required Thickness [TREQ]:
= sqrt(6 * max(Mt, Mc) / (B * 1.5 * SBA))
= sqrt(6 * 1525/(400 * 206.9))
= 32.931 mm

Required bolt area per D. Moss [ABREQM]:
= T/STBA
= 7599/48.26

= 15.4409 cm^2 [< Ast (18.91) --> PASSED]

Distance from Top of Legs to Vessel CG [CD_DIST]:
= 1347 mm

Total Overturning Moment at Baseplate [Mbb]:
= (Mleg / max(CD_DIST, minDist)) * (CD_DIST + Lleg)
= (7473/max(1347, 38.1)) * (1347 + 1440)
= 15461.718 kgm

Required Total Bolt Area per Leg per H. Bednar [ABREQB]:
= (1/(Nleg * STBA)) * ((4 * Mbb/(Rn * 2)) - W)
= (1/(4 * 48.26)) * ((4 * 15462/(2722)) - 7419)
= 7.7727 cm^2

Available Total Bolt Corr. Area per Leg [ABAVL]:
= As * NBT
= 6.302 * 6
= 37.8131 cm^2 [> ABREQB (7.77) --> PASSED]

Baseplate & Bolting Summary of Results: (mm, cm^2)

	Actual	Required	Pass/Fail
Baseplate Thickness	40.000	32.931	Pass
Bolt Root Area (Bednar)	37.81	7.77	Pass
Bolt Root Area (D. Moss)	18.91	15.44	Pass

The required thickness calculation is performed based on:
** Strong axis orientation of the beam leg*
** Even number of bolts installed only on the B dimension sides*

Review notes about nozzle loadings and supports in the Warnings report.

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RESULTS FOR LEGS : HydroTest Case Description: LEGS

Legs attached to: node 20

Section Properties : I Beam HE200B

European Structural Steel Data

Overall Leg Length		1440.000	mm
Effective Leg Length	Leglen	1240.000	mm
Distance Leg Up Side of Vessel		350.000	mm
Number of Legs	Nleg	4	
Cross Sectional Area for HE200B	Aleg	78.100	cm^2
Section Inertia (strong axis)		5695.972	cm^4
Section Inertia (weak axis)		2002.990	cm^4
Section Modulus (strong axis)		570002.312	mm³
Section Modulus (weak axis)		200000.812	mm³
Radius of Gyration (strong axis)		85.400	mm
Radius of Gyration (weak axis)		50.700	mm

Leg Orientation - Weak Axis

Overturning Moment at top of Legs		1312.6	kgm
Total Weight Load at top of Legs	W	29978.2	kgf
Total Shear force at top of Legs		765.4	kgf
Additional force in Leg due to Bracing	Fadd	0.0	kgf
Occasional Load Factor	Occfac	1.333	
Effective Leg End Condition Factor	k	1.000	

Note: The Legs are Not Cross Braced

The Leg Shear Force includes Wind, Seismic, and Applied Load Effects.

Pad Width along Circumference	C11P	300.000	mm
Pad Length along Vessel Axis	C22P	350.000	mm
Pad Thickness	Tpad	18.000	mm

Maximum Shear at top of one Leg [Vleg]:
= (max(Wind, Seismic, Blast) + applied forces)(Imax / Itot)
= (765.4)(5696/15407)
= 282.98 kgf

Axial Compression, Leg furthest from the Neutral Axis [Sma]:
= W/Nleg + (Mleg/(Nlegm*Rn))/Aleg
= 293981/4 + (12870725/(2 * 1361))/7810
= 10.02 N/mm^2

Axial Compression, Leg closest to the Neutral Axis [Sva]:
= (W / Nleg) / Aleg
= (29978/4)/78.1
= 9.41 N/mm^2

Allowable Compressive Stress for the Selected Leg (KL/r < Cc) [Sa]:
= Occfac(1-(kl/r)²/(2*Cc²))Fy/(5/3+3(Kl/r)/(8*Cc)-(Kl/r³)/(8*Cc³)
= 1.333(1-(24.46)²/(2*127.2²))248.2/(5/3+3(24.46)/(8*127.2)-(24.46³)/(8*127.2³)
= 186.87 N/mm^2

Bending at the Bottom of the Leg closest to the NA. [S]:
= (Vleg * Leglen / Smdwa)
= (283 * 1240/200001)
= 17.21 N/mm^2

Allowable Bending Stress[Sb]:
= (0.6 * Fy * Occfac)
= (0.6 * 248.2 * 1.333)
= 198.53 N/mm^2

AISC Unity Check [Sc](must be <= to 1 and > 0) :
= (Sma/Sa)+(0.85*S)/((1-Sma/Spex)*Sb)
= (10.02/186.9)+(0.85 *17.21)/((1 -10.02/2334) *198.5)
= 0.1276

WRC 107 Stress Analysis for Leg to Shell Junction, Test Condition

Rectangular Attachment Parameter	C11	200.000	mm
Rectangular Attachment Parameter	C22	330.950	mm

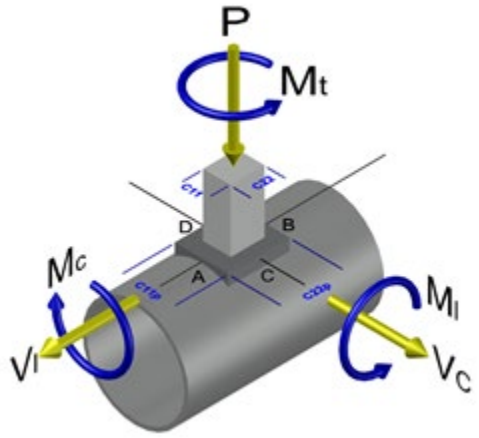
Input Echo, WRC107/537 Item 1, Description: LEGS

Diameter Basis for Vessel	Vbasis	ID	
Cylindrical or Spherical Vessel	Cylsph	Cylindrical	
Internal Corrosion Allowance	Cas	0.0000	mm
Vessel Diameter	Dv	2464.300	mm
Vessel Thickness	Tv	17.850	mm
Design Temperature	T1	90.0	C
Vessel Material		SA-516 70	
Vessel UNS Number		K02700	
Vessel Cold S.I. Allowable	Smc	179.27	N/mm^2
Vessel Hot S.I. Allowable	Smh	179.27	N/mm^2
Attachment Type	Type	Rectangular	
Parameter C11	C11	200.00	mm
Parameter C22	C22	330.95	mm
Thickness of Reinforcing Pad	Tpad	18.000	mm
Pad Parameter C11P	C11p	300.000	mm
Pad Parameter C22P	C22p	350.000	mm
Design Internal Pressure	Dp	12.000	barg
Include Pressure Thrust		No	
Vessel Centerline Direction Cosine	Vx	0.000	
Vessel Centerline Direction Cosine	Vy	1.000	
Vessel Centerline Direction Cosine	Vz	0.000	
Nozzle Centerline Direction Cosine	Nx	1.000	
Nozzle Centerline Direction Cosine	Ny	0.000	
Nozzle Centerline Direction Cosine	Nz	0.000	
Global Force (SUS)	Fx	0.0	kgf
Global Force (SUS)	Fy	7494.5	kgf
Global Force (SUS)	Fz	0.0	kgf
Global Moment (SUS)	Mx	0.0	kgm
Global Moment (SUS)	My	0.0	kgm
Global Moment (SUS)	Mz	831.9	kgm
Internal Pressure (SUS)	P	12.00	barg
Include Pressure Thrust		No	
Global Force (OCC)	Fx	283.0	kgf
Global Force (OCC)	Fy	482.2	kgf
Global Force (OCC)	Fz	0.0	kgf
Global Moment (OCC)	Mx	0.0	kgm
Global Moment (OCC)	My	0.0	kgm

Global Moment (OCC)	Mz	229.0	kgm
Occasional Internal Pressure (OCC)	Pvar	5.57	barg

Use Interactive Control		No
WRC107 Version	Version	March 1979
Include Pressure Stress Indices per Div. 2		No
Compute Pressure Stress per WRC-368		No
Local Loads applied at end of Nozzle/Attachment		No

WRC Bulletin 537 provides equations for the dimensionless curves found in bulletin 107. As noted in the foreword to bulletin 537, "537 is equivalent to WRC 107". Where 107 is printed in the results below, "537" can be interchanged with "107".



WRC 107/537 has dimensional limitations that can be found in the bulletin's Foreword and which can also be inferred by review of the non-dimensional curve limits.

WRC 107 Stress Calculation for SUStained loads:

Radial Load	P	0.0	kgf
Circumferential Shear	VC	0.0	kgf
Longitudinal Shear	VL	7494.5	kgf
Circumferential Moment	MC	0.0	kgm
Longitudinal Moment	ML	-831.9	kgm
Torsional Moment	MT	0.0	kgm

Dimensionless Parameters used : Gamma = 34.87

Dimensionless Loads for Cylindrical Shells at Attachment Junction:

Curves read for 1979	Beta	Figure	Value	Location
N(PHI) / (P/Rm)	0.129	4C	5.879	(A,B)
N(PHI) / (P/Rm)	0.129	3C	4.735	(C,D)
M(PHI) / (P)	0.096	2C1	0.098	(A,B)
M(PHI) / (P)	0.096	1C	0.131	(C,D)
N(PHI) / (MC/(Rm**2 * Beta))	0.095	3A	0.929	(A,B,C,D)
M(PHI) / (MC/(Rm * Beta))	0.103	1A	0.097	(A,B,C,D)
N(PHI) / (ML/(Rm**2 * Beta))	0.112	3B	3.589	(A,B,C,D)
M(PHI) / (ML/(Rm * Beta))	0.108	1B	0.045	(A,B,C,D)
N(x) / (P/Rm)	0.114	3C	5.083	(A,B)
N(x) / (P/Rm)	0.114	4C	6.043	(C,D)
M(x) / (P)	0.116	1C1	0.118	(A,B)
M(x) / (P)	0.116	2C	0.081	(C,D)

N(x) / (MC/(Rm**2 * Beta))	0.095	4A	1.346	(A,B,C,D)
M(x) / (MC/(Rm * Beta))	0.124	2A	0.049	(A,B,C,D)
N(x) / (ML/(Rm**2 * Beta))	0.112	4B	1.037	(A,B,C,D)
M(x) / (ML/(Rm * Beta))	0.122	2B	0.066	(A,B,C,D)

Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Attachment Junction (N/mm^2)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Bend. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. ML	4.1	4.1	-4.1	-4.1	0.0	0.0	0.0	0.0
Circ. Bend. ML	12.7	-12.7	-12.7	12.7	0.0	0.0	0.0	0.0
Tot. Circ. Str.	16.8	-8.6	-16.8	8.6	0.0	0.0	0.0	0.0
Long. Memb. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend. P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb. ML	1.5	1.5	-1.5	-1.5	0.0	0.0	0.0	0.0
Long. Bend. ML	16.3	-16.3	-16.3	16.3	0.0	0.0	0.0	0.0
Tot. Long. Str.	17.9	-14.8	-17.9	14.8	0.0	0.0	0.0	0.0
Shear VC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear VL	0.0	0.0	0.0	0.0	-3.1	-3.1	3.1	3.1
Shear MT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tot. Shear	0.0	0.0	0.0	0.0	-3.1	-3.1	3.1	3.1
Str. Int.	17.9	14.8	17.9	14.8	6.2	6.2	6.2	6.2

Dimensionless Parameters used : Gamma = 69.53

Dimensionless Loads for Cylindrical Shells at Pad Edge:

Curves read for 1979	Beta	Figure	Value	Location
N(PHI) / (P/Rm)	0.142	4C	10.123	(A,B)
N(PHI) / (P/Rm)	0.142	3C	6.828	(C,D)
M(PHI) / (P)	0.128	2C1	0.048	(A,B)
M(PHI) / (P)	0.128	1C	0.082	(C,D)
N(PHI) / (MC/(Rm**2 * Beta))	0.127	3A	2.706	(A,B,C,D)
M(PHI) / (MC/(Rm * Beta))	0.138	1A	0.078	(A,B,C,D)
N(PHI) / (ML/(Rm**2 * Beta))	0.134	3B	7.625	(A,B,C,D)
M(PHI) / (ML/(Rm * Beta))	0.134	1B	0.030	(A,B,C,D)
N(x) / (P/Rm)	0.136	3C	7.162	(A,B)
N(x) / (P/Rm)	0.136	4C	10.368	(C,D)
M(x) / (P)	0.137	1C1	0.079	(A,B)
M(x) / (P)	0.137	2C	0.044	(C,D)
N(x) / (MC/(Rm**2 * Beta))	0.127	4A	4.660	(A,B,C,D)
M(x) / (MC/(Rm * Beta))	0.154	2A	0.036	(A,B,C,D)
N(x) / (ML/(Rm**2 * Beta))	0.134	4B	2.737	(A,B,C,D)
M(x) / (ML/(Rm * Beta))	0.141	2B	0.037	(A,B,C,D)

Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Edge of Reinforcing Pad (N/mm^2)

Type of Stress	Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb.	P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Bend.	P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb.	MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb.	MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb.	ML	15.1	15.1	-15.1	-15.1	0.0	0.0	0.0	0.0
Circ. Bend.	ML	27.2	-27.2	-27.2	27.2	0.0	0.0	0.0	0.0
Tot. Circ. Str.		42.4	-12.1	-42.4	12.1	0.0	0.0	0.0	0.0
Long. Memb.	P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend.	P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb.	MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend.	MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb.	ML	5.6	5.6	-5.6	-5.6	0.0	0.0	0.0	0.0
Long. Bend.	ML	32.4	-32.4	-32.4	32.4	0.0	0.0	0.0	0.0
Tot. Long. Str.		38.0	-26.7	-38.0	26.7	0.0	0.0	0.0	0.0
Shear	VC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear	VL	0.0	0.0	0.0	0.0	-5.9	-5.9	5.9	5.9
Shear	MT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tot. Shear		0.0	0.0	0.0	0.0	-5.9	-5.9	5.9	5.9
Str. Int.		42.4	26.7	42.4	26.7	11.8	11.8	11.8	11.8

WRC 107 Stress Calculation for OCCasional loads:

Radial Load	P	283.0	kgf
Circumferential Shear	VC	0.0	kgf
Longitudinal Shear	VL	482.2	kgf
Circumferential Moment	MC	0.0	kgm
Longitudinal Moment	ML	-229.0	kgm
Torsional Moment	MT	0.0	kgm

Dimensionless Parameters used : Gamma = 34.87

Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Attachment Junction (N/mm^2)

Type of Stress	Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb.	P	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3	-0.3
Circ. Bend.	P	-1.3	1.3	-1.3	1.3	-1.7	1.7	-1.7	1.7
Circ. Memb.	MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb.	MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb.	ML	1.1	1.1	-1.1	-1.1	0.0	0.0	0.0	0.0
Circ. Bend.	ML	3.5	-3.5	-3.5	3.5	0.0	0.0	0.0	0.0
Tot. Circ. Str.		3.0	-1.5	-6.2	3.3	-2.0	1.4	-2.0	1.4
Long. Memb.	P	-0.3	-0.3	-0.3	-0.3	-0.4	-0.4	-0.4	-0.4

Long. Bend. P	-1.5	1.5	-1.5	1.5	-1.0	1.0	-1.0	1.0
Long. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb. ML	0.4	0.4	-0.4	-0.4	0.0	0.0	0.0	0.0
Long. Bend. ML	4.5	-4.5	-4.5	4.5	0.0	0.0	0.0	0.0
Tot. Long. Str.	3.1	-2.9	-6.8	5.3	-1.4	0.7	-1.4	0.7
Shear VC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear VL	0.0	0.0	0.0	0.0	-0.2	-0.2	0.2	0.2
Shear MT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tot. Shear	0.0	0.0	0.0	0.0	-0.2	-0.2	0.2	0.2
Str. Int.	3.1	2.9	6.8	5.3	2.0	1.5	2.0	1.5

Dimensionless Parameters used : Gamma = 69.53
Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Edge of Reinforcing Pad (N/mm^2)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb. P	-1.3	-1.3	-1.3	-1.3	-0.9	-0.9	-0.9	-0.9
Circ. Bend. P	-2.5	2.5	-2.5	2.5	-4.3	4.3	-4.3	4.3
Circ. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Memb. ML	4.2	4.2	-4.2	-4.2	0.0	0.0	0.0	0.0
Circ. Bend. ML	7.5	-7.5	-7.5	7.5	0.0	0.0	0.0	0.0
Tot. Circ. Str.	7.9	-2.1	-15.4	4.6	-5.2	3.5	-5.2	3.5
Long. Memb. P	-0.9	-0.9	-0.9	-0.9	-1.3	-1.3	-1.3	-1.3
Long. Bend. P	-4.1	4.1	-4.1	4.1	-2.3	2.3	-2.3	2.3
Long. Memb. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Bend. MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Memb. ML	1.6	1.6	-1.6	-1.6	0.0	0.0	0.0	0.0
Long. Bend. ML	8.9	-8.9	-8.9	8.9	0.0	0.0	0.0	0.0
Tot. Long. Str.	5.4	-4.1	-15.5	10.6	-3.6	1.0	-3.6	1.0
Shear VC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear VL	0.0	0.0	0.0	0.0	-0.4	-0.4	0.4	0.4
Shear MT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tot. Shear	0.0	0.0	0.0	0.0	-0.4	-0.4	0.4	0.4
Str. Int.	7.9	4.1	15.5	10.6	5.2	3.5	5.2	3.5

WRC 107/537 Stress Summations:

Vessel Stress Summation at Attachment Junction (N/mm^2)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Pm (SUS)	40.7	41.9	40.7	41.9	40.7	41.9	40.7	41.9
Circ. Pm (OCC)	18.9	19.4	18.9	19.4	18.9	19.4	18.9	19.4

Circ. Pm(TOTAL)	59.5	61.3	59.5	61.3	59.5	61.3	59.5	61.3
Circ. Pl (SUS)	4.1	4.1	-4.1	-4.1	0.0	0.0	0.0	0.0
Circ. Pl (OCC)	0.8	0.8	-1.5	-1.5	-0.3	-0.3	-0.3	-0.3
Circ. Pl(TOTAL)	4.8	4.8	-5.6	-5.6	-0.3	-0.3	-0.3	-0.3
Circ. Q (SUS)	12.7	-12.7	-12.7	12.7	0.0	0.0	0.0	0.0
Circ. Q (OCC)	2.2	-2.2	-4.8	4.8	-1.7	1.7	-1.7	1.7
Circ. Q (TOTAL)	14.9	-14.9	-17.5	17.5	-1.7	1.7	-1.7	1.7
Long. Pm (SUS)	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3
Long. Pm (OCC)	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Long. Pm(TOTAL)	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8
Long. Pl (SUS)	1.5	1.5	-1.5	-1.5	0.0	0.0	0.0	0.0
Long. Pl (OCC)	0.1	0.1	-0.7	-0.7	-0.4	-0.4	-0.4	-0.4
Long. Pl(TOTAL)	1.7	1.7	-2.3	-2.3	-0.4	-0.4	-0.4	-0.4
Long. Q (SUS)	16.3	-16.3	-16.3	16.3	0.0	0.0	0.0	0.0
Long. Q (OCC)	3.0	-3.0	-6.0	6.0	-1.0	1.0	-1.0	1.0
Long. Q (TOTAL)	19.3	-19.3	-22.4	22.4	-1.0	1.0	-1.0	1.0
Shear Pm (SUS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pm (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pm(TOTAL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pl (SUS)	0.0	0.0	0.0	0.0	-3.1	-3.1	3.1	3.1
Shear Pl (OCC)	0.0	0.0	0.0	0.0	-0.2	-0.2	0.2	0.2
Shear Pl(TOTAL)	0.0	0.0	0.0	0.0	-3.3	-3.3	3.3	3.3
Shear Q (SUS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Q (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Q (TOTAL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pm (SUS)	40.7	41.9	40.7	41.9	40.7	41.9	40.7	41.9
Pm (SUS+OCC)	59.5	61.3	59.5	61.3	59.5	61.3	59.5	61.3
Pm+Pl (SUS)	44.7	45.9	36.6	37.8	41.1	42.3	41.1	42.3
Pm+Pl (SUS+OCC)	64.4	66.1	54.0	55.7	59.6	61.3	59.6	61.3
Pm+Pl+Q (Total)	79.3	51.2	36.5	73.2	57.9	63.0	57.9	63.0

Vessel Stress Summation Comparison (N/mm^2):

Type of Stress Int.	Max. S.I.	S.I. Allowable	Result
Pm (SUS)	41.85	179.27	Passed
Pm (SUS+OCC)	61.30	215.12	Passed
Pm+Pl (SUS)	45.93	268.90	Passed
Pm+Pl (SUS+OCC)	66.13	322.69	Passed
Pm+Pl+Q (TOTAL)	79.31	537.81	Passed

The Pm+Pl+Q allowable above was based on the rules of ASME VIII-2 Part 4, 4.1.6.3 (a)&(b) or per ASME VIII-2, 5.5.6.1(1)&(2) Part 5 as applicable.

The Pm+Pl+Q allowable was based on a temperature range cycling from ambient to design temperature.

WRC 107/537 Stress Summations:

Vessel Stress Summation at Reinforcing Pad Edge (N/mm^2)

Type of Stress	Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl

Circ. Pm (SUS)	82.2	83.4	82.2	83.4	82.2	83.4	82.2	83.4
Circ. Pm (OCC)	38.2	38.8	38.2	38.8	38.2	38.8	38.2	38.8
Circ. Pm(TOTAL)	120.4	122.2	120.4	122.2	120.4	122.2	120.4	122.2
Circ. Pl (SUS)	15.1	15.1	-15.1	-15.1	0.0	0.0	0.0	0.0
Circ. Pl (OCC)	2.9	2.9	-5.4	-5.4	-0.9	-0.9	-0.9	-0.9
Circ. Pl(TOTAL)	18.0	18.0	-20.6	-20.6	-0.9	-0.9	-0.9	-0.9
Circ. Q (SUS)	27.2	-27.2	-27.2	27.2	0.0	0.0	0.0	0.0
Circ. Q (OCC)	5.0	-5.0	-10.0	10.0	-4.3	4.3	-4.3	4.3
Circ. Q (TOTAL)	32.2	-32.2	-37.2	37.2	-4.3	4.3	-4.3	4.3
Long. Pm (SUS)	41.1	41.1	41.1	41.1	41.1	41.1	41.1	41.1
Long. Pm (OCC)	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1
Long. Pm(TOTAL)	60.2	60.2	60.2	60.2	60.2	60.2	60.2	60.2
Long. Pl (SUS)	5.6	5.6	-5.6	-5.6	0.0	0.0	0.0	0.0
Long. Pl (OCC)	0.7	0.7	-2.4	-2.4	-1.3	-1.3	-1.3	-1.3
Long. Pl(TOTAL)	6.3	6.3	-8.1	-8.1	-1.3	-1.3	-1.3	-1.3
Long. Q (SUS)	32.4	-32.4	-32.4	32.4	0.0	0.0	0.0	0.0
Long. Q (OCC)	4.8	-4.8	-13.1	13.1	-2.3	2.3	-2.3	2.3
Long. Q (TOTAL)	37.2	-37.2	-45.4	45.4	-2.3	2.3	-2.3	2.3
Shear Pm (SUS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pm (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pm(TOTAL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Pl (SUS)	0.0	0.0	0.0	0.0	-5.9	-5.9	5.9	5.9
Shear Pl (OCC)	0.0	0.0	0.0	0.0	-0.4	-0.4	0.4	0.4
Shear Pl(TOTAL)	0.0	0.0	0.0	0.0	-6.3	-6.3	6.3	6.3
Shear Q (SUS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Q (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Q (TOTAL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pm (SUS)	82.2	83.4	82.2	83.4	82.2	83.4	82.2	83.4
Pm (SUS+OCC)	120.4	122.2	120.4	122.2	120.4	122.2	120.4	122.2
Pm+Pl (SUS)	97.4	98.6	67.1	68.3	83.1	84.2	83.1	84.2
Pm+Pl (SUS+OCC)	138.5	140.2	99.9	101.6	120.2	122.0	120.2	122.0
Pm+Pl+Q (Total)	170.7	108.0	62.6	138.9	115.9	126.3	115.9	126.3

Vessel Stress Summation Comparison (N/mm^2):

Type of Stress Int.	Max. S.I.	S.I. Allowable	Result
Pm (SUS)	83.44	179.27	Passed
Pm (SUS+OCC)	122.20	215.12	Passed
Pm+Pl (SUS)	98.58	268.90	Passed
Pm+Pl (SUS+OCC)	140.24	322.69	Passed
Pm+Pl+Q (TOTAL)	170.70	537.81	Passed

The Pm+Pl+Q allowable above was based on the rules of ASME VIII-2 Part 4, 4.1.6.3 (a)&(b) or per ASME VIII-2, 5.5.6.1(1)&(2) Part 5 as applicable.

The Pm+Pl+Q allowable was based on a temperature range cycling from ambient to design temperature.

Bolting Size Requirement for Leg Baseplates :

Baseplate Material		SA-516 70	
Baseplate Allowable Stress	SBA	137.90	N/mm^2
Baseplate Length	B	400.0000	mm
Baseplate Width	D	400.0000	mm
Baseplate Thickness	BTHK	40.0000	mm
Leg Dimension Along Baseplate Length	d	199.9996	mm

Leg Dimension Along Baseplate Width	b	199.9996	mm
Dist. from the Leg Edge to Bolt Hole Center	z	50.0000	mm
Bolt Material		SA-307 B	
Bolt Allowable Tensile Stress	STBA	48.26	N/mm^2
Bolt Allowable Shear Stress	SBShear	28.96	N/mm^2
Anchor Bolt Nominal Diameter	BOD	33.0000	mm
Number of Anchor Bolts in Tension per Leg	NB	3	
Total Number of Anchors Bolt per Leg	NBT	6	
Bolt Corrosion Allowance	bca	0.0000	mm
Ultimate 28-day Concrete Strength	FCPRIME	20.685	N/mm^2

Leg Baseplate and Bolting Analysis, including Moments

Shear Stress in a Single Bolt [taub]:
= Shear Force/(Bolt Area * Number of Bolts)
= 4809/(6.302 * 24)
= 3.1 N/mm^2. Must be less than 29.0 N/mm^2.

I-Beam Leg

Base Plate Available Area [AA]:
= B * D
= 400 * 400
= 1600.000 cm^2

Clearance Between The Bolt And The Leg Edge [BCL]:
= z - BOD / 2
= 50 - 33/2
= 33.500 mm

Moment at Baseplate [MOMENT]:
= Vleg * Lleg
= 283 * 1440
= 407.493 kgm

Axial Load on the baseplate [P]:
= 1854.787 kgf, based on governing load combinatioN

Eccentricity [e]:
= MOMENT * Conv_Factor / P
= 407.5 * 9807/1855
= 219.694 mm, > D/6 [Plate Uplift Condition]

Clearance [a]:
= (D - d)/2
= (400 - 200)/2
= 100.000 mm

Modular Ratio of Steel/Concrete [n]:
= ES/EC
= 203402/21526
= 9.449

Dimension [F]:
= 0.5 * d + z
= 0.5 * 200 + 50
= 150.000 mm

Dimension [K1]:
= 3(e - 0.5 * D)
= 3(219.7 - 0.5 * 400)
= 59.081 mm

Value [K2]:
  = 6 * n * Ast/B(F + e)
  = 6 * 9.449 * 18.91/400 (150 + 219.7)
  = 990.676 cm^2

Distance [K3]:
  = -K2(0.5 * D + F)
  = -990.7 (0.5 * 400 + 150)
  = -346736.500 mm³

Solving For The Effective Bearing Length Using Iteration [Y]:
  :: Y³ + K1 * Y² + K2 * Y + K3 = 0
  :: Y³ + 59.08 * Y² + 990.7 * Y - 346736 = 0
  = 217.659 mm

Term [NUM]:
  = D/2 - Y/3 - e
  = 400/2 - 217.7/3 - 219.7
  = -92.247 mm

Term [DENOM]:
  = D/2 - Y/3 + F
  = 400/2 - 217.7/3 + 150
  = 277.447 mm

Total Bolt Tension Force [T]:
  = - P * NUM/DENOM
  = - 1855 * -92.25/277.4
  = 616.688 kgf

Overturning Moment Due To Bolt In Tension [Mt]:
  = T(0.5 * D + F - Y)
  = 616.7 (0.5 * 400 + 150 - 217.7)
  = 81.615 kgm

Bearing Pressure [FC]:
  = 2(P + T)/(Y * B)
  = 2(1855 + 616.7)/(217.7 * 400)
  = 5.57 barg [<= FCPRIME (206.84)]

Equivalent Bearing Pressure [f1]:
  = FC(Y - a)/Y
  = 5.567 (217.7 - 100)/217.7
  = 3.010 barg

Overturning Moment Due To Bearing Pressure [Mc]:
  = (a² * B/6) * (f1 + 2 * FC)
  = (100² * 400/6) * (3.01 + 2 * 5.567)
  = 96.161 kgm

The Baseplate Required Thickness [TREQ]:
  = sqrt(6 * max(Mt, Mc) / (B * 1.5 * SBA))
  = sqrt(6 * 96.16/(400 * 206.9))
  = 8.269 mm

Required bolt area per D. Moss [ABREQM]:
  = T/STBA
  = 616.7/48.26
  = 1.2530 cm^2 [< Ast (18.91) --> PASSED]

Distance from Top of Legs to Vessel CG [CD_DIST]:
  = 1543 mm

Total Overturning Moment at Baseplate [Mbb]:

```
  = ( Mleg / max( CD_DIST, minDist ) ) * ( CD_DIST + Lleg )
  = ( 1313/max( 1543, 38.1 ) ) * ( 1543 + 1440 )
  = 2537.539 kgm
```

Required Total Bolt Area per Leg per H. Bednar [ABREQB]:

```
  = ( 1/( Nleg * STBA ) ) * ( ( 4 * Mbb/( Rn * 2 ) ) - W )
  = ( 1/( 4 * 48.26 )) * ( ( 4 * 2538/( 2722 ) ) - 7419 )
  = -1.8745 cm^2 --> (No tension in bolts)
```

Baseplate & Bolting Summary of Results: (mm, cm^2)

	Actual	Required	Pass/Fail
Baseplate Thickness	40.000	8.269	Pass
Bolt Root Area (D. Moss)	18.91	1.25	Pass

The required thickness calculation is performed based on:
** Strong axis orientation of the beam leg*
** Even number of bolts installed only on the B dimension sides*

Review notes about nozzle loadings and supports in the Warnings report.

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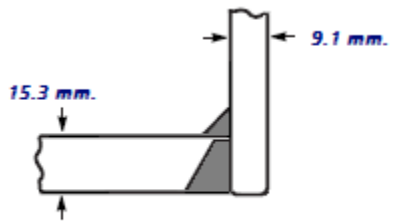
Input, Nozzle Desc: Drain From: 10

Pressure for Reinforcement Calculations	P	12.600	barg
Temperature for Internal Pressure	Temp	90	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N/mm^2
Parent Allowable Stress At Ambient	Sva	137.90	N/mm^2
Inside Diameter of Elliptical Head	D	2469.40	mm
Aspect Ratio of Elliptical Head	Ar	2.00	
Head Finished (Minimum) Thickness	t	15.3000	mm
Head Internal Corrosion Allowance	c	1.5000	mm
Head External Corrosion Allowance	co	0.0000	mm
Distance from Head Centerline	L1	0.0000	mm
User Entered Minimum Design Metal Temperature		-29.00	°C

Type of Element Connected to the Parent : Nozzle

Material [Impact Tested]		SA-333 6	
Material UNS Number		K03006	
Material Specification/Type		Smls. & wld. pipe	
Allowable Stress at Temperature	Sn	117.90	N/mm^2
Allowable Stress At Ambient	Sna	117.90	N/mm^2
Diameter Basis (for tr calc only)		Inside	
Layout Angle		0.00	deg
Diameter		1.0000	iN
Size and Thickness Basis		Nominal	
Nominal Thickness		XXS	
Flange Material		SA-350 LF2	
Flange Type		Weld Neck Flange	
Corrosion Allowance	can	1.5000	mm
Joint Efficiency of Shell Seam at Nozzle	E1	1.00	
Joint Efficiency of Nozzle Neck	En	1.00	
Outside Projection	ho	100.0000	mm
Weld leg size between Nozzle and Pad/Shell	Wo	10.0000	mm
Groove weld depth between Nozzle and Vessel	Wgnv	12.7500	mm
Inside Projection	h	0.0000	mm
Weld leg size, Inside Element to Shell	Wi	0.0000	mm
Flange Class		150	
Flange Grade		GR 1.1	

The Pressure Design option was Design Pressure + static head.



Reinforcement CALCULATION, Description: Drain

ASME Code, Section VIII, Div. 1, UG-37 to UG-45

```
Actual Inside Diameter Used in Calculation            0.599  iN
Actual Thickness Used in Calculation                  0.358  iN
```

Nozzle input data check completed without errors.

Reqd thk per UG-37(a) of Elliptical Head, tr [Int. Press]
```
  = P*D*K1/(2*Sv*E-0.2*P) per Appendix 1-4(c)
  = 12.6*2472*0.899/(2*137.9*1-0.2*12.6)
  = 10.1638 mm
```

Reqd thk per App. 1 of Nozzle Wall, trn [Int. Press]
```
  = R( exp([P/(Sn*E)] - 1 ) per Appendix 1-2 (a)(1)
  = 9.107(exp([12.6/(117.9*1]-1)
  = 0.0979 mm
```

UG-40, Limits of Reinforcement: [Internal Pressure]
```
Parallel to Vessel Wall (Diameter Limit)          Dl    61.0010  mm
Parallel to Vessel Wall                       Rn+tn+t    30.5005  mm
Normal to Vessel Wall (Thickness Limit), no pad   Tlnp    18.9830  mm
```

Taking a UG-36(c)(3)(a) exemption for nozzle: DraiN
This calculation is valid for nozzles that meet all the requirements of paragraph UG-36. Please check the Code carefully, especially for nozzles that are not isolated or do not meet Code spacing requirements. To force the computation of areas for small nozzles go to Tools->Configuration and check the box to force the UG-37 small nozzle area calculatioN

UG-45 Minimum Nozzle Neck Thickness Requirement: [Int. Press.]
```
Wall Thickness for Internal/External pressures      ta = 1.5979 mm
Wall Thickness per UG16(b),                      tr16b = 4.0000 mm
Wall Thickness, shell/head, internal pressure     trb1 = 12.7880 mm
Wall Thickness                 tb1 = max(trb1, tr16b) = 12.7880 mm
Wall Thickness                 tb2 = max(trb2, tr16b) = 4.0000 mm
Wall Thickness per table UG-45                    tb3 = 4.4464 mm
```

Determine Nozzle Thickness candidate [tb]:
```
  = min[ tb3, max( tb1,tb2) ]
  = min[ 4.446, max( 12.79, 4 ) ]
  = 4.4464 mm
```

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
```
  = max( ta, tb )
  = max( 1.598, 4.446 )
  = 4.4464 mm
```

Available Nozzle Neck Thickness = 0.875 * 9.093 = 7.957 mm -> OK

Nozzle Junction Minimum Design Metal Temperature (MDMT) Calculations:

Nozzle Neck to Flange Weld (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

```
Impact Test Temperature provided per Specification     -46 °C

Calculated Minimum Design Metal Temperature           -104 °C
```

Nozzle-Shell/Head Weld for the Nozzle (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

Impact Test Temperature provided per Specification -46 °C

Calculated Minimum Design Metal Temperature -104 °C

Gov. MDMT of the nozzle to shell joint welded assembly : -104 °C

Flange MDMT including Temperature reduction per UCS-66.1:

MDMT of ASME B16.5/47 flange per Matl. Specification -46 °C
Flange MDMT with Temp reduction per UCS-66(i)(2) -65 °C

Where the Stress Reduction Ratio per UCS-66(i)(2) is :
Design Pressure/Ambient Rating = 12.60/19.60 = 0.643

Weld Size Calculations, Description: Drain

Intermediate Calc. for nozzle/shell Welds Tmin 7.5932 mm

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	5.3152 = 0.7 * tmiN	7.0700 = 0.7 * Wo mm

Skipping the nozzle attachment weld strength calculations. Per UW-15(b)(2) the nozzles exempted by UG-36(c)(3)(a) (small nozzles) do not require a weld strength check.

The Drop for this Nozzle is : 0.0624 mm
The Cut Length for this Nozzle is, Drop + Ho + H + T : 115.3624 mm

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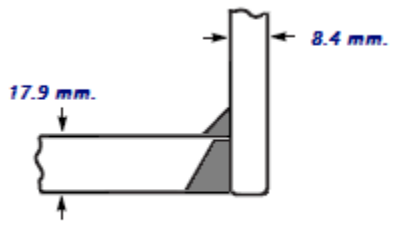
Input, Nozzle Desc: PG From: 20

Pressure for Reinforcement Calculations	P	12.600	barg
Temperature for Internal Pressure	Temp	90	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N/mm^2
Parent Allowable Stress At Ambient	Sva	137.90	N/mm^2
Inside Diameter of Cylindrical Shell	D	2464.00	mm
Shell Finished (Minimum) Thickness	t	17.8500	mm
Shell Internal Corrosion Allowance	c	1.5000	mm
Shell External Corrosion Allowance	co	0.0000	mm
Distance from Bottom/Left Tangent		360.00	mm
User Entered Minimum Design Metal Temperature		-29.00	°C

Type of Element Connected to the Parent : Nozzle

Material [Impact Tested]		SA-350 LF2	
Material UNS Number		K03011	
Material Specification/Type		Forgings	
Allowable Stress at Temperature	Sn	137.90	N/mm^2
Allowable Stress At Ambient	Sna	137.90	N/mm^2
Diameter Basis (for tr calc only)		Outside	
Layout Angle		-15.00	deg
Diameter		1.5000	iN
Size and Thickness Basis		Actual	
Actual Thickness	tn	8.3820	mm
Corrosion Allowance	can	1.5000	mm
Joint Efficiency of Shell Seam at Nozzle	E1	1.00	
Joint Efficiency of Nozzle Neck	En	1.00	
Outside Projection	ho	32.7750	mm
Weld leg size between Nozzle and Pad/Shell	Wo	10.0000	mm
Groove weld depth between Nozzle and Vessel	Wgnv	14.8500	mm
Inside Projection	h	0.0000	mm
Weld leg size, Inside Element to Shell	Wi	0.0000	mm

The Pressure Design option was Design Pressure + static head.



Reinforcement CALCULATION, Description: PG

ASME Code, Section VIII, Div. 1, UG-37 to UG-45

Actual Outside Diameter Used in Calculation		1.500	iN

Actual Thickness Used in Calculation 0.330 iN

Nozzle input data check completed without errors.

Reqd thk per UG-37(a) of Cylindrical Shell, tr [Int. Press]
= P*R/(Sv*E-0.6*P) per UG-27 (c)(1)
= 12.6*1234/(137.9*1-0.6*12.6)
= 11.3334 mm

Reqd thk per App. 1 of Nozzle Wall, trn [Int. Press]
= Ro(1 - exp(-P/(Sn*E))) per Appendix 1-2 (a)(1)
= 19.05(1-exp(-12.6/(137.9*1)))
= 0.1733 mm

UG-40, Limits of Reinforcement: [Internal Pressure]

Parallel to Vessel Wall (Diameter Limit)	Dl	70.8000	mm
Parallel to Vessel Wall	Rn+tn+t	35.4000	mm
Normal to Vessel Wall (Thickness Limit), no pad	Tlnp	17.2050	mm

Taking a UG-36(c)(3)(a) exemption for nozzle: PG.
This calculation is valid for nozzles that meet all the requirements of paragraph UG-36. Please check the Code carefully, especially for nozzles that are not isolated or do not meet Code spacing requirements. To force the computation of areas for small nozzles go to Tools->Configuration and check the box to force the UG-37 small nozzle area calculatioN

UG-45 Minimum Nozzle Neck Thickness Requirement: [Int. Press.]

Wall Thickness for Internal/External pressures	ta	= 1.6733 mm
Wall Thickness per UG16(b),	tr16b	= 4.0000 mm
Wall Thickness, shell/head, internal pressure	trb1	= 12.8333 mm
Wall Thickness	tb1 = max(trb1, tr16b)	= 12.8333 mm
Wall Thickness	tb2 = max(trb2, tr16b)	= 4.0000 mm
Wall Thickness per table UG-45	tb3	= 4.6200 mm

Determine Nozzle Thickness candidate [tb]:
= min[tb3, max(tb1,tb2)]
= min[4.62, max(12.83, 4)]
= 4.6200 mm

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
= max(ta, tb)
= max(1.673, 4.62)
= 4.6200 mm

Available Nozzle Neck Thickness = 8.3820 mm -> OK

Nozzle Junction Minimum Design Metal Temperature (MDMT) Calculations:

Nozzle-Shell/Head Weld for the Nozzle (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

Impact Test Temperature provided per Specification -46 °C

Calculated Minimum Design Metal Temperature -104 °C

Gov. MDMT of the nozzle to shell joint welded assembly : -104 °C

Weld Size Calculations, Description: PG

Intermediate Calc. for nozzle/shell Welds Tmin 6.8820 mm

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	4.8174 = 0.7 * tmiN	7.0700 = 0.7 * Wo mm

Skipping the nozzle attachment weld strength calculations. Per UW-15(b)(2) the nozzles exempted by UG-36(c)(3)(a) (small nozzles) do not require a weld strength check.

The Drop for this Nozzle is : 0.1473 mm
The Cut Length for this Nozzle is, Drop + Ho + H + T : 50.7723 mm

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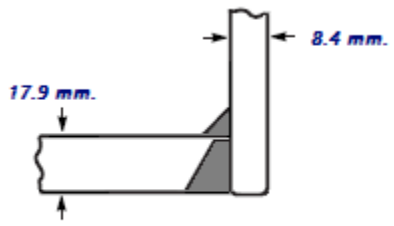
Input, Nozzle Desc: PT From: 20

Pressure for Reinforcement Calculations	P	12.600	barg
Temperature for Internal Pressure	Temp	90	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N/mm^2
Parent Allowable Stress At Ambient	Sva	137.90	N/mm^2
Inside Diameter of Cylindrical Shell	D	2464.00	mm
Shell Finished (Minimum) Thickness	t	17.8500	mm
Shell Internal Corrosion Allowance	c	1.5000	mm
Shell External Corrosion Allowance	co	0.0000	mm
Distance from Bottom/Left Tangent		1060.00	mm
User Entered Minimum Design Metal Temperature		-29.00	°C

Type of Element Connected to the Parent : Nozzle

Material [Impact Tested]		SA-350 LF2	
Material UNS Number		K03011	
Material Specification/Type		Forgings	
Allowable Stress at Temperature	Sn	137.90	N/mm^2
Allowable Stress At Ambient	Sna	137.90	N/mm^2
Diameter Basis (for tr calc only)		Outside	
Layout Angle		15.00	deg
Diameter		1.5000	iN
Size and Thickness Basis		Actual	
Actual Thickness	tn	8.3820	mm
Corrosion Allowance	can	1.5000	mm
Joint Efficiency of Shell Seam at Nozzle	E1	1.00	
Joint Efficiency of Nozzle Neck	En	1.00	
Outside Projection	ho	32.7750	mm
Weld leg size between Nozzle and Pad/Shell	Wo	10.0000	mm
Groove weld depth between Nozzle and Vessel	Wgnv	14.8500	mm
Inside Projection	h	0.0000	mm
Weld leg size, Inside Element to Shell	Wi	0.0000	mm

The Pressure Design option was Design Pressure + static head.



Reinforcement CALCULATION, Description: PT

ASME Code, Section VIII, Div. 1, UG-37 to UG-45

Actual Outside Diameter Used in Calculation		1.500	iN

Actual Thickness Used in Calculation 0.330 iN

Nozzle input data check completed without errors.

Reqd thk per UG-37(a) of Cylindrical Shell, tr [Int. Press]
= P*R/(Sv*E-0.6*P) per UG-27 (c)(1)
= 12.6*1234/(137.9*1-0.6*12.6)
= 11.3334 mm

Reqd thk per App. 1 of Nozzle Wall, trn [Int. Press]
= Ro(1 - exp(-P/(Sn*E))) per Appendix 1-2 (a)(1)
= 19.05(1-exp(-12.6/(137.9*1)))
= 0.1733 mm

UG-40, Limits of Reinforcement: [Internal Pressure]

Parallel to Vessel Wall (Diameter Limit)	Dl	70.8000	mm
Parallel to Vessel Wall	Rn+tn+t	35.4000	mm
Normal to Vessel Wall (Thickness Limit), no pad	Tlnp	17.2050	mm

Taking a UG-36(c)(3)(a) exemption for nozzle: PT.
This calculation is valid for nozzles that meet all the requirements of paragraph UG-36. Please check the Code carefully, especially for nozzles that are not isolated or do not meet Code spacing requirements. To force the computation of areas for small nozzles go to Tools->Configuration and check the box to force the UG-37 small nozzle area calculatioN

UG-45 Minimum Nozzle Neck Thickness Requirement: [Int. Press.]

Wall Thickness for Internal/External pressures	ta = 1.6733 mm
Wall Thickness per UG16(b),	tr16b = 4.0000 mm
Wall Thickness, shell/head, internal pressure	trb1 = 12.8333 mm
Wall Thickness	tb1 = max(trb1, tr16b) = 12.8333 mm
Wall Thickness	tb2 = max(trb2, tr16b) = 4.0000 mm
Wall Thickness per table UG-45	tb3 = 4.6200 mm

Determine Nozzle Thickness candidate [tb]:
= min[tb3, max(tb1,tb2)]
= min[4.62, max(12.83, 4)]
= 4.6200 mm

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
= max(ta, tb)
= max(1.673, 4.62)
= 4.6200 mm

Available Nozzle Neck Thickness = 8.3820 mm -> OK

Nozzle Junction Minimum Design Metal Temperature (MDMT) Calculations:

Nozzle-Shell/Head Weld for the Nozzle (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

Impact Test Temperature provided per Specification		-46 °C
Calculated Minimum Design Metal Temperature		-104 °C
Gov. MDMT of the nozzle to shell joint welded assembly :		-104 °C

Weld Size Calculations, Description: PT

Intermediate Calc. for nozzle/shell Welds	Tmin	6.8820	mm

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	4.8174 = 0.7 * tmiN	7.0700 = 0.7 * Wo mm

Skipping the nozzle attachment weld strength calculations. Per UW-15(b)(2) the nozzles exempted by UG-36(c)(3)(a) (small nozzles) do not require a weld strength check.

The Drop for this Nozzle is : 0.1473 mm
The Cut Length for this Nozzle is, Drop + Ho + H + T : 50.7723 mm

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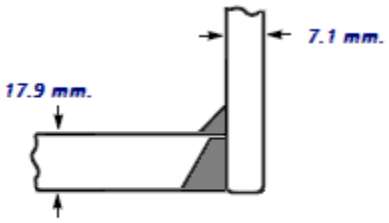
Input, Nozzle Desc: TG From: 20

Pressure for Reinforcement Calculations	P	12.600	barg
Temperature for Internal Pressure	Temp	90	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N/mm^2
Parent Allowable Stress At Ambient	Sva	137.90	N/mm^2
Inside Diameter of Cylindrical Shell	D	2464.00	mm
Shell Finished (Minimum) Thickness	t	17.8500	mm
Shell Internal Corrosion Allowance	c	1.5000	mm
Shell External Corrosion Allowance	co	0.0000	mm
Distance from Bottom/Left Tangent		360.00	mm
User Entered Minimum Design Metal Temperature		-29.00	°C

Type of Element Connected to the Parent : Nozzle

Material [Impact Tested]		SA-333 6	
Material UNS Number		K03006	
Material Specification/Type		Smls. & wld. pipe	
Allowable Stress at Temperature	Sn	117.90	N/mm^2
Allowable Stress At Ambient	Sna	117.90	N/mm^2
Diameter Basis (for tr calc only)		Outside	
Layout Angle		15.00	deg
Diameter		1.5000	iN
Size and Thickness Basis		Nominal	
Nominal Thickness		160	
Flange Material		SA-350 LF2	
Flange Type		Weld Neck Flange	
Corrosion Allowance	can	1.5000	mm
Joint Efficiency of Shell Seam at Nozzle	E1	1.00	
Joint Efficiency of Nozzle Neck	En	1.00	
Outside Projection	ho	75.0000	mm
Weld leg size between Nozzle and Pad/Shell	Wo	10.0000	mm
Groove weld depth between Nozzle and Vessel	Wgnv	14.8500	mm
Inside Projection	h	0.0000	mm
Weld leg size, Inside Element to Shell	Wi	0.0000	mm
Flange Class		150	
Flange Grade		GR 1.1	

The Pressure Design option was Design Pressure + static head.



Reinforcement CALCULATION, Description: TG

ASME Code, Section VIII, Div. 1, UG-37 to UG-45

```
Actual Outside Diameter Used in Calculation          1.900  iN
Actual Thickness Used in Calculation                 0.281  iN
```

Nozzle input data check completed without errors.

Reqd thk per UG-37(a) of Cylindrical Shell, tr [Int. Press]
```
  = P*R/(Sv*E-0.6*P) per UG-27 (c)(1)
  = 12.6*1234/(137.9*1-0.6*12.6)
  = 11.3334 mm
```

Reqd thk per UG-37(a) of Nozzle Wall, trn [Int. Press]
```
  = P*Ro/(Sn*E+0.4*P) per Appendix 1-1 (a)(1)
  = 12.6*24.13/(117.9*1+0.4*12.6)
  = 0.2568 mm
```

UG-40, Limits of Reinforcement: [Internal Pressure]
```
Parallel to Vessel Wall (Diameter Limit)           Dl    80.9600  mm
Parallel to Vessel Wall                        Rn+tn+t   40.4800  mm
Normal to Vessel Wall (Thickness Limit), no pad  Tlnp    14.0935  mm
```

Taking a UG-36(c)(3)(a) exemption for nozzle: TG.
This calculation is valid for nozzles that meet all the requirements of paragraph UG-36. Please check the Code carefully, especially for nozzles that are not isolated or do not meet Code spacing requirements. To force the computation of areas for small nozzles go to Tools->Configuration and check the box to force the UG-37 small nozzle area calculatioN

UG-45 Minimum Nozzle Neck Thickness Requirement: [Int. Press.]
```
Wall Thickness for Internal/External pressures      ta = 1.7568 mm
Wall Thickness per UG16(b),                      tr16b = 4.0000 mm
Wall Thickness, shell/head, internal pressure     trb1 = 12.8333 mm
Wall Thickness                 tb1 = max(trb1, tr16b) = 12.8333 mm
Wall Thickness                 tb2 = max(trb2, tr16b) = 4.0000 mm
Wall Thickness per table UG-45                   tb3 = 4.7200 mm
```

Determine Nozzle Thickness candidate [tb]:
```
  = min[ tb3, max( tb1,tb2) ]
  = min[ 4.72, max( 12.83, 4 ) ]
  = 4.7200 mm
```

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
```
  = max( ta, tb )
  = max( 1.757, 4.72 )
  = 4.7200 mm
```

Available Nozzle Neck Thickness = 0.875 * 7.137 = 6.245 mm -> OK

Nozzle Junction Minimum Design Metal Temperature (MDMT) Calculations:

Nozzle Neck to Flange Weld (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

```
Impact Test Temperature provided per Specification    -46 °C

Calculated Minimum Design Metal Temperature          -104 °C
```

Nozzle-Shell/Head Weld for the Nozzle (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

Impact Test Temperature provided per Specification -46 °C

Calculated Minimum Design Metal Temperature -104 °C

Gov. MDMT of the nozzle to shell joint welded assembly : -104 °C

Flange MDMT including Temperature reduction per UCS-66.1:

MDMT of ASME B16.5/47 flange per Matl. Specification -46 °C
Flange MDMT with Temp reduction per UCS-66(i)(2) -65 °C

Where the Stress Reduction Ratio per UCS-66(i)(2) is :
Design Pressure/Ambient Rating = 12.60/19.60 = 0.643

Weld Size Calculations, Description: TG

Intermediate Calc. for nozzle/shell Welds Tmin 5.6374 mm

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	3.9462 = 0.7 * tmiN	7.0700 = 0.7 * Wo mm

Skipping the nozzle attachment weld strength calculations. Per UW-15(b)(2) the nozzles exempted by UG-36(c)(3)(a) (small nozzles) do not require a weld strength check.

The Drop for this Nozzle is : 0.2363 mm
The Cut Length for this Nozzle is, Drop + Ho + H + T : 93.0863 mm

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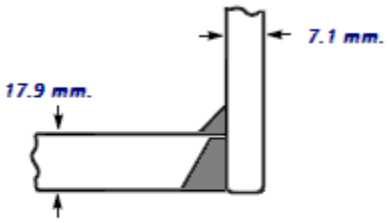
Input, Nozzle Desc: TT From: 20

Pressure for Reinforcement Calculations	P	12.600	barg
Temperature for Internal Pressure	Temp	90	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N/mm^2
Parent Allowable Stress At Ambient	Sva	137.90	N/mm^2
Inside Diameter of Cylindrical Shell	D	2464.00	mm
Shell Finished (Minimum) Thickness	t	17.8500	mm
Shell Internal Corrosion Allowance	c	1.5000	mm
Shell External Corrosion Allowance	co	0.0000	mm
Distance from Bottom/Left Tangent		1060.00	mm
User Entered Minimum Design Metal Temperature		-29.00	°C

Type of Element Connected to the Parent : Nozzle

Material [Impact Tested]		SA-333 6	
Material UNS Number		K03006	
Material Specification/Type		Smls. & wld. pipe	
Allowable Stress at Temperature	Sn	117.90	N/mm^2
Allowable Stress At Ambient	Sna	117.90	N/mm^2
Diameter Basis (for tr calc only)		Outside	
Layout Angle		-15.00	deg
Diameter		1.5000	iN
Size and Thickness Basis		Nominal	
Nominal Thickness		160	
Flange Material		SA-350 LF2	
Flange Type		Weld Neck Flange	
Corrosion Allowance	can	1.5000	mm
Joint Efficiency of Shell Seam at Nozzle	E1	1.00	
Joint Efficiency of Nozzle Neck	En	1.00	
Outside Projection	ho	75.0000	mm
Weld leg size between Nozzle and Pad/Shell	Wo	10.0000	mm
Groove weld depth between Nozzle and Vessel	Wgnv	14.8500	mm
Inside Projection	h	0.0000	mm
Weld leg size, Inside Element to Shell	Wi	0.0000	mm
Flange Class		150	
Flange Grade		GR 1.1	

The Pressure Design option was Design Pressure + static head.



Reinforcement CALCULATION, Description: TT

ASME Code, Section VIII, Div. 1, UG-37 to UG-45

Actual Outside Diameter Used in Calculation	1.900	iN
Actual Thickness Used in Calculation	0.281	iN

Nozzle input data check completed without errors.

Reqd thk per UG-37(a) of Cylindrical Shell, tr [Int. Press]
= P*R/(Sv*E-0.6*P) per UG-27 (c)(1)
= 12.6*1234/(137.9*1-0.6*12.6)
= 11.3334 mm

Reqd thk per UG-37(a) of Nozzle Wall, trn [Int. Press]
= P*Ro/(Sn*E+0.4*P) per Appendix 1-1 (a)(1)
= 12.6*24.13/(117.9*1+0.4*12.6)
= 0.2568 mm

UG-40, Limits of Reinforcement: [Internal Pressure]

Parallel to Vessel Wall (Diameter Limit)	Dl	80.9600	mm
Parallel to Vessel Wall	Rn+tn+t	40.4800	mm
Normal to Vessel Wall (Thickness Limit), no pad	Tlnp	14.0935	mm

Taking a UG-36(c)(3)(a) exemption for nozzle: TT.
This calculation is valid for nozzles that meet all the requirements of paragraph UG-36. Please check the Code carefully, especially for nozzles that are not isolated or do not meet Code spacing requirements. To force the computation of areas for small nozzles go to Tools->Configuration and check the box to force the UG-37 small nozzle area calculatioN

UG-45 Minimum Nozzle Neck Thickness Requirement: [Int. Press.]

Wall Thickness for Internal/External pressures	ta = 1.7568 mm
Wall Thickness per UG16(b),	tr16b = 4.0000 mm
Wall Thickness, shell/head, internal pressure	trb1 = 12.8333 mm
Wall Thickness	tb1 = max(trb1, tr16b) = 12.8333 mm
Wall Thickness	tb2 = max(trb2, tr16b) = 4.0000 mm
Wall Thickness per table UG-45	tb3 = 4.7200 mm

Determine Nozzle Thickness candidate [tb]:
= min[tb3, max(tb1,tb2)]
= min[4.72, max(12.83, 4)]
= 4.7200 mm

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
= max(ta, tb)
= max(1.757, 4.72)
= 4.7200 mm

Available Nozzle Neck Thickness = 0.875 * 7.137 = 6.245 mm -> OK

Nozzle Junction Minimum Design Metal Temperature (MDMT) Calculations:

Nozzle Neck to Flange Weld (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

Impact Test Temperature provided per Specification	-46 °C
Calculated Minimum Design Metal Temperature	-104 °C

Nozzle-Shell/Head Weld for the Nozzle (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

Impact Test Temperature provided per Specification -46 °C

Calculated Minimum Design Metal Temperature -104 °C

Gov. MDMT of the nozzle to shell joint welded assembly : -104 °C

Flange MDMT including Temperature reduction per UCS-66.1:

MDMT of ASME B16.5/47 flange per Matl. Specification -46 °C
Flange MDMT with Temp reduction per UCS-66(i)(2) -65 °C

Where the Stress Reduction Ratio per UCS-66(i)(2) is :
Design Pressure/Ambient Rating = 12.60/19.60 = 0.643

Weld Size Calculations, Description: TT

Intermediate Calc. for nozzle/shell Welds Tmin 5.6374 mm

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	3.9462 = 0.7 * tmiN	7.0700 = 0.7 * Wo mm

Skipping the nozzle attachment weld strength calculations. Per UW-15(b)(2) the nozzles exempted by UG-36(c)(3)(a) (small nozzles) do not require a weld strength check.

The Drop for this Nozzle is : 0.2363 mm
The Cut Length for this Nozzle is, Drop + Ho + H + T : 93.0863 mm

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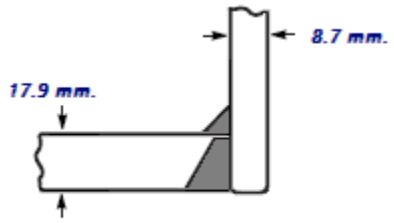
Input, Nozzle Desc: IN/OUT From: 20

Pressure for Reinforcement Calculations	P	12.600	barg
Temperature for Internal Pressure	Temp	90	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N/mm^2
Parent Allowable Stress At Ambient	Sva	137.90	N/mm^2
Inside Diameter of Cylindrical Shell	D	2464.00	mm
Shell Finished (Minimum) Thickness	t	17.8500	mm
Shell Internal Corrosion Allowance	c	1.5000	mm
Shell External Corrosion Allowance	co	0.0000	mm
Distance from Bottom/Left Tangent		360.00	mm
User Entered Minimum Design Metal Temperature		-29.00	°C

Type of Element Connected to the Parent : Nozzle

Material [Impact Tested]		SA-333 6	
Material UNS Number		K03006	
Material Specification/Type		Smls. & wld. pipe	
Allowable Stress at Temperature	Sn	117.90	N/mm^2
Allowable Stress At Ambient	Sna	117.90	N/mm^2
Diameter Basis (for tr calc only)		Outside	
Layout Angle		180.00	deg
Diameter		2.0000	iN
Size and Thickness Basis		Nominal	
Nominal Thickness		160	
Flange Material		SA-350 LF2	
Flange Type		Weld Neck Flange	
Corrosion Allowance	can	1.5000	mm
Joint Efficiency of Shell Seam at Nozzle	E1	1.00	
Joint Efficiency of Nozzle Neck	En	1.00	
Outside Projection	ho	32.7750	mm
Weld leg size between Nozzle and Pad/Shell	Wo	10.0000	mm
Groove weld depth between Nozzle and Vessel	Wgnv	14.8500	mm
Inside Projection	h	0.0000	mm
Weld leg size, Inside Element to Shell	Wi	0.0000	mm
Flange Class		150	
Flange Grade		GR 1.1	

The Pressure Design option was Design Pressure + static head.



Reinforcement CALCULATION, Description: IN/OUT

ASME Code, Section VIII, Div. 1, UG-37 to UG-45

Actual Outside Diameter Used in Calculation	2.375	iN
Actual Thickness Used in Calculation	0.344	iN

Nozzle input data check completed without errors.

Reqd thk per UG-37(a) of Cylindrical Shell, tr [Int. Press]
= P*R/(Sv*E-0.6*P) per UG-27 (c)(1)
= 12.6*1234/(137.9*1-0.6*12.6)
= 11.3334 mm

Reqd thk per UG-37(a) of Nozzle Wall, trn [Int. Press]
= P*Ro/(Sn*E+0.4*P) per Appendix 1-1 (a)(1)
= 12.6*30.16/(117.9*1+0.4*12.6)
= 0.3210 mm

UG-40, Limits of Reinforcement: [Internal Pressure]

Parallel to Vessel Wall (Diameter Limit)	Dl	93.0250	mm
Parallel to Vessel Wall	Rn+tn+t	46.5125	mm
Normal to Vessel Wall (Thickness Limit), no pad	Tlnp	18.0940	mm

Taking a UG-36(c)(3)(a) exemption for nozzle: IN/OUT.
This calculation is valid for nozzles that meet all the requirements of paragraph UG-36. Please check the Code carefully, especially for nozzles that are not isolated or do not meet Code spacing requirements. To force the computation of areas for small nozzles go to Tools->Configuration and check the box to force the UG-37 small nozzle area calculatioN

UG-45 Minimum Nozzle Neck Thickness Requirement: [Int. Press.]

Wall Thickness for Internal/External pressures	ta = 1.8210 mm
Wall Thickness per UG16(b),	tr16b = 4.0000 mm
Wall Thickness, shell/head, internal pressure	trb1 = 12.8333 mm
Wall Thickness	tb1 = max(trb1, tr16b) = 12.8333 mm
Wall Thickness	tb2 = max(trb2, tr16b) = 4.0000 mm
Wall Thickness per table UG-45	tb3 = 4.9200 mm

Determine Nozzle Thickness candidate [tb]:
= min[tb3, max(tb1,tb2)]
= min[4.92, max(12.83, 4)]
= 4.9200 mm

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
= max(ta, tb)
= max(1.821, 4.92)
= 4.9200 mm

Available Nozzle Neck Thickness = 0.875 * 8.738 = 7.645 mm -> OK

Nozzle Junction Minimum Design Metal Temperature (MDMT) Calculations:

Nozzle Neck to Flange Weld (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

Impact Test Temperature provided per Specification	-46 °C
Calculated Minimum Design Metal Temperature	-104 °C

Nozzle-Shell/Head Weld for the Nozzle (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

Impact Test Temperature provided per Specification -46 °C

Calculated Minimum Design Metal Temperature -104 °C

Gov. MDMT of the nozzle to shell joint welded assembly : -104 °C

Flange MDMT including Temperature reduction per UCS-66.1:

MDMT of ASME B16.5/47 flange per Matl. Specification -46 °C
Flange MDMT with Temp reduction per UCS-66(i)(2) -65 °C

Where the Stress Reduction Ratio per UCS-66(i)(2) is :
Design Pressure/Ambient Rating = 12.60/19.60 = 0.643

Weld Size Calculations, Description: IN/OUT

Intermediate Calc. for nozzle/shell Welds Tmin 7.2376 mm

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	5.0663 = 0.7 * tmiN	7.0700 = 0.7 * Wo mm

Skipping the nozzle attachment weld strength calculations. Per UW-15(b)(2) the nozzles exempted by UG-36(c)(3)(a) (small nozzles) do not require a weld strength check.

The Drop for this Nozzle is : 0.3693 mm
The Cut Length for this Nozzle is, Drop + Ho + H + T : 50.9942 mm

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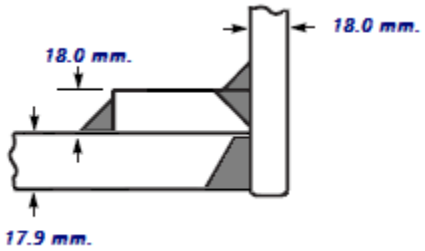
Input, Nozzle Desc: MAN HOLE From: 20

Pressure for Reinforcement Calculations	P	12.600	barg
Temperature for Internal Pressure	Temp	90	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N/mm^2
Parent Allowable Stress At Ambient	Sva	137.90	N/mm^2
Inside Diameter of Cylindrical Shell	D	2464.00	mm
Shell Finished (Minimum) Thickness	t	17.8500	mm
Shell Internal Corrosion Allowance	c	1.5000	mm
Shell External Corrosion Allowance	co	0.0000	mm
Distance from Bottom/Left Tangent		560.00	mm
User Entered Minimum Design Metal Temperature		-29.00	°C

Type of Element Connected to the Parent : Nozzle

Material		SA-516 70	
Material UNS Number		K02700	
Material Specification/Type		Plate	
Allowable Stress at Temperature	Sn	137.90	N/mm^2
Allowable Stress At Ambient	Sna	137.90	N/mm^2
Diameter Basis (for tr calc only)		Outside	
Layout Angle		270.00	deg
Diameter		24.0000	iN
Size and Thickness Basis		Actual	
Actual Thickness	tn	18.0000	mm
Flange Material		SA-350 LF2	
Flange Type		Weld Neck Flange	
Corrosion Allowance	can	1.5000	mm
Joint Efficiency of Shell Seam at Nozzle	E1	1.00	
Joint Efficiency of Nozzle Neck	En	1.00	
Outside Projection	ho	75.0000	mm
Weld leg size between Nozzle and Pad/Shell	Wo	15.0000	mm
Groove weld depth between Nozzle and Vessel	Wgnv	14.8500	mm
Inside Projection	h	0.0000	mm
Weld leg size, Inside Element to Shell	Wi	0.0000	mm
Pad Material		SA-516 70	
Pad Allowable Stress at Temperature	Sp	137.90	N/mm^2
Pad Allowable Stress At Ambient	Spa	137.90	N/mm^2
Diameter of Pad along vessel surface	Dp	810.0000	mm
Thickness of Pad	te	18.0000	mm
Weld leg size between Pad and Shell	Wp	18.0000	mm
Groove weld depth between Pad and Nozzle	Wgpn	18.0000	mm
Reinforcing Pad Width		100.2000	mm
This is a Manway or Access Opening.			
Flange Class		150	
Flange Grade		GR 1.1	

The Pressure Design option was Design Pressure + static head.



Reinforcement CALCULATION, Description: MAN HOLE

ASME Code, Section VIII, Div. 1, UG-37 to UG-45

```
Actual Outside Diameter Used in Calculation          24.000  iN
Actual Thickness Used in Calculation                  0.709  iN
```

Nozzle input data check completed without errors.

Reqd thk per UG-37(a) of Cylindrical Shell, tr [Int. Press]
```
= P*R/(Sv*E-0.6*P) per UG-27 (c)(1)
= 12.6*1234/(137.9*1-0.6*12.6)
= 11.3334 mm
```

Reqd thk per UG-37(a) of Nozzle Wall, trn [Int. Press]
```
= P*Ro/(Sn*E+0.4*P) per Appendix 1-1 (a)(1)
= 12.6*304.8/(137.9*1+0.4*12.6)
= 2.7750 mm
```

UG-40, Limits of Reinforcement: [Internal Pressure]
```
Parallel to Vessel Wall (Diameter Limit)           Dl  1153.2001  mm
Parallel to Vessel Wall, opening length             d   576.6000  mm
Normal to Vessel Wall (Thickness Limit), pad side Tlwp   40.8750  mm
```

Weld Strength Reduction Factor [fr1]:
```
= min( 1, Sn/Sv )
= min( 1, 137.9/137.9 )
= 1.000
```

Weld Strength Reduction Factor [fr2]:
```
= min( 1, Sn/Sv )
= min( 1, 137.9/137.9 )
= 1.000
```

Weld Strength Reduction Factor [fr4]:
```
= min( 1, Sp/Sv )
= min( 1, 137.9/137.9 )
= 1.000
```

Weld Strength Reduction Factor [fr3]:
```
= min( fr2, fr4 )
= min( 1, 1 )
= 1.000
```

Results of Nozzle Reinforcement Area Calculations: (cm^2)

AREA AVAILABLE, A1 to A5		Design	External	Mapnc
Area Required	Ar	65.348	NA	NA
Area in Shell	A1	28.926	NA	NA
Area in Nozzle Wall	A2	11.220	NA	NA
Area in Inward Nozzle	A3	0.000	NA	NA

Area in Welds	A41+A42+A43	5.490	NA	NA
Area in Element	A5	36.072	NA	NA
TOTAL AREA AVAILABLE	Atot	81.708	NA	NA

The Internal Pressure Case Governs the Analysis.

Nozzle Angle Used in Area Calculations 90.00 degs.

The area available without a pad is Insufficient.
The area available with the given pad is Sufficient.

SELECTION OF POSSIBLE REINFORCING PADS:	Diameter	Thickness	
Based on given Pad Thickness:	719.1105	18.0000	mm
Based on given Pad Diameter:	810.0001	9.8363	mm
Based on Shell or Nozzle Thickness:	720.0308	17.8500	mm

Area Required [A]:
= (d * tr*F + 2 * tn * tr*F * (1-fr1)) UG-37(c)
= (576.6*11.33*1+2*16.5*11.33*1*(1-1))
= 65.348 cm^2

Reinforcement Areas per Figure UG-37.1

Area Available in Shell [A1]:
= d(E1*t - F*tr) - 2 * tn(E1*t - F*tr) * (1 - fr1)
= 576.6 (1 * 16.35 - 1 * 11.33) - 2 * 16.5
(1 * 16.35 - 1 * 11.33) * (1 - 1)
= 28.926 cm^2

Area Available in Nozzle Wall Projecting Outward [A2]:
= (2 * Tlwp) * (tn - trn) * fr2
= (2 * 40.88) * (16.5 - 2.775) * 1
= 11.220 cm^2

Area Available in Welds [A41 + A42 + A43]:
= Wo² * fr3 + (Wi-can/0.707)² * fr2 + Wp² * fr4
= 15² * 1 + (0)² * 1 + 18² * 1
= 5.490 cm^2

Area Available in Element [A5]:
= (min(Dp,DL)-(Nozzle OD))*(min(tp,Tlwp,te)) * fr4
= (810 - 609.6) * 18 * 1
= 36.072 cm^2

UG-45 Minimum Nozzle Neck Thickness Requirement:
Wall Thickness for Internal/External pressures ta = 4.2750 mm

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
= ta
= 4.2750 mm

Available Nozzle Neck Thickness = 18.0000 mm -> OK

Nozzle Junction Minimum Design Metal Temperature (MDMT) Calculations:

Nozzle Neck to Flange Weld, Curve: B

GovrN thk, tg = 18, tr = 2.775, c = 1.5 mm, E✱ = 1
Thickness Ratio = tr * E✱/(tg - c) = 0.168, Temp. Reduction = 78 °C

Min Metal Temp. w/o impact per UCS-66, Curve B	-11 °C
Min Metal Temp. at Required thickness (UCS 66.1)	-104 °C

Min Metal Temp. w/o impact per UG-20(f) -29 °C

Nozzle Neck to Pad Weld for the Nozzle, Curve: B

GovrN thk, tg = 18, tr = 2.775, c = 1.5 mm, E✱ = 1
Thickness Ratio = tr * E✱/(tg - c) = 0.168, Temp. Reduction = 78 °C

Min Metal Temp. w/o impact per UCS-66, Curve B -11 °C
Min Metal Temp. at Required thickness (UCS 66.1) -104 °C
Min Metal Temp. w/o impact per UG-20(f) -29 °C

Nozzle Neck to Pad Weld for Reinforcement pad, Curve: B

GovrN thk, tg = 18, tr = 2.775, c = 1.5 mm, E✱ = 1
Thickness Ratio = tr * E✱/(tg - c) = 0.168, Temp. Reduction = 78 °C

Min Metal Temp. w/o impact per UCS-66, Curve B -11 °C
Min Metal Temp. at Required thickness (UCS 66.1) -104 °C
Min Metal Temp. w/o impact per UG-20(f) -29 °C

Shell to Pad Weld Junction at Pad OD, Curve: B

GovrN thk, tg = 17.85, tr = 11.33, c = 1.5 mm, E✱ = 1
Thickness Ratio = tr * E✱/(tg - c) = 0.693, Temp. Reduction = 17 °C

Min Metal Temp. w/o impact per UCS-66, Curve B -11 °C
Min Metal Temp. at Required thickness (UCS 66.1) -28 °C
Min Metal Temp. w/o impact per UG-20(f) -29 °C

Nozzle-Shell/Head Weld (UCS-66(a)1(b)), Curve: B

GovrN thk, tg = 17.85, tr = 11.33, c = 1.5 mm, E✱ = 1
Thickness Ratio = tr * E✱/(tg - c) = 0.693, Temp. Reduction = 17 °C

Min Metal Temp. w/o impact per UCS-66, Curve B -11 °C
Min Metal Temp. at Required thickness (UCS 66.1) -28 °C
Min Metal Temp. w/o impact per UG-20(f) -29 °C

Gov. MDMT of the Nozzle : -29 °C
Gov. MDMT of the Reinforcement Pad : -29 °C
Gov. MDMT of the nozzle to shell joint welded assembly : -29 °C

Flange MDMT including Temperature reduction per UCS-66.1:

MDMT of ASME B16.5/47 flange per Matl. Specification -46 °C
Flange MDMT with Temp reduction per UCS-66(i)(2) -48 °C

Where the Stress Reduction Ratio per UCS-66(i)(2) is :
Design Pressure/Ambient Rating = 12.60/19.60 = 0.643

Weld Size Calculations, Description: MAN HOLE

Intermediate Calc. for nozzle/shell Welds Tmin 16.5000 mm
Intermediate Calc. for pad/shell Welds TminPad 16.5000 mm

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	6.0000 = Min per Code	10.6050 = 0.7 * Wo mm
Pad Weld	8.2500 = 0.5*TminPad	12.7260 = 0.7 * Wp mm

Weld Strength and Weld Loads per UG-41.1, Sketch (a) or (b)

Weld Load [W]:

= max(0, (A-A1+2*tn*fr1*(E1*t-tr))Sv)
= max(0, (65.35 - 28.93 + 2 * 16.5 * 1 *
(1 * 16.35 - 11.33))137.9)
= 53543.28 kgf

Note: F is always set to 1.0 throughout the calculatioN

Weld Load [W1]:
= (A2+A5+A4-(Wi-Can/.707)²*fr2)*Sv
= (11.22 + 36.07 + 5.49 - 0 * 1) * 137.9
= 74220.38 kgf

Weld Load [W2]:
= (A2 + A3 + A4 + (2 * tn * t * fr1)) * Sv
= (11.22 + 0 + 2.25 + (5.396)) * 137.9
= 26528.24 kgf

Weld Load [W3]:
= (A2+A3+A4+A5+(2*tn*t*fr1))*S
= (11.22 + 0 + 5.49 + 36.07 + (5.396)) * 137.9
= 81807.34 kgf

Strength of Connection Elements for Failure Path Analysis

Shear, Outward Nozzle Weld [Sonw]:
= (pi/2) * Dlo * Wo * 0.49 * Snw
= (3.142/2.0) * 609.6 * 15 * 0.49 * 137.9
= 98966. kgf

Shear, Pad Element Weld [Spew]:
= (pi/2) * DP * WP * 0.49 * SEW
= (3.142/2.0) * 810 * 18 * 0.49 * 137.9
= 157801. kgf

Shear, Nozzle Wall [Snw]:
= (pi *(Dlr + Dlo)/4) * (Thk - Can) * 0.7 * Sn
= (3.142 * 296.6) * (18 - 1.5) * 0.7 * 137.9
= 151309. kgf

Tension, Pad Groove Weld [Tpgw]:
= (pi/2) * Dlo * Wgpn * 0.74 * Seg
= (3.142/2) * 609.6 * 18 * 0.74 * 137.9
= 179351. kgf

Tension, Shell Groove Weld [Tngw]:
= (pi/2) * Dlo * Wgnvi * 0.74 * Sng
= (3.142/2.0) * 609.6 * (14.85 - 0) * 0.74 * 137.9
= 147965. kgf

See UG-41 and UW-15 for clarification of allowable stresses.

Strength of Failure Paths:

Failure Path [Path 1-1]:
= (SPEW + SNW) = (157801 + 151309) = 309110 kgf

Failure Path [Path 2-2]:
= (Sonw + Tpgw + Tngw + Sinw)
= (98966 + 179351 + 147965 + 0) = 426283 kgf

Failure Path [Path 3-3]:
= (Spew + Tngw + Sinw)
= (157801 + 147965 + 0) = 305766 kgf

Summary of Failure Path Calculations:

```
 Path 1-1 = 309110  kgf, must exceed W = 53543 kgf    or W1 = 74220 kgf
 Path 2-2 = 426282  kgf, must exceed W = 53543 kgf    or W2 = 26528 kgf
 Path 3-3 = 305765  kgf, must exceed W = 53543 kgf    or W3 = 81807 kgf
```

Maximum Allowable Pressure for this Nozzle at this Location:

```
 Converged Maximum Allowable Pressure in the Operating case: 14.14 barg
```

The Drop for this Nozzle is : 38.2994 mm
The Cut Length for this Nozzle is, Drop + Ho + H + T : 131.1494 mm

Percent Elongation Calculations:

```
 % Elongation per Table UG-79-1 (50*tnom/Rf*(1-Rf/Ro))  3.043 %
```



Nozzle Layout or placement warning. Area for reinforcement
may have been used that might not actually exist in this situatioN
Please check the nozzle geometry and placement carefully.

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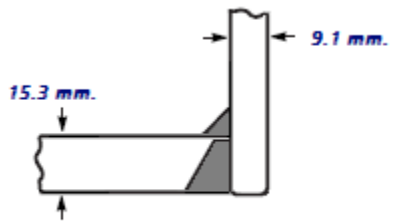
Input, Nozzle Desc: Vent From: 50

Pressure for Reinforcement Calculations	P	12.000	barg
Temperature for Internal Pressure	Temp	90	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N/mm^2
Parent Allowable Stress At Ambient	Sva	137.90	N/mm^2
Inside Diameter of Elliptical Head	D	2469.40	mm
Aspect Ratio of Elliptical Head	Ar	2.00	
Head Finished (Minimum) Thickness	t	15.3000	mm
Head Internal Corrosion Allowance	c	1.5000	mm
Head External Corrosion Allowance	co	0.0000	mm
Distance from Head Centerline	L1	0.0000	mm
User Entered Minimum Design Metal Temperature		-29.00	°C

Type of Element Connected to the Parent : Nozzle

Material [Impact Tested]		SA-333 6	
Material UNS Number		K03006	
Material Specification/Type		Smls. & wld. pipe	
Allowable Stress at Temperature	Sn	117.90	N/mm^2
Allowable Stress At Ambient	Sna	117.90	N/mm^2
Diameter Basis (for tr calc only)		Inside	
Layout Angle		0.00	deg
Diameter		1.0000	iN
Size and Thickness Basis		Nominal	
Nominal Thickness		XXS	
Flange Material		SA-350 LF2	
Flange Type		Weld Neck Flange	
Corrosion Allowance	can	1.5000	mm
Joint Efficiency of Shell Seam at Nozzle	E1	1.00	
Joint Efficiency of Nozzle Neck	En	1.00	
Outside Projection	ho	100.0000	mm
Weld leg size between Nozzle and Pad/Shell	Wo	10.0000	mm
Groove weld depth between Nozzle and Vessel	Wgnv	12.7500	mm
Inside Projection	h	0.0000	mm
Weld leg size, Inside Element to Shell	Wi	0.0000	mm
Flange Class		150	
Flange Grade		GR 1.1	

The Pressure Design option was Design Pressure + static head.



Reinforcement CALCULATION, Description: Vent

ASME Code, Section VIII, Div. 1, UG-37 to UG-45

```
Actual Inside Diameter Used in Calculation            0.599  iN
Actual Thickness Used in Calculation                  0.358  iN
```

Nozzle input data check completed without errors.

Reqd thk per UG-37(a) of Elliptical Head, tr [Int. Press]
```
  = P*D*K1/(2*Sv*E-0.2*P) per Appendix 1-4(c)
  = 12*2472*0.899/(2*137.9*1-0.2*12)
  = 9.6794 mm
```

Reqd thk per App. 1 of Nozzle Wall, trn [Int. Press]
```
  = R( exp([P/(Sn*E)] - 1 ) per Appendix 1-2 (a)(1)
  = 9.107(exp([12/(117.9*1]-1)
  = 0.0932 mm
```

UG-40, Limits of Reinforcement: [Internal Pressure]
```
Parallel to Vessel Wall (Diameter Limit)           Dl    61.0010  mm
Parallel to Vessel Wall                        Rn+tn+t    30.5005  mm
Normal to Vessel Wall (Thickness Limit), no pad   Tlnp    18.9830  mm
```

Taking a UG-36(c)(3)(a) exemption for nozzle: Vent.
This calculation is valid for nozzles that meet all the requirements of paragraph UG-36. Please check the Code carefully, especially for nozzles that are not isolated or do not meet Code spacing requirements. To force the computation of areas for small nozzles go to Tools->Configuration and check the box to force the UG-37 small nozzle area calculatioN

UG-45 Minimum Nozzle Neck Thickness Requirement: [Int. Press.]
```
Wall Thickness for Internal/External pressures      ta = 1.5932 mm
Wall Thickness per UG16(b),                      tr16b = 4.0000 mm
Wall Thickness, shell/head, internal pressure     trb1 = 12.2500 mm
Wall Thickness                 tb1 = max(trb1, tr16b) = 12.2500 mm
Wall Thickness                 tb2 = max(trb2, tr16b) = 4.0000 mm
Wall Thickness per table UG-45                    tb3 = 4.4464 mm
```

Determine Nozzle Thickness candidate [tb]:
```
  = min[ tb3, max( tb1,tb2) ]
  = min[ 4.446, max( 12.25, 4 ) ]
  = 4.4464 mm
```

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
```
  = max( ta, tb )
  = max( 1.593, 4.446 )
  = 4.4464 mm
```

Available Nozzle Neck Thickness = 0.875 * 9.093 = 7.957 mm -> OK

Nozzle Junction Minimum Design Metal Temperature (MDMT) Calculations:

Nozzle Neck to Flange Weld (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

```
Impact Test Temperature provided per Specification    -46 °C

Calculated Minimum Design Metal Temperature          -104 °C
```

Nozzle-Shell/Head Weld for the Nozzle (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

Impact Test Temperature provided per Specification -46 °C

Calculated Minimum Design Metal Temperature -104 °C

Gov. MDMT of the nozzle to shell joint welded assembly : -104 °C

Flange MDMT including Temperature reduction per UCS-66.1:

MDMT of ASME B16.5/47 flange per Matl. Specification -46 °C
Flange MDMT with Temp reduction per UCS-66(i)(2) -67 °C

Where the Stress Reduction Ratio per UCS-66(i)(2) is :
Design Pressure/Ambient Rating = 12.00/19.60 = 0.612

Weld Size Calculations, Description: Vent

Intermediate Calc. for nozzle/shell Welds Tmin 7.5932 mm

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	5.3152 = 0.7 * tmiN	7.0700 = 0.7 * Wo mm

Skipping the nozzle attachment weld strength calculations. Per UW-15(b)(2) the nozzles exempted by UG-36(c)(3)(a) (small nozzles) do not require a weld strength check.

The Drop for this Nozzle is : 0.0624 mm
The Cut Length for this Nozzle is, Drop + Ho + H + T : 115.3624 mm

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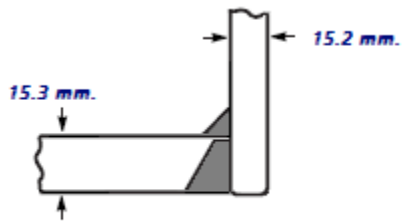
Input, Nozzle Desc: PSV From: 50

Pressure for Reinforcement Calculations	P	12.600	barg
Temperature for Internal Pressure	Temp	90	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N/mm^2
Parent Allowable Stress At Ambient	Sva	137.90	N/mm^2
Inside Diameter of Elliptical Head	D	2469.40	mm
Aspect Ratio of Elliptical Head	Ar	2.00	
Head Finished (Minimum) Thickness	t	15.3000	mm
Head Internal Corrosion Allowance	c	1.5000	mm
Head External Corrosion Allowance	co	0.0000	mm
Distance from Head Centerline	L1	500.0000	mm
User Entered Minimum Design Metal Temperature		-29.00	°C

Type of Element Connected to the Parent : Nozzle

Material [Impact Tested]		SA-333 6	
Material UNS Number		K03006	
Material Specification/Type		Smls. & wld. pipe	
Allowable Stress at Temperature	Sn	117.90	N/mm^2
Allowable Stress At Ambient	Sna	117.90	N/mm^2
Diameter Basis (for tr calc only)		Inside	
Layout Angle		0.00	deg
Diameter		3.0000	iN
Size and Thickness Basis		Nominal	
Nominal Thickness		XXS	
Flange Material		SA-350 LF2	
Flange Type		Weld Neck Flange	
Corrosion Allowance	can	1.5000	mm
Joint Efficiency of Shell Seam at Nozzle	E1	1.00	
Joint Efficiency of Nozzle Neck	En	1.00	
Outside Projection	ho	100.0000	mm
Weld leg size between Nozzle and Pad/Shell	Wo	9.0000	mm
Groove weld depth between Nozzle and Vessel	Wgnv	12.7500	mm
Inside Projection	h	0.0000	mm
Weld leg size, Inside Element to Shell	Wi	0.0000	mm
Flange Class		150	
Flange Grade		GR 1.1	

The Pressure Design option was Design Pressure + static head.



Note : Checking Nozzle in the Meridional directioN

Reinforcement CALCULATION, Description: PSV

ASME Code, Section VIII, Div. 1, UG-37 to UG-45

Actual Inside Diameter Used in Calculation	2.300	iN
Actual Thickness Used in Calculation	0.600	iN

Nozzle input data check completed without errors.

Reqd thk per UG-37(a) of Elliptical Head, tr [Int. Press]
= P*D*K1/(2*Sv*E-0.2*P) per Appendix 1-4(c)
= 12.6*2472*0.899/(2*137.9*1-0.2*12.6)
= 10.1638 mm

Reqd thk per UG-37(a) of Nozzle Wall, trn [Int. Press]
= P*R/(Sn*E-0.6*P) per UG-27 (c)(1)
= 12.6*30.71/(117.9*1-0.6*12.6)
= 0.3303 mm

UG-40, Limits of Reinforcement: [Internal Pressure]

Parallel to Vessel Wall (Diameter Limit)	Dl	125.7965	mm
Parallel to Vessel Wall, opening length	d	62.8983	mm
Normal to Vessel Wall (Thickness Limit), no pad	Tlnp	34.3500	mm

Weld Strength Reduction Factor [fr1]:
= min(1, Sn/Sv)
= min(1, 117.9/137.9)
= 0.855

Weld Strength Reduction Factor [fr2]:
= min(1, Sn/Sv)
= min(1, 117.9/137.9)
= 0.855

Weld Strength Reduction Factor [fr3]:
= min(fr2, fr4)
= min(0.855, 1)
= 0.855

Results of Nozzle Reinforcement Area Calculations: (cm^2)

AREA AVAILABLE, A1 to A5		Design	External	Mapnc
Area Required	Ar	6.798	NA	NA
Area in Shell	A1	2.142	NA	NA
Area in Nozzle Wall	A2	8.036	NA	NA
Area in Inward Nozzle	A3	0.000	NA	NA
Area in Welds	A41+A42+A43	0.693	NA	NA
Area in Element	A5	0.000	NA	NA
TOTAL AREA AVAILABLE	Atot	10.871	NA	NA

The Internal Pressure Case Governs the Analysis.

Nozzle Angle Used in Area Calculations	77.55	degs.

The area available without a pad is Sufficient.

Area Required [A]:
= (d * tr*F + 2 * tn * tr*F * (1-fr1)) UG-37(c)
= (62.9*10.16*1+2*13.74*10.16*1*(1-0.855))

= 6.798 cm^2

Reinforcement Areas per Figure UG-37.1

Area Available in Shell [A1]:
= d(E1*t - F*tr) - 2 * tn(E1*t - F*tr) * (1 - fr1)
= 62.9 (1 * 13.8 - 1 * 10.16) - 2 * 13.74
(1 * 13.8 - 1 * 10.16) * (1 - 0.855)
= 2.142 cm^2

Area Available in Nozzle Projecting Outward [A2]:
= (2 * tlnp)(tn - trn)fr2/sin(alpha3)
= (2 * 34.35)(13.74 - 0.33)0.855/sin(78.55)
= 8.036 cm^2

See ASME VIII-1 2011(a) Appendix L, L-7.7.7(b) for more informatioN

Area Available in Inward Weld + Outward Weld [A41 + A43]:
= Wo² * fr2 + (Wi-can/0.707)² * fr2
= 9² * 0.855 + (0)² * 0.855
= 0.693 cm^2

Nozzle Junction Minimum Design Metal Temperature (MDMT) Calculations:

Nozzle Neck to Flange Weld (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

Impact Test Temperature provided per Specification -46 °C

Calculated Minimum Design Metal Temperature -104 °C

Nozzle-Shell/Head Weld for the Nozzle (Impact tested) :

Note:
This Material was specified as being an Impact Tested (Low Temperature) Material.

Impact Test Temperature provided per Specification -46 °C

Calculated Minimum Design Metal Temperature -104 °C

Gov. MDMT of the nozzle to shell joint welded assembly : -104 °C

Flange MDMT including Temperature reduction per UCS-66.1:

MDMT of ASME B16.5/47 flange per Matl. Specification -46 °C
Flange MDMT with Temp reduction per UCS-66(i)(2) -65 °C

Where the Stress Reduction Ratio per UCS-66(i)(2) is :
Design Pressure/Ambient Rating = 12.60/19.60 = 0.643

Weld Size Calculations, Description: PSV

Intermediate Calc. for nozzle/shell Welds Tmin 13.7400 mm

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	6.0000 = Min per Code	6.3630 = 0.7 * Wo mm

Weld Strength and Weld Loads per UG-41.1, Sketch (a) or (b)

Weld Load [W]:
= max(0, (A-A1+2*tn*fr1*(E1*t-tr))Sv)

```
  = max( 0, (6.798 - 2.142 + 2 * 13.74 * 0.855 *
    (1 * 13.8 - 10.16 ) )137.9 )
  = 7748.05 kgf
```

Note: F is always set to 1.0 throughout the calculatioN

Weld Load [W1]:
```
  = (A2+A5+A4-(Wi-Can/.707)²*fr2)*Sv
  = ( 8.036 + 0 + 0.693 - 0 * 0.855 ) * 137.9
  = 12274.08 kgf
```

Weld Load [W2]:
```
  = (A2 + A3 + A4 + (2 * tn * t * fr1)) * Sv
  = ( 8.036 + 0 + 0.693 + ( 3.242 ) ) * 137.9
  = 16833.20 kgf
```

Weld Load [W3]:
```
  = (A2+A3+A4+A5+(2*tn*t*fr1))*S
  = ( 8.036 + 0 + 0.693 + 0 + ( 3.242 ) ) * 137.9
  = 16833.20 kgf
```

Strength of Connection Elements for Failure Path Analysis

Shear, Outward Nozzle Weld [Sonw]:
```
  = (pi/2) * Dlo * Wo * 0.49 * Snw
  = ( 3.142/2.0 ) * 91.04 * 9 * 0.49 * 117.9
  = 7582. kgf
```

Shear, Nozzle Wall [Snw]:
```
  = (pi *( Dlr + Dlo )/4 ) * ( Thk - Can ) * 0.7 * Sn
  = (3.142 * 38.48 ) * ( 15.24 - 1.5 ) * 0.7 * 117.9
  = 13980. kgf
```

Tension, Shell Groove Weld [Tngw]:
```
  = (pi/2) * Dlo * Wgnvi * 0.74 * Sng
  = ( 3.142/2.0 ) * 91.04 * ( 12.75 - 0 ) * 0.74 * 137.9
  = 18973. kgf
```

See UG-41 and UW-15 for clarification of allowable stresses.

Strength of Failure Paths:

Failure Path [Path 1-1]:
```
  = ( SONW + SNW ) = ( 7582 + 13980 ) = 21562 kgf
```

Failure Path [Path 2-2]:
```
  = ( Sonw + Tpgw + Tngw + Sinw )
  = ( 7582 + 0 + 18973 + 0 ) = 26554 kgf
```

Failure Path [Path 3-3]:
```
  = ( Sonw + Tngw + Sinw )
  = ( 7582 + 18973 + 0 ) = 26554 kgf
```

Summary of Failure Path Calculations:
```
 Path 1-1 = 21561   kgf, must exceed W = 7748 kgf     or W1 = 12274 kgf
 Path 2-2 = 26554   kgf, must exceed W = 7748 kgf     or W2 = 16833 kgf
 Path 3-3 = 26554   kgf, must exceed W = 7748 kgf     or W3 = 16833 kgf
```

Maximum Allowable Pressure for this Nozzle at this Location:
```
 Converged Maximum Allowable Pressure in the Operating case: 14.8 barg
```

Note: The MAWP of this junction was limited by the parent Shell/Head.

Note : Checking Nozzle in the Latitudinal directioN

Reinforcement CALCULATION, Description: PSV

ASME Code, Section VIII, Div. 1, UG-37 to UG-45

```
Actual Inside Diameter Used in Calculation            2.300  iN
Actual Thickness Used in Calculation                  0.600  iN
```

Nozzle input data check completed without errors.

Reqd thk per UG-37(a) of Elliptical Head, tr [Int. Press]
```
  = P*D*K1/(2*Sv*E-0.2*P) per Appendix 1-4(c)
  = 12.6*2472*0.899/(2*137.9*1-0.2*12.6)
  = 10.1638 mm
```

Reqd thk per UG-37(a) of Nozzle Wall, trn [Int. Press]
```
  = P*R/(Sn*E-0.6*P) per UG-27 (c)(1)
  = 12.6*30.71/(117.9*1-0.6*12.6)
  = 0.3303 mm
```

UG-40, Limits of Reinforcement: [Internal Pressure]

```
Parallel to Vessel Wall (Diameter Limit)          Dl   122.8400  mm
Parallel to Vessel Wall, opening length            d    61.4200  mm
Normal to Vessel Wall (Thickness Limit), no pad  Tlnp   34.3500  mm
```

Results of Nozzle Reinforcement Area Calculations: (cm^2)

AREA AVAILABLE, A1 to A5		Design	External	Mapnc
Area Required	Ar	6.648	NA	NA
Area in Shell	A1	2.088	NA	NA
Area in Nozzle Wall	A2	7.876	NA	NA
Area in Inward Nozzle	A3	0.000	NA	NA
Area in Welds	A41+A42+A43	0.693	NA	NA
Area in Element	A5	0.000	NA	NA
TOTAL AREA AVAILABLE	Atot	10.657	NA	NA

The Internal Pressure Case Governs the Analysis.

```
Nozzle Angle Used in Area Calculations                90.00  degs.
```

The area available without a pad is Sufficient.

Area Required [A]:
```
  = ( d * tr*F + 2 * tn * tr*F * (1-fr1) ) UG-37(c)
  = (61.42*10.16*1+2*13.74*10.16*1*(1-0.855))
  = 6.648 cm^2
```

Reinforcement Areas per Figure UG-37.1

Area Available in Shell [A1]:
```
  = d( E1*t - F*tr ) - 2 * tn( E1*t - F*tr ) * ( 1 - fr1 )
  = 61.42 ( 1 * 13.8 - 1 * 10.16 ) - 2 * 13.74
    ( 1 * 13.8 - 1 * 10.16 ) * ( 1 - 0.855 )
  = 2.088 cm^2
```

Area Available in Nozzle Projecting Outward [A2]:
```
  = ( 2 * tlnp )( tn - trn )fr2
  = ( 2 * 34.35 )( 13.74 - 0.33 )0.855
  = 7.876 cm^2
```

Area Available in Inward Weld + Outward Weld [A41 + A43]:
```
  = Wo² * fr2 + ( Wi-can/0.707 )² * fr2
```

= 9² * 0.855 + (0)² * 0.855
= 0.693 cm^2

UG-45 Minimum Nozzle Neck Thickness Requirement: [Int. Press.]

```
Wall Thickness for Internal/External pressures      ta = 1.8303 mm
Wall Thickness per UG16(b),                      tr16b = 4.0000 mm
Wall Thickness, shell/head, internal pressure     trb1 = 12.7880 mm
Wall Thickness                 tb1 = max(trb1, tr16b) = 12.7880 mm
Wall Thickness                 tb2 = max(trb2, tr16b) = 4.0000 mm
Wall Thickness per table UG-45                    tb3 = 6.3000 mm
```

Determine Nozzle Thickness candidate [tb]:
= min[tb3, max(tb1,tb2)]
= min[6.3, max(12.79, 4)]
= 6.3000 mm

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
= max(ta, tb)
= max(1.83, 6.3)
= 6.3000 mm

Available Nozzle Neck Thickness = 0.875 * 15.240 = 13.335 mm -> OK

Weld Size Calculations, Description: PSV

```
Intermediate Calc. for nozzle/shell Welds   Tmin     13.7400  mm
```

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	6.0000 = Min per Code	6.3630 = 0.7 * Wo mm

Weld Strength and Weld Loads per UG-41.1, Sketch (a) or (b)

Weld Load [W]:
= max(0, (A-A1+2*tn*fr1*(E1*t-tr))Sv)
= max(0, (6.648 - 2.088 + 2 * 13.74 * 0.855 *
(1 * 13.8 - 10.16))137.9)
= 7612.36 kgf

Note: F is always set to 1.0 throughout the calculatioN

Weld Load [W1]:
= (A2+A5+A4-(Wi-Can/.707)²*fr2)*Sv
= (7.876 + 0 + 0.693 - 0 * 0.855) * 137.9
= 12049.21 kgf

Weld Load [W2]:
= (A2 + A3 + A4 + (2 * tn * t * fr1)) * Sv
= (7.876 + 0 + 0.693 + (3.242)) * 137.9
= 16608.33 kgf

Weld Load [W3]:
= (A2+A3+A4+A5+(2*tn*t*fr1))*S
= (7.876 + 0 + 0.693 + 0 + (3.242)) * 137.9
= 16608.33 kgf

Strength of Connection Elements for Failure Path Analysis

Shear, Outward Nozzle Weld [Sonw]:
= (pi/2) * Dlo * Wo * 0.49 * Snw
= (3.142/2.0) * 88.9 * 9 * 0.49 * 117.9
= 7404. kgf

Shear, Nozzle Wall [Snw]:

= (pi *(Dlr + Dlo)/4) * (Thk - Can) * 0.7 * Sn
= (3.142 * 37.58) * (15.24 - 1.5) * 0.7 * 117.9
= 13651. kgf

Tension, Shell Groove Weld [Tngw]:
= (pi/2) * Dlo * Wgnvi * 0.74 * Sng
= (3.142/2.0) * 88.9 * (12.75 - 0) * 0.74 * 137.9
= 18527. kgf

See UG-41 and UW-15 for clarification of allowable stresses.

Strength of Failure Paths:

Failure Path [Path 1-1]:
= (SONW + SNW) = (7404 + 13651) = 21055 kgf

Failure Path [Path 2-2]:
= (Sonw + Tpgw + Tngw + Sinw)
= (7404 + 0 + 18527 + 0) = 25930 kgf

Failure Path [Path 3-3]:
= (Sonw + Tngw + Sinw)
= (7404 + 18527 + 0) = 25930 kgf

Summary of Failure Path Calculations:

Path 1-1 = 21055	kgf, must exceed W = 7612 kgf	or W1 = 12049 kgf
Path 2-2 = 25930	kgf, must exceed W = 7612 kgf	or W2 = 16608 kgf
Path 3-3 = 25930	kgf, must exceed W = 7612 kgf	or W3 = 16608 kgf

Maximum Allowable Pressure for this Nozzle at this Location:
Converged Maximum Allowable Pressure in the Operating case: 14.8 barg

Note: The MAWP of this junction was limited by the parent Shell/Head.

The Drop for this Nozzle is : 10.6838 mm
The Cut Length for this Nozzle is, Drop + Ho + H + T : 126.3790 mm

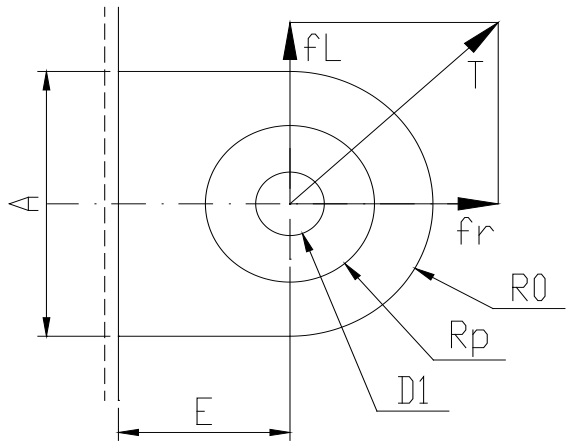
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CLIENTE : **ROSETTI MARINO** ***CUSTOMER***	**COMM:** : **166/24** ***JOB:***	
	ITEM: : **AIR RECEIVER**	

Dimensionamento dei golfari di sollevamento

Design calculation of tailing lug

M	peso del serbatoio durante il sollevamento *weight of vessel during erection*	7411	kg
P	peso del serbatoio durante il sollevamento *weight of vessel during erection*	72702	N
R_0	raggio esterno del golfare *outside radius of tailing lug*	125	mm
R_p	raggio esterno del rinforzo *outside radius of pad eye*	0	mm
D_1	diametro del foro del golfare *hole diameter*	60	mm
t_L	spessore del golfare *thickness of tailing lug*	20	mm
t_p	spessore del rinforzo *thickness of pad eye*	0	mm
A	larghezza del golfare *width of tailing lug*	250	mm
E	sporgenza del golfare *protruding of tailing lug*	150	mm
n_s	numero di golfari *number of tailing lug*	1	
l_s	lunghezza della saldatura *length of weld*	250	mm
w_s	dimensione minima della saldatura *minimum size of weld*	15	mm
	materiale tailing lug *tailing lug material*	SA 516 Gr.70	
F_S	sollecitazione ammissibile del golfare *allowable stress of lifting lug*	138	MPa
F_w	sollecitazione ammissibile della saldatura *allowable stress of weld*	138	MPa
C_d	coefficiente dinamico *dinamic coefficient*	2	



Sforzi nei golfari
Stress in the tailing lug

$$T = \frac{P \times C_d}{n_s}$$

145403,82

Area richiesta al foro della spina, A_r
Area required at pin hole, A_r

$$A_r = \frac{T}{F_s}$$

1054

Area disponibile al foro della spina, A_r
Area available at pin hole, A_r

$$A_a = (2 \times R_0 \times t_L) + \left(2 \times (2 \times R_p \times t_p)\right) - (D_1 \times t_L) - (2 \times D_1 \times t_p)$$

3800

Ok!

Momento flettente nel golfare, M_b (posizione verticale)
Bending moment in lug, M_b (vertical position)

$$f_L = T \qquad M_b = f_L \times E$$

21810573

Modulo d'inerzia del golfare, Z
Section modulus of lug, Z

$$Z = \frac{t_L \times A^2}{6}$$

208333

Sforzo nel golfare, σ_b
Bending stress in lug, σ_b

$$\sigma_b = \frac{M_b}{Z}$$

104,7

Ok!

Sforzi nella saldatura
Stress in the weld

$$A_{Rw} = 2 \times w_s \times l_s \times 0.707$$

5302,5

$$\tau_W = \frac{T}{A_{RW}}$$

27,42

Ok!

REV.	DESCRIZIONE DESCRIPTION	EMESSO ISSUED	APPROVATO APPROVED	DATA DATE
01	REVISION	GT	TM	28-mag-24
00	ISSUE	GT	TM	21-mag-24

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
Giuseppe Cavallo	23/04/25

Power Hub (BLPH)

NT AIR PACKAGE

NT DATA SHEETS

IR COMPRESSOR, DRYERS, ETC.

I724000428-MAC-DS-00011

ment Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
04	01/04/2025	Accepted for Construction (AFC)	GT	MC	TM
03	03/02/2025	Accepted for Construction (AFC)	GT	MC	TM
02	17/12/2024	Issue for Review (IFR)	GT	MC	TM
01	10/05/2024	Issue for Review (IFR)	GT	MC	TM
00	28/03/2024	Issue for Review (IFR)	GT	MC	TM

COES

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coes	CLIENTE CUSTOMER	:	ROSETTI MARINO	COMM: JOB:	:	166/24		
	RIFERIMENTO REFERENCE	:	CROSSWIND	UNITA' ITEM	:	/		
	IMPIANTO DRYING UNIT	:	INSTRUMENT AIR PACKAGE	FOGLIO N° SHEET	:	1	DI : OF	5

FOGLIO DATI PER COMPRESSORE
COMPRESSOR DATA SHEET

		DATI GENERALI **GENERAL DATA**		
1	QUANTITA' QUANTITY	:	2x100%	
2	ITEM TAG	:	K-63001A / K-63001B	
3	SERVIZIO SERVICE	:	PLANT AIR FOR DRYER AND NITROGEN GENERATOR	
4	TIPO TYPE	:	ROTARY SCREW	
5	CARATTERISTICHE FEATURES	:	OIL-FREE	
		DATI FUNZIONALI **FUNCTIONAL DATA**		
6	INSTALLAZIONE INSTALLATION	:	OUTDOOR	
7	MOSSO DA DRIVEN BY	:	ELECTRIC MOTOR	
8	POTENZA MOTORE MOTOR POWER	:	55 kW	
9	POTENZA TOTALE TOTAL POWER	:	65.9 kW	
10	TENSIONE DI ALIMENTAZIONE POWER SUPPLY	:	400 V	3 Ph + PE 50 Hz
11	PRESSIONE ARIA IN MANDATA DISCHARGE AIR PRESSURE	:	9.5 barg	
12	PORTATA ARIA IN MANDATA DISCHARGE AIR FLOWRATE	:	415 Sm^3/h	
13	TEMPERATURA ARIA IN MANDATA DISCHARGE AIR TEMPERATURA	:	35 °C	
14	GRADO DI PROTEZIONE PROTECTION DEGREE	:	IP 55	
15	CLASSIFICAZIONE AREA AREA CLASSIFICATION	:	SICURA SAFE	
16				
17		**DATI MOTORE** **MOTOR DATA**		
18	TIPO TYPE	:	SQUIRREL CAGE MOTOR	
19	RAFFREDDAMENTO METHOD OF COOLING	:	AIRCOOLED	
20	ISOLAMENTO INSULATION	:	CLASS F	
21	STANDARD - CLASS	:	IEC - IE4	
22	SAFETY FACTOR	:	1.32	
23	DUTY TYPE	:	S1	
24	SPEED	:	2980 RPM	
25	**NOTES**			
26	COSTRUTTORE MANUFACTURER	:	ATLAS COPCO	
27	MODELLO MODELLO	:	ZT55-10.50-400D	
28	RUMOROSITA' NOISE LEVEL	:	76 dB(A)	
29	PED INFO	:	N/A	

REV.	DESCRIZIONE DESCRIPTION	EMESSO ISSUED	APPROVATO APPROVED	DATA DATE
04	ACCEPTED FOR CONSTRUCTION	GT	TM	01-Apr-25
03	ACCEPTED FOR CONSTRUCTION	GT	TM	03-Feb-25
02	ISSUE FOR REVIEW	GT	TM	17-Dec-24
01	ISSUE FOR REVIEW	GT	TM	09-May-24
00	ISSUE FOR REVIEW	GT	TM	28-Mar-24

coes	CLIENTE / CUSTOMER	: ROSETTI MARINO	COMM: / JOB:	: 166/24	
	RIFERIMENTO / REFERENCE	: CROSSWIND	UNITA' / ITEM	: /	
	IMPIANTO / DRYING UNIT	: INSTRUMENT AIR PACKAGE	FOGLIO N° / SHEET	: 2	DI : 5 / OF

FOGLIO DATI PER PRE-FILTRO
PRE-FILTER DATA SHEET

DATI GENERALI
GENERAL DATA

1	QUANTITA' / QUANTITY	:	2
2	ITEM / TAG	:	S-63001A/B
3	SERVIZIO / SERVICE	:	WATER AND DUST REMOVING
4			

DATI PROGETTO CALDARERIA
VESSELS DESIGN DATA

5	PRESSIONE PROGETTO / DESIGN PRESSURE	:	12 barg	TEMPERATURA PROGETTO / DESIGN TEMPERATURE	:	-10 / +90 °C
6	MATERIALE / MATERIAL	:	SS 316/316L	SOVRASPESS. CORROSIONE / CORROSION OVER-THICKNESS	:	/
7	NORMATIVA PROGETTO / DESIGN CODE	:	ASME VIII DIV.1	NORMATIVA COLLAUDO / INSPECTION CODE	:	2014/68/EU PED (CAT. I)

DATI FUNZIONALI
FUNCTIONAL DATA

8	GAS DA TRATTARE / GAS TO BE TREATED	:	OIL FREE AIR	PORTATA IN INGRESSO / INLET FLOWRATE	:	415 Sm^3/h
9	PRESSIONE DI ESERCIZIO / OPERATING PRESSURE	:	9.5 barg	TEMPERATURA DI ESERCIZIO / OPERATING TEMPERATURE	:	35 °C
10	PERDITA DI CARICO/FILTRO PULITO / PRESSURE DROP/CLEAN FILTER	:	0.1 bar	PERDITA DI CARICO/FILTRO SPORCO / PRESSURE DROP/DIRTY FILTER	:	0.3 bar
11	EFFICIENZA / EFFICIENCY	:	99.9 %	GRADO DI FILTRAZIONE / FILTRATION DEGREE	:	3 µm
12	OLIO RESIDUO / RESIDUAL OIL	:	N/A			
13						

CARATTERISTICHE ELEMENTI FILTRANTI
FILTRATION ELEMENTS DATA

14						
15	TIPO ELEMENTO FILTRANTE / FILTRATION ELEMENT TYPE	:	CARTRIDGE	MATERIALE / MATERIAL	:	COALESCING MICROFIBER
16	N° CARTUCCE PER FILTRO / No. OF ELEMENTS/EACH FILTER	:	1	MODELLO / MODEL	:	60A

STRUMENTI - ACCESSORI
INSTRUMENTS - ACCESSORIES

17	☐	BY-PASS FILTRO / FILTER BY-PASS						
18	☒	TUBAZIONE DI RACCORDO FILTRO / CONNECTION PIPE TO FILTER						
19	☒	VALVOLE INTERCETTAZIONE / ON/OFF VALVES	☒	2 VIE / 2-WAY	☐	3 VIE / 3-WAY	☐	AUTOMATICHE / AUTOMATIC
20	☐	MANOMETRO DIFFERENZIALE / DIFFERENTIAL PRESSURE GAUGE						
21	☒	TRASMETTITORE DI PRESSIONE DIFFERENZIALE / DIFFERENTIAL PRESSURE TRANSMITTER	AS PER P&ID No. 1724000428-PR-PID-00019					
22	☒	VALVOLA DI DRENAGGIO / DRAIN VALVE						
23	☒	SCARICATORE DI CONDENSA / STEAM TRAP			☐	AUTOMATICO / AUTOMATIC	☒	GALLEGGIANTE / FLOATING
24	☐	VALVOLE DI SICUREZZA / SAFETY VALVES						

NOTE / REMARKS :
- SAFE AREA
- UNPAINTED

REV. / REV.	DESCRIZIONE / DESCRIPTION	EMESSO / ISSUED	APPROVATO / APPROVED	DATA / DATE
04	ACCEPTED FOR CONSTRUCTION	GT	TM	01-Apr-25
03	ACCEPTED FOR CONSTRUCTION	GT	TM	03-Feb-25
02	ISSUE FOR REVIEW	GT	TM	17-Dec-24
01	ISSUE FOR REVIEW	GT	TM	09-May-24
00	ISSUE FOR REVIEW	GT	TM	28-Mar-24

coes	CLIENTE / CUSTOMER	:	ROSETTI MARINO	COMM: / JOB:	:	166/24	
	RIFERIMENTO / REFERENCE	:	CROSSWIND	UNITA' / ITEM	:	/	
	IMPIANTO / DRYING UNIT	:	INSTRUMENT AIR PACKAGE	FOGLIO N° / SHEET	:	3	DI : 5 / OF

FOGLIO DATI PER ESSICCATORE
DRYER DATA SHEET

DATI GENERALI
GENERAL DATA

1	QUANTITA' / QUANTITY	:	2 + 2	
2	ITEM / TAG	:	D-63001A/B & D-63002A/B	
3	SERVIZIO / SERVICE	:	AIR DRYER	
4	TIPO / TYPE	:	HEATLESS	

DATI PROGETTO MECCANICO
MECHANICAL DESIGN DATA

5	PRESSIONE PROGETTO SERBATOI / VESSELS DESIGN PRESSURE	:	12 barg	TEMPERATURA PROGETTO SERBATOI / VESSELS DESIGN TEMPERATURE	:	-10 / +90 °C
6	MATERIALE SERBATOI / VESSELS MATERIAL	:	SS 316/316L	SOVRASPESS. CORROSIONE SERBATOI / VESSELS CORROSION OVER-THICKNESS	:	/
7	NORMATIVA PROGETTO SERBATOI / VESSELS DESIGN CODE	:	ASME VIII DIV.1	NORMATIVA COLLAUDO SERBATOI / VESSELS INSPECTION CODE	:	2014/68/EU PED (CAT. IV)
8						

DATI FUNZIONALI
FUNCTIONAL DATA

9	PORTATA ARIA IN INGRESSO / INLET AIR FLOWRATE	:	415	Sm^3/h
10	PRESSIONE DI ESERCIZIO / OPERATING PRESSURE	:	9.4	barg
11	TEMPERATURA DI ESERCIZIO / OPERATING TEMPERATURE	:	35	°C
12	PUNTO DI RUGIADA IN INGRESSO / INLET DEW POINT	:	35	°C
13	TIPO MATERIALE ADSORBENTE / DESICCANT MATERIAL TYPE	:	ACTIVATED ALUMINA	
14	QUANTITA' ADSORBENTE PER TORRE / DESICCANT QUANTITY/EACH TOWER	:	60	kg
15	PORTATA ARIA IN USCITA / OUTLET AIR FLOWRATE	:	350	Sm^3/h
16	PUNTO DI RUGIADA IN USCITA / OUTLET DEW POINT	:	-40	°C
17	POTENZA TOTALE INSTALLATA / TOTAL DEMANDE RATE	:	0.05	kW
18	PERDITA DI CARICO / PRESSURE DROP	:	0.2	bar
19	DURATA CICLO / LENGHT OF CYCLE	:	5+5	min
20	PRESSIONE IN USCITA / OUTLET PRESSURE	:	9.2	barg
21	CONSUMO kWh PER RIGENERAZIONE / kWh CONSUMPTION/EACH REGENERATION	:	/	
22	TENSIONE DI ALIMENTAZIONE / SUPPLY VOLTAGE	:	24 VDC	AUX.
23	GRADO DI PROTEZIONE / PROTECTION DEGREE	:	IP 65	
24	CLASSIFICAZIONE AREA / AREA CLASSIFICATION	:	SAFE	
25	RUMOROSITA' / NOISE LEVEL	:	85dB(A) max PRESSURE LEVEL at 1 m	
26				

NOTE / REMARKS :
- SAFE AREA
- UNPAINTED
- INSTRUMENTATION AS PER P&ID No. 1724000428-PR-PID-00019

REV. / REV.	DESCRIZIONE / DESCRIPTION	EMESSO / ISSUED	APPROVATO / APPROVED	DATA / DATE
04	ACCEPTED FOR CONSTRUCTION	GT	TM	01-Apr-25
03	ACCEPTED FOR CONSTRUCTION	GT	TM	03-Feb-25
02	ISSUE FOR REVIEW	GT	TM	17-Dec-24
01	ISSUE FOR REVIEW	GT	TM	09-May-24
00	ISSUE FOR REVIEW	GT	TM	28-Mar-24

coes	CLIENTE / CUSTOMER	: ROSETTI MARINO	COMM: / JOB:	: 166/24	
	RIFERIMENTO / REFERENCE	: CROSSWIND	UNITA' / ITEM	: /	
	IMPIANTO / DRYING UNIT	: INSTRUMENT AIR PACKAGE	FOGLIO N° / SHEET	: 4	DI : 5 OF

FOGLIO DATI PER POST-FILTRO
AFTER-FILTER DATA SHEET

DATI GENERALI
GENERAL DATA

1	QUANTITA' / QUANTITY	:	2
2	ITEM / TAG	:	S-63002A/B
3	SERVIZIO / SERVICE	:	DUST REMOVING
4			

DATI PROGETTO CALDARERIA
VESSELS DESIGN DATA

5	PRESSIONE PROGETTO / DESIGN PRESSURE	:	12 barg	TEMPERATURA PROGETTO / DESIGN TEMPERATURE	:	-10 / +90 °C
6	MATERIALE / MATERIAL	:	SS 316/316L	SOVRASPESS. CORROSIONE / CORROSION OVER-THICKNESS	:	/
7	NORMATIVA PROGETTO / DESIGN CODE	:	ASME VIII DIV.1	NORMATIVA COLLAUDO / INSPECTION CODE	:	2014/68/EU PED (CAT. I)

DATI FUNZIONALI
FUNCTIONAL DATA

8	GAS DA TRATTARE / GAS TO BE TREATED	:	OIL FREE AIR	PORTATA IN INGRESSO / INLET FLOWRATE	:	350 Sm^3/h
9	PRESSIONE DI ESERCIZIO / OPERATING PRESSURE	:	9.2 barg	TEMPERATURA DI ESERCIZIO / OPERATING TEMPERATURE	:	35 °C
10	PERDITA DI CARICO/FILTRO PULITO / PRESSURE DROP/CLEAN FILTER	:	0.1 bar	PERDITA DI CARICO/FILTRO SPORCO / PRESSURE DROP/DIRTY FILTER	:	0.3 bar
11	EFFICIENZA / EFFICIENCY	:	99.9 %	GRADO DI FILTRAZIONE / FILTRATION DEGREE	:	3 µm
12	OLIO RESIDUO / RESIDUAL OIL	:	N/A			
13						

CARATTERISTICHE ELEMENTI FILTRANTI
FILTRATION ELEMENTS DATA

14						
15	TIPO ELEMENTO FILTRANTE / FILTRATION ELEMENT TYPE	:	CARTRIDGE	MATERIALE / MATERIAL	:	COALESCING MICROFIBER
16	N° CARTUCCE PER FILTRO / No. OF ELEMENTS/EACH FILTER	:	1	MODELLO / MODEL	:	60A

STRUMENTI - ACCESSORI
INSTRUMENTS - ACCESSORIES

17	☐	BY-PASS FILTRO / FILTER BY-PASS						
18	☒	TUBAZIONE DI RACCORDO FILTRO / CONNECTION PIPE TO FILTER						
19	☒	VALVOLE INTERCETTAZIONE / ON/OFF VALVES	☒	2 VIE / 2-WAY	☐	3 VIE / 3-WAY	☐	AUTOMATICHE / AUTOMATIC
20	☐	MANOMETRO DIFFERENZIALE / DIFFERENTIAL PRESSURE GAUGE						
21	☒	TRASMETTITORE DI PRESSIONE DIFFERENZIALE / DIFFERENTIAL PRESSURE TRANSMITTER	AS PER P&ID No. 1724000428-PR-PID-00019					
22	☒	VALVOLA DI DRENAGGIO / DRAIN VALVE						
23	☐	SCARICATORE DI CONDENSA / STEAM TRAP			☐	AUTOMATICO / AUTOMATIC	☐	GALLEGGIANTE / FLOATING
24	☐	VALVOLE DI SICUREZZA / SAFETY VALVES						

NOTE / REMARKS :
- SAFE AREA
- UNPAINTED

REV. / REV.	DESCRIZIONE / DESCRIPTION	EMESSO / ISSUED	APPROVATO / APPROVED	DATA / DATE
04	ACCEPTED FOR CONSTRUCTION	GT	TM	01-Apr-25
03	ACCEPTED FOR CONSTRUCTION	GT	TM	03-Feb-25
02	ISSUE FOR REVIEW	GT	TM	17-Dec-24
01	ISSUE FOR REVIEW	GT	TM	09-May-24
00	ISSUE FOR REVIEW	GT	TM	28-Mar-24

coes	CLIENTE / CUSTOMER	:	ROSETTI MARINO	COMM: / JOB:	: 166/24
	RIFERIMENTO / REFERENCE	:	CROSSWIND	UNITA' / ITEM	: /
	IMPIANTO / DRYING UNIT	:	INSTRUMENT AIR PACKAGE	FOGLIO N° / SHEET	: 5 DI : 5 OF

FOGLIO DATI PER SERBATOIO
PRESSURE VESSEL DATA SHEET

DATI PROGETTO MECCANICO
MECHANICAL DESIGN DATA

1	QUANTITA' / QUANTITY	:	1			
2	ITEM / TAG	:	V-63001			
3	SERVIZIO / SERVICE	:	SERBATOIO ARIA SECCA / DRY AIR VESSEL	TIPO / TYPE	:	VERTICALE / VERTICAL
4	MATERIALE / MATERIAL	:	SA 516 Gr.70	SPESSORE VIROLA / SHELL THICKNESS	:	18 mm
5	TIPO FONDI / HEAD TYPE	:	ELLIPTICAL 2:1	SPESSORE FONDI / HEAD THICKNESS	:	18 mm (15.3 mm M.A.F.)
6	NORMATIVA PROGETTO / DESIGN CODE	:	ASME VIII DIV.1	NORMATIVA COLLAUDO / INSPECTION CODE	:	2014/68/EU PED (CAT. IV)
7				SOVRASPESS. CORROSIONE / CORROSION OVER-THICKNESS	:	1.5 mm
8	PRESSIONE PROGETTO / DESIGN PRESSURE	:	12 barg	TEMPERATURA PROGETTO / DESIGN TEMPERATURE	:	-10 / +90 °C
9	DIAMETRO ESTERNO / EXTERNAL DIAMETER	:	2500 mm	LUNGHEZZA T/T / T/T LENGHT	:	4026 mm
10	VOLUME / VOLUME	:	23 m^3			
11	RADIOGRAFIE / RT TEST	:	☒ YES SPOT ☐ NO			
12	VERNICIATURA / PAINTING	:	☒ EXTERNAL ☐ INTERNAL ACC. TO 1724000428-MAT-PRO-00022			
13	ZINCATURA / GALVANIZING	:	☐ YES ☒ NO			
14	NOTE / NOTES	:	FURTHER DETAILS (FASTENERS, GASKETS, ETC.) INCLUDED IN SECTIONAL DRAWING			

ELENCO CONNESSIONI
NOZZLES LIST

	SIGLA / TAG	DIAMETRO / DIAMETER	TIPO / TYPE	SERIE / RATING	SERVIZIO / SERVICE	NOTE / REMARKS
15						
16	A1	3"	WN	ANSI 150	SAFETY VALVE	ASME B16.5
17	A2	1"	WN	ANSI 150	DRAIN	ASME B16.5
18	A3	1"	WN	ANSI 150	VENT	ASME B16.5
19	A4	1/2"	NPT	6000#	PRESSURE GAUGE	
20	A5	1/2"	NPT	6000#	PRESSURE TRANSMITTER	
21	A6	1.1/2"	WN	ANSI 150	TEMPERATURE GAUGE	ASME B16.5
22	A7	1.1/2"	WN	ANSI 150	TEMPERATURE TRANSMITTER	ASME B16.5
23	A8	2"	WN	ANSI 150	PROCESS IN/OUT	ASME B16.5
24	A9	24"	WN	ANSI 150	MAN HOLE	ASME B16.5

STRUMENTI - ACCESSORI
INSTRUMENTS - ACCESSORIES

25	☒	VALVOLA DI SICUREZZA / SAFETY VALVE
26	☒	MANOMETRO / PRESSURE GAUGE
27	☒	TRASMETTITORE DI PRESSIONE / PRESSURE TRANSMITTER
28	☒	TERMOMETRO / TEMPERATURE GAUGE
29	☒	TRASMETTITORE DI TEMPERATURA / TEMPERATURE TRANSMITTER
30	☒	VALVOLA DI DRENAGGIO MANUALE / MANUAL DRAIN VALVE
31	☒	SCARICATORE DI CONDENSA / DRAIN TRAP
32		

REV. / REV.	DESCRIZIONE / DESCRIPTION	EMESSO / ISSUED	APPROVATO / APPROVED	DATA / DATE
04	ACCEPTED FOR CONSTRUCTION	GT	TM	01-Apr-25
03	ACCEPTED FOR CONSTRUCTION	GT	TM	03-Feb-25
02	ISSUE FOR REVIEW	GT	TM	17-Dec-24
01	ISSUE FOR REVIEW	GT	TM	09-May-24
00	ISSUE FOR REVIEW	GT	TM	28-Mar-24

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE
PACKAGE EQUIPMENT NOISE DATA SHEETS
INCLUDING AIR COMPRESSOR, DRYERS, ETC.

Document Number: 1724000428-MAC-DS-00012

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
Giuseppe Cavallo	05/09/24

Rev.	Date	Description	Prepared	Reviewed	Approved
01	03/09/2024	Accepted for Construction (AFC)	GT	SG	TM
00	01/07/2024	Issue for Review (IFR)	GT	SG	TM

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Revision / Change Log

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

HOLDS LIST

No.	Description
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None

1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

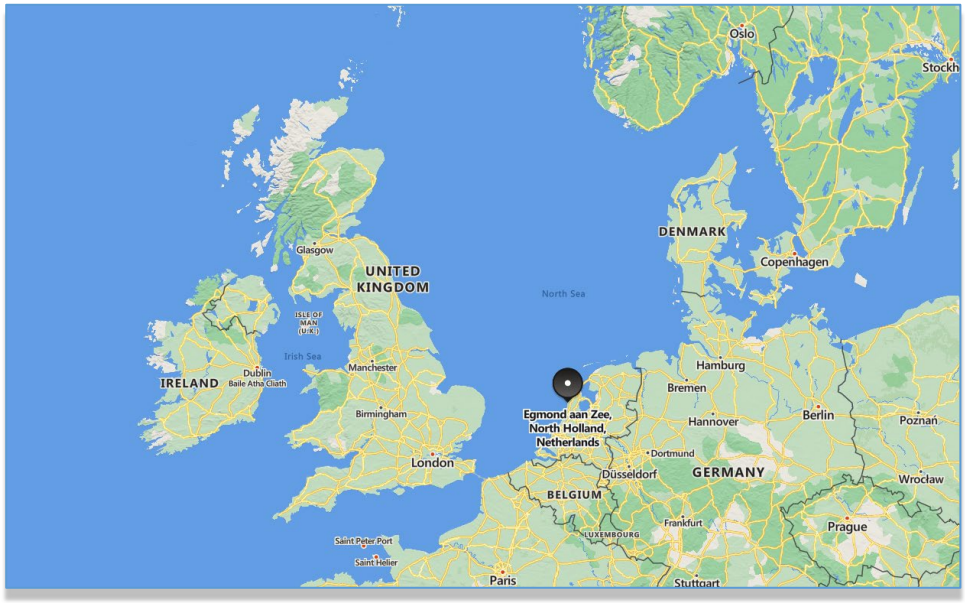


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

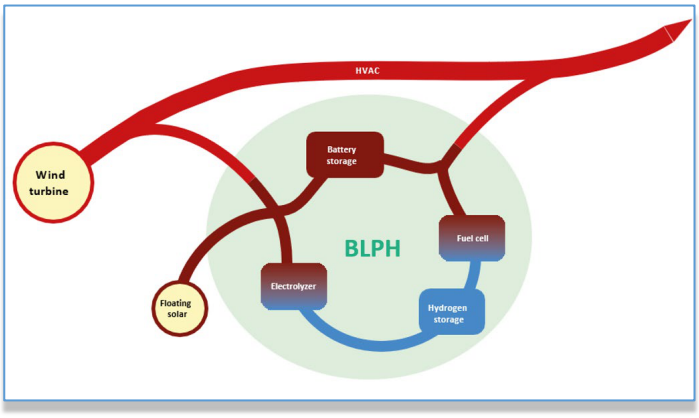


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DS-00011	EQUIPMENT DATA SHEETS INCLUDING MOTORS, AIR COMPRESSOR, DRYERS, ETC.

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

3 NOISE DATASHEET

NOISE GUARANTEED VALUE: 85 dB(A) @ 1 m (positive tolerance +0 dB(A))

LOAD CONDITIONS

☐ NORMAL OPERATION

☑ FULL LOAD

☐ NO LOAD

THE SOUND POWER LEVELS HAVE BEEN OPTAIN BY

☐ DIRECT MEASURING

☐ MEASURING ON ANALOGOUS SOURCE

☑ CALCULATION

NOISE LEVEL OF AIR COMPRESSOR (K-63001A / K-63001B)									
	Octave band center frequencies (Hz)								Noise level dB(A)
	63	125	250	500	1K	2K	4K	8K	
Maximum sound pressure level (dB) Ref. 20 mPa at 1 meter distance from equipment surface	-	75	74	72	72	68	67	-	76

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NOISE LEVEL OF COES DRYER (D-63001A/B / D-63002A/B)									
	Octave band center frequencies (Hz)								Noise level dB(A)
	63	125	250	500	1K	2K	4K	8K	
Maximum sound pressure level (dB) Ref. 20 mPa at 1 meter distance from vent silencer	80	78	80	79	73	69	68	62	80

NOISE LEVEL OF COMPLETE SKID (A-63000)									
	Octave band center frequencies (Hz)								Noise level dB(A)
	63	125	250	500	1K	2K	4K	8K	
Maximum sound pressure level (dB) Ref. 20 mPa at 1 meter distance from equipment compressor baseplate	80	77	82	84	79	75	68	60	85

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Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000
INSTRUMENT DATA SHEETS

Document Number: 1724000428-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

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Sign	Date
Giuseppe Cavallo	25/01/25

Document Class: 3

Rev.	Date	Description	Prepared	Reviewed	Approved
03	02/01/2025	Issue for Information (IFI)	GT	MC	TM
02	04/09/2024	Issue for Information (IFI)	GT	MC	TM
01	01/07/2024	Issue for Information (IFI)	GT	MC	TM
00	02/05/2024	Issue for Information (IFI)	GT	MC	TM

COES

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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	
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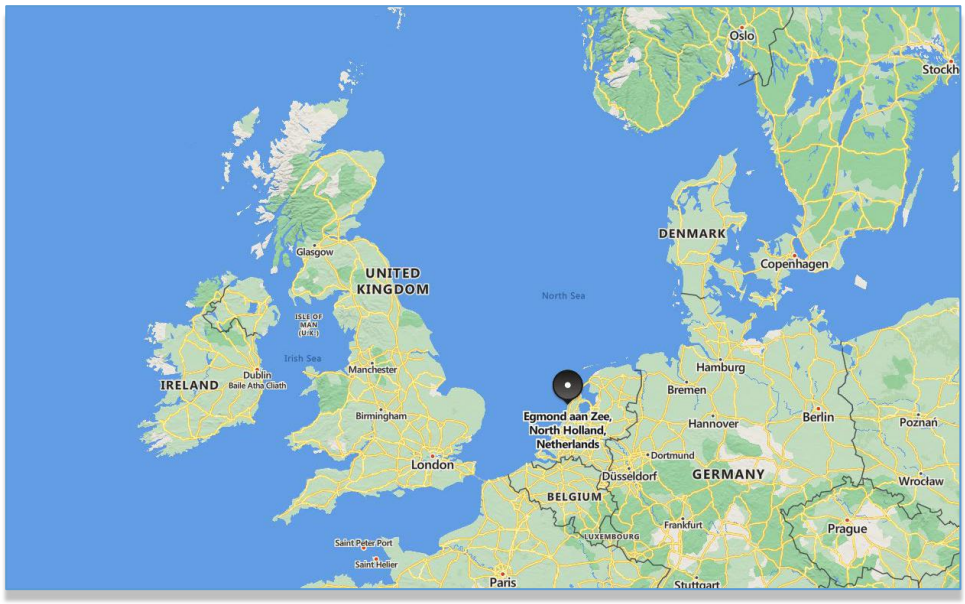


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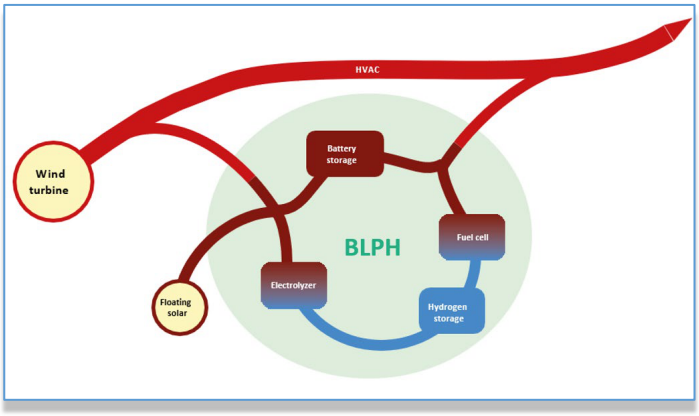


Figure 3 – BLPH Concept

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2.1 REFERENCES

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1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DS-00011	EQUIPMENT DATA SHEETS INCLUDING MOTORS, AIR COMPRESSOR, DRYERS, ETC.

Table 1 - Reference Documents

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COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
RF	RAISED FACE

Table 2 - Definitions and Abbreviations

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3 INSTRUMENT DATASHEETS

PRESSURE TRANSMITTER			
General	1	Tag number	63-PIT-064
	2	Service	Instrument air receiver pressure
	3	Quantity	1
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	90°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Transmitter	11	Output	4…20mA HART 7
	12	Available range	-0.98 ÷ 20.7 bar
	13	Calibrated range	0 ÷ 16 barg
	14	Element type	Isolating Diaphragm
	15	Wetted parts material	SS 316L
	16	Element material	SS 316L
	17	Case material	SS 316L
	18	Execution	IP66
	19	Process connections	Female thread 1/2-14 NPT-F
	20	Cable entry	M20x1.5
	21	Digital display	YES - LCD type integrated
	22	Accuracy	Better than 0,25% of adjusted span
	23	Power supply	24 VDC
	24	Certification:	ATEX, II 1/2 G Ex db IIC T6…T4 Ga/Gb
Accessories	25	Manifold Supplier	EMERSON
	26	Manifold type / Model	2-Valves / R305C22B11L4
	27	Manifold mat.l Body / seal	SS316 / PTFE
Purchase	28	Instrument Manufacturer	EMERSON
	29	Model	2051CG4A22A1KS5E8L4M5D4T1Q4Q8HR7
Notes	30		

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DIFFERENTIAL PRESSURE TRANSMITTER			
General	1	Tag number	63-PDIT-051, 63-PDIT-062
	2	Service	Pre-filters, After-filters pressure drop
	3	Quantity	1 + 1
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	90°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Transmitter	11	Output	4…20mA HART 7
	12	Available range	-2.5 ÷ 2.5 bar
	13	Calibrated range	0 ÷ 1 bar
	14	Element type	Isolating Diaphragm
	15	Wetted parts material	SS 316L
	16	Element material	SS 316L
	17	Case material	SS 316L
	18	Execution	IP66
	19	Process connections	Female thread 1/2-14 NPT-F
	20	Cable entry	M20x1.5
	21	Digital display	YES - LCD type integrated
	22	Accuracy	Better than 0,25% of adjusted span
	23	Power supply	24 VDC
	24	Certification:	ATEX, II 1/2 G Ex db IIC T6…T4 Ga/Gb
Accessories	25	Manifold Supplier	EMERSON
	26	Manifold type / Model	5-Valves / R305RC52B11
	27	Manifold mat.l Body / seal	SS316 / PTFE
Purchase	28	Instrument Manufacturer	EMERSON
	29	Model	2051CD3A22A1KS5E8L4M5D4T1Q4Q8HR7
Notes	30		

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PRESSURE GAUGES			
General	1	Tag number	63-PI-053, 63-PI-055, 63-PI-057, 63-PI-059
	2	Service	Dryer towers pressure
	3	Quantity	4
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	90°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Gauge	11	Type	Bourdon Tube
	12	Range	0 ÷ 16 barg
	13	Mounting	Local
	14	Dial size	DN100 mm
	15	Dial / Pointer color / material	White / black / aluminum
	16	Case material	Stainless steel SS 316
	17	Ring material	Stainless steel SS 316
	18	Blow out protection	With solid baffle wall and blow-out back
	19	Lens material	Safety glass
	20	Pressure element type	Bourdon
	21	Pressure element material	SS 316L (1.4571)
	22	Socket material	Stainless Steel SS 316
	23	Movement material	Stainless Steel SS 316
	24	Connection size	1/2" NPT-M
	25	Connection type	Radial Bottom
	26	Protection degree	IP66
	27	Nominal accuracy	CLASS 1 EN837 - 1% on range
	28	Over pressure	30% of span
	29	Certification:	ATEX, Ex h Gas II 2G Ex h IIC T6 ...T1 Gb X
Accessories	30	Diaphragm seal	NO
	31	Manifold type	2 Valves
Purchase	32	Instruments Manufacturer	WIKA
	33	Model	233.30
Notes	34		

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PRESSURE GAUGES			
General	1	Tag number	63-PI-063
	2	Service	Air receiver pressure
	3	Quantity	1
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	90°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Gauge	11	Type	Bourdon Tube
	12	Range	0 ÷ 16 barg
	13	Mounting	Local
	14	Dial size	DN100 mm
	15	Dial / Pointer color / material	White / black / aluminum
	16	Case material	Stainless steel SS 316
	17	Ring material	Stainless steel SS 316
	18	Blow out protection	With solid baffle wall and blow-out back
	19	Lens material	Safety glass
	20	Pressure element type	Bourdon
	21	Pressure element material	SS 316L (1.4571)
	22	Socket material	Stainless Steel SS 316
	23	Movement material	Stainless Steel SS 316
	24	Connection size	1/2" NPT-M
	25	Connection type	Radial Bottom
	26	Protection degree	IP66
	27	Nominal accuracy	CLASS 1 EN837 - 1% on range
	28	Over pressure	30% of span
	29	Certification:	ATEX, Ex h Gas II 2G Ex h IIC T6 ...T1 Gb X
Accessories	30	Diaphragm seal	NO
	31	Manifold type	2 Valves
Purchase	32	Instruments Manufacturer	WIKA
	33	Model	233.30
Notes	34		

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DIFFERENTIAL PRESSURE GAUGES			
General	1	Tag number	63-PDI-052, 63-PDI-061
	2	Service	Dryer pressure drop
	3	Quantity	1 + 1
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	90°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Gauge	11	Type	Bourdon Tube
	12	Range	0 ÷ 1.6 bar
	13	Mounting	Local
	14	Dial size	DN100 mm
	15	Dial / Pointer color / material	White / black / aluminum
	16	Pointer	Micrometric adjustable
	17	Case material	Stainless steel SS 316
	18	Ring material	Stainless steel SS 316
	19	Blow out protection	With solid baffle wall and blow-out back
	20	Lens material	Safety glass
	21	Pressure element type	Bourdon
	22	Pressure element material	SS 316L (1.4571)
	23	Socket material	Stainless Steel SS 316
	24	Movement material	Stainless Steel SS 316
	25	Connection size	1/2" NPT-M
	26	Connection type	Radial Bottom
	27	Protection degree	IP66
	28	Nominal accuracy	CLASS 1 EN837 – 1.6% on range
	29	Certification:	ATEX, Ex h Gas II 2G Ex h IIC T6 ...T1 Gb X
Accessories	30	Manifold type	5-Valves
Purchase	31	Instruments Manufacturer	WIKA
	32	Model	732.51
Notes	33		

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PRESSURE SWITCH			
General	1	Tag number	63-PS-054, 63-PS-056, 63-PS-058, 63-PS-060
	2	Service	Dryer towers pressure
	3	Quantity	4
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	90°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Instrument	11	Range	0 ÷ 16 barg
	12	Measuring element	Bourdon
	13	Set point	Adjustable
	14	Switch type	Micro switch
	15	Switch action	Hermetically sealed SPDT
	16	Switch load	Resistive
	17	Case material	SS 316
	18	Wetted parts material	Stainless steel
	19	Pressure connection size	½" NPTM
	20	Pressure connection type	Bottom
	21	Electric connection	M20x1.5
	22	Protection degree	IP66
	23	Nominal accuracy	<0,5% on range
	24	Certification:	ATEX, Zone 2, IIC, T1 Ex-d
Accessories	25	Diaphragm seal	NO
	26	Manifold	NO
Purchase	27	Manufacturer	Tema
	28	Model	PMS8.1
Notes	29		Factory set point 5 barg

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TEMPERATURE ELEMENT + TRANSMITTER			
General	1	Tag number	63-TIT-051
	2	Service	Inlet air temperature
	3	Quantity	1
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	90°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Transmitter / Element	11	Output	4…20mA HART 7
	12	Input	Dual sensor input
	13	Instrument Range	-50 ÷ 450 °C
	14	Calibration Range	0 ÷ 100°C
	15	Accuracy	±0.15°C
	16	Case material	SS 316
	17	Execution	IP66
	18	Cable Entry	2 x M20x1.5
	19	Installation	DIN A Head mount transmitter
	20	Power supply	24 VDC
	21	Digital display	YES - LCD type integrated
	22	Certification:	ATEX, II 2G Ex db IIC T6…T1 Gb
Purchase	23	Manufacturer	EMERSON
	24	Element Model	214CRTSMA1S3MxxxxSLDFN1SR2C2B1UAE100V20Q4G1XAXW
	25	Transmitter Model	644HANDM5Q4T1HR7XA
	26	Element Type	PT 100 Class A
	27	Element Bulb	Ø6.5mm - extension 100mm
	28	Element insertion length	To be confirmed
	29	Conn. to Thermowell	1/2" NPT-M
	30	Connection to Process	316L – 1.1/2” 150# – 1/2" NPT-F
Thermowell	31	Head length	70 mm
	32	Immersion length	To be confirmed
	33	Thermowell	SS316
Notes	34		

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TEMPERATURE ELEMENT + TRANSMITTER			
General	1	Tag number	63-TIT-052
	2	Service	Instrument air receiver temperature
	3	Quantity	1
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	90°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Transmitter / Element	11	Output	4…20mA HART 7
	12	Input	Dual sensor input
	13	Instrument Range	-50 ÷ 450 °C
	14	Calibration Range	0 ÷ 100°C
	15	Accuracy	±0.15°C
	16	Case material	SS 316
	17	Execution	IP66
	18	Cable Entry	2 x M20x1.5
	19	Installation	DIN A Head mount transmitter
	20	Power supply	24 VDC
	21	Digital display	YES - LCD type integrated
	22	Certification:	ATEX, II 2G Ex db IIC T6…T1 Gb
Purchase	23	Manufacturer	EMERSON
	24	Element Model	214CRTSMA1S3MxxxxSLDFN1SR2C2B1UAE100V20Q4G1XAXW
	25	Transmitter Model	644HANDM5Q4T1HR7XA
	26	Element Type	PT 100 Class A
	27	Element Bulb	Ø6.5mm - extension 100mm
	28	Element insertion length	To be confirmed
	29	Conn. to Thermowell	1/2" NPT-M
	30	Connection to Process	316L – 1.1/2” 150# – 1/2" NPT-F
Thermowell	31	Head length	70 mm
	32	Immersion length	To be confirmed
	33	Thermowell	SS316
Notes	34		

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TEMPERATURE GAUGES			
General	1	Tag number	63-TI-053
	2	Service	Instrument air receiver temperature
	3	Quantity	1
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	90°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Gauge	11	Type	Bimetal
	12	Range	0 ÷ 100°C
	13	Mounting	Local
	14	Dial size	DN100 mm
	15	Dial / Pointer color / material	White / black / aluminum
	16	Case material	Stainless steel SS 304
	17	Ring material	Stainless steel SS 304
	18	Bulb Diameter	6.5mm
	19	Lens material	Safety glass
	20	Socket material	Stainless Steel SS 316
	21	Movement material	Stainless Steel SS 316
	22	Connection size	1/2" NPT-M
	23	Connection type	Back mount, adjustable
	24	Filling	None
	25	Protection degree	IP66
	26	Nominal accuracy	CLASS 1 EN837 - 1% on range
	27	Certification:	ATEX, Ex h Gas II 2G Ex h IIC T6 ...T1 Gb X
Accessories	28	Thermowell	316L – 1.1/2” 150# - 1/2" NPT-F
	29	Thermowell Head length	70 mm
	30	Thermowell Immersion length	450 mm under flange
Purchase	31	Instruments Manufacturer	WIKA
	32	Model	S55 + TW10
Notes	33		

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DEW POINT ANALYZER			
General	1	Tag number	63-AIT-051
	2	Service	Package outlet dewpoint
	3	Quantity	1
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	90°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Transmitter	11	Analog output	4…20mA HART 7
	12	Calibrated Range	-100 ÷ +20°C
	13	Power supply	24 VDC
	14	Sensor	Thin film aluminum oxide
	15	Accuracy	±2°C above -100°C / ±2°C below -100°C
	16	Repeatability	±2°C above -100°C / ±0.5°C below -100°C
	17	Execution	IP66
	18	Cable Entry	M20x1.5
	19	Certification:	ATEX, II 1G Ex ia IIC T4 Ga
Probe	20	Mounting	Local
Accessories	21	Digital display	YES
	22	Isolation valves	YES
Purchase	23	Manufacturer	GE SENSING
	24	Model	HYGROPROII-2-1-0-4-0-0-0-3-0
Notes	25		

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FLOW TRANSMITTER			
General	1	Tag number	63-FIT-051
	2	Service	Package outlet flowrate
	3	Quantity	1
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	90°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Transmitter	11	Output	4…20mA HART 7
	12	Available range	-623 ÷ 623 mbar
	13	Calibrated range	0 ÷ 500 Sm^3/h
	14	Element type	Isolating Diaphragm
	15	Wetted parts material	SS 316L
	16	Element material	SS 316L
	17	Case material	SS 316L
	18	Execution	IP65
	19	Process connections	Female thread 1/2-14 NPT-F
	20	Cable entry	M20x1.5
	21	Digital display	YES - LCD type integrated
	22	Accuracy	Better than 0,25% of adjusted span
	23	Power supply	24 VDC
	24	Certification:	ATEX, II 1/2 G Ex db IIC T6…T4 Ga/Gb
Accessories	25	Manifold Supplier	EMERSON
	26	Manifold type / Model	5-Valves / R305RC52B11
	27	Manifold mat.l Body / seal	SS316 / PTFE
	28	Restriction Orifice Plate	Yes, Model 1495
Purchase	29	Instrument Manufacturer	EMERSON
	30	Model	2051CD2A22A1KS5E8L4M5D4T1Q4Q8HR7
Notes	31		

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SOLENOID VALVE			
General	1	Tag number	63-XY-051, 63-XY-052, 63-XY-053, 63-XY-054, 63-XY-055, 63-XY-056, 63-XY-056, 63-XY-057, 63-XY-058, 63-XY-059, 63-XY-060
	2	Service	Actuated valves command
	3	Type	Solenoid valve
Body	4	Material	SS 316
	5	Connections	1/4" NPT-F
	6	Seals	NBR
Acting	7	Ways/Position	3/2
	8	Type	UNIVERSAL
Coil	9	Power supply	24Vdc
	10	Insulation class	H
	11	Protection degree	IP66
	12	Electrical connection	M20 x 1.5
	13	Power consumption	11W
Purchase	14	Manufacturer	NADI
	15	Model	C28I60D0C
	16	Certification	ATEX, Eexd IIC T6
Notes	17	Installed inside local control panel	

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SAFETY VALVE			
General	1	Tag number	63-PSV-001, 63-PSV-002, 63-PSV-003, 63-PSV-004
	2	Service	Vessel protection
	3	Quantity	4
	4	Type	Safety relief valve
Process	5	Fluid	Air
	6	Operating pressure	12 barg
	7	Operating temperature	40°C
	8	Design pressure	12 barg
	9	Design temperature	80°C
	10	Area classification	Safe
	11	Ambient temperature	-8.4 ÷ 25°C
Design	12	Design	2014/68/EU PED
	13	Code	ISO 4126-1
	14	Design case	Fire case
	15	Inlet connection	1” ANSI 150 RF
	16	Outlet connection	2” ANSI 150 RF
	17	Orifice designation	D
	18	Set pressure	12 barg
	19	Back pressure	0
	20	Overpressure	10%
Materials	21	Diaphragm seal	NO
	22	Body	SS316
Purchase	23	Manufacturer	N.G.I.
	24	Model	G10-API
Notes	25		

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SAFETY VALVE			
General	1	Tag number	63-PSV-005
	2	Service	Air receiver protection
	3	Quantity	1
	4	Type	Safety relief valve
Process	5	Fluid	Air
	6	Operating pressure	12 barg
	7	Operating temperature	40°C
	8	Design pressure	12 barg
	9	Design temperature	80°C
	10	Area classification	Safe
	11	Ambient temperature	-8.4 ÷ 25°C
Design	12	Design	2014/68/EU PED
	13	Code	ISO 4126-1
	14	Design case	Fire case
	15	Inlet connection	3” ANSI 150 RF
	16	Outlet connection	4” ANSI 150 RF
	17	Orifice designation	K
	18	Set pressure	12 barg
	19	Back pressure	0
	20	Overpressure	10%
Materials	21	Diaphragm seal	NO
	22	Body	SS316
Purchase	23	Manufacturer	N.G.I.
	24	Model	G40-API
Notes	25		

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ACTUATED VALVES			
General	1	Tag number	63-XV-051, 63-XV-053
	2	Service	ON-OFF actuated valves
	3	Quantity	2
	4	Type	5-way pneumatic distributor
Process	5	Fluid	AIR
	6	Operating pressure	12 barg
	7	Operating temperature	40°C
	8	Design pressure	12 barg
	9	Design temperature	80°C
	10	Area classification	Safe
	11	Ambient temperature	-8.4 ÷ 25°C
Body	12	Size	1”
	13	Rating	NOT APPLICABLE
	14	End connections	THREADED
	15	Material	Aluminium
	16	Internals	SS 316
	17	Seat	FKM+GRAPHITE
Actuator	18	Type	NOT APPLICABLE
	19	Fail position	OPEN
Purchase	20	Manufacturer	COES
	21	Model	D7848
Notes	22		

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ACTUATED VALVES			
General	1	Tag number	63-XV-052, 63-XV-054
	2	Service	ON-OFF actuated valves
	3	Quantity	2
	4	Type	3-way pneumatic distributor
Process	5	Fluid	AIR
	6	Operating pressure	12 barg
	7	Operating temperature	40°C
	8	Design pressure	12 barg
	9	Design temperature	80°C
	10	Area classification	Safe
	11	Ambient temperature	-8.4 ÷ 25°C
Body	12	Size	3/4”
	13	Rating	NOT APPLICABLE
	14	End connections	THREADED
	15	Material	Aluminium
	16	Internals	SS 316
	17	Seat	FKM+GRAPHITE
Actuator	18	Type	NOT APPLICABLE
	19	Fail position	OPEN
Purchase	20	Manufacturer	COES
	21	Model	17316
Notes	22		

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ACTUATED VALVES			
General	1	Tag number	63-XV-055, 63-XV-056, 63-XV-057, 63-XV-058 63-XV-059, 63-XV-060
	2	Service	ON-OFF actuated valves
	3	Quantity	6
	4	Type	Ball valve
Process	5	Fluid	AIR
	6	Operating pressure	12 barg
	7	Operating temperature	40°C
	8	Design pressure	12 barg
	9	Design temperature	80°C
	10	Area classification	Safe
	11	Ambient temperature	-8.4 ÷ 25°C
Body	12	Size	2”
	13	Rating	150
	14	End connections	RF
	15	Material	A351 CF8M
	16	Ball	SS 316
	17	Seat	FKM+GRAPHITE
Actuator	18	Type	RACK & PINION
	19	Fail position	OPEN
Purchase	20	Manufacturer	VALPRES
	21	Model	ART.68J000
Notes	22		

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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
Giuseppe Cavallo	12/02/25

r Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000

AIR COMPRESSOR PERFORMANCE CHART

Document Number: 1724000428-MAC-DS-00014

Document Class: 3

02	03/02/2025	Issue for Information (IFI)	GT	MC	TM
01	02/01/2025	Issue for Information (IFI)	GT	MC	TM
00	02/10/2024	Issue for Information (IFI)	GT	MC	TM
Rev.	Date	Description	Prepared	Reviewed	Approved

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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	

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None

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

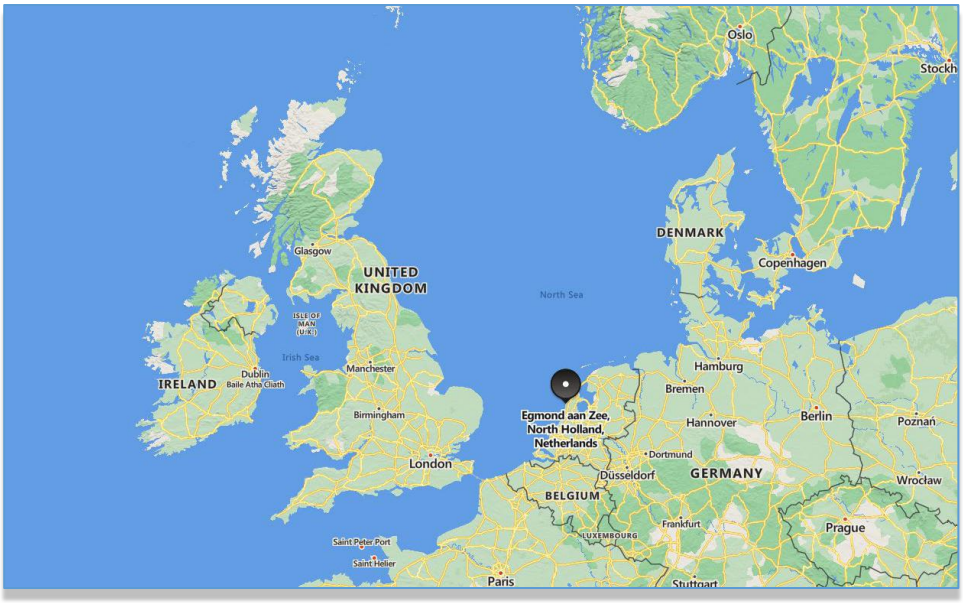


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

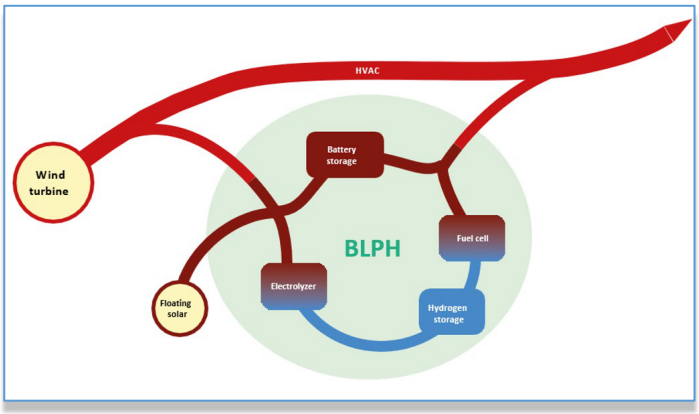


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies the performance chart of the compressors installed in the package.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
ISO1217 : 2009	DISPLACEMENT COMPRESSORS – ACCEPTANCE TESTS

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
SER	Specific Energy Requirement

Table 2 - Definitions and Abbreviations

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3 PERFORMANCE CHART

ATLAS COPCO
COMPRESSOR PERFORMANCE CHART

Product definition	
Model	ZT 55-10.50-400D
Pressure variant	10 bar
Frequency	50 Hz

Reference conditions	
Absolute inlet pressure	1 bar(a)
Relative humidity	100 %
Air inlet temperature	25 °C
Cooling air inlet temperature	25 °C
Effective working pressure	9 bar(g)

Performance data	
Maximum working pressure	10 bar(g)
– Air delivery	414.4 Nm^3/h
– Total electrical power input	70.2 kW
– Total specific energy requirements (SER)	510.9 J/l
Effective working pressure	9 bar(g)
– Air delivery	415.0 Nm^3/h
– Total electrical power input	66.5 kW
– Total specific energy requirements (SER)	483.5 J/l
Minimum effective working pressure	6 bar(g)
– Air delivery	416.5 Nm^3/h
– Total electrical power input	55.3 kW
– Total specific energy requirements (SER)	400.2 J/l

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Base Load Power Hub (BLPH)

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Sign	Date
ROSETTI MARINO S.p.A. Technical Office Quality Control Dept.	08/08/2024

INSTRUMENT AIR PACKAGE
INSPECTION TEST PLAN (ITP)

nt Number: 1724000428-QC-ITP-00002

Document Class: 2

03	16/07/2024	Accepted for Construction (AFC)	GT	MC	TM
02	07/07/2024	Accepted for Construction (AFC)	GT	MC	TM
01	22/05/2024	Accepted for Construction (AFC)	GT	MC	TM
00	27/03/2024	Issue for Review (IFR)	GT	MC	TM
Rev.	Date	Description	Prepared	Reviewed	Approved

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CUSTOMER: ROSETTI MARINO

PURCHASE ORDER: 1724000428

PROJECT: 123A90A - BASE LOAD POWER HUB PLATFORM

SCOPE OF SUPPLY: NO.1 INSTRUMENT AIR PACKAGE

COES JOB: 166/24

3	GT	TM	16/07/2024	REVISION
2	GT	TM	07/07/2024	REVISION
1	GT	TM	22/05/2024	REVISION
0	GT	TM	27/03/2024	FIRST ISSUE
REV. No	**EMESSO DA** *Issued by*	**CONTR./APPROV.** *Checked/Approved by*	**DATA** *Date*	**DESCRIZIONE REVISIONE** *Revision Description*

Pos	Description	Coes	B	C	T	Reference document Acceptance criteria	Remarks
1	**AIR DRYER PACKAGE**						
1.1	Check of completeness of the supply according to the purchase order	H	R	R	/	P.O. 1724000428	
1.2	Incoming materials certificates of materials: - Valves - Instruments - Raw materials	H	R	R	/	EN 10204	
1.3	Work Program (for welding refer to steps 3.4)	H	R	R	/		
1.4	Welding procedures and welders' qualification (WPS+WQP+PQR) approval check	H	R	R	/	ASME IX	
1.5	NDT (Non Destructive Test) according to codes for type of material - RT 10% on piping welds - RT 10% on pressure vessels - MT 100% on lifting lugs - VT 100% on piping/pressure vessels/structure welds	H	W	M	/	ASME V	
1.6	Test procedure approval check (Hydrostatic test of pressure parts, Mechanical running test)	H	R	R	/		
1.7	ATEX Certificates	R	R	R	/	Approved ATEX Register: 1724000428-MAC-LIS-00027	Only for instruments
1.8	Functional blank test	H	W	W	W	Approved FAT procedure: 1724000428-QC-PRO-00024	
1.9	Visual and dimensional check	H	W	W	W	General arrangement drawing: 1724000428-MAC-DA-00005 Piping & Instrument Diagram: 1724000428-PR-PID-00019	
1.10	Weight control	H	R	R	/	General arrangement drawing: 1724000428-MAC-DA-00005	
1.11	PED certificates	H	R	R	H		
1.12	Nameplate check	H	R	R	/		
1.13	Painting Inspection (Type, color, surface preparation, primer, final, dry film thickness and certifications)	H	W	W	/	Approved painting procedure: 1724000428-MAT-PRO-00022	
1.14	Spare parts check (type, quantity and labelling)	H	R	R	/	P.O. 1724000428	
1.15	Packing, marking and packing list check	H	R	R	/	Approved packing procedure: 1724000428-QC-PRO-00031	
1.16	Final documentation review (Data Book)	H	R	R	/	Approved MRB Index: 1724000428-QC-LIS-00026	

Pos	Description	Coes	B	C	T	Reference document Acceptance criteria	Remarks
2	**AIR COMPRESSOR**						
2.1	Drawings and Data Sheet approval check	R	R	R	/	General arrangement drawing: 1724000428-MAC-DA-00005	
2.2	Performance / Mechanical running test	R	R	R	/	Mfr standard procedure	Review of reports/certificates
2.3	Full functional	H	W	W	/	Approved procedure	Performed in Coes, during FAT of assembled skid
2.4	Visual and dimensional	H	W	W	/	General arrangement drawing: 1724000428-MAC-DA-00005	Performed in Coes, during FAT of assembled skid
2.5	Weight control	R	R	R	/	General arrangement drawing: 1724000428-MAC-DA-00005	
2.6	Nameplate check	R	R	R	/		
2.7	Painting Inspection (Type, color, surface preparation, primer, final, dry film thickness and certifications)	H	W	W	/	Approved painting procedure: 1724000428-MAT-PRO-00022	
2.8	Spare parts check (type, quantity and labelling)	R	R	R	/	P.O. 1724000428	
2.9	Packing, marking and packing list check	H	R	R	/	Approved packing procedure: 1724000428-QC-PRO-00031	Performed in Coes, during packing of assembled skid
2.10	EC Declaration of Conformity of the complete unit	R	R	R	/		

Pos	Description	Coes	B	C	T	Reference document Acceptance criteria	Remarks
3	**FILTER / VESSELS**						
3.1	Drawings and Data Sheet approval check	R	R	R	R	Cross sectional drawings: 1724000428-MAC-DD-00006	
3.2	Review of unrefined material certificates (visual/dimensional, NDT, chemical analysis & mechanical properties)	H	R	R	R		
3.3	Welding procedures and welders' qualification (WPS+WQP+PQR) approval check	H	R	R	R	ASME IX / 2014/68/EU	
3.4	Start of welding	H	W	M	/	Approved welding book: 1724000428-WEL-LIS-00021	
3.5	Test procedure approval check	H	R	R	/	ASME V / 2014/68/EU	
3.6	NDT (Non Destructive Test) according to codes for type of material - RT 10% - PT 100%	H	R	R	/	ASME VIII Div.1 / 2014/68/EU	
3.7	Visual and dimensional examination of internal parts prior to installation	H	R	R	W	Cross sectional drawings: 1724000428-MAC-DD-00006	
3.8	Visual and dimensional check of the assembled vessel	H	R	R	W	Cross sectional drawings: 1724000428-MAC-DD-00006	
3.9	Hydrostatic test	H	W	W	W	2014/68/EU	
3.10	Check of nameplate and marking	H	R	R	W	2014/68/EU	
3.11	Painting Inspection (Type, color, surface preparation, primer, final, dry film thickness and certifications)	H	W	W	/		
3.12	Spare parts check (type, quantity and labelling)	H	R	R	/	P.O. 1724000428	
3.13	Completeness supply check according to the purchase order	H	R	R	/	P.O. 1724000428	
3.14	Packing, marking and packing list check	H	R	R	/	Approved packing procedure: 1724000428-QC-PRO-00031	
3.15	Final documentation review (Data Book)	H	R	R	/	Approved MRB Index: 1724000428-QC-LIS-00026	
3.16	Filtering elements check	H	R	R	/		
3.17	Check of filtering elements disassembly	H	R	R	/		

LEGEND:

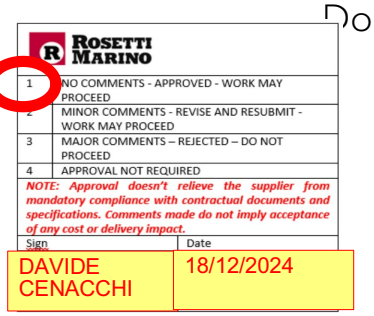
H = HOLD POINT
W = RIGHT TO WITNESS
R = REVIEW
A = APPROVAL
M = MONITOR

OR = OFFICIAL RECORD
IR = INTERNAL RECORD
C = COMPANY
B = ROSETTI MARINO
T = NOTIFIED BODY

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE
WELDING BOOK (WPS, PQR, WELDERS QUALIFICATIONS, WELDING MAPS, ETC.)

Document Number: 1724000428-WEL-LIS-00021


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
DAVIDE CENACCHI	18/12/2024

Document Class: 2

02	16/12/2024	Accepted For Construction (AFC)	GT	MC	TM
01	03/09/2024	Issue for Review (IFR)	GT	MC	TM
00	06/06/2024	Issue for Review (IFR)	GT	MC	TM
Rev.	Date	Description	Prepared	Reviewed	Approved

COES

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Revision / Change Log

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

HOLDS LIST

No.	Description
1	
2	
3	
4	

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None

1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

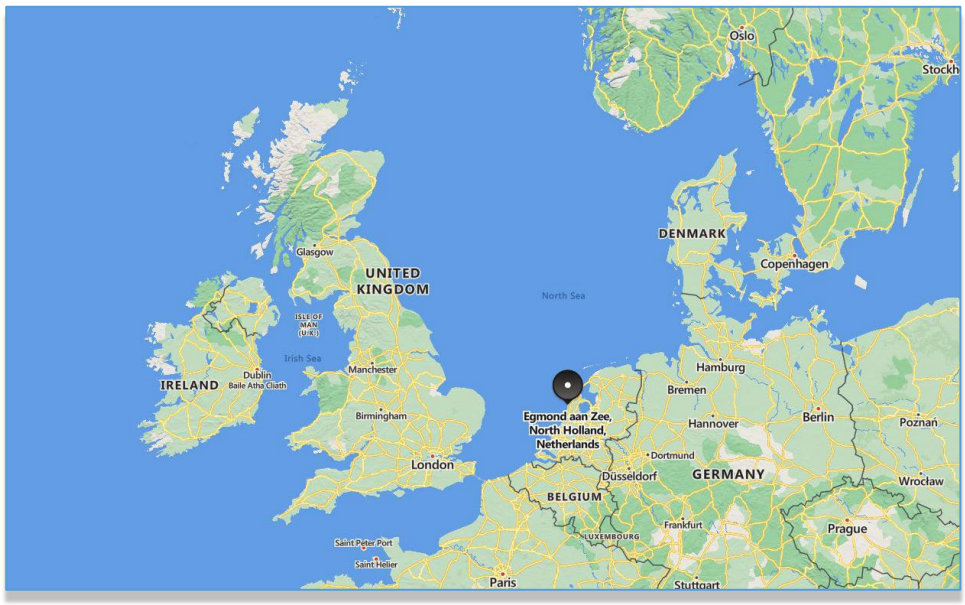


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

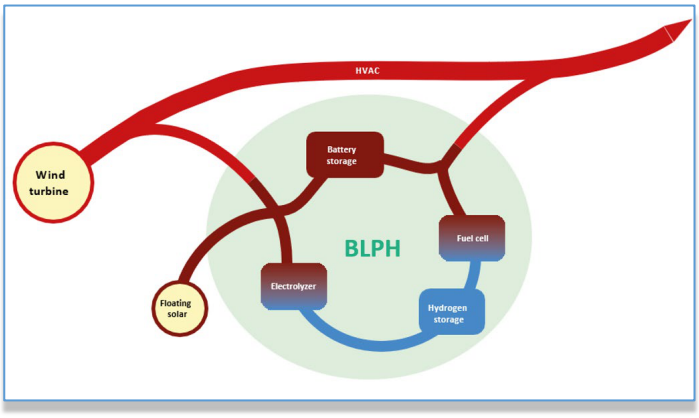


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DS-00011	EQUIPMENT DATA SHEETS INCLUDING MOTORS, AIR COMPRESSOR, DRYERS, ETC.
1724000428-QC-ITP-00002	INSPECTION TEST PLAN (ITP)
1724000428-NDT-PRO-00020	NDT PROCEDURES INCLUDING PERSONNEL QUALIFICATIONS
ISO 15614-1	SPECIFICATION AND QUALIFICATION OF WELDING PROCEDURES FOR METALLIC MATERIALS – WELDING PROCEDURE TEST
ISO 9606-1	QUALIFICATION TESTING OF WELDERS – FUSION WELDING
EN 14732	WELDING PERSONNEL – QUALIFICATION TESTING OF WELDING OPERATORS AND WELD SETTERS FOR MECHANIZED AND AUTOMATIC WELDING OF METALLIC MATERIALS
ASME IX	WELDING, BRAZING, AND FUSING QUALIFICATIONS

Table 1 - Reference Documents

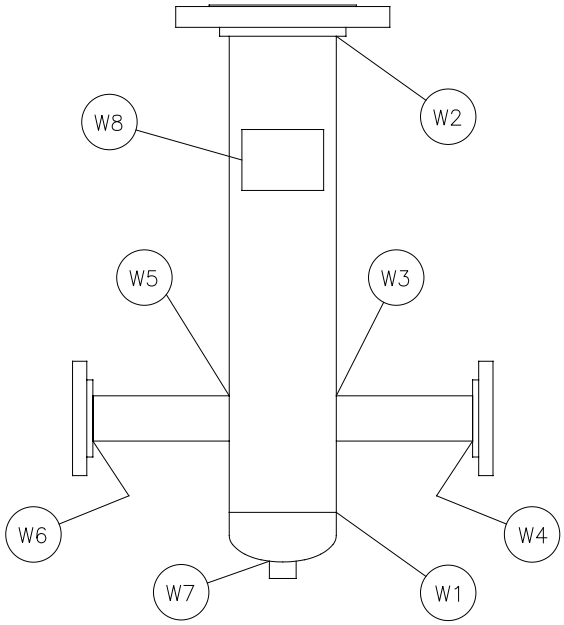
2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

3 WELDING BOOK

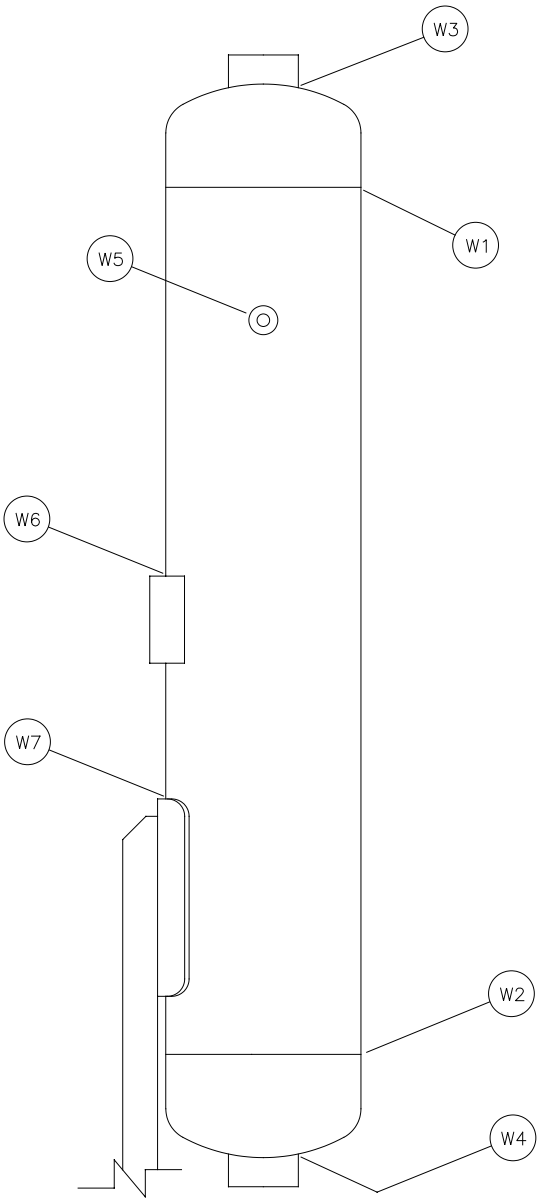
3.1 FILTERS WELDING MAP



Pos	Joint	Materials	WPS	PQR	Process	RT	PT	Welder
W1	Shell to head	SA 312 TP 316L SA 403 WP 316L	03/20-A1 - 316	03/20-A	GTAW SMAW	10%	100%	S2
W2	Shell to flange	SA 312 TP 316L SA 182 F 316L	03/20-A6- 316	03/20-A	SMAW	/	100%	S2
W3	Pipe to shell	SA 312 TP 316L SA 312 TP 316L	03/20-A2 - 316	03/20-A	GTAW SMAW	/	100%	S2
W4	Pipe to flange	SA 312 TP 316L SA 182 F 316L	03/20-A6- 316	03/20-A	GTAW SMAW	/	100%	S2
W5	Pipe to shell	SA 312 TP 316L SA 312 TP 316L	03/20-A2 - 316	03/20-A	GTAW SMAW	/	100%	S2
W6	Pipe to flange	SA 312 TP 316L SA 182 F 316L	03/20-A6- 316	03/20-A	GTAW SMAW	/	100%	S2
W7	Head to coupling	SA 403 WP 316L SA 182 F 316L	03/20-A2 - 316	03/20-A	GTAW SMAW	/	100%	S2
W8	Plate to shell	SA 240 316L SA 312 TP 316L	03/20-A6- 316	03/20-A	SMAW	/	100%	S2

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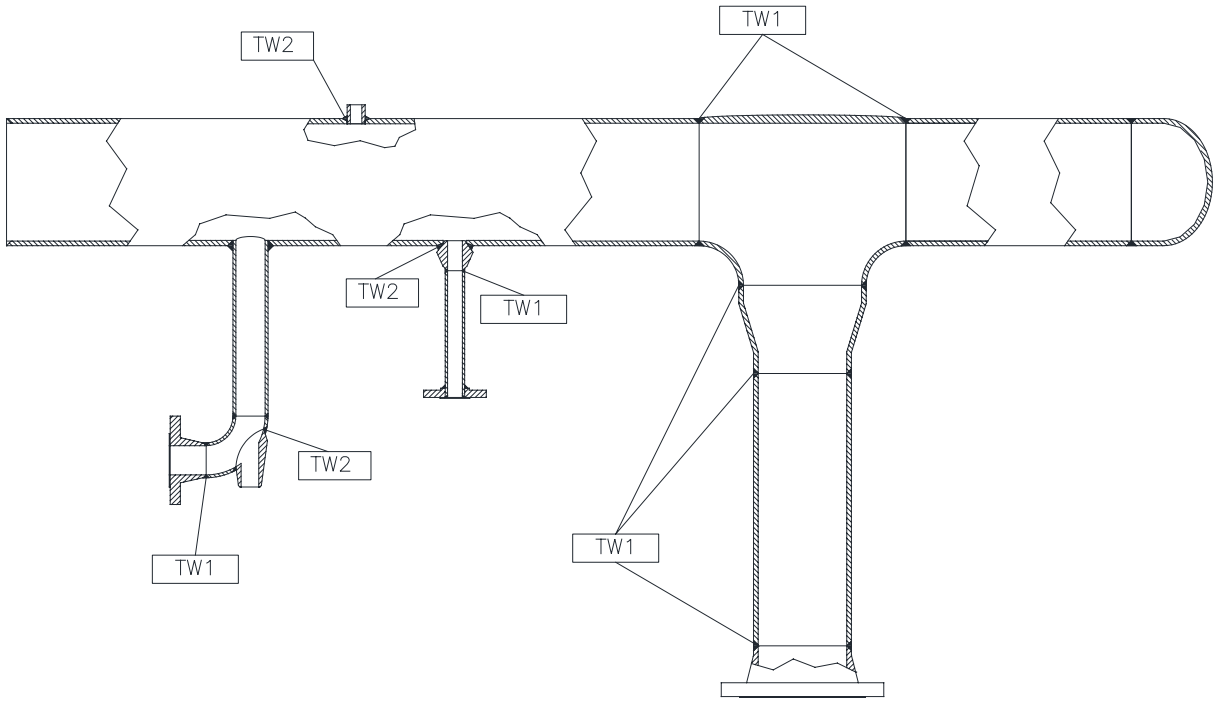
3.2 DRYER VESSELS WELDING MAP



Pos	Joint	Materials	WPS	PQR	Process	RT	PT	Welder
W1	Circumferential shell to head	SA 312 TP 316L SA 403 WP 316L	03/20-A1 - 316	03/20-A	GTAW SMAW	10%	100%	S4
W2	Circumferential shell to head	SA 312 TP 316L SA 403 WP 316L	03/20-A1 - 316	03/20-A	GTAW SMAW	10%	100%	S4
W3	Pipe to head	SA 312 TP 316L SA 403 WP 316L	03/20-A2 - 316	03/20-A	GTAW SMAW	/	100%	S4
W4	Pipe to head	SA 312 TP 316L SA 403 WP 316L	03/20-A2 - 316	03/20-A	GTAW SMAW	/	100%	S4
W5	Half coupling to shell	SA 182 F 316L SA 312 TP 316L	03/20-A2 - 316	03/20-A	GTAW SMAW	/	100%	S4
W6	Plate to shell	SA 240 316L SA 312 TP 316L	03/20-A6- 316	03/20-A	SMAW	/	100%	S4
W7	Plate to shell	SA 240 316L SA 312 TP 316L	03/20-A6 - 316	03/20-A	SMAW	/	100%	S4

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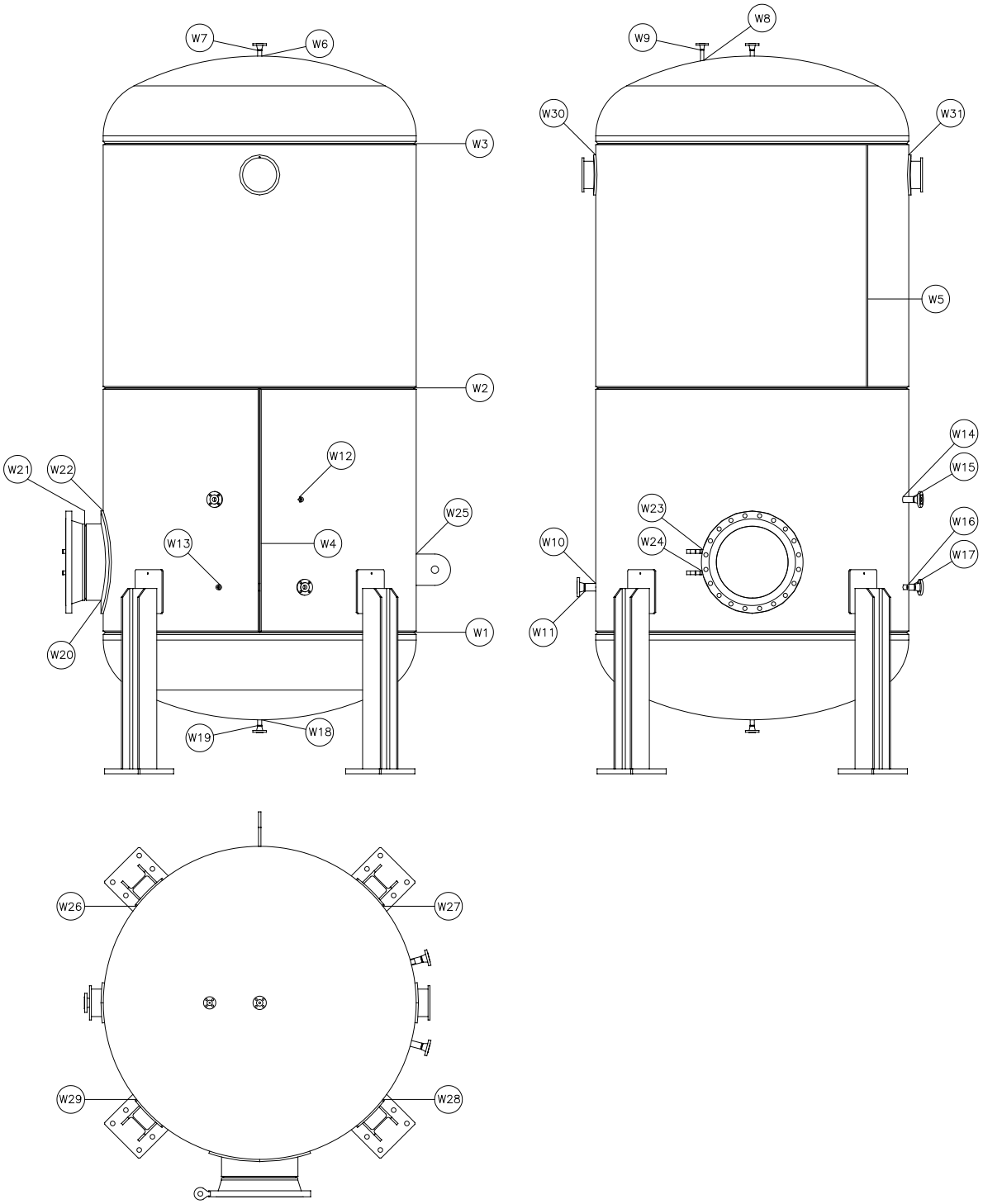
3.3 PIPING WELDING MAP



Pos	Joint	Thk.	Materials	WPS	PQR	Process	RT	PT	Welder
TW1	Butt Weld	1,5 to 5.54mm	SA 312 TP316L SA 182 F316L SA 403 WP316L	02_17-A1 - 316	02/17-A	GTAW	10%	100%	S2
TW1	Butt Weld	1.5 to 20mm	SA 312 TP316L SA 182 F316L SA 403 WP316L	03/20-A1 - 316	03/20-A	GTAW SMAW	10%	100%	S2
TW2	Branch full Penetration weld (set in)	1,5 to 20mm	SA 312 TP316L SA 182 F316L SA 403 WP316L	03/20-A2 - 316	03/20-A	GTAW SMAW	/	100%	S4
TW2	Branch full Penetration weld (set on)	1,5 to 20mm	SA 312 TP316L SA 182 F316L SA 403 WP316L	03/20-A4 - 316	03/20-A	GTAW SMAW	/	100%	S4

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3.4 AIR RECEIVER WELDING MAP



Pos	Joint	Materials	WPS	PQR	Process	RT	PT	Welder
W1	Circumferential shell to head	SA 516 Gr.70 SA 516 Gr.70	01/18-A1	1/18-A	GTAW SMAW SAW	10%	100%	S4
W2	Circumferential shell to head	SA 516 Gr.70 SA 516 Gr.70	01/18-A1	1/18-A	GTAW SMAW SAW	10%	100%	S4
W3	Circumferential shell to head	SA 516 Gr.70 SA 516 Gr.70	01/18-A1	1/18-A	GTAW SMAW SAW	10%	100%	S4
W4	Longitudinal weld	SA 516 Gr.70 SA 516 Gr.70	01/18-A1	1/18-A	GTAW SMAW SAW	10%	100%	S4
W5	Longitudinal weld	SA 516 Gr.70 SA 516 Gr.70	01/18-A1	1/18-A	GTAW SMAW SAW	10%	100%	S4
W6	Pipe to head	SA 333 Gr.6 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S4
W7	Flange to pipe	SA 350 LF2 Cl.1 SA 333 Gr.6	02/20-A1	2/20-A	GTAW SMAW	/	100%	S2
W8	Pipe to head	SA 333 Gr.6 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S4
W9	Flange to pipe	SA 350 LF2 Cl.1 SA 333 Gr.6	02/20-A1	2/20-A	GTAW SMAW	/	100%	S2
W10	Pipe to shell	SA 333 Gr.6 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S4
W11	Flange to pipe	SA 350 LF2 Cl.1 SA 333 Gr.6	02/20-A1	2/20-A	GTAW SMAW	/	100%	S2
W12	Coupling to shell	SA 350 LF2 Cl.1 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S4
W13	Coupling to shell	SA 350 LF2 Cl.1 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S4
W14	Pipe to shell	SA 333 Gr.6 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S4
W15	Flange to pipe	SA 350 LF2 Cl.1 SA 333 Gr.6	02/20-A1	2/20-A	GTAW SMAW	/	100%	S2
W16	Pipe to shell	SA 333 Gr.6 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S4
W17	Flange to pipe	SA 350 LF2 Cl.1 SA 333 Gr.6	02/20-A1	2/20-A	GTAW SMAW	/	100%	S2
W18	Pipe to head	SA 333 Gr.6 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S4
W19	Flange to pipe	SA 350 LF2 Cl.1 SA 333 Gr.6	02/20-A1	2/20-A	GTAW SMAW	/	100%	S2
W20	Manhole shell to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S4
W21	Manhole shell to flange	SA 516 Gr.70 SA 350 LF2 Cl.1	02/20-A1	2/20-A	GTAW SMAW	/	100%	S4
W22	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S4
W23	Plate to flange	SA 516 Gr.70 SA 350 LF2 Cl.1	02/20-A6	2/20-A	SMAW	/	100%	S4
W24	Plate to flange	SA 516 Gr.70 SA 350 LF2 Cl.1	02/20-A6	2/20-A	SMAW	/	100%	S4

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Pos	Joint	Materials	WPS	PQR	Process	RT	PT	Welder
W25	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S4
W26	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S4
W27	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S4
W28	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S4
W29	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S4
W30	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S4
W31	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S4

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Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n° *Certificate No.*	**ICIM – WACo – 023002 - 00**
Fabbricante *Manufacturer*	Coes S.r.l.
Indirizzo *Address*	Via Pontida, 265 – 24040, Stezzano (BG)
Procedura di Saldatura del Fabbricante n° *Manufacturer Welding Procedure WPS n°*	01/18-A
Nome dell'Operatore di Saldatura *Welding Operator's Name*	**DELIGIOS Giuliano Gavino**
Metodo di Identificazione *Identification method*	C. I. AU 8582800 Stamp N. S4
Data e luogo di nascita *Date and Place of Birth*	15/04/1974 Sassari – (SS)/Italia
Datore di lavoro *Employer*	Coes S.r.l.
Codice/Norma di esame *Code/Testing Standard*	UNI EN ISO 14732:2013 ☒ ICIM S.p.A. è ON per Direttiva 2014/68/UE – No. Bo. 0425. La presente qualifica soddisfa la direttiva 2014/68/UE- All. I - 3.1.2

Conoscenze tecniche
Job Knowledge

☐ Accettabile / *Accettable*
☒ Non sottoposta a prova */Not Tested*

Variabili ***Variables***	**Dettagli della prova** ***Welding test details***	**Campo di validità** ***Range of approval***
Processo di saldatura *Welding Process*	121	121
Apparecchiatura di saldatura *Welding equipment*	ESAB MPH 40/40	Same equipment
Unità di saldatura *Welding machine*		
Dettagli per la saldatura meccanizzata ***Details for mechanized welding***	**Dettagli della prova** ***Welding test details***	**Campo di validità** ***Range of approval***
Controllo visivo/controllo visivo in remoto *Visual control/remote visual control*	Direct	Direct
Controllo automatico della lunghezza dell'arco *Automatic control of arc length*	Without	With & Without
Inseguimento automatico del giunto *Automatic traking of joint*	Without	With & Without
Posizione di saldatura *Welding position*	PA	Flat
Passata singola/passata multipla *Single run/Multirun*	Multiple	Single & Multiple
Materiale a supporto *Back-up material*	With	With
Inserto consumabile *Consumable insert*	Without	With & Without

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Dettagli per la saldatura automatica *Details for automatic welding*	**Dettagli della prova** *Welding test details*	**Campo di validità** *Range of approval*
Sensore del giunto *Joint sensor*	-	-
Sensore di controllo dell'arco *Sensor for arc welding control*	-	-
Tecnica a passata Singola/Multipla *Single run/Multirun technique*	-	-
Tipo unità di saldatura *Type of welding machine*	-	-
Altro *Other*	-	-

Approval based on *Qualificazione basata su*		**Tests result documentation** *Documentazione del risultato delle prove*
Prova di procedura di saldatura secondo il punto 4.1 a *Test of welding procedure according to 4.1 a (UNI EN ISO 15614-1, UNI EN ISO 15614-2)*	☒	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 19/0483RP02
Prova di saldatura di pre-produzione o di produzione secondo il punto 4.1 b *Test of pre-production welding or production welding according to 4.1 b (UNI EN ISO 15613)*	☐	
Prova di saldatura in conformità alla ISO 9606 secondo il punto 4.1 c *Test of welding as per ISO 9606 requirements according to 4.1 c*	☐	
Prova di produzione o di campionamento della produzione secondo il punto 4.1 d *Test of sample of the production according to 4.1 d*	☐	

Si certifica che l'operatore di saldatura sopra indicato, usando la procedura di saldatura indicata nel presente modulo, ha soddisfatto I requisiti descritti dalle norme applicate.

We certify that the welding operator identified above, using the welding procedure given in the present form, has satisfied the requirements described from the applied standards.

Data di saldatura *Date of welding*	Validità della qualificazione fino al *Validity of qualification until*	Esaminatore *Examiner*
06/03/2019	05/03/2025	LAZZARIN MARCO – ICIM Welding Inspector

Data di delibera *Date of approval*	**Approvatore** *Manager*
12/07/2021	*Vincenzo Delacqua* Rappresentante Direzione / Management Representative **ICIM S.p.A.**

Conferma della validità da parte del Fabbricante (semestrale)
Confirmation of the validity by Manufacturer (6 month)

Posizione/Titolo *Position/title*	Firma *Signature*	Data *Date*
Welding Specialist		06/09/2019
Welding Specialist		06/03/2020
Welding Specialist		06/09/2020

Posizione/Titolo *Position/title*	Firma *Signature*	Data *Date*
Welding Specialist		06/03/2021
Welding Specialist		06/09/2021
Welding Specialist		06/03/2022

Riconvalida della qualificazione da parte dell'Esaminatore (triennale)
Revalidation for qualification by Examiner (every 3 years)

Posizione/Titolo *Position/title*	Firma *Signature*	Data *Date*

Posizione/Titolo *Position/title*	Firma *Signature*	Data *Date*

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ALLEGATO RIVALIDAZIONE QUALIFICA SALDATORI
WELDERS QUALIFICATION REVALIDATION ATTACHMENT

Fabbricante *(Manufacturer)*: **Coes S.r.l.**

Certificato n° (*Certificate No.*): **ICIM – WAC – 023002 – 00**

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
06/03/2022		Welding Specialist
06/03/2023		Welding Specialist
06/03/2023		Welding Specialist
06/03/2024		Welding Specialist

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*
/	/	/

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
06/09/2024		Welding Specialist

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

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CERTIFICATO PROVA DI QUALIFICAZIONE DEL SALDATORE
WELDER APPROVAL TEST CERTIFICATE - UNI EN ISO 9606-1

ACCREDIA
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Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n° / *Certificate No.*	**ICIM – WAC – 023003 – 00**
Fabbricante / *Manufacturer*	Coes S.r.l.
Indirizzo / *Address*	Via Pontida 265 – Stezzano (BG)
Procedura di Saldatura del Fabbricante n° / *Manufacturer Welding Procedure WPS n°*	02/20-A
Nome del Saldatore / *Welder's Name*	**DEL PRATO Roberto**
Metodo di Identificazione / *Identification method*	C.I. AR 1275864 Stamp N. S2
Data e luogo di nascita / *Date and Place of Birth*	07/01/1975 Seriate – (BG) / Italia
Datore di lavoro / *Employer*	Coes S.r.l.
Codice/Norma di esame / *Code/Testing Standard*	UNI EN ISO 9606-1:2017; Schema ICIM 0248CS; ☒ ICIM S.p.A. è ON per Direttiva 2014/68/UE – No. Bo. 0425. La presente qualifica soddisfa la direttiva 2014/68/UE- All. I - 3.1.2

Prova supplementare di saldatura ad angolo / *Supplementary fillet weld test* ☐ Sì/*Yes* ☒ No

Conoscenze tecniche / *Job Knowledge* ☐ Accettabile / *Acceptable* ☒ Non sottoposta a prova / *Not Tested*

Variabili / *Variables*	**Dettagli della prova** / *Welding test details*	**Campo di validità** / *Range of approval*
Processo di saldatura / *Welding Process*	141 111	141, 142, 143, 145 111
Modalità di trasferimento / *Transfer Mode*	N.A.	N.A.
Tipo di prodotto / *Product Type – Plate (P) or Pipe (T)*	T	P - T - Branch Connection ≥ 60°
Tipo di saldatura / *Type of weld*	BW	BW
Gruppo del materiale base e sottogruppo / *Parent Material Group(s) and Sub Group(s)*	1.1	N.A.
Materiale d'apporto designazione / *Filler material designation*	141: S 111: B	141: S, M 111: A, B, RA, RB, RC, RR, R
Gruppo materiale d'apporto / *Filler material group*	FM1	FM1, FM2
Gas di protezione / *Shielding gas*	EN ISO 14175 I1	-
Ausiliari / *Auxiliaries (e.g. backing gas)*	-	-
Tipologia di corrente e polarità / *Type of Current and Polarity*	DCEN DCEP	-
Spess. del materiale (mm) / *Material Thickness (mm)*	10 to 30	-
Spessore del materiale depositato (mm) / *Deposited Thickness (mm)*	141: 2 111: 8	141: 2 to 4 111: 3 to 16
Diametro esterno del tubo (mm) / *Pipe outside diameter (mm)*	50	≥ 25
Posizione di saldatura / *Welding positions*	PA	Flat
Dettagli della saldatura / *Weld details*	141: ss nb 111: ss mb	141: ss nb - ss mb - bs - ss gb - ss fb 111: ss mb – bs
Strati multipli/strato singolo / *Multy-layer / single layer*	N.A.	-
Altro / *Other*	N.A.	-

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CERTIFICATO PROVA DI QUALIFICAZIONE DEL SALDATORE
WELDER APPROVAL TEST CERTIFICATE - UNI EN ISO 9606-1

ACCREDIA
PRS N° 082 C

Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n°
Certificate No. **ICIM – WAC – 023003 – 00**

Tipo di test *Type of test*	**Eseguite e Accettate** *Performed and Acceptable*	**Non testate** *Not tested*
Esame visivo *Visual testing (UNI EN ISO 17637)*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RPA01	
Esame radiografico *Radiographic testing (UNI EN ISO 17636)* o, se applicabile / *or, if applicable* **Esame ultrasonoro** *Ultrasonic testing (UNI EN ISO 17640)*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RPA01	X
Prova di piegatura *Bend test (UNI EN ISO 5173)* o, se applicabile / *or, if applicable* **Prova di trazione con intaglio** *Notch tensile test*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RPA01	X
Prova di frattura *Fracture test (UNI EN ISO 9017)* o, se applicabile / *or, if applicable* **Esame macrografico** *Macroscopic examination (UNI EN ISO 17639)* o, se applicabile / *or, if applicable*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RPA01	X

Si certifica che il saldatore sopra indicato, usando la procedura di saldatura indicata nel presente modulo, ha soddisfatto i requisiti descritti dalle norme applicate con la seguente Designazione:

We certify that the welder identified above, using the welding procedure given in the present form, has satisfied the requirements described from the applied standards with the following Designation:

UNI EN ISO 9606-1: 2017 – 141 – T – BW – FM1 – S – D50 – s2 – PA – ss nb
UNI EN ISO 9606-1: 2017 – 111 – T – BW – FM1 – B – D50 – s8 – PA – ss mb

Luogo di saldatura *Place of welding*	Data di saldatura *Date of welding*	Esaminatore *Examiner*
Stezzano (BG)	02/11/2020	LAZZARIN Marco – Welding Inspector

Data di delibera ***Date of approval***	**Approvatore** ***Manager***
12/07/2021	*Vincenzo Delacqua* Rappresentante Direzione / Management Representative **ICIM S.p.A.**

Rivalidazione dopo 3 anni *Revalidation after 3 years*	Valido fino al *Valid until*	Rivalidazione dopo 2 anni *Revalidation after 2 years*	Valido fino al *Valid until*	Rivalidazione dopo 6 mesi *Revalidation after 6 months*	Valido fino al *Valid until*
9.3 a)		**9.3 b)**	01/11/2022	**9.3 c)**	

Applicabile esclusivamente per rivalidazione secondo paragrafi 9.3 b) oppure paragrafo 9.3 c)

Applicable for Revalidation according to sub-clause 9.3 b) or sub-clause 9.3 c)

Per la rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni si prega di fare riferimento all'allegato 0085CM

For the revalidation of the qualification by examining body for the following 2 years please refer to the attachment 0085CM

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi

Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
02/05/2021		Welding Specialist
02/11/2021		Welding Specialist
02/05/2022		Welding Specialist
31/10/22	ICIM S.p.A.	LAZZARIN MARCO – WELDING INSP.

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Fabbricante *(Manufacturer)*: **Coes S.r.l.**

Certificato n° (*Certificate No.)*: **ICIM – WAC – 023003 – 00**

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
01/05/2023		Welding Specialist
01/11/2023		Welding Specialist
01/05/2024		Welding Specialist

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

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Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi

Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni

Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi

Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni

Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi

Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni

Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

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CERTIFICATO PROVA DI QUALIFICAZIONE DEL SALDATORE
WELDER APPROVAL TEST CERTIFICATE - UNI EN ISO 9606-1

ACCREDIA
PRS N° 082 C
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n° / Certificate No.	**ICIM – WAC – 023004 – 00**
Fabbricante / *Manufacturer*	Coes S.r.l.
Indirizzo / *Address*	Via Pontida 265 – Stezzano (BG)
Procedura di Saldatura del Fabbricante n° / *Manufacturer Welding Procedure WPS n°*	02/20-A
Nome del Saldatore / *Welder's Name*	**DELIGIOS Giuliano Gavino**
Metodo di Identificazione / *Identification method*	C.I. CA67930EC Stamp N. S4
Data e luogo di nascita / *Date and Place of Birth*	15/04/1974 Sassari – (SS) / Italia
Datore di lavoro / *Employer*	Coes S.r.l.
Codice/Norma di esame / *Code/Testing Standard*	UNI EN ISO 9606-1:2017; Schema ICIM 0248CS; ☒ ICIM S.p.A. è ON per Direttiva 2014/68/UE – No. Bo. 0425. La presente qualifica soddisfa la direttiva 2014/68/UE- All. I - 3.1.2

Prova supplementare di saldatura ad angolo / *Supplementary fillet weld test* — ☐ Sì/*Yes* ☒ No

Conoscenze tecniche / *Job Knowledge* — ☐ Accettabile / *Acceptable* ☒ Non sottoposta a prova / *Not Tested*

Variabili / *Variables*	Dettagli della prova / *Welding test details*	Campo di validità / *Range of approval*
Processo di saldatura / *Welding Process*	141 111	141, 142, 143, 145 111
Modalità di trasferimento / *Transfer Mode*	N.A.	N.A.
Tipo di prodotto / *Product Type – Plate (P) or Pipe (T)*	T	P - T - Branch Connection ≥ 60°
Tipo di saldatura / *Type of weld*	BW	BW
Gruppo del materiale base e sottogruppo / *Parent Material Group(s) and Sub Group(s)*	1.1	N.A.
Materiale d'apporto designazione / *Filler material designation*	141: S 111: B	141: S, M 111: A, B, RA, RB, RC, RR, R
Gruppo materiale d'apporto / *Filler material group*	FM1	FM1, FM2
Gas di protezione / *Shielding gas*	EN ISO 14175 I1	-
Ausiliari / *Auxiliaries (e.g. backing gas)*	-	-
Tipologia di corrente e polarità / *Type of Current and Polarity*	DCEN DCEP	-
Spess. del materiale (mm) / *Material Thickness (mm)*	10 to 30	-
Spessore del materiale depositato (mm) / *Deposited Thickness (mm)*	141: 2 111: 8	141: 2 to 4 111: 3 to 16
Diametro esterno del tubo (mm) / *Pipe outside diameter (mm)*	50	≥ 25
Posizione di saldatura / *Welding positions*	PA	Flat
Dettagli della saldatura / *Weld details*	141: ss nb 111: ss mb	141: ss nb - ss mb - bs - ss gb - ss fb 111: ss mb – bs
Strati multipli/strato singolo / *Multy-layer / single layer*	N.A.	-
Altro / *Other*	N.A.	-

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CERTIFICATO PROVA DI QUALIFICAZIONE DEL SALDATORE
WELDER APPROVAL TEST CERTIFICATE - UNI EN ISO 9606-1

ACCREDIA
PRS N° 082 C
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n°
Certificate No. **ICIM – WAC – 023004 – 00**

Tipo di test *Type of test*	**Eseguite e Accettate** ***Performed and Acceptable***	**Non testate** ***Not tested***
Esame visivo *Visual testing (UNI EN ISO 17637)*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RP05	
Esame radiografico *Radiographic testing (UNI EN ISO 17636)* o, se applicabile / *or, if applicable* **Esame ultrasonoro** *Ultrasonic testing (UNI EN ISO 17640)*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RP05	X
Prova di piegatura *Bend test (UNI EN ISO 5173)* o, se applicabile / *or, if applicable* **Prova di trazione con intaglio** *Notch tensile test*		X
Prova di frattura *Fracture test (UNI EN ISO 9017)* o, se applicabile / *or, if applicable* **Esame macrografico** *Macroscopic examination (UNI EN ISO 17639)* o, se applicabile / *or, if applicable*		X

Si certifica che il saldatore sopra indicato, usando la procedura di saldatura indicata nel presente modulo, ha soddisfatto i requisiti descritti dalle norme applicate con la seguente Designazione:

We certify that the welder identified above, using the welding procedure given in the present form, has satisfied the requirements described from the applied standards with the following Designation:

UNI EN ISO 9606-1: 2017 – 141 – T – BW – FM1 – S – D50 – s2 – PA – ss nb
UNI EN ISO 9606-1: 2017 – 111 – T – BW – FM1 – B – D50 – s8 – PA – ss mb

Luogo di saldatura *Place of welding*	Data di saldatura *Date of welding*	Esaminatore *Examiner*
Stezzano (BG)	02/11/2020	LAZZARIN Marco – Welding Inspector

Data di delibera ***Date of approval***	**Approvatore** ***Manager***
12/07/2021	*Vincenzo Delacqua* Rappresentante Direzione / Management Representative **ICIM S.p.A.**

Rivalidazione dopo 3 anni *Revalidation after 3 years*	Valido fino al *Valid until*	Rivalidazione dopo 2 anni *Revalidation after 2 years*	Valido fino al *Valid until*	Rivalidazione dopo 6 mesi *Revalidation after 6 months*	Valido fino al *Valid until*
9.3 a)		**9.3 b)**	01/11/2022	**9.3 c)**	

Applicabile esclusivamente per rivalidazione secondo paragrafi 9.3 b) oppure paragrafo 9.3 c)

Applicable for Revalidation according to sub-clause 9.3 b) or sub-clause 9.3 c)

Per la rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni si prega di fare riferimento all'allegato 0085CM

For the revalidation of the qualification by examining body for the following 2 years please refer to the attachment 0085CM

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi

Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
02/05/2021		Welding Specialist
02/11/2021		Welding Specialist
02/05/2022		Welding Specialist
31/10/22		LAZZARIN MARCO – WELDING INSP.

0251CM_09_IT

Fabbricante *(Manufacturer)*: **Coes S.r.l.**

Certificato n° (*Certificate No.)*: **ICIM – WAC – 023004 – 00**

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
01/05/2023		Welding Specialist
01/11/2023		Welding Specialist
01/05/2024		Welding Specialist

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

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Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

ICIM SpA
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CERTIFICATO PROVA DI QUALIFICAZIONE DEL SALDATORE
WELDER APPROVAL TEST CERTIFICATE - UNI EN ISO 9606-1

ACCREDIA
PRS N° 082 C
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n° / Certificate No.	**ICIM – WAC – 023005 – 00**
Fabbricante / *Manufacturer*	Coes S.r.l.
Indirizzo / *Address*	Via Pontida 265 – Stezzano (BG)
Procedura di Saldatura del Fabbricante n° / *Manufacturer Welding Procedure WPS n°*	03/20-A
Nome del Saldatore / *Welder's Name*	**DELIGIOS Giuliano Gavino**
Metodo di Identificazione / *Identification method*	C.I. CA67930EC Stamp N. S4
Data e luogo di nascita / *Date and Place of Birth*	15/04/1974 Sassari – (SS) / Italia
Datore di lavoro / *Employer*	Coes S.r.l.
Codice/Norma di esame / *Code/Testing Standard*	UNI EN ISO 9606-1:2017; Schema ICIM 0248CS; ☒ ICIM S.p.A. è ON per Direttiva 2014/68/UE – No. Bo. 0425. La presente qualifica soddisfa la direttiva 2014/68/UE- All. I - 3.1.2

Prova supplementare di saldatura ad angolo / *Supplementary fillet weld test* ☐ Sì/*Yes* ☒ No

Conoscenze tecniche / *Job Knowledge* ☐ Accettabile / *Acceptable* ☒ Non sottoposta a prova / *Not Tested*

Variabili / *Variables*	Dettagli della prova / *Welding test details*	Campo di validità / *Range of approval*
Processo di saldatura / *Welding Process*	141 111	141, 142, 143, 145 111
Modalità di trasferimento / *Transfer Mode*	N.A.	N.A.
Tipo di prodotto / *Product Type – Plate (P) or Pipe (T)*	T	P - T - Branch Connection ≥ 60°
Tipo di saldatura / *Type of weld*	BW	BW
Gruppo del materiale base e sottogruppo / *Parent Material Group(s) and Sub Group(s)*	8.1	N.A.
Materiale d'apporto designazione / *Filler material designation*	141: S 111: R	141: S, M 111: A, RA, RB, RC, RR, R
Gruppo materiale d'apporto / *Filler material group*	FM5	FM5
Gas di protezione / *Shielding gas*	EN ISO 14175 I1	-
Ausiliari / *Auxiliaries (e.g. backing gas)*	EN ISO 14175 I1	-
Tipologia di corrente e polarità / *Type of Current and Polarity*	DCEN DCEP	-
Spess. del materiale (mm) / *Material Thickness (mm)*	10 to 30	-
Spessore del materiale depositato (mm) / *Deposited Thickness (mm)*	141: 2 111: 8	141: 2 to 4 111: 3 to 16
Diametro esterno del tubo (mm) / *Pipe outside diameter (mm)*	50	≥ 25
Posizione di saldatura / *Welding positions*	PA	Flat
Dettagli della saldatura / *Weld details*	141: ss gb 111: ss mb	141: ss mb – bs – ss gb 111: ss mb – bs
Strati multipli/strato singolo / *Multy-layer / single layer*	N.A.	N.A.
Altro / *Other*	N.A.	N.A.

0251CM_09_IT

CERTIFICATO PROVA DI QUALIFICAZIONE DEL SALDATORE
WELDER APPROVAL TEST CERTIFICATE - UNI EN ISO 9606-1

ACCREDIA
PRS N° 082 C
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n°
Certificate No. **ICIM – WAC – 023005 – 00**

Tipo di test *Type of test*	**Eseguite e Accettate** *Performed and Acceptable*	**Non testate** *Not tested*
Esame visivo *Visual testing (UNI EN ISO 17637)*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RP06	
Esame radiografico *Radiographic testing (UNI EN ISO 17636)* o, se applicabile / *or, if applicable* **Esame ultrasonoro** *Ultrasonic testing (UNI EN ISO 17640)*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RP06	X
Prova di piegatura *Bend test (UNI EN ISO 5173)* o, se applicabile / *or, if applicable* **Prova di trazione con intaglio** *Notch tensile test*		X
Prova di frattura *Fracture test (UNI EN ISO 9017)* o, se applicabile / *or, if applicable* **Esame macrografico** *Macroscopic examination (UNI EN ISO 17639)* o, se applicabile / *or, if applicable*		X

Si certifica che il saldatore sopra indicato, usando la procedura di saldatura indicata nel presente modulo, ha soddisfatto i requisiti descritti dalle norme applicate con la seguente Designazione:

We certify that the welder identified above, using the welding procedure given in the present form, has satisfied the requirements described from the applied standards with the following Designation:

UNI EN ISO 9606-1: 2017 – 141 – T – BW – FM5 – S – D50 – s2 – PA – ss gb
UNI EN ISO 9606-1: 2017 – 111 – T – BW – FM5 – R – D50 – s8 – PA – ss mb

Luogo di saldatura *Place of welding*	Data di saldatura *Date of welding*	Esaminatore *Examiner*
Stezzano (BG)	02/11/2020	LAZZARIN Marco – Welding Inspector

Data di delibera ***Date of approval***	**Approvatore** ***Manager***
12/07/2021	*Vincenzo Delacqua* Rappresentante Direzione / Management Representative **ICIM S.p.A.**

Rivalidazione dopo 3 anni *Revalidation after 3 years*	Valido fino al *Valid until*	Rivalidazione dopo 2 anni *Revalidation after 2 years*	Valido fino al *Valid until*	Rivalidazione dopo 6 mesi *Revalidation after 6 months*	Valido fino al *Valid until*
9.3 a)		**9.3 b)**	01/11/2022	**9.3 c)**	

Applicabile esclusivamente per rivalidazione secondo paragrafi 9.3 b) oppure paragrafo 9.3 c)

Applicable for Revalidation according to sub-clause 9.3 b) or sub-clause 9.3 c)

Per la rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni si prega di fare riferimento all'allegato 0085CM

For the revalidation of the qualification by examining body for the following 2 years please refer to the attachment 0085CM

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi

Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
02/05/2021		Welding Specialist
02/11/2021		Welding Specialist
02/05/2022		Welding Specialist
31/10/22	ICIM S.p.A.	LAZZARIN MARCO – WELDING INSP.

0251CM_09_IT

Fabbricante *(Manufacturer)*: **Coes S.r.l.**

Certificato n° (*Certificate No.)*: **ICIM – WAC – 023005 – 00**

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
01/05/2023		Welding Specialist
01/11/2023		Welding Specialist
01/05/2024		Welding Specialist

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

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Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

ICIM SpA
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ICIM

CERTIFICATO PROVA DI QUALIFICAZIONE DEL SALDATORE
WELDER APPROVAL TEST CERTIFICATE - UNI EN ISO 9606-1

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO

PRS N° 082 C

Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n° / *Certificate No.*	**ICIM – WAC – 023006 – 00**
Fabbricante / *Manufacturer*	Coes S.r.l.
Indirizzo / *Address*	Via Pontida 265 – Stezzano (BG)
Procedura di Saldatura del Fabbricante n° / *Manufacturer Welding Procedure WPS n°*	03/20-A
Nome del Saldatore / *Welder's Name*	**DEL PRATO Roberto**
Metodo di Identificazione / *Identification method*	C.I. AR 1275864 Stamp N. S2
Data e luogo di nascita / *Date and Place of Birth*	07/01/1975 Seriate – (BG) / Italia
Datore di lavoro / *Employer*	Coes S.r.l.
Codice/Norma di esame / *Code/Testing Standard*	UNI EN ISO 9606-1:2017; Schema ICIM 0248CS; ☒ ICIM S.p.A. è ON per Direttiva 2014/68/UE – No. Bo. 0425. La presente qualifica soddisfa la direttiva 2014/68/UE- All. I - 3.1.2

Prova supplementare di saldatura ad angolo / *Supplementary fillet weld test*	☐ Sì/*Yes* ☒ No
Conoscenze tecniche / *Job Knowledge*	☐ Accettabile / *Acceptable* ☒ Non sottoposta a prova / *Not Tested*

Variabili / ***Variables***	**Dettagli della prova** / ***Welding test details***	**Campo di validità** / ***Range of approval***
Processo di saldatura / *Welding Process*	141 111	141, 142, 143, 145 111
Modalità di trasferimento / *Transfer Mode*	N.A.	N.A.
Tipo di prodotto / *Product Type – Plate (P) or Pipe (T)*	T	P - T - Branch Connection ≥ 60°
Tipo di saldatura / *Type of weld*	BW	BW
Gruppo del materiale base e sottogruppo / *Parent Material Group(s) and Sub Group(s)*	8.1	N.A.
Materiale d'apporto designazione / *Filler material designation*	141: S 111: R	141: S, M 111: A, RA, RB, RC, RR, R
Gruppo materiale d'apporto / *Filler material group*	FM5	FM5
Gas di protezione / *Shielding gas*	EN ISO 14175 I1	-
Ausiliari / *Auxiliaries (e.g. backing gas)*	EN ISO 14175 I1	-
Tipologia di corrente e polarità / *Type of Current and Polarity*	DCEN DCEP	-
Spess. del materiale (mm) / *Material Thickness (mm)*	10 to 30	-
Spessore del materiale depositato (mm) / *Deposited Thickness (mm)*	141: 2 111: 8	141: 2 to 4 111: 3 to 16
Diametro esterno del tubo (mm) / *Pipe outside diameter (mm)*	50	≥ 25
Posizione di saldatura / *Welding positions*	PA	Flat
Dettagli della saldatura / *Weld details*	141: ss gb 111: ss mb	141: ss mb – bs – ss gb 111: ss mb – bs
Strati multipli/strato singolo / *Multy-layer / single layer*	N.A.	N.A.
Altro / *Other*	N.A.	N.A.

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CERTIFICATO PROVA DI QUALIFICAZIONE DEL SALDATORE
WELDER APPROVAL TEST CERTIFICATE - UNI EN ISO 9606-1

PRS N° 082 C

Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n°
Certificate No. **ICIM – WAC – 023006 – 00**

Tipo di test *Type of test*	**Eseguite e Accettate** *Performed and Acceptable*	**Non testate** *Not tested*
Esame visivo *Visual testing (UNI EN ISO 17637)*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RPA02	
Esame radiografico *Radiographic testing (UNI EN ISO 17636)* o, se applicabile / *or, if applicable* **Esame ultrasonoro** *Ultrasonic testing (UNI EN ISO 17640)*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RPA02	X
Prova di piegatura *Bend test (UNI EN ISO 5173)* o, se applicabile / *or, if applicable* **Prova di trazione con intaglio** *Notch tensile test*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RPA02	X
Prova di frattura *Fracture test (UNI EN ISO 9017)* o, se applicabile / *or, if applicable* **Esame macrografico** *Macroscopic examination (UNI EN ISO 17639)* o, se applicabile / *or, if applicable*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RPA02	X

Si certifica che il saldatore sopra indicato, usando la procedura di saldatura indicata nel presente modulo, ha soddisfatto i requisiti descritti dalle norme applicate con la seguente Designazione:

We certify that the welder identified above, using the welding procedure given in the present form, has satisfied the requirements described from the applied standards with the following Designation:

UNI EN ISO 9606-1: 2017 – 141 – T – BW – FM5 – S – D50 – s2 – PA – ss gb
UNI EN ISO 9606-1: 2017 – 111 – T – BW – FM5 – R – D50 – s8 – PA – ss mb

Luogo di saldatura *Place of welding*	Data di saldatura *Date of welding*	Esaminatore *Examiner*
Stezzano (BG)	02/11/2020	LAZZARIN Marco – Welding Inspector

Data di delibera ***Date of approval***	**Approvatore** ***Manager***
12/07/2021	*Vincenzo Delacqua* Rappresentante Direzione / Management Representative **ICIM S.p.A.**

Rivalidazione dopo 3 anni *Revalidation after 3 years*	Valido fino al *Valid until*	Rivalidazione dopo 2 anni *Revalidation after 2 years*	Valido fino al *Valid until*	Rivalidazione dopo 6 mesi *Revalidation after 6 months*	Valido fino al *Valid until*
9.3 a)		**9.3 b)**	01/11/2022	**9.3 c)**	

Applicabile esclusivamente per rivalidazione secondo paragrafi 9.3 b) oppure paragrafo 9.3 c)

Applicable for Revalidation according to sub-clause 9.3 b) or sub-clause 9.3 c)

Per la rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni si prega di fare riferimento all'allegato 0085CM

For the revalidation of the qualification by examining body for the following 2 years please refer to the attachment 0085CM

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi

Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
02/05/2021		Welding Specialist
02/11/2021		Welding Specialist
02/05/2022		Welding Specialist
31/10/22		LAZZARIN MARCO – WELDING INSP

0251CM_09_IT

Fabbricante *(Manufacturer)*: **Coes S.r.l.**

Certificato n° (*Certificate No.)*: **ICIM – WAC – 023006 – 00**

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
01/05/2023		Welding Specialist
01/11/2023		Welding Specialist
01/05/2024		Welding Specialist

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

ICIM SpA
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Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

ICIM SpA
Piazza Don Enrico Mapelli, 75 - 20099 Sesto San Giovanni (MI) - Tel. +39 02 725341 Fax +39 02 72002098 - www.icim.it - info@icim.it Capitale sociale € 260.000,00 int. versato ed esistente - C.F./P.IVA e Iscriz. Reg. Imprese di Milano n. 12908230159 – R.E.A. n. 1596292

ICIM

CERTIFICATO PROVA DI QUALIFICAZIONE DEL SALDATORE
WELDER APPROVAL TEST CERTIFICATE - UNI EN ISO 9606-1

ACCREDIA
PRS N° 082 C
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n° / *Certificate No.*	**ICIM – WAC – 023007 – 00**
Fabbricante / *Manufacturer*	Coes S.r.l.
Indirizzo / *Address*	Via Pontida 265 – Stezzano (BG)
Procedura di Saldatura del Fabbricante n° / *Manufacturer Welding Procedure WPS n°*	04/20-A
Nome del Saldatore / *Welder's Name*	**DEL PRATO Roberto**
Metodo di Identificazione / *Identification method*	C.I. AR 1275864 Stamp N. S2
Data e luogo di nascita / *Date and Place of Birth*	07/01/1975 Seriate – (BG) / Italia
Datore di lavoro / *Employer*	Coes S.r.l.
Codice/Norma di esame / *Code/Testing Standard*	UNI EN ISO 9606-1:2017; Schema ICIM 0248CS; ☒ ICIM S.p.A. è ON per Direttiva 2014/68/UE – No. Bo. 0425. La presente qualifica soddisfa la direttiva 2014/68/UE- All. I - 3.1.2

Prova supplementare di saldatura ad angolo / *Supplementary fillet weld test*	☐ Sì/*Yes* ☒ No
Conoscenze tecniche / *Job Knowledge*	☐ Accettabile / *Acceptable* ☒ Non sottoposta a prova / *Not Tested*

Variabili / *Variables*	**Dettagli della prova** / *Welding test details*	**Campo di validità** / *Range of approval*
Processo di saldatura / *Welding Process*	141 111	141, 142, 143, 145 111
Modalità di trasferimento / *Transfer Mode*	N.A.	N.A.
Tipo di prodotto / *Product Type – Plate (P) or Pipe (T)*	T	P - T - Branch Connection ≥ 60°
Tipo di saldatura / *Type of weld*	BW	BW
Gruppo del materiale base e sottogruppo / *Parent Material Group(s) and Sub Group(s)*	1.1	N.A.
Materiale d'apporto designazione / *Filler material designation*	141: S 111: B	141: S, M 111: A, B, RA, RB, RC, RR, R
Gruppo materiale d'apporto / *Filler material group*	FM1	FM1, FM2
Gas di protezione / *Shielding gas*	EN ISO 14175 I1	-
Ausiliari / *Auxiliaries (e.g. backing gas)*	-	-
Tipologia di corrente e polarità / *Type of Current and Polarity*	DCEN DCEP	-
Spess. del materiale (mm) / *Material Thickness (mm)*	15 to 30	-
Spessore del materiale depositato (mm) / *Deposited Thickness (mm)*	141: 2 111: 13	141: 2 to 4 111: 3 to 26
Diametro esterno del tubo (mm) / *Pipe outside diameter (mm)*	80	≥ 40
Posizione di saldatura / *Welding positions*	PA	Flat
Dettagli della saldatura / *Weld details*	141: ss nb 111: ss mb	141: ss nb – ss mb – bs – ss gb – ss fb 111: ss mb – bs
Strati multipli/strato singolo / *Multy-layer / single layer*	N.A.	N.A.
Altro / *Other*	N.A.	N.A.

0251CM_09_IT

CERTIFICATO PROVA DI QUALIFICAZIONE DEL SALDATORE
WELDER APPROVAL TEST CERTIFICATE - UNI EN ISO 9606-1

ACCREDIA
PRS N° 082 C
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n°
Certificate No. **ICIM – WAC – 023007 – 00**

Tipo di test *Type of test*	**Eseguite e Accettate** *Performed and Acceptable*	**Non testate** *Not tested*
Esame visivo *Visual testing (UNI EN ISO 17637)*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RPA03	
Esame radiografico *Radiographic testing (UNI EN ISO 17636)* o, se applicabile / *or, if applicable* **Esame ultrasonoro** *Ultrasonic testing (UNI EN ISO 17640)*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RPA03	X
Prova di piegatura *Bend test (UNI EN ISO 5173)* o, se applicabile / *or, if applicable* **Prova di trazione con intaglio** *Notch tensile test*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RPA03	X
Prova di frattura *Fracture test (UNI EN ISO 9017)* o, se applicabile / *or, if applicable* **Esame macrografico** *Macroscopic examination (UNI EN ISO 17639)* o, se applicabile / *or, if applicable*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RPA03	X

Si certifica che il saldatore sopra indicato, usando la procedura di saldatura indicata nel presente modulo, ha soddisfatto i requisiti descritti dalle norme applicate con la seguente Designazione:

We certify that the welder identified above, using the welding procedure given in the present form, has satisfied the requirements described from the applied standards with the following Designation:

UNI EN ISO 9606-1: 2017 – 141 – T – BW – FM1 – S – D80 – s2 – PA – ss nb
UNI EN ISO 9606-1: 2017 – 111 – T – BW – FM1 – B – D80 – s13 – PA – ss mb

Luogo di saldatura *Place of welding*	Data di saldatura *Date of welding*	Esaminatore *Examiner*
Stezzano (BG)	02/11/2020	LAZZARIN Marco – Welding Inspector

Data di delibera ***Date of approval***	**Approvatore** ***Manager***
12/07/2021	*Vincenzo Delacqua* Rappresentante Direzione / Management Representative ICIM S.p.A.

Rivalidazione dopo 3 anni *Revalidation after 3 years*	Valido fino al *Valid until*	Rivalidazione dopo 2 anni *Revalidation after 2 years*	Valido fino al *Valid until*	Rivalidazione dopo 6 mesi *Revalidation after 6 months*	Valido fino al *Valid until*
9.3 a)		**9.3 b)**	01/11/2022	**9.3 c)**	

Applicabile esclusivamente per rivalidazione secondo paragrafi 9.3 b) oppure paragrafo 9.3 c)

Applicable for Revalidation according to sub-clause 9.3 b) or sub-clause 9.3 c)

Per la rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni si prega di fare riferimento all'allegato 0085CM

For the revalidation of the qualification by examining body for the following 2 years please refer to the attachment 0085CM

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi

Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
02/05/2021		Welding Specialist
02/11/2021		Welding Specialist
02/05/2022		Welding Specialist
31/10/22		LAZZARIN MARCO – WELDING INSP.

0251CM_09_IT

Fabbricante *(Manufacturer)*: **Coes S.r.l.**

Certificato n° (*Certificate No.)*: **ICIM – WAC – 023007 – 00**

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
01/05/2023		Welding Specialist
01/11/2023		Welding Specialist
01/05/2024		Welding Specialist

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

ICIM SpA
Piazza Don Enrico Mapelli, 75 - 20099 Sesto San Giovanni (MI) - Tel. +39 02 725341 Fax +39 02 72002098 - www.icim.it - info@icim.it Capitale sociale € 260.000,00 int. versato ed esistente - C.F./P.IVA e Iscriz. Reg. Imprese di Milano n. 12908230159 – R.E.A. n. 1596292

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

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ICIM

CERTIFICATO PROVA DI QUALIFICAZIONE DEL SALDATORE
WELDER APPROVAL TEST CERTIFICATE - UNI EN ISO 9606-1

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO

PRS N° 082 C

Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n° / *Certificate No.*	**ICIM – WAC – 023008 – 00**
Fabbricante / *Manufacturer*	Coes S.r.l.
Indirizzo / *Address*	Via Pontida 265 – Stezzano (BG)
Procedura di Saldatura del Fabbricante n° / *Manufacturer Welding Procedure WPS n°*	04/20-A
Nome del Saldatore / *Welder's Name*	**DELIGIOS Giuliano Gavino**
Metodo di Identificazione / *Identification method*	C.I. CA67930EC Stamp N. S4
Data e luogo di nascita / *Date and Place of Birth*	15/04/1974 Sassari – (SS) / Italia
Datore di lavoro / *Employer*	Coes S.r.l.
Codice/Norma di esame / *Code/Testing Standard*	UNI EN ISO 9606-1:2017; Schema ICIM 0248CS; ☒ ICIM S.p.A. è ON per Direttiva 2014/68/UE – No. Bo. 0425. La presente qualifica soddisfa la direttiva 2014/68/UE- All. I - 3.1.2

Prova supplementare di saldatura ad angolo / *Supplementary fillet weld test* ☐ Sì/*Yes* ☒ No

Conoscenze tecniche / *Job Knowledge* ☐ Accettabile / *Acceptable* ☒ Non sottoposta a prova / *Not Tested*

Variabili *Variables*	**Dettagli della prova** *Welding test details*	**Campo di validità** *Range of approval*
Processo di saldatura *Welding Process*	141 111	141, 142, 143, 145 111
Modalità di trasferimento *Transfer Mode*	N.A.	N.A.
Tipo di prodotto *Product Type – Plate (P) or Pipe (T)*	T	P - T - Branch Connection ≥ 60°
Tipo di saldatura *Type of weld*	BW	BW
Gruppo del materiale base e sottogruppo *Parent Material Group(s) and Sub Group(s)*	1.1	N.A.
Materiale d'apporto designazione *Filler material designation*	141: S 111: B	141: S, M 111: A, B, RA, RB, RC, RR, R
Gruppo materiale d'apporto *Filler material group*	FM1	FM1, FM2
Gas di protezione *Shielding gas*	EN ISO 14175 I1	-
Ausiliari *Auxiliaries (e.g. backing gas)*	-	-
Tipologia di corrente e polarità *Type of Current and Polarity*	DCEN DCEP	-
Spess. del materiale (mm) *Material Thickness (mm)*	15 to 30	-
Spessore del materiale depositato (mm) *Deposited Thickness (mm)*	141: 2 111: 13	141: 2 to 4 111: 3 to 26
Diametro esterno del tubo (mm) *Pipe outside diameter (mm)*	80	≥ 40
Posizione di saldatura *Welding positions*	PA	Flat
Dettagli della saldatura *Weld details*	141: ss nb 111: ss mb	141: ss nb – ss mb – bs – ss gb – ss fb 111: ss mb – bs
Strati multipli/strato singolo *Multy-layer / single layer*	N.A.	N.A.
Altro *Other*	N.A.	N.A.

0251CM_09_IT

CERTIFICATO PROVA DI QUALIFICAZIONE DEL SALDATORE
WELDER APPROVAL TEST CERTIFICATE - UNI EN ISO 9606-1

ACCREDIA
PRS N° 082 C

Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n°
Certificate No. **ICIM – WAC – 023008 – 00**

Tipo di test *Type of test*	**Eseguite e Accettate** *Performed and Acceptable*	**Non testate** *Not tested*
Esame visivo *Visual testing (UNI EN ISO 17637)*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RP07	
Esame radiografico *Radiographic testing (UNI EN ISO 17636)* o, se applicabile / *or, if applicable* **Esame ultrasonoro** *Ultrasonic testing (UNI EN ISO 17640)*	ACCEPTABLE QUALITY CONTROL S.r.l. Report no. 21/0591RP07	X
Prova di piegatura *Bend test (UNI EN ISO 5173)* o, se applicabile / *or, if applicable* **Prova di trazione con intaglio** *Notch tensile test*		X
Prova di frattura *Fracture test (UNI EN ISO 9017)* o, se applicabile / *or, if applicable* **Esame macrografico** *Macroscopic examination (UNI EN ISO 17639)* o, se applicabile / *or, if applicable*		X

Si certifica che il saldatore sopra indicato, usando la procedura di saldatura indicata nel presente modulo, ha soddisfatto i requisiti descritti dalle norme applicate con la seguente Designazione:

We certify that the welder identified above, using the welding procedure given in the present form, has satisfied the requirements described from the applied standards with the following Designation:

UNI EN ISO 9606-1: 2017 – 141 – T – BW – FM1 – S – D80 – s2 – PA – ss nb
UNI EN ISO 9606-1: 2017 – 111 – T – BW – FM1 – B – D80 – s13 – PA – ss mb

Luogo di saldatura *Place of welding*	Data di saldatura *Date of welding*	Esaminatore *Examiner*
Stezzano (BG)	02/11/2020	LAZZARIN Marco – Welding Inspector

Data di delibera ***Date of approval***	**Approvatore** ***Manager***
12/07/2021	*Vincenzo Delacqua* Rappresentante Direzione / Management Representative **ICIM S.p.A.**

Rivalidazione dopo 3 anni *Revalidation after 3 years*	Valido fino al *Valid until*	Rivalidazione dopo 2 anni *Revalidation after 2 years*	Valido fino al *Valid until*	Rivalidazione dopo 6 mesi *Revalidation after 6 months*	Valido fino al *Valid until*
9.3 a)		**9.3 b)**	01/11/2022	**9.3 c)**	

Applicabile esclusivamente per rivalidazione secondo paragrafi 9.3 b) oppure paragrafo 9.3 c)

Applicable for Revalidation according to sub-clause 9.3 b) or sub-clause 9.3 c)

Per la rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni si prega di fare riferimento all'allegato 0085CM

For the revalidation of the qualification by examining body for the following 2 years please refer to the attachment 0085CM

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi

Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
02/05/2021		Welding Specialist
02/11/2021		Welding Specialist
02/05/2022		Welding Specialist
31/10/22		LAZZARIN MARCO – WELDING INSP.

0251CM_09_IT

Fabbricante *(Manufacturer)*: **Coes S.r.l.**

Certificato n° (*Certificate No.)*: **ICIM – WAC – 023008 – 00**

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*
01/05/2023		Welding Specialist
01/11/2023		Welding Specialist
01/05/2024		Welding Specialist

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

ICIM SpA
Piazza Don Enrico Mapelli, 75 - 20099 Sesto San Giovanni (MI) - Tel. +39 02 725341 Fax +39 02 72002098 - www.icim.it - info@icim.it Capitale sociale € 260.000,00 int. versato ed esistente - C.F./P.IVA e Iscriz. Reg. Imprese di Milano n. 12908230159 – R.E.A. n. 1596292

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

Conferma della validità da parte del datore di lavoro/coordinatore della saldatura/ente di esame, per i successivi 6 mesi
Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

Data *Date*	Firma *Signature*	Posizione o Titolo *Position or Title*

Rivalidazione della qualifica da parte dell'ente di esame, per i successivi 2 anni
Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

ICIM SpA
Piazza Don Enrico Mapelli, 75 - 20099 Sesto San Giovanni (MI) - Tel. +39 02 725341 Fax +39 02 72002098 - www.icim.it - info@icim.it Capitale sociale € 260.000,00 int. versato ed esistente - C.F./P.IVA e Iscriz. Reg. Imprese di Milano n. 12908230159 – R.E.A. n. 1596292

ACCREDIA
PRD N° 004 B
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Certificato n° Certificate No.	**ICIM – WPQR – 007096 – 00**
dovFabbricante *Manufacturer*	COES S.r.l.
Indirizzo *Address*	Via Pontida 265, Stezzano (BG)
Procedura di saldatura del Fabbricante n° *Manufacturer Welding Procedure WPS n°*	01/18-A
Codice/Norma *Code/Standard*	UNI EN ISO 15614-1:2019 LIVELLO 1: ☐ LIVELLO 2: ☒
Altro *Other*	☒ ICIM S.p.A. è Organismo Notificato per Direttiva 2014/68/UE – No. Bo. 0425 La presente qualifica soddisfa la direttiva 2014/68/UE- Al. 3.1.2

METODO DI QUALIFICAZIONE ***QUALIFICATION METHOD***	
a) Prova di procedura di saldatura. *a) Welding Procedure test (UNI EN ISO 15614-1)*	X
b) Materiali d'apporto di saldatura sottoposti a prove. *b) Tested welding consumables (UNI EN ISO 15610)*	N.A.
c) Esperienza di saldatura precedente *c) Previous welding experience (UNI EN ISO 15611)*	N.A.
d) Procedura di saldatura di riferimento *d) Standard welding procedure (UNI EN ISO 15612)*	N.A.
e) Prova di saldatura di pre-produzione *e) Pre-production welding test (UNI EN ISO 15613)*	N.A.
Documentazione di riferimento per c) *Reference documentation for c)*	N.A.
Altro *Other*	-

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ACCREDIA
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Certificato n°
Certificate No.

ICIM – WPQR – 007096 – 00

CAMPO DI VALIDITÀ ***RANGE OF APPROVAL***	
Processo di saldatura *Welding process(es)*	141 + 111 + 121
Tipo di giunto e saldatura *Type of Joint and Weld*	BW (P&T): Full penetration and Partial penetration Branch connection with angle ≥ 60° FW (P&T) solo in caso in cui non sia la forma predominante delle saldature di produzione / if not predominant form of production welding
Gruppo del materiale di base e sottogruppo *Parent Material Group(s) and Sub Group(s)*	1.2 to 1.2
Spessore materiale base (mm) *Parent Material Thickness (mm)*	BW: 20 ÷ 80 FW: ≥ 5
Materiale di saldatura depositato (mm) *Weld Metal Thickness (mm)*	141: ≤ 4 111: ≤ 8 121: ≤ 80
Altezza di gola (mm) *Throat Thickness (mm)*	Nessuna restrizione - No restriction
Passata singola / Multipla *Single run / Multi run*	Multipla – Multi run
Diametro esterno tubo (mm) *Pipe Outside Diameter (mm)*	> 500 mm > 150 mm in PC, in PF or in PA rotated position
Materiale d'apporto Designazione/Produttore/Dimensioni *Filler Material Designation/Make/Size*	Materiali d'apporto in accordo alla designazione impiegata o che hanno proprietà meccaniche equivalenti, stessa tipologia di rivestimento, stessa composizione chimica nominale e stesso o minore contenuto di idrogeno. Nessuna limitazione sul diametro del materiale d'apporto (requisiti di resilienza e durezza non richiesti). Filler materials according to the employed designation or they have equivalent mechanical properties, same type of covering or flux core, same nominal chemical composition and same or lower hydrogen content. There is no limitation on filler material size (impact and hardness requirements not applied).
Tipo di gas / Flusso di protezione *Designation of Shielding Gas/Flux*	EN ISO 14175: I1 (Ar 99,99%)
Tipo di gas di protezione al rovescio *Designation of Backing Gas*	N.A.
Tipologia di corrente di saldatura e polarità *Type of Welding Current and Polarity*	141: DC EN 111 - 121: DC EP
Modalità di trasferimento del metallo d'apporto *Mode of Metal Transfer*	N.A.
Apporto Termico (kJ/mm) *Heat input (kJ/mm)*	141: 1,11 ± 25% 111: 1,29 ± 25% 121: 1,71 ± 25%
Posizione di saldatura *Welding position*	Tutte le posizioni eccetto PG, PJ e J-L045 All position except PG, PJ and J-L045
Temperatura di preriscaldo (°C) *Preheat Temperature (°C)*	≥ 10
Temperatura Interpass (°C) *Interpass Temperature (°C)*	≤ 250
Post-Riscaldo (°C – holding time) *Post-Heating (°C – holding time)*	N.A.
Trattamento Termico dopo Saldatura (°C – holding time) *Post Weld Heat Treatment PWHT (°C – holding time)*	N.A.
Grado di meccanizzazione *Degree of mechanization*	141 – 111: Manuale – Manual 121: Completamente meccanizzato / Fully Mechanized
Altre informazioni *Other information*	-

Si certifica che la procedura di saldatura sopra definita ha soddisfatto i requisiti delle norme e di altri documenti indicati.
We certify that the welding procedure described above has satisfied the requirement of the code/testing standard indicated.

Data di emissione *Date of issue*	Fabbricante *Manufacturer*	Esaminatore *Examiner*
22 marzo 2019	COES S.r.l.	LAZZARIN MARCO – ICIM Welding Inspector

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ACCREDIA
PRD N° 004 B
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

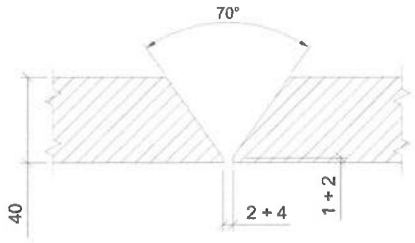
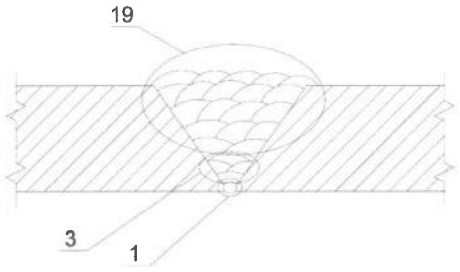
Certificato n°
Certificate No. **ICIM – WPQR – 007096 – 00**

PROCEDURA DI SALDATURA/WELDING PROCEDURE

Procedura di saldatura del Fabbricante n° *Manufacturer Welding Procedure WPS n°*	01/18-A
Fabbricante *Manufacturer*	COES S.r.l.

Processo di saldatura *Welding process*	141 + 111 + 121
Tipo *Type*	141 – 111: Manuale – Manual 121: Completamente meccanizzato / Fully Mechanized
Dettagli della procedura di saldatura *Welding Procedure Details*	Vedere di seguito / See below

DATI DEL GIUNTO/*JOINT DATA*

Tipo di giunto *Joint Type*	Giunto di testa su lamiera a piena penetrazione / Butt joint in plate with full penetration
Geometria del giunto *Joint Design*	
Sequenza di saldatura *Welding sequence*	

DETTAGLI DI SALDATURA/*WELDING DETAILS*

Passate *Run*	Processo *Process*	Dim. Metallo d'apporto *Size of Filler Metal*	Amperaggio *Current* (A)	Tensione *Voltage* (V)	Polarità corrente *Current Polarity*	Velocità di avanzamento filo *Wire Feed* (m/min)	Vel. di saldatura *Travel Speed* (mm/min)	apporto termico *Heat Input* (kJ/mm)	Modalità di trasferimento del metallo d'apporto *Mode of Metal Transfer*
1	141	2,4	165	15	DCEN	N.A.	80	1,11	N.A.
2 - 4	111	3,2	140	23	DCEP	N.A.	120	1,29	N.A.
5 – 23	121	3,2	450	31	DCEP	2	490	1,71	N.A.

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PRD N° 004 B
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Certificato n°
Certificate No. **ICIM – WPQR – 007096 – 00**

MATERIALI BASE/PARENT METAL						
Specifica materiali di base *Parent Metal Specification*	SA-516 Gr.70			-		
Gruppo di materiali di base *Parent Metal Group*	1			-		
Spessori Materiale di Base (mm) *Parent Metal Thickness (mm)*	40	-	Diametro esterno tubo (mm) *Pipe outside Diameter (mm)*	-	-	
Altro *Other*	Heat no. 1NX086 con contenuto di carbonio ≤ 0.25					

MATERIALE DI APPORTO/FILLER METAL			
Tipo *Type*	EN ISO 636-A W 46 5 W2Si EN ISO 2560-A: E 42 5 B 4 2 H5 EN ISO 14171-A: S 38 4 AB S2	Dimensione/Forma *Size/shape*	Solid rod ø 2,4 mm Basic electrode ø 3,2 Solid Wire ø 3,2
Tipo e specifica *Trade name and specification*	EML 5 (Bohler) FOX EV 50 (Bohler) OK Autrod 12.20 (Esab)	Analisi chimica (%) *Chemical Analisys (%)*	-
Metodo di alimentazione *Method of applying filler metal*	Manuale – Manual Completamente meccanizzato / Fully Mechanized		
Precauzioni di essiccamento o ricottura *Any special Baking or Drying*	N.A.		
Elettrodo di tungsteno Tipo/Dim. *Tungsten electrode Type/Size*	EN ISO 6848 WLa 20 ø2,4 mm		
Altro *Other*	Flusso per 121: Designation: EN ISO 14174: S A AB 1 67 AC H5 Manufacturer/trade name: Esab/OK Flux 10.71		

FLUSSO/FLUX			
Tipo gas *Gas Type*	EN ISO 14175: I1		
Gas di Schermatura *Gas - Shielding*	Ar 99,99%	Gas di Sostegno *Gas – Backing*	-
Velocità di flusso del gas di Schermatura *Gas Flow Rate – Shielding*	10 l/min	Velocità di flusso del gas di sostegno *Gas Flow Rate – Backing*	-
Altro *Other*	-		

SALDATURA/WELDING	
Attrezzature di fissaggio *Fixture details*	Puntatura / Tack weld
Posizione di saldatura *Welding position*	PA
Preparazione della saldatura *Welding Preparation*	Di macchina / Machining
Grado di meccanizzazione *Degree of mechanization*	141 – 111: Manuale – Manual 121: Completamente meccanizzato / Fully Mechanized
Dettagli sulla solcatura al rovescio *Details of Bach Gouging*	N.A.
Dettagli sostegno *Details of Backing*	Senza sostegno / No backing
Metodo di pulitura prima della saldatura *Method of cleaning before welding*	Spazzolatura e molatura / brushing and grinding

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SALDATURA/WELDING				
Modalità di trasferimento del metallo *Mode of Metal Transfer*	N.A.			
Temperatura di preriscaldo (°C) *Preheat temperature (°C)*	15			
Temperatura di passaggio intermedio (°C) *Interpass temperature (°C)*	250			
Oscillazione *Welding Weaving*	NO			
Oscillazione: Larghezza massima *Welding Weaving : Max Width*	N.A.			
Oscillazione: Ampiezza *Welding Weaving: Oscillation amplitude*	N.A.			
Oscillazione: Frequenza *Welding Weaving: Oscillation frequency*	N.A.			
Oscillazione: Tempo di stazionamento *Welding Weaving: Oscillation dwell time*	N.A.			
Oscillazione: Dettagli corrente pulsate *Welding Weaving: Pulse welding details*	N.A.			
Oscillazione: Distanza guidafilo/pezzo *Welding Weaving: Stand off distance*	N.A.			
Dettagli saldatura plasma *Plasma welding details*	N.A.			
Inclinazione torcia *Torch angle*	N.A.			
Metodo di pulitura dopo la saldatura *Method of cleaning after welding*	Spazzolatura / brushing			
Tratt.termico post saldatura: *Post welding heat treatment:*	Temperatura (°C) *Temperature (°C)*	-	Metodo *Method*	-
	Gradiente (°C/h) *H/C rate (°C/h)*	-	Tempo *Time*	-
Altro *Other*	-			

Data di emissione *Date of issue*	Fabbricante *Manufacturer*	Esaminatore *Examiner*
22 marzo 2019	COES S.r.l.	LAZZARIN MARCO – ICIM Welding Inspector

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RISULTATI DELLA PROVA/TEST RESULTS

Procedura di saldatura del Fabbricante n° *Manufacturer Welding Procedure WPS no.*	01/18-A
Fabbricante *Manufacturer*	COES S.r.l.

Data esecuzione *Date of welding*	6 marzo 2019	Luogo *Location*	Stezzano (BG)
Nome del saldatore *Welder Name*		Deligios Giuliano Gavino	
Identificativo saldatore *Welder's stamp*		S4	
Altro *Other*		-	

Temperatura di ambiente (°C) *Workspace temperature (°C)*	15
Altro *Other*	-

PROVE NON DISTRUTTIVE (UNI EN 15614-X) /*NON DESTRUCTIVE TESTING*

Tipo di test *Type of test*	Eseguite da *Performed by*	Esito *Result*	Numero certificato *Certificate number*	Data *Date*
Esame visivo *Visual examination*	QUALITY CONTROL S.r.l.	ACCETTABILE	19/0483RP01	22/03/2019
Prova liquidi penetranti *Penetrant test*	QUALITY CONTROL S.r.l.	ACCETTABILE	19/0483RP01	22/03/2019
Prova particelle magnetiche *Magnetic Particle test*	-	-	-	-
Esame radiografico *Radiography*	QUALITY CONTROL S.r.l.	ACCETTABILE	19/0483RP01	22/03/2019
Esame ultrasonoro *Ultrasonic examination*	-	-	-	-
Altro *Other*	-	-	-	-

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Certificato n°
Certificate No.

ICIM – WPQR – 007096 – 00

PROVE DISTRUTTIVE (UNI EN 15614-1) /*DESTRUCTIVE TESTING*

Prova a trazione *Tensile Tests*	Eseguita da *Performed by*	QUALITY CONTROL S.r.l.	Cert.N° *Cert.No.*	19/0483RP01	Data *Date*	22/03/2019

Test specimen	Test specimen Section dimension [mm]		Test Temp. [°C]	Rm [N/mm²]	Re [N/mm²]	A %	Z %	Fracture location		Remarks
	Transversal, acting on			Cylindrical specimen only						
	All thk.	Part of thk.		Requirements				Base metal	Weld metal	
				≥ 485	N.A.	N.A.	N.A.			
483A 1 Top	-	30,10 x 25,06	22	525	-	-	-	X	-	Ductile fracture
483A 1 Bottom	-	30,00 x 25,05	22	530	-	-	-	X	-	Ductile fracture
483A 2 Top	-	29,89 x 25,07	22	519	-	-	-	X	-	Ductile fracture
483A 2 Bottom	-	30,15 x 25,11	22	526	-	-	-	X	-	Ductile fracture

Prova di piegamento *Bend Tests*	Eseguita da *Performed by*	QUALITY CONTROL S.r.l.	Cert.N° *Cert.No.*	19/0483RP01	Data *Date*	22/03/2019

Test specimen	Test specimen		Bend Angle	ø Former (mm)	Direction of bending and Elongation*				Results Remarks
	Trans.	Long.			Face Bend Test	Rev. Bend Test	Side Bend acting on		
							All thk.	Part of thk	
483A 1	X	-	180°	40	-	-	-	X	SATISFACTORY
483A 2	X	-	180°	40	-	-	-	X	SATISFACTORY
483A 3	X	-	180°	40	-	-	-	X	SATISFACTORY
483A 4	X	-	180°	40	-	-	-	X	SATISFACTORY

Prova di resilienza *Impact Tests*	Eseguita da *Performed by*	QUALITY CONTROL S.r.l.	*Cert.N° Cert.No.*	19/0483RP01	Data *Date*	22/03/2019

Test specimen	Test specimen		Test Temp. [°C]	Charpy V - Values [J]						Remarks
	Size [mm]	Location		Single Values			Avg.	Requirements		
								Min.	Avg.	
483A 121	10 x 10	VWT 0/0,5	-46	35	43	30	36	27	27	-
483A 121	10 x 10	VHT 1,5/0,5	-46	194	209	207	203,3	27	27	-
483A 141+111	10 x 10	VWT 0/28,5	-46	33	34	36	34,3	27	27	-
483A 141+111	10 x 10	VHT 1,5/28,5	-46	184	180	182	182	27	27	-

Prova di durezza *Hardness Tests*	Eseguita da *Performed by*	QUALITY CONTROL S.r.l.	Certi.N° Cert.No	19/0483RP01	Data *Date*	22/03/2019

Type / Load	Requirements		Min. ÷ Max. Values					Remarks
	Single run	Multi run	B.M. (1)	H.A.Z. (1)	W.M.	H.A.Z. (2)	B.M. (2)	
HV_{10}	-	380 HV	159-156-161	178-195-253	223-203-205	258-229-190	165-162-159	-
HV_{10}	-	380 HV	158-160-149	174-185-218	194-199-197	245-200-184	160-153-156	-
HV_{10}	-	380 HV	155-154-156	175-182-210	178-175-175	198-192-178	151-154-151	-

Altre prove *Other Tests**	Eseguita da *Performed by*	Esito *Result*	Certificato N° *Certificate(s) No.*	Data *Date*
Macro examination	QUALITY CONTROL S.r.l.	ACCETTABILE	19/0483RP01	22/03/2019
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

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RAPPORTI DI PROVA DEL LABORATORIO/*LABORATORY REPORT*	
Il testo è stato eseguito conformemente ai requisiti di *Test carried out in accordance with the requirement of*	UNI EN ISO 15614-1 Ed.2019
Riferimento rapporti di laboratorio n° *Laboratory report reference n°*	QUALITY CONTROL S.r.l. test report no. 19/0483RP01
Allegati *Annex*	QUALITY CONTROL S.r.l. test reports
Le prove sono state effettuate alla presenza di: *Tests carried out in the presence of:*	LAZZARIN MARCO – ICIM Welding Inspector
I risultati delle prove sono ***Test results were***	**ACCETTABILI - *ACCEPTABLE***
Altro *Other*	-

Data di emissione *Date of issue*	Fabbricante *Manufacturer*	Esaminatore *Examiner*
22 marzo 2019	COES S.r.l.	LAZZARIN MARCO – ICIM Welding Inspector

Data di delibera ***Date of approval***	**Approvatore** ***Manager***
12/07/2021	*Vincenzo Delacqua* Rappresentante Direzione / Management Representative **ICIM S.p.A.**

Luogo *Location*
Sesto San Giovanni (MI)

0253CM_06_IT

QUALITY CONTROL

LABORATORIO DI PROVE E CONTROLLI SU MATERIALI METALLICI E GIUNTI DI SALDATURA

RAPPORTO DI PROVA N. *Test Report No.*	19/0483RP01	DATA *Date*	22/03/2019	CAMPIONE N. *Sample No.*	483A	PAGINA *Page*	1	DI *of*	9

ORDINE / *Order* N° 745/19
Data ordine / Order date 01/03/2019
RIFERIMENTO / *Reference* ---
Data riferimento / Reference date ---
DATA DI RICEZIONE *Material received on* 07/03/2019

CLIENTE / Customer

COES S.r.l.
Via Pontida, 265
24040 Stezzano (BG)

OGGETTO *Subject*

Welding Procedure Qualification Record W.P.Q.R. n.: **01/18-A**
Plate Thk. 40,0 mm
Welding process: 141+111+121 (MANUAL + MECHANIZED)
Joint Type: BW
Welding Position: PA
WPS n.: 01/18-A
Welder: DELIGIOS GIULIANO GAVINO (STAMP N°S4)
Job 597/18

MATERIALE *Material* ASME SA516 GR.70

COLATA *Heat* ---

PRODUTTORE *Supplier* --- **CERTIFICATO** *Certificate* --- **DATA** *Date* ---

NORME DI COLLAUDO *Test Specification* EN ISO 15614-1: 2017 Level 2

ELENCO DELLE PROVE / List of tests		Metodo / *Method*	Saggio / *Test*	Pagina / *Sheet*
☑	Visivo / *Visual*	UNI EN ISO 17637	483A	2
☑	Esame mediante liquidi penetranti / *Dye penetrant test*	UNI EN ISO 3452-1	483A	3
☑	Esame radiografico / *Radiographic test*	UNI EN ISO 17636-1	483A	4
☑	Trazione trasversale / *Tensile test*	UNI EN ISO 4136	483A	5
☑	Pieghe / *Bend test*	UNI EN ISO 5173	483A	6
☑	Prova di resilienza su giunti saldati *Destr. tests. on welds - Impact test*	UNI EN ISO 9016	483A	7
☑	Esame macroscopico / *Macroscopic examination*	UNI EN ISO 17639	483A	8
☑	Prova di durezza / *Vickers hardness test*	UNI EN ISO 9015-1	483A	9

La firma digitale del documento o la firma su esemplare cartaceo in questa pagina di copertina attesta il controllo e l'approvazione dei risultati del test riportati nelle tabelle seguenti / *The file digital signature or the signature on paper in this cover page attests control and approval of test results reported in the following tables*

Il presente rapporto di prova riguarda esclusivamente il campione esaminato, non può essere riprodotto neanche parzialmente senza l'autorizzazione del Laboratorio. La copia conforme all'originale è conservata nell'archivio del Laboratorio. I tempi di conservazione dei rapporti, dei documenti e delle parti dei saggi e delle provette sono riportate nel sito web www.qualitycontrolsrl.it. / *This test report only concerns the examined sample, it cannot be even partially reproduced without the authorization of the Laboratory. The true copy of the original is stored in the archive of the Laboratory. The storage times of reports, documents and parts of the sample and the test piece are shown in www.qualitycontrolsrl.it websit*

Ente di Collaudo / Surveyor

ICIM S.p.A. No. Bo-0425 Reviewed Witnessed 22/3/19

Quality Control Group S.r.l.

Dott. Ing. VALERIO COLOMBO

ESAME VISIVO - UNI EN ISO 17637:2011
Visual test – UNI EN ISO 17637:2011

Standard di riferimento *Reference standard*	UNI EN ISO 17637
Criterio di accettabilità *Acceptance criteria*	UNI EN ISO 5817 Lev. B
Stadio di lavorazione *Working step*	AFTER WELDING
Condizioni superficiali *Surface conditions*	AS WELDED

TECNICA *TECHNIQUE*		
■ Esame diretto / *Direct examination*	□ Esame indiretto / *Remote examination*	
Pulizia iniziale della superficie / *Starting surface Cleaning*		BRUSHING
Distanza massima occhio-oggetto / *Maximum distance eye-object (cm)*		60
Intensità di luce / *light intensity (lux)*		>1000 Lux
Strumento di illuminazione / *Lighting equipment*		NATURAL

STRUMENTI UTILIZZATI *USED EQUIPMENTS*			
	Tipo / *Type*	**Costruttore** / *Manufacturer*	**Matricola** / *Serial Number*
□	Endoscopio / *Boroscope*		
■	Calibro Cambridge / *Cambridge Caliper*	The welding institute	(SA112)
■	Luxmetro / *Luxmeter*	Delta Ohm HD2302.0	16001682 (SA132)
□			

Data inizio prova *Test start date*	12/03/2019	Data fine prova *Test end date*	12/03/2019	Apparecchiatura *Equipment*	---

NOTA / *Note:* l'esame non ha evidenziato indicazioni / *examination has not shown indications.*

Ente di Controllo / Surveyor

CIM S.p.A. No. Bo. 0025 Reviewed Written 22/3/19

Quality Control Group S.r.l.

CIMINO EMILIO Liv. 2 - EN 473 / ISO 9712 IP Liv. SNT-TC-1A RT - PT - MT - UT - VT

Dott. Ing. VITTORIO COLOMBO

ESAME MEDIANTE LIQUIDI PENETRANTI – UNI EN ISO 3452-1:2013
Dye penetrant test – UNI EN ISO 3452-1:2013

Standard di riferimento *Reference standard*	UNI EN ISO 3452-1
Criterio di accettabilità *Acceptance criteria*	UNI EN ISO 23277
Stadio di lavorazione *Working step*	AFTER WELDING

TECNICA / *TECHNIQUE*			
■	Contrasto di colore / *Color contrast*	□	Fluorescente / *Fluorescent*
■	Lavabile in acqua / *Water washable*	□	Lavabile con solvente / *Solvent removable*

Pulizia iniziale della superficie / *Starting surface Cleaning*	Cleaner spray
Metodo applicazione del penetrante / *Dye penetrant application method*	Spray
Tempo min-max di penetrazione / *Min-max penetration time* (min.)	15-20
Metodo rimozione del penetrante / *Penetrant removing method*	Water rinsing
Metodo asciugatura / *Drying method*	Cloths and air flow
Tempo asciugatura / *Drying Time* (min.)	5
Metodo applicazione sviluppatore / *Developer application method*	Spray
Tempo min-max di sviluppo / *Min-max developing time* (min.)	10-60
Temperatura / *Temperature* (°C)	18°C
Strumento di illuminazione / *Lighting equipment*	Bulb lamp 100 W
Intensità di luce sulla superficie / *Light intensity on the surface*	>1000 LUX

PRODOTTI UTILIZZATI / *USED MATERIALS*			
	Produttore / *Manufacturer*	**Tipo** / *Type*	**Lotto** / *Lot*
Sgrassante / *Cleaner*	NDT-ELITE'	BC1	B160101s
Penetrante / *Penetrant*	NDT-ELITE'	K71B 2p	150907Ps
Pulitore / *Remover*	Water	—	—
Sviluppatore / *Developer*	NDT-ELITE'	D112A	160210Ws

Data inizio prova *Test start date*	12/03/2019	Data fine prova *Test end date*	12/03/2019	Apparecchiatura *Equipment*	—

Nota / Note: l'esame non ha evidenziato indicazioni / *Examination has not shown indications.*

Ente di Collaudo / Surveyor

ICIM S.p.A. No. Bo. 0425 Reviewer Witness 22/3/19

Quality Control Group S.r.l.

CIMINO EMILIO Liv. 2 - EN 473 / ISO 9712 IIW Liv. SNT-TC-1A RT - PT - MT - UT - VT

Dott. Ing. UMBERTO COLOMBO

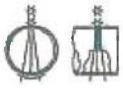
ESAME RADIOGRAFICO – UNI EN ISO 17636-1:2013
Radiographic test according – UNI EN ISO 17636-1:2013

Standard di riferimento *Reference standard*	UNI EN ISO 17636-1:2013		
Criterio di accettabilità *Acceptance criteria*	UNI EN ISO 10675/UNI EN ISO 19232	**Stadio di lavorazione** *Working step*	AS WELDED

TECNICA DI ESPOSIZIONE / *Exposure technique*


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PARAMETRI DEL TEST / *Test parameters*

Spess. nominale di parete (mm) *Nominal single wall thickness*	40	Spessore rinf. di sald. (mm) *Welding reinforcement thickness*	2	Numero di esposizioni *Exposure number*	1
Distanza fuoco-oggetto (mm) *Source to object distance*	700	Distanza oggetto film (mm) *Object to film distance*	42	Nr. Films per cassetta *Film for each holder*	1
Costruttore della sorgente *Source manufacturer*	SEIFERT	Tipo di sorgente *Source type*	RX	Identificazione *Source identification*	SA151
Attività (Ci) *Activity*	—	Energia della radiazione (KV) *Radiation Energy*	290	Intens. radiazione (mA) *Radiation intensity*	3
Tempo di esposizione (minuti) *Exposure time*	2'48"	Macchia focale (mm) *Focal spot size*	3	Penombra *Ug*	0,06
Tipo di penetrametro *Penetrameter type*	10FeEN	Posizione del penetrametro *Penetrameter location*	SOURCE	Filo/Foro richiesto *Required wire/hole*	W10
Produttore film *Film manufacturer*	AGFA GEVAERT	Tipo di film *Film type*	D7	Dimensioni (cm) *Film size*	10x48

Tecnica di esposizione *Exposure technique*	☒ Parete sing. *Single wall*	☐ Parete dop. *Double wall*	Tecnica di lettura *Viewing technique*	☒ Parete sing. *Single wall*	☐ Parete dop. *Double wall*		
Tipo schermi intensificatori *Intensifying screen type*	☒ Pb	☐ Cu	Spessore schermi (mm) *Screen thickness*	Ant.	0,05	Post.	0,10
Trattamento del film *Film treatment*	☒ Automatico *Automatic*	☐ Manuale *Manual*					

LEGENDA

C	Conforme *Conforming*	R	Non conforme *Not conforming*	RRX	Ripetere esposizione *Exposure to be repeated*
D*	Densità misurata *Measured density*	S*	Filo/Foro rilevato *Wire/Hole detected*	G*	Giudizio *Evaluation*

VALUTAZIONE / *EVALUATION*

Tallone *Coupon*	Tratto *Area*	Discontinuità *Discontinuity*	D*	S*	G*	Tallone *Coupon*	Tratto *Area*	Discontinuità *Discontinuity*	D*	S*	G*
	1-2	-----	2,8	W12	C						

CLASSIFICAZIONE DELLE DISCONTINUITÁ
DISCONTINUITY CLASSIFICATION

101	Cricca longitudinale *Longitudinal crack*	2014	Porosità allineate *Linear Porosity*	304	Inclusioni metalliche *Metallic inclusion*	504	Eccesso di penetrazione *Excessive penetration*
102	Cricca trasversale *Transversal crack*	2015 2016	Cavità allungate e tarli *Elongated cavities and wormholes*	C 401	Mancanza di fusione *Lack of fusion*	601	Colpo d'arco *Stray arc*
104	Cricca di cratere *Crater crack*	202	Cavità di ritiro *Shrinkage cavity*	D 402	Mancanza di penetrazione *Lack of penetration*	602	Spruzzi *Spatter*
2011 2012	Porosità *Porosity and gas pores*	2024	Crateri di ritiro *Crater pipe*	5011 5012	Incisione cont. e interm. *Undercut continues and intermit.*	SCR	Difetto schermo *Screen defect*
2013	Gruppi di porosità *Clustered Porosity*	301 302	Inclusioni di scoria o flusso *Slag or flux inclusion*	515	Insellamento *Root concavity*	F	Difetto film *Film defect*

Data inizio prova *Test start date*	12/03/2019	Data fine prova *Test end date*	12/03/2019	Apparecchiatura *Equipment*	---

NOTA / *Note:* l'esame non ha evidenziato indicazioni / *The examination has not shown indications.*

Ente di Collaudo / Surveyor

ICIM S.p.A. No. Bo. 1415 Reviewed Without 22/03/19

Quality Control Group S.r.l.

CHIMICO E.L.I.B. Liv. 3 - EN 473 - ISO 9712 II° Liv. SETTORE 1A RT - ET - MT - UT - VT

Dott. Ing. VALERIO COLOMBO

PROVA DI TRAZIONE TRASVERSALE SU GIUNTI SALDATI – UNI EN ISO 4136: 2012
Transverse tensile test on welded joint – UNI EN ISO 4136: 2012

ID. SAGGIO *Identification test*		DIMENSIONE PROVETTA *Specimen size*			CARICO DI ROTTURA *Tensile strength*		Posizione di rottura *Fracture location*		Aspetto della frattura *Fracture appearance*		Temp.
PROVA *Test No.*	SENSO *Direction*	SPESS. *Thick.*	LARGH. *Width*	AREA *Area*	F_m N	R_m N/mm²	In saldatura *In weld*	Fuori saldatura *Out of weld*	Duttile *Ductile*	Fragile *Fragile*	°C
		mm	mm	mm	---	≥ 485					
483A 1 TOP	T	30,10	25,06	754,3	396.000	525	---	X	---	X	+22
483A 1 BOTTOM	T	30,00	25,05	751,5	398.000	530	---	X	---	X	+22
483A 2 TOP	T	29,89	25,07	749,3	389.000	519	---	X	---	X	+22
483A 2 BOTTOM	T	30,15	25,11	757,1	398.000	526	---	X	---	X	+22

Data inizio prova *Test start date*	22/03/2019	Data fine prova *Test end date*	22/03/2019	Apparecchiatura *Equipment*	QC 355

Nota / *Note*: i risultati di prova sono conformi ai requisiti previsti per il giunto di saldatura dalla normativa EN ISO 15614-1: 2017 Level 2 con riferimento, per i requisiti del materiale, alla normativa ASME SA516 / *The test results are conform to the requirements of standard EN ISO 15614-1: 2017 Level 2 for the welded joint and of ASME SA516 for material requirements.*

Ente di Collaudo / Surveyor

ICIM S.p.A. No. Bo. 0425 Reviewed Witnessed 22/03/19

Quality Control Group S.r.l.

Dott. Ing. VALERIO COLOMBO

RAPPORTO DI PROVA N. *Test Report No.*	19/0483RP01	DATA *Date*	22/03/2019	CAMPIONE N. *Sample No.*	483A	PAGINA *Page*	6	DI *of*	9

PROVA DI PIEGAMENTO SU GIUNTI SALDATI – UNI EN ISO 5173: 2012
Bend test on welded joint – UNI EN ISO 5173: 2012

SAGGIO *Identification*		DIMENSIONE PROVETTA *Size*			CARATTERISTICHE E RISULTATI DELLA PROVA DI PIEGA *Features and bend test results*				
Prova N. *Test No.*	Senso *Direction*	Spessore *Thickness* mm	Larghezza *Width* mm	Lunghezza *Length* mm	Tipo *Type*	Mandrino *Former* Ø mm	Dist.appoggi *Rolls dist.* mm	Angolo *Bend Angle*	Risultato *Result*
483A 1	T	10,04	41,1	296	SIDE	40	63	180	Assenza di difetti *Absence of defects*
483A 2	T	10,05	41,0	296	SIDE	40	63	180	Assenza di difetti *Absence of defects*
483A 3	T	10,03	40,8	296	SIDE	40	63	180	Assenza di difetti *Absence of defects*
483A 4	T	10,10	41,1	296	SIDE	40	63	180	Assenza di difetti *Absence of defects*

Data inizio prova *Test start date*	22/03/2019	Data fine prova *Test end date*	22/03/2019	Apparecchiatura *Equipment*	QC 355

Nota / *Note:* i risultati di prova sono conformi ai requisiti previsti dalla normativa EN ISO 15614-1: 2017 Level 2 / *The test results are conform to the requirements of standard EN ISO 15614-1: 2017 Level 2*

Ente di Collaudo / Surveyor

ICIM S.p.A. No. Bo. 0125 Reviewed Witnessed 22/03/19

Quality Control Group S.r.l.

Dott. Ing. VALERIO COLOMBO

RAPPORTO DI PROVA N. *Test Report No.*	19/0483RP01	DATA *Date*	22/03/2019	CAMPIONE N. *Sample No.*	483A	PAGINA *Page*	7	DI *of*	9

PROVA DI RESILIENZA SU GIUNTI SALDATI – UNI EN ISO 9016: 2012
Charpy impact test on welded joints – UNI EN ISO 9016: 2012

SAGGIO *Test* No.	SENSO *Direct.*	POSIZIONE *Position*	TIPO *Type*	TEMP. °C	DIMENS. *Size* mm	VALORI *Single values* ≥ 27 J 1	2	3	MEDIA *Average* ≥ 27 J	ESPANSIONE LATERALE *Lateral Expansion* mm 1	2	3	AREA DUTTILE *Shear Area* ≥ % 1	2	3
483A PROC.121	T	VWT 0/0,5	KV_2	-46	10x10	35	43	30	36,0	---	---	---	---	---	---
483A PROC.121	T	VHT 1,5/0,5	KV_2	-46	10x10	194	209	207	203,3	---	---	---	---	---	---
483A PROC.111+ 141	T	VWT 0/28,5	KV_2	-46	10x10	33	34	36	34,3	---	---	---	---	---	---
483A PROC. 111+141	T	VHT 1,5/28,5	KV_2	-46	10x10	184	180	182	182,0	---	---	---	---	---	---

Data inizio prova *Test start date*	22/03/2019	Data fine prova *Test end date*	22/03/2019	Apparecchiatura *Equipment*	QC 378

Nota / *Note*: *Conform/Conform*

Ente di Collaudo / Surveyor

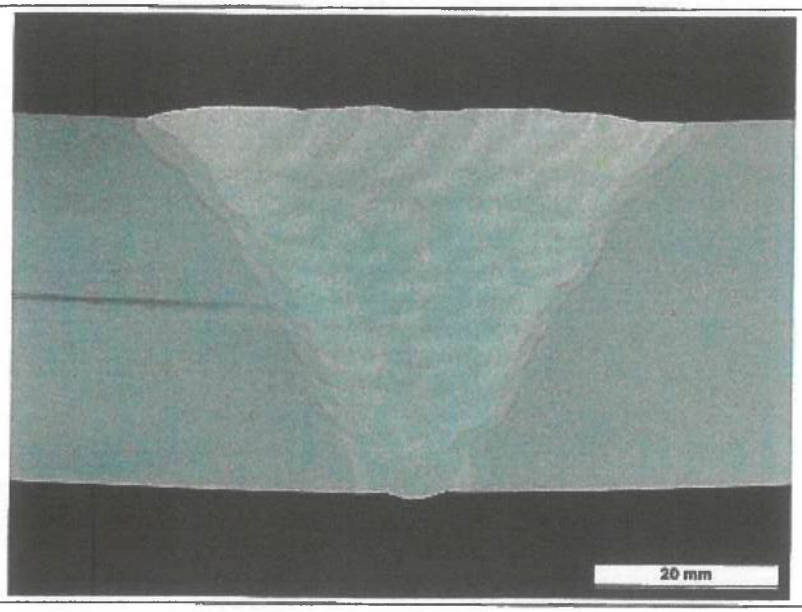
RINA S.p.A. No. Bo. 0125 Reviewed Witnessed 22/03/19

Quality Control Group S.r.l.

Dott. Ing. Valerio COLOMBO

ESAME MACROSCOPICO SU GIUNTI SALDATI – UNI EN ISO 17639: 2013

Macroscopic examination on welds – UNI EN ISO 17639: 2013



Provetta n. *Test Specimen No.*	**483.A**
Attacco *Etchant*	Nital 5%
Direzione di prelievo *Direction of sampling*	Trasversale *Transverse*

Data inizio prova *Test start date*	22/03/2019	Data fine prova *Test end date*	22/03/2019	Apparecchiatura *Equipment*	QC 401

Nota / *Note:* L'esame visivo ad ingrandimento 10X non ha evidenziato difetti. / *Visual inspection at 10X magnification has shown no defects.*

Ente di Collaudo / Surveyor

ICIM S.P.A. No. Bo. 0425 Reviewed Witness 22/3/19

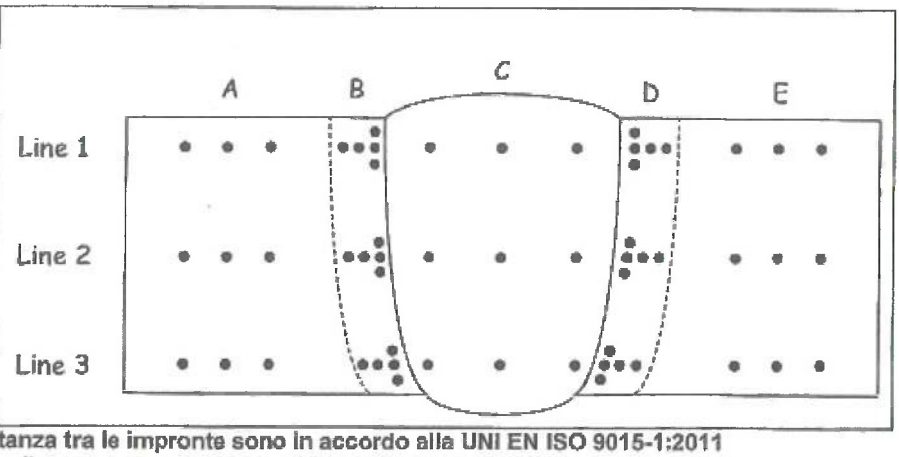
Quality Control Group S.r.l.

Dott. Ing. VALERIO COLOMBO

RAPPORTO DI PROVA N. *Test Report No.*	19/0483RP01	DATA *Date*	22/03/2019	CAMPIONE N. *Sample No.*	483A	PAGINA *Page*	9	DI *of*	9

PROVA DI DUREZZA VICKERS SU GIUNTI SALDATI – UNI EN ISO 9015-1: 2011
Weld joints hardness testing – UNI EN ISO 9015-1: 2011

SAGGIO *Test*	**483.A**
TIPO DI DUREZZA *Hardness type*	HV_{10}
VALORE MAX *Required value*	380 HV_{10}



Lo schema delle impronte di durezza e la distanza tra le impronte sono in accordo alla UNI EN ISO 9015-1:2011
The hardness indentation sketch and indentation distance are according to UNI EN ISO 9015-1:2011

Posizione/*position*		A (BM)	B (HAZ)	C (WM)	D (HAZ)	E (BM)
Trasversale *Transverse*	Linea 1 *Line 1*	159-156-161	231 178-195-253 225	223-203-205	258 252-229-190 235	165-162-159
	Linea 2 *Line 2*	158-160-149	218 174-185-205 207	194-199-197	234 245-200-184 206	160-153-156
	Linea 3 *Line 3*	155-154-156	197 175-182-205 210	178-175-175	197 198-192-178 196	151-154-151

Data inizio prova *Test start date*	22/03/2019	Data fine prova *Test end date*	22/03/2019	Apparecchiatura *Equipment*	QC 371

Nota / *Note: Conforme / Conform*

Ente di Collaudo / Surveyor

ICIM S.p.A. No. Bo. 0435 Reviewed Witnessed 22/03/19

Quality Control Group S.r.l.

Dott. Ing. VALERIO COLOMBO

QUALITY CONTROL

LABORATORIO DI PROVE E CONTROLLI SU MATERIALI METALLICI E GIUNTI DI SALDATURA

RAPPORTO DI PROVA N. *Test Report No.*	19/0483RP02	DATA *Date*	22/03/2019	CAMPIONE N. *Sample No.*	483A	PAGINA *Page*	1	DI *of*	3

ORDINE / *Order*	N° 745/19
Data ordine / Order date	01/03/2019
RIFERIMENTO / *Reference*	---
Data riferimento / Reference date	---
DATA DI RICEZIONE *Material received on*	07/03/2019

CLIENTE / Customer

COES S.r.l.
Via Pontida, 265
24040 Stezzano (BG)

OGGETTO *Subject*

Welder Approval Test Certificate W.A.T.C. n.: **01/18-A**
Plate Thk. 40,0 mm
Welding process: 141+111+121 (MANUAL + MECHANIZED)
Joint Type: BW
Welding Position: PA
WPS n.: 01/18-A
Welder: DELIGIOS GIULIANO GAVINO (STAMP N°S4)
Job 597/18

MATERIALE *Material*: ASME SA516 GR.70

COLATA *Heat*: ---

PRODUTTORE *Supplier*: --- **CERTIFICATO** *Certificate*: --- **DATA** *Date*: ---

NORME DI COLLAUDO *Test Specification*: EN ISO 9606-1: 2017

	ELENCO DELLE PROVE / List of tests	Metodo / *Method*	Saggio / *Test*	Pagina / *Sheet*
☑	Visivo / *Visual*	UNI EN ISO 17637	483A	2
☑	Esame radiografico / *Radiographic test*	UNI EN ISO 17636-1	483A	3
☐				
☐				
☐				
☐				
☐				
☐				

La firma digitale del documento o la firma su esemplare cartaceo in questa pagina di copertina attesta il controllo e l'approvazione dei risultati dei test riportati nelle tabelle seguenti / *The file digital signature or the signature on paper in this cover page attests control and approval of test results reported in the following tables*

Il presente rapporto di prova riguarda esclusivamente il campione esaminato, non può essere riprodotto neanche parzialmente senza l'autorizzazione del Laboratorio. La copia conforme all'originale è conservata nell'archivio del Laboratorio. I tempi di conservazione dei rapporti, dei documenti e delle parti dei saggi e delle provette sono riportate nel sito web www.qualitycontrolsrl.it. / *This test report only concerns the examined sample, it cannot be even partially reproduced without the authorization of the Laboratory. The true copy of the original is stored in the archive of the Laboratory. The storage times of reports, documents and parts of the sample and the test piece are shown in www.qualitycontrolsrl.it websit*

Ente di Collaudo / Surveyor

RINA S.p.A. No. Bg. 0135 Reviewed Witnessed 22/3/19

Quality Control Group S.r.l.

Dott. Ing. V[illegible]

ESAME VISIVO - UNI EN ISO 17637:2011
Visual test – UNI EN ISO 17637:2011

Standard di riferimento *Reference standard*	UNI EN ISO 17637
Criterio di accettabilità *Acceptance criteria*	UNI EN ISO 5817 Lev. B
Stadio di lavorazione *Working step*	AFTER WELDING
Condizioni superficiali *Surface conditions*	AS WELDED

TECNICA
TECHNIQUE

■ Esame diretto / *Direct examination*	□ Esame indiretto / *Remote examination*	
Pulizia iniziale della superficie / *Starting surface Cleaning*		BRUSHING
Distanza massima occhio-oggetto / *Maximum distance eye-object (cm)*		60
Intensità di luce / *light intensity (lux)*		>1000 Lux
Strumento di illuminazione / *Lighting equipment*		NATURAL

STRUMENTI UTILIZZATI
USED EQUIPMENTS

	Tipo / *Type*	Costruttore / *Manufacturer*	Matricola / *Serial Number*
□	Endoscopio / *Boroscope*		
■	Calibro Cambridge / *Cambridge Caliper*	The welding institute	(SA112)
■	Luxmetro / *Luxmeter*	Delta Ohm HD2302.0	16001682 (SA132)
□			

Data inizio prova *Test start date*	12/03/2019	Data fine prova *Test end date*	12/03/2019	Apparecchiatura *Equipment*	---

NOTA / *Note:* l'esame non ha evidenziato indicazioni / *examination has not shown indications.*

Ente di Collaudo / Surveyor

ICIM S.p.A. No. Bo 655 Reviewed Witness 22/3/19

Quality Control Group S.r.l.

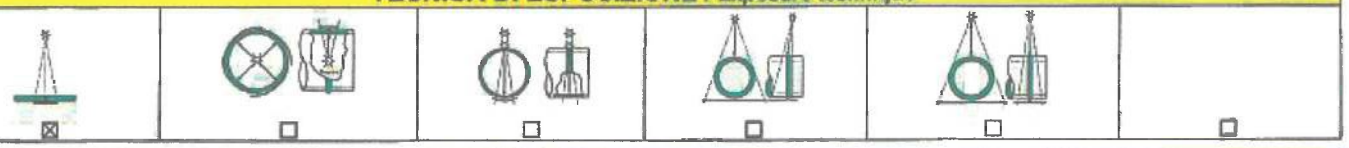
Dott. Ing. VALERIO COLOMBO

RAPPORTO DI PROVA N. *Test Report No.*	19/0483RP02	DATA *Date*	22/03/2019	CAMPIONE N. *Sample No.*	483A	PAGINA *Page*	3	DI *of*	3

ESAME RADIOGRAFICO – UNI EN ISO 17636-1:2013
Radiographic test according – UNI EN ISO 17636-1:2013

Standard di riferimento *Reference standard*	UNI EN ISO 17636-1:2013		
Criterio di accettabilità *Acceptance criteria*	UNI EN ISO 10675/UNI EN ISO 19232	**Stadio di lavorazione** *Working step*	AS WELDED

TECNICA DI ESPOSIZIONE / *Exposure technique*



☒ ☐ ☐ ☐ ☐ ☐

PARAMETRI DEL TEST / *Test parameters*

Spess. nominale di parete (mm) *Nominal single wall thickness*	40	Spessore rinf. di sald. (mm) *Welding reinforcement thickness*	2	Numero di esposizioni *Exposure number*	1
Distanza fuoco-oggetto (mm) *Source to object distance*	700	Distanza oggetto film (mm) *Object to film distance*	42	Nr. Films per cassetta *Film for each holder*	1
Costruttore della sorgente *Source manufacturer*	SEIFERT	Tipo di sorgente *Source type*	RX	Identificazione *Source identification*	SA151
Attività (Ci) *Activity*	----	Energia della radiazione (KV) *Radiation Energy*	290	Intens. radiazione (mA) *Radiation intensity*	3
Tempo di esposizione (minuti) *Exposure time*	2'48"	Macchia focale (mm) *Focal spot size*	3	Penombra *Ug*	0,06
Tipo di penetrametro *Penetrameter type*	10FeEN	Posizione del penetrametro *Penetrameter location*	SOURCE	Filo/Foro richiesto *Required wire/hole*	W10
Produttore film *Film manufacturer*	AGFA GEVAERT	Tipo di film *Film type*	D7	Dimensioni (cm) *Film size*	10x48

Tecnica di esposizione *Exposure technique*	☒ Parete sing. *Single wall*	☐ Parete dop. *Double wall*	Tecnica di lettura *Viewing technique*	☒ Parete sing. *Single wall*	☐ Parete dop. *Double wall*		
Tipo schermi intensificatori *Intensifying screen type*	☒ Pb	☐ Cu	Spessore schermi (mm) *Screen thickness*	Ant. 0,05	Post. 0,10		
Trattamento del film *Film treatment*	☒ Automatico *Automatic*	☐ Manuale *Manual*					

LEGENDA

C	Conforme *Conforming*	R	Non conforme *Not conforming*	RRX	Ripetere esposizione *Exposure to be repeated*
D*	Densità misurata *Measured density*	S*	Filo/Foro rilevato *Wire/Hole detected*	G*	Giudizio *Evaluation*

VALUTAZIONE / *EVALUATION*

Tallone *Coupon*	Tratto *Area*	Discontinuità *Discontinuity*	D*	S*	G*	Tallone *Coupon*	Tratto *Area*	Discontinuità *Discontinuity*	D*	S*	G*
	1-2	----	2,8	W12	C						

CLASSIFICAZIONE DELLE DISCONTINUITÁ
DISCONTINUITY CLASSIFICATION

101	Cricca longitudinale *Longitudinal crack*	2014	Porosità allineate *Linear Porosity*	304	Inclusioni metalliche *Metallic inclusion*	504	Eccesso di penetrazione *Excessive penetration*
102	Cricca trasversale *Transversal crack*	2015 2016	Cavità allungate e tarli *Elongated cavities and wormholes*	C 401	Mancanza di fusione *Lack of fusion*	601	Colpo d'arco *Stray arc*
104	Cricca di cratere *Crater crack*	202	Cavità di ritiro *Shrinkage cavity*	D 402	Mancanza di penetrazione *Lack of penetration*	602	Spruzzi *Spatter*
2011 2012	Porosità *Porosity and gas pores*	2024	Crateri di ritiro *Crater pipe*	5011 5012	Incisione cont. e interm. *Undercut continues and intermit.*	SCR	Difetto schermo *Screen defect*
2013	Gruppi di porosità *Clustered Porosity*	301 302	Inclusioni di scoria o flusso *Slag or flux inclusion*	515	Insellamento *Root concavity*	F	Difetto film *Film defect*

Data inizio prova *Test start date*	12/03/2019	Data fine prova *Test end date*	12/03/2019	Apparecchiatura *Equipment*	—

NOTA / *Note:* l'esame non ha evidenziato indicazioni / *The examination has not shown indications.*

Ente di Collaudo / Surveyor

ICIM S.p.A. No. Bo. 0425 Reviewed ☒ Witnessed ☐ 22/03/19

Quality Control Group S.r.l.

Dott. Ing. VALERIO COLOMBO

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

PROCEDURE QUALIFICATION RECORD
QW-483 - ASME IX Ed. 2019

Redatto/Issued: D.VILLA	Approvato/Approved: R.ZOIA	Data: 14/05/2021

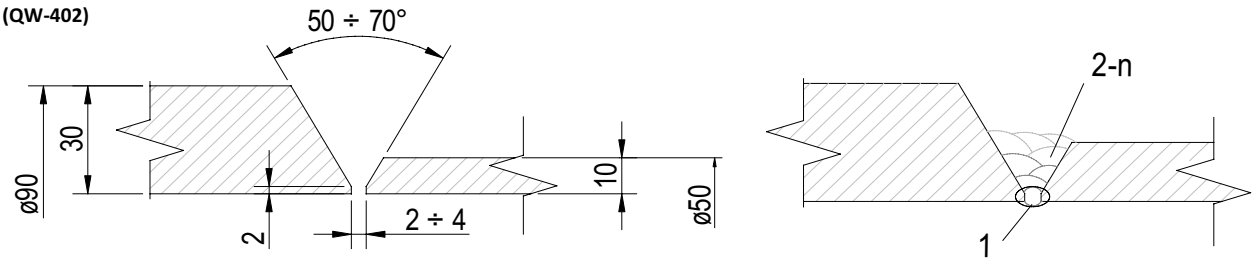
Company Name: **COES SRL Via Pontida, 265 STEZZANO 24040 (BG) - ITALY**

Procedure Qualification Record PQR No. **02/20-A** Data: **14/05/2021**

WPS No. **02/20-A**

Welding Process(es) **1) GTAW** **2) SMAW** Types **1) Manual** **2) Manual**

JOINT (QW-402)



BASE METAL (QW-403)

Material Spec.	**SA-350**	to	**SA-350**	
Type and Grade	**LF2 cl.1**	to	**LF2 cl.1**	
P No. **1**	Gr. **2**	to P No. **1**	Gr. **2**	
Thicknsess	**10 to 30 mm**			
Diameter	**50 to 90 mm**			
Others	**tpass > 13 mm: N.A.**			

POSTWELD HEAT TREATMENT (QW-407)

Temperature	**N.A.**
Time	**N.A.**
Other	**N.A.**

GAS (QW-408)	Gas(es)	% Composition (Mixture)	Flow Rate
Shielding	**1) ARGON**	**99,998**	**10 l/m**
Backing	**N.A.**		
Trailing	**N.A.**		

FILLER METALS (QW-404)	**GTAW**	**SMAW**	
SFA Specification	**5.18**	**5.1**	
AWS Classification	**ER70S-6**	**E7016-1**	
Filler Metal F. No.	**6**	**4**	
Weld Metal Analysis A. No.	**1 (note 1)**	**1**	
Size of Electrodes (mm)	**ø 2,4**	**ø 3,2**	
Deposited Weld Metal	**2,0 mm**	**8,00 mm**	
Others Tradename	**Solid**		

ELECTRICAL CHARATERISTICS (QW-409)

Current/Polarity	**1) DC-Straight**	**2) DC-Reverse**
Amperes	**1) 140**	**2) 100**
Volts	**1) 14**	**2) 24**
Tugsten Electrode Size	**ø 2.4 mm WLa20 (Blue)**	
Other		
Heat Imput Max	**1) 1,96 kJ/mm**	**2) 1,44 kJ/mm**

POSITION (QW-405)

Position of Groove	**1G**
Weld Progression (Uph. Dow.)	**N.A.**

PREHEAT (QW-406)

Preheat Temperature	**18 °C**
Interpass Temperature	**300 ° C**
Preheat Maintenance	**N.A.**

TECHNIQUE (QW-410)

Travel Speed	**1) 60 mm/1'** **2) 100 mm/1'**
String or Weave Bead	**String**
Oscillation	**N.A.**
Multipass or Single Pass (for Side)	**Multipass**
Single or Multiple Electrodes	**N.A.**
Other	**Grinding & Brushing after each bead**

Note: note 1: Mn max 1.6%

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

PROCEDURE QUALIFICATION RECORD
QW-483 - ASME IX Ed. 2019

Tensile Test (QW-150)

Specimen No.	widt (mm)	thickness (mm)	Area (mm^2)	Ult. Total Load (KN)	Ult. Unit Stress (N/mm^2)	Charact. Of Fail & Location
0591.A-1	ø13	9,8	127,4	63,19	496	B.M. - Ductile
0591.A-2	ø13,1	9,7	127	62,35	491	B.M. - Ductile

Guided Bend Test (QW-160)

Type and Figure No.		Result
0591.A-1.1	**(Face Bend) (180°/4t)**	**Satisfactory**
0591.A-1.2	**(Face Bend) (180°/4t)**	**Satisfactory**
0591.A-2,1	**(Root Bend) (180°/4t)**	**Satisfactory**
0591.A-2,2	**(Root Bend) (180°/4t)**	**Satisfactory**

Toughness Test (QW-170) *Test positions selected according to ASME VIII Div.1 UG-84 (h) (3) and UG-84 (5)*

Specimen No.	Notch Location	Notch Type	Test Temp.	Impact Value	Lateral Expansion		Drop Weight	
					% Shear	Mils	Break	No Break
0591.A	**W.M.**	**KV2**	**-46**	**51,7**	**/**	**/**	**/**	**/**
0591.A	**H.A.Z. SIDE THK.10**	**KV2**	**-46**	**112**	**/**	**/**	**/**	**/**
0591.A	**H.A.Z. SIDE THK.10**	**KV2**	**-46**	**133,3**	**/**	**/**	**/**	**/**

Test Position Selected According to ASME VIII Div.1 UG-84 Table UG-84.6 between 1/4 t and 1/2 t from the surface.
The Charpy impact on GTAW process was not performed because the usefull thk. of the process is less than 2.5 mm, according to UG-84(5)(c).

Fillet Weld Test (QW--180)

Result-Satisfactory (yes/no)	**N.A.**	Penetr.into Parental Metal (yes/no)	N.A.
ReMacro-Result	**N.A.**		

Other Tests

Type of Test	Visual Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA19 - 0591-A**
Type of Test	Penetrant Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA19 - 0591-A**
Type of Test	Radiography Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA19 - 0591-A**
Type of Test	Macrography Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA19 - 0591-A**
Type of Test	Hardness Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA19 - 0591-A**
Welder Name	**DEL PRATO ROBERTO**	ClocK No.	**/**	Stamp No.	**S2**
Test Conducted by	**QUALITY CONTROL GROUP S.r.l**	Laboratory Test No.	**21/0591RPA19**	Date	**14/05/2021**

We certify that the statement in the record are correct and that the test welds were prepared, welded and tested in accordance with the reqirements od Sect.IX of the ASME Code 2019

Manufacturer

COES srl - STEZZANO (BG)

Date 14/05/2021 by R.Zoia

RAPPORTO DI PROVA N. *Test Report No.* 21/0591RPA19 **DATA** *Date* 14/05/2021 **CAMPIONE N.** *Sample No.* 0591.A (ASME) **PAGINA** *Page* 1 **DI** *of* 9

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ORDINE / *Order* N° 651/21
Data ordine / Order date 15/03/2021

RIFERIMENTO / *Reference* ---
Data riferimento / Reference date

DATA DI RICEZIONE *Reception date* 24/03/2021

CLIENTE / Customer

COES S.r.l.
Via Pontida, 265
24040 Stezzano (BG)

DATA DI ACCETTAZIONE *Acceptance date* 24/03/2021

OGGETTO *Subject* Tallone qualifica procedimento di saldatura PQR 02/20-A
Coupon Welding Procedure Qualification PQR 02/20-A

ELENCO DELLE PROVE / List of tests	**Metodo** / *Method*	**Saggio** / *Test*	**Pagina** / *Sheet*
Esame visivo / *Visual examination*	ASME V art. 9 Ed. 2019 (*)	0591.A	2
Esame mediante liquidi penetranti / *Dye penetrant test*	ASME V art. 6 Ed. 2019 (*)	0591.A	3
Radiografico / *Radiographic*	ASME V art. 2 Ed. 2019 (*)	0591.A	4
Prova di trazione trasversale su giunti saldati / *Destructive tests on welds - Tensile test*	ASME IX QW-150 Ed. 2019	0591.A	5
Prova di piegamento su giunti saldati / *Destructive tests on welds - Bend test*	ASME IX QW-160 Ed. 2019	0591.A	6
Prova di resilienza su giunti saldati / *Destructive tests on welds - Impact test*	ASME IX QW-170 Ed. 2019	0591.A	7
Esame macroscopico delle saldature / *Macroscopic examination of welds*	ASTM E340-15	0591.A	8
Prova di durezza Vickers su giunti saldati / *Destructive tests on welds – Vickers hardness test*	ASTM E92-17	0591.A	9

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Marco Locatelli — Direttore Tecnico / Technical Manager

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CARATTERISTICHE DEL CAMPIONE DICHIARATE DAL CLIENTE / *features of sample declared by customer*

	Descrizione *Description*	Dimensioni *Dimension*	Fornitore *Supplier*	Colata/Lotto *Heat/Lot*	Certificato *Certificate*	Date *Date*
Materiale base 1 *Parent material1*	ASME SA-350 LF2 CL.1	Ø 90,0 Thk. 30,0 mm	---	---	---	---
Materiale base 2 *Parent material 2*	ASME SA-350 LF2 CL.1	Ø 50,0 Thk. 10,0 mm	---	---	---	---
Metallo d'apporto *Filler Metal*	(GTAW)AWS SFA 5.18 ER70S-2; (SMAW) AWS SFA 5.1 E7016-1	Ø 2,4 mm; Ø 3,25 mm	---	---	---	---
Tipo di giunto *Joint type*	BW	Processo di saldatura *Welding process*	GTAW+SMAW	Posizione di saldatura *Welding position*		1G
WPS n.	02/20-A	Saldatore Welder	DEL PRATO ROBERTO		Stamp	S2
Altre caratteristiche *Other features*	Tests according to ASME IX 2019 Ed.					

Il presente rapporto di prova riguarda esclusivamente il campione esaminato, non può essere riprodotto neanche parzialmente senza l'autorizzazione del Laboratorio ed è conservato in copia conforme all'originale nell'archivio del Laboratorio I tempi di conservazione dei rapporti, dei documenti e delle parti dei saggi e delle provette sono riportate nel sito web www.qualitycontrolsrl.it. / *This test report only concerns the examined sample, it can not be even partially reproduced without the authorization of the Laboratory and his certified copy is stored in the original in the archive of the Laboratory. The storage times of reports, documents and parts of the sample and the test piece are shown in www.qualitycontrolsrl.it website*

Tutte le prove riportate nelle pagine seguenti sono state eseguite presso il laboratorio di MEDOLAGO (BG) / *All tests reported in the following pages were carried out at the laboratory of MEDOLAGO (BG)*

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Ente di Collaudo / Surveyor — Ente di Collaudo / Surveyor

☐ Reviewed ☒ Witnessed date 14/05/2021

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ESAME VISIVO - ASME V art. 9 Ed. 2019 (*)
Visual test – ASME V art. 9 Ed. 2019 (*)

Criterio di accettabilità *Acceptance criteria*	ASME VIII DIV.1 UW33 – UW35 + ASME IX 2019 Ed. QW-194
Stadio di lavorazione *Working step*	AFTER WELDING
Condizioni superficiali *Surface conditions*	AS WELDED

TECNICA
TECHNIQUE

■ Esame diretto / *Direct examination*	□ Esame indiretto / *Remote examination*
Pulizia iniziale della superficie / *Starting surface Cleaning*	BRUSHING
Distanza massima occhio-oggetto / *Maximum distance eye-object (cm)*	60
Intensità di luce / *light intensity (lux)*	>1076 Lux
Strumento di illuminazione / *Lighting equipment*	NATURAL

STRUMENTI UTILIZZATI
USED EQUIPMENTS

	Tipo / *Type*	Costruttore / *Manufacturer*	Matricola / *Serial Number*
□	Endoscopio / *Boroscope*		
■	Calibro Cambridge / *Cambridge Caliper*	The welding institute	(SA112)
■	Luxmetro / *Luxmeter*	Delta Ohm HD2302.0	16001682 (SA136)
□			

07.01mod RP VT1A

Data inizio prova *Test start date*	27/03/2021	Data fine prova *Test end date*	27/03/2021	Tecnico qualificato *Qualified technician*	CIMINO EMILIO *Liv.2 – ISO9712 II° Liv. SNT-TC-1A RT - MT – PT - UT - VT*	Apparecchiatura *Equipment*	---

NOTA / *Note:* l'esame non ha evidenziato indicazioni / *examination has not shown indications.*

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ESAME MEDIANTE LIQUIDI PENETRANTI – ASME V art.6 Ed. 2019 (*)

Dye penetrant examination – ASME V art.6 Ed. 2019 (*)

Criterio di accettabilità *Acceptance criteria*	ASME IX QW 195.2 - 2019 Ed.
Stadio di lavorazione *Working step*	AS WELDED

TECNICA / *TECHNIQUE*			
■ Contrasto di colore / *Color contrast*		□ Fluorescente / *Fluorescent*	
■ Lavabile in acqua / *Water washable*		□ Lavabile con solvente / *Solvent removable*	
Pulizia iniziale della superficie / *Starting surface Cleaning*			Cleaner spray
Metodo applicazione del penetrante / *Dye penetrant application method*			Spray
Tempo min-max di penetrazione / *Min-max penetration time* (min.)			15-20
Metodo rimozione del penetrante / *Penetrant removing method*			Potable Water rinsing
Metodo asciugatura / *Drying method*			Cloths and air flow
Tempo asciugatura / *Drying Time* (min.)			5
Metodo applicazione sviluppatore / *Developer application method*			Spray
Tempo min-max di sviluppo / *Min-max developing time* (min.)			10-60
Temperatura / *Temperature* (°C)			18°C
Strumento di illuminazione / *Lighting equipment*			Bulb lamp 100 W
Intensità di luce sulla superficie / *Light intensity on the surface*			>1076 LUX

PRODOTTI UTILIZZATI / *USED MATERIALS*			
	Produttore / *Manufacturer*	**Tipo** / *Type*	**Lotto** / *Lot*
Sgrassante / *Cleaner*	NDT-ELITE'	BC1	B200626s (Exp.06/2024)
Penetrante / *Penetrant*	NDT-ELITE'	K71B2p	210115Ps (Exp.02/2025)
Pulitore / *Remover*	Water	----	-----
Sviluppatore / *Developer*	NDT-ELITE'	D112A	210330W150s (Exp.03/2025)

07.01mod RP PT1A

Data inizio prova *Test start date*	27/03/2021	Data fine prova *Test end date*	27/03/2021	Tecnico qualificato *Qualified technician*	CIMINO EMILIO *Liv.2 – ISO9712 II° Liv. SNT-TC-1A RT - MT – PT - UT - VT*	Apparecchiatura *Equipment*	---

Nota / Note: l'esame non ha evidenziato indicazioni / *Examination has not shown indications.*

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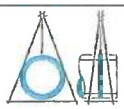
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ESAME RADIOGRAFICO – ASME V art.2 Ed. 2019 (*)

Radiographic examination – ASME V art.2 Ed. 2019 (*)

Criterio di accettabilità *Acceptance criteria*	ASME IX QW 191.1 - Ed. 2019	**Stadio di lavorazione** *Working step*	AS WELDED

TECNICA DI ESPOSIZIONE / *Exposure technique*

 ☐	 ☐	 ☐	 ☐	 ☒	☐

PARAMETRI DEL TEST / *Test parameters*

Spess. nominale di parete (mm) *Nominal single wall thickness*	10/30	Spessore rinf. di sald. (mm) *Welding reinforcement thickness*	3	Numero di esposizioni *Exposure number*	3
Distanza fuoco-oggetto (mm) *Source to object distance*	700	Distanza oggetto film (mm) *Object to film distance*	50	Nr. Films per cassetta *Film for each holder*	1
Costruttore della sorgente *Source manufacturer*	SEIFERT	Tipo di sorgente *Source type*	RX	Identificazione *Source identification*	SA150
Attività (Ci) *Activity*	----	Energia della radiazione (KV) *Radiation Energy*	290	Intens. radiazione (mA) *Radiation intensity*	3
Tempo di esposizione (minuti) *Exposure time*	1'18"	Macchia focale (mm) *Focal spot size*	3	Penombra *Ug*	0,21
Tipo di penetrametro *Penetrameter type*	ASTM 1B	Posizione del penetrametro *Penetrameter location*	SOURCE	Filo/Foro richiesto *Required wire/hole*	W10
Produttore film *Film manufacturer*	AGFA GEVAERT	Tipo di film *Film type*	D5	Dimensioni (cm) *Film size*	10x24

Tecnica di esposizione *Exposure technique*	☐ Parete sing. *Single wall*	☒ Parete dop. *Double wall*	Tecnica di lettura *Viewing technique*	☐ Parete sing. *Single wall*	☒ Parete dop. *Double wall*		
Tipo schermi intensificatori *Intensifying screen type*	☒ Pb	☐ Cu	Spessore schermi (mm) *Screen thickness*	Ant.	0,05	Post.	0,10
Trattamento del film *Film treatment*	☒ Automatico *Automatic*	☐ Manuale *Manual*					

LEGENDA

C	Conforme *Conforming*	R	Non conforme *Not conforming*	RRX	Ripetere esposizione *Exposure to be repeated*
D*	Densità misurata *Measured density*	S*	Filo/Foro rilevato *Wire/Hole detected*	G*	Giudizio *Evaluation*

VALUTAZIONE / *EVALUATION*

Tallone *Coupon*	Tratto *Area*	Discontinuità *Discontinuity*	D*	S*	G*	Tallone *Coupon*	Tratto *Area*	Discontinuità *Discontinuity*	D*	S*	G*
	A	-----	2,5	W8	C						
	B	-----	2,6	W8	C						
	C	-----	2,7	W8	C						

CLASSIFICAZIONE DELLE DISCONTINUITA
DISCONTINUITY CLASSIFICATION

101	Cricca longitudinale *Longitudinal crack*	2014	Porosità allineate *Linear Porosity*	304	Inclusioni metalliche *Metallic inclusion*	504	Eccesso di penetrazione *Excessive penetration*
102	Cricca trasversale *Transversal crack*	2015 2016	Cavità allungate e tarli *Elongated cavities and wormholes*	C 401	Mancanza di fusione *Lack of fusion*	601	Colpo d'arco *Stray arc*
104	Cricca di cratere *Crater crack*	202	Cavità di ritiro *Shrinkage cavity*	D 402	Mancanza di penetrazione *Lack of penetration*	602	Spruzzi *Spatter*
2011 2012	Porosità *Porosity and gas pores*	2024	Crateri di ritiro *Crater pipe*	5011 5012	Incisione cont. e interm. *Undercut continues and intermit.*	SCR	Difetto schermo *Screen defect*
2013	Gruppi di porosità *Clustered Porosity*	301 302	Inclusioni di scoria o flusso *Slag or flux inclusion*	515	Insellamento *Root concavity*	F	Difetto film *Film defect*

Data inizio prova *Test start date*	27/03/2021	Data fine prova *Test end date*	27/03/2021	Tecnico qualificato *Qualified technician*	CIMINO EMILIO *Liv.2 – ISQ0712 II° Liv. SNT-TC-1A RT - MT – PT - UT - VT*	Apparecchiatura *Equipment*	---

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PROVA DI TRAZIONE TRASVERSALE SU GIUNTI SALDATI – ASME IX QW-150 Ed. 2019

Transverse tensile test on welded joint – ASME IX QW-150 Ed. 2019

ID. SAGGIO *Identification test*		DIMENSIONE PROVETTA *Specimen size*			CARICO DI ROTTURA *Tensile strength*		Posizione di rottura *Fracture location*		Aspetto della frattura *Fracture appearance*		Temp.
PROVA *Test No.*	SENSO *Direction*	SPESS. *Thick.*	LARGH. *Width*	AREA *Area*	F_m N	R_m N/mm²	In saldatura *In weld*	Fuori saldatura *Out of weld*	Duttile *Ductile*	Fragile *Fragile*	
		mm	mm	mm	---	≥ 485					°C
0591.A 1	T	9,8	13,0	127,4	63.190	496	---	X	X	---	+22
0591.A 2	T	9,7	13,1	127,0	62.350	491	---	X	X	---	+22

07.01mod RP TT4A

Data inizio prova *Test start date* **14/05/2021** Data fine prova *Test end date* **14/05/2021** Tecnico qualificato *Qualified technician* **GIUSEPPE ALZATI** Apparecchiatura *Equipment* **QC 350**

Nota / *Note*

i risultati di prova sono conformi ai requisiti previsti per il giunto di saldatura dalle normative ASME IX 2019 Ed. con riferimento, per i requisiti del materiale alla normativa ASME SA350

Test results are conform to the requirements of standards ASME IX 2019 Ed. for the welded joint and of ASME SA335 for material requirements.

COQS SRL 14/05/21 W R

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PROVA DI PIEGAMENTO SU GIUNTI SALDATI – ASME IX QW-160 Ed. 2019

Bend test on welded joint – ASME IX QW-160 Ed. 2019

SAGGIO *Identification*		DIMENSIONE PROVETTA *Size*			CARATTERISTICHE E RISULTATI DELLA PROVA DI PIEGA *Features and bend test results*				
Prova N. *Test No.*	Senso *Direction*	Spessore *Thickness* mm	Larghezza *Width* mm	Lunghezza *Length* mm	Tipo *Type*	Mandrino *Former* Ø mm	Dist.appoggi *Rolls dist.* mm	Angolo *Bend Angle* °	Risultato *Result*
0591.A 1.1	T	10,1	15,0	245	FACE	40	63	180	Assenza di difetti *Absence of defects*
0591.A 1.2	T	10,1	15,1	245	FACE	40	63	180	Assenza di difetti *Absence of defects*
0591.A 2.1	T	10,2	15,1	245	ROOT	40	63	180	Assenza di difetti *Absence of defects*
0591.A 2.2	T	10,0	15,0	245	ROOT	40	63	180	Assenza di difetti *Absence of defects*

07.01mod RP BT1A

Data inizio prova *Test start date*	**14/05/2021**	Data fine prova *Test end date*	**14/05/2021**	Tecnico qualificato *Qualified technician*	**GIUSEPPE ALZATI**	Apparecchiatura *Equipment*	**QC 355**

NOTA*/Note:*
i risultati di prova sono conformi ai requisiti previsti per il giunto di saldatura dalla normativa ASME IX QW-160 Ed. 2019
test results are conform in accordance with the requirements of standard ASME IX QW-160 Ed. 2019

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PROVA DI RESILIENZA SU GIUNTI SALDATI – ASME IX QW-170 Ed. 2019

Charpy impact test on welded joints – ASME IX QW-170 Ed. 2019

SAGGIO *Test* No.	SENSO *Direct.*	POSIZIONE *Position*	TIPO *Type*	TEMP. °C	DIMENS. *Size* mm	VALORI *Single values* ≥ 20,25 J			MEDIA *Average* ≥ 20,25 J	ESPANSIONE LATERALE *Lateral Expansion* --- mm			AREA DUTTILE *Shear Area* --- %		
						1	2	3		1	2	3	1	2	3
0591.A	T	W.M.	KV_2	-46	10x8	60	55	40	51,7	---	---	---	---	---	---
0591.A	T	H.A.Z. SIDE THK.10	KV_2	-46	10x8	125	99	112	112,0	---	---	---	---	---	---
0591.A	T	H.A.Z. SIDE THK.30	KV_2	-46	10x8	129	144	127	133,3	---	---	---	---	---	---

07.01mod RP IT2A

Data inizio prova *Test start date* **14/05/2021** | Data fine prova *Test end date* **14/05/2021** | Tecnico qualificato *Qualified technician* **GIUSEPPE ALZATI** | Apparecchiatura *Equipment* **QC 378**

Nota / *Note*: ---

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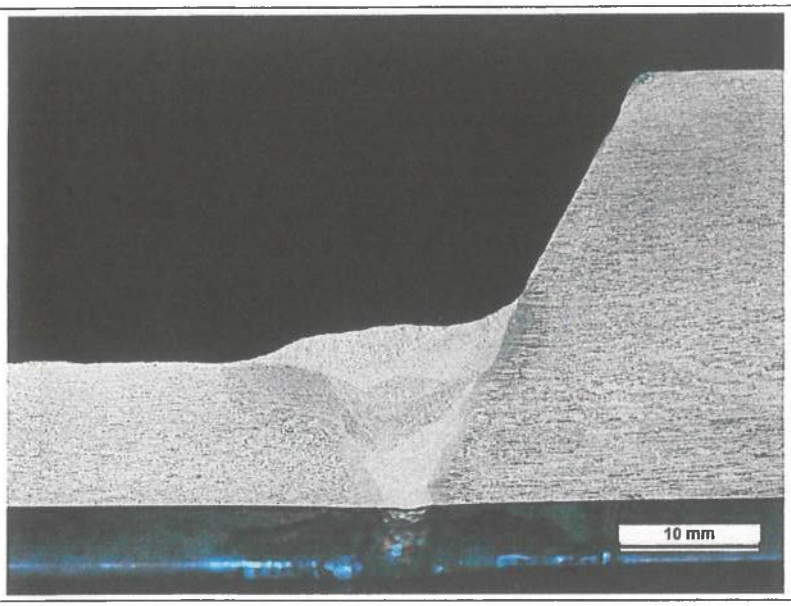
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date 14/05/2021

ESAME MACROSCOPICO DELLE SALDATURE - ASTM E340-15
Macroscopic examination of Welds - ASTM E340-15



Provetta n. *Test Specimen No.*	**0591.A**
Attacco *Etchant*	Acqua regia *Aqua regia*
Direzione di prelievo *Direction of sampling*	Trasversale *Transverse*

07.01 mod RP ME1A

Data inizio prova *Test start date*	14/05/2021	Data fine prova *Test end date*	14/05/2021	Tecnico qualificato *Qualified technician*	ANNIBALE ZOCCARATO	Apparecchiatura *Equipment*	---

Nota / *Note:*
L'esame visivo ad ingrandimento 5X e 10X non ha evidenziato difetti
Visual inspection at 5X and 10X magnification has shown no defects

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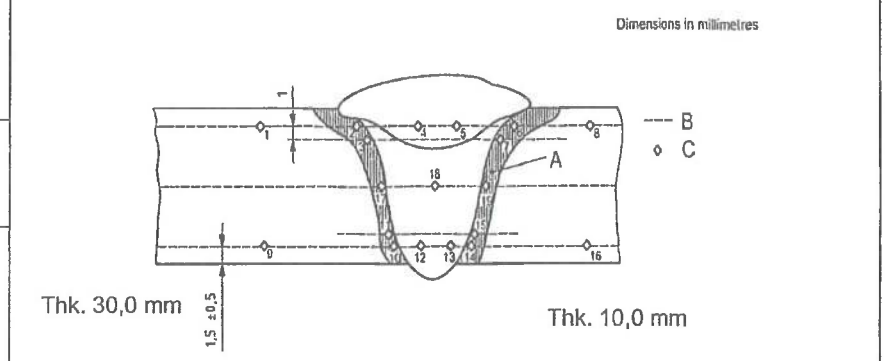
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PROVA DI DUREZZA VICKERS SU GIUNTI SALDATI – ASTM E92-17

Weld joints hardness testing – ASTM E92-17

SAGGIO *Test*	0591.A
TIPO DI DUREZZA *Hardness type*	HV_{10}
VALORE MAX *Required value*	MAX 248 HV_{10}



Lo schema delle impronte di durezza la distanza tra le impronte è in accordo alla NACE MR0175

The hardness indentation sketch and indentation distance are according to NACE MR0175

RISULTATO

RESULT

01=	140	**02=**	185	**03=**	189	**04=**	185	**05=**	192	**06=**	199
07=	196	**08=**	140	**09=**	138	**10=**	177	**11=**	185	**12=**	169
13=	172	**14=**	169	**15=**	172	**16=**	140	**17=**	175	**18=**	178
19=	174										

Data inizio prova *Test start date*	**14/05/2021**	Data fine prova *Test end date*	**14/05/2021**	Tecnico qualificato *Qualified techinician*	**ANNIBALE BRAVI**	Apparecchiatura *Equipment*	**QC 372**

Nota / *Note:* ---

FINE RAPPORTO / *END REPORT*

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date 14/05/2021

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

PROCEDURE QUALIFICATION RECORD
QW-483 - ASME IX Ed. 2019

Redatto/Issued: L.T.	Approvato/Approved: R.ZOIA	Data: 14/05/2021

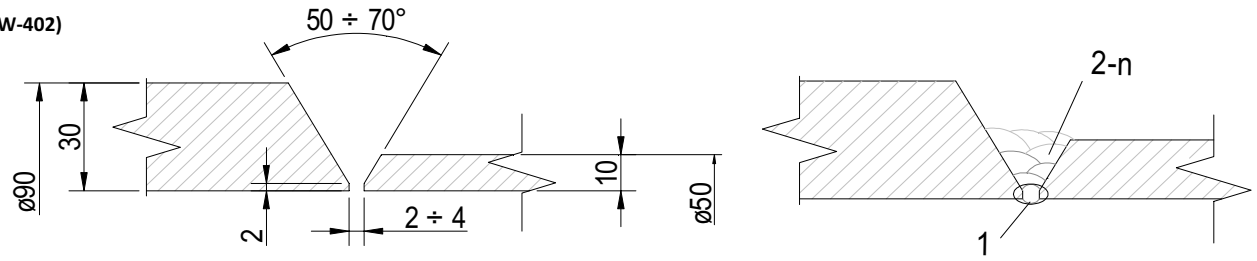
Company Name: **COES SRL Via Pontida, 265 STEZZANO 24040 (BG) - ITALY**

Procedure Qualification Record PQR No. **03/20-A** Data: **14/05/2021**

WPS No. **03/20-A**

Welding Process(es) **1) GTAW** **2) SMAW** Types **1) Manual** **2) Manual**

JOINT (QW-402)



BASE METAL (QW-403)

Material Spec.	**SA-182**	to	**SA-182**		
Type and Grade	**F316/316L**	to	**F316/316L**		
P No. **8**	Gr. **1**	to P No. **8**	Gr. **1**		
Thicknsess	**10 to 30 mm**				
Diameter	**50 to 90 mm**				
Others	**tpass > 13 mm**				

FILLER METALS (QW-404)	**GTAW**	**SMAW**	
SFA Specification	**5.9**	**5.4**	
AWS Classification	**ER316L**	**E316L-16**	
Filler Metal F. No.	**6**	**5**	
Weld Metal Analysis A. No.	**8**	**8**	
Size of Electrodes (mm)	**ø 2,4**	**ø 3,2**	
Deposited Weld Metal	**2,0 mm**	**8,00 mm**	
Others Tradename	**Solid**	**Solid**	

POSITION (QW-405)

Position of Groove **1G**

Weld Progression (Uph. Dow.) **N.A.**

PREHEAT (QW-406)

Preheat Temperature **18 °C**

Interpass Temperature **150 ° C**

Preheat Maintenance **N.A.**

POSTWELD HEAT TREATMENT (QW-407)

Temperature **N.A.**

Time **N.A.**

Other **N.A.**

GAS (QW-408)	Gas(es)	**% Composition** (Mixture)	Flow Rate
Shielding	**ARGON**	**99,998**	**10 l/m**
Backing	**ARGON**	**99,998**	**4 l/m**
Trailing	**N.A.**		

ELECTRICAL CHARATERISTICS (QW-409)

Current/Polarity **1) DC-Straight** **2) DC-Reverse**

Amperes **1) 120** **2) 110**

Volts **1) 14** **2) 24**

Tugsten Electrode Size **ø 2.4 mm WLa20 (Blue)**

Other

Heat Imput Max **1) 1,68 kJ/mm** **2) 1,58 kJ/mm**

TECHNIQUE (QW-410)

Travel Speed **1) 60 mm/1'** **2) 100 mm/1'**

String or Weave Bead **String**

Oscillation **N.A.**

Multipass or Single Pass (for Side) **Multipass**

Single or Multiple Electrodes **N.A.**

Other **Grinding & Brushing after each bead**

Note:

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

PROCEDURE QUALIFICATION RECORD
QW-483 - ASME IX Ed. 2019

Tensile Test (QW-150)

Specimen No.	widt (mm)	thickness (mm)	Area (mm^2)	Ult. Total Load (KN)	Ult. Unit Stress (N/mm^2)	Charact. Of Fail & Location
0591.B-1	ø13	9,5	123,5	69,1	560	B.M. - Ductile
0591.B-2	ø13,1	9,6	125,8	70,8	563	B.M. - Ductile

Guided Bend Test (QW-160)

Type and Figure No.		Result
0591.B-1.1	**(Face Bend) (180°/4t)**	**Satisfactory**
0591.B-1.2	**(Face Bend) (180°/4t)**	**Satisfactory**
0591.B-2,1	**(Root Bend) (180°/4t)**	**Satisfactory**
0591.B-2,2	**(Root Bend) (180°/4t)**	**Satisfactory**

Toughness Test (QW-170) *Test positions selected according to ASME VIII Div.1 UG-84 (h) (3) and UG-84 (5)*

Specimen No.	Notch Location	Notch Type	Test Temp.	Impact Value	Lateral Expansion		Drop Weight	
					% Shear	Mils	Break	No Break
0591.B	**W.M.**	**KV2**	**-196**	**40,3**	**/**	**/**	**/**	**/**
0591.B	**H.A.Z. SIDE THK.30**	**KV2**	**-196**	**114,7**	**/**	**/**	**/**	**/**
0591.B	**H.A.Z. SIDE THK.30**	**KV2**	**-196**	**187,3**	**/**	**/**	**/**	**/**

Test Position Selected According to ASME VIII Div.1 UG-84 Table UG-84.6 between 1/4 t and 1/2 t from the surface.
The Charpy impact on GTAW process was not performed because the usefull thk. of the process is less than 2.5 mm, according to UG-84(5)(c).

Fillet Weld Test (QW--180)

Result-Satisfactory (yes/no)	**N.A.**	Penetr.into Parental Metal (yes/no)	N.A.
ReMacro-Result	**N.A.**		

Other Tests

Type of Test	Visual Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA20 - 0591.B**
Type of Test	Penetrant Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA20 - 0591.B**
Type of Test	Radiography Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA20 - 0591.B**
Type of Test	Macrography Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA20 - 0591.B**
Type of Test	Hardness Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA20 - 0591.B**
Type of Test	Ferrite Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA20 - 0591.B**

Welder Name	**DEL PRATO ROBERTO**	ClocK No.	**/**	Stamp No.	**S2**
Test Conducted by	**QUALITY CONTROL GROUP S.r.l**	Laboratory Test No.	**21/0591RPA20**	Date	**14/05/2021**

We certify that the statement in the record are correct and that the test welds were prepared, welded and tested in accordance with the reqirements od Sect.IX of the ASME Code 2019

Manufacturer

COES srl - STEZZANO (BG)

Date 14/05/2021 by R.Zoia

QUALITY CONTROL

LAB N° 1384 L

RAPPORTO DI PROVA N. *Test Report No.*	21/0591RPA20	DATA *Date*	14/05/2021	CAMPIONE N. *Sample No.*	0591.B (ASME)	PAGINA *Page*	1	DI *of*	10

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ORDINE / *Order* N° 651/21
Data ordine / Order date 15/03/2021

RIFERIMENTO / *Reference* ---
Data riferimento / Reference date

CLIENTE / Customer

COES S.r.l.
Via Pontida, 265
24040 Stezzano (BG)

DATA DI RICEZIONE *Reception date* 24/03/2021

DATA DI ACCETTAZIONE *Acceptance date* 24/03/2021

OGGETTO *Subject* Tallone qualifica procedimento di saldatura PQR 03/20-A
Coupon Welding Procedure Qualification PQR 03/20-A

ELENCO DELLE PROVE / List of tests	Metodo / *Method*	Saggio / *Test*	Pagina / *Sheet*
Esame visivo / *Visual examination*	ASME V art. 9 Ed. 2019 (*)	0591.B	2
Esame mediante liquidi penetranti / *Dye penetrant test*	ASME V art. 6 Ed. 2019 (*)	0591.B	3
Radiografico / *Radiographic*	ASME V art. 2 Ed. 2019 (*)	0591.B	4
Prova di trazione trasversale su giunti saldati / *Destructive tests on welds - Tensile test*	ASME IX QW-150 Ed. 2019	0591.B	5
Prova di piegamento su giunti saldati / *Destructive tests on welds - Bend test*	ASME IX QW-160 Ed. 2019	0591.B	6
Prova di resilienza su giunti saldati / *Destructive tests on welds - Impact test*	ASME IX QW-170 Ed. 2019	0591.B	7
Esame macroscopico delle saldature / *Macroscopic examination of welds*	ASTM E340-15	0591.B	8
Prova di durezza Vickers su giunti saldati / *Destructive tests on welds – Vickers hardness test*	ASTM E92-17	0591.B	9
Misura del contenuto di Ferrite con Ferritoscopio / *Determination of Ferrite content by Ferritoscope*	IL 18.00.01 Rev. 0 (*)	0591.B	10

L'accreditamento è legato esclusivamente alle prove incluse nell'elenco allegato al certificato n° 1384L disponibile sul sito web www.accredia.it. Le prove non accreditate da Accredia sono caratterizzate dall'asterisco (*) / *The accreditation is related solely to the tests included in the list annexed to the certificate n° 1384L available on the website www.accredia.it. The tests not accredited by Accredia are characterized by asterisk (*)*

Marco Locatelli — Direttore Tecnico / Technical Manager

"La firma digitale o la firma autografa sul rapporto certifica la sua validità. L'originalità del rapporto è garantita dalla tracciabilità nel sistema della PEC utilizzata per la sua consegna al cliente / The digital or hand-written signature on the report certifies its validity. The originality of the relationship is guaranteed by the traceability of the PEC system used for delivery to customer"

La regola decisionale utilizzata dal laboratorio quando fornisce dichiarazioni di conformità a norme o specifiche è riportata nel sito web http://qualitycontrolsrl.it/ / *The decision rule used by the laboratory when providing declarations of compliance with standards or specifications is shown in http://www.qualitycontrolsrl.it website.*

Il campionamento è effettuato dal Cliente e non è oggetto di accreditamento; i risultati delle prove si riferiscono al campione così come ricevuto. / *Sampling is carried out by the customer and is not subject to accreditation; test results refer to the sample as received.*

Il Laboratorio è responsabile di ogni informazione riportata nel presente rapporto di prova ad eccezione delle informazioni fornite dal Cliente rispetto alle quali declina ogni responsabilità / *The Laboratory is responsible for any information reported in this test report except for the information provided by the Customer with respect to which it disclaims any responsibility*

CARATTERISTICHE DEL CAMPIONE DICHIARATE DAL CLIENTE / *features of sample declared by customer*

	Descrizione *Description*	Dimensioni *Dimension*	Fornitore *Supplier*	Colata/Lotto *Heat/Lot*	Certificato *Certificate*	Date *Date*
Materiale base 1 *Parent material1*	ASME SA-182 F316/F316L	Ø 90,0 Thk. 30,0 mm	---	---	---	---
Materiale base 2 *Parent material 2*	ASME SA-182 F316/F316L	Ø 50,0 Thk. 10,0 mm	---	---	---	---
Metallo d'apporto *Filler Metal*	(GTAW)AWS SFA 5.9 ER316L; (SMAW) AWS SFA 5.4 E316L-16	Ø 2,4 mm; Ø 3,25 mm	---	---	---	---
Tipo di giunto *Joint type*	BW	Processo di saldatura *Welding process*	GTAW+SMAW	Posizione di saldatura *Welding position*		1G
WPS n.	03/20-A	Saldatore *Welder*	DEL PRATO ROBERTO		Stamp	S2
Altre caratteristiche *Other features*	Tests according to ASME IX 2019 Ed.					

Il presente rapporto di prova riguarda esclusivamente il campione esaminato, non può essere riprodotto neanche parzialmente senza l'autorizzazione del Laboratorio ed è conservato in copia conforme all'originale nell'archivio del Laboratorio I tempi di conservazione dei rapporti, dei documenti e delle parti dei saggi e delle provette sono riportate nel sito web www.qualitycontrolsrl.it. / *This test report only concerns the examined sample, it can not be even partially reproduced without the authorization of the Laboratory and his certified copy is stored in the original in the archive of the Laboratory. The storage times of reports, documents and parts of the sample and the test piece are shown in www.qualitycontrolsrl.it website*

Tutte le prove riportate nelle pagine seguenti sono state eseguite presso il laboratorio di MEDOLAGO (BG)
All tests reported in the following pages were carried out at the laboratory of MEDOLAGO (BG)

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Ente di Collaudo / Surveyor — 17/05/21

Ente di Collaudo / Surveyor
☐ Reviewed - ☒ Witnessed
date 14/07/2021

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ESAME VISIVO - ASME V art. 9 Ed. 2019 (*)
Visual test – ASME V art. 9 Ed. 2019 (*)

Criterio di accettabilità *Acceptance criteria*	ASME VIII DIV.1 UW33 – UW35 + ASME IX 2019 Ed. QW-194
Stadio di lavorazione *Working step*	AFTER WELDING
Condizioni superficiali *Surface conditions*	AS WELDED

TECNICA *TECHNIQUE*		
■ Esame diretto / *Direct examination*	□ Esame indiretto / *Remote examination*	
Pulizia iniziale della superficie / *Starting surface Cleaning*		BRUSHING
Distanza massima occhio-oggetto / *Maximum distance eye-object (cm)*		60
Intensità di luce / *light intensity (lux)*		>1076 Lux
Strumento di illuminazione / *Lighting equipment*		NATURAL

STRUMENTI UTILIZZATI
USED EQUIPMENTS

	Tipo / *Type*	Costruttore / *Manufacturer*	Matricola / *Serial Number*
□	Endoscopio / *Boroscope*		
■	Calibro Cambridge / *Cambridge Caliper*	The welding institute	(SA112)
■	Luxmetro / *Luxmeter*	Delta Ohm HD2302.0	16001682 (SA136)
□			

07.01mod RP VT1A

Data inizio prova *Test start date*	Data fine prova *Test end date*	Tecnico qualificato *Qualified technician*	Apparecchiatura *Equipment*
27/03/2021	27/03/2021	CIMINO EMILIO Liv.2 - ISO9712 II° Liv. SNT-TC-1A RT - MT - PT - UT - VT	---

NOTA / *Note:* l'esame non ha evidenziato indicazioni / *examination has not shown indications.*

COES SRL 17/05/21 W R

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date 14/05/2021

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ESAME MEDIANTE LIQUIDI PENETRANTI – ASME V art.6 Ed. 2019 (*)

Dye penetrant examination – ASME V art.6 Ed. 2019 (*)

Criterio di accettabilità *Acceptance criteria*	ASME IX QW 195.2 - 2019 Ed.
Stadio di lavorazione *Working step*	AS WELDED

TECNICA / *TECHNIQUE*			
■ Contrasto di colore / *Color contrast*		□ Fluorescente / *Fluorescent*	
■ Lavabile in acqua / *Water washable*		□ Lavabile con solvente / *Solvent removable*	
Pulizia iniziale della superficie / *Starting surface Cleaning*			Cleaner spray
Metodo applicazione del penetrante / *Dye penetrant application method*			Spray
Tempo min-max di penetrazione / *Min-max penetration time* (min.)			15-20
Metodo rimozione del penetrante / *Penetrant removing method*			Potable Water rinsing
Metodo asciugatura / *Drying method*			Cloths and air flow
Tempo asciugatura / *Drying Time* (min.)			5
Metodo applicazione sviluppatore / *Developer application method*			Spray
Tempo min-max di sviluppo / *Min-max developing time* (min.)			10-60
Temperatura / *Temperature* (°C)			18°C
Strumento di illuminazione / *Lighting equipment*			Bulb lamp 100 W
Intensità di luce sulla superficie / *Light intensity on the surface*			>1076 LUX

PRODOTTI UTILIZZATI / *USED MATERIALS*	**Produttore** / *Manufacturer*	**Tipo** / *Type*	**Lotto** / *Lot*
Sgrassante / *Cleaner*	NDT-ELITE'	BC1	B200626s (Exp.06/2024)
Penetrante / *Penetrant*	NDT-ELITE'	K71B2p	210115Ps (Exp.02/2025)
Pulitore / *Remover*	Water	----	-----
Sviluppatore / *Developer*	NDT-ELITE'	D112A	210330W150s (Exp.03/2025)

07.01mod RP PT1A

Data inizio prova *Test start date*	27/03/2021	Data fine prova *Test end date*	27/03/2021	Tecnico qualificato *Qualified technician*	CIMINO EMILIO *Liv.2 – ISO9712 II° Liv. SNT-TC-1A RT - MT – PT - UT - VT*	Apparecchiatura *Equipment*	---

Nota / Note: l'esame non ha evidenziato indicazioni / *Examination has not shown indications.*

COES SRL 17/05/21 W R

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date 14/05/2021

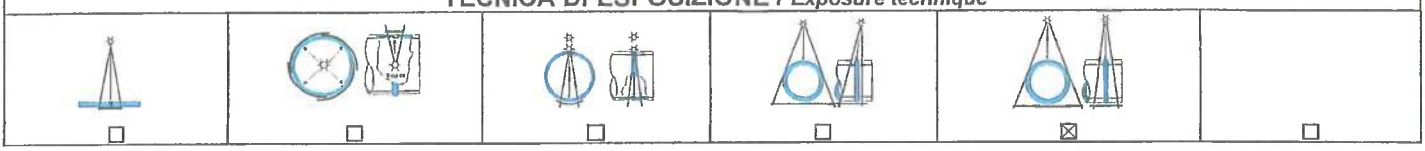
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ESAME RADIOGRAFICO – ASME V art.2 Ed. 2019 (*)

Radiographic examination – ASME V art.2 Ed. 2019 (*)

Criterio di accettabilità *Acceptance criteria*	ASME IX QW 191.1 - Ed. 2019	**Stadio di lavorazione** *Working step*	AS WELDED

TECNICA DI ESPOSIZIONE / *Exposure technique*



☐	☐	☐	☐	☒	☐

PARAMETRI DEL TEST / *Test parameters*

Spess. nominale di parete (mm) *Nominal single wall thickness*	10/30	Spessore rinf. di sald. (mm) *Welding reinforcement thickness*	3	Numero di esposizioni *Exposure number*	3
Distanza fuoco-oggetto (mm) *Source to object distance*	700	Distanza oggetto film (mm) *Object to film distance*	50	Nr. Films per cassetta *Film for each holder*	1
Costruttore della sorgente *Source manufacturer*	SEIFERT	Tipo di sorgente *Source type*	RX	Identificazione *Source identification*	SA150
Attività (Ci) *Activity*	----	Energia della radiazione (KV) *Radiation Energy*	290	Intens. radiazione (mA) *Radiation intensity*	3
Tempo di esposizione (minuti) *Exposure time*	1'18"	Macchia focale (mm) *Focal spot size*	3	Penombra *Ug*	0,21
Tipo di penetrametro *Penetrameter type*	ASTM 1B	Posizione del penetrametro *Penetrameter location*	SOURCE	Filo/Foro richiesto *Required wire/hole*	W10
Produttore film *Film manufacturer*	AGFA GEVAERT	Tipo di film *Film type*	D5	Dimensioni (cm) *Film size*	10x24

Tecnica di esposizione *Exposure technique*	☐	Parete sing. *Single wall*	☒	Parete dop. *Double wall*	Tecnica di lettura *Viewing technique*	☐	Parete sing. *Single wall*	☒ Parete dop. *Double wall*
Tipo schermi intensificatori *Intensifying screen type*	☒	Pb	☐	Cu	Spessore schermi (mm) *Screen thickness*	Ant.	0,05	Post. 0,10
Trattamento del film *Film treatment*	☒	Automatico *Automatic*	☐	Manuale *Manual*				

LEGENDA

C	Conforme *Conforming*	R	Non conforme *Not conforming*	RRX	Ripetere esposizione *Exposure to be repeated*
D*	Densità misurata *Measured density*	S*	Filo/Foro rilevato *Wire/Hole detected*	G*	Giudizio *Evaluation*

VALUTAZIONE / *EVALUATION*

Tallone *Coupon*	Tratto *Area*	Discontinuità *Discontinuity*	D*	S*	G*	Tallone *Coupon*	Tratto *Area*	Discontinuità *Discontinuity*	D*	S*	G*
	A	-----	2,7	W8	C						
	B	-----	2,8	W8	C						
	C	-----	2,7	W8	C						

CLASSIFICAZIONE DELLE DISCONTINUITA
DISCONTINUITY CLASSIFICATION

101	Cricca longitudinale *Longitudinal crack*	2014	Porosità allineate *Linear Porosity*	304	Inclusioni metalliche *Metallic inclusion*	504	Eccesso di penetrazione *Excessive penetration*
102	Cricca trasversale *Transversal crack*	2015 2016	Cavità allungate e tarli *Elongated cavities and wormholes*	C 401	Mancanza di fusione *Lack of fusion*	601	Colpo d'arco *Stray arc*
104	Cricca di cratere *Crater crack*	202	Cavità di ritiro *Shrinkage cavity*	D 402	Mancanza di penetrazione *Lack of penetration*	602	Spruzzi *Spatter*
2011 2012	Porosità *Porosity and gas pores*	2024	Crateri di ritiro *Crater pipe*	5011 5012	Incisione cont. e interm. *Undercut continues and intermit.*	SCR	Difetto schermo *Screen defect*
2013	Gruppi di porosità *Clustered Porosity*	301 302	Inclusioni di scoria o flusso *Slag or flux inclusion*	515	Insellamento *Root concavity*	F	Difetto film *Film defect*

Data inizio prova *Test start date*	27/03/2021	Data fine prova *Test end date*	27/03/2021	Tecnico qualificato *Qualified technician*	CIMINO EMILIO Liv.2 – ISO9712 II° Liv. SNT-TC-1A RT - MT – PT - UT - VT	Apparecchiatura *Equipment*	---

COES SRL W R

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date 14/05/2021

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PROVA DI TRAZIONE TRASVERSALE SU GIUNTI SALDATI – ASME IX QW-150 Ed. 2019

Transverse tensile test on welded joint – ASME IX QW-150 Ed. 2019

ID. SAGGIO *Identification test*		DIMENSIONE PROVETTA *Specimen size*			CARICO DI ROTTURA *Tensile strength*		Posizione di rottura *Fracture location*		Aspetto della frattura *Fracture appearance*		Temp.
PROVA *Test No.*	SENSO *Direction*	SPESS. *Thick.*	LARGH. *Width*	AREA *Area*	F_m N	R_m N/mm²	In saldatura *In weld*	Fuori saldatura *Out of weld*	Duttile *Ductile*	Fragile *Fragile*	
		mm	mm	mm	---	≥ 515					°C
0591.B 1	T	9,5	13,0	123,5	69.100	560	---	X	X	---	+22
0591.B 2	T	9,6	13,1	125,8	70.800	563	---	X	X	---	+22

07.01mod RP TT4A

Data inizio prova *Test start date*	**14/05/2021**	Data fine prova *Test end date*	**14/05/2021**	Tecnico qualificato *Qualified technician*	**GIUSEPPE ALZATI**	Apparecchiatura *Equipment*	**QC 350**

Nota / *Note*

i risultati di prova sono conformi ai requisiti previsti per il giunto di saldatura dalle normative ASME IX 2019 Ed. con riferimento, per i requisiti del materiale alla normativa ASME SA182

Test results are conform to the requirements of standards ASME IX 2019 Ed. for the welded joint and of ASME SA182 for material requirements.

CQS SRL 17/05/21 W R

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date 14/07/21

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PROVA DI PIEGAMENTO SU GIUNTI SALDATI – ASME IX QW-160 Ed. 2019

Bend test on welded joint – ASME IX QW-160 Ed. 2019

SAGGIO *Identification*		DIMENSIONE PROVETTA *Size*			CARATTERISTICHE E RISULTATI DELLA PROVA DI PIEGA *Features and bend test results*				
Prova N. *Test No.*	Senso *Direction*	Spessore *Thickness* mm	Larghezza *Width* mm	Lunghezza *Length* mm	Tipo *Type*	Mandrino *Former* Ø mm	Dist.appoggi *Rolls dist.* mm	Angolo *Bend Angle* °	Risultato *Result*
0591.B 1.1	T	10,3	15,1	245	FACE	40	63	180	Assenza di difetti *Absence of defects*
0591.B 1.2	T	10,3	15,1	245	FACE	40	63	180	Assenza di difetti *Absence of defects*
0591.B 2.1	T	10,2	15,0	245	ROOT	40	63	180	Assenza di difetti *Absence of defects*
0591.B 2.2	T	10,1	15,2	245	ROOT	40	63	180	Assenza di difetti *Absence of defects*

07.01mod RP BT1A

Data inizio prova *Test start date*	**14/05/2021**	Data fine prova *Test end date*	**14/05/2021**	Tecnico qualificato *Qualified technician*	**GIUSEPPE ALZATI**	Apparecchiatura *Equipment*	**QC 355**

NOTA/*Note:*

i risultati di prova sono conformi ai requisiti previsti per il giunto di saldatura dalla normativa ASME IX QW-160 Ed. 2019

test results are conform in accordance with the requirements of standard ASME IX QW-160 Ed. 2019

COES SRL 12/05/21 ☐W ☒R

Ente di Collaudo / Surveyor

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MILAN ITALY

Ente di Collaudo / Surveyor

☐ Reviewed - ☒ Witnessed

date 14/05/2021

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PROVA DI RESILIENZA SU GIUNTI SALDATI – ASME IX QW-170 Ed. 2019

Charpy impact test on welded joints – ASME IX QW-170 Ed. 2019

SAGGIO *Test* No.	SENSO *Direct.*	POSIZIONE *Position*	TIPO *Type*	TEMP. °C	DIMENS. *Size* mm	VALORI *Single values* ≥ 20,25 J 1	2	3	MEDIA *Average* ≥ 20,25 J	ESPANSIONE LATERALE *Lateral Expansion* --- mm 1	2	3	AREA DUTTILE *Shear Area* --- % 1	2	3
0591.B	T	W.M.	KV_2	-196*	10x7,5	40	38	43	40,3	---	---	---	---	---	---
0591.B	T	H.A.Z. SIDE THK.30	KV_2	-196*	10x7,5	114	105	125	114,7	---	---	---	---	---	---
0591.B	T	H.A.Z. SIDE THK.10	KV_2	-196*	10x7,5	190	199	173	187,3	---	---	---	---	---	---

07.01mod RP IT2A

Data inizio prova *Test start date* **14/05/2021** | Data fine prova *Test end date* **14/05/2021** | Tecnico qualificato *Qualified technician* **GIUSEPPE ALZATI** | Apparecchiatura *Equipment* **QC 378**

Nota / *Note*: ---

* Temperatura fuori range rispetto all'accreditamento ACCREDIA

* *Temperature out of range compared to ACCREDIA accreditation*

COES SRL 17/05/21 W R

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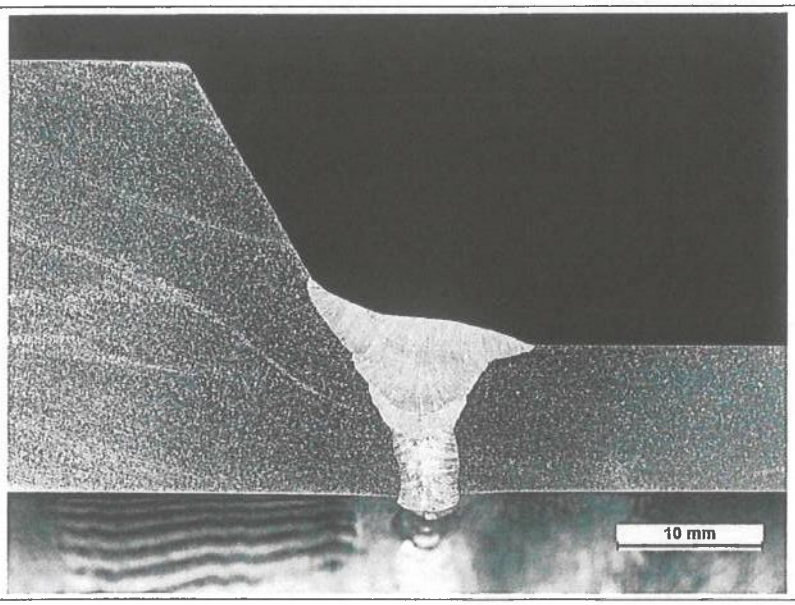
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date 19/05/21

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ESAME MACROSCOPICO DELLE SALDATURE - ASTM E340-15

Macroscopic examination of Welds - ASTM E340-15



Provetta n. *Test Specimen No.*	**0591.B**
Attacco *Etchant*	Acqua regia *Aqua regia*
Direzione di prelievo *Direction of sampling*	Trasversale *Transverse*

07.01 mod RP ME1A

Data inizio prova *Test start date*	14/05/2021	Data fine prova *Test end date*	14/05/2021	Tecnico qualificato *Qualified technician*	ANNIBALE ZOCCARATO	Apparecchiatura *Equipment*	---

Nota / *Note:*

L'esame visivo ad ingrandimento 5X e 10X non ha evidenziato difetti

Visual inspection at 5X and 10X magnification has shown no defects

COES SRL 17/05/2021 W R

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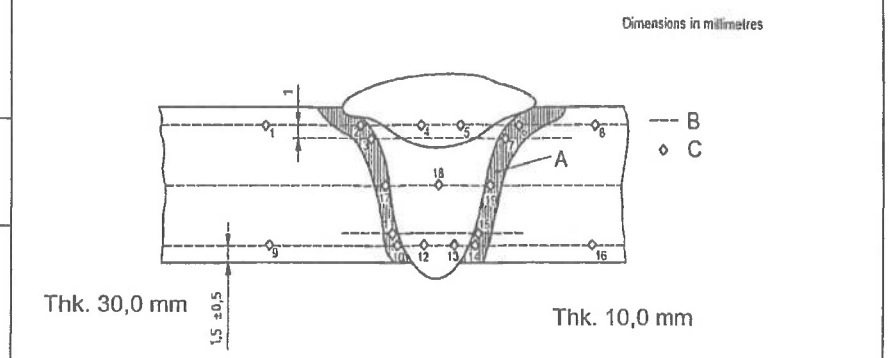
Reviewed / Witnessed

date 14/05/2021

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PROVA DI DUREZZA VICKERS SU GIUNTI SALDATI – ASTM E92-17
Weld joints hardness testing – ASTM E92-17

SAGGIO *Test*	**0591.B**
TIPO DI DUREZZA *Hardness type*	HV_{10}
VALORE MAX *Required value*	MAX 248 HV_{10}



Lo schema delle impronte di durezza la distanza tra le impronte è in accordo alla NACE MR0175
The hardness indentation sketch and indentation distance are according to NACE MR0175

RISULTATO
RESULT

01= 165	**02=** 176	**03=** 180	**04=** 198	**05=** 199	**06=** 165
07= 162	**08=** 155	**09=** 168	**10=** 182	**11=** 178	**12=** 208
13= 213	**14=** 185	**15=** 189	**16=** 157	**17=** 180	**18=** 199
19= 178					

Data inizio prova *Test start date*	**14/05/2021**	Data fine prova *Test end date*	**14/05/2021**	Tecnico qualificato *Qualified techinician*	**ANNIBALE BRAVI**	Apparecchiatura *Equipment*	**QC 372**

Nota / *Note:* ---

COEG SRL 17/05/21 W R

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date 14/05/2021

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MISURA DEL CONTENUTO DI FERRITE CON FERRITOSCOPIO – IL 18.00.01 (*)

Determination of Ferrite content by Ferritoscope – Il 18.00.01 (*)

Apparecchiature: *Test equipment*
- Ferritoscope FISCHER MP30 digitale (No. 030002498/2965)
- Calibrated by STANDARD FISCHER (SET No. 1239)

Valori richiesti: *Required values*
FOR INFO

Risultati: *Results:*

Posizione / *Position*	Valori ottenuti (%) / *Obtained values (%)*		
	1	2	3
Weld metal	12,5	13,2	12,7

07.01mod RP ME10

Data inizio prova *Test start date*	14/05/2021	Data fine prova *Test end date*	14/05/2021	Tecnico qualificato *Qualified technician*	LUCA ZOCCARATO	Apparecchiatura *Equipment*	---

Nota / *Note:* ---

FINE RAPPORTO / *END REPORT*

COES SRL 17/05/21 W R

Ente di Collaudo / Surveyor

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20099 SESTO SAN GIOVANNI
MILAN ITALY

Ente di Collaudo / Surveyor
Reviewed Witnessed
date 17/05/2021

CERTIFICATO DI APPROVAZIONE DI SALDATURA
WELDING PROCEDURE APPROVAL CERTIFICATE

PRD N° 004 B

Certificate No. 0001064

Fabbricante *Manufacturer*	**COES S.r.l.**
Indirizzo *Address*	**Via Pontida 265 – 24040 Stezzano (BG)**

Procedura di saldatura del Fabbricante n° *Manufacturer Welding Procedure n°*	Standard di riferimento *Reference Standard*	Ente Esaminatore *Examination Body*
01/17-A1 dated December 4, 2017	ASME SECTION IX	ICIM S.p.A.
02/17-A1 dated December 4, 2017	ASME SECTION IX	ICIM S.p.A.
02/20-A dated May 14, 2021	ASME SECTION IX	ICIM S.p.A.
03/20-A dated May 14, 2021	ASME SECTION IX	ICIM S.p.A.

ICIM S.p.A. Organismo Notificato no. 0425 certifica che la/e procedura/e di saldatura sopra indicata/e soddisfa/no i Requisiti Essenziali di Sicurezza della Direttiva PED 2014/68/UE con riferimento all'allegato I punto 3.1.2 sulla base dei risultati delle prove di laboratorio ed esami effettuati richiesti dalla Standard di riferimento e di eventuali prove ed esami aggiuntivi, stabiliti dalla relativa norma armonizzata.

ICIM S.p.A. Notified Body no. 0425 certifies that the welding procedure(s) indicated above meet(s) the Essential Safety Requirements of the PED Directive 2014/68/EU with reference to Annex I point 3.1.2 on the basis of the results of the laboratory tests and examinations carried out required by reference Standard and any eventual tests and examinations, set out by appropriate harmonized standard.

Data di redazione *Date of preparation*	Esaminatore *Examiner*	Luogo *Location*	Approvatore *Manager*
01/09/2023	Marco Lazzarin	Sesto S. Giovanni (MI)	*Vincenzo Delacqua* Rappresentante Direzione / Management Representative ICIM S.p.A.

13598M_00_IT

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

PROCEDURE QUALIFICATION RECORD
QW-483 - ASME IX Ed. 2019

Redatto/Issued: D.VILLA	Approvato/Approved: R.ZOIA	Data: 04/12/2017

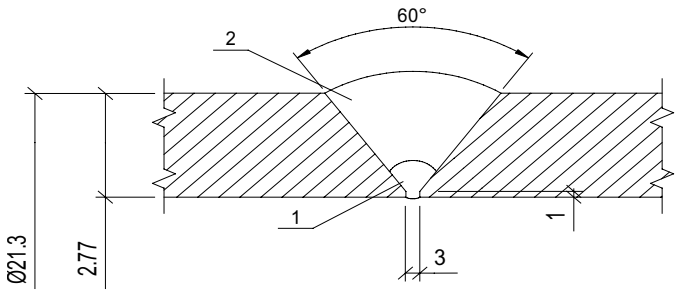
Company Name: **COES SRL Via Pontida, 265 STEZZANO 24040 (BG) - ITALY**

Procedure Qualification Record PQR No. **02/17-A1** Data: **04/12/2017**

WPS No. **02/17/-A1**

Welding Process(es) **1) GTAW** Types **1) Manual**

JOINT (QW-402)



BASE METAL (QW-403)

Material Spec.	**SA-312**	to	**SA-312**	
Type and Grade	**304**	to	**304**	
P No. **8**	Gr. **1**	to P No. **8**	Gr. **1**	
Thicknsess	**2,77 mm**			
Diameter	**21,3 mm**			
Others	**N.A.**			

FILLER METALS (QW-404)

	GTAW		
SFA Specification	**5.9**		
AWS Classification	**ER308L**		
Filler Metal F. No.	**6**		
Weld Metal Analysis A. No.	**8**		
Size of Electrodes (mm)	**ø 2,4**		
Deposited Weld Metal	**2,77 mm**		
Others Tradename	**Solid**		

POSITION (QW-405)

Position of Groove	**1G**
Weld Progression (Uph. Dow.)	**N.A.**

PREHEAT (QW-406)

Preheat Temperature	**15° C**
Interpass Temperature	**< 150 ° C**
Preheat Maintenance	**N.A.**

POSTWELD HEAT TREATMENT (QW-407)

Temperature	**N.A.**
Time	**N.A.**
Other	**N.A.**

GAS (QW-408)	Gas(es)	% Composition (Mixture)	Flow Rate
Shielding	**1) ARGON**	**99,998**	**10 l/m**
Backing	**1) ARGON**	**99,998**	**4 l/m**
Trailing	**N.A.**		

ELECTRICAL CHARATERISTICS (QW-409)

Current/Polarity	**1) DC-Straight**
Amperes	**1) 75-90**
Volts	**1) 12V**
Tugsten Electrode Size	**ø 2.4 mm WTh20 (Red)**
Other	
Heat Imput Max	**1) 1,08 kJ/mm**

TECHNIQUE (QW-410)

Travel Speed	**1) 60 mm/1'**
String or Weave Bead	**String**
Oscillation	**N.A.**
Multipass or Single Pass (for Side)	**Multipass**
Single or Multiple Electrodes	**N.A.**
Other	**Grinding & Brushing after each bead**

Note:

QUALITY CONTROL S.r.l.

LABORATORIO DI PROVE E CONTROLLI
SU MATERIALI METALLICI E GIUNTI DI SALDATURA

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www.qualitycontrolsrl.it - e-mail: info@qualitycontrolgroup.com
Iscr. Reg. Imp. BG 12004 - C.C.I.A.A. BG 166333 - Cod. Fisc. e P.IVA 00663350163 - Cap. Soc. €101.490,00

RAPPORTO DI PROVA N. *Test Report N.* 17/2303RP15 **DATA** *Date* 04/12/2017 **Foglio** *Page* 1 **di** *of* 7

CLIENTE *Customer* COES S.r.l. – STEZZANO (BG) **SAGGIO N.** *Test No.* 2303H

ORDINE *Order*	n. 3231/17 dated 14/11/2017	**DISTINTA PROVE** *List of tests*	---	**MATERIALE RICEVUTO IL** *Material received on*	15/11/2017

OGGETTO *Object*

Welding procedure qualification P.Q.R. n. **02/17-A1**
valid also for W.P.Q. n. **02/17-A1 – S4**
Pipe Ø 21,3 mm Thk. 2,77 mm
Welding Process: GTAW
Welding Position: 1G
Joint Type: BW
Job: 428/17
WPS n.: 02/17-A1
Welder: DELIGIOS GIULIANO GAVINO (Stamp: S4)

MATERIALE *Material* ASME SA312 Tp. 304

COLATA *Heat* ---

PRODUTTORE *Supplier* — **CERT. N.** *Cert. No.* --- **DEL** *dated* ---

NORME DI COLLAUDO *Test Specification* ASME IX 2015 Ed.

ENTE DI COLLAUDO *Surveyors* *ICIM*

Prove *Tests*	Pagina *Sheet*	Data Prova *Date of test*	Metodo di prova *Test method*	Apparecchiatura *Equipment*	Note *Note*
☑ Visivo / *Visual*	2	30/11/17	ASME V art.9	see report	***Conform***
☑ Penetranti / *Penetrant*	3	30/11/17	ASTM V art 6	see report	***Conform***
☑ Radiografia / *Radiography*	4	30/11/17	ASME V art.2	see report	***Conform***
☑ Trazione / *Tensile*	5	04/12/17	ASME IX - QW 150	QC 355	***Conform***
☑ Piega / *Bend*	5	04/12/17	ASME IX QW 160	QC 355	***Conform***
☑ Macrografia / *Macrography*	6	04/12/17	ASTM E340	QC 401	***Conform***
☑ Durezze / *Hardness*	7	04/12/17	ASTM E384	QC 371	***Conform***

Se non diversamente specificato, per l'accettabilità fanno fede le norme di collaudo e le norme relative al materiale
Unless otherwise specified, for the acceptability are valid test specifications and material standards

SI CERTIFICANO I RISULTATI OTTENUTI. TALI RISULTATI SONO RIFERITI ESCLUSIVAMENTE AI PROVINI TESTATI.
We certify the obtained results. These tests results refer only to examined samples.

ENTE DI COLLAUDO *Surveyor*

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Piazza Don Enrico Mapelli, 75
20099 SESTO SAN GIOVANNI
MILAN ITALY
info@icim.it

☐ Reviewed ☐ Witnessed
date 04/12/2017

COES SRL
04/12/17
W R

QUALITY CONTROL S.r.l.
MEDOLAGO (BG)
LOCATELLI p.i. MARC

QUALITY CONTROL S.r.l.
LABORATORIO DI PROVE E CONTROLLI
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CLIENTE / *Customer* COES S.r.l. – STEZZANO (BG) **SAGGIO N.** / *Test No.* 2303H

ESAME VISIVO
VISUAL TEST

Standard di riferimento / *Reference standard*	ASME V art.9 - 2015 Ed.
Criterio di accettabilità / *Acceptance criteria*	ASME IX QW-194 - 2015 Ed.
Stadio di lavorazione / *Working step*	AS WELDED
Condizioni superficiali / *Surface conditions*	AS WELDED

TECNICA
TECHNIQUE

■ Esame diretto / *Direct examination*	□ Esame indiretto / *Remote examination*	
Pulizia iniziale della superficie / *Starting surface Cleaning*		BRUSHING
Distanza massima occhio-oggetto / *Maximum distance eye-object (cm)*		60
Intensità di luce / *light intensity (lux)*		> 1000 Lux
Strumento di illuminazione / *Lighting equipment*		NATURAL

STRUMENTI UTILIZZATI
USED EQUIPMENTS

Tipo / *Type*	Costruttore / *Manufacturer*	Matricola / *Serial Number*
□ Endoscopio / *Boroscope*		
■ Calibro Cambridge / *Cambridge Caliper*	The welding institute	(SA112)
■ Luxmetro / *Luxmeter*	Delta Ohm HD2102.1	11009281 (SA132)
□		

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05/12/17
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CLIENTE / *Customer* COES S.r.l. – STEZZANO (BG) **SAGGIO N.** / *Test No.* 2303H

ESAME LIQUIDI PENETRANTI
PENETRANT TEST

Standard di riferimento *Reference standard*	ASME V art.6 - 2015 Ed.
Criterio di accettabilità *Acceptance criteria*	ASME IX QW 195.2 - 2015 Ed.
Stadio di lavorazione *Working step*	AS WELDED

TECNICA / *TECHNIQUE*			
■	Contrasto di colore / *Color contrast*	□	Fluorescente / *Fluorescent*
■	Lavabile in acqua / *Water washable*	□	Lavabile con solvente / *Solvent removable*
Pulizia iniziale della superficie / *Starting surface Cleaning*			Cleaner spray
Metodo applicazione del penetrante / *Dye penetrant application method*			Spray
Tempo min-max di penetrazione / *Min-max penetration time* (min.)			15-20
Metodo rimozione del penetrante / *Penetrant removing method*			Water rinsing
Metodo asciugatura / *Drying method*			Cloths and air flow
Tempo asciugatura / *Drying Time* (min.)			5
Metodo applicazione sviluppatore / *Developer application method*			Spray
Tempo min-max di sviluppo / *Min-max developing time* (min.)			10-60
Temperatura / *Temperature* (°C)			18°C
Strumento di illuminazione / *Lighting equipment*			Bulb lamp 100 W
Intensità di luce sulla superficie / *Light intensity on the surface*			>1000 LUX

PRODOTTI UTILIZZATI / *USED MATERIALS*			
	Produttore / *Manufacturer*	**Tipo** / *Type*	**Lotto** / *Lot*
Sgrassante / *Cleaner*	NDT-ELITE'	BC1	B160101s
Penetrante / *Penetrant*	NDT-ELITE'	K71B2p	150907Ps
Pulitore / *Remover*	Water	----	-----
Sviluppatore / *Developer*	NDT-ELITE'	D112A	160210Ws

COES SRL 05/12/17 W R

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date 04/12/2017

CIMINO EMILIO
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II° Liv. SNT-TC-1A
ST - PT - MT - UT - VT

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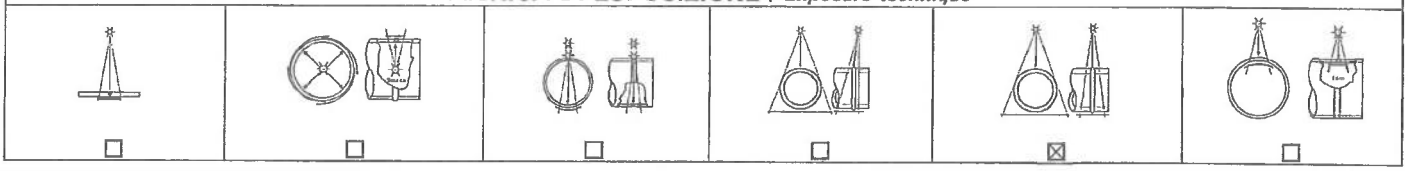
RAPPORTO DI PROVA N. / Test Report N.	DATA / Date	Foglio / Page	di / of
17/2303RP15	04/12/2017	4	7

CLIENTE / Customer: COES S.r.l. – STEZZANO (BG)

SAGGIO N. / *Test No.*: 2303H

Standard di riferimento / *Reference standard*	ASME V art.2		
Criterio di accettabilità / *Acceptance criteria*	ASME IX QW 191.1.2	**Stadio di lavorazione** / *Working step*	AS WELDED

TECNICA DI ESPOSIZIONE / *Exposure technique*



☐ ☐ ☐ ☐ ☒ ☐

PARAMETRI DEL TEST / *Test parameters*

Spess. nominale di parete (mm) / *Nominal single wall thickness*	2,77	Spessore rinf. di sald. (mm) / *Welding reinforcement thickness*	2	Numero di esposizioni / *Exposure number*	3
Distanza fuoco-oggetto (mm) / *Source to object distance*	700	Distanza oggetto film (mm) / *Object to film distance*	21.3	Nr. Films per cassetta / *Film for each holder*	1
Costruttore della sorgente / *Source manufacturer*	SEIFERT	Tipo di sorgente / *Source type*	RX	Identificazione / *Source identification*	SA151
Attività (Ci) / *Activity*	---	Energia della radiazione (KV) / *Radiation Energy*	160	Intens. radiazione (mA) / *Radiation intensity*	3
Tempo di esposizione (minuti) / *Exposure time*	1'	Macchia focale (mm) / *Focal spot size*	3	Penombra / *Ug*	0,09
Tipo di penetrametro / *Penetrameter type*	ASTM 1A	Posizione del penetrametro / *Penetrameter location*	SOURCE	Filo/Foro richiesto / *Required wire/hole*	W7
Produttore film / *Film manufacturer*	AGFA GEVAERT	Tipo di film / *Film type*	D5	Dimensioni (cm) / *Film size*	10x16

Tecnica di esposizione / *Exposure technique*	☐ Parete sing. / *Single wall*	☒ Parete dop. / *Double wall*	Tecnica di lettura / *Viewing technique*	☐ Parete sing. / *Single wall*	☒ Parete dop. / *Double wall*		
Tipo schermi intensificatori / *Intensifying screen type*	☒ Pb	☐ Cu	Spessore schermi (mm) / *Screen thickness*	Ant.	0,05	Post.	0,10
Trattamento del film / *Film treatment*	☒ Automatico / *Automatic*	☐ Manuale / *Manual*					

LEGENDA

C	Conforme / Conforming	R	Non conforme / Not conforming	RRX	Ripetere esposizione / Exposure to be repeated
D*	Densità misurata / Measured density	S*	Filo/Foro rilevato / Wire/Hole detected	G*	Giudizio / Evaluation

VALUTAZIONE / *EVALUATION*

Tallone / *Coupon*	Tratto / *Area*	Discontinuità / *Discontinuity*	D*	S*	G*	Tallone / *Coupon*	Tratto / *Area*	Discontinuità / *Discontinuity*	D*	S*	G*
1	A	2011	2,5	W3	C	3	A	-----	2,4	W3	C
	B	-----	2,3	W3	C		B	-----	2,3	W3	C
	C	-----	2,2	W3	C		C	-----	2,4	W3	C
2	A	-----	2,5	W3	C	4	A	-----	2,8	W3	C
	B	2011	2,1	W3	C		B	-----	2,5	W3	C
	C	-----	2,2	W3	C		C	-----	2,3	W3	C

CLASSIFICAZIONE DELLE DISCONTINUITÀ
DISCONTINUITY CLASSIFICATION

101	Cricca longitudinale / *Longitudinal crack*	2014	Porosità allineate / *Linear Porosity*	304	Inclusioni metalliche / *Metallic inclusion*	504	Eccesso di penetrazione / *Excessive penetration*
102	Cricca trasversale / *Transversal crack*	2015 2016	Cavità allungate e tarli / *Elongated cavities and wormholes*	C 401	Mancanza di fusione / *Lack of fusion*	601	Colpo d'arco / *Stray arc*
104	Cricca di cratere / *Crater crack*	202	Cavità di ritiro / Shrinkage cavity	D 402	Mancanza di penetrazione / *Lack of penetration*	602	Spruzzi / *Spatter*
201 1 201 2	Porosità / *Porosity and gas pores*	2024	Crateri di ritiro / *Crater pipe*	5011 5012	Incisione cont. e interm. / *Undercut continues and intermit.*	SCR	Difetto schermo / *Screen defect*
201 3	Gruppi di porosità / *Clustered Porosity*	301 302	Inclusioni di scoria o flusso / *Slag or flux inclusion*	515	Insellamento / *Root concavity*	F	Difetto film / *Film defect*

ENTE DI COLLAUDO / Surveyor

ICIM S.p.A
Piazza Don Enrico Mapelli, 75
20099 SESTO SAN GIOVANNI
MILAN ITALY
info@icim.it

☒ Reviewed - ☐ Witnessed
date 04/12/2017

COES SRL
05/12/17
W R

CERTIFICATO EMILIO
Liv. 2 - EN 473 / ISO 9712
PT - MT - UT - VT

QUALITY CONTROL S.r.l.
MEDOLAGO (BG)

LOCATELLI p.i. MARC

QUALITY CONTROL S.r.l.
LABORATORIO DI PROVE E CONTROLLI
SU MATERIALI METALLICI E GIUNTI DI SALDATURA
24030 MEDOLAGO (BG) - Via Roma, 79 - Tel. 035/90.14.73 (n. 4 linee r.a.) - Fax 035/90.10.82
www.qualitycontrolsrl.it - e-mail: info@qualitycontrolgroup.com
Iscr. Reg. Imp. BG 12004 - C.C.I.A.A. BG 166333 - Cod. Fisc. e P.IVA 00663350163 - Cap. Soc. €101.490,00

CLIENTE / *Customer* COES S.r.l. – STEZZANO (BG) **SAGGIO N.** / *Test No.* 2303H

PROVA DI TRAZIONE
TENSILE TEST

SAGGIO *Test* N.	DIMENSIONI *Size* mm	AREA *Section* mm²	SENSO *Direction*	Lo mm	CARICO TOTALE A ROTTURA *Total load at break* ---- N	ROTTURA *Tensile Strength* ≥ 515 N/mm²	ALLUNG. *Elong.* ≥ ---- %	STRIZ. *Reduct.* ≥ --- %	TEMP. °C
2303H 1	Ø 21,3 Thk.2,77	161,3	T	---	106.000	657	---	---	+21
2303H 2	Ø 21,3 Thk.2,77	161,3	T	---	105.000	651	---	---	+21
ROTTE FUORI SALDATURA - FRATTURA DUTTILE *BROKEN OUT OF WELDING - DUCTILE FRACTURE*									

PROVA DI PIEGA
BEND TEST

SAGGIO *Test* N.	SENSO *Direction*	ANGOLO *Angle*	MANDRINO *Former*	POSIZIONE *Position*	ALLUNG. *Elong.*	RISULTATO *Result*	NOTE *Notes*
2303H 1	T	180	Ø 4T	FACE	---	SATISFACTORY	---
2303H 2	T	180	Ø 4T	FACE	---	SATISFACTORY	---
2303H 1	T	180	Ø 4T	ROOT	---	SATISFACTORY	---
2303H 2	T	180	Ø 4T	ROOT	---	SATISFACTORY	---

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05/12/17
W R

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LOCATELLI p.i. MARCO

...il testo non può essere riprodotto, salvo autorizzazione scritta del laboratorio

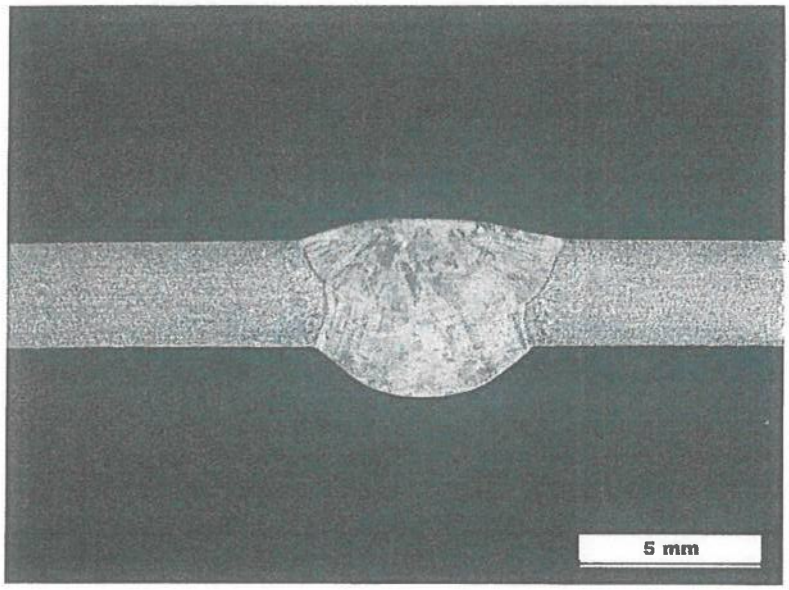
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CLIENTE *Customer* COES S.r.l. – STEZZANO (BG) **SAGGIO N.** *Test No.* 2303H

ESAME MACROGRAFICO
MACROGRAPHIC EXAMINATION



Attacco: Acqua regia
Etching: Aqua regia

RISULTATO
RESULT

L'esame visivo a 10X di ingrandimento non ha evidenziato difetti o anomalie metallurgiche.
The visual examination at 10X magnification has shown no defects or abnormal metallurgical features.

ENTE DI COLLAUDO *Surveyor*
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date 04/12/2017

COES SRL
05/12/17
W R

QUALITY CONTROL S.r.l.
LOCATELLI p.i. MARIO

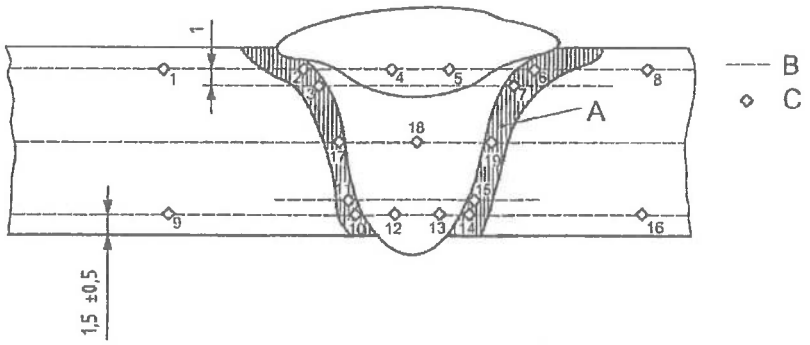
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CLIENTE / *Customer* COES S.r.l. – STEZZANO (BG) **SAGGIO N.** / *Test No.* 2303H

PROVE DI DUREZZA TIPO HV_{10} (MAX 248 HV)

HARDNESS TEST TYPE HV_{10} (MAX 248 HV)

Dimensions in millimetres



RISULTATO

RESULT

01= 172	02= 174	03= 172	04= 156	05= 153	06= 175
07= 177	08= 169	09= 170	10= 169	11= 173	12= 158
13= 157	14= 168	15= 165	16= 164	17= 172	18= 155
19= 172					

ENTE DI COLLAUDO / *Surveyor*
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20099 SESTO SAN GIOVANNI
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☐ Reviewed - ☐ Witnessed
date 04/12/2017

COES SRL
05/12/17
W R

QUALITY CONTROL S.r.l.
LOCATELLI p.i. MARC

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

PROCEDURE QUALIFICATION RECORD
QW-483 - ASME IX Ed. 2019

Tensile Test (QW-150)

Specimen No.	widt (mm)	thickness (mm)	Area (mm^2)	Ult. Total Load (KN)	Ult. Unit Stress (N/mm^2)	Charact. Of Fail & Location
2303H-1	ø21,3	2,77	161,3	106	657	B.M. - Ductile
2302H-2	ø21,3	2,77	161,3	105	651	B.M. - Ductile

Guided Bend Test (QW-160)

Type and Figure No.		Result
2303H-1	**(Face Bend) (180°/4t)**	**Satisfactory**
2303H-2	**(Face Bend) (180°/4t)**	**Satisfactory**
2303H-1	**(Root Bend) (180°/4t)**	**Satisfactory**
2303H-2	**(Root Bend) (180°/4t)**	**Satisfactory**

Toughness Test (QW-170) *Test positions selected according to ASME VIII Div.1 UG-84 (h) (3) and UG-84 (5)*

Specimen No.	Notch Location	Notch Type	Test Temp.	Impact Value	Lateral Expansion		Drop Weight	
					% Shear	Mils	Break	No Break
/	/		/		/	/	/	/
/	/		/		/	/	/	/
/	/		/		/	/	/	/
/	/		/		/	/	/	/

Test Position Selected According to ASME VIII Div.1 UG-84 Table UG-84.6 between 1/4 t and 1/2 t from the surface.
The Charpy impact on GTAW process was not performed because the usefull thk. of the process is less than 2.5 mm, according to UG-84(5)(c).

Fillet Weld Test (QW--180)

Result-Satisfactory (yes/no)	**N.A.**	Penetr.into Parental Metal (yes/no)	N.A.
ReMacro-Result			

Other Tests

Type of Test	Visual Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**17/2303RP15**
Type of Test	Penetrant Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**17/2303RP15**
Type of Test	Radiography Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**17/2303RP15**
Type of Test	Macrography Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**17/2303RP15**
Type of Test	Hardness Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**17/2303RP15**
Welder Name	**DELIGIOS GIULIANO GAVINO**	ClocK No.	/	Stamp No.	**S4**
Test Conducted by	**QUALITY CONTROL GROUP S.r.l.**	Laboratory Test No.	**17/2303RP15**	Date	**04/12/2017**

We certify that the statement in the record are correct and that the test welds were prepared, welded and tested in accordance with the reqirements od Sect.IX of the ASME Code 2019

Manufacturer

COES srl - STEZZANO (BG)

Date 04/12/2017 by R.Zoi

COES S.r.l. 24040 STEZZANO, ITALY - Via Pontida, 265	**SPECIFICA DI PROCEDURA DI SALDATURA** *WELDING PROCEDURE SPECIFICATION*	**ICIM-WPQR-007096-00_01/18-A1**

CAMPO DI VALIDITA' - *RANGE OF APPROVAL*

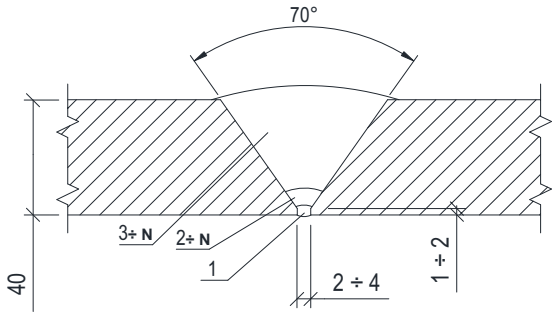
WPQR N.	PROCEDIMENTO DI SALDATURA *WELDING PROCESS*	POSIZIONE DI SALDATURA *WELDING POSITIONG*	TIPO DI GIUNTO *JOINT TYPE*
ICIM-WPQR-007096-00	141 + 111 + 121	PA	BW

NORME APPLICABILI *APPLICABLE RULES*	METODO DI PREPARAZIONE E PULIZIA *METHOD OF PREPARATION AND CLEANING*	GRUPPO DEL MATERIALE BASE *PARENT METAL GROUP*
UNI EN ISO 15614-1	MOLATURA SGRASSAGGIO / GRINDING DEGREASING	1 to 1

TEMPERATURA DI PRERISCALDO *PREHEATING TEMPERATURE*	TRATTAMENTO TERMICO DOPO SALDATURA *POST WELD HEAT TREATMENT*
min 10°C	N.A.

PREPARAZIONE DI SALDATURA - *WELD PREPARATION*

CAMPO DI VALIDITA' - SPES. (mm) *RANGE OF APPROVAL- THICKNESS (mm)*	CAMPO DI VALIDITA' EST. TUBO (mm) *PIPE OUT. DIAMETER RANGE OF APPROVAL (mm)*
3 ÷ 20 *(nessun limite sullo spessore del materiale base)*	≥ 25
DISEGNO DEL GIUNTO - *JOINT DESIGN*	SEQUENZA DELLE PASSATE - *WELDING SEQUENCE*



PARAMETRI DI SALDATURA - *WELDING DETAILS*

PASSATA *LAYER*	PROCEDIMENTO *PROCESS*	MAT. D'APP.(mm) *Φ FILLER METAL(mm)*	AMPERAGGIO *CURRENT*	VOLTAGGIO *VOLTAGE*	TIPO DI COR./POLARITA' *TYPE OF CURRENT/POLARITY*	VELOCITA'(mm/min) *TRAVEL SPEED(mm/min)*	APPORTO TER.(J/mm) *HEAT IMPUT(kJ/mm)*
1	141	Ø2,4	160 ÷ 170	19 ÷ 20	DC (-)	80 ÷ 90	2.55
2	111	Ø3,25	140 ÷ 160	22 ÷ 24	DC (+)	180 ÷ 190	1.28
3 ÷ n	121	Ø3,25	440 ÷ 460	30 ÷ 32	DC (+)	480 ÷ 500	1.84

METALLO BASE TIPO/ DESIGNAZIONE : *BASE METAL TYPE/DESIGNATION:*	1.1 - 1.1		

METALLO D'APPORTO/DESIGNAZIONE : *FILLER METAL TYPE / DESIGNATION :*	AWS-SFA 5.18 EN ISO 2560-A: E 42 5 B 32 H5
	AWS-SFA 5.1 EN ISO 14171-A: S 38 4 AB S2

FLUSSO : *FLUX :*	EN ISO 14174: S A AB 1 67 AC H5	TEMPERATURA DI MANTENIMENTO (C°): *TEMPERATURE OF HOLDING OVEN(C°):*	N.A.

GAS DI PROTEZIONE : *SHIELDING GAS :*	PORTATA GAS (l/min) : *GAS FLOW RATE (l/min) :*	GAS DI SOSTEGNO : *BACKING GAS :*
EN ISO 14175 I1 (141)	9÷12 (141)	N.A.

TEMPERATURA DI INTERPASS (C°) : *INTERPASS TEMPERATURE (C°) :*	ELETTRODO DI TUNGSTENO/TIPO E SEZIONE: *TUNGSTEN ELECTRODE/ TYPE AND SIZE :*
<250°C	ø 2.4 mm WLa20 (Blue)

NOTE:

N° DI REVISIONE : *REVISION N°:*	EMESSA DA : *ISSUED BY:*	APPROVATA DA: *APPROVED BY:*	DATA *DATE*
0	ZR	Roberto Zoia	02/11/2020

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

PROCEDURE QUALIFICATION RECORD
QW-483 - ASME IX Ed. 2019

Redatto/Issued: D.VILLA	Approvato/Approved: R.ZOIA	Data: 14/05/2021

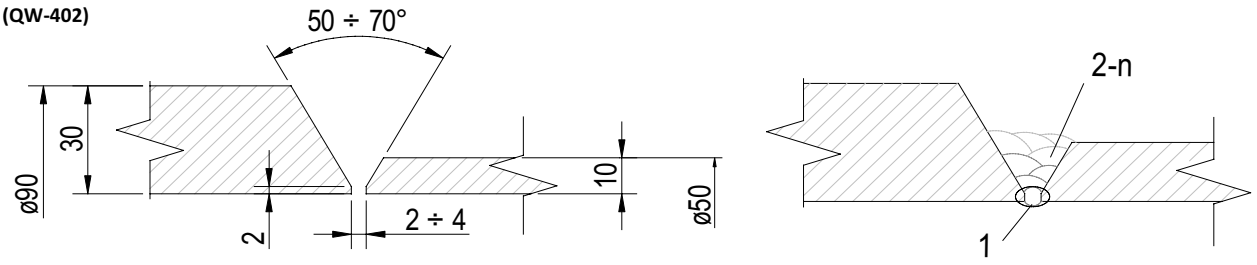
Company Name: **COES SRL Via Pontida, 265 STEZZANO 24040 (BG) - ITALY**

Procedure Qualification Record PQR No. **02/20-A** Data: **14/05/2021**

WPS No. **02/20-A**

Welding Process(es) **1) GTAW** **2) SMAW** Types **1) Manual** **2) Manual**

JOINT (QW-402)



BASE METAL (QW-403)

Material Spec.	**SA-350**	to	**SA-350**	
Type and Grade	**LF2 cl.1**	to	**LF2 cl.1**	
P No. **1**	Gr. **2**	to P No. **1**	Gr. **2**	
Thicknsess	**10 to 30 mm**			
Diameter	**50 to 90 mm**			
Others	**tpass > 13 mm: N.A.**			

POSTWELD HEAT TREATMENT (QW-407)

Temperature	**N.A.**
Time	**N.A.**
Other	**N.A.**

GAS (QW-408)	Gas(es)	% Composition (Mixture)	Flow Rate
Shielding	**1) ARGON**	**99,998**	**10 l/m**
Backing	**N.A.**		
Trailing	**N.A.**		

FILLER METALS (QW-404)	**GTAW**	**SMAW**	
SFA Specification	**5.18**	**5.1**	
AWS Classification	**ER70S-6**	**E7016-1**	
Filler Metal F. No.	**6**	**4**	
Weld Metal Analysis A. No.	**1 (note 1)**	**1**	
Size of Electrodes (mm)	**ø 2,4**	**ø 3,2**	
Deposited Weld Metal	**2,0 mm**	**8,00 mm**	
Others Tradename	**Solid**		

ELECTRICAL CHARATERISTICS (QW-409)

Current/Polarity	**1) DC-Straight**	**2) DC-Reverse**
Amperes	**1) 140**	**2) 100**
Volts	**1) 14**	**2) 24**
Tugsten Electrode Size	**ø 2.4 mm WLa20 (Blue)**	
Other		
Heat Imput Max	**1) 1,96 kJ/mm**	**2) 1,44 kJ/mm**

POSITION (QW-405)

Position of Groove	**1G**
Weld Progression (Uph. Dow.)	**N.A.**

PREHEAT (QW-406)

Preheat Temperature	**18 °C**
Interpass Temperature	**300 ° C**
Preheat Maintenance	**N.A.**

TECHNIQUE (QW-410)

Travel Speed	**1) 60 mm/1'** **2) 100 mm/1'**
String or Weave Bead	**String**
Oscillation	**N.A.**
Multipass or Single Pass (for Side)	**Multipass**
Single or Multiple Electrodes	**N.A.**
Other	**Grinding & Brushing after each bead**

Note: note 1: Mn max 1.6%

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

PROCEDURE QUALIFICATION RECORD
QW-483 - ASME IX Ed. 2019

Tensile Test (QW-150)

Specimen No.	widt (mm)	thickness (mm)	Area (mm^2)	Ult. Total Load (KN)	Ult. Unit Stress (N/mm^2)	Charact. Of Fail & Location
0591.A-1	ø13	9,8	127,4	63,19	496	B.M. - Ductile
0591.A-2	ø13,1	9,7	127	62,35	491	B.M. - Ductile

Guided Bend Test (QW-160)

Type and Figure No.		Result
0591.A-1.1	**(Face Bend) (180°/4t)**	**Satisfactory**
0591.A-1.2	**(Face Bend) (180°/4t)**	**Satisfactory**
0591.A-2,1	**(Root Bend) (180°/4t)**	**Satisfactory**
0591.A-2,2	**(Root Bend) (180°/4t)**	**Satisfactory**

Toughness Test (QW-170) *Test positions selected according to ASME VIII Div.1 UG-84 (h) (3) and UG-84 (5)*

Specimen No.	Notch Location	Notch Type	Test Temp.	Impact Value	Lateral Expansion		Drop Weight	
					% Shear	Mils	Break	No Break
0591.A	**W.M.**	**KV2**	**-46**	**51,7**	**/**	**/**	**/**	**/**
0591.A	**H.A.Z. SIDE THK.10**	**KV2**	**-46**	**112**	**/**	**/**	**/**	**/**
0591.A	**H.A.Z. SIDE THK.10**	**KV2**	**-46**	**133,3**	**/**	**/**	**/**	**/**

Test Position Selected According to ASME VIII Div.1 UG-84 Table UG-84.6 between 1/4 t and 1/2 t from the surface.
The Charpy impact on GTAW process was not performed because the usefull thk. of the process is less than 2.5 mm, according to UG-84(5)(c).

Fillet Weld Test (QW--180)

Result-Satisfactory (yes/no)	**N.A.**	Penetr.into Parental Metal (yes/no)	N.A.
ReMacro-Result	**N.A.**		

Other Tests

Type of Test	Visual Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA19 - 0591-A**
Type of Test	Penetrant Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA19 - 0591-A**
Type of Test	Radiography Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA19 - 0591-A**
Type of Test	Macrography Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA19 - 0591-A**
Type of Test	Hardness Test	Laboratory	QUALITY CONTROL GROUP S.r.l	Test No.	**21/0591RPA19 - 0591-A**
Welder Name	**DEL PRATO ROBERTO**	ClocK No.	**/**	Stamp No.	**S2**
Test Conducted by	**QUALITY CONTROL GROUP S.r.l**	Laboratory Test No.	**21/0591RPA19**	Date	**14/05/2021**

We certify that the statement in the record are correct and that the test welds were prepared, welded and tested in accordance with the reqirements od Sect.IX of the ASME Code 2019

Manufacturer

COES srl - STEZZANO (BG)

Date 14/05/2021 by R.Zoia

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

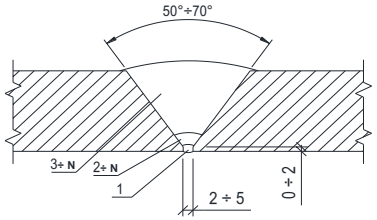
SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

SOCIETA':					
Company Name:				COES SRL Via Pontida, 265 24040 STEZZANO (BG) - ITALY	
SPECIFICA DI SALDATURE No.:				QUALIFICA DI SUPPORTO:	
Welding Procedure Specification No.:	**WPS 02/17-A1**			Supporting PQR No.(s):	**02/17-A1**
REVISIONE:		DATA:		CLIENTE:	
Revision:	**0**	Date:	**04/12/2017**	Customer:	**
TIPO:				COMMESSA:	
Type:	**Manual**			Job No.:	**
PROCEDIMENTO:				DISEGNO No.:	
Welding Process:	**GTAW**			Drawing No.:	**

GIUNTO
Joints (QW-402)

DISEGNO DEL GIUNTO: **V GROOVE**
Joint Design:
SUPPORTO / Backing: **NO for GTAW - YES for SMAW**
MATERIALE SUPPORTO
Backing Material (type):
Base Metal **X Weld Metal**
No Fusible Metal | No Metal | No Retainers

DETTAGLI:
Details:



METALLO BASE
BASE MATERIALS (QW-403)

P No.:	**8**	GRUPPO No.:		To P No.:	**8**	CON GRUPPO No.:
		Group No.:				TO Group No.:

SPECIFICA TIPO E GRADO:
Specification Type and Grade: **

CON SPECIFICA TIPO E GRADO:
To Specification Type and Grade: **

ANALISI CHIMICA E PROPRIETA' MECCANICHE:
Chemical Analysis and Mechanical Proprerty: **

CON ANALISI CHIMICA E PROPRIETA' MECCANICHE:
To Chemical Analysis and Mechanical Proprerty: **

METALLO BASE:	SMUSSO:		ANGOLO:	
Base Metal:	Groove:	**1,5 ÷ 5,54 mm**	Fillet:	**ALL**
GAMMA DIAMETRI TUBI:	SMUSSO:		ANGOLO:	
Pipe Dia. Range:	Groove:	**-**	Fillet:	

ALTRO:
Other: **No Pass > 13 mm. (QW-403.9)**

MATERIALE D'APPORTO
FILLER METAL (QW-404)

PROCEDIMENTO: Process:	**GTAW**		
Speci. No. (SFA):	**5.9**		
AWS No. (Class):	**ER308L**		
F-NO No.:	**6**		
A-NO No.:	**8**		
DIAM. METALLO D'APPORTO: Size of filler metal:	**ø 2,4**		
METALLO D'APPORTO DEPOSITATO: Deposited weld metal:			
GAMMA SPESSORI: Thickness range:			
SMUSSO: Groove:	**≤ 5,54 mm**	**≤ mm**	**≤ mm**
ANGOLO: Fillet:	**N.A.**		
FILO-FLUSSO / Electrode - Flux (Class) +/-	**N.A.**		
DENOMINAZIONE COMMERCIALE: Tradename:			
INSERTO CONSUMABILE: Consumable insert:	**N.A.**		
TIPOLOGIA MATERIALE DI APPORTO: Filler metal product form:	**SOLID WIRE**		

coes
Via Pontida, 265 24040 STEZZANO (BG) - ITALY

SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

POSIZIONE: **Position (QW-405):**			**TRATTAMENTO TERMICO DOPO SALDATURA:** **Postweld Heat Treatment (QW-407):**		
POSIZIONE SMUSSO: Groove Position(s):	**FLAT**		GAMMA DI TEMPERATURA: Temperature Range:	**N.A.**	
PROGRESSIONE SALDATURA: Welding Progression (up/down):	**N.A.**		TEMPO DI MANTENIMENTO: Time Range:	**N.A.**	
POSIZIONE SALDATURA ANGOLO: Fillet Position(s):	**N.A.**		ALTRO: Other:		
PRERISCALDO: **Preheat (QW-406):**		**GAS (QW-408)**	**% Composition**		
			Gas(es)	(Mixture)	Flow Rate
TEMPERATURA PRERISCALDO MIN.: Min. Preheat Temp.:	**15° C**	Shielding	**(GTAW) ARGON**	**99,998**	**9 ÷ 11 l/m**
TEMPERATURA DI INTERPASS MAX: Max. Interpass Temp.:	**150° C**	Backing	**(GTAW) ARGON**	**99,998**	**3,5 ÷ 4,5 l/m**
MANTENIMENTO PRERISCALDO: Preheat Maintenance:	**N.A.**	Trailing	**N.A.**		

CARATTERISTICHE ELETTRICHE **Eletrical Characteristics (QW-409)**			
CORRENTE - POLARITA': Current A.C. or D.C. - Polarity:	**1) DC-Straight**		
CAMPO AMPERAGGIO: Ampere (Range):	**See Table**	CAMPO VOLTS: Volts (Range):	**See Table**
TIPO E DIAMETRO ELETTRODO TUGSTENO (GTAW): Tugsten Electrodes Size and Type (GTAW):	**ø 2.4 mm WLa20 (Blue)**		
CARATTERISTICHE DELL'ARCO PER GMAW: Mode of Metal Transfer for GMAW:	**N.A.**		
GAMMA DI VELOCITA' ALIMENTAZIONE FILO: Electrodes Wire Feed Speed Range:	**N.A.**		

TECNICA **TECHNIQUE (QW-410)**	**GTAW**			
PASSATA STRETTA O LARGA: String or Weavw Bead:	**String**			
DIMENSION UGELLO: Orifice or Gas Cup Size:	**ø 14 mm**			
PULIZIA INIZIALE TRA LE PASSATE (Spazzolatura, Molatura, etc.): Inital and Interpass Cleaning (Brushing, Grinding, etc.):	**Grinding & Brushing after each bead**			
METODO DI RIPRESA AL ROVESCIO: Method of Back Gouging:	**N.A.**			
OSCILLAZIONE: Oscillation:	**NO**			
DISTANZA UGELLO DI CONTATTO / PEZZO: Contact Tube to Work Distance:	**N.A.**			
PASSATA SINGOLA O MULTLIPLA (per lato): Single or Multiple pass (for side):	**Multipass**			
ELETTRODO MULTIPLO O SINGOLO: Multiple or Single Electrodes:				
CAMPO VELOCITA' SALDATURA: Travel Speed (range):	**See Table**			
MARTELLATURA: Peening:	**NO**			

ALTRO: Other:	Temp. Range: **min. according to Table UCS-56.1 (ASME VIII Div.1), max. according to PQR** Time Range: **min. according to Table UCS-56.1 (ASME VIII Div.1), max. according to PQR**

TABELLA
Table

STRATI Weld Layers(s)	PROCED. DI SALDATURA Process	METALLO D'APPORTO Filler Metal Classif.	 Dia. (mm)	CORRENTE Current POLARITA' Polarity	 CAMPO AMPERE Amp. Range	CAMPO VOLTS Voltage Range	GAMMA VELOCITA' DI LAVORO Travel Speed Range (mm/1')	MAX. APP. TERMICO Max. Heat Input (KJ/mm)
1	**GTAW**	**ER308L**	**ø 2,4**	**1) DC-Straight**	**81 ÷ 99**	**10,8 ÷ 13,2**	**54 ÷ 66**	**1,452**
2 ÷ N	**GTAW**	**ER308L**	**ø 2,4**	**2) DC-Reverse**	**67,5 ÷ 82,5**	**10,8 ÷ 13,2**	**54 ÷ 66**	**1,21**

Redatto/Issued:	D.VILLA	Approvato/Approved:		Data:	04/12/2017

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

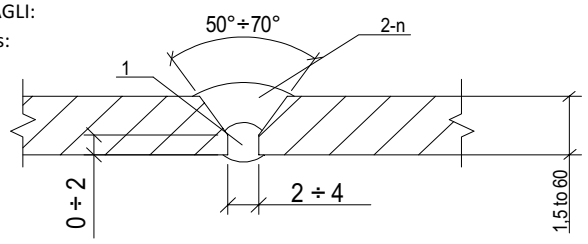
SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

SOCIETA':					
Company Name:				COES SRL Via Pontida, 265 24040 STEZZANO (BG) - ITALY	
SPECIFICA DI SALDATURE No.:				QUALIFICA DI SUPPORTO:	
Welding Procedure Specification No.:	**WPS 02/20-A**			Supporting PQR No.(s):	**02/20-A**
REVISIONE:		DATA:		CLIENTE:	
Revision:	**0**	Date:	**14/05/2021**	Customer:	**
TIPO:				COMMESSA:	
Type:	**1) Manual**	**2) Manual**		Job No.:	**
PROCEDIMENTO:				DISEGNO No.:	
Welding Process:	**1) GTAW**	**2) SMAW**		Drawing No.:	**

GIUNTO
Joints (QW-402)

DISEGNO DEL GIUNTO: **V GROOVE**
Joint Design:
SUPPORTO / Backing: **NO for GTAW - YES for SMAW**
MATERIALE SUPPORTO
Backing Material (type):
Base Metal **X Weld Metal**
No Fusible Metal | No Metal | No Retainers

DETTAGLI:
Details:



METALLO BASE
BASE MATERIALS (QW-403)

P No.:	**1**	GRUPPO No.:		To P No.:	**1**	CON GRUPPO No.:
		Group No.:				TO Group No.:

SPECIFICA TIPO E GRADO:
Specification Type and Grade: **

CON SPECIFICA TIPO E GRADO:
To Specification Type and Grade: **

ANALISI CHIMICA E PROPRIETA' MECCANICHE:
Chemical Analysis and Mechanical Proprerty: **

CON ANALISI CHIMICA E PROPRIETA' MECCANICHE:
To Chemical Analysis and Mechanical Proprerty: **

METALLO BASE:	SMUSSO:			ANGOLO:	
Base Metal:	Groove:	**1,5 ÷ 60 mm**		Fillet:	**ALL**
GAMMA DIAMETRI TUBI:	SMUSSO:			ANGOLO:	
Pipe Dia. Range:	Groove:	**-**		Fillet:	

ALTRO:
Other: **No Pass > 13 mm. (QW-403.9)**

MATERIALE D'APPORTO
FILLER METAL (QW-404)

PROCEDIMENTO: Process:	**GTAW**	**SMAW**	
Speci. No. (SFA):	**5.18**	**5.1**	
AWS No. (Class):	**ER70S-6**	**E7016-1**	
F-NO No.:	**6**	**4**	
A-NO No.:	**1 (note 1)**	**1**	
DIAM. METALLO D'APPORTO: Size of filler metal:	**ø 2,4**	**ø 3,2**	
METALLO D'APPORTO DEPOSITATO: Deposited weld metal:			
GAMMA SPESSORI: Thickness range:			
SMUSSO: Groove:	**≤ 4,0 mm**	**≤ 16,0 mm**	**≤ mm**
ANGOLO: Fillet:	**N.A.**	**N.A.**	
FILO-FLUSSO / Electrode - Flux (Class) +/-	**N.A.**	**N.A.**	
DENOMINAZIONE COMMERCIALE: Tradename:	**-**	**-**	
INSERTO CONSUMABILE: Consumable insert:	**N.A.**	**N.A.**	
TIPOLOGIA MATERIALE DI APPORTO: Filler metal product form:	**SOLID WIRE**	**-**	

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

POSIZIONE: **Position (QW-405):**		**TRATTAMENTO TERMICO DOPO SALDATURA:** **Postweld Heat Treatment (QW-407):**			
POSIZIONE SMUSSO: Groove Position(s):	**FLAT - 1G**	GAMMA DI TEMPERATURA: Temperature Range:	**N.A**		
PROGRESSIONE SALDATURA: Welding Progression (up/down):	**N.A.**	TEMPO DI MANTENIMENTO: Time Range:	**N.A**		
POSIZIONE SALDATURA ANGOLO: Fillet Position(s):	**N.A.**	ALTRO: Other:	**N.A**		
PRERISCALDO: **Preheat (QW-406):**		**GAS (QW-408)**	**% Composition**		
			Gas(es)	(Mixture)	Flow Rate
TEMPERATURA PRERISCALDO MIN.: Min. Preheat Temp.:	**> 10° C**	Shielding	**(GTAW) ARGON**	**99,998**	**9 ÷ 11 l/m**
TEMPERATURA DI INTERPASS MAX: Max. Interpass Temp.:	**< 300° C**	Backing	**N.A.**		
MANTENIMENTO PRERISCALDO: Preheat Maintenance:	**N.A.**	Trailing	**N.A.**		

CARATTERISTICHE ELETTRICHE **Eletrical Characteristics (QW-409)**			
CORRENTE - POLARITA': Current A.C. or D.C. - Polarity:	**1) DC-Straight**	**2) DC-Reverse**	
CAMPO AMPERAGGIO: Ampere (Range):	**See Table**	CAMPO VOLTS: Volts (Range):	**See Table**
TIPO E DIAMETRO ELETTRODO TUGSTENO (GTAW): Tugsten Electrodes Size and Type (GTAW):	**ø 2.4 mm WLa20 (Blue)**		
CARATTERISTICHE DELL'ARCO PER GMAW: Mode of Metal Transfer for GMAW:	**N.A.**		
GAMMA DI VELOCITA' ALIMENTAZIONE FILO: Electrodes Wire Feed Speed Range:	**N.A.**		

TECNICA **TECHNIQUE (QW-410)**	**GTAW**	**SMAW**	
PASSATA STRETTA O LARGA: String or Weavw Bead:	**String**	**String**	
DIMENSION UGELLO: Orifice or Gas Cup Size:	**ø 14 mm**		
PULIZIA INIZIALE TRA LE PASSATE (Spazzolatura, Molatura, etc.): Inital and Interpass Cleaning (Brushing, Grinding, etc.):	**Grinding & Brushing after each bead**	**Grinding & Brushing after each bead**	
METODO DI RIPRESA AL ROVESCIO: Method of Back Gouging:	**N.A.**	**N.A.**	
OSCILLAZIONE: Oscillation:	**NO**	**NO**	
DISTANZA UGELLO DI CONTATTO / PEZZO: Contact Tube to Work Distance:	**N.A.**	**N.A.**	
PASSATA SINGOLA O MULTLIPLA (per lato): Single or Multiple pass (for side):	**Multipass**	**0**	
ELETTRODO MULTIPLO O SINGOLO: Multiple or Single Electrodes:		**N.A.**	
CAMPO VELOCITA' SALDATURA: Travel Speed (range):	**See Table**	**See Table**	
MARTELLATURA: Peening:	**NO**	**NO (slag removal is not considered peening)**	

ALTRO: Other:	

TABELLA
Table

STRATI Weld Layers(s)	PROCED. DI SALDATURA Process	METALLO D'APPORTO Filler Metal Classif.	 Dia. (mm)	CORRENTE Current POLARITA' Polarity	 CAMPO AMPERE Amp. Range	CAMPO VOLTS Voltage Range	GAMMA VELOCITA' DI LAVORO Travel Speed Range (mm/1')	MAX. APP. TERMICO Max. Heat Input (KJ/mm)
1	**GTAW**	**ER70S-2**	**ø 2,4**	**1) DC-Straight**	**133 ÷ 147**	**13,3 ÷ 14,7**	**57 ÷ 63**	**2,274**
2 ÷ N	**SMAW**	**E7016-1**	**ø 3,2**	**2) DC-Reverse**	**95 ÷ 105**	**22,8 ÷ 25,2**	**95 ÷ 105**	**1,67**

Redatto/Issued:	D.VILLA	Approvato/Approved:	R.ZOIA	Data:	14/05/2021

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

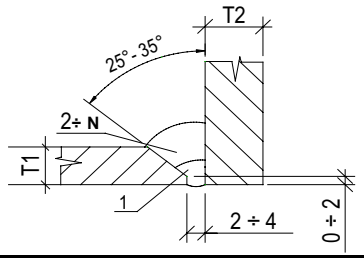
SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

SOCIETA':					
Company Name:				COES SRL Via Pontida, 265 24040 STEZZANO (BG) - ITALY	
SPECIFICA DI SALDATURE No.:				QUALIFICA DI SUPPORTO:	
Welding Procedure Specification No.:		**WPS 02/20-A2**		Supporting PQR No.(s):	**02/20-A**
REVISIONE:		DATA:		CLIENTE:	
Revision:	**0**	Date:	**14/05/2021**	Customer:	**
TIPO:				COMMESSA:	
Type:	**1) Manual**	**2) Manual**		Job No.:	**
PROCEDIMENTO:				DISEGNO No.:	
Welding Process:	**1) GTAW**	**2) SMAW**		Drawing No.:	**

GIUNTO
Joints (QW-402)

DISEGNO DEL GIUNTO: **1/2 V GROOVE**
Joint Design:
SUPPORTO / Backing: **NO for GTAW - YES for SMAW**
MATERIALE SUPPORTO
Backing Material (type):
Base Metal **X Weld Metal**
No Fusible Metal | No Metal | No Retainers

DETTAGLI:
Details:



METALLO BASE
BASE MATERIALS (QW-403)

P No.:	**1**	GRUPPO No.: Group No.:	**-**	To P No.:	**1**	CON GRUPPO No.: TO Group No.:	**-**

SPECIFICA TIPO E GRADO: Specification Type and Grade: **
CON SPECIFICA TIPO E GRADO: To Specification Type and Grade: **
ANALISI CHIMICA E PROPRIETA' MECCANICHE: Chemical Analysis and Mechanical Proprerty: **
CON ANALISI CHIMICA E PROPRIETA' MECCANICHE: To Chemical Analysis and Mechanical Proprerty: **

METALLO BASE: Base Metal:	SMUSSO: Groove:	**1,5 ÷ 60 mm**		ANGOLO: Fillet:	**ALL**
GAMMA DIAMETRI TUBI: Pipe Dia. Range:	SMUSSO: Groove:	**-**		ANGOLO: Fillet:	

ALTRO: Other: **No Pass > 13 mm. (QW-403.9)**

MATERIALE D'APPORTO
FILLER METAL (QW-404)

PROCEDIMENTO: Process:	**GTAW**	**SMAW**	
Speci. No. (SFA):	**5.18**	**5.1**	
AWS No. (Class):	**ER70S-6**	**E7016-1**	
F-NO No.:	**6**	**4**	
A-NO No.:	**1 (note 1)**	**1**	
DIAM. METALLO D'APPORTO: Size of filler metal:	**ø 2,4**	**ø 3,2**	
METALLO D'APPORTO DEPOSITATO: Deposited weld metal:			
GAMMA SPESSORI: Thickness range:			
SMUSSO: Groove:	≤ **4,0** **mm**	≤ **16,0** **mm**	
ANGOLO: Fillet:	**N.A.**	**N.A.**	
FILO-FLUSSO / Electrode - Flux (Class) +/-	**N.A.**	**N.A.**	
DENOMINAZIONE COMMERCIALE: Tradename:	-	-	
INSERTO CONSUMABILE: Consumable insert:	**N.A.**	**N.A.**	
TIPOLOGIA MATERIALE DI APPORTO: Filler metal product form:	**SOLID WIRE**	-	

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Via Pontida, 265 24040 STEZZANO (BG) - ITALY

SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

POSIZIONE: **Position (QW-405):**			**TRATTAMENTO TERMICO DOPO SALDATURA:** **Postweld Heat Treatment (QW-407):**		
POSIZIONE SMUSSO: Groove Position(s):	**FLAT**		GAMMA DI TEMPERATURA: Temperature Range:	**N.A.**	
PROGRESSIONE SALDATURA: Welding Progression (up/down):	**N.A.**		TEMPO DI MANTENIMENTO: Time Range:	**N.A.**	
POSIZIONE SALDATURA ANGOLO: Fillet Position(s):	**N.A.**		ALTRO: Other:		
PRERISCALDO: **Preheat (QW-406):**		**GAS (QW-408)**	**% Composition**		
			Gas(es)	(Mixture)	Flow Rate
TEMPERATURA PRERISCALDO MIN.: Min. Preheat Temp.:	**> 10° C**	Shielding	**(GTAW) ARGON**	**99,998**	**9 ÷ 11 l/m**
TEMPERATURA DI INTERPASS MAX: Max. Interpass Temp.:	**< 300° C**	Backing	**N.A.**		
MANTENIMENTO PRERISCALDO: Preheat Maintenance:	**N.A.**	Trailing	**N.A.**		

CARATTERISTICHE ELETTRICHE **Eletrical Characteristics (QW-409)**			
CORRENTE - POLARITA': Current A.C. or D.C. - Polarity:	**1) DC-Straight**	**2) DC-Reverse**	
CAMPO AMPERAGGIO: Ampere (Range):	**See Table**	CAMPO VOLTS: Volts (Range):	**See Table**
TIPO E DIAMETRO ELETTRODO TUGSTENO (GTAW): Tugsten Electrodes Size and Type (GTAW):	**ø 2.4 mm WLa20 (Blue)**		
CARATTERISTICHE DELL'ARCO PER GMAW: Mode of Metal Transfer for GMAW:	**N.A.**		
GAMMA DI VELOCITA' ALIMENTAZIONE FILO: Electrodes Wire Feed Speed Range:	**N.A.**		

TECNICA **TECHNIQUE (QW-410)**	**GTAW**	**SMAW**	
PASSATA STRETTA O LARGA: String or Weavw Bead:	**String**	**String**	
DIMENSION UGELLO: Orifice or Gas Cup Size:	**ø 14 mm**		
PULIZIA INIZIALE TRA LE PASSATE (Spazzolatura, Molatura, etc.): Inital and Interpass Cleaning (Brushing, Grinding, etc.):	**Grinding & Brushing after each bead**	**Grinding & Brushing after each bead**	
METODO DI RIPRESA AL ROVESCIO: Method of Back Gouging:	**N.A.**	**N.A.**	
OSCILLAZIONE: Oscillation:	**NO**	**NO**	
DISTANZA UGELLO DI CONTATTO / PEZZO: Contact Tube to Work Distance:	**N.A.**	**N.A.**	
PASSATA SINGOLA O MULTLIPLA (per lato): Single or Multiple pass (for side):	**Multipass**	**0**	
ELETTRODO MULTIPLO O SINGOLO: Multiple or Single Electrodes:		**N.A.**	
CAMPO VELOCITA' SALDATURA: Travel Speed (range):	**See Table**	**See Table**	
MARTELLATURA: Peening:	**NO**	**NO (slag removal is not considered peening)**	

ALTRO: Other:	Temp. Range: **min. according to Table UCS-56.1 (ASME VIII Div.1), max. according to PQR** Time Range: **min. according to Table UCS-56.1 (ASME VIII Div.1), max. according to PQR**

TABELLA
Table

STRATI	PROCED. DI SALDATURA	METALLO D'APPORTO Filler Metal		CORRENTE Current		CAMPO VOLTS	GAMMA VELOCITA' DI LAVORO	MAX. APP. TERMICO
Weld Layers(s)	Process	Classif.	Dia. (mm)	POLARITA' Polarity	CAMPO AMPERE Amp. Range	Voltage Range	Travel Speed Range (mm/1')	Max. Heat Input (KJ/mm)
1	**GTAW**	**ER70S-2**	**ø 2,4**	**1) DC-Straight**	**133 ÷ 147**	**13,3 ÷ 14,7**	**57 ÷ 63**	**2,274**
2 ÷ N	**SMAW**	**E7016-1**	**ø 3,2**	**2) DC-Reverse**	**95 ÷ 105**	**22,8 ÷ 25,2**	**95 ÷ 105**	**1,67**

Redatto/Issued:	D. VILLA	Approvato/Approved:	R. ZOIA	Data:	14/05/2021

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

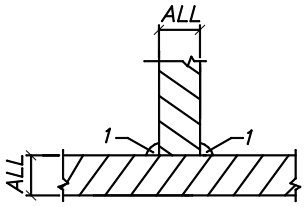
SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

SOCIETA':					
Company Name:	COES SRL Via Pontida, 265 24040 STEZZANO (BG) - ITALY				
SPECIFICA DI SALDATURE No.:				QUALIFICA DI SUPPORTO:	
Welding Procedure Specification No.:	**WPS 02/20-A6**			Supporting PQR No.(s):	**02/20-A**
REVISIONE:		DATA:		CLIENTE:	
Revision:	**0**	Date:	**09/07/2019**	Customer:	**
TIPO:				COMMESSA:	
Type:	**Manual**			Job No.:	**
PROCEDIMENTO:				DISEGNO No.:	
Welding Process:	**SMAW**			Drawing No.:	**

GIUNTO
Joints (QW-402)

DISEGNO DEL GIUNTO: **1/2 V GROOVE**
Joint Design:
SUPPORTO / Backing: **YES for SMAW**
MATERIALE SUPPORTO
Backing Material (type):
Base Metal **X Weld Metal**
No Fusible Metal | No Metal | No Retainers

DETTAGLI:
Details:



METALLO BASE
BASE MATERIALS (QW-403)

P No.:	1	GRUPPO No.: Group No.:	-	To P No.:	1	CON GRUPPO No.: TO Group No.:	-

SPECIFICA TIPO E GRADO: Specification Type and Grade: **
CON SPECIFICA TIPO E GRADO: To Specification Type and Grade: **
ANALISI CHIMICA E PROPRIETA' MECCANICHE: Chemical Analysis and Mechanical Proprerty: **
CON ANALISI CHIMICA E PROPRIETA' MECCANICHE: To Chemical Analysis and Mechanical Proprerty: **

METALLO BASE: Base Metal:	SMUSSO: Groove:	**N.A.**		ANGOLO: Fillet:	**ALL**
GAMMA DIAMETRI TUBI: Pipe Dia. Range:	SMUSSO: Groove:	**-**		ANGOLO: Fillet:	

ALTRO: Other: **No Pass > 13 mm. (QW-403.9)**

MATERIALE D'APPORTO
FILLER METAL (QW-404)

PROCEDIMENTO: Process:	**SMAW**		
Speci. No. (SFA):	**5.1**		
AWS No. (Class):	**E7016.1**		
F-NO No.:	**4**		
A-NO No.:	**1**		
DIAM. METALLO D'APPORTO: Size of filler metal:	**ø 3,25**		
METALLO D'APPORTO DEPOSITATO: Deposited weld metal:			
GAMMA SPESSORI: Thickness range:			
SMUSSO: Groove:	**≤ N.A. mm**		
ANGOLO: Fillet:	**N.A.**		
FILO-FLUSSO / Electrode - Flux (Class) +/-	**N.A.**		
DENOMINAZIONE COMMERCIALE: Tradename:	**-**		
INSERTO CONSUMABILE: Consumable insert:	**N.A.**		
TIPOLOGIA MATERIALE DI APPORTO: Filler metal product form:	**-**		

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Via Pontida, 265 24040 STEZZANO (BG) - ITALY

SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

POSIZIONE: **Position (QW-405):**	**TRATTAMENTO TERMICO DOPO SALDATURA:** **Postweld Heat Treatment (QW-407):**
POSIZIONE SMUSSO: Groove Position(s): **FLAT**	GAMMA DI TEMPERATURA: Temperature Range: **N.A.**
PROGRESSIONE SALDATURA: Welding Progression (up/down): **N.A.**	TEMPO DI MANTENIMENTO: Time Range: **N.A.**
POSIZIONE SALDATURA ANGOLO: Fillet Position(s): **N.A.**	ALTRO: Other:

PRERISCALDO: **Preheat (QW-406):**	**GAS (QW-408)**	**% Composition**		
		Gas(es)	(Mixture)	Flow Rate
TEMPERATURA PRERISCALDO MIN.: Min. Preheat Temp.: **15° C**	Shielding	**N.A.**		
TEMPERATURA DI INTERPASS MAX: Max. Interpass Temp.: **150° C**	Backing	**N.A.**		
MANTENIMENTO PRERISCALDO: Preheat Maintenance: **N.A.**	Trailing	**N.A.**		

CARATTERISTICHE ELETTRICHE **Eletrical Characteristics (QW-409)**		
CORRENTE - POLARITA': Current A.C. or D.C. - Polarity: **DC-Reverse**		
CAMPO AMPERAGGIO: Ampere (Range): **See Table**	CAMPO VOLTS: Volts (Range):	**See Table**
TIPO E DIAMETRO ELETTRODO TUGSTENO (GTAW): Tugsten Electrodes Size and Type (GTAW): **N.A.**		
CARATTERISTICHE DELL'ARCO PER GMAW: Mode of Metal Transfer for GMAW: **N.A.**		
GAMMA DI VELOCITA' ALIMENTAZIONE FILO: Electrodes Wire Feed Speed Range: **N.A.**		

TECNICA **TECHNIQUE (QW-410)**	**SMAW**		
PASSATA STRETTA O LARGA: String or Weavw Bead:	**String**		
DIMENSION UGELLO: Orifice or Gas Cup Size:	**ø 14 mm**		
PULIZIA INIZIALE TRA LE PASSATE (Spazzolatura, Molatura, etc.): Inital and Interpass Cleaning (Brushing, Grinding, etc.):	**Grinding & Brushing after each bead**		
METODO DI RIPRESA AL ROVESCIO: Method of Back Gouging:	**N.A.**		
OSCILLAZIONE: Oscillation:	**NO**		
DISTANZA UGELLO DI CONTATTO / PEZZO: Contact Tube to Work Distance:	**N.A.**		
PASSATA SINGOLA O MULTLIPLA (per lato): Single or Multiple pass (for side):	**Multipass**		
ELETTRODO MULTIPLO O SINGOLO: Multiple or Single Electrodes:	**Single**		
CAMPO VELOCITA' SALDATURA: Travel Speed (range):	**See Table**		
MARTELLATURA: Peening:	**NO**		

ALTRO: Other:	

TABELLA
Table

STRATI Weld Layers(s)	PROCED. DI SALDATURA Process	METALLO D'APPORTO Filler Metal Classif.	 Dia. (mm)	CORRENTE Current POLARITA' Polarity	 CAMPO AMPERE Amp. Range	CAMPO VOLTS Voltage Range	GAMMA VELOCITA' DI LAVORO Travel Speed Range (mm/1')	MAX. APP. TERMICO Max. Heat Input (KJ/mm)
1 ÷ N	**SMAW**	**E7016-1**	**ø 3,25**	**2) DC-Reverse**	**148**	**23**	**187**	**1089**

Redatto/Issued: F.ROSSI Approvato/Approved: R. ZOLA Data: 28/05/2024

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

SOCIETA':					
Company Name:				COES SRL Via Pontida, 265 24040 STEZZANO (BG) - ITALY	
SPECIFICA DI SALDATURE No.:				QUALIFICA DI SUPPORTO:	
Welding Procedure Specification No.:	**WPS 03/20-A1 - 316**			Supporting PQR No.(s):	**03/20-A**
REVISIONE:		DATA:		CLIENTE:	
Revision:	**0**	Date:	**14/05/2021**	Customer:	**
TIPO:				COMMESSA:	
Type:	**1) Manual**	**2) Manual**		Job No.:	**
PROCEDIMENTO:				DISEGNO No.:	
Welding Process:	**1) GTAW**	**2) SMAW**		Drawing No.:	**

GIUNTO
Joints (QW-402)

DISEGNO DEL GIUNTO: **V GROOVE**
Joint Design:

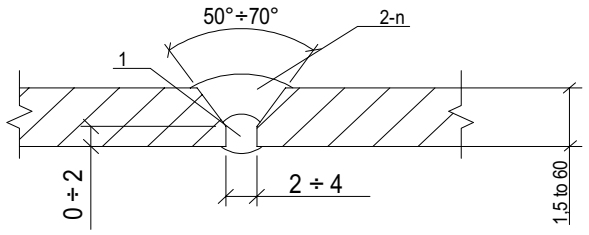
SUPPORTO / Backing: **NO for GTAW - YES for SMAW**

MATERIALE SUPPORTO
Backing Material (type):

Base Metal **X Weld Metal**

No Fusible Metal | No Metal | No Retainers

DETTAGLI:
Details:



METALLO BASE
BASE MATERIALS (QW-403)

P No.:	**8**	GRUPPO No.: Group No.:	**-**	To P No.:	**8**	CON GRUPPO No.: TO Group No.:	**-**

SPECIFICA TIPO E GRADO:
Specification Type and Grade: **

CON SPECIFICA TIPO E GRADO:
To Specification Type and Grade: **

ANALISI CHIMICA E PROPRIETA' MECCANICHE:
Chemical Analysis and Mechanical Proprerty: **

CON ANALISI CHIMICA E PROPRIETA' MECCANICHE:
To Chemical Analysis and Mechanical Proprerty: **

METALLO BASE:	SMUSSO:		ANGOLO:	
Base Metal:	Groove:	**1,5 ÷ 60 mm**	Fillet:	**ALL**
GAMMA DIAMETRI TUBI:	SMUSSO:		ANGOLO:	
Pipe Dia. Range:	Groove:	**-**	Fillet:	

ALTRO:
Other: **No Pass > 13 mm. (QW-403.9)**

MATERIALE D'APPORTO
FILLER METAL (QW-404)

PROCEDIMENTO: Process:	**GTAW**	**SMAW**	
Speci. No. (SFA):	**5.9**	**5.4**	
AWS No. (Class):	**ER316L**	**E316L-16**	
F-NO No.:	**6**	**5**	
A-NO No.:	**8**	**8**	
DIAM. METALLO D'APPORTO: Size of filler metal:	**ø 2,4**	**ø 3,2**	
METALLO D'APPORTO DEPOSITATO: Deposited weld metal:			
GAMMA SPESSORI: Thickness range:			
SMUSSO: Groove:	**≤ 4,0 mm**	**≤ 16,0 mm**	
ANGOLO: Fillet:	**N.A.**	**N.A.**	
FILO-FLUSSO / Electrode - Flux (Class) +/-	**N.A.**	**N.A.**	
DENOMINAZIONE COMMERCIALE: Tradename:	**-**	**-**	
INSERTO CONSUMABILE: Consumable insert:	**N.A.**	**N.A.**	
TIPOLOGIA MATERIALE DI APPORTO: Filler metal product form:	**SOLID WIRE**	**-**	

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

POSIZIONE: **Position (QW-405):**	**TRATTAMENTO TERMICO DOPO SALDATURA:** **Postweld Heat Treatment (QW-407):**
POSIZIONE SMUSSO: Groove Position(s): **FLAT**	GAMMA DI TEMPERATURA: Temperature Range: **N.A.**
PROGRESSIONE SALDATURA: Welding Progression (up/down): **N.A.**	TEMPO DI MANTENIMENTO: Time Range: **N.A.**
POSIZIONE SALDATURA ANGOLO: Fillet Position(s): **N.A.**	ALTRO: Other:

PRERISCALDO: **Preheat (QW-406):**	**GAS (QW-408)**	**% Composition**		
		Gas(es)	(Mixture)	Flow Rate
TEMPERATURA PRERISCALDO MIN.: Min. Preheat Temp.: **15° C**	Shielding	**ARGON**	**99,998**	**9,5 ÷ 10,5 l/m**
TEMPERATURA DI INTERPASS MAX: Max. Interpass Temp.: **150° C**	Backing	**ARGON**	**99,998**	**3,5 ÷ 4,5 l/m**
MANTENIMENTO PRERISCALDO: Preheat Maintenance: **N.A.**	Trailing	**N.A.**		

CARATTERISTICHE ELETTRICHE **Eletrical Characteristics (QW-409)**		
CORRENTE - POLARITA': Current A.C. or D.C. - Polarity: **1) DC-Straight**	**2) DC-Reverse**	
CAMPO AMPERAGGIO: Ampere (Range): **See Table**	CAMPO VOLTS: Volts (Range):	**See Table**
TIPO E DIAMETRO ELETTRODO TUGSTENO (GTAW): Tugsten Electrodes Size and Type (GTAW):	**ø 2.4 mm WLa20 (Blue)**	
CARATTERISTICHE DELL'ARCO PER GMAW: Mode of Metal Transfer for GMAW:	**N.A.**	
GAMMA DI VELOCITA' ALIMENTAZIONE FILO: Electrodes Wire Feed Speed Range:	**N.A.**	

TECNICA **TECHNIQUE (QW-410)**	**GTAW**	**SMAW**	
PASSATA STRETTA O LARGA: String or Weavw Bead:	**String**	**String**	
DIMENSION UGELLO: Orifice or Gas Cup Size:	**ø 14 mm**		
PULIZIA INIZIALE TRA LE PASSATE (Spazzolatura, Molatura, etc.): Inital and Interpass Cleaning (Brushing, Grinding, etc.):	**Grinding & Brushing after each bead**	**Grinding & Brushing after each bead**	
METODO DI RIPRESA AL ROVESCIO: Method of Back Gouging:	**N.A.**	**N.A.**	
OSCILLAZIONE: Oscillation:	**NO**	**NO**	
DISTANZA UGELLO DI CONTATTO / PEZZO: Contact Tube to Work Distance:	**N.A.**	**N.A.**	
PASSATA SINGOLA O MULTLIPLA (per lato): Single or Multiple pass (for side):	**Multipass**	**0**	
ELETTRODO MULTIPLO O SINGOLO: Multiple or Single Electrodes:		**N.A.**	
CAMPO VELOCITA' SALDATURA: Travel Speed (range):	**See Table**	**See Table**	
MARTELLATURA: Peening:	**NO**	**NO (slag removal is not considered peening)**	

ALTRO: Other:	

TABELLA
Table

STRATI Weld Layers(s)	PROCED. DI SALDATURA Process	METALLO D'APPORTO Filler Metal Classif.	 Dia. (mm)	CORRENTE Current POLARITA' Polarity	 CAMPO AMPERE Amp. Range	CAMPO VOLTS Voltage Range	GAMMA VELOCITA' DI LAVORO Travel Speed Range (mm/1')	MAX. APP. TERMICO Max. Heat Input (KJ/mm)
1	**GTAW**	**ER316L**	**ø 2,4**	**1) DC-Straight**	**114 ÷ 126**	**13,3 ÷ 14,7**	**57 ÷ 63**	**1,95**
2 ÷ N	**SMAW**	**E316L-16**	**ø 3,2**	**2) DC-Reverse**	**104 ÷ 115**	**22,8 ÷ 25,2**	**95 ÷ 105**	**1,83**

Redatto/Issued: D. VILLA Approvato/Approved: R. ZOIA Data: 14/05/2021

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

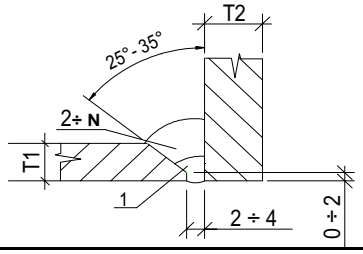
SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

SOCIETA':					
Company Name:				COES SRL Via Pontida, 265 24040 STEZZANO (BG) - ITALY	
SPECIFICA DI SALDATURE No.:				QUALIFICA DI SUPPORTO:	
Welding Procedure Specification No.:	**WPS 03/20-A2 - 316**			Supporting PQR No.(s):	**03/20-A**
REVISIONE:		DATA:		CLIENTE:	
Revision:	**0**	Date:	**14/05/2021**	Customer:	**
TIPO:				COMMESSA:	
Type:	**1) Manual**	**2) Manual**		Job No.:	**
PROCEDIMENTO:				DISEGNO No.:	
Welding Process:	**1) GTAW**	**2) SMAW**		Drawing No.:	**

GIUNTO
Joints (QW-402)

DISEGNO DEL GIUNTO: **1/2 V GROOVE**
Joint Design:
SUPPORTO / Backing: **NO for GTAW - YES for SMAW**
MATERIALE SUPPORTO
Backing Material (type):
Base Metal **X Weld Metal**
No Fusible Metal | No Metal | No Retainers

DETTAGLI:
Details:



METALLO BASE
BASE MATERIALS (QW-403)

P No.:	**8**	GRUPPO No.: Group No.:	**-**	To P No.:	**8**	CON GRUPPO No.: TO Group No.:	**-**

SPECIFICA TIPO E GRADO: Specification Type and Grade: **
CON SPECIFICA TIPO E GRADO: To Specification Type and Grade: **
ANALISI CHIMICA E PROPRIETA' MECCANICHE: Chemical Analysis and Mechanical Proprerty: **
CON ANALISI CHIMICA E PROPRIETA' MECCANICHE: To Chemical Analysis and Mechanical Proprerty: **

METALLO BASE:	SMUSSO:			ANGOLO:	
Base Metal:	Groove:	**1,5 ÷ 60 mm**		Fillet:	**ALL**
GAMMA DIAMETRI TUBI:	SMUSSO:			ANGOLO:	
Pipe Dia. Range:	Groove:	**-**		Fillet:	

ALTRO:
Other: **No Pass > 13 mm. (QW-403.9)**

MATERIALE D'APPORTO
FILLER METAL (QW-404)

PROCEDIMENTO: Process:	**GTAW**			**SMAW**			
Speci. No. (SFA):	**5.9**			**5.4**			
AWS No. (Class):	**ER316L**			**E316L-16**			
F-NO No.:	**6**			**5**			
A-NO No.:	**8**			**8**			
DIAM. METALLO D'APPORTO: Size of filler metal:	**ø 2,4**			**ø 3,2**			
METALLO D'APPORTO DEPOSITATO: Deposited weld metal:							
GAMMA SPESSORI: Thickness range:							
SMUSSO: Groove:	**≤**	**4,0**	**mm**	**≤**	**16,0**	**mm**	
ANGOLO: Fillet:	**N.A.**			**N.A.**			
FILO-FLUSSO / Electrode - Flux (Class) +/-	**N.A.**			**N.A.**			
DENOMINAZIONE COMMERCIALE: Tradename:	**-**			**-**			
INSERTO CONSUMABILE: Consumable insert:	**N.A.**			**N.A.**			
TIPOLOGIA MATERIALE DI APPORTO: Filler metal product form:	**SOLID WIRE**			**-**			

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

POSIZIONE: **Position (QW-405):**	**TRATTAMENTO TERMICO DOPO SALDATURA:** **Postweld Heat Treatment (QW-407):**
POSIZIONE SMUSSO: Groove Position(s): **FLAT**	GAMMA DI TEMPERATURA: Temperature Range: **N.A.**
PROGRESSIONE SALDATURA: Welding Progression (up/down): **N.A.**	TEMPO DI MANTENIMENTO: Time Range: **N.A.**
POSIZIONE SALDATURA ANGOLO: Fillet Position(s): **N.A.**	ALTRO: Other:

PRERISCALDO: **Preheat (QW-406):**	**GAS (QW-408)**	**% Composition**		
		Gas(es)	(Mixture)	Flow Rate
TEMPERATURA PRERISCALDO MIN.: Min. Preheat Temp.: **15° C**	Shielding	**ARGON**	**99,998**	**9,5 ÷ 10,5 l/m**
TEMPERATURA DI INTERPASS MAX: Max. Interpass Temp.: **150° C**	Backing	**ARGON**	**99,998**	**3,5 ÷ 4,5 l/m**
MANTENIMENTO PRERISCALDO: Preheat Maintenance: **N.A.**	Trailing	**N.A.**		

CARATTERISTICHE ELETTRICHE **Eletrical Characteristics (QW-409)**			
CORRENTE - POLARITA': Current A.C. or D.C. - Polarity:	**1) DC-Straight**	**2) DC-Reverse**	
CAMPO AMPERAGGIO: Ampere (Range):	**See Table**	CAMPO VOLTS: Volts (Range):	**See Table**
TIPO E DIAMETRO ELETTRODO TUGSTENO (GTAW): Tugsten Electrodes Size and Type (GTAW):	**ø 2.4 mm WLa20 (Blue)**		
CARATTERISTICHE DELL'ARCO PER GMAW: Mode of Metal Transfer for GMAW:	**N.A.**		
GAMMA DI VELOCITA' ALIMENTAZIONE FILO: Electrodes Wire Feed Speed Range:	**N.A.**		

TECNICA **TECHNIQUE (QW-410)**	**GTAW**	**SMAW**	
PASSATA STRETTA O LARGA: String or Weavw Bead:	**String**	**String**	
DIMENSION UGELLO: Orifice or Gas Cup Size:	**ø 14 mm**		
PULIZIA INIZIALE TRA LE PASSATE (Spazzolatura, Molatura, etc.): Inital and Interpass Cleaning (Brushing, Grinding, etc.):	**Grinding & Brushing after each bead**	**Grinding & Brushing after each bead**	
METODO DI RIPRESA AL ROVESCIO: Method of Back Gouging:	**N.A.**	**N.A.**	
OSCILLAZIONE: Oscillation:	**NO**	**NO**	
DISTANZA UGELLO DI CONTATTO / PEZZO: Contact Tube to Work Distance:	**N.A.**	**N.A.**	
PASSATA SINGOLA O MULTLIPLA (per lato): Single or Multiple pass (for side):	**Multipass**	**0**	
ELETTRODO MULTIPLO O SINGOLO: Multiple or Single Electrodes:		**N.A.**	
CAMPO VELOCITA' SALDATURA: Travel Speed (range):	**See Table**	**See Table**	
MARTELLATURA: Peening:	**NO**	**NO (slag removal is not considered peening)**	

ALTRO: Other:	

TABELLA
Table

STRATI Weld Layers(s)	PROCED. DI SALDATURA Process	METALLO D'APPORTO Filler Metal Classif.	 Dia. (mm)	CORRENTE Current POLARITA' Polarity	 CAMPO AMPERE Amp. Range	CAMPO VOLTS Voltage Range	GAMMA VELOCITA' DI LAVORO Travel Speed Range (mm/1')	MAX. APP. TERMICO Max. Heat Input (KJ/mm)
1	**GTAW**	**ER316L**	**ø 2,4**	**1) DC-Straight**	**114 ÷ 126**	**13,3 ÷ 14,7**	**57 ÷ 63**	**1,95**
2 ÷ N	**SMAW**	**E316L-16**	**ø 3,2**	**2) DC-Reverse**	**104 ÷ 115**	**22,8 ÷ 25,2**	**95 ÷ 105**	**1,83**

Redatto/Issued: D. VILLA Approvato/Approved: R. ZOIA Data: 14/05/2021

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

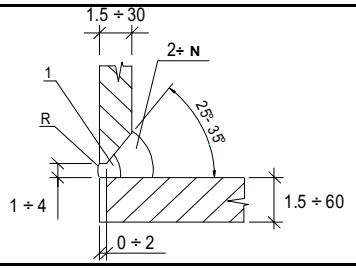
SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

SOCIETA':					
Company Name:				COES SRL Via Pontida, 265 24040 STEZZANO (BG) - ITALY	
SPECIFICA DI SALDATURE No.:				QUALIFICA DI SUPPORTO:	
Welding Procedure Specification No.:	**WPS 03/20-A4 - 316**			Supporting PQR No.(s):	**03/20-A**
REVISIONE:		DATA:		CLIENTE:	
Revision:	**0**	Date:	**14/05/2021**	Customer:	**
TIPO:				COMMESSA:	
Type:	**1) Manual**	**2) Manual**		Job No.:	**
PROCEDIMENTO:				DISEGNO No.:	
Welding Process:	**1) GTAW**	**2) SMAW**		Drawing No.:	**

GIUNTO
Joints (QW-402)

DISEGNO DEL GIUNTO: **1/2 V GROOVE**
Joint Design:
SUPPORTO / Backing: **YES for GTAW - YES for SMAW**
MATERIALE SUPPORTO
Backing Material (type):
Base Metal **X Weld Metal**
No Fusible Metal | No Metal | No Retainers

DETTAGLI:
Details:



METALLO BASE
BASE MATERIALS (QW-403)

P No.:	**8**	GRUPPO No.: Group No.:	**-**	To P No.:	**8**	CON GRUPPO No.: TO Group No.:	**-**

SPECIFICA TIPO E GRADO: Specification Type and Grade: **
CON SPECIFICA TIPO E GRADO: To Specification Type and Grade: **
ANALISI CHIMICA E PROPRIETA' MECCANICHE: Chemical Analysis and Mechanical Proprerty: **
CON ANALISI CHIMICA E PROPRIETA' MECCANICHE: To Chemical Analysis and Mechanical Proprerty: **

METALLO BASE: Base Metal:	SMUSSO: Groove:	**1,5 ÷ 60 mm**		ANGOLO: Fillet:	**ALL**
GAMMA DIAMETRI TUBI: Pipe Dia. Range:	SMUSSO: Groove:	**-**		ANGOLO: Fillet:	

ALTRO: Other: **No Pass > 13 mm. (QW-403.9)**

MATERIALE D'APPORTO
FILLER METAL (QW-404)

PROCEDIMENTO: Process:	**GTAW**	**SMAW**	
Speci. No. (SFA):	**5.9**	**5.4**	
AWS No. (Class):	**ER316L**	**E316L-16**	
F-NO No.:	**6**	**5**	
A-NO No.:	**8**	**8**	
DIAM. METALLO D'APPORTO: Size of filler metal:	**ø 2,4**	**ø 3,2**	
METALLO D'APPORTO DEPOSITATO: Deposited weld metal:			
GAMMA SPESSORI: Thickness range:			
SMUSSO: Groove:	**≤ 4,0 mm**	**≤ 16,0 mm**	
ANGOLO: Fillet:	**N.A.**	**N.A.**	
FILO-FLUSSO / Electrode - Flux (Class) +/-	**N.A.**	**N.A.**	
DENOMINAZIONE COMMERCIALE: Tradename:	**-**	**-**	
INSERTO CONSUMABILE: Consumable insert:	**N.A.**	**N.A.**	
TIPOLOGIA MATERIALE DI APPORTO: Filler metal product form:	**SOLID WIRE**	**-**	

POSIZIONE: **Position (QW-405):**			**TRATTAMENTO TERMICO DOPO SALDATURA:** **Postweld Heat Treatment (QW-407):**		
POSIZIONE SMUSSO: Groove Position(s):	**FLAT**		GAMMA DI TEMPERATURA: Temperature Range:	**N.A.**	
PROGRESSIONE SALDATURA: Welding Progression (up/down):	**N.A.**		TEMPO DI MANTENIMENTO: Time Range:	**N.A.**	
POSIZIONE SALDATURA ANGOLO: Fillet Position(s):	**N.A.**		ALTRO: Other:		
PRERISCALDO: **Preheat (QW-406):**		**GAS (QW-408)**	**% Composition**		
			Gas(es)	(Mixture)	Flow Rate
TEMPERATURA PRERISCALDO MIN.: Min. Preheat Temp.:	**15° C**	Shielding	**ARGON**	**99,998**	**9,5 ÷ 10,5 l/m**
TEMPERATURA DI INTERPASS MAX: Max. Interpass Temp.:	**150° C**	Backing	**ARGON**	**99,998**	**3,5 ÷ 4,5 l/m**
MANTENIMENTO PRERISCALDO: Preheat Maintenance:	**N.A.**	Trailing	**N.A.**		

CARATTERISTICHE ELETTRICHE **Eletrical Characteristics (QW-409)**			
CORRENTE - POLARITA': Current A.C. or D.C. - Polarity:	**1) DC-Straight**	**2) DC-Reverse**	
CAMPO AMPERAGGIO: Ampere (Range):	**See Table**	CAMPO VOLTS: Volts (Range):	**See Table**
TIPO E DIAMETRO ELETTRODO TUGSTENO (GTAW): Tugsten Electrodes Size and Type (GTAW):	**ø 2.4 mm WLa20 (Blue)**		
CARATTERISTICHE DELL'ARCO PER GMAW: Mode of Metal Transfer for GMAW:	**N.A.**		
GAMMA DI VELOCITA' ALIMENTAZIONE FILO: Electrodes Wire Feed Speed Range:	**N.A.**		

TECNICA **TECHNIQUE (QW-410)**	**GTAW**	**SMAW**	
PASSATA STRETTA O LARGA: String or Weavw Bead:	**String**	**String**	
DIMENSION UGELLO: Orifice or Gas Cup Size:	**ø 14 mm**		
PULIZIA INIZIALE TRA LE PASSATE (Spazzolatura, Molatura, etc.): Inital and Interpass Cleaning (Brushing, Grinding, etc.):	**Grinding & Brushing after each bead**	**Grinding & Brushing after each bead**	
METODO DI RIPRESA AL ROVESCIO: Method of Back Gouging:	**N.A.**	**N.A.**	
OSCILLAZIONE: Oscillation:	**NO**	**NO**	
DISTANZA UGELLO DI CONTATTO / PEZZO: Contact Tube to Work Distance:	**N.A.**	**N.A.**	
PASSATA SINGOLA O MULTLIPLA (per lato): Single or Multiple pass (for side):	**Multipass**	**0**	
ELETTRODO MULTIPLO O SINGOLO: Multiple or Single Electrodes:		**N.A.**	
CAMPO VELOCITA' SALDATURA: Travel Speed (range):	**See Table**	**See Table**	
MARTELLATURA: Peening:	**NO**	**NO (slag removal is not considered peening)**	
ALTRO: Other:			

TABELLA
Table

STRATI Weld Layers(s)	PROCED. DI SALDATURA Process	METALLO D'APPORTO Filler Metal Classif.	 Dia. (mm)	CORRENTE Current POLARITA' Polarity	 CAMPO AMPERE Amp. Range	CAMPO VOLTS Voltage Range	GAMMA VELOCITA' DI LAVORO Travel Speed Range (mm/1')	MAX. APP. TERMICO Max. Heat Input (KJ/mm)
1	**GTAW**	**ER316L**	**ø 2,4**	**1) DC-Straight**	**114 ÷ 126**	**13,3 ÷ 14,7**	**57 ÷ 63**	**1,95**
2 ÷ N	**SMAW**	**E316L-16**	**ø 3,2**	**2) DC-Reverse**	**104 ÷ 115**	**22,8 ÷ 25,2**	**95 ÷ 105**	**1,83**

Redatto/Issued: D. VILLA Approvato/Approved: R. ZOIA Data: 14/05/2021

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE
NDT PROCEDURES
INCLUDING PERSONNEL QUALIFICATIONS

Document Number: 1724000428-NDT-PRO-00020

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
Comandini Massimo Level III NDT EN - ISO9712 WI CSWIP 3.1	12-08-2024

Rev.	Date	Description	Prepared	Reviewed	Approved
02	05/08/2024	Accepted for Construction (AFC)	GT	MC	TM
01	04/06/2024	Issue for Review (IFR)	GT	MC	TM
01	19/04/2024	Issue for Review (IFR)	GT	MC	TM

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Revision / Change Log

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

HOLDS LIST

No.	Description
1	
2	
3	
4	

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Lifting sketch

None

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

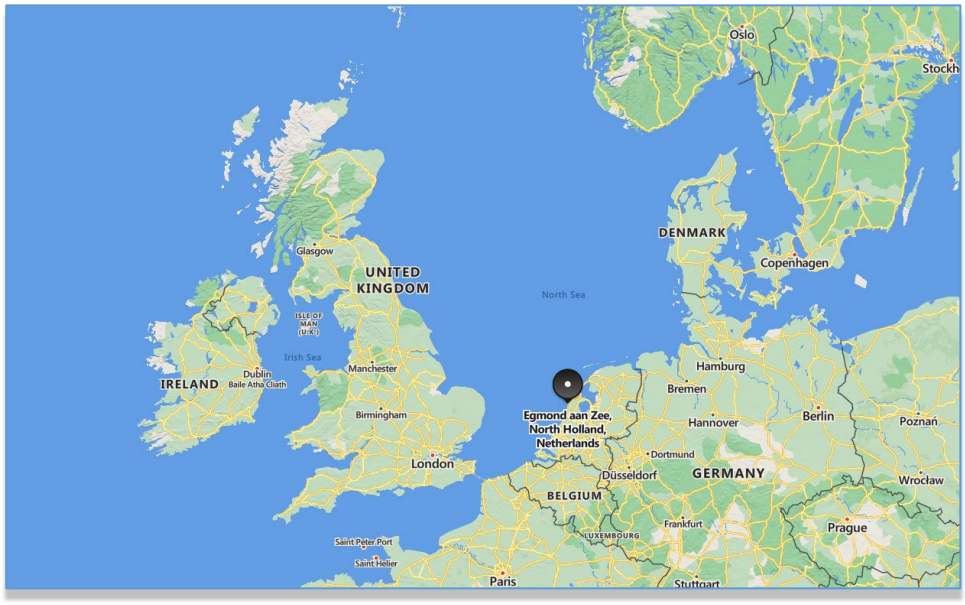


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

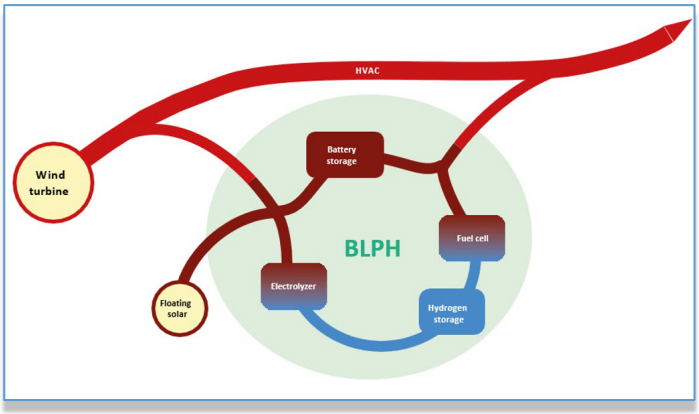


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
1724000428-QC-ITP-00002	INSPECTION TEST PLAN (ITP)

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

3 PROCEDURE FOR LIQUID PENETRANT EXAMINATION

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ASME PROCEDURE N°CTP03682

GENERAL PROCEDURE FOR LIQUID PENETRANT EXAMINATION

PROCEDURA DI ESAME CON LIQUIDI PENETRANTI

Certified demonstrated to the Inspector by TM : 9 cm
as conforming to the requirements of ASME V Par. T-150

..... Date : 14/01/2020

For review and acceptance by the Inspector:
as conforming to the requirements of ASME V Par. T-150

..... Date : 14/01/2020

Rev	Issued by	Approved by	Date	Revision Description
5	O. Oldani (NDE Level III)	M. Cattaneo (QCM)	30.12.2019	Revised par. 2, 12.2
4	O. Oldani (NDE Level III)	M. Cattaneo (QCM)	04.10.2018	Revised par. 2, 12.2
3	O. Oldani (NDE Level III)	M. Cattaneo (QCM)	10.02.2016	Revised par. 1, 2, 5.2, 5.3, 6.1, 8.1, 8.2, 8.3, 8.4, 8.5, 9.3, 11, Deleted 6.2 and variables and renumbered 6.3
2	O. Oldani (NDE Level III)	M. Cattaneo (QCM)	10.04.2013	REVISION PAR.2 AND PAR.3 *REVISIONE PAR.2 E PAR.3*
1	M. Galli (NDE Level III)	M. Cattaneo (QCM)	09.02.2010	GENERAL REVISION *REVISIONE GENERALE*
0	M. Galli (NDE Level III)	M. Cattaneo (QCM)	29.03.2007	FIRST ISSUE *PRIMA EMISSIONE*

1	SCOPE	SCOPO
1.1	This document defines the methods to perform colour contrast, water washable liquid penetrant examination, and to evaluate the results of welds, and relevant base materials of COES SRL products. This procedure shall be demonstrated to satisfaction of the A.I. as per ASME BPVC sect. V art. T-150 (a).	Questo documento definisce le modalità per eseguire il controllo con liquidi penetranti lavabili in acqua a contrasto di colore di saldature e relativi materiali base di produzione COES SRL. Questa procedura sarà dimostrata a soddisfazione dell'A.I. come richiesto da ASME BPVC sez. V art. T-150 (a).
2	REFERENCE STANDARDS	STANDARDS DI RIFERIMENTO
2.1	ASME BPVC Section V, VIII div. 1 ed. 2019 ASNT SNT-TC-1A ed. 2016 più Addendum 1 ASME B31.3	ASME BPVC Section V, VIII div. 1 2019 ed. ASNT SNT-TC-1A ed. 2016 plus Addendum 1 ASME B31.3
3	PERSONNEL	PERSONALE
3.1	Personnel evaluating and certifying the results of the examination shall be qualified and certified level II by a level III in accordance with the company Written practice which satisfies the Recommended Practice SNT-TC-1A.	Il personale che esegue, valuta e certifica i risultati del controllo sarà qualificato e certificato livello II da un livello III in accordo alla Written Practice aziendale che soddisfa i requisiti della SNT-TC-1A.
4	EQUIPMENT	ATTREZZATURA
4.1	The term penetrant material as used in this document, is intended to include all penetrants, solvents, or cleaning agents, developers, used in this examination process. Colour contrast penetrant shall be used with water washable penetrant processes. The table 1 gives the material combinations, the brand names of penetrant, remover and developer, which shall be used.	Il termine "materiali per liquidi penetranti" usato in questo documento, include tutti i penetranti, agenti di rimozione, agenti di pulizia, sviluppatori, utilizzati nel processo d'esame. Saranno utilizzati penetranti a contrasto di colore con tecnica lavabili in acqua. La tabella 1 definisce le combinazioni di materiali, il nome di penetranti, agenti di rimozione e sviluppatori da utilizzare.

BRAND NAME	CLEANER	PENETRANT	REMOVER	DEVELOPER
MET-L-CHECK	E 59 A	VP 30	Potable Water	D70

Table 1 – Penetrant material
Tabella 1 – Materiali per liquidi penetranti

5	GENERAL REQUIREMENTS	REQUISITI GENERALI
5.1	Control of contaminants	Controllo dei contaminanti
5.1.1	The liquid penetrant materials used on nickel base alloys, austenitic stainless steels and titanium shall be certified for contaminant content which shall not be greater than 0,1% by weight. The certifications shall include the penetrant manufacturer's batch numbers and the test results obtained in accordance with Mandatory Appendix II of ASME sect. V art. 6. The certifications shall be maintained as defined by the COES SRL Quality System.	I materiali per liquidi penetranti usati su leghe a base di Nichel, acciai inossidabili austenitici e titanio saranno certificati per il contenuto di contaminanti che non sarà superiore allo 0,1% in peso. Il certificato deve includere il numero di lotto del produttore e i risultati dei test ottenuti in accordo alla Mandatory Appendix II dell'ASME sez. V art. 6. La certificazione sarà mantenuta in archivio come stabilito dal Sistema Qualità COES SRL

5.2	Surface preparation	Preparazione della superficie
5.2.1	In general satisfactory results may be obtained when the surface of the weld is in the as-welded or the surface of the base material is as-rolled, as-forged condition. Surface preparation by grinding, machining, or other methods may be necessary where surface irregularities could mask indications. Prior to each liquid penetrant examination, the surface to be examined and all adjacent areas within at least 1 in. (25 mm) shall be dry and free of all dirt, grease, lint, scale, welding flux, weld spatter, paint, oil, and other extraneous matter that could obscure surface openings or otherwise interfere with the examination. For a weld, the surface to be examined shall include at least the weld metal and the heat affected zone. Cleaner Met-L-Chek E59A shall be used for surface preparation and it shall meet the requirements of paragraph 5.1 above.	In generale risultati soddisfacenti possono essere ottenuti quando la superficie della saldatura è in condizioni di come-saldato, o la superficie del materiale base è come-laminato, come-forgiato. La preparazione della superficie a mezzo molatura, lavorazione di macchina, o altri metodi possono essere necessari quando le irregolarità possono mascherare le indicazioni. Prima dell'esame, la superficie da esaminare e le aree adiacenti per almeno 1 in. (25 mm) saranno asciutte e libere da sporco, grasso, lint, scaglie, flusso di saldatura, spruzzi, vernice, olio, o altro materiale estraneo che potrebbe oscurare le aperture superficiali o comunque interferire con l'esame. Per una saldatura la superficie da esaminare includerà almeno il materiale d'apporto e la zona termicamente alterata. Sarà utilizzato il pulitore E59A della Met-L-Chek che deve soddisfare i requisiti del paragrafo 5.1 sopra.
5.3	Drying after preparation	Asciugatura dopo la preparazione
5.3.1	After cleaning, drying of the surface to be examined shall be accomplished by normal evaporation. A minimum period of 5 minutes shall be allowed to ensure that the cleaning solution has evaporated prior to application of the penetrant.	Dopo la pulizia, l'asciugatura della superficie da esaminare sarà eseguita per normale evaporazione. Prima di applicare il penetrante si attenderà almeno 5 minuti per assicurare la completa evaporazione della soluzione di pulizia.
6	TECHNIQUE	TECNICA
	A colour contrast penetrant water washable shall be used.	Saranno utilizzati penetranti a contrasto di colore Lavabili in acqua.
6.1	As a standard technique, the temperature of the penetrant and the surface of the part to be processed shall not be below 10 °C nor above 52 °C throughout the examination period. Local heating or cooling is permitted provided the part temperature remains in the range of 10 °C to 52 °C during the examination. Where it is not practical to comply with these temperature limitations, other temperatures and times may be used, provided the a new procedure shall be issued and qualified as per ASME BPVC sec. V art. 6.	Come tecnica standard, la temperatura dei penetranti e la superficie della parte da esaminare non sarà inferiore a 10 °C e nemmeno superiore a 52 °C durante tutto il periodo dell'esame. Riscaldamenti o raffreddamenti localizzati sono permessi a condizione che la parte rimanga nel campo fra 10 °C to 52 °C durante l'esame. Dove non è pratico rispettare detti limiti di temperatura, saranno utilizzati altri tempi e temperature, a condizione che la sia emessa una nuova procedura e la stessa sia qualificata secondo i criteri dell'ASME BPVC sez. V art. 6.
6.2	Technique restriction	Restrizioni delle tecniche
6.2.1	Intermixing of penetrant materials from different families or different manufacturers is not permitted. A retest with water washable penetrant may cause loss of marginal indications due to contamination	L'utilizzo di materiali per liquidi penetranti di differenti famiglie o di differenti produttori non è permesso. Una riprova con liquidi penetranti lavabili in acqua può provocare la perdita di indicazioni marginali a causa di contaminazione.

7	CALIBRATION	CALIBRAZIONE
7.1	Visible light meters shall be calibrated at least once a year or whenever the meter has been repaired. If meters have not been in use for one year or more, calibration shall be done before being used.	I misuratori di intensità luminosa visibile saranno calibrati almeno una volta l'anno o quando lo strumento sarà riparato. Se i misuratori non sono stati utilizzati per un anno o più, la calibrazione sarà eseguita prima dell'uso.
8	EXAMINATION	ESAME
8.1	Penetrant application	Applicazione del penetrante
8.1.1	The penetrant shall be applied by spray cans.	Il penetrante sarà applicato con bombolette a spruzzo.
8.2	Penetration (dwell) time	Tempo di penetrazione
	Penetration (dwell) time is critical. The minimum penetration time shall be 10 minutes. The penetrant shall not remain on any part of the surface being examined for a time longer than 60 minutes, during the excess penetrant removal. The penetrant shall not be allowed to dry. If for any reason the penetrant does dry, the examination procedure shall be repeated, beginning with a cleaning of the examination surface as per par. 5.2.	Il tempo di penetrazione è critico. Il tempo minimo di penetrazione sarà di 10 minuti. Il penetrante non rimarrà su ogni parte della superficie da esaminare per un tempo maggiore di 60 minuti, durante la rimozione del penetrante in eccesso. Il penetrante non sarà lasciato essiccare. Se per qualsiasi ragione dovesse essiccare, la procedura d'esame dovrà essere ripetuta a cominciare dalla pulizia della superficie come da par. 5.2.
8.3	Excess penetrant removal	Rimozione del penetrante in eccesso
8.3.1	After the specified penetration (dwell) time has elapsed, any penetrant remaining on the surface shall be removed, taking care to minimize removal of penetrant from discontinuity. Excess water-washable penetrant shall be removed with a water spray. The water pressure shall not exceed 345 kPa, and the water temperature shall not exceed 43 °C.	Al termine del tempo di penetrazione, il penetrante presente sulla superficie sarà rimosso, avendo cura di ridurre la rimozione del penetrante dalle discontinuità. L'eccesso di penetrante lavabile in acqua sarà rimosso con spruzzo d'acqua. La pressione non sarà superiore a 345 kPa, e la temperatura dell'acqua non sarà superiore a 43 °C.
8.4	Drying after excess penetrant removal	Asciugatura dopo la rimozione del penetrante
8.4.1	For the water-washable technique, the surfaces may be dried by blotting with clean materials or by using circulating air, provided the temperature of the surface is not raised above 52 °C. The minimum drying time shall be 5 minutes. The maximum drying time is 30 minutes.	Per la tecnica con lavabili in acqua, le superfici possono essere asciugate tamponando con materiali puliti o utilizzando la circolazione dell'aria, purché la temperatura della superficie non oltrepassi i 52 °C. Il tempo minimo di asciugatura sarà di 5 minuti. Il tempo massimo di asciugatura sarà di 30 minuti.
8.5	Developing	Sviluppo
8.5.1	The developer shall be applied as soon as possible after penetrant removal; the time interval shall not exceed the maximum drying time. Insufficient coating thickness may not draw the penetrant out of discontinuities; conversely, excessive coating thickness may mask the indications. Only wet Nonaqueous developer shall be used.	Lo sviluppatore sarà applicato al più presto dopo la rimozione del penetrante in eccesso; l'intervallo di tempo non dovrà eccedere il tempo di asciugatura massimo. Uno spessore insufficiente di sviluppatore potrebbe non estrarre il penetrante dalle discontinuità; contrariamente, uno spessore eccessivo potrebbe mascherare le indicazioni. Saranno utilizzati solo sviluppatori umidi Non Acquosi.

Prior to applying suspension type wet developer to the surface, the developer must be throughly agitated to ensure adequate dispersion of suspended particles.
Nonaqueous developer shall be applied only to a dry surface. It shall be applied by spray cans. Drying shall be by normal evaporation.

Developing time for final interpretation begins as soon as a wet developer coating is dry. The minimum developing time shall be 10 minutes.

Prima di applicare lo sviluppatore in sospensione, esso deve essere adeguatamente agitato per assicurare una corretta dispersione delle particelle.

Sviluppatore Non Acquoso sarà applicato solo su superfici asciutte. Esso sarà applicato con bombolette a spruzzo. L'asciugatura sarà mediante normale evaporazione.
Il tempo di sviluppo per l'interpretazione finale inizia appena lo strato di sviluppatore applicato è asciutto. Il tempo minimo di sviluppo è di 10 minuti.

9 INTERPRETATION

INTERPRETAZIONE

9.1 Final interpretation

Interpretazione finale

9.1.1 Final interpretation shall be made within 10 to 60 min after developer coating is dry. If the surface to be examined is large enough to preclude complete examination within the prescribed or established time, the examination shall be performed in increments.

L'interpretazione finale sarà eseguita tra 10 e 60 minuti dall'asciugatura dello sviluppatore. Se la superficie da esaminare è talmente larga da precludere l'esame completo nei tempi prescritti, l'esame sarà eseguito a zone.

9.2 Characterizing indication(s)

Caratterizzazione delle indicazioni

9.2.1 The type of discontinuities are difficult to evaluate if the penetrant diffuses excessively into the developer. If this condition occurs, close observation of the formation of indication(s) during application of the developer may assist in characterizing and determining the extent of the indication(s)

E' difficile valutare il tipo di discontinuità se il penetrante diffonde eccessivamente nello sviluppatore. Se ciò accade, l'osservazione da vicino del formarsi delle indicazioni durante l'applicazione dello sviluppatore può aiutare nella caratterizzazione e nel determinare l'estensione delle indicazioni.

9.3 Colour contrast penetrant

Penetranti a contrasto di colore

9.3.1 With a colour contrast penetrant, the developer forms a reasonably uniform white coating. Surface discontinuities are indicated by bleed-out of the penetrant which is normally a deep red colour that stains the developer. Indications with a light pink colour may indicate excessive cleaning. Inadequate cleaning may leave an excessive background making interpretation difficult.

A minimum light intensity of 1076 Lx is required on the surface to be examined to ensure adequate sensitivity during the examination and evaluation of indications. The light intensity, natural or supplemental white light source, shall be measured with a white light meter prior to the evaluation of indications or a verified light source shall be used. Verification of light source is required to be demonstrated only one time, documented, and maintained on file.

Con i penetranti a contrasto di colore, lo sviluppatore forma una copertura bianca ragionevolmente uniforme. Le discontinuità superficiali sono indicate dalla fuoriuscita di penetrante, normalmente di rosso intenso, che macchia lo sviluppatore. Indicazioni di colore rosa pallido possono significare un eccesso di pulizia. Una rimozione inadeguata può lasciare un colore di fondo eccessivo che può rendere difficile l'interpretazione. Un'intensità luminosa di almeno 1076 Lx è necessaria sulla superficie da esaminare per assicurare una adeguata sensibilità durante l'esame e la valutazione delle indicazioni. L'intensità della luce della sorgente di luvce bianca, naturale o supplementare, sarà misurata con un luxmetro prima della valutazione delle indicazioni oppure sarà utilizzata una sorgente di luce verificata. La verifica della sorgente di luce è richiesto che sia dimostrata una sola volta, documentata, e mantenuta la registrazione in archivio.

9.4 Post-examination cleaning

Pulizia dopo l'esame

9.4.1 The examined surface shall be washed or cleaned by brushing as soon as practical after evaluation and documentation are finished.

La superficie esaminata sarà lavata o pulita con spazzole secondo la praticità del metodo, solo dopo che la valutazione e la documentazione dell'esame sono terminati.

10 EVALUATION

VALUTAZIONE

10.1 All indications shall be evaluated in terms of the Acceptance Standards in this document.

Tutte le indicazioni saranno valutate secondo il criterio di accettabilità specificato in questo documento.

Discontinuities at the surface will be indicated by bleed-out of penetrant; however, localized surface irregularities due to machining marks or other surface conditions may produce false indications.

Discontinuità in superficie saranno indicate dalla fuoriuscita di penetrante; comunque, irregolarità superficiali localizzate dovute a lavorazioni di macchina o altre condizioni superficiali possono produrre false indicazioni.

Any indication that is believed to be nonrelevant shall be regarded as a defect and shall be re-examined to verify whether or not actual defects are present. Surface conditioning may precede the re-examination.
Broad areas of pigmentations which could mask indications of discontinuities are unacceptable, and such areas shall be cleaned and re-examined

Ogni indicazione valutabile come non-rilevante sarà considerata difetto e riesaminata per verificare se effettivamente sia presente un difetto. Un condizionamento della superficie può precedere il riesame.
Larghe aree di pigmentazione che possono mascherare indicazioni di discontinuità non sono accettabili, e dette aree saranno pulite e riesaminate.

11 ACCEPTANCE STANDARD

CRITERI DI ACCETTABILITA'

11.1 These acceptance standards shall apply unless other more restrictive standards are required by the contract.
Relevant indications are those which result from mechanical discontinuities. Linear indications are those indications in which the length is more than three times the width. Rounded indications are indications which are circular or elliptical with the length less than three times the width.
An indication of a discontinuity may be larger than the discontinuity that causes it; however, the size of the indication and not the size of the discontinuity is the basis of acceptance or rejection.

Questi criteri di accettabilità saranno applicati a meno di richieste contrattuali più restrittive.

Indicazioni rilevanti sono quelle risultanti da discontinuità meccaniche. Indicazioni lineari sono le indicazioni che hanno lunghezza maggiore di tre volte la larghezza. Indicazioni tondeggianti sono indicazioni circolari o ellittiche che hanno la lunghezza inferiore a tre volte la larghezza.
Un'indicazione di discontinuità può essere più larga della discontinuità che la causa; comunque il parametro per l'accettabilità o lo scarto sarà la dimensione dell'indicazione e non la dimensione della discontinuità.

Only indications with major dimensions greater than 1,5 mm shall be considered relevant.
All surfaces examined shall be free of:
(a) relevant linear indications;
(b) relevant rounded indications greater than 5 mm;

Solo indicazioni con dimensioni maggiori di 1,5 mm saranno considerate rilevanti.
Tutte le superfici esaminate saranno esenti da:
(a) indicazioni lineari rilevanti;
(b) indicazioni rilevanti tondeggianti maggiori di 5 mm;

(c) four or more relevant rounded indications in a line separated by 1,5 mm or less edge to edge;

(c) Quattro o più indicazioni rilevanti tondeggianti disposte in linea separate da 1,5 mm o meno fra le estremità;

(d) ten or more indications in any 3870 mm^2 of surface with the major dimension of this area not to exceed 150 mm with the area taken in the most unfavourable location relative to the indications being evaluated.

(d) dieci o più indicazioni in ogni 3870 mm^2 di superficie con dimensione maggiore dell'area non eccedente 150 mm con l'area calcolata nella condizione più sfavorevole delle indicazioni da valutare.

12	DOCUMENTATION	DOCUMENTAZIONE
12.1	Recording of indication	Registrazione delle indicazioni
12.1.1	Rejectable indications shall be recorded. As a minimum, the type of indications (linear or rounded), location and extent (length or diameter or aligned) shall be recorded.	Saranno registrate le indicazioni non accettabili. Come minimo saranno registrati il tipo di indicazione (lineare o tondeggiante), la posizione e l'estensione (lunghezza o diametro o allineamento).
12.2	Examination records	Rapporto d'esame
12.2.1	For each examination, the following information shall be recorded: a) identification of the part being examined; b) procedure identification and revision; c) liquid penetrant type (visible or fluorescent) d) type (number or letter designation) of each penetrant, penetrant remover, and developer used; e) examination personnel identity and qualification level; f) map or record of indications g) material, thickness; h) lighting equipment; i) result of examination: j) date of examination.	Per ogni esame, le seguenti informazioni saranno registrate: a) identificazione della parte esaminata b) identificazione della procedura e revisione; c) tipo di liquidi penetranti (visibili o fluorescenti) d) tipo (numero o lettera di designazione) di ogni penetrante, agente di rimozione, e sviluppatore usati; e) identità del personale esaminatore e livello di qualifica; f) mappa o impronte delle indicazioni g) materiale, spessore; h) attrezzature di illuminazione; i) risultato dell'esame; j) data dell'esame.
13	REPAIR	RIPARAZIONE
13.1	All discontinuities in excess to acceptance standards shall be removed by suitable means and repaired according to approved procedure. The repaired area shall be re-examined after repair in accordance with this procedure.	Tutte le discontinuità eccedenti i criteri di accettabilità saranno rimosse con mezzi adeguati e riparate in accordo a una procedura approvata. L'area riparata sarà riesaminata dopo la riparazione in accordo con la presente procedura.

COES SRL Via Pontida, 265 24040 Stezzano Italy	NDE QUALIFICATION CERTIFICATE Certificato di qualifica PnD

We certify that
Si certifica che

GRITTI MICHEL

SURNAME / NAME

Birth date / Data di nascita: 18/05/1989
Birth place / Luogo di nascita: Alzano Lombardo (BG)

In accordance to the requirements of our Written Practice nr. NDE-WP-SNT rev. 4 which satisfies the ASNT Recommended Practice SNT-TC-1A edition 2006 is qualified to

Level / Livello: II
Method / Metodo: PT - Liquid Penetrant

Limitation / Limitazioni: None

Certification date / Data della certificazione: 11/09/2019
Expiring date / Data di scadenza: End of September 2024

This certificate is based on
School graduation: Grammar School — obtained on year: 2004
Training satisfactorily performed on: 2019 — for a total hours: 40
Initial experience duration of: > 210 hours in the method
and > 400 total hours in NDE
Examination performed on: 11/09/2019
with a composite grade of: 83.3 %
Satisfactory continuity from: Not applicable
Latest Technical Performance Evaluation satisfactorily performed on: Not applicable
Re-examination performed on: Not applicable
with a composite grade of: ==
Visual acuity verified on: 22/05/2019

The level III evaluator
Il livello III valutatore

BRVI srl
Oliviero OLDANI
NDT Level III
ASNT nr. 171252
MT-PT-RT-UT-VT
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11/09/2019

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TEST REPORT LIQUID PENETRANT EXAMINATION

Customer:		**Purchase Order:**	
Project:		**Supply:**	
S.N.:		**Tag:**	
Coes Job:		**Serial Number:**	

Sample:			
Identification:			
Test standards:			
Test procedure:			
Acceptance standard:			
Material:			
Area inspected:		**Surface condition:**	
Surface Temperature:		**Examination coverage:**	
Inspection method:		**Illumination type:**	
Equipment:			
Manufacturer:			
Pre-cleaner:		**Drying time:**	
Penetrant:		**Penetration time:**	
Remover:		**Drying time:**	
Developer:		**Developing time:**	
Post cleaning:		**Interpretation time:**	
Examination results:			
Evaluation:			
Note:			
Operators			
Level II Acc. to SNT TC 1A			
MICHEL GRITTI			

SAMPLE

4 PROCEDURE FOR RADIOGRAPHIC EXAMINATION

ASME PROCEDURE N° CTP03683

GENERAL PROCEDURE FOR RADIOGRAPHIC EXAMINATION

PROCEDURA DI ESAME RADIOGRAFICO

Rev	Issued by	Approved by	Date	Revision Description
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3	O. Oldani (NDE Level III)	M. Cattaneo (QCM)	25.03.2014	GENERAL REVISION *REVISIONE GENERALE*
2	O. Oldani (NDE Level III)	M. Cattaneo (QCM)	06.03.2013	GENERAL REVISION *REVISIONE GENERALE*
1	M. Galli (NDE Level III)	M. Cattaneo (QCM)	09.02.2010	GENERAL REVISION *REVISIONE GENERALE*
0	M. Galli (NDE Level III)	M. Cattaneo (QCM)	29.03.2007	FIRST ISSUE *PRIMA EMISSIONE*

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1 SCOPO

Questo documento definisce i requisiti minimi applicati da COES per eseguire l'esame radiografico di saldature di testa dei componenti costruiti in accordo ai documenti di seguito elencati.
Le saldature da esaminare saranno eseguite fra lamiere, forgiati, tubi e fusioni di materiali ferrosi o non-ferrosi fino a uno spessore di 25 mm.

1 SCOPE

This document defines the minimum COES requirements to perform radiographic examination of butt welds on their component manufactured according to the below referenced documents.
Welds to be radiographically examined shall be welds between plates, forgings, pipes and castings of either ferrous and non-ferrous materials up to 25 mm thick.

2 DOCUMENTI DI RIFERIMENTO

ASME BPVC Sez. V, VIII div. 1, IX Ed. 2021
ASNT SNT-TC-1A Ed.2016 più Addendum 1
ASME B31.3

2 REFERENCE DOCUMENTS

ASME BPVC Sect. V, VIII div. 1, IX 2021 ed.
ASNT SNT-TC-1A Ed.2016 ed. plus Addendum 1
ASME B31.3

3 PERSONALE

Il personale che valuta e certifica i risultati del controllo sarà qualificato e certificato almeno al livello II by a level III in accordo alla Written Practice aziendale che soddisfa i requisiti della SNT-TC-1A e ASME BPVC sez. V art. 1 Mandatory Appendix III.

3 PERSONNEL

Personnel performing, evaluating and certifying the results of the examination shall be qualified and certified at least level II by a level III in accordance with the company Written practice which satisfies the Recommended Practice SNT-TC-1A and ASME BPVC sec. V art. 1 Mandatory Appendix III.

4 REQUISITI GENERALI

4.1 Condizioni superficiali

Le superfici delle saldature possono essere nelle condizioni di come-saldato, molato, lavorato di macchina o raccordate con il materiale base in accordo ai requisiti a disegno. Il sovrammetallo, se presente, non deve eccedere il massimo permesso dalla sezione del codice di riferimento come mostrato nella Tabella 1. Saranno applicati i valori nella Tabella 1, a meno di diverse richieste contrattuali specificate sul disegno.
Le irregolarità superficiali interne (se accessibili) e esterne saranno rimosse con un metodo adeguato fino al livello necessario, in modo che l'immagine radiografica risultante di ogni irregolarità non mascheri o sia confusa con l'immagine di discontinuità.

4 GENERAL REQUIREMENTS

4.1 Surface conditioning

The weld joint finished surfaces may be in as welded condition, ground, machined or may be flush with the base material according to drawing requirements. The weld crown, if present, shall not exceed the maximum permitted values of the referencing Code Section as shown in Table 1.
The values shown in Table 1 shall be applied unless otherwise required by the drawing.

The weld ripples or weld surface irregularities on both the inside (where accessible) and outside shall be removed by any suitable process to such a degree that the resulting radiographic image due to any irregularities cannot mask or be confused with the image of any discontinuity.

Maximum weld reinforcement in mm for ASME Sect. VIII div. 1 Massimo sovrammetallo in mm per ASME Sez. VIII div. 1		
Nominal Thickness Spessore nominale *(mm)*	**Category B & C Butt Welds** Saldature di testa Categoria B & C	**Other welds** Altre saldature
less than/*meno di* 2.4	2.5	0.8
2.4 to/*a* 4.8 incl.	3	1.5
Over/*oltre* 4.8 to/*a* 13 incl.	4.0	2.5
Over/*oltre* 13 to/*a* 25 incl.	5	2.5

Table 1
Tabella 1

4.2 Radiazione retro diffusa

Una lettera “B” in piombo, con dimensione minima di 11 mm in altezza e 1,5 mm in spessore, sarà applicata al retro di ogni cassetta durante ogni esposizione per determinare l’influenza della radiazione retrodiffusa sull’immagine radiografica. La lettera in piombo “B” sarà posizionata in modo che appaia in un’area della radiografia che soddisfi i requisiti del paragrafo 8.2.

4.3 Sistema di identificazione

Sarà utilizzato un sistema per produrre su ogni radiografia un’identificazione riconducibile all’oggetto radiografato che sia permanente per il periodo di conservazione della radiografia richiesto. Questa informazione includerà il contratto, il componente, il numero di saldatura o il numero della parte per quanto appropriato. In aggiunta il simbolo del costruttore, o il nome e la data della radiografia saranno incluse in ogni radiografia. Questo sistema di identificazione non richiede necessariamente che le informazioni appaiano come immagini radiografiche. In ogni caso, queste informazioni non devono oscurare l’area d’interesse.
La figura 1 mostra il sistema di identificazione.

4.2 Backscatter radiation

A lead symbol “B”, with minimum dimensions of 11 mm in height and 1,5 mm in thickness, shall be attached to the back of each film holder during each exposure to determine if backscatter radiation is exposing the film. The lead symbol “B” shall be placed in a location so that it would appear within an area on the radiograph that meets the requirements of par. 8.2.

4.3 System of identification

A system shall be used to produce on each radiograph an identification that is traceable to the item being radiographed and that is permanent for the required retention period of the radiograph. This information shall include the contract, component, weld number, or part number, as appropriate. In addition, the Manufacturer’s symbol or name and the date of the radiograph shall be included with the identification information on each radiograph. This identification system does not necessarily require the information appear as radiographic images. In any case, this information shall not obscure the area of interest.
The figure 1 shows the identification system.

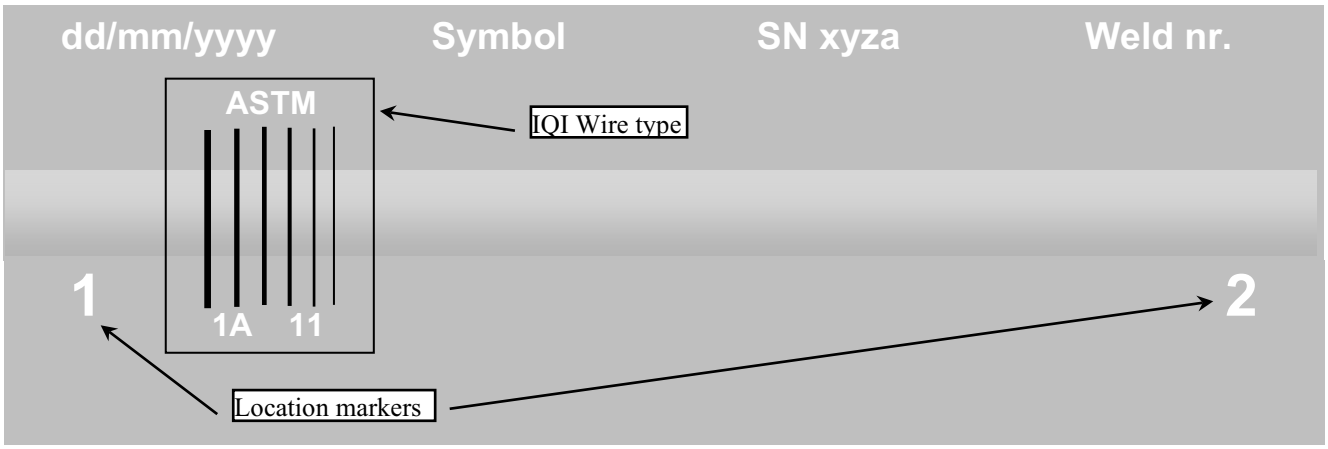


Figure 1 – System of identification
Figura 1 – Sistema di identificazione

5 ATTREZZATURA

5.1 Pellicole

5.1.1 Tipo di Film. Le radiografie saranno eseguite utilizzando pellicole radiografiche industriali.
I paragrafi da 23 a 26 dello standard ASME/ASTM SE-94 saranno utilizzati come guida per il processo delle pellicole.
La tabella 2a indica i tipi di pellicole che saranno utilizzati.

5.1.2 Trattamento delle pellicole. Sarà utilizzato un processo automatico. L'essenzialità del processo automatico è il controllo. Il processore mantiene le soluzioni chimiche nelle condizioni corrette di temperature, esegue una agitazione e una rigenerazione automatica e trasporta le pellicole meccanicamente a una velocità accuratamente controllata attraverso il ciclo di processo. Le caratteristiche delle pellicole devono essere compatibili con le condizioni del processo. E' comunque necessario che siano seguite le raccomandazioni dei produttori delle pellicole, della sviluppatrice e dei chimici.

5 EQUIPMENT

5.1 Film

5.1.1 Film type. Radiographs shall be made using industrial radiographic films.
Paragraphs from 23 to 26 Standard Guide for Radiographic examination SE-94 shall be used as a guide for processing films.
The Table 2a shows the films which can be used.

5.1.2 Film processing. An Automatic processing shall be used. The essence of the automatic processing system is control. The processor maintains the chemical solutions at the proper temperature, agitates and replenishes the solution automatically, and transports the film mechanically at a carefully controlled speed throughout the processing cycle. Film characteristics must be compatible with processing conditions. It is therefore, essential that the recommendations of the film, processor, and chemical manufacturers be followed.

SE-1815 Class	ISO 11699-1 Class	Manufacturer and designation			
		AGFA	FOMA BOHEMIA	FUJI	Carestream (former KODAK)
I	C2	Structurix D3	Indux R3	IX25	M100
I	C3	Structurix D4	Indux R4	IX50	MX125
I	C4	Structurix D5	Indux R5	IX80	T200
II	C5	Structurix D7	Indux R7	IX100	AA400

Table 2a – Films type classification
Tabella 2a – Classificazione delle pellicole

Developing machine		Chemicals manufacturer		
Manufacturer	Type	Manufacturer	Developer	Fixer
AGFA	Structurix NDT-M Eco	AGFA	G135	G335
Kodak	M35	Carestream	Industrex	Industrex LO
Colenta	900 NDT	Fujifilm	Audel Ind X-ray	Aufix Ind X-ray

Table 2b – Developing machines and chemicals combinations
Tabella 2b – Combinazioni sviluppatrici e bagni chimici

5.2 Schermi di rinforzo

Saranno utilizzati schermi di rinforzo a diretto contatto con le pellicole durante l'esposizione.
Il materiale degli schermi sarà piombo.
Lo spessore degli schermi in piombo normalmente utilizzati sarà come mostrato in Tabella 3.

5.2 Intensifying screens

Intensifying screens in direct contact with the film during the exposure shall be used.
The screen material will be lead.
The lead screen thickness as shown in the following Table 3 shall be normally used.

Radiation *Tipo di Radiazione*				Screen Thickness / *Spessore schermo* (mm) Front / *Anteriore*	 Back / *Posteriore*
X-ray up to *Raggi X fino a*			120 KV	--	0.10
X-ray up to *Raggi X fino a*	120	to *a*	450 KV	0.05 minimum	0.10 minimum
Ir 192				0.05 minimum	0.10 minimum
Se 75				0.05 minimum	0.10 minimum

Table 3 – Intensifying screens
Tabella 3 – Schermi di rinforzo

5.3 Indicatori qualità d'immagine (Penetrametri)

Saranno utilizzati penetrametri a filo prodotti e identificati in accordo ai requisiti dello standard ASME/ASTM SE-747, ad eccezione che il numero del filo maggiore o il numero identificativo possono essere omessi. I penetrametri standard ASME sono indicati nella Tabella 4.
Penetrametri a filo prodotti e identificati in accordo allo standard EN-462 o ISO 19232 possono essere utilizzati a condizione che il diametro del filo essenziale sia uguale o inferiore a quello del filo essenziale standard ASME richiesto, e a condizione che siano dello stesso materiale. La tabella 4 definisce l'equivalenza fra i penetrametri degli standard ASME/ ASTM SE-747 e EN-462 o ISO 19232.

5.3 Image Quality Indicator

IQI's shall be wire type. Wire-type IQIs shall be manufactured and identified in accordance with the requirements or alternates allowed in SE-747, except that the largest wire number or the identity number may be omitted. ASME standard IQIs shall consist of those in the following Table 4.
Wire IQIs designed and manufactured in accordance with EN-462 or ISO 19232 may be used provided their essential wire diameter is equal to or less than required ASME standard IQI essential wire, and provided the material IQI requirements are met. The following table 4 shows the equivalence between the SE-747 wire and the EN-462 or ISO 19232 wire.

ASME/ASTM SE/E747				EN 462-1 or ISO 19232		
Set	ident.	Ø *inches (mm)*		Ø mm	ident.	set
				0,050	W19	
				0,063	W18	
	1	0.0032	(0.08)	0,080	W17	13 xx EN or ISO
	2	0.004	(0.10)	0,100	W16	
	3	0.005	(0.13)	0,125	W15	
A	4	0.0063	(0.16)	0,16	W14	
	5	0.008	(0.20)	0,20	W13	10 xx EN or ISO
	6	0.010	(0.25)	0,25	W12	
	7	0.013	(0.33)	0,32	W11	
	8	0.016	(0.41)	0,40	W10	
B	9	0.020	(0.51)	0,50	W9	
	10	0.025	(0.64)	0,63	W8	6 xx EN or ISO
	11	0.032	(0.81)	0,80	W7	
	12	0.040	(1.02)	1,00	W6	
	13	0.050	(1.27)	1,25	W5	
C	14	0.063	(1.60)	1,60	W4	
	15	0.080	(2.03)	2,00	W3	1 xx EN or ISO
	16	0.100	(2.54)	2,50	W2	

Table 4 – Equivalence between SE747 vs. EN462 and ISO 19232 IQI's
Tabella 4 – Equivalenza fra penetrametri SE747 con EN462 e ISO 19232

5.4 Attrezzature per la lettura dei radiogrammi

Le attrezzature per la lettura devono fornire una retro illuminazione di intensità tale da non causare riflessi, ombre, o bagliori sulla radiografia.

5.4 Facilities for viewing of radiographs

Viewing facilities shall provide subdued background lighting of an intensity that will not cause troublesome reflections, shadows, or glare

L'attrezzatura utilizzata per l'interpretazione deve fornire una sorgente di luce regolabile, sufficiente a vedere il filo designato per lo specifico campo di densità. Le condizioni di lettura saranno tali per cui la luce proveniente dall'esterno del bordo del radiogramma o attraverso zone a bassa densità del radiogramma non interferiscano con l'interpretazione.

5.5 Sorgenti di radiazione

Saranno utilizzate le seguenti sorgenti di radiazione:

a) Unità a raggi X fino a 450 KV;
b) Sorgenti a raggi γ tipo Ir 192;
c) Sorgenti a raggi γ tipo Se 75.

La massima dimensione della macchia focale (F secondo il par. 7.4) sarà di 4 mm.

5.6 Densitometro

Un densitometro sarà utilizzato per giudicare la densità delle pellicole.

6. CALIBRAZIONE

6.1 Dimensione della sorgente

Per la verifica della dimensione della sorgente, saranno accettabili le pubblicazioni del fornitore o del costruttore quali manuali tecnici, curve di decadimento, o dichiarazioni scritte che documentino la dimensione attuale o massima della sorgente o della macchia focale.
Se non disponibili le pubblicazioni del fornitore o del costruttore la dimensione della sorgente sarà determinate come segue:
a) Per macchine a raggi X fino a 500 KV, la dimensione della macchia focale può essere determinata in accordo allo standard SE-1165.
b) Per sorgenti Ir 192 la dimensione può essere determinate in accordo allo standard SE-1114.

6.2 Densitometro

Il densitometro sarà calibrato almeno ogni tre mesi come di seguito specificato:
a) Sarà utilizzata una "step tablet" standard nazionale o un film a gradini, riconducibile a una "step tablet" che abbia almeno 5 valori di densità compresa fra 1.0 e 4.0. Il film a gradini deve essere stato verificato entro l'ultimo anno per comparazione con una "step tablet" standard

on the radiograph. Equipment used to view radiographs for interpretation shall provide a variable light source sufficient for the essential IQI designated wire to be visible for the specified density range. The viewing conditions shall be such that light from around the outer edge of the radiograph or coming through low-density portions of the radiograph does not interfere with interpretation.

5.5 Radiation sources

The following radiation sources shall be used:

a) X-ray units less than 450 KV;
b) γ-ray source type Ir 192;
c) γ-ray source type Se 75.

The maximum source size to be used (F as per par. 7.4) shall be 4 mm.

5.6 Densitometer

A densitometer shall be used for judging film density.

6. CALIBRATION

6.1 Source size

The equipment manufacturer's or supplier's publications, such as technical manuals, decay curves, or written statements documenting the actual or maximum source size or focal spot, shall be acceptable as source size verification.

When manufacturer's or supplier's publications are not available, source size may be determined as follows:
a) For X-ray machine operating at 500 KV and less, the focal spot size may be determined in accordance with SE-1165.
b) For Ir 192 source, the source size may be determined in accordance with SE-1114.

6.2 Densitometer

Densitometer shall be calibrated at least every three months during use as follows:
a) A national standard step tablet or a step wedge calibration film, traceable to a national standard step tablet and having at least 5 steps with neutral densities from at least 1.0 through 4.0, shall be used. The step wedge calibration film shall have been verified within the last year

nazionale a meno che, prima del suo primo utilizzo, sia stato mantenuto in un imballo sigillato a tenuta di luce e di umidità sigillato come fornito dal produttore. Il film a gradini può essere utilizzato senza verifica per un anno dopo l'apertura, purché entro la data di scadenza dichiarata dal produttore.

b) Saranno seguite passo passo le istruzioni fornite dal produttore del densitometro.

c) Saranno letti i valori di densità più vicini a 1.0, 2.0, 3.0, e 4.0 della "step tablet" o del film a gradini.
d) Il densitometro è accettabile se i valori di densità letti non variano più di ± 0.05 del valore indicato sulla "step tablet" standard o sul film a gradini.

La calibrazione del densitometro sopradescritta sarà documentata, ma la lettura di ogni valore non sarà registrata.
Una verifica periodica della calibrazione, effettuata come sopra descritto, sarà effettuata all'inizio di ogni turno di lavoro, dopo 8 ore di uso continuativo, o dopo ogni sostituzione dell'apertura, qualsiasi sia il primo evento. Il densitometro è accettabile se i valori di densità letti non variano più di ± 0.05 del valore determinato in c). Le verifiche periodiche non saranno registrate.

by comparison with a national standard step tablet unless, prior to first use, it was maintained in a light-tight and waterproof sealed package as supplied by the Manufacturer. Step wedge calibration films may be used without verification for one year upon opening, provided it is within the manufacturer's stated shelf life.
b) The densitometer manufacturer's step-by-step instructions for the operation of the densitometer shall be followed.
c) The density steps closest to 1.0, 2.0, 3.0, and 4.0 on the national standard step tablet or step wedge calibration film shall be read.
d) The densitometer is acceptable if the density readings do not vary by more than ± 0.05 density units from the actual density stated on the national standard step tablet or step wedge calibration film.

Densitometer calibration required above shall be documented, but the actual readings for each step do not have to be recorded.
Periodic calibration verification checks shall be performed as described above at the beginning of each shift, after 8 hr of continuous use, or after change of apertures, whichever comes first. The densitometer is acceptable if the density readings are within ± 0.05 of the calibration readings determined in c) above. Periodic verification checks do not have to be recorded.

7. ESAME

7.1 Tecnica radiografica

La tecnica di esposizione a parete singola sarà utilizzata ovunque pratico. Quando l'uso della tecnica a parte singola non sarà ritenuto pratico, si utilizzerà la tecnica di esposizione a parete doppia. Un numero adeguato di esposizioni sarà effettuato per dimostrare che la copertura richiesta è stata ottenuta.

7.1.1 Tecnica a parete singola
Nella tecnica a parte singola, la radiazione passa solo attraverso una parete della saldatura, la quale è mostrata sulla pellicola per l'accettabilità.

7.1.2 Tecnica a doppia parete
Quando l'uso della tecnica a parte singola non sarà ritenuto pratico, si utilizzerà una delle seguenti tecniche di esposizione a parete doppia.
(a) Lettura a parte singola. In questa tecnica la radiazione passa attraverso due pareti e solo quella dal lato film è mostrata sulla pellicola per l'accettabilità. Quando è richiesta una copertura al

7. EXAMINATION

7.1 Radiographic technique

A single-wall exposure technique shall be used for radiography whenever practical. When it is not practical to use a single-wall technique, a double-wall technique shall be used. An adequate number of exposure shall be made to demonstrate that required coverage has been obtained.

7.1.1 Single-wall technique
In the single-wall technique, the radiation passes through only one wall of the weld, which is viewed for acceptance on the radiograph.

7.1.2 Double-wall technique
When it is not practical to use a single-wall technique, one of the following double-wall technique shall be used.
(a) Single-wall viewing. In this technique the radiation passes through two walls and only the weld on the film-side wall is viewed for acceptance on the radiograph. When complete coverage is

100% di saldature circonferenziali, saranno eseguite almeno tre esposizioni a 120 gradi l'una dall'altra.

(b) Lettura a parete doppia. Per saldature fino a 3 ½ in. (89 mm) di diametro nominale esterno, può essere utilizzata una tecnica in cui la radiazione passa attraverso due pareti ed entrambe sono mostrate sulla stessa pellicola per l'accettabilità. Per la tecnica di lettura a parete doppia, sarà utilizzato solo il penetrametro lato sorgente. Si avrà cura di assicurare che la massima sfumatura geometrica ammessa sia rispettata. Nel caso in cui la massima sfumatura geometrica non possa essere rispettata, sarà utilizzata la tecnica di lettura a parete singola.

1. Il fascio di radiazioni può essere inclinato rispetto all'asse centrale, di un angolo sufficiente a separare le immagini delle due pareti in modo tale che non ci sia sovrapposizione fra le due aree da interpretare. Quando è richiesta una copertura al 100%, saranno eseguite almeno due esposizioni a 90 gradi fra loro per ogni giunto.

2. In alternativa, la saldatura può essere radiografata con il fascio di radiazioni posizionato in modo che le immagini delle due pareti siano sovrapposte fra loro. Quando è richiesta una copertura al 100%, saranno eseguite almeno tre esposizioni a 60 gradi o a 120 gradi fra loro.

3. Saranno eseguite esposizioni aggiuntive quando la copertura richiesta non può essere ottenuta con il minimo di esposizioni indicate sopra.

required for circumferential welds, a minimum of three exposures taken 120 deg. To each other shall be made.

(b) Double-wall viewing. For welds 3 ½ in. (89 mm) or less in nominal outside diameter, a technique may be used in which the radiation passes through two walls and the weld in both walls is viewed for acceptance on the same radiograph. For double-wall viewing, only a source-side IQI shall be used. Care should be exercised to ensure that the required geometric unsharpness is not exceeded. If the geometric unsharpness requirement cannot be met, then single-wall viewing shall be used.

1. The radiation beam may be offset from the plane of the weld at an angle sufficient to separate the images of the source-side and film-side portions of the weld so that there is no overlap of the areas to be interpreted. When complete coverage is required, a minimum of two exposure taken 90 deg. To each other shall be made for each joint.
2. As an alternative, the weld may be radiographed with the radiation beam positioned so that the images of both walls are superimposed. When complete coverage is required, a minimum of three exposures taken at either 60 deg. or 120 deg. To each other shall be made for each joint.
3. Additional exposures shall be made if the required radiographic coverage cannot be obtained using the minimum number of exposures indicated here above.

7.2 Energia della radiazione

L'energia della radiazione impiegata deve permettere di ottenere la densità richiesta e di vedere l'immagine del penetrametro richiesto da questo documento.

7.2 Radiation energy

The radiation energy employed for any radiographic technique shall achieve the density and IQI image requirements of this document.

7.3 Direzione della radiazione

La direzione dell'asse centrale della radiazione sarà per quanto praticabile centrata nell'area d'interesse.

7.3 Direction of radiation

The direction of the central beam of radiation shall be centered on the area of interest whenever practical.

7.4 Sfumatura geometrica

La sfumatura geometrica della radiografia sarà determinata con la formula seguente:

$$Ug = F \times d / D$$

7.4 Geometric Unsharpness

Geometric Unsharpness of the radiograph shall be determined in accordance with:

$$Ug = F \times d / D$$

dove
Ug = sfumatura geometrica
F = la massima dimensione della sorgente, proiettata (o macchia focale effettiva) nel piano perpendicolare alla distanza D dall'oggetto radiografato, mm.
D = distanza dalla sorgente di radiazioni all'oggetto radiografato, mm.
d = distanza dal lato sorgente dell'oggetto radiografato alla pellicola, mm.

D e d saranno determinati approssimativamente al centro dell'area di interesse.
D avrà un valore compreso fra 100 e 1500 mm

d avrà un valore compreso fra 1 e 100 mm.

7.5 Marcatori

I marcatori (Vedi figura 2), che devono apparire come immagine radiografica sulla pellicola, saranno posizionati sulla parte, non sulla cassetta. La loro posizione sarà marcata permanentemente sulla superficie della parte radiografata quando permesso, o su una mappa, in modo da rendere che l'area d'interesse sia accuratamente rintracciabile alla propria posizione sulla parte, per il periodo richiesto di archiviazione del la radiografia. In aggiunta, la loro posizione non limita l'area di interesse o l'area da interpretare. Deve essere data evidenza sulla radiografia che la copertura richiesta è stata ottenuta. I marcatori saranno posizionati come di seguito specificato.

I marcatori saranno posizionati sul lato sorgente quando si radiografano i seguenti soggetti:
1) giunti longitudinali in componenti cilindrici o conici;
2) componenti sferici o curvi il cui lato concavo è verso la sorgente e quando la distanza "sorgente-oggetto" è inferiore del raggio interno del componente;
3) componenti sferici o curvi il cui lato convesso è lato sorgente.
I marcatori saranno posizionati lato film radiografando componenti sferici e curvi il cui lato concavo sia verso la sorgente e quando la distanza "sorgente-oggetto" è maggiore del raggio interno.

I marcatori saranno posizionati indifferentemente lato sorgente o lato film radiografando componenti sferici o curvi il cui lato concavo è verso la sorgente e la distanza "sorgente-oggetto" sia uguale al raggio interno del componente.

where
Ug = geometric unsharpness
F = the maximum projected dimension of the radiating source (or effective focal spot) in the plan perpendicular to the distance D from the weld or object being radiographed, mm.
D = distance from source of radiation to weld or object being radiographed, mm.
d = distance from source side of weld or object being radiographed to the film, mm.

D and d shall be determined at the approximate center of the area of interest.
D shall have a value in the range of 100 to 1500 mm
d shall have a value in the range of 1 to 100 mm.

7.5 Location markers

Location markers (see Figure 2), which are to appear as radiographic images on the film, shall be placed on the part, not on the exposure holder/cassette. Their locations shall be permanently marked on the surface of the part being radiographed when permitted, or on a map, in a manner permitting the area of interest on a radiograph to be accurately traceable to its location on the part, for the required retention period of the radiograph. In addition, their locations do not limit the area of interest or the area to be interpreted. Evidence shall also be provided on the radiograph that required coverage of the region being examined has been obtained. Location markers shall be placed as follows.
Location markers shall be placed on the source side when radiographing the following:
1) longitudinal joints in cylindrical or conical components;
2) curved or spherical components whose concave side is toward the source and when the "source-to-material" distance is less than the inside radius of the component;
3) curved or spherical components whose convex side is toward the source.
Location markers shall be placed on the film side when radiographing either curved or spherical components whose concave side is toward the source and when the "source-to-material" distance is greater than the inside radius.
Location markers may be placed on either the source or film side when radiographing either curved or spherical components whose concave side is toward the source and the "source-to-material" distance equals the inside radius of the component.

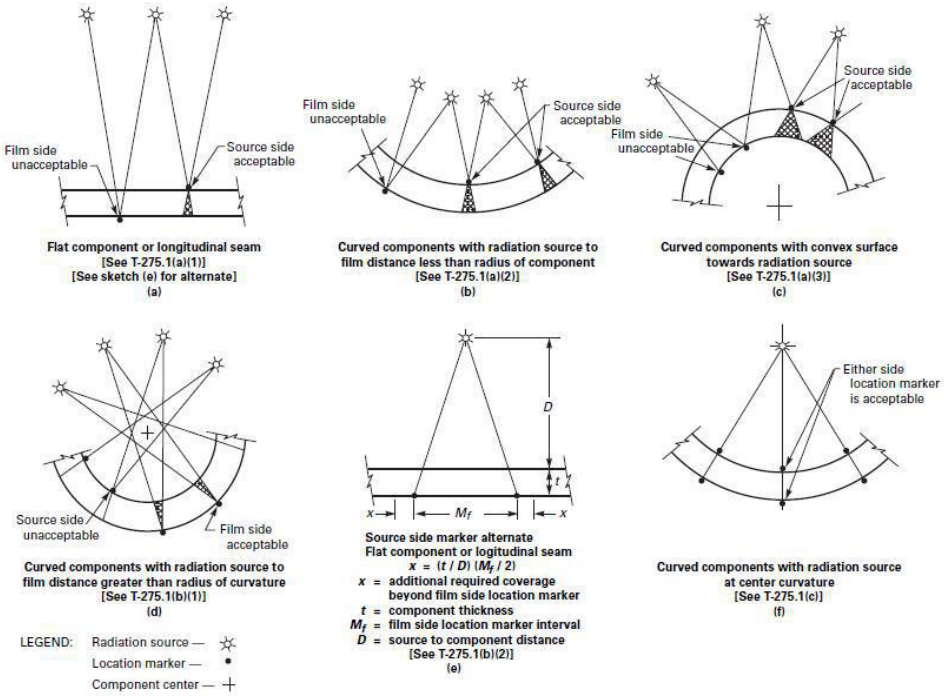


Figure 2 – Location makers
Figura 2 – Posizione marcatori

7.6 Selezione del penetrametro

7.6.1 Materiale
Il penetrametro sarà scelto della stessa lega di materiale identificato nello standard SE-747, come applicabile, o di una lega di materiale di minore assorbimento del materiale radiografato.

7.6.2 Dimensione
Il filo essenziale scelto sarà come specificato in Tabella 5.
Per gli IQI a fili, un filo di diametro inferiore può essere il sostituto del filo essenziale richiesto per ogni campo di spessori elencati in tabella 5.
(a) Saldature con sovrammetallo. Lo spessore sul quale è basata la scelta del penetrametro è lo spessore nominale della parete singola più il sovrammetallo stimato essere presente su entrambe le superfici (I.D. e O.D.). Il valore stimato dello spessore di sovrammetallo sarà rappresentativo delle condizioni della saldatura e non eccederà il massimo permesso da questo documento. La misura fisica dello spessore di sovrammetallo effettivo non è richiesta. I piattini di supporto non saranno considerati parti dello spessore nella scelta dell'IQI.

(b) Saldature senza sovrammetallo. Lo spessore sul quale è basata la scelta del penetrametro è lo spessore nominale della singola parete del materiale. I piattini di supporto non saranno considerati parti dello spessore nella scelta dell'IQI.

7.6 IQI selection

7.6.1 Material
IQIs shall be selected from either the same alloy material group or grade as identified in SE-747, as applicable, or from an alloy material group or grade with less radiation absorption than material being radiographed.

7.6.2 Size
The designated essential wire shall be as specified in Table 5.
For wire type IQIs a smaller diameter wire may be substituted for the essential wire required for any section thickness listed in Table 5.
(a) Welds with reinforcements. The thickness on which the IQI is based is the nominal single-wall material thickness plus the weld reinforcement thickness estimated to be present on both sides of the weld (I.D. and O.D.). The values used for the estimated weld reinforcement thicknesses shall be representative of the weld conditions and shall not exceed the maximum permitted by this document. Physical measurement of the actual weld reinforcements is not required. Backing rings or strips shall not be considered as part of the thickness in IQI selection.
(b) Welds without reinforcement. The thickness on which the IQI is based is the nominal single-wall material thickness. Backing rings or strips shall not be considered as part of the thickness in IQI selection.

(c) Valori attuale. Riguardo i capoversi *(a)* e *(b)* di cui sopra, quando lo spessore attuale del materiale/saldatura è misurato, la selezione dell'IQI può essere basata su tali valori conosciuti.

(c) Actual values. With regard to *(a)* and *(b)* above, when the actual material/weld thickness is measured, IQI selection may be based on these known values.

Nominal Single-Wall Material Thickness range *Campo di spessori nominale singola parete*		**IQI essential wire** / *Filo essenziale Penetrametro*			
		Source Side / *Lato sorgente*		**Film Side** / *Lato film*	
in.	mm	SE 747	EN 462-1 & ISO 19232	SE 747	EN 462-1 & ISO 19232
Up to 0.25, incl.	Up to 6.4, incl.	5	W13	4	W14
Over 0.25 through 0.375	Over 6.4 through 9.5	6	W12	5	W13
Over 0.375 through 0.50	Over 9.5 through 12.7	7	W11	6	W12
Over 0.50 through 0.75	Over 12.7 through 19.0	8	W10	7	W11
Over 0.75 through 1.00	Over 19.0 through 25.4	9	W9	8	W10
Over 1.00 through 1.50	Over 25.4 through 38.1	10	W8	9	W9

Table 5 – IQI selection

Tabella 5 – Selezione del penetrametro

7.7 Uso del penetrametro per il monitoraggio dell'esame

Il penetrametro sarà posizionato sul lato sorgente della parte da esaminare, ad eccezione delle condizioni descritte di seguito.
Quando l'inaccessibilità impedisce il posizionamento manuale del penetrametro lato sorgente, il penetrametro sarà posizionato lato film a contatto con la parte in esame. Una lettera "F" in piombo sarà posizionata adiacente o sul penetrametro.
Il penetrametro a fili sarà posizionato sulla saldatura in modo che la lunghezza dei fili sia trasversale alla lunghezza della saldatura. L'identificazione del penetra metro e, quando utilizzata, la lettera "F", non sarà nell'area di interesse eccetto quando la condizione geometrica renda ciò impraticabile.
Quando una o più cassette sono utilizzate per una singola esposizione, almeno un'immagine di penetrametro apparirà su ogni radiografia eccetto quanto indicato in 7.7.1 di seguito.
Se i limiti di densità prescritti sono raggiunti utilizzando più di un penetrametro, uno sarà rappresentativo dell'area d'interesse più chiara e l'altro della zona più scura; le aree a densità intermedie saranno considerate di valore accettabile.

7.7 Use of IQI to monitor radiographic examination

The IQI(s) shall be placed on the source side of the part being examined, except for the condition described here below.
Where inaccessibility prevents hand placing the IQI(s) on the source side, the IQI(s) shall be placed on the film side in contact with the part being examined. A lead letter "F" shall be placed adjacent to or on the IQI(s).
The wire-type IQI(s) shall be placed on the weld so that the length of the wires is transverse to the length of the weld. The IQI identification and, when used, the lead letter "F", shall not be in the area of interest except when geometric configuration makes it impractical.
When one or more film holders are used for an exposure, at least one IQI image shall appear on each radiograph except as outlined in 7.7.1 below.

If the requirements of radiographic density are met using more than one IQI, one shall be representative of the lightest area of interest and the other the darkest area of interest; the intervening densities on the radiograph shall be considered as having acceptable density.

7.7.1 Casi speciali
(1) Per componenti cilindrici dove la sorgente è posizionata sull'asse del componente per una singola esposizione, sono necessari almeno tre penetrametri, posizionati approssimativamente a 120 gradi fra loro, nelle seguenti condizioni:
quando la circonferenza completa è radiografata utilizzando una o più cassette, o;
quando si radiografa una sezione o più sezioni di

7.7.1 Special cases
(1) For cylindrical components where the source is placed on the axis of the component for a single exposure, at least three IQIs, spaced approximately 120 deg. Apart, are required under the following conditions:
when the complete circumference is radiographed using one or more film holders, or;
when a section or sections of the circumference,

circonferenza, dove la lunghezza fra le estremità fra le sezioni più esterne è intorno a 240 gradi o più, utilizzando una o più cassette. Il posizionamento di film addizionali può essere necessario per ottenere la necessaria spaziatura dei penetrametri.
(2) Per componenti cilindrici dove la sorgente è posizionata sull'asse del componente per una singola esposizione, sono richiesti almeno tre penetrametri, con uno posizionato ad ogni estremità del tratto di circonferenza radiografata e uno approssimativamente al centro del tratto, alle seguenti condizioni:
quando una sezione di circonferenza, la cui lunghezza è maggiore di 120 gradi e inferiore a 240, è radiografata utilizzando un'unica cassetta, o;
quando una o più sezioni di circonferenza, dove la distanza fra le estremità delle sezioni più esterne copre meno di 240 gradi, è radiografata utilizzando più di una cassetta.
(3) In *(1)* e *(2)* sopra, dove sezioni di saldature longitudinali incrociano le circonferenziali sono radiografate simultaneamente con le saldature circonferenziali, un IQI supplementare sarà posto su ogni longitudinale nel punto più lontano dall'incrocio con la circonferenziale radiografata.

where the length between the ends of the outermost sections span 240 or more deg., is radiographed using one or more film holders. Additional film locations may be required to obtain necessary IQI spacing
(2) For cylindrical components where the source is placed on the axis of the component for a single exposure, at least three IQI(s), with one placed at each end of the span of the circumference radiographed and one in the approximate center of the span, are required under the following conditions:
when a section of the circumference, the length of which is greater 120 deg. and less then 240 deg., is radiographed using just one film holder, or;
when a section or sections of the circumference, where the length between the ends of the outermost sections span less than 240 deg., is radiographed using more than one film holder.
(3) In *(1)* and *(2)* above, where sections of longitudinal welds adjoining the circumferential weld are radiographed simultaneously with the circumferential weld, an additional IQI shall be placed on each longitudinal weld at the end of the section most remote from the junction with the circumferential weld being radiographed.

8. VALUTAZIONE

8.1 Qualità delle radiografie

Tutte le radiografie saranno esenti da difetti meccanici, chimici o altro, la cui estensione mascheri o possa essere confusa con l'immagine di discontinuità nell'area di interesse dell'oggetto radiografato. Tali difetti includono, ma non sono limitati a: nebbia, difetti di trattamento quali striature, segni d'acqua, o chimiche, graffi, ditate, pieghe, sporcizia, segni elettrostatici, macchie, o strappi, false indicazioni dovute agli schermi difettosi.

8.2 Densità radiografica

La densità del film nella zona adiacente al filo designato dell'IQI e nell'area di interesse sarà 1.8 minimo per lettura in film singolo di radiografie eseguite con sorgenti a raggi X e 2.0 minimo per radiografie eseguite con sorgenti a raggi gamma. Per lettura composita di esposizione a film multiplo, ogni film del set avrà una densità minima di 1.3. La densità massima sarà 4.0 per lettura singola o composita. Una tolleranza dello 0.05 in densità è ammessa per la variazione fra le letture dei densitometri.

8. EVALUATION

8.1 Quality of radiographs

All radiographs shall be free from mechanical, chemical, or other blemishes to the extent that they do not mask and are not confused with the image of any discontinuity in the area of interest of the object being radiographed. Such blemishes include, but are not limited to: fogging, processing defects such as streaks, watermarks, or chemical stains, scratches, finger marks, crimps, dirtiness, static marks, smudges, or tears, false indications due to defective screens.

8.2 Radiographic density

The transmitted film density through the radiographic image adjacent to the designated wire of a wire IQI and the area of interest shall be 1.8 minimum for single film viewing for radiographs made with any X-ray source and 2.0 minimum for radiographs made with a gamma ray source. For composite viewing of multiple film exposure, each film of the composite set shall have a minimum density of 1.3. The maximum density shall be 4.0 for either single or composite viewing. A tolerance of 0.05 in density is allowed for variations between densitometer readings.

La densità della radiografia in ogni punto dell'area di interesse non dovrà

(1) Variare oltre il meno 15% o più 30% dalla densità misurata attraverso il corpo del penetrametro a fori nella zona adiacente al foro designato o adiacente al filo essenziale designato del penetrametro a fili, e
(2) Eccedere i valori minimo e massimo ammissibile di densità specificati sopra.

Nel calcolo della variazione del valore di densità il valore può essere arrotondato allo 0.1 più vicino all'interno del campo specificato sopra.

The density of the radiograph anywhere through the area of interest shall not

(1) Vary by more than minus 15% or plus 30% from the density through the body of the designated hole-type adjacent to the essential hole or adjacent to the essential wie of a wire-type IQI, and
(2) Exceed the minimum/maximum allowable density ranges specified above.

When calculating the allowable variation in density, the calculation may be rounded to the earest 0.1 within the range specified above.

8.3 Sensibilità dell'IQI

Le radiografie saranno eseguite con una tecnica di sensibilità sufficiente a mostrare il filo essenziale dell'IQI a fili. Le radiografie mostreranno anche i numeri e le lettere di identificazione dell'IQI. Se l'immagine del filo essenziale non è visibile su ognuno dei film in una tecnica a film multiplo, ma è visibile in lettura composita, l'interpretazione è permessa solo in lettura composita.
Per gli IQI a fili, il filo essenziale sarà visibile entro l'area di interesse che rappresenta lo spessore utilizzato per determinare il filo essenziale, incluse le variazioni di densità ammesse nel paragrafo 8.2 sopra.

8.3 IQI sensitivity

Radiography shall be performed with a technique of sufficient sensitivity to display the essential wire of a wire IQI. The radiographs shall also display the IQI identifying numbers and letters. If the essential wire IQI image do not show on any film in a multiple film technique, but do show in composite film viewing, interpretation shall be permitted only by composite film viewing.
For wire-type IQIs, the essential wire shall be visible within the area of interest representing the thickness used for determining the essential wire, inclusive of the allowable density variations described in 8.2 above.

8.4 Eccessiva radiazione retro diffusa

Se un'immagine chiara della lettera "B", descritta in 4.2, appare su un fondo scuro della radiografia, la protezione dalla retrodiffusione è insufficiente e la radiografia sarà considerata inaccettabile. Un'immagine scura della lettera "B" su fondo chiaro non sarà causa di scarto.

8.4 Excessive backscatter

If a light image of the "B", as described in 4.2, appears on a darker background of a radiograph, protection from backscatter is insufficient and the radiograph shall be considered unacceptable. A dark image of the "B" on a lighter background is not cause for rejection.

8.5 Limiti di sfumatura geometrica

Il limite raccomandato ma non obbligatorio di sfumatura geometrica è

8.5 Geometric unsharpness limitation

Recommended but not mandatory maximum value for Geometric unsharpness is

0.51 mm

8.6 Valutazione del costruttore

Il costruttore è responsabile della verifica, interpretazione, e accettabilità delle radiografie nella loro completezza per assicurarne la conformità con i requisiti dell'Articolo 2 del codice ASME Sez. V e le altre sezioni applicabili del codice. Come supporto per la verifica e la valutazione, la documentazione

8.6 Evaluation by manufacturer

The manufacturer shall be responsible for the review, interpretation, and acceptance of the completed radiographs to assure compliance with the requirements of Article 2 of ASME Code Sect. V and the other applicable ASME Code section. As an aid to the review and evaluation, the

della tecnica radiografica richiesta di seguito sarà completata prima della valutazione. Il Rapporto Radiografico sarà completato durante la valutazione. I dettagli della tecnica e il Rapporto Radiografico accompagneranno le radiografie. L'accettazione sarà completata prima della presentazione delle radiografie e della relativa documentazione all'ispettore.

radiographic technique documentation required here below shall be completed prior to the evaluation. The Radiographic Test Report shall be completed during the evaluation. The radiographic technique details and the Radiographic Test Report shall accompany the radiographs. Acceptance shall be completed prior to presentation of the radiographs and accompanying documentation to the inspector.

9. CRITERI DI ACCETTABILITA'

Per tutte le saldature saranno applicati i criteri di accettabilità del par. 9.2. Eccezioni saranno fatte per le saldature di qualifica di saldatori e operatori di saldatura e per le saldature da esaminare secondo il paragrafo UW-52 della sezione VIII div. 1, per le quali saranno rispettivamente applicati i criteri di accettabilità ai paragrafi 9.3 e 9.4 di questo documento.
Il disegno costruttivo applicabile definisce quali sono i criteri di accettabilità applicabili.

9. ACCEPTANCE CRITERIA

These acceptance standards in par. 9.2 shall apply. Exception shall be taken for the acceptance criteria of welds for welders or welders operators and welds to be examined according to UW-52 of section VIII div. 1, for which shall be applied respectively the paragraph 9.3 and 9.4 of this document.

The applicable construction drawing shall define the acceptance criteria to be applied.

9.1 Terminologia

a) Indicazioni tondeggianti. Indicazioni con una lunghezza massima di tre volte la larghezza o meno sulla radiografia sono definite indicazioni tondeggianti. Tali indicazioni possono essere circolari, ellittiche, coniche, o irregolari nella forma e possono avere code. Valutando la dimensione di un'indicazione, la coda sarà inclusa. Le indicazioni possono essere di qualsiasi natura nella saldatura, quali porosità, scorie o tungsteno.
b) Indicazioni allineate. Una sequenza di Quattro o più indicazioni tondeggianti saranno considerate allineate quando esse formano una linea parallela alla lunghezza della saldatura disegnata attraverso il centro delle due indicazioni più esterne.
c) Spessore t. "t" è lo spessore di saldatura, del materiale resistente alla pressione, o il più sottile fra le sezioni saldate, comunque il minore. Se una saldatura a piena penetrazione include una saldatura d'angolo, lo spessore di gola sarà incluso in "t".
d) Densità dell'immagine. La densità dell'indicazione all'interno dell'immagine può variare e non è criterio per accettabilità o scarto.
e) Indicazione tondeggiante rilevante. Solo indicazioni tondeggianti oltre le seguenti dimensioni saranno considerate rilevanti.
1/10 t per t meno di 3 mm
0.4 mm per t da 3 mm a 6 mm incl.
0.8 mm per t maggiore di 6 mm a 50 mm incl.
1.6 mm per t maggiore di 50 mm.

9.1 Terminology

a) Rounded Indications. Indications with a maximum length of three times the width or less on the radiograph are defined as rounded indications. These indications may be circular, elliptical, conical, or irregular in shape and may have tails. When evaluating the size of an indication, the tail shall be included. The indication may be from any source in the weld, such as porosity, slag or tungsten.
b) Aligned Indications. A sequence of four or more rounded indications shall be considered to be aligned when they touch a line parallel to the length of the weld drawn through the centre of the two outer rounded indications.
c) Thickness t. "t" is the thickness of the weld, of the pressure-retaining material, or of the thinner of the sections being joined, whichever is less. If a full penetration weld includes a fillet weld, the thickness of the fillet weld throat shall be included in "t".
d) Image Density. Density within the image of the indication may vary and is not a criterion for acceptance or rejection.
e) Relevant rounded Indications. Only those rounded indications which exceed the following dimensions shall be considered relevant.
1/10 t for t less than 3 mm
0.4 mm for t from 3 mm to 6 mm incl.
0.8 mm for t greater than 6 mm to 50 mm incl.
1.6 mm for t greater than 50 mm.

9.2 Criteri di accettabilità

Le seguenti discontinuità sono considerate inaccettabili:
(1) ogni indicazione caratterizzata come cricca o zona di incomplete fusione o penetrazione;
(2) ogni altra indicazione allungata sulla radiografia che abbia una lunghezza maggiore di:
a) 6 mm per t fino a 19 mm.
b) 1/3 t per t da 19 a 57 mm.
c) 19 mm per t oltre 57 mm.
(3) ogni gruppo di indicazioni allineate che abbiano una lunghezza cumulative maggiore di t in un tratto lungo 12 t, eccetto quando la distanza fra le successive imperfezioni eccede 6L dove L è la lunghezza dell'imperfezione più lunga del gruppo;
(4) indicazioni tondeggianti oltre quanto specificato dai criteri standard indicati nell'Appendix 4 del codice ASME BPV Sezione VIII divisione 1.

9.3 Criteri di accettabilità per la qualifica di saldatori

Le radiografie per la qualifica di saldatori e di operatori di saldatura saranno valutate in accordo al codice ASME Sez. IX paragrafo QW-191 come di seguito.
(a) Indicazioni lineari. Cricche, mancanze di fusione, mancanza di penetrazione, e scorie sono rappresentate sulle radiografie come indicazioni lineari in cui la lunghezza è maggiore di tre volte la larghezza.
(b) Indicazioni tondeggianti. Porosità e inclusioni come scorie o tungsteno sono rappresentati in radiografia come indicazioni tondeggianti la cui lunghezza è tre volte la larghezza o inferiore. Tali indicazioni possono essere circolari, ellittiche o di forma irregolare; possono avere code; e possono variare in densità.

9.3.1 Prove di qualifica delle saldature

Le prove di performance di saldatori e operatori di saldatura effettuate mediante la radiografia di talloni di qualifica saranno giudicati inaccettabili quando la radiografia mostri imperfezioni eccedenti i limiti definiti di seguito.
(a) Indicazioni lineari
(1) Qualsiasi tipo di cricca o zona di mancanza di fusione o penetrazione:
(2) Ogni inclusione di scoria allungata con una lunghezza maggiore di:
a) 3 mm per t fino a 10 mm
b) 1/3 t per t oltre 10 fino a 57 mm incluso
c) 19 mm for t over 57 mm.
(3) Ogni gruppo di inclusioni di scoria in line che abbia una lunghezza totale di t in una lunghezza di 12 t, eccetto quando la distanza tra successive

9.2 Acceptance criteria

The following discontinuities are considered unacceptable:
(1) any indication characterized as a cracks or zone of incomplete fusion or penetration;
(2) any other elongated indication on the radiograph which has length greater than:
a) 6 mm for t up to 19 mm.
b) 1/3 t for t from 19 to 57 mm.
c) 19 mm for t over 57 mm.
(3) any group of aligned indications that have an aggregate length greater than t in a length of 12 t, except when the distance between the successive imperfections exceeds 6L where L is the length of the longest imperfection in the group;
(4) rounded indications in excess of that specified by the acceptance standards given in Appendix 4 of ASME BPV Code Section VIII division 1.

9.3 Acceptance criteria for welders qualification

RT for qualification of welders and welder operators shall be evaluated according with ASME Sect. IX paragraph QW-191 as follow.

(a) Linear indication. Cracks, incomplete fusion, inadequate penetration, and slag are represented on the radiograph as linear indications in which the length is more than three times the width.

(b) Rounded indications. Porosity and inclusions such as slag or tungsten are represented on the radiograph as rounded indications within a length three times the width or less. These indications may be circular, elliptical, or irregular in shape; may have tails; and may vary in density.

9.3.1 Qualification Test welds.

Welder and welding operator performance tests by radiography of welds in test assemblies shall be judged unacceptable when the radiograph exhibits any imperfection in excess of the limits specified below.
(a) Linear indications
(1) any type of crack or zone of incomplete fusion or penetration;
(2) any elongated slag inclusion which has a length greater than:
a) 3 mm for *t* up to 10 mm.
b) 1/3 *t* for *t* over 10 to 57 mm inclusive.
c) 19 mm for *t* over 57 mm.
(3) any group of slag inclusions in line that have an aggregate length greater than *t* in a length of *12 t*, except when the distance between the

imperfezioni eccede 6L dove L è la lunghezza della più lunga fra le imperfezioni del gruppo.

(b) Indicazioni tondeggianti

(1) La dimensione massima permessa per indicazioni tondeggianti sarà il valore più piccolo fra il 20% di t o 3 mm.

(2) Per saldature in materiali inferiori a 3 mm di spessore, il numero massimo di indicazioni tondeggianti accettabili sarà 12 in 150 mm di lunghezza di saldatura. Un numero proporzionalmente più piccolo di indicazioni tondeggianti sarà permesso per saldature inferiori a 150 mm di lunghezza.

(3) Per saldature in materiali di spessore 3 mm o maggiori la mappa in Figura 3 rappresenta il tipo massimo accettabile di indicazioni tondeggianti illustrate nelle configurazioni tipiche di raggruppamenti, assortimento e dispersione casuale. Indicazioni tondeggianti inferiori a 0,8 mm di diametro massimo non saranno considerate nella valutazione della radiografia per l'accettazione di saldatori o operatori di saldatura in questi campi di spessore dei materiali.

9.3.2 Saldature di produzione

Il criterio di accettabilità per saldatori e operatori di saldatura qualificati con saldature di produzione quando permesso da ASME BPVC sez. IX par. QW-304.1 o QW-305.1 saranno come da 9.3.1.

successive imperfections exceeds *6L* where *L* is the length of the longest imperfection in the group.

(b) Rounded Indications

(1) The maximum permissible dimension for rounded indications shall be the 20% of t or 3 mm whichever is smaller.

(2) For welds in material less than 3 mm in thickness, the maximum number of acceptable rounded indications shall not exceed 12 in a 150 mm length of weld. A proportionally fewer number of rounded indications shall be permitted in welds less than 150 mm in length.

(3) for welds in material 3 mm or greater in thickness, the charts in Figure 3 represent the maximum acceptable types of rounded indications illustrated in tipically clustered, assorted, and randomly dispersed configurations. Rounded indications less than 0,8 mm in maximum diameter shall not be considered in the radiographic acceptance tests of welders and welding operators in these ranges of material thickness.

9.3.2 Saldature di produzione

Il criterio di accettabilità per saldatori e operatori di saldatura qualificati con saldature di produzione quando permesso da ASME BPVC sez. IX par. QW-304.1 o QW-305.1 saranno come da 9.3.1.

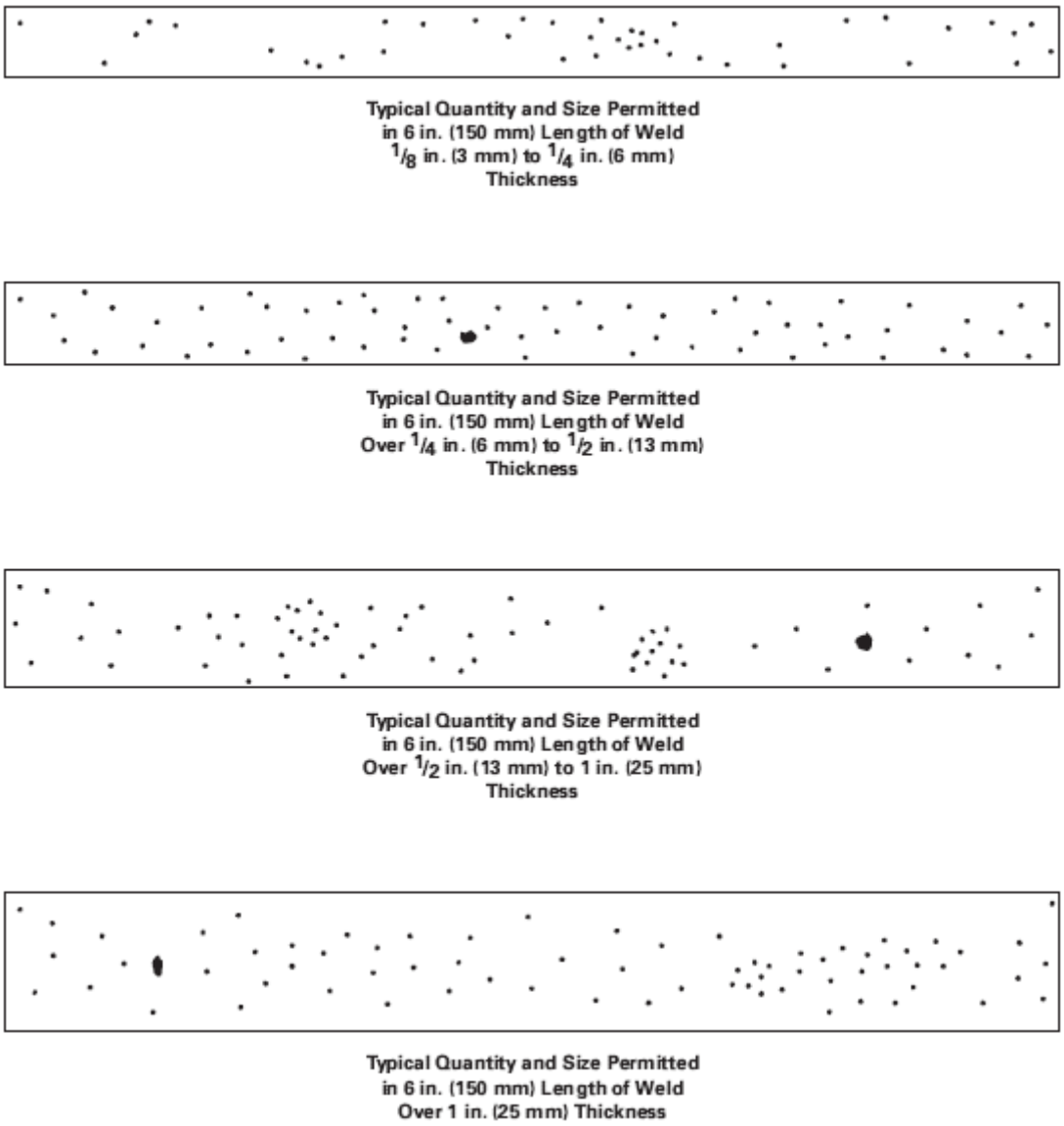


Figure 3 – Rounded indication chart for ASME BPVC sec. IX acceptance criteria
Figura 3 – Mappa delle indicazioni tondeggianti per criteri di accettabilità ASME BPVC sez. IX

9.4 Criterio di accettabilità per esame a spot

(a) Le saldature di testa da radiografare a spot saranno esaminate localmente come specificato di seguito.

(b) Estensione minima dell'esame a spot

(1) Uno spot sarà esaminato per ogni recipiente, ogni 15 m di saldatura o frazione fra quelle per le quali è stata selezionata l'efficienza alla colonna (b) della Tabella UW-12. Comunque, per recipienti o parti identiche, ognuna con meno di 15 m di saldatura per le quali è stata selezionata l'efficienza alla colonna (b) della Tabella UW-12, i 15 m di incremento possono essere rappresentati da

9.4 Acceptance criteria for spot examination

(a) Butt welded joints which are to be spot radiographed shall be examined locally as provided herein.

(b) Minimum extent of spot radiographic examination

(1) One spot shall be examined on each vessel for each 15 m increment of weld or fraction thereof for which a joint efficiency from column (b) of Table UW-12 is selected. However, for identical vessels or parts, each with less than 15 m of weld for which a joint efficiency from column (b) of Table UW-12 is selected, 15 m increments may be represented by one spot examination.

un unico spot.

(2) Per ogni incremento di saldatura da esaminre, un numero sufficiente di spot radiografici sarà eseguito per esaminare la saldatura di ogni saldatore o operatore di saldatura. Nelle condizioni in cui due o più saldatori o operatori di saldatura eseguono passate in una stessa saldatura, o su due lati di una stessa saldatura, uno spot può rappresentare il lavoro di tutti i saldatori e operatori di saldatura.

(3) Ogni spot sarà eseguito appena possibile dopo il completamento dell'incremento di saldatura da esaminare. La posizione dello spot sarà scelta dall'Ispettore dopo il completamento dell'incremento di saldatura da esaminare, eccetto quando l'Ispettore è stato notificato in adeguato anticipo e non può essere presente o effettuare la scelta, Il costruttore può esercitare il proprio giudizio per selezionare lo spot.

(4) Le radiografie da eseguire per soddisfare le regole di altri paragrafi (ad esempio UW-9(d), UW-11(a)(5)(b) e UW-14(b)) non saranno utilizzati per soddisfare i requisiti per l'esame a spot.

(c) Criteri per l'esame a spot
L'esame a spot sarà eseguito in accordo alle tecniche descritte in questo documento. La lunghezza minima dello spot sarà di 150 mm Le saldature esaminate a spot saranno valutate secondo I seguenti criteri:

(1) Sono inaccettabili le saldature nelle quali le indicazioni sono caratterizzate come cricche o zone di incomplete fusione o penetrazione.

(2) Le saldature nelle quali le indicazioni sono caratterizzate come inclusioni di scoria o cavità saranno inaccettabili se la lunghezza di ogni indicazione è maggiore di 2/3t dove t è lo spessore come definito in 9.1 di questo documento. Se più indicazioni contenute nelle limitazioni qui sopra sono allineate, la saldatura sarà ritenuta accettabile quando la soma delle maggiori dimensioni di tali indicazioni non è maggiore di t per ogni 6t di lunghezza della saldatura (o in proporzione per radiografie più corte di 6t) e se l'indicazione più lunga fra quelle considerate sono separate da almeno 3L di metallo saldato dove L è la lunghezza dell'indicazione più lunga. La lunghezza massima di ogni indicazione accettabili sarà 19 mm. Ogni indicazione più corta di 6 mm sarà accettabile per ogni spessore di lamiera.

(3) Le indicazioni tondeggianti non sono criterio di accettabilità delle saldature che non

(2) For each increment of weld to be examined, a sufficient number of spot radiographs shall be taken to examine the welding of each welder or welding operator. Under conditions where two or more welders or welding operators make weld layers in a joint, or on the two sides of a double-welded butt joint, one spot may represent the work of all welders or welding operators.

(3) Each spot examination shall be made as soon as practicable after completion of the increment of weld to be examined. The location of the spot shall be chosen by the Inspector after completion of the increment of welding to be examined, except that when the Inspector has been notified in advance and cannot be present or otherwise make the selection, the manufacturer may exercise his own judgment in selecting the spots.

(4) Radiographs required at specific locations to satisfy the rules of other paragraphs (such as UW-9(d), UW-11(a)(5)(b) and UW-14(b)) shall not be used to satisfy the requirements for spot radiography.

(c) Standards for spot radiographic examination
Spot examination shall be made in accordance with the technique described in this document. The minimum length of spot radiograph shall be 150 mm. The acceptability of welds examined by spot radiography shall be judged by the following standard:

(1) Welds in which indications are characterized as cracks or zones of incomplete fusion or penetration shall be unacceptable.

(2) Welds in which indications are characterized as slag inclusions or cavities shall be unacceptable if the length of any such indication is greater than 2/3t where t is the thickness as defined in 9.1 of this document. If several indications within the above limitation exist in line, the welds shall be judged acceptable if the sum of the longest dimensions of all such indications is not more than t in a length of 6t (or proportionately for radiographs shorter than 6t) and if the longest indications considered are separated by at least 3L of acceptable weld metal where L is the length of the longest indication. The maximum length of acceptable indications shall be 19 mm. Any such indications shorter than 6 mm shall be acceptable for any plate thickness.

(3) Rounded indications are not a factor in the acceptability of welds not required to be fully

debbano essere radiografate completamente.

(d) Valutazione e riesame

(1) Quando la radiografia a spot, secondo le regole sopra, è accettabile, l'intero incremento di saldatura rappresentato datale radiografia è accettabile.

(2) Quando uno spot, eseguito come sopra, è stato esaminato e la radiografia scopre saldature che non rispettano i minimi requisiti di qualità specificati sopra, saranno eseguiti due spot aggiuntivi per lo stesso incremento di saldatura in posizione lontana dal precedente. Le posizioni di questi spot aggiuntivi saranno determinati dall'Ispettore o dal fabbricante come previsto per lo spot originale. Le aree di saldatura riparate saranno esaminate radiograficamente in accordo ai precedenti requisiti di questo paragrafo 9.4.

(a) Se i due spot aggiuntivi esaminati mostrano che la saldatura soddisfa i requisiti sopra elencati, l'intero incremento di saldatura rappresentato dalle tre radiografie è accettabile a condizione che I difetti scoperti dal primo spot siano rimossi e l'area riparata di saldatura.

(b) Se anche uno dei due spot aggiuntivi mostra che la saldatura non soddisfa I requisiti di qualità sopra indicati, l'intero incremento di saldatura sarà rigettato. L'intero incremento di saldatura rappresentato sarà radiografato completamente e tutti i difetti saranno riparati.

(c) La riparazione della saldatura sarà eseguita in accordo al paragrafo 11 di questo documento 11 e il giunto riparato o risaldato sarà esaminato radiograficamente a spot in una posizione secondo i precedenti requisiti di questo paragrafo 9.4.

radiographed.

(d) Evaluation and retests

(1) When a spot radiographed as required above, is acceptable, the entire weld increment represented by this radiograph is acceptable.

(2) When a spot, radiographed as required above, has been examined and the radiograph discloses welding which does not comply with the minimum quality requirements above, two additional spots shall be radiographically examined in the same weld increment at locations away from the original spot. The locations of these additional spots shall be determined by the Inspector or fabricator as provided for the original spot examination described above. The weld repaired area shall be radiographically examined in accordance with the foregoing requirements of this paragraph 9.4.

(a) If the two additional spots examined show welding which meets the minimum quality requirements above, the entire weld increment represented by the three radiographs is acceptable provided the defects disclosed by the first of the three radiographs are removed and the area repaired by welding.

(b) If either of the two additional spots examined shows welding which does not comply with the minimum quality requirements above, the entire increment of weld represented shall be rejected. The entire increment of weld represented shall be completely radiographed and all defects need be corrected.

(c) Repair welding shall be performed as per paragraph 11 of this document and the rewelded or repaired joint shall be spot radiographically examined at one location in accordance with the foregoing requirements of this paragraph 9.4.

10. RAPPORTO

10.1 Documentazione di dettaglio della tecnica

Il fornitore di servizi RT preparerà e documenterà i dettagli della tecnica radiografica. Come minimo, le seguenti informazioni saranno fornite.
(a) identificazione, es.: comm/PO e numero di fabbrica (se applicabile)
(b) la mappa (se utilizzata) del piazzamento dei marcatori
(c) numero di esposizioni
(d) Voltaggio o tipo di isotopo utilizzato
(e) Dimensione macchia focale (F al par. 7.4)

10. REPORT

10.1 Radiographic technique documentation detail

The RT supplier shall prepare and document the radiographic technique details. As a minimum, the following information shall be provided.
(a) identification, e.g.; job/contract number and serial number (if applicable)
(b) the dimensional map (if used) of location marker placement
(c) number of exposures
(d) X-ray voltage or isotope type used
(e) Source size (F in par. 7.4)

(f) Tipo di materiale base e spessore, spessore di saldatura, spessore del rinforzo, quanto applicabile

(g) Distanza sorgente-oggetto (D al par. 7.4)
(h) Distanza oggetto lato sorgente-film (d al par. 7.4)
(i) Produttore e designazione del film

(l) Numero di film in ogni cassetta
(m) Esposizione singola- o doppia-parete
(n) Lettura singola- o doppia-parete
(o) Data dell'esame
(p) Nome e livello di certificazione del personale che ha eseguito l'esame
(q) Identificazione della procedura e indice di revisione

10.2 Rapporto radiografico

Il fornitore di servizi RT preparerà il Rapporto Radiografico. Il Rapporto conterrà almeno le seguenti informazioni:
(a) elenco di ogni tratto radiografato
(b) dettagli della tecnica radiografica
(c) valutazione e disposizione delle saldature esaminate
(d) identificazione dell'operatore che esegue la valutazione
(e) data della valutazione dell'operatore
(f) identificazione del rappresentante del Costruttore che esegue l'accettazione finale delle radiografie

(g) data della valutazione del Costruttore

11. RIPARAZIONE

Tutte le discontinuità eccedenti i criteri di accettabilità saranno rimosse con mezzi adeguati e riparate dal costruttore in accordo a una procedura approvata.
L'area riparata sarà riesaminata dopo la riparazione in accordo con la presente procedura, il film dell'area riparata sarà identificato con la lettera in piombo "R".

(f) Base material type and thickness, weld thickness, weld reinforcement thickness, as applicable
(g) Source-to- object distance (D in par. 7.4)
(h) Distance from source side of object to film (d in par. 7.4)
(i) Film manufacturer and their assigned type/designation
(l) Number of film in each holder/cassette
(m) Single- or double-wall exposure
(n) Single- or double-wall viewing
(o) Date of examination
(p) Name and certification level for personnel performing the examination
(q) Procedure identification and revision index

10.2 Radiographic test report

The RT supplier shall prepare the Radiographic Test Report. As a minimum, the following information shall be provided:
(a) a listing of each radiograph location
(b) the radiographic technique details
(c) evaluation and disposition of the weld(s) examined
(d) identification of the Operator who performed the evaluation
(e) date of the operator's evaluation
(f) identification of the Manufacturer's representative who performed the final acceptance of the radiograph
(g) date of Manufacturer's evaluation

11. REPAIR

All discontinuities in excess to acceptance standards shall be removed by suitable means and repaired according to approved procedure by the manufacturer.
The repaired area shall be re-examined after repair in accordance with this procedure; the film of the repaired area shall be identified with the lead letter "R".

ISTITUTO DI RICERCHE TECNOLOGICHE E COLLAUDI
TREZZO SULL'ADDA (MI)

ATTESTATO DI CERTIFICAZIONE **No. 17**
CERTIFICATION

SI DICHIARA CHE THIS IS TO CERTIFY THAT	***LOREFICE NICOLÒ***
DIPENDENTE DELLA AN EMPLOYEE OF	IRTEC - ISTITUTO DI RICERCHE TECNOLOGICHE E COLLAUDI S.R.L. TREZZO SULL'ADDA
IN BASE ALLE CAPACITA' PERSONALI, ISTRUZIONE, ESAMI, ESPERIENZA ED IN ACCORDO CON QUANTO PRESCRITTO DA BY VERTUE OF HIS PERSONAL CAPABILITIES, INSTRUCTION, EXAMINATION, EXPERIENCE AND ACCORDING TO THE REQUIREMENTS OF	**IRTEC QUA-02 REV. 10 WRITTEN PRACTICE FOR PERSONNEL QUALIFICATION AND CERTIFICATION IN NON DESTRUCTIVE TESTING, PREPARED ON THE BASIS OF SNT-TC-1A RECOMMENDED PRACTICE, ED. 2020**
E' QUALIFICATO AL LIVELLO IS QUALIFIED AS LEVEL	II (SECONDO) II (SECOND)
PER LA SEGUENTE TECNICA DI CONTROLLO NON DISTRUTTIVO FOR THE FOLLOWING NON DESTRUCTIVE TESTING TECHNIQUE	CONTROLLO RADIOGRAFICO (RT) RADIOGRAPHIC TESTING (RT)
DATA DI RILASCIO DEL CERTIFICATO DATE	31/01/2024
QUESTO ATTESTATO E' VALIDO FINO AL THIS CERTIFICATE IS VALID UP TO	31/01/2029

III Livello
NDE LEVEL III

Dott. Ing. G. Grossi
dott. Ing. G. GROSSI

IRTEC srl – TREZZO SULL'ADDA
General Manager : Mrs. C. Salvi
31/01/2024

I.R.T.E.C. srl
via F. Santi, 3
20056 Trezzo sull'Adda (Mi)
C.F. e P.IVA 02829820154
(Firma del Legale rappresentante)

IRTEC SRL
SISTEMA DI QUALITA' CERTIFICATO ISO 9001:2008

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E-mail : info@irtecsrl.com Web : www.irtecsrl.com

RAPP.DI PROVA N°
RDP No
RIF.
REF.
DATA
DATE
FOGLIO 1 DI 2
SHEET OF

RADIOGRAPHIC EXAMINATION REPORT

SAMPLE

CLIENTE
CUSTOMER

COMMESSA
JOB

OGGETTO
SUBJECT

SPECIFICA PROCEDURE:
SPECIFICATION ACCEPTABILITY:

Stadio di lavorazione Working step	**Superficie** Surface	**Materiali** Materials	Pipes: Flanges:	Fittings :

1

Materiale Material	Dimensioni Dimensions	Tipo di sorgente Source type	Tecnica Technique	Distanze - Distances: Oggetto-Film Object to Film	Distanze - Distances: Sorgente-Oggetto Source to object	Spessore saldatura Weld thickness	Tipo IQI IQI Type	Posizione IQI IQI Position
See mat.table		γ Ray	Fig. E					Source side Film side ☒

Tensione Voltage	Corrente Current	Dimens. sorgente Source size	Attività Ir 192 / Ir 192 activity	Tipo Film Film type	Densità Density	Sensibilità Sensitivity	Geometric unsharpness (Ug)	Film
					Required 2.0÷4.0 Actual 2.7-3.1	Required 5 Actual 5	0.08 mm	Single ☒ Double

2

Materiale Material	Dimensioni Dimensions	Tipo di sorgente Source type	Tecnica Technique	Distanze - Distances: Oggetto-Film Object to Film	Distanze - Distances: Sorgente-Oggetto Source to object	Spessore saldatura Weld thickness	Tipo IQI IQI Type	Posizione IQI IQI Position
See mat.table		X Ray	Fig. G					Source side ☒ Film side

Tensione Voltage	Corrente Current	Dimens. sorgente Source size	Attività Ir 192 / Ir 192 activity	Tipo Film Film type	Densità Density	Sensibilità Sensitivity	Geometric unsharpness (Ug)	Film
240 KV	3.0 mA	3.0 mm	//	AGFA D4	Required 1.8÷4.0 Actual 2.7-2.8	Required 5/6 Actual 5	0.13÷0.29 mm	Single ☒ Double

Film system class/Classification	**AGFA D4 = C3/Class I**	**AGFA D5 = C4/Class I**	**AGFA D7 = C5/Class II**	**Processing**	**AUTOMATIC**

LEGENDA **OK = BUONO – Good** **RRX = RIPARARE – Repair** **NX = RIPETERE FILM – Repeat the exposure**
SWE= Single Wall Exposure **DWE = Double Wall Exposure** **SWV = Single Wall Viewing** **DWV = Double Wall Viewing**

1	Cricche	Cracks	12	Mancanza di penetrazione	Lack of penetration
2a	Pori e porosità - Passata singola	Pores and porosity Single pass	13	Cricche di cratere	Crater cracks
2b	Pori e Porosità - Multipass	Pores and porosity Multipass	14a	Incisioni marginali	Undercuts
3	Porosità localizzata	Localized cluster porosity	14b	Incisioni al vertice	Root undercuts
4a	Porosità allineata - Passata singola	Linear porosity - Single pass	15a	Eccesso di penetrazione	Excess penetration
4b	Porosità allineata - Multipass	Linear porosity - Multipass	16	Colpi d'arco	Stray arc
5	Cavità allungate e tarli	Elongated cavities and wormholes	17	Spruzzi	Spatters
6	Cavità di ritiro (escluse cavità di cratere)	Shrinkage cavities(other than crater pipes)	18	Insellamento	Root concavity
7	Cavità di cratere	Crater pipe	19	Ripresa difettosa	Poor restart
8	Inclusione di scoria o ossido	Slag or oxide inclusion	20	Riempimento scarso	Incompletely filled groove
9	Inclusioni metalliche (escluso Cu)	Metallic inclusions (other than Cu)	21	Slivellamento	Misalignment
10	Inclusioni di Rame	Copper inclusions	22	Difetto film	Process or film defect
11	Incollature	Lack of fusion	/	Nessun difetto	No defect

NOTE REMARKS	**EXAMINATION COVERAGE : 100% BUTT WELDS INDICATED BY THE CUSTOMER (10% TOTAL BUTT WELDS)**
OPERATORE OPERATOR	Lorefice-Nicolò Level 2 RT SNT-TC-1A - IRTEC certificate No. 17

PROVE ESEGUITE DA Test conducted by	PER IL LABORATORIO For the laboratory	L'ISPETTORE DEL CLIENTE Customer inspector	IL COLLAUDATORE The inspector
Lorefice Nicolò RT Liv. II SNT-TC-1A	Francesco Morandi RT Liv. II SNT-TC-1A		

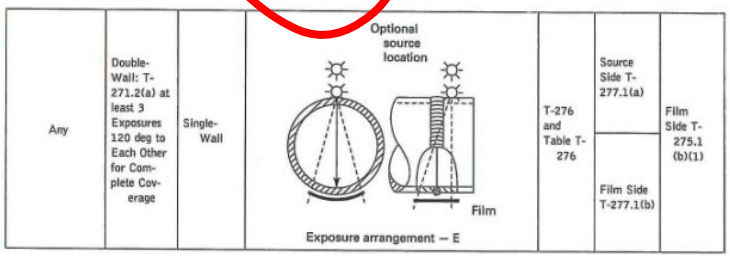
IRTEC SRL
SISTEMA DI QUALITA' CERTIFICATO ISO 9001:2008

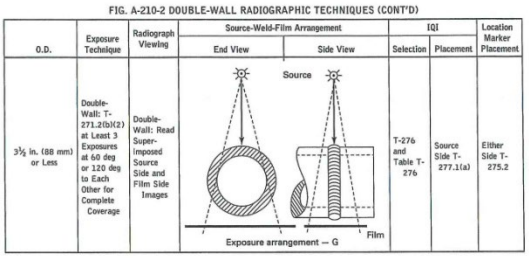
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SALDATURA WELD	TECNICA TECNIQUE	POSIZIONE POSITION	DIFETTI DEFECTS	ESITO RESULT	SALDATURA WELD	TECNICA TECNIQUE	POSIZIONE POSITION	DIFETTI DEFECTS	ESITO RESULT
***	2-Fig.G DWE-DWV	A	/		***	2-Fig.G DWE-DWV	A	/	
***		B	/		***		B	/	
***		C	/		***		C	/	
***		A	/		***		A	/	
***		B	/		***		B	/	
***		C	/		***		C	/	
***		A	/		***		A	/	
***		B	/		***		B	/	
***		C	/		***		C	/	
***		A	/		***		A	/	
***		B	/		***		B	/	
***		C	/		***		C	/	
***		A	/		***		A	/	
***		B	/		***		B	/	
***		C	/		***		C	/	
***		A	/		***		A	/	
***		B	/		***		B	/	
***		C	/		***		C	/	
***		A	/		***	1-Fig.E DWE-SWV	0-1	/	
***		B	/		***		1-2	/	
***		C	/		***		2-0	/	
***		A			***		0-1	/	
***		B	/		***		1-2	/	
***		C	/		***		2-0	/	

SAMPLE





PROVE ESEGUITE DA Test conducted by	PER IL LABORATORIO For the laboratory	L'ISPETTORE DEL CLIENTE Customer inspector	IL COLLAUDATORE The inspector
Lorefice Nicolò RT Liv. II SNT-TC-1A	Francesco Morandi RT Liv. II SNT-TC-1A		

5 PROCEDURE FOR MAGNETIC PARTICLE EXAMINATION

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ASME PROCEDURE N°NDE-MT-001

GENERAL PROCEDURE FOR MAGNETIC PARTICLE EXAMINATION

PROCEDURA DI ESAME CON PARTICELLE MAGNETICHE

Certified demonstrated to the Inspector by TM :
as conforming to the requirements of ASME V Par. T-150

..... Date : .....

For review and acceptance by the Inspector:
as conforming to the requirements of ASME V Par. T-150

..... Date : .....

Rev	Issued by	Approved by	Date	Revision Description
2	O. Oldani (NDE Level III)	M. Cattaneo (QCM)	30.12.2019	Revised par. 1, 2, 3, 4.1, 4.2, 6.1, 6.2, 7.1, 8.2, 8.4, 8.6.1, 8.7, 9.1, 10.2; Added figures 1a and 1b
1	M. Cattaneo (QCM)	O. Oldani (Level III)	08.10.2014	*General revision*
0	M. Cattaneo (QCM)	O. Oldani (Level III)	10.02.2011	FIRST ISSUE *PRIMA EMISSIONE*

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1 SCOPO

Questa procedura definisce le modalità di esecuzione dell'esame magnetoscopico con tecnica del giogo delle saldature e relativi materiali base delle costruzioni COES SRL.

Il materiale esaminato sarà acciaio ferromagnetico in ogni forma quali lamiere, forgiati, tubi, fusioni e giunti saldati e di ogni dimensione e spessore.

1 SCOPE

This procedure defines the minimum requirements to perform magnetic particle examination by yoke technique on weld joints and relevant base material of COES SRL production.

The examined material shall be ferromagnetic steel in any type of shape as plates, forgings, pipes and tubes, castings and weld joints, and any type of size and thickness.

2 DOCUMENTI DI RIFERIMENTO

ASME BPVC Sezioni V e VIII div. 1 ed. 2019

ASNT SNT-TC-1A ed. 2016 più Addendum 1

2 REFERENCE DOCUMENTS

ASME BPVC Sections V and VIII div. 1 2019 edition

ASNT SNT-TC-1A ed. 2016 plus Addendum 1

3 PERSONALE

Il personale che esegue, valuta e certifica i risultati del controllo sarà qualificato e certificato almeno al livello II da un livello III in accordo alla Written Practice aziendale che soddisfa i requisiti della SNT-TC-1A.

3 PERSONNEL

Personnel performing, evaluating and certifying the results of the examination shall be qualified and certified at least level II by a level III in accordance with the company Written practice which satisfies the Recommended Practice SNT-TC-1A.

4. APPARECCHIATURA

4.1 Strumento

L'esame con particelle magnetiche sarà eseguito con Giogo in corrente alternata (AC).

Saranno utilizzati apparecchi CIGIEMME (Twist), NDT Italiana (Silver), MAGNAFLUX (Y6) o equivalenti gioghi elettromagnetici.

4.2 Rivelatore

Le particelle ferromagnetiche utilizzate per l'esame soddisfano i seguenti requisiti.

(a) Tipi di polvere. Le particelle avranno un trattamento per ottenere una colorazione da renderle molto visibili (contrastanti) in contrasto con il fondo della superficie in esame.

(b) Polveri. Saranno utilizzate particelle a umido e il relativo liquido di sospensione, che soddisfino le specifiche applicabili elencate nella SE-709.

(c) Le particelle saranno utilizzate fino a 50° C.

Le particelle usate saranno scelte fra una di quelle elencate nella tabella seguente:

4. EQUIPMENT

4.1 Apparatus

To perform Magnetic Particle examination an Electromagnetic Yoke AC shall be used.

The apparatus by CIGIEMME (Twist) or NDT Italiana (Silver), MAGNAFLUX (Y6) or equivalent electromagnetic yoke shall be used.

4.2 Examination medium

The finely divided ferromagnetic particles used for the examination shall meet the following requirements.

(a) Particles type. The particles shall be treated to impart color in order to make them highly visible (contrasting) against the background of the surface being examined.

(b) Particles. Wet particles and suspension vehicles in accordance with the applicable specifications listed in SE-709 shall be used.

(c) Particles shall be used up to 50° C.

The particles to be used shall be one of that listed in the following table:

Type of powder *Tipo di polvere*	**TYPE** *Tipo*	**COLOUR** *Colore*	**MANUFACTURER** *Produttore*
WET / *Umido*	7HF Suspended in oil K	BLACK / *Nero*	MAGNAFLUX

Note
La polvere nera ad umido tipo 7HF MAGNAFLUX può essere utilizzata con la vernice di contrasto WCP 2

Remarks
MAGNAFLUX Black wet powder 7HF can be used with the surface contrast varnish type WCP-2

5. REQUISITI GENERALI

5.1 Surface conditioning

Normalmente si ottengono risultati soddisfacenti quando la superficie è nelle condizioni di come-saldato, come-laminato, come-fuso o come-forgiato. La preparazione della superficie mediante molatura o lavorazione di macchina può essere necessaria nel caso in cui le irregolarità possano mascherare indicazioni dovute a discontinuità.

Prima dell'esame, la superfice da controllare (es. per le saldature la parte da esaminare include il metallo d'apporto e la zona termicamente alterata per almeno 10 mm su ogni lato) e l'area adiacente per almeno 1 in. (25,4 mm) sarà asciutta e libera da sporco, grasso, garze, scaglie, flusso di saldatura e spruzzi, olio, o altro materiale estraneo che potrebbe interferire con l'esame.

5. MISCELLANEOUS REQUIREMENTS

5.1 Surface conditioning

Satisfactory results are usually obtained when the surface are in the as-welded, as-rolled, as-cast or as-forged conditions. However, surface preparation by grinding or machining may be necessary where surface irregularities could mask indications due to discontinuities.

Prior to magnetic particle examination, the surface to be examined (e.g. for welds the part to be examined includes weld metal and the heat affected zone for 10 mm on each side) and all adjacent areas within at least 1 in. (25,4 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.

La pulizia può essere effettuata con detergenti, solventi organici, soluzioni disincrostanti, solventi di vernice, grassaggio a vapore, sabbiatura o granigliatura, o mediante ultrasuoni.

5.2 Aumento del contrasto superficiale

Un rivestimento non-magnetico può essere applicato dall'operatore sulla superficie non rivestita nella quantità sufficiente per aumentare il contrasto delle particelle. Quando un rivestimento non-magnetico è applicato temporaneamente sulla superficie non rivestita nella quantità sufficiente per aumentare il contrasto, sarà dimostrato che le indicazioni possono essere individuate attraverso il rivestimento. Non è necessario misurare lo spessore del rivestimento.

6. TECNICA

6.1 Tecnica

Sarà utilizzata la tecnica di magnetizzazione con giogo elettromagnetico.

6.2 Tecnica con giogo

Per questa tecnica sarà utilizzato un giogo elettromagnetico a corrente alternata.

7. CALIBRAZIONE

7.1 Capacità di sollevamento del giogo

Prima di ogni uso, la capacità di magnetizzazione del giogo elettromagnetico deve essere stata controllata entro i dodici mesi precedenti. La capacità di sollevamento di tutti i gioghi sarà controllata ogni qualvolta il giogo ha subito danneggiamenti o riparazioni.
Ogni giogo elettromagnetico in corrente alternata deve avere una capacità di sollevamento di almeno 4,5 Kg alla massima apertura dei poli e con un contatto simile a quello utilizzato durante l'esame.
Ogni peso sarà misurato con uno strumento di un costruttore riconosciuto e inciso con il proprio peso nominale prima dell'uso. Un peso necessita di essere verificato solo se danneggiato in modo tale da poter avere potenzialmente perso materiale.

7.2 Misuratore di intensità di luce

I misuratori di luce saranno calibrati annualmente o quando lo strumento ha subito riparazioni. Se lo strumento non è in

Cleaning may be accomplished using detergents, organic solvents, descaling solution, paint removers, vapor degreasing, sand or grit blasting, or ultrasonic cleaning methods.

5.2 Nonmagnetic surface contrast enhancement

Nonmagnetic surface contrasts may be applied by the examiner to uncoated surfaces, only in amounts sufficient to enhance particle contrast. When nonmagnetic surface contrast enhancement is used, it shall be demonstrated that indications can be detected through the enhancement coating. Thickness measurement of this nonmagnetic surface contrast enhancement is not required.

6. TECHNIQUE

6.1 Technique

The Electromagnetic Yoke magnetization technique shall be used.

6.2 Yoke technique

For this technique, alternating current electromagnetic yokes shall be used.

7. CALIBRATION

7.1 Lifting power of yokes

Prior to use, the magnetizing power of electromagnetic yokes shall have been checked within the past year. The magnetizing power of all yokes shall be checked whenever the yoke has been damaged or repaired.

Each alternating current electromagnetic yoke shall have a lifting power of at least 4,5 Kg at the maximum pole spacing, with contact similar to what will be used during examination.
Each weight shall be weighed with a scale from a reputable manufacturer and stenciled with the applicable nominal weight prior to first use. A weight need only be verified again if damaged in a manner that could have caused potential loss of material.

7.2 Light meters

Light meters shall be calibrated at least once a year or whenever the meter has been repaired. If meters have not

uso per un anno o più, la calibrazione sarà effettuata prima dell'uso.

been in use for one year or more, calibration shall be done before being used.

8. ESAME

8.1 Esame preliminare

Prima di eseguire l'esame con particelle magnetiche, sarà eseguito il controllo della superficie da esaminare per individuare ogni discontinuità aperta in superficie che potrebbe non attrarre e trattenere le particelle magnetiche a causa della propria larghezza.

8.2 Direzione di magnetizzazione

Almeno due esami separati saranno eseguiti su ogni area. Al secondo esame, le linee di flusso magnetico saranno approssimativamente perpendicolari a quelle del primo esame.
Le figure 1a e 1b mostrano l'area magnetizzata, la direzione di magnetizzazione e la sovrapposizione.

8. EXAMINATION

8.1 Preliminary examination

Before the magnetic particle examination is conducted, a check of the examination surface shall be conducted to locate any discontinuity surface openings which may not attract and hold magnetic particles because of their width.

8.2 Direction of magnetization

At least two separate examination shall be performed on each area. During the second examination, the lines of magnetic flux shall be approximately perpendicular to those used during the first examination.
The following figures 1a and 1b shows the magnetized area, the magnetizing directions and overlaps.

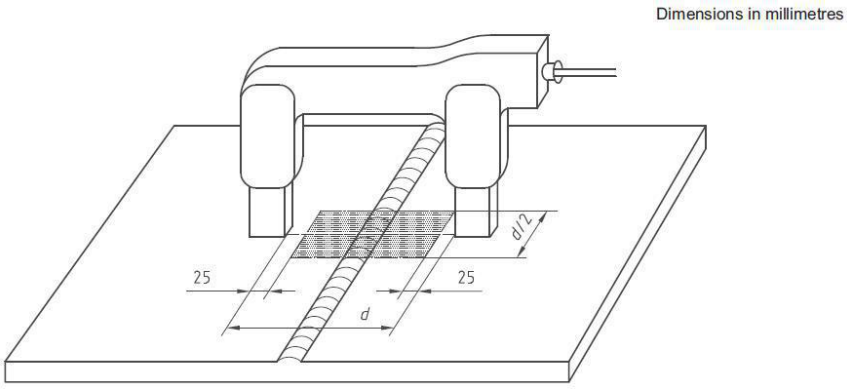


Figure 1a – Magnetized area
Figura 1a – Area magnetizzata

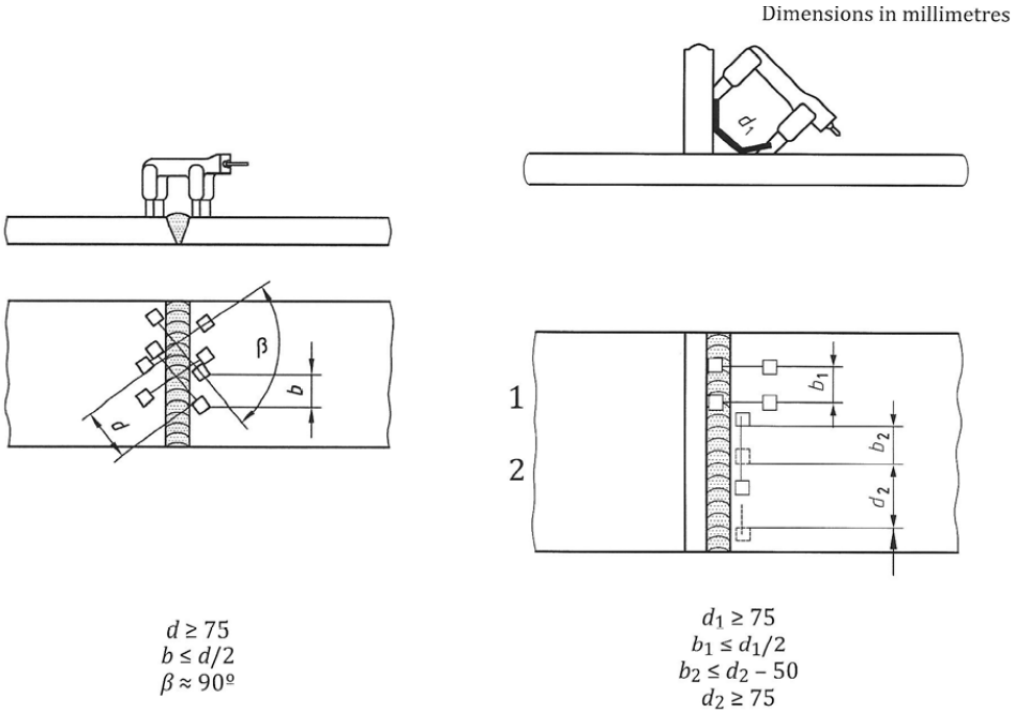


Figure 1b – Magnetization directions and overlap
Figura 1b – Direzione di magnetizzazione e sovrapposizione

8.3 Metodo d'esame

Le particelle magnetiche utilizzate saranno a umido, e non fluorescenti. L'esame sarà condotto con il metodo continuo.

(a) Particelle a secco. Non utilizzabili.
(b) Particelle a umido. La corrente di magnetizzazione sarà applicata dopo l'applicazione delle particelle. Il flusso di particelle sarà fermato con l'applicazione della corrente. Particelle magnetiche da bombolette spray possono essere applicate prima e/o dopo l'applicazione della corrente. Le particelle magnetiche possono essere applicate contemporaneamente alla corrente di magnetizzazione se esse non sono applicate direttamente sulla superficie in esame e sono lasciate scorrere sopra la superficie in esame oppure se sono applicate direttamente alla superficie in esame con bassa velocità, insufficiente a rimuovere le particelle accumulate.

8.4 Estensione dell'esame

L'esame sarà condotto con una sovrapposizione sufficiente a garantire il 100% della copertura alla sensibilità richiesta.
Per grandi aree sarà tracciata una griglia per garantire la copertura dell'intera area da esaminare.
La distanza fra le estremità del giogo sarà compresa fra 75 mm e 200 mm.

8.3 Method of examination

The ferromagnatic particles used in an examination medium shall wet, and nonfluorescent. Examination(s) shall be done by the continuous method.
(a) Dry particles. Not used.
(b) Wet particles. The magnetizing current shall be turned on after the particles have been applied. Flow of particles shall stop with the application of current. Wet particles applied from aerosol spray cans may be applied before and/or after magnetizing current is applied. Wet particles may be applied during the application of magnetizing current if they are not applied directly to the examination area and are allowed to flow over the examination area or are applied directly to the examination area with low velocities insufficient to remove accumulated particles.

8.4 Examination coverage

All examination shall be conducted with sufficient overlap to assure 100% coverage at the required sensitivity.
A grid shall be used for large areas to guarantee the complete coverage of the area to be examined.
The yoke pole distance shall be from 75 mm to 200 mm.

8.5 Rimozione delle particelle in eccesso

L'accumulo eccessivo di particelle sarà rimosso pulendo adeguatamente la superficie e l'esame sarà ripetuto nell'area così ricondizionata.

8.6 Interpretazione

L'interpretazione individuerà se un'indicazione è falsa, non rilevante, o rilevante. Indicazioni false e non rilevanti dovranno essere dimostrate come tali. L'interpretazione sarà effettuata per identificare la posizione e la natura delle indicazioni.

8.6.1 Particelle magnetiche colorate
Le discontinuità superficiali sono indicate dall'accumulo di particelle magnetiche che contrastano con la superficie in esame. Il colore delle particelle magnetiche sarà sufficientemente diverso dal colore della superficie.

E' necessaria l'illuminazione (naturale o supplementare con luce bianca) della superficie in esame per la valutazione delle indicazioni. L'intensità minima di luce sarà 1076 lux. L'intensità della luce, naturale o supplementare con luce bianca, sarà misurata con un luxmetro prima della valutazione delle indicazioni, oppure sarà utilizzata una sorgente di luce verificata. La verifica delle sorgenti di luce è richiesto che sia eseguita una sola volta, che sia documentata e mantenuta in archivio.

8.7 Smagnetizzazione

Il magnetismo residuo prodotto dalla tecnica del giogo non interferisce con il processo successivo o con l'utilizzo, la parte non sarà smagnetizzata dopo l'esame.

8.8 Pulizia dopo l'esame

Dopo l'esame, la parte sarà pulita mediante spazzola o stracci.

9. VALUTAZIONE

Discontinuità in superficie o appena sotto sono indicate dalla ritenzione del mezzo d'esame. Comunque, irregolarità superficiali dovute a segni di lavorazioni di macchina o altre condizioni superficiali possono produrre false indicazioni.
Ogni indicazione discutibile o dubbia sarà riesaminata per stabilire se rilevante o falsa.
Il ricondizionamento della superficie può precedere la

8.5 Excess particle removal

Accumulations of excess particles in examinations shall be removed the surface adequately cleaned and the examination repeated.

8.6 Interpretation

The interpretation shall identify if an indication as false, non-relevant, or relevant. False and non-relevant indications shall be proven as false or non-relevant. Interpretation shall be carried out to identify the locations of indications and the character of the indication.

8.6.1 Visible (Colour contrast) magnetic particles
Surface discontinuities are indicated by accumulations of magnetic particles which should contrast with the examination surface. The colour of the magnetic particles shall be sufficiently different than the color of the examination surface.
Illumination (natural or supplemental white light) of the examination surface is required for the evaluation indications. 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 evaluation of indications 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.

8.7 Demagnetization

Residual magnetism produced by yoke technique does not interfere with subsequent processing or usage, the part shall be left as it is after completion of the examination.

8.8 Post-examination cleaning

After examination, the examined part shall be cleaned by brush or cloths.

9. EVALUATION

Discontinuities on or near the surface are indicated by retention of the examination medium. However, localized surface irregularities due to machining marks or other surface conditions may produce false indications.

Any questionable or doubtful indications shall be re-examined to determine whether or not they are relevant.
Surface conditioning may precede the re-examination.

ripetizione dell'esame.
Quando un'indicazione è dimostrata non rilevante, non è necessario investigare altre indicazioni non rilevanti dello stesso tipo.
Indicazioni non rilevanti che potrebbero mascherare indicazioni di difetti sono inaccettabili.
Ampi accumuli di particelle che possono mascherare, indicazioni di discontinuità, sono proibite, e tali aree saranno pulite e riesaminate.

9.1 Criteri di accettabilità

Questi criteri di accettabilità saranno applicati a meno di richieste contrattuali più restrittive.
Indicazioni rilevanti sono quelle risultanti da discontinuità meccaniche. Indicazioni lineari sono le indicazioni che hanno lunghezza maggiore di tre volte la larghezza. Indicazioni tondeggianti sono indicazioni circolari o ellittiche che hanno la lunghezza inferiore a tre volte la larghezza.
Un'indicazione di discontinuità può essere più larga della discontinuità che la causa; comunque il parametro per l'accettabilità o lo scarto sarà la dimensione dell'indicazione e non la dimensione della discontinuità.
Solo indicazioni con dimensioni maggiori di 1,5 mm saranno considerate rilevanti.
Tutte le superfici esaminate saranno esenti da:
(a) indicazioni lineari rilevanti;
(b) indicazioni rilevanti tondeggianti maggiori di 5 mm;
(c) Quattro o più indicazioni rilevanti tondeggianti disposte in linea separate da 1,5 mm o meno fra le estremità;
(d) dieci o più indicazioni in ogni 3870 mm^2 di superficie con dimensione maggiore dell'area non eccedente 150 mm con l'area calcolata nella condizione più sfavorevole delle indicazioni da valutare.

After an indication has been verified to be non relevant, it is not necessary to re investigate repetitive non relevant indication of the same type.
Non relevant indication that would mask indication of defects are unacceptable.
Broad areas of particle accumulation, which might mask indications from discontinuities, are prohibited, and such areas shall be cleaned and re-examined.

9.1 Acceptance standards

These acceptance standards shall apply unless other more restrictive standards are required by the contract.
Relevant indications are those which result from mechanical discontinuities. Linear indications are those indications in which the length is more than three times the width. Rounded indications are indications which are circular or elliptical with the length less than three times the width.
An indication of a discontinuity may be larger than the discontinuity that causes it; however, the size of the indication and not the size of the discontinuity is the basis of acceptance or rejection.
Only indications with major dimensions greater than 11,5 mm shall be considered relevant.
All surfaces examined shall be free of:
(a) relevant linear indications;
(b) relevant rounded indications greater than 5 mm;
(c) four or more relevant rounded indications in a line separated by 1,5 mm or less edge to edge;
(d) ten or more indications in any 3870 mm^2 of surface with the major dimension of this area not to exceed 150 mm with the area taken in the most unfavourable location relative to the indications being evaluated.

10. DOCUMENTAZIONE

10.1 Registrazione delle indicazioni

10.1.1 Indicazioni accettabili
Le indicazioni accettabili non saranno registrate.

10.1.2 Indicazioni non accettabili
Le indicazioni non accettabili saranno registrate, ad eccezione di quelle rilevate durante le riprese a rovescio delle saldature. Come minimo saranno registrati il tipo di indicazione (lineare o tondeggiante), posizione ed estensione (lunghezza o diametro o allineate).

10. DOCUMENTATION

10.1 Recording of indications

10.1.1 Nonrejectable indications
Nonrejectable indications shall not be recorded.

10.1.2 Rejectable indications
Rejectable indications shall be recorded, except rejectable indications found during weld back gouging. As a minimum, the type of indications (linear or rounded), location and extent (length or diameter or aligned) shall be recorded.

10.2 Registrazione dell'esame

Al termine dell'esame sarà emesso un Rapporto dall'operatore qualificato; il rapporto conterrà almeno i seguenti dati:
a) commessa, identificazione della parte;
b) identificazione della procedura e revisione;
c) tecnica;
d) apparecchiatura e tipo di corrente utilizzati;
e) particelle magnetiche;
f) documenti di riferimento;
g) materiale e spessore;
h) stato del materiale;
i) mappa o registrazione delle indicazioni come da paragrafo 10.1 e risultato dell'esame;
j) strumento di illuminazione;
k) identificazione e qualifica dell'operatore;
l) data e risultato dell'esame.

11. RIPARAZIONE

Tutte le discontinuità eccedenti i criteri di accettabilità saranno rimosse con mezzi adeguati e riparate in accordo a una procedura approvata.
L'area riparata sarà riesaminata dopo la riparazione in accordo con la presente procedura.

10.2 Examination records

After examination a Report shall be issued by qualified personnel; the Report shall contain at least the followings:

a) job, part identification;
b) procedure identification and revision;
c) technique;
d) magnetic particle equipment and type of current;
e) magnetic particles;
f) reference documents;
g) material and thickness;
h) material status;
i) map or record of indications as per 10.1 and result of examination;
j) lighting equipment;
k) identification and qualification of operator;
l) date and result of examination.

11. REPAIR

All discontinuities in excess to acceptance standards shall be removed by suitable means and repaired according to approved procedure.
The repaired area shall be re-examined after repair in accordance with this procedure.

COES SRL Via Pontida, 265 24040 Stezzano Italy	NDE QUALIFICATION CERTIFICATE Certificato di qualifica PnD

We certify that
Si certifica che

CHIAPPA MARCO

SURNAME / NAME

Birth date / Data di nascita: 17/01/1968 — Birth place / Luogo di nascita: Palermo (PA)

In accordance to the requirements of our Written Practice nr. NDE-WP-SNT rev. 4 which satisfies the ASNT Recommended Practice SNT-TC-1A edition 2006 is qualified to

Level / Livello: II — Method / Metodo: MT - Magnetic Particle

Limitation / Limitazioni: None

Certification date / Data della certificazione: 20/12/2019 — Expiring date / Data di scadenza: End of December 2024

This certificate is based on

School graduation: Technical High School Diploma — obtained on year: 1987
Training satisfactorily performed on: 2010 — for a total hours: 40
Initial experience duration of: 8 months
Examination performed on: 20/12/2011
with a composite grade of: 94.4
Satisfactory continuity from: 2011 to actual
Latest Technical Performance Evaluation satisfactorily performed on: 06/12/2019
Re-examination performed on: Not applicable
with a composite grade of: ==
Visual acuity verified on: 06/11/2019

The level III evaluator
Il livello III valutatore

Oliviero OLDANI
NDT Level III
SNT-TC-1A MT-PT-RT-UT-VT
ASNT nr. 171282 MT-PT-RT-UT-VT
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TEST REPORT MAGNETIC PARTICLE TESTING

NUMBER:		**DATE:**	
CUSTOMER:		**N° ORDER:**	
SCOPE OF SUPPLY:		**COES JOB:**	
LOS S.N.:		**SERIAL NO.**	
SAMPLE:			
IDENTIFICATION:			
DATE OF TEST:			
TEST STANDARDS:			
TEST PROCEDURE			
ACCEPTANCE STANDARD:			
MATERIAL:		**URFACE CONDITION:**	
AREA INSPECTED:		**EXAMINATION COVERAGE:**	
MAGNETIZATION MODE:		**METHOD:**	
DETECTION MODE:		**LIGHT TYPE:**	
EQUIPMENT:			
CURRENT TYPE:		**DISTANCE POLES:**	
CURRENT INTENSITY:		**MAGNETIC FIELD STRENGTH:**	
MANUFACTURER:		**PRE-CLEANER:**	
BACKGROUND CONTRAST:		**PARTICLES TYPE:**	
DEMAGNETIZATION:		**POST CLEANING:**	
OPERATOR (*LEVEL II ACC. TO SNT TC 1A*)			
MARCO CHIAPPA			

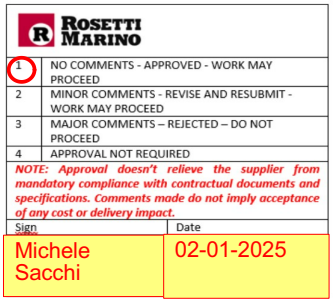
SAMPLE

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000

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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	02-01-2025

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Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

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

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Lifting sketch

None

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

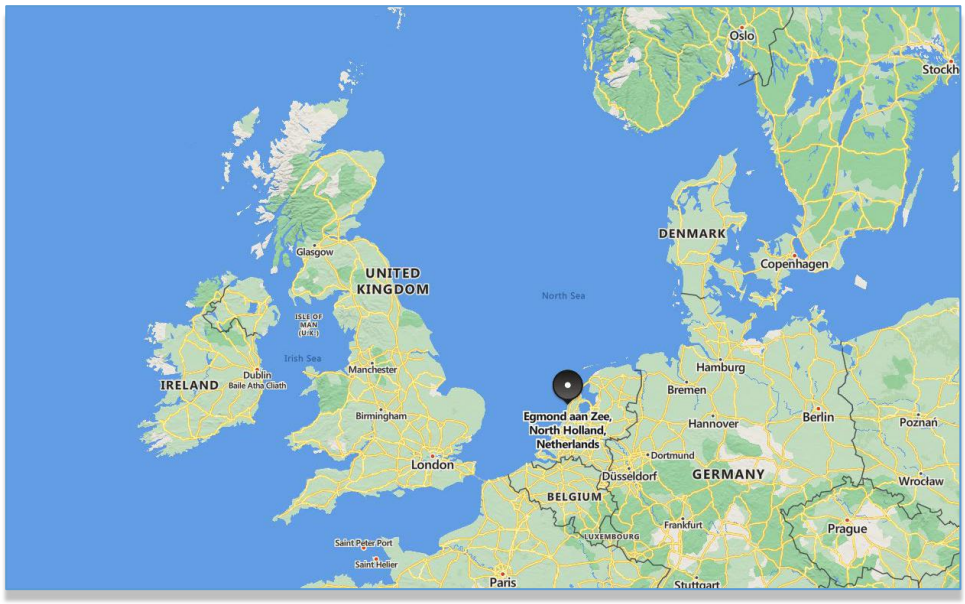


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

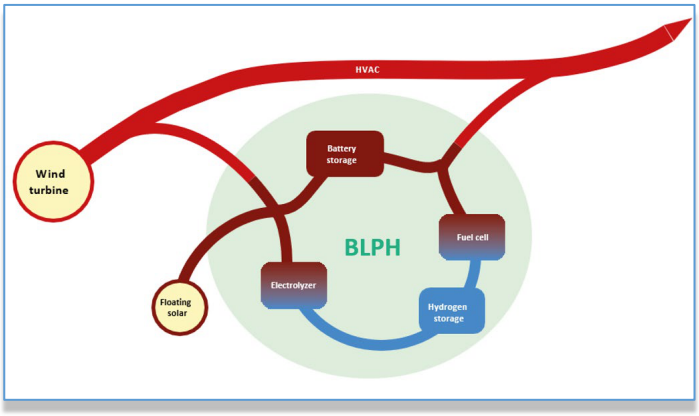


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

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3 PAINTING SPECIFICATION

3.1 SCOPE

This coating procedures describes the surface preparation and paint application for the Instrument Air Package and shall be read in conjunction with the instruction of the Paint Manufacturer of the used products.

3.2 REFERENCE DOCUMENTS

- 123A90-DDL-MAT-SP-60006_00 Coating and Painting spec
- ISO 8501 (Parts 1;3) Latest Edition: Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness
- ISO 8502 (Parts 3; 6; 9) Latest Edition: Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness
- ISO 8503 (Parts 1; 2) Latest Edition: Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast-cleaned steel substrates
- SSPC SP1 Latest Edition: Surface Preparation Standard
- ISO 19840 Latest Edition: Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Measurement of, and acceptance criteria for, the thickness of dry films on rough surfaces
- ASTM D4285 Latest Edition: Standard Test Method for Indicating Oil or Water in Compressed Air
- ASTM D4940 Latest Edition: Standard Test Method for Conductimetric Analysis of Water Soluble Ionic Contamination of Blast Cleaning Abrasives

3.3 PRELIMINARY CONTROLS

Preliminary controls shall be in accordance with SSPC-SP1 Latest Edition.

Paints shall not be applied on any surfaces containing grease, oil, loose rust, mill scale, corrosion products or any other deleterious material. No paint shall be applied to wet, moist or sweating surfaces, or uncleaned previously applied paint.

Under no circumstances shall coating application work be carried out when the relative humidity is above 85%, when ambient temperature is below 10°C or above 40°C, or when the substrate temperature is less than 3°C above the dew point temperature.

All edges, corners, bolt holes and cut ends shall be stripe coated by brush, prior to the application of the second coat. The stripe coat shall either be an additional coat of primer or an additional coat of intermediate coat of different color. The intention of the stripe coat is to ensure that the minimum required dry film thickness is achieved at edges.

All painting equipment must be maintained in good working condition and daily cleaned in accordance with the paint supplier's instructions.

As per ASTM D4285, compressed air used at any time during the painting process shall be completely free of oil and water. Adequate separators and traps shall be provided, installed in the coolest part of the system.

Paint supplier's instructions and recommendations must be followed in detail, without exceptions.

Before starting painting operations, all surfaces which do not require painting shall be checked to verify that they are adequately masked and protected.

Testing shall be performed as detailed in section no.3.9.

3.4 SURFACE PREPARATION

Oil and grease contaminated surfaces, included bolt holes, shall be solvent cleaned per SSPC-SP1 prior any abrasive blasting.

Prior to abrasive blasting, all equipment which can be damaged by blasting, dust, grid or shot, shall be protected by wrapping, taping or other adequate means, to prevent damage.

Surfaces shall be blast cleaned using oil free air, reaching a surface finishing grade equal to SSPC-16 grade for S.S., and ISO 8501-1 Sa3 for C.S.. After blast cleaning, surfaces shall be blown clean of all blasting material and dust with dry air, or by means of an industrial vacuum cleaner.

All weld spatters, sharp edges and surface irregularities shall be contoured and surface irregularities ground smooth as required by reference standard ISO 8501-3 Grade P3.

The use of Carbon steel and copper/nickel alloy abrasives on hot dip galvanized steel and austenitic steel surface is forbidden.

In case of high RH%, above 70%, coatings shall be applied within 4 hours from surface preparation.

Coatings shall not be applied when:

- the ambient temperature is less than 10°C
- the relative humidity is more than 85%
- the surface temperature is less than 3°C above the dew point
- the metal surface temperature is higher than that recommended by manufacturer for application
- surface preparation has not been completed or oil, grease and dust are present on the substrate to be painted
- poor weather conditions for painting exist or are expected within two hours of application such as blowing sand, fog, rain or snow
- total soluble salts are higher than 20 mg/m2 as per ISO 8502-6 & 8502-9.
- available light is less than 500 lux.

Abrasive media shall have a conductivity less than 150µS/cm at 20°C and shall be tested in accordance with ASTM D 4940. Abrasive shall be grit type.

In general, testing shall be performed as detailed in section 3.9.

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3.5 PAINT APPLICATION

All paint furnished shall be in unopened, clearly identifiable containers. No paint shall be used whose shelf life has expired. Containers shall remain unopened until required for use.

Coating application shall be carried out after completion of blast cleaning and before any rusting occurs. The blast-cleaned surface shall be vacuum cleaned or blown free of dust and other loose contaminants.

All application data shall be in accordance with the PTDS of the Paint Manufacturer. The type of thinner used shall comply with the Manufacturer's recommendation. Contrasting colors shall be used for each coat of paint. Airless or conventional spray pumps shall be used. Stripe-coating with brush of edges, welds, corners and all irregular surfaces shall be performed to obtain the specified film thickness and to avoid holidays.

The blast-cleaned test panels shall be painted contemporaneously with the same paint system as per the items.

In the period between coating and curing, the freshly applied coating shall not come into contact with handling equipment or any other items that may impact coating quality and shall be held in a covered facility protected from dust, wind and rain. Over-coating time shall be recommended by the Paint Manufacturer in the PTDS.

3.6 PRIMER COAT

Apply to the surface one coat of primer coat.

After primer coat drying, all surfaces shall be visually inspected to verify the absence of areas with mismatched color or paint drops, blisters, bubbles, craters, sags, runs, unnecessary over-spray or brush marks, damages, scoring, and DFT shall be checked.

The use of roller shall be avoided on blast cleaned surfaces or rough welds; roller can be either used for successive layers or stripe coats

Any area evidencing such poor quality shall be cleaned by means of wire brush or emery paper. The surrounding paint, which is still intact, shall be roughened for a distance of 50 mm beyond the damaged area, prior to spot painting, which consists of all the coats previously applied, it is executed by brush and it shall overlap the damaged area at least 50 mm.

Application method and product data are indicated on relevant painting report

3.7 INTERMEDIATE COAT

All surfaces shall be cleaned before intermediate coat application: traces of dirt, grease, oil or other foreign particle must be removed using clean rags and washer detergent, or thinner.

Apply to the surface one coat of intermediate coat

After intermediate coat drying, all surfaces shall be visually inspected to verify the absence of areas with mismatched color or paint drops, blisters, bubbles, craters, sags, runs, unnecessary over-spray or brush marks, damages, scoring, and DFT shall be checked.

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Any area evidencing such poor quality shall be cleaned by means of wire brush or emery paper. The surrounding paint, which is still intact, shall be roughened for a distance of 50 mm beyond the damaged area, prior to spot painting, which consists of all the coats previously applied, it is executed by brush and it shall overlap the damaged area at least 50 mm. Application method and product data are indicated on relevant painting report.

3.8 FINAL COAT

All surfaces shall be cleaned before final coat application: traces of dirt, grease, oil or other foreign particle must be removed using clean rags and washer detergent, or thinner.

Apply to the surface one coat of final coat.

After final coat drying, all surfaces shall be visually inspected to verify the absence of areas with mismatched color or paint drops, blisters, bubbles, craters, sags, runs, unnecessary over-spray or brush marks, damages, scoring, and DFT shall be checked.

Any area evidencing such poor quality shall be cleaned by means of wire brush or emery paper. The surrounding paint, which is still intact, shall be roughened for a distance of 50 mm beyond the damaged area, prior to spot painting, which consists of all the coats previously applied, it is executed by brush and it shall overlap the damaged area at least 50 mm. Application method and product data are indicated on relevant painting report.

Repairs:

Major defects (paint products, application, non conformity of test results): the paint shall be removed completely by abrasive blast-cleaning and the entire system shall be re-applied.

Minor defects (localized appearance, mechanical damage, scratches, etc.): subject to agreement of the supplier of the product, the system shall be removed by localized blast-cleaning, the edges of around coating shall be feathered back about 50mm, and the repair system shall be applied.

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3.9 TESTING

Inspectors shall be individually certified by an approved organization (NACE or FROSIO)

The following tests are carried out, to guarantee the correct and complete painting process

TEST TYPE	METHOD	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION
Blotter Test	White adsorbent paper ASTM D 4285	Once a day.	A piece of clean white absorbent paper shall be positioned at the air-outlet. After about 1 min. of air discharge there shall be no trace of water and oil on the paper.	Any accumulated moisture and oil in the traps, separators and filters shall be emptied.
Abrasive material	ASTM D4940	Every shift	Conductivity ≤ 150 µS/cm	Materials discarded and clean abrasive shall be used
Temperature Relative Humidity Dew point	Thermo hygrometer ISO 8502-4	Before and during blasting and painting operations.	Air and steel temperature min. 10°C – max. 40°C 85% max. 3°C or more above Dew Point Temperature.	Unless these parameters are met the operations shall not proceed.
Visual Examination	Visual ISO 8501-3	All surfaces.	Fillets, corners, welds are dressed to achieve preparation grade P3 of ISO 8501-3. Sharp edges and weld spatters are dressed to achieve P3 of ISO 8501-3. Flame and plasma cut surfaces are ground smooth. Welding is continuous. Raised slivers, burrs, scabs, weld spatter, laminations or hackles of steel are removed.	Out of conformity items shall be kept aside. Vendor shall be notified.
Pre-cleaning of surfaces	Steam jet cleaner SSPC-SP 1	All surfaces.	Surface contaminants such as oil and grease shall be solvent cleaned as per SSPC-SP 1. Soluble salt deposits, soil and any exogenous compounds shall be removed by steam cleaning and brushing in combination with detergent.	If oil, grease and any exogenous compound is still visible on the surface the operations shall be repeated until conformity is achieved.
Surface Preparation Cleanliness	Blasting booth ISO 8501-1	All surfaces.	The required visual standard of blast cleaning shall correspond to ISO 8501-1 SA 3 for C.S. and SSPC-SP16 for S.S.	Recleaning and retesting until acceptable.
Water Soluble Salts	Bresle-kit ISO 8502-6 ISO 8502-9	Once per 100 m2. Min. 1 for each item	The salt concentration (chlorides) tested on the blast-cleaned surfaces shall not exceed 20 mg/m2.	Washing with potable water and retesting until acceptable.

Blasted Surface Roughness	ISO comparator ISO 8503-1	Spot check Min. 5 readings per 10 m2.	The surface profile shall be between 50 to 85µm, with rough peaks to 100µm (Rz).	Re-blasting.
Surface Dust Cleanliness	Transparent adhesive tape ISO 8502-3	100% of surfaces	After surface preparation any grit, dust, etc. shall be removed. The residual particle quantity and particle size shall be class 2, rating 2.	Recleaning and retesting until acceptable.
Wet Film Thickness	Comb type ISO 2808 Method 1A	Spot checks.	As indicated in PTDS.	Additional coat
Visual Inspection	Visual	During all phases of coating application.	The coating shall be smooth, of uniform color, free of runs, sags, visible holidays, blisters, orange peel, scratches, dust inclusions, solvent retention or any other irregularities.	Repair and retesting.
Dry Film Thickness	Electromagnetic thickness gauge ISO 19840	See table 1 ISO 19840.	Equal to or above 80% NDFT (Nominal Dry Film Thickness). Number of readings between 80% of DFT and NDFT shall not exceed 20% of total readings and max value as indicated in the PTDS. DFT values higher than those indicate in the PTDS shall be allowed only for those areas subjected to stripe-coating.	Repair, additional coats or recoating as appropriate.
Adhesion Test	ISO 4624	Spot checks	Performed on the coated test panels when the coating system is fully cured. Minimum acceptable adhesion value: 5 MPa	Painting to be rejected

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3.10 TOTAL DRY FILM THICKNESS CHECK

Total dry film thickness shall be measured using a daily calibrated magnetic induction instrument. No individual thickness shall be less than 80% of the specified minimum thickness and not more than 20% of thickness measurements taken at random shall be less than the specified minimum thickness.

Required total dry film thickness for the different painting cycles are indicated in paragraph 11

Coated surface shall be free of damage, runs, and sags, pinholes, voids, bubbles, mud cracking and solvent retention.

In any case maximum DFT of Coating Manufacturer shall not be exceeded.

3.11 CERTIFICATION

Painting report, according to applicator standard, with the following information:

- Name of the applicator and responsible personnel
- Dates when the work was carried out
- Equipment and techniques used
- Type of instruments used
- Weather and ambient conditions
- Painting periods
- Tools and methods used to prepare surface
- Information on system being applied
- Paint application techniques.
- Certificates (NACE or FROSIO) of operators and inspectors

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3.12 PAINTING SYSTEMS

3.12.1 Painting system 6A, for external surface of uninsulated stainless steel:

SURFACE PREPARATION	PRIMER	INTERMEDIATE	TOP COAT
Sweep blasting with non-metallic and chloride free grit to obtain anchor profile of approximately 25 µm to 45 µm.	Epoxy primer HEMPEL Hempadur 15570 d.f.t. 50 µm	Epoxy HEMPEL Hempadur 45880 d.f.t. 100 µm	Polyurethane HEMPEL Hempathane HS 55610 d.f.t. 75 µm
NOMINAL TOTAL DRY FILM THICKNESS (NDFT): 225 µm			
FINISHING COLORS • PIPING: White (RAL 9002) • MANUAL & ACTUATED VALVES: White (RAL 9002)			

3.12.2 Painting system 1, for external surface of uninsulated carbon steel

SURFACE PREPARATION	PRIMER	INTERMEDIATE	TOP COAT
Cleanliness: ISO 8501-1 Sa 2½ Roughness: ISO 8503 Profile 50 to 85 µm	Zinc rich primer HEMPEL AVANTGUARD 750 d.f.t. 60 µm	Epoxy HEMPEL Hempadur 45880 d.f.t. 190 µm	Polyurethane HEMPEL Hempathane 55610 d.f.t. 50 µm
NOMINAL TOTAL DRY FILM THICKNESS (NDFT): 300 µm			
FINISHING COLORS • SKID STRUCTURE: White (RAL 9002) • PIPING SUPPORTS: White (RAL 9002) • INSTRUMENT AIR RECEIVER: White (RAL 9002) • MANUAL VALVES: White (RAL 9002)			

3.12.3 Not painted equipments

- Stainless steel tubing and fittings
- Carbon Steel galvanised grating
- Stainless steel PLC

Hempadur Avantguard 750 TL100

Product characteristics

Description
Hempadur Avantguard 750 TL100 is an activated zinc-rich epoxy primer in compliance with the requirements of Level 2, type II in SSPC Paint-20, 2019 and ISO 12944 Part 5, 2018. The product is in full compliance with ASTM D520 type II and EU Directive 2004/42/EC, the Paints Directive on the limitation of volatile organic compounds: subcategory j.

Recommended use
Hempadur Avantguard 750 TL100 is recommended as a primer for steel constructions and bridges.

Service temperature:
- Maximum, dry exposure only: 160°C [320°F].

Certificates / Approvals
- Approved by the German Federal Highway Research Institute (BAST), TL/TP-KOR-Stahlbauten. Blatt 100, Material No.100.1.1.

Features
- Reduces the effect of corrosion and provides excellent galvanic protection.
- Fast drying primer with short minimum overcoating intervals.
- Excellent mechanical strength, also in cyclic temperatures, with improved tolerance to high film thickness through high flexibility and self-healing effect.
- Superior tolerance to high relative humidity during application.
- Cures down to -10°C [14°F].

Product safety

Flash point 25°C [78°F]

VOC content mixed product

Legislation	Value
EU	333 g/L [2.78 lb/US gal]
US (coatings)	333 g/L [2.78 lb/US gal]
US (regulatory)	333 g/L [2.78 lb/US gal]
China	333 g/L [2.78 lb/US gal]

VOC values may vary with shade, please consult the Safety Data Sheet, section 9. According to specific legislation, see details in the Explanatory Notes available at Hempel website, hempel.com or at your local Hempel website. [a]EU Directive 2004/42/CE.

Handling
Handle with care. Before and during use, observe safety labels on packaging and paint containers and follow all local and national safety regulations. Always consult Hempel's Safety Data Sheet for this product along with the Product Data Sheet.

For professional use only.

Product data

Product code
17361

Product components
Base 17365
Curing agent 97043

Standard shade / code
Reddish Grey 19830

Gloss
Flat

Volume solids
65 ± 2%

Specific gravity
2.3 kg/L [19 lb/US gal]

Hempadur Avantguard 750 TL100

Reference dry film thickness
80 micron [3.2 mils]

Surface preparation

Cleanliness
- Remove oil, grease and other contaminants by suitable detergent cleaning.
- Remove salts, detergents and other contaminants by high pressure fresh water cleaning.

New build:
- Abrasive blasting to min. Sa 2½ (ISO 8501-1) / SP 10 (SSPC).
- Remove dust, blast media and loose materials.

Roughness
- Surface profile Medium (G) (ISO 8503-2).

Consult Hempel's separate Surface Preparation Guidelines for more details.

Application

Mixing ratio
Base 17365 : Curing agent 97043
(8.5 : 1.5 by volume)

Stir well before use. It is recommended to use fixed volumes/can size for multi-component products.

Thinner
Above 20°C [68°F] Hempel's Thinner 08450

Cleaner
Hempel's Tool Cleaner 99610

Pot life

Product temperature	0°C [32°F]	0°C [32°F]	20°C [68°F]
Pot life	5 hours	5 hours	4 hours

Application method

Tool	Thinning max vol.	Application parameters
Airless spray	5%	Nozzle pressure: 220 bar [3200 psi] Nozzle orifice: 0.017-0.021"
Air spray	10%	Not Applicable.
Brush/Roller	5%	Not Applicable.

If brush or roller application is used, more coats will be necessary to achieve the specified dry film thickness. Spray data are indicative and subject to adjustment. Pressure is for a material temperature of 20°C [68°F].

Film thickness

Specification range	Low	High	Recommended
Dry film thickness	40 micron [1.6 mils]	100 micron [4.0 mils]	80 micron [3.2 mils]
Wet film thickness	61 micron [2.5 mils]	153 micron [6.1 mils]	123 micron [4.9 mils]
Theoretical spreading rate	16 m²/L [652 sq ft/US gal]	6.5 m²/L [265 sq ft/US gal]	8.2 m²/L [334 sq ft/US gal]

Overthickness must be closely controlled and never locally exceed 150 micron [6.0 mils] DFT. On irregular surfaces it is recommended to employ special care in avoiding over application.

Application conditions
- Temperature of product must be above 15°C [59°F] during application.
- To avoid condensation, apply on a clean and dry surface with a temperature that is at least 3°C [5°F] above the dew point.
- Surface temperature must be above -10°C [14°F] during application and curing.
- Surface temperature must be below 40°C [104°F] during application and curing.
- Minimum surface temperature: 5°C/41°F in case of ZTV ING regulated project.
- Beware of ice on the surface at low temperatures.

Relative Humidity:
- Relative humidity must be below 95% during application.
- Relative humidity must be below 95% during curing.

Hempadur Avantguard 750 TL100

Drying and overcoating

Product compatibility

- Previous coat: According to Hempel's Specification.
- Subsequent coat: According to Hempel's Specification.

Drying time

Surface temperature		5°C [41°F]	15°C [59°F]	30°C [86°F]
Touch dry	min	30	10	5
Hard dry	hours	3	2	1
Fully cured	days	-	-	7

Determined for dry film thickness 80 micron [3.2 mils] at standard conditions, see Hempel's Explanatory Notes for details.

Drying conditions

- To obtain the drying time stated, it is important to maintain sufficient ventilation during application, drying and curing.

Overcoating details

- If the maximum overcoating interval is exceeded, roughening of the surface is necessary to ensure intercoat adhesion.
- Remove zinc salts or other contamination before overcoating.
- The surface must be dry and clean prior to application.

Storage

Shelf life

Ambient temperature	25°C [77°F]
Base	12 months
Curing agent	36 months

Shelf life from date of production, when stored in original, unopened containers. Thereafter, the product quality must be re-inspected. Storage at elevated temperatures may reduce shelf life. For advice, please consult Hempel.

Storage conditions

- Product must be stored according to local legislation, at 40°C [104°F] without direct sunlight and protected from rain and snow.

Carbon Footprint

Dry film thickness	1 µm	1 mil
GWP (Global Warming Potential)	18.8 g CO_2e/m^2	0.098 lb CO_2e/ft^2

The carbon footprint is for 1 square meter / square foot of surface area with a dry film thickness of 1 micron / mil.

The scope includes raw materials, in-bound transport to the Hempel factory, Hempel manufacturing processes, and any Volatile Organic Compounds emitted during and after the application of the product.

It is calculated based on the standard shade defined in this PDS. Values may vary with shade.

Hempadur Avantguard 750 TL100

Additional documents

Additional information is available at the Hempel website https://www.hempel.com/service-and-support/technical-guidelines or at your local Hempel website:

- Explanatory Notes for Product Data Sheet.
- Application methods.
- Substrates.
- Surface Preparation.
- Application Instruction for this product.
- Repair & maintenance.
- Inspection & quality control.

This Product Data Sheet ("**PDS**") relates to the supplied product ("**Product**") and is subject to updating from time-to-time. Accordingly, the buyer/applicator should have regard to the PDS supplied together with the relevant batch of the Product (and not an earlier version). In addition to the PDS, the buyer/applicator may receive some or all of the following specifications, statements and/or guidelines as listed below or as are available from the Hempel website under 'Products' at www.hempel.com (the "**Additional documents**"):

No.	Document description	Location/comments
1.	Technical Statement	One-off specific advice provided on request for specific projects
2.	Specification	Only issued for specific projects
3.	PDS	This document
4.	Explanatory Notes to the PDS	Available at www.hempel.com and contain relevant information about the Product testing parameters
5.	Application Instruction	Where available, at www.hempel.com
6.	Generic technical guidelines (e.g. on application and surface preparation)	Where available, at www.hempel.com

In the event of a conflict of information between the PDS and the Additional documents, the order of priority of information shall be in the order as set out above. In such event you should also contact your representative at Hempel for clarification. Furthermore, the buyer/applicator must have full regard to the relevant Safety Data Sheet provided with each Product and which can also be downloaded from www.hempel.com.

Hempel shall not be liable for defects where the application of the Product has not been made fully in accordance with the recommendations and requirements set out in the relevant PDS and the Additional Documents. The information and terms of this disclaimer apply to this PDS, the Additional documents and any other documents supplied by Hempel in respect of the Product. In addition, the Product is supplied and all technical assistance is given subject to Hempel's General Conditions of Sale, Delivery and Service, unless otherwise expressly agreed in writing.

Hempadur 15570

Product characteristics

Description
Hempadur 15570 is a two component, polyamide-adduct cured epoxy paint, which cures to a strong and highly corrosion resistant coating, at temperatures down to -10°C/14°F. The Micaceous Iron Oxide pigmented reddish grey 12430 shade is also well suited for application under humid conditions, on damp steel surfaces, and may be applied on moist surfaces. The greyish yellow 21780 and the grey 11320 shades contains zinc phosphate.
Complies with EU Directive 2004/42/EC, The Paints Directive on the limitation of volatile organic compounds: subcategory j.

Recommended use
As a maintenance and repair primer, intermediate, and/or finishing coat in Hempadur systems in severely corrosive environment. As a finishing coat where a cosmetic appearance is of less importance. As a low temperature curing epoxy primer, intermediate, and/or finishing coat in paint systems according to specification. Well suited as a (blast) primer in epoxy systems.
Mist coat on Galvosil.

Service temperature:
- Maximum, dry exposure only: 140°C [284°F].

Certificates / Approvals
- EC-type examined as a low flame spread material when used as part of a predefined paint system. Please refer to “Declaration of Conformity” on hempel.com for further details.
- Reaction to fire tested (as part of a coating system with approved primer and topcoat) according to EN13501-1 B-s1, d0.

Product safety

Flash point 25°C [77°F]

VOC content mixed product

Legislation	Value
EU	412 g/L [3.44 lb/US gal]
US (coatings)	412 g/L [3.44 lb/US gal]
US (regulatory)	412 g/L [3.44 lb/US gal]
China	388 g/L [3.24 lb/US gal]

According to specific legislation, see details in the Explanatory Notes available at Hempel website, hempel.com or at your local Hempel website. VOC values may vary with shade, please consult the Safety Data Sheet, section 9. [a]EU Directive 2004/42/CE.

Handling
Handle with care. Before and during use, observe safety labels on packaging and paint containers and follow all local and national safety regulations. Always consult Hempel’s Safety Data Sheet for this product along with the Product Data Sheet.

For professional use only.

Product data

Product code
15570

Product components
Base 15579
Curing Agent 95570

Standard shade* / code
Brownish red 50630

Gloss
Flat

Volume solids
54 ± 2%

Specific gravity
1.3 kg/L [11 lb/US gal]

* Other shades are available, please contact your local Hempel representative.

Hempadur 15570

Reference dry film thickness
100 micron [4.0 mils]

Micaceous iron oxide (MIO) shade / code
Metallic grey 12430

Gloss
Flat

Volume solids
54 ± 2%

Specific gravity
1.4 kg/L [12 lb/US gal]

Reference dry film thickness
100 micron [4.0 mils]

Surface preparation

Cleanliness
- Remove oil, grease and other contaminants by suitable detergent cleaning.
- Remove salts, detergents and other contaminants by high pressure fresh water cleaning.
- All damage of shopprimer and contamination from storage and fabrication should be thoroughly mechanically/chemically cleaned prior to final painting.

New build:
- Abrasive blasting to min. Sa 2½ (ISO 8501-1) / SP 10 (SSPC).
- Stainless steel, aluminium and other non ferric metals and alloys: use non-metallic blast media (corundum, garnet, etc.). Sweep blasting to a uniform dense sharp profile, without blank spots.
- Remove dust, blast media and loose materials.

Maintenance and Repair
- Abrasive blasting to min. Sa 2 (ISO 8501-1) / SP 6 (SSPC).
- Water jetting to min. Wa 2 (ISO 8501-4).
- Flash rust degree of maximum FR M (ISO 8501-4).
- Minor areas can be cleaned by power tool to St 3 provided the surface is roughened and not polished.
- Stainless steel, aluminium and other non ferric metals and alloys: use non-metallic blast media (corundum, garnet, etc.). Sweep blasting to a uniform dense sharp profile, without blank spots.
- Remove dust, blast media and loose materials.

Roughness
- Surface profile Medium (G) (ISO 8503-2).

Consult Hempel's separate Surface Preparation Guidelines for more details.

Application

Mixing ratio
Base 15579 : Curing Agent 95570
(3 : 1 by volume)

Stir well before use.

Hempadur 15570

Thinner
Hempel's Thinner 08450

Cleaner
Hempel's Tool Cleaner 99610

Pot life

Product temperature	20°C [68°F]
Pot life	2 hours

Application method

Tool	Thinning max vol.	Application parameters
Airless spray	5%	Nozzle pressure: 175 bar [2500 psi] Nozzle orifice: 0.019-0.021"
Air spray	15%	Not Applicable.
Brush	5%	Not Applicable.

If brush or roller application is used, more coats will be necessary to achieve the specified dry film thickness. Spray data are indicative and subject to adjustment. Pressure is for a material temperature of 20°C [68°F].

Film thickness

Specification range	Low	High	Recommended
Dry film thickness	50 micron [2.0 mils]	125 micron [5.0 mils]	100 micron [4.0 mils]
Wet film thickness	93 micron [3.7 mils]	231 micron [9.3 mils]	185 micron [7.4 mils]
Theoretical spreading rate	11 m²/L [448 sq ft/US gal]	4.3 m²/L [175 sq ft/US gal]	5.4 m²/L [220 sq ft/US gal]

For best performance, avoid excessive film thickness. Product may be specified in another film thickness than indicated depending on purpose and area of use. This will alter spreading rate, drying and curing time and overcoating interval.

Application conditions
- To avoid condensation, apply on a clean and dry surface with a temperature that is at least 3°C [5°F] above the dew point.
- Surface temperature must be above -10°C [14°F] during application and curing.
- Beware of ice on the surface at low temperatures.
- Temperature of product must be above 15°C [59°F] during application.

Relative Humidity:
- Relative humidity must be below 85% during application.
- Relative humidity must be below 85% during curing.

Application remarks
- Metallised surfaces should be overcoated before exposure to open air conditions.
- Flash-coat technique is recommended when overcoating porous substrates.

Drying and overcoating

Product compatibility
- Previous coat: None or according to Hempel's specification.
- Subsequent coat: According to Hempel's Specification. Recommended products are: Hempadur, Hempathane, Hempatex

Drying time

Surface temperature		20°C [68°F]
Touch dry	min	60
Hard dry	hours	5
Fully cured	days	7

Determined for dry film thickness 100 micron [4.0 mils] at standard conditions, see Hempel's Explanatory Notes for details.

Hempadur 15570

Overcoating

Hempel's specification supersedes any guidelines indicated in the overcoating table

Quality name		0°C [32°F]	10°C [50°F]	20°C [68°F]	30°C [86°F]
Atmospheric medium					
Hempadur 15570	Min Max	18 h Ext	8 h Ext	4 h Ext	3 h Ext
Hempathane HS 55610	Min Max	18 h Ext	8 h Ext	4 h Ext	3 h Ext
Hempatex Enamel 56360	Min Max	9 h 36 h	4 h 16 h	2 h 8 h	90 min 6 h
Immersion					
Hempadur 15570	Min Max	36 h Ext	16 h Ext	8 h Ext	6 h Ext

Overcoating times are indicative for products of the same generic chemistry. Consult Hempel's specification for more information.

Drying conditions

- To obtain the drying time stated, it is important to maintain sufficient ventilation during application, drying and curing.

Overcoating details

- If the maximum overcoating interval is exceeded, roughening of the surface is necessary to ensure intercoat adhesion.
- The surface must be clean before overcoating.

Other remarks

- Epoxy coats have an inherent tendency of chalking in outdoor exposure. This does not affect the performance of the coating.
- Hempel's Specification supersedes any recommendations given in the Product Data Sheets.

Storage

Shelf life

Ambient temperature	25°C [77°F]
Base	36 months
Curing Agent	36 months

Shelf life from date of production, when stored in original, unopened containers. Thereafter, the product quality must be re-inspected. Storage at elevated temperatures may reduce shelf life. For advice, please consult Hempel.

Storage conditions

- Product must be stored according to local legislation, at maximum 40°C [104°F], without direct sunlight and protected from rain and snow.

Carbon Footprint

Dry film thickness	1 µm	1 mil
GWP (Global Warming Potential)	9.1 g CO_2e/m^2	0.047 lb CO_2e/ft^2

The carbon footprint is for 1 square meter / square foot of surface area with a dry film thickness of 1 micron / mil.

The scope includes raw materials, in-bound transport to the Hempel factory, Hempel manufacturing processes, and any Volatile Organic Compounds emitted during and after the application of the product.

It is calculated based on the standard shade defined in this PDS. Values may vary with shade.

Hempadur 15570

Additional documents

Additional information is available at the Hempel website
https://www.hempel.com/service-and-support/technical-guidelines
or at your local Hempel website:

- Explanatory Notes for Product Data Sheet.
- Application methods.
- General Application Guidelines

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No.	Document description	Location/comments
1.	Technical Statement	One-off specific advice provided on request for specific projects
2.	Specification	Only issued for specific projects
3.	PDS	This document
4.	Explanatory Notes to the PDS	Available at www.hempel.com and contain relevant information about the Product testing parameters
5.	Application Instruction	Where available, at www.hempel.com
6.	Generic technical guidelines (e.g. on application and surface preparation)	Where available, at www.hempel.com

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Hempel shall not be liable for defects where the application of the Product has not been made fully in accordance with the recommendations and requirements set out in the relevant PDS and the Additional Documents. The information and terms of this disclaimer apply to this PDS, the Additional documents and any other documents supplied by Hempel in respect of the Product. In addition, the Product is supplied and all technical assistance is given subject to Hempel's General Conditions of Sale, Delivery and Service, unless otherwise expressly agreed in writing.

Hempadur Mastic 45880

Product characteristics

Description
Hempadur Mastic 45880 is a polyamide curing, high solids modified epoxy paint. It forms a hard and tough coating, has good wetting properties and cures at low temperature.
Complies with EU Directive 2004/42/EC, The Paints Directive on the limitation of volatile organic compounds: subcategory j.

Recommended use
Hempadur Mastic 45880 is recommended as a self-primed, surface tolerant paint for steel and concrete or as an intermediate or a topcoat in systems where low VOC and high film build are required. The product can be used when extended recoating properties for polyurethane topcoats are required. It may also be used directly on zinc silicate or spray metallised surfaces. The product can be used for minor repairs in immersed areas.

Service temperature:
- Maximum, dry exposure only: 120°C [248°F].

Certificates / Approvals
- EC-type examined as a low flame spread material when used as part of a predefined paint system. Please refer to “Declaration of Conformity” on hempel.com for further details.
- Meets requirements to ISO 12944 when used as part of a predefined paint system. Part 6 C4 High.
- Reaction to fire tested (as part of a coating system with approved primer and topcoat) according to EN13501-1 B-s1, d0.
- Complies with US FDA and EU food regulations for contact with dry foodstuff. Consult Hempel for details.
- Complies with the requirements in EN1504-2 Products and systems for the protection and repair of concrete structures.

Features
- Versatile, can be used for both steel and concrete.
- High surface tolerance.
- Low temperature curing.

Product safety

Flash point 25°C [77°F]

VOC content mixed product

Legislation	Value	5% thinning, by volume	Limit value, phase II (2010)[a]
EU	217 g/L [1.81 lb/US gal]	248 g/L [2.07 lb/US gal]	500 g/L [4.17 lb/US gal]
US (coatings)	217 g/L [1.81 lb/US gal]	-	-
US (regulatory)	217 g/L [1.81 lb/US gal]		
China	217 g/L [1.81 lb/US gal]		

According to specific legislation, see details in the Explanatory Notes available at Hempel website, hempel.com or at your local Hempel website. VOC values may vary with shade, please consult the Safety Data Sheet, section 9. [a]EU Directive 2004/42/CE.

Handling
Handle with care. Before and during use, observe safety labels on packaging and paint containers and follow all local and national safety regulations. Always consult Hempel’s Safety Data Sheet for this product along with the Product Data Sheet.

For professional use only.

Product data

Product code
45880

Product components
Base 45889
Curing Agent 95880

Standard shade* / code
Light grey 12170 **

* Other shades are available, including shades containing MIO. Please contact your local Hempel representative.
** Slight discolouration may occur. This does not affect the performance of the coating.

Hempadur Mastic 45880

Wide range of colours is available via Hempel's tinting system.

Gloss
Semi-gloss

Volume solids
80 ± 2%

Specific gravity
1.5 kg/L [12 lb/US gal]

Reference dry film thickness
125 micron [5.0 mils]

Aluminium shade / code
Aluminium grey 19002

Gloss
Please consult Hempel's Guideline on aluminium pigmented coatings.

Volume solids
72 ± 2%

Specific gravity
1.3 kg/L [11 lb/US gal]

Reference dry film thickness
125 micron [5.0 mils]

Surface preparation

Cleanliness
- Remove oil, grease and other contaminants by suitable detergent cleaning.
- Remove salts, detergents and other contaminants by high pressure fresh water cleaning.

New build:
- Abrasive blasting to min. Sa 2½ (ISO 8501-1) / SP 10 (SSPC).
- Concrete: According to Hempel's Specification.
- Remove dust, blast media and loose materials.

Maintenance and Repair
- Spot abrasive blasting to min. PSa 2 (ISO 8501-2) / SP 6 (SSPC).
- Water jetting to min. Wa 2 (ISO 8501-4).
- Flash rust degree of maximum FR M (ISO 8501-4).
- Remove dust, blast media and loose materials.
- Minor areas can be cleaned by power tool to St 2 provided the surface is roughened and not polished.

Roughness
- Surface profile Medium (G) (ISO 8503-2).

Consult Hempel's separate Surface Preparation Guidelines for more details.

Application

Mixing ratio
Base 45889 : Curing Agent 95880
(3 : 1 by volume)

Stir well before use.

Thinner
Hempel's Thinner 08450

Cleaner
Hempel's Tool Cleaner 99610

Hempadur Mastic 45880

Pot life

Product temperature	15°C [59°F]	20°C [68°F]	30°C [86°F]
Induction time	15 min	10 min	0 min
Pot life (spray)	90 min	60 min	30 min
Pot life (brush)	3 hours	2 hours	1 hour

Application method

Tool	Thinning max vol.	Application parameters
Airless spray	5%	Nozzle pressure: 250 bar [3600 psi] Nozzle orifice: 0.017-0.023"
Brush/Roller	5%	Not Applicable.

If brush or roller application is used, more coats will be necessary to achieve the specified dry film thickness. Spray data are indicative and subject to adjustment. Pressure is for a material temperature of 20°C [68°F].

Film thickness

Specification range	Low	High	Recommended
Dry film thickness	100 micron [4.0 mils]	200 micron [8.0 mils]	125 micron [5.0 mils]
Wet film thickness	125 micron [5.0 mils]	250 micron [10 mils]	150 micron [6.0 mils]
Theoretical spreading rate	8 m²/L [326 sq ft/US gal]	4 m²/L [163 sq ft/US gal]	6.4 m²/L [261 sq ft/US gal]

Product may be specified in another film thickness than indicated depending on purpose and area of use. This will alter spreading rate, drying and curing time and overcoating interval. For best performance, avoid excessive film thickness.

Application conditions

- Temperature of product must be above 15°C [59°F] during application.
- To avoid condensation, apply on a clean and dry surface with a temperature that is at least 3°C [5°F] above the dew point.
- Surface temperature must be above -5°C [23°F] during application and curing.

Relative Humidity:

- Relative humidity must be below 85% during curing.

Drying and overcoating

Product compatibility

- Previous coat: None or according to Hempel's specification.
- Subsequent coat: None or according to Hempel's specification.

Drying time

Surface temperature		-5°C [23°F]	0°C [32°F]	20°C [68°F]	40°C [104°F]
Surface dry	hours	36	20	2½	1
Hard dry	hours	48	25	3½	1½
Fully cured	days	75	30	7	3

Determined for dry film thickness 125 micron [5.0 mils] at standard conditions, see Hempel's Explanatory Notes for details.

Overcoating

Hempel's specification supersedes any guidelines indicated in the overcoating table

Quality name		0°C [32°F]	20°C [68°F]	30°C [86°F]	40°C [104°F]
Atmospheric medium					
Hempadur Mastic 45880	Min Max	54 h Ext	6 h Ext	4½ h Ext	3½ h Ext
Hempathane HS 55610	Min Max	54 h Ext	6 h Ext	4½ h Ext	3½ h Ext
Atmospheric severe					
Hempadur Mastic 45880	Min Max	4 d Ext	10 h Ext	7½ h Ext	5½ h Ext
Hempathane HS 55610	Min Max	4 d 27 d	10 h 72 h	7½ h 54 h	5½ h 40 h

Overcoating times are indicative for products of the same generic chemistry. Consult Hempel's specification for more information.

Hempadur Mastic 45880

Drying conditions
- To obtain the drying time stated, it is important to maintain sufficient ventilation during application, drying and curing.

Overcoating details
- If the maximum overcoating interval is exceeded, roughening of the surface is necessary to ensure intercoat adhesion.
- The surface must be dry and clean prior to application.

Other remarks
- Epoxy coats have an inherent tendency of chalking in outdoor exposure. This does not affect the performance of the coating.
- Hempel's Specification supersedes any recommendations given in the Product Data Sheets.

Storage

Shelf life

Ambient temperature	25°C [77°F]
Base	36 months
Curing Agent	36 months

Shelf life from date of production, when stored in original, unopened containers. Thereafter, the product quality must be re-inspected. Storage at elevated temperatures may reduce shelf life. For advice, please consult Hempel.

Storage conditions
- Product must be stored according to local legislation, at maximum 40°C [104°F], without direct sunlight and protected from rain and snow.

Carbon Footprint

Dry film thickness	1 µm	1 mil
GWP (Global Warming Potential)	6.2 g CO_2e/m^2	0.032 lb CO_2e/ft^2

The carbon footprint is for 1 square meter / square foot of surface area with a dry film thickness of 1 micron / mil.

The scope includes raw materials, in-bound transport to the Hempel factory, Hempel manufacturing processes, and any Volatile Organic Compounds emitted during and after the application of the product.

It is calculated based on the standard shade defined in this PDS. Values may vary with shade.

Hempadur Mastic 45880

Additional documents

Additional information is available at the Hempel website https://www.hempel.com/service-and-support/technical-guidelines or at your local Hempel website:

- Explanatory Notes for Product Data Sheet.
- Application methods.
- Substrates.
- Surface Preparation.
- Application Instruction for this product.
- Repair & maintenance.

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3.	PDS	This document
4.	Explanatory Notes to the PDS	Available at www.hempel.com and contain relevant information about the Product testing parameters
5.	Application Instruction	Where available, at www.hempel.com
6.	Generic technical guidelines (e.g. on application and surface preparation)	Where available, at www.hempel.com

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Hempathane HS 55610

Product characteristics

Description
Hempathane HS 55610 is a glossy polyurethane topcoat, cured with aliphatic isocyanate. The product has very good gloss and colour retention and contains zinc phosphate.
Complies with EU Directive 2004/42/EC, The Paints Directive on the limitation of volatile organic compounds: subcategory j.

Recommended use
Hempathane HS 55610 is recommended as VOC compliant, high-build finishing coat for protection of structural steel in severely corrosive environment. The product may be specified as a one coat "direct to metal" system in environments classified as C2 and C3. It may also be applied directly on galvanised steel.

Service temperature:
- Maximum, dry exposure only: 120°C [248°F].

Certificates / Approvals
- EC-type examined as a low flame spread material when used as part of a predefined paint system. Please refer to “Declaration of Conformity” on hempel.com for further details.
- The following shades are formulated with special electrical conductive pigments that makes it possible to design paint systems that meet the requirements in ISO 80079-36:2016 Explosive atmospheres (ATEX): 95000
- Meets requirements to NORSOK M-501 when used as part of a predefined paint system. Edition 6, System 1. Edition 7, System 1A, 1B.

Features
- For severely corrosive atmospheric environment.
- Direct-to-metal in C2 and C3 environments.
- Glossy with very good gloss and colour retention.
- High volume solids and VOC-compliant.
- The minimum temperature for curing is -10°C [14°F].

Product safety

Flash point 31°C [88°F]

VOC content mixed product

Legislation	Value	5% thinning, by volume	Limit value, phase II (2010)[a]
EU	343 g/L [2.86 lb/US gal]	366 g/L [3.05 lb/US gal]	500 g/L [4.17 lb/US gal]
US (coatings)	320 g/L [2.67 lb/US gal]	-	-
US (regulatory)	343 g/L [2.86 lb/US gal]		
China	343 g/L [2.86 lb/US gal]		
Hong Kong	320 g/L [2.67 lb/US gal]		

According to specific legislation, see details in the Explanatory Notes available at Hempel website, hempel.com or at your local Hempel website. VOC values may vary with shade, please consult the Safety Data Sheet, section 9. [a]EU Directive 2004/42/CE. According to EPA Method 24.

Handling
Handle with care. Before and during use, observe safety labels on packaging and paint containers and follow all local and national safety regulations. Always consult Hempel’s Safety Data Sheet for this product along with the Product Data Sheet.

For professional use only.

Product data

Product code
55610

Product components
Base 55619
Curing Agent 97050

Hempathane HS 55610

Standard shade / code
White 10000 *

Wide range of colours is available via Hempel's tinting system.

Gloss
Glossy

Volume solids
67 ± 2%

Specific gravity
1.4 kg/L [12 lb/US gal]

Reference dry film thickness
80 micron [3.2 mils]

Aluminium shade / code
Aluminium grey 19002

Gloss
Please consult Hempel's Guideline on aluminium pigmented coatings.

Volume solids
58 ± 2%

Specific gravity
1.1 kg/L [10 lb/US gal]

Reference dry film thickness
80 micron [3.2 mils]

Surface preparation

Cleanliness
- Remove oil, grease and other contaminants by suitable detergent cleaning.
- Remove salts, detergents and other contaminants by high pressure fresh water cleaning.

New build:
- Abrasive blasting to min. Sa 2½ (ISO 8501-1) / SP 10 (SSPC).
- Remove dust, blast media and loose materials.

Maintenance and Repair
- Abrasive blasting to min. Sa 2 (ISO 8501-1) / SP 6 (SSPC).
- Minor areas may be hand or power tool cleaned instead of abrasive blasting.
- Water jetting to Wa 2½ (ISO 8501-4).
- Flash rust degree of maximum FR M (ISO 8501-4).
- Remove dust, blast media and loose materials.

Roughness
- Surface profile Medium (S) (ISO 8503-2).

Consult Hempel's separate Surface Preparation Guidelines for more details.

Application

Mixing ratio
Base 55619 : Curing Agent 97050
(7 : 1 by volume)

Stir well before use.

Thinner
Hempel's Thinner 08080

Cleaner
Hempel's Thinner 08080

* Colour stability may be affected by exposure to harsh chemical and/or high temperatures.

Hempathane HS 55610

Pot life

Product temperature	10°C [50°F]	20°C [68°F]	30°C [86°F]
Pot life	3½ hours	2 hours	1 hour

Application method

Tool	Thinning max vol.	Application parameters
Airless spray	5%	Nozzle pressure: 175 bar [2500 psi] Nozzle orifice: 0.017-0.021"

If brush or roller application is used, more coats will be necessary to achieve the specified dry film thickness. Never thin more than allowed according to local environmental legislation. Spray data are indicative and subject to adjustment. Pressure is for a material temperature of 20°C [68°F].

Film thickness

Specification range	Low	High	Recommended
Dry film thickness	50 micron [2.0 mils]	125 micron [5.0 mils]	80 micron [3.2 mils]
Wet film thickness	75 micron [3.0 mils]	187 micron [7.5 mils]	120 micron [4.8 mils]
Theoretical spreading rate	13 m²/L [530 sq ft/US gal]	5.3 m²/L [216 sq ft/US gal]	8.3 m²/L [338 sq ft/US gal]

For best performance, avoid excessive film thickness.

Application conditions

- To avoid condensation, apply on a clean and dry surface with a temperature that is at least 3°C [5°F] above the dew point.
- Surface temperature must be above -10°C [14°F] during application and curing.
- Beware of ice on the surface at low temperatures.
- The film formation may be adversely affected by light rain, high humidity and/or condensation during application and the following interval after application: “8 hours, 20°C/68°F”.
- Optimal spraying properties are obtained at paint temperatures of 15-30°C [59-86°F]. Beyond these temperatures additional thinning may be necessary.

Relative Humidity:

- Relative humidity must be below 85% during curing.
- Relative humidity must be below 85% during application.

Drying and overcoating

Product compatibility

- Previous coat: According to Hempel’s Specification. Recommended products are: Hempaprime Multi 500, Hempadur
- Subsequent coat: None.

Drying time

Surface temperature		10°C [50°F]	20°C [68°F]	30°C [86°F]
Touch dry	min	120	90	60
Surface dry	hours	11	3½	2
Hard dry	hours	12	5	3
Fully cured	days	-	7	-

Determined for dry film thickness 80 micron [3.2 mils] at standard conditions, see Hempel’s Explanatory Notes for details.

Overcoating

Hempel’s specification supersedes any guidelines indicated in the overcoating table

Quality name		-10°C [14°F]	10°C [50°F]	20°C [68°F]	30°C [86°F]
Atmospheric medium					
Hempathane HS 55610	Min	30 h	9 h	6 h	3 h
	Max	Ext*	Ext	Ext	Ext

Overcoating times are indicative for products of the same generic chemistry. Consult Hempel’s specification for more information.

Drying conditions

- To obtain the drying time stated, it is important to maintain sufficient ventilation during application, drying and curing.
- Condensation on the freshly applied coating should be avoided.

Overcoating details

- The surface must be dry and clean prior to application.

Other remarks

- Hempel’s Specification supersedes any recommendations given in the Product Data Sheets.

Hempathane HS 55610

Storage

Shelf life

Ambient temperature	25°C [77°F]
Base	36 months
Curing Agent	24 months

Shelf life from date of production, when stored in original, unopened containers. Thereafter, the product quality must be re-inspected. Storage at elevated temperatures may reduce shelf life. For advice, please consult Hempel.

Storage conditions

- Product must be stored according to local legislation, at maximum 40°C [104°F], without direct sunlight and protected from rain and snow.
- The curing agent is sensitive to moisture. Store in a dry place and keep the can tightly closed until use.

Carbon Footprint

Dry film thickness	1 µm	1 mil
GWP (Global Warming Potential)	8.7 g CO_2e/m^2	0.045 lb CO_2e/ft^2

The carbon footprint is for 1 square meter / square foot of surface area with a dry film thickness of 1 micron / mil.

The scope includes raw materials, in-bound transport to the Hempel factory, Hempel manufacturing processes, and any Volatile Organic Compounds emitted during and after the application of the product.

It is calculated based on the standard shade defined in this PDS. Values may vary with shade.

Additional documents

Additional information is available at the Hempel website https://www.hempel.com/service-and-support/technical-guidelines or at your local Hempel website:

- Explanatory Notes for Product Data Sheet.
- Application methods.
- Surface Preparation.
- Application Instruction for this product.
- Aluminium pigmented topcoats.

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Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000
HYDROSTATIC TEST PROCEDURE

Document Number: 1724000428-QC-PRO-00023

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
Giuseppe Cavallo	05/09/24

Rev.	Date	Description	Prepared	Reviewed	Approved
03	03/09/2024	Accepted for Construction (AFC)	GT	MC	TM
02	05/07/2024	Accepted for Construction (AFC)	GT	MC	TM
01	29/05/2024	Accepted for Construction (AFC)	GT	MC	TM
00	18/04/2024	Issue for Review (IFR)	GT	MC	TM

COES

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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)

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Lifting sketch

None

1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

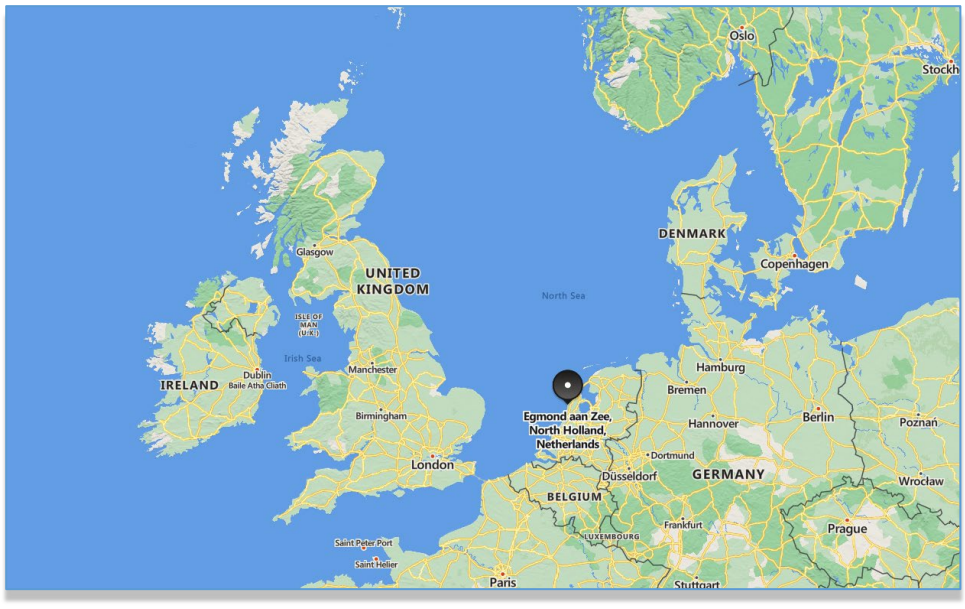


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

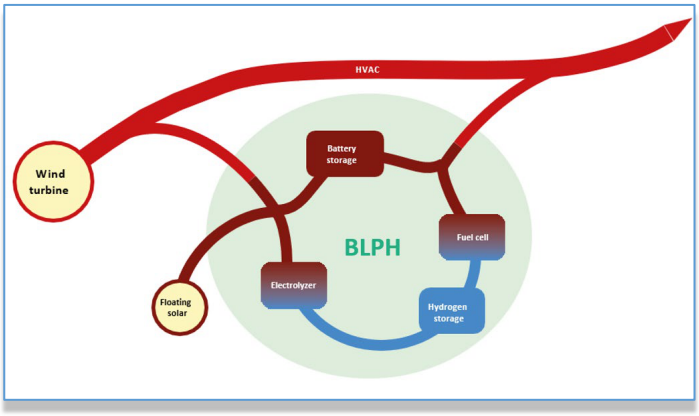


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

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3 HYDROSTATIC TEST PROCEDURE

3.1 SCOPE

This procedure has the scope of giving instructions to the Company's personnel for the performance of Code hydrostatic tests on pressure vessels and piping, before painting.

Complete list of items to be tested is:

Item	Tag. no.	Serial no.	Design Pressure	Test Pressure	Note
Dryer vessel	D-63001A	S240123	12 barg	17.2 barg	Acc. to 2014/68/EU
Dryer vessel	D-63001B	S240124	12 barg	17.2 barg	Acc. to 2014/68/EU
Dryer vessel	D-63001A	S240125	12 barg	17.2 barg	Acc. to 2014/68/EU
Dryer vessel	D-63001B	S240126	12 barg	17.2 barg	Acc. to 2014/68/EU
Pre-Filter	S-63001A	S240121	12 barg	17.2 barg	Acc. to 2014/68/EU
Pre-Filter	S-63001B	S240122	12 barg	17.2 barg	Acc. to 2014/68/EU
After-Filter	S-63002A	S240127	12 barg	17.2 barg	Acc. to 2014/68/EU
After-Filter	S-63002B	S240128	12 barg	17.2 barg	Acc. to 2014/68/EU
Air receiver	V-63001	S240119	12 barg	17.2 barg	Acc. to 2014/68/EU
Piping	/	/	12 barg	17.2 barg	Acc. to 2014/68/EU

3.2 REFERENCE CODES AND STANDARDS

ASME VIII DIV. 1 Edition 2021

2014/68/EU (PED)

3.3 RESPONSIBILITY

The QCI shall prepare the item for the Hydrostatic test and proceed to the performance of the test with his personnel following the instructions of the Company's QCM who has the responsibility of the enforcement of this procedure, the QC Manual and the Code.

3.4 PREPARATION

3.4.1 The code hydrostatic test follows all manufacture and inspection activities.

3.4.2 The QCM, after having ensured himself that all inspection activities have been satisfactorily completed and reported in the QC plan, authorizes the Shop Manager to prepare the item for the hydrostatic test.

3.4.3 The hydrostatic test shall be done prior to painting.

3.4.4 The Vessel shall be adequately supported before being filled with water, to avoid distortions.

3.4.5 The test medium shall be clean water. The hydrostatic testing of equipment with internal surfaces in austenitic stainless steel material shall be carried out with potable quality water having a maximum chloride content of 30 ppm. For other materials, water with chloride content greater than 250 ppm shall not be used for testing. The temperature of the test water shall be between 5°C to 40°C. The perimeter of the hydrostatic testing should be barricaded, and signs should be set up to inform others that a hydrostatic test is in progress.

3.4.6 All connections shall be blanked off by means of adequate plugs or blind flanges of the rating specified in the drawing, same service gaskets and bolting of the same size and resistance as those specified in the drawing.

3.4.7 The QCM shall provide the required calibrated pressure gauge: the pressure gauge shall be directly connected to the item to be hydrostatic pressure tested, and shall be directly visible by the operator conducting the test. Pressure gauge shall be graduated over a range of about double the intended maximum test pressure but in no case less than 1.5 nor more than 4 times that pressure.

3.4.8 All gauges shall be calibrated against a standard dead-weight tester or a calibrated master gauge. Gauges shall be re-calibrated at any time that there is reason to believe that they are in error.

3.4.9 Calibration records shall be available for review prior to testing.

3.4.10 The Vessel to be tested shall be filled with water and adequately vented from the highest point.

3.4.11 The hydrostatic pressure to be applied shall be that shown on the drawing and shall be read at the highest point of the vessel as positioned for the test, if the pressure gauge is not at this level, the geodetic difference from the top of the vessel and the pressure gauge shall be disallowed from pressure gauge reading. Test pressure shall be determined in accordance with the Division used for construction.

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3.5 EXAMINATION

3.5.1 Start hydrostatic test pump to reach the required test pressure which should increase pressure 3 steps. Each step should hold the time not less than 5 minutes before increasing pressure to the next step.

3.5.2 The test pressure shall be maintained for a sufficient time to detect leakage. The minimum time the hydrostatic test is maintained is 30 minutes, during the first 15 minutes it is not recommended to make the close up examination, but only a check of the pressure gauge and a distant examination for conspicuous leaks. Close up examination is performed after the first 15 minutes of stabilization. The safety considerations recommend the close up examination may be performed after having decreased the test pressure to the test pressure divided by 1.3 times.

3.5.3 Except for leakage that might occur at temporary test closures for those openings intended for welded connections, leakage is not allowed at the time of the required visual inspection. Leakage from temporary seals shall be directed away so as to avoid masking leaks from other joints. No permanent deformation is allowed.

3.5.4 After testing, the equipment shall be drained and dried to prevent corrosion. Do not leave systems filled with water. During draining a vent valve shall be open at the highest point of the equipment to prevent vacuum.

3.6 TEST RECORDS

3.6.1 Upon satisfactory completion of the hydrostatic pressure test the QCM shall prepare, date and sign the "Hydrostatic test report" which shall contain at least the following data:

- Equipment identification and test position (horizontal or vertical) if different from the drawing.
- Test pressure, time and close up examination pressure if different.
- Test medium, serial No. range and calibration date of pressure gauge used.
- Date and signature of the QCM.

3.6.2 The hydrostatic test certificate shall be retained in the QC file for the job.

3.7 AUTHORIZED INSPECTOR

For items belonging to 2014/68/EU Category II and above, the Authorized Inspector from Notified Body must witness the hydrostatic test

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000
FAT (FACTORY ACCEPTANCE TEST) PROCEDURE

Document Number: 1724000428-QC-PRO-00024

ROSETTI MARINO

ment Class: 2

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
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Sign	Date
Giuseppe Cavallo	23/04/2025

		ction (AFC)	GT	MC	TM
		ction (AFC)	GT	MC	TM
		(IFR)	GT	MC	TM
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Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

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00	Issue for Review (IFR)
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Lifting sketch

None

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1 INTRODUCTION

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Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

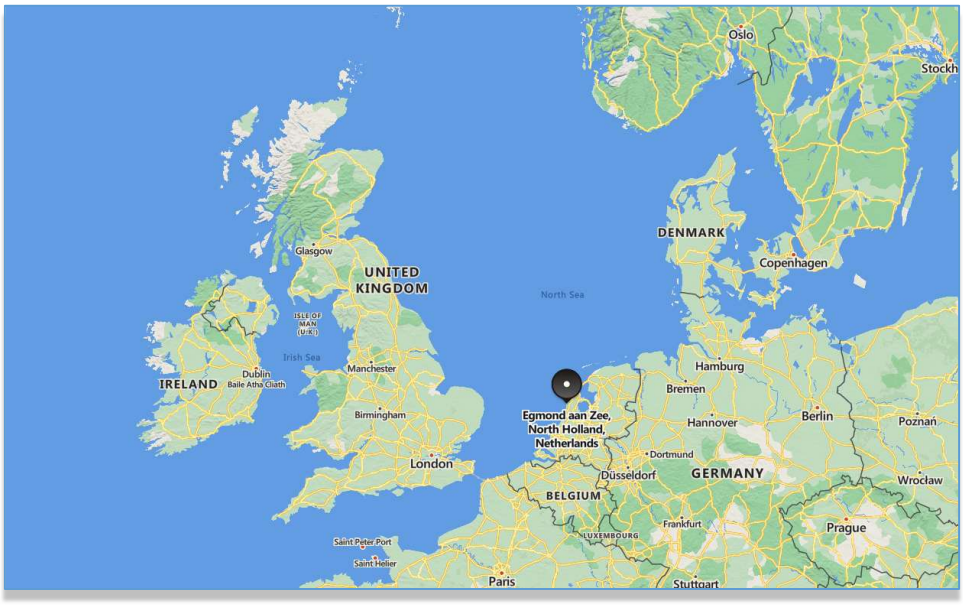


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

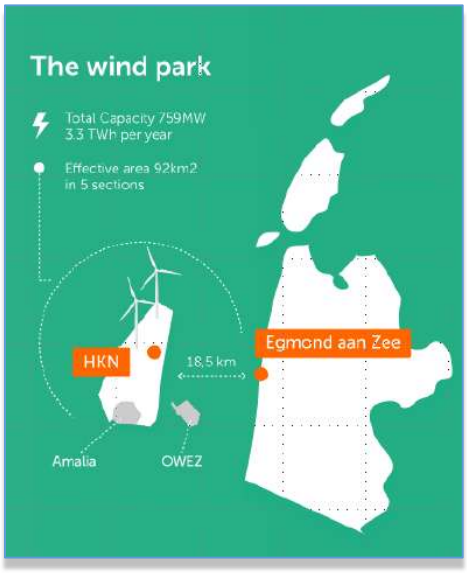


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

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All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

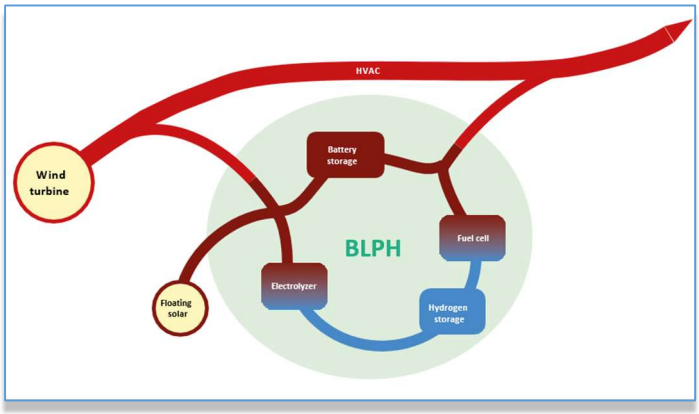


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
1724000428-QC-ITP-00002	INSPECTION TEST PLAN (ITP)
1724000428-MAC-SP-00003	SYSTEM/PACKAGE FUNCTIONAL DESCRIPTION
1724000428-MAC-DG-00009	PACKAGE WIRING DIAGRAM INCLUDING LAYOUT OF PACKAGE CONTROL PANEL
1724000428-MAC-DS-00011	EQUIPMENT DATA SHEETS
1724000428-MAT-PRO-00022	PAINTING PROCEDURE

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
FAT:	FACTORY ACCEPTANCE TEST
QCI:	QUALITY CONTROL INSPECTOR
QCM:	QUALITY CONTROL MANAGER
P&ID:	PIPING AND INSTRUMENT DIAGRAM
I/O:	INPUT/OUTPUT
CoG:	CENTER OF GRAVITY

Table 2 - Definitions and Abbreviations

3 FAT PROCEDURE

3.1 VISUAL AND DIMENSIONAL CHECK

3.1.1 SCOPE

This procedure has the scope of giving instructions to Coes personnel for the performance of visual and dimensional control on complete instrument air package.

3.1.2 RESPONSIBILITY

The QCI shall proceed to the performance of the test with his personnel following the instructions of QCM who has the responsibility of the enforcement of this procedure.

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3.1.3 EXAMINATION

A bend meter is used for the dimensional inspection so that to verify that overall sizes of the instrument air package correspond to figures shown on general arrangement drawing.

During this check, the location and the dimensions of the group limits as well as the total height of the instrument air package will be verified.

The inspection will give a satisfactory result only if sizes will be in accordance with those shown on general arrangement drawing: acceptable tolerance is ± 20 mm on the battery limits.

At least the following list shall be checked during examination:

- Overall base frame dimension check
- Overall height check
- Foundation and/or fixation position check
- Tank and drip pan drain position check
- Filling and vent flange for customer connection position check
- Earthing position check
- Location of the terminal box
- All terminal points
- Visual check of flange surface condition at terminal points.
- Flange management, including:
    - Flange condition assessment
    - Gasket record
    - Bolting record
    - Bolt tension check
    - Integrity testing
- Pipe routing and all the equipment connections and installations against P&IDs.

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3.2 LOCAL PANEL WIRING CHECK

3.2.1 SCOPE

This procedure has the scope of giving instructions to Coes personnel for the performance of wiring check on local panels installed on instrument air package.

3.2.2 RESPONSIBILITY

The QCI shall proceed to the performance of the test with his personnel following the instructions of the QCM who has the responsibility of the enforcement of this procedure.

3.2.3 EXAMINATION

Local control panel, junction boxes (if any) and instruments are checked according to the reference documents.

The test will give a satisfactory result only if wiring has been executed according to the reference drawings.

All remote I/O signals shall be validated.

Electrical earthing continuity check shall be performed.

A complete ITR (Inspection Test Report) will be in place prior to testing.

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3.3 MARKING AND NAMEPLATES CHECK

3.3.1 SCOPE

This procedure has the scope of giving instructions to Coes personnel for the performance of the nameplates check on complete instrument air package.

3.3.2 RESPONSIBILITY

The QCI shall proceed to the performance of the test with his personnel following the instructions of the QCM who has the responsibility of the enforcement of this procedure.

3.3.3 EXAMINATION

Components tagging is checked according to P&ID: if customer does not assign dedicated items to all the components, Coes indicates standard items on P&ID, but tagging is not carried out.

Pressure vessel nameplates are checked according to construction drawings.

The inspection will give a satisfactory result only if all components are correctly tagged and all pressure vessels are correctly marked.

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3.4 PNEUMATIC LEAKAGE TEST

3.4.1 SCOPE

This procedure has the scope of giving instructions to Coes personnel for the performance of leakage test on complete instrument air package.

3.4.2 RESPONSIBILITY

The QCI shall prepare the item for the leakage test and proceed to the performance of the test with his personnel following the instructions of the QCM who has the responsibility of the enforcement of this procedure.

3.4.3 TEST

During this test the instrument air package is pressurized up to 9 / 9.5 barg and isolated to check that no leakage occurs.

During this test, all valves installed in the package should be in open position, in order to allow pressurization of the whole package.

After 1 hour it is verified if the pressure is mainteined.

Then the pressure is reduced to 1 barg and the perfect sealing of all flanged and threaded connections is verified, using soapy water: the test will give a satisfactory result only if air pockets will not be noticed.

In case air pockets are detected, connection must be tighten and leakage test has to be repeated until it gives a satisfactory result.

Instruments used to perform the test shall have valid calibration certificates to be attached to test report.

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3.5 FAT PERFORMANCE TEST

3.5.1 SCOPE

This procedure has the scope of giving instructions to Coes personnel for the execution of the performance test on complete instrument air package.

3.5.2 RESPONSIBILITY

The QCI shall prepare the item for the test and proceed to the performance of the test with his personnel following the instructions of the QCM who has the responsibility of the enforcement of this procedure.

3.5.3 TEST

During this test compressors (one per time) and dryer (one per time) are switched on, to verify the full functionality and the good operation of all installed components (compressors, dryer, local control panel) and the proper sequence of all the cycle phases: the functioning and performance criteria are validated if aligned with the document n.1724000428-MAC-SP-00003 SYSTEMPACKAGE FUNCTIONAL DESCRIPTION.

The ambient conditions of the test are those available in Coes workshop at the moment of the test.

The following measured values will be checked:

- Check pre-filter pressure drop by means of differential pressure transmitter 63-PDIT-051.
- Check air dryer pressure drop by means of differential pressure gauges 63-PDI-052 / 63-PDI-061.
- Check after-filter pressure drop by means of differential pressure transmitter 63-PDIT-062.
- Check dryer adsorption/regeneration operating pressure by means of pressure gauges 63-PI-053 / 63-PI-055 / -63-PI-057 / 63-PI-059
- Check the pressure switches on dryer units 1&2 (63-PS-054, 63-PS-056, 63-PS-058, 63-PS-060)

The test will give a satisfactory result only if the different phases of the operating cycle will take place correctly, as described in the functional description.

Running test for each compressor shall have a duration of 30 minutes minimum.

Performance guarantees:

- Outlet air dew point, by means of analyzer 63-AIT-051 installed downstream dryer: -40°C
- Outlet air flowrate, by means of a flow transmitter 63-FIT-051 installed downstream dryer: 350 Sm^3/h
- Outlet air pressure, by means of a calibrated pressure gauge (shop test instrument): 9 barg
- Outlet air temperature, by means of temperature transmitter 63-TT-052: 35°C
- Air receiver operating pressure not less than 8 barg, by means of pressure transmitter 63-PIT-064

Process instrumentation set-points to be verified against the document no. 1724000428-IN-LIS-00017 INSTRUMENT LIST WITH SET POINTS/CONTROL/ALARM/SHUTDOWN.

Performances of the air dryer package are guaranteed if the above mentioned parameters are detected stable for 30 minutes minumum.

Instruments used to perform the test shall have valid calibration certificates to be attached to test report.

3.6 PAINTING CHECK

3.6.1 SCOPE

This procedure has the scope of giving instructions to Coes personnel for the performance of painting check on complete instrument air package .

3.6.2 RESPONSIBILITY

The QCI shall proceed to the performance of the test with his personnel following the instructions of the QCM who has the responsibility of the enforcement of this procedure.

3.6.3 TEST

Total dry film thickness shall be measured using a magnetic induction instrument.

The test will give a satisfactory result only if:

- no points with film thickness less than 80% of the specified minimum thickness are found

- not more than 20% of thickness measurements taken at random shall be less than the specified minimum thickness

- RAL/colors are in compliance with reference proceudure

Instruments used to perform the test (magnetic induction instrument) shall have valid calibration certificates and shall be attached to FAT report.

Reference painting procedure is the document no. 1724000428-MAT-PRO-00022

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Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000
HANDLING, PRESERVATION AND PACKAGING PROCEDURE

Document Number: 1724000428-QC-PRO-00031

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
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Revision / Change Log

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

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No.	Description
1	
2	
3	
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None

1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

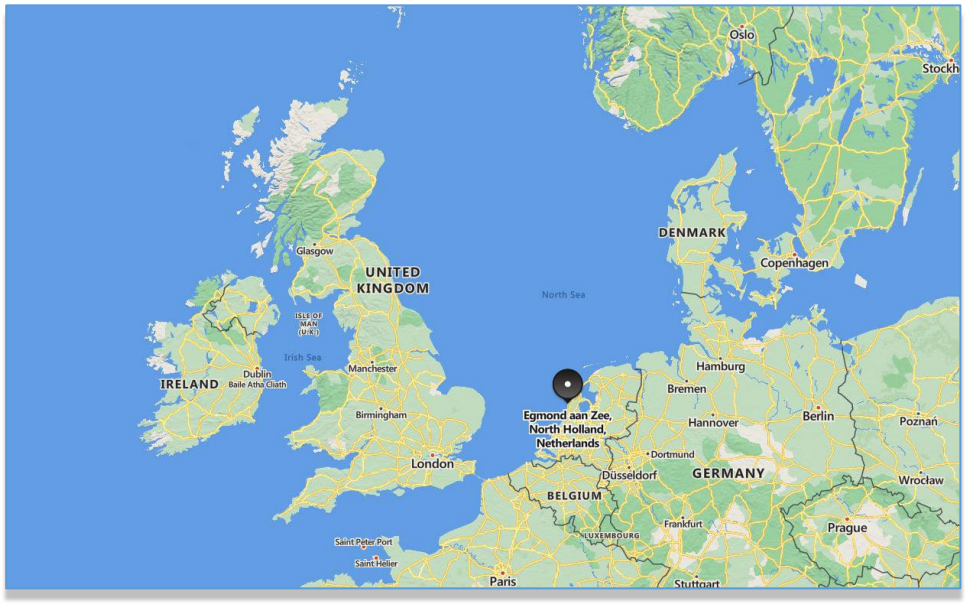


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

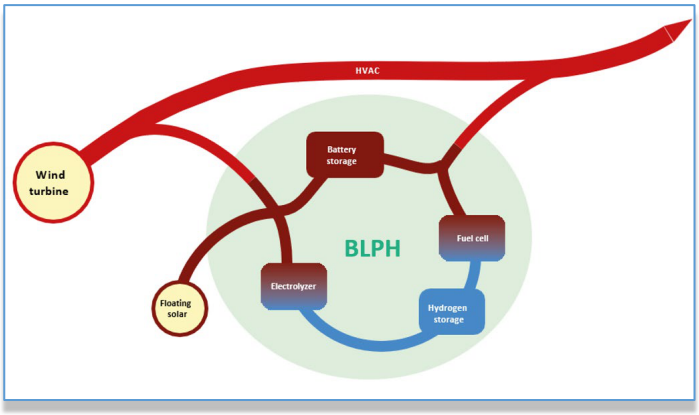


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
1724000428-MAC-DD-00006	EQUIPMENT SECTIONAL DRAWING WITH BILL OF MATERIAL

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

3 HANDLING, PRESERVATION AND PACKING PROCEDURE

3.1 SCOPE

The instrument air package will be delivered fully assembled, protected with a heat shrinkable film suitable for road transportation.

The instrument air receiver will be delivered fully assembled (in terms of installed instruments and valves), of a wooden pallet protected with a heat shrinkable film suitable for road transportation.

Any exposed equipment that may be damaged by slings and lifting equipment during transportation and installation shall be protected or removed.

The equipment can be handled with furnished no.4 lifting lugs; welded on main baseframe.

Every 3 months check the conditions of the packing: if damaged proceed with replacing

Keep closed all battery limit connections with blind flanges or plugs (supplied with the package), to avoid that humidity, dust or atmospheric pollution enter into the component of the package.

Keep closed all vent and drain valves and all electrical connections.

In case of prolonged storage, every month it is suggested to carry out site inspection as per following checklist:

1. Check that all manual vent and drain valves are closed.
2. Check that all blind flanges (if any) are closed and correctly tightened: install the flanges and tighten the stud bolts, if necessary.
3. Check that all terminal boxes are closed and that the internal is clean from sand or dust and that no dew is detected: clean, close of replace them, if necessary.
4. Check that all instruments, valves are not damaged: replace them, if necessary.
5. Check that all tubing is properly connected: tighten compression fittings, if necessary.

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Istituto di ricerche tecnologiche e collaudi

MD 8A RP RT1 R0	**RAPPORTO DI PROVA** / Test Report	RA240836	**Data** / Date	2024/09/16
	COMMESSA IRTEC/ IRTEC Job	JA240331	**PAGINA** / Page	1 / 2

RA240836 JA240331 2024/09/16 **CONTROLLO RADIOGRAFICO** RADIOGRAPHIC EXAMINATION REPORT

ORDINE/*Order*	E-MAIL	DEL/*On*	2024/09/04
RICEZIONE/*Reception*	//	DEL/*On*	//
ACCETTAZIONE/**Acceptance**	JA240331	DEL/*On*	2024/09/10

CLIENTE *CUSTOMER*	COES S.R.L. VIA PONTIDA , 265 24040 STEZZANO (BG)	**UTENTE** USER	
COMMESSA *JOB*	C.166/24		
OGGETTO *SUBJECT*	RADIOGRAPHIC TESTING OF : AIR RECEIVER // DWG : CCO52811 Rev.2 SN : S240119		
SPECIFICA *SPECIFICATION*	EXECUTION : ASME V ART.2 : 2023 IRTEC PROCEDURE : PT A4W R0 ACCEPTANCE STANDARD : ASME VIII DIV.1 UW52 : 2023		

Stadio di lavorazione *Working step*	Dopo saldatura After weld	**Superficie** *Surface*	Come saldata As welded	**Materiali** *Materials*	Flange: // Shell: ASME SA 516 GR.70	Pipe: // Fitting: //

	Dimensioni Dimensions [mm]	Proc. Sald. Weld. Process	Tecnica Technique	Spess.Sald. Weldthickness [mm]	Distanze – Distances: Oggetto-Film Object-Film b [mm]	Sorgente-Oggetto Source-Object f [mm]	Sorgente-Film Source-Film [mm]	Tipo IQI IQI Type	Posizione IQI IQI Position
1	Ø 2500 x 18	//	Fig.1 SWE-SWI	20	18	700	718	ASTM 1 B 11	Source side ☒ Film side ☐

Apparecchio Equipment		Dim.sorgente Source size d [mm]	Tensione Voltage kV	Attività Activity Ci	Tipo Film Film type	Spess. schermi Screen thk. mm		Esposizione Exposure s	Densità Density		Sensibilità Sensitivity		Film
RX	715-IR	3	290	//	D5	Front	0.027	60	Required	1.8÷4.0	Required	8	Single ☒
Ir 192						Back	0.027		Actual	2.9÷3.3	Actual	7	Double ☐

Film system class/Classification	**AGFA D4 = C3/Class I**	**AGFA D5 = C4/Class I**	**AGFA D7 = C5/Class II**	**Processing AUTOMATIC**

LEGENDA : OK = BUONO-Good RRX = RIPARARE - Repair NX = RIPETERE ESPOSIZIONE – Repeat the exposure

SWE = single-wall exposure **DWE** = double-wall exposure **SWI** = single-wall image **DWI** = double-wall image

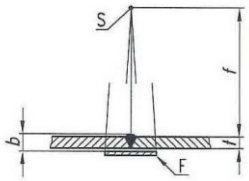
1	Cricche	Cracks	12	Mancanza di penetrazione	Lack of penetration
2a	Pori e porosità - Passata singola	Pores and porosity Single pass	13	Cricche di cratere	Cratercracks
2b	Pori e Porosità - Multipass	Pores and porosityMultipass	14a	Incisioni marginali	Undercuts
3	Porosità localizzata	Localized cluster porosity	14b	Incisioni al vertice	Rootundercuts
4a	Porosità allineata - Passata singola	Linear porosity - Single pass	15a	Eccesso di penetrazione	Excesspenetration
4b	Porosità allineata - Multipass	Linear porosity - Multipass	16	Colpi d'arco	Strayarc
5	Cavità allungate e tarli	Elongatedcavities and wormholes	17	Spruzzi	Spatters
6	Cavità di ritiro (escluse cavità di cratere)	Shrinkage cavities(other than crater pipes)	18	Insellamento	Rootconcavity
7	Cavità di cratere	Crater pipe	19	Ripresa difettosa	Poorrestart
8	Inclusione di scoria o ossido	Slag or oxideinclusion	20	Riempimento scarso	Incompletelyfilledgroove
9	Inclusioni metalliche (escluso Cu)	Metallic inclusions (other than Cu)	21	Slivellamento	Misalignment
10	Inclusioni di Rame	Copperinclusions	22	Difetto film	Process or film defect
11	Incollature	Lack of fusion	/	Nessun difetto	No defect

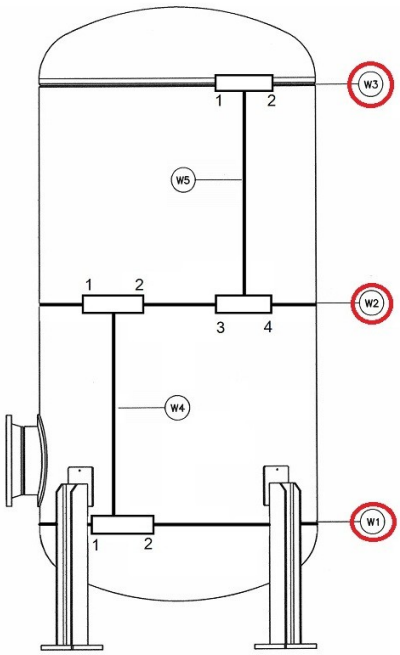
NOTE *REMARKS*	**RT COVERAGE : SPOT INDICATED BY THE CUSTOMER**	
OPERATORE *OPERATOR*	Lorefice-Nicolò Level 2 RT SNT-TC-1A - IRTEC certificate No. 17	
PROVE ESEGUITE IL *TEST PERFORMED ON*	2024/09/10	**Presso COES - STEZZANO** At the COES headquarters in STEZZANO

OPERATORE Operator	**PER IL LABORATORIO** For the Laboratory	**L'ISPETTORE DEL CLIENTE** CustomerInspector	**IL COLLAUDATORE** The Inspector
Lorefice Nicolò RT LIV.II SNT-TC-1A	Francesco Morandi RT LIV.II SNT-TC-1A		

SIGLA Mark	TECNICA Technique	POSIZIONE. Position		DIFETTI Defects	ESITO Result
S240119	1-Fig.1 SWE-SWI	W1	1-2	//	OK
		W2	1-2	3	OK
			3-4	//	OK
		W3	1-2	14a	OK

Fig.1





COES Job: 166/24
Subject: AIR RECEIVER
Drawing: CCO52811 Rev.2
Serial number: S240119

FINE DOCUMENTO / *End document*

OPERATORE Operator	PER IL LABORATORIO For the Laboratory	L'ISPETTORE DEL CLIENTE CustomerInspector	IL COLLAUDATORE The Inspector
Lorefice Nicolò RT LIV.II SNT-TC-1A	Francesco Morandi RT LIV.II SNT-TC-1A		

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RAPP.DI PROVA No. RDP No	RA-240848
RIF. REF.	JA240331
DATA DATE	2024/10/01
FOGLIO SHEET	1 DI OF 2

RADIOGRAPHIC EXAMINATION REPORT

CLIENTE CUSTOMER	COES S.R.L. VIA PONTIDA , 265 - 24040 STEZZANO (BG)
COMMESSA JOB	C.166/24
OGGETTO SUBJECT	RADIOGRAPHIC TESTING OF : DRYER VESSEL DRWING: CCO54156 SERIAL NUMBERS: S240123/S240124/S240125/S124126
SPECIFICA SPECIFICATION	EXECUTION: ASME V ART.2 : 2023 IRTEC PROCEDURE: PT A4W VR0 ACCEPTABILITY STANDARD: ASME VIII DIV.1 UW52 : 2023

Stadio di lavorazione Working step	After welding	**Superficie** Surface	As welded	**Materiali** Materials	Plates: SA312TP316L / Flanges SA182F316L

	Materiale Material	Dimensioni Dimensions	Tipo di sorgente Source type	Tecnica Technique	Distanze - Distances: Oggetto-Film Object to Film	Distanze - Distances: Sorgente-Oggetto Source to object	Spessore saldatura Weld thickness	Tipo IQI IQI Type	Posizione IQI IQI Position
1	See mat.table	Ø273 x 4.19 mm	X Ray	Fig. E	4,19 mm	900 mm	6 mm	ASTM1B11	Source side / Film side ☒

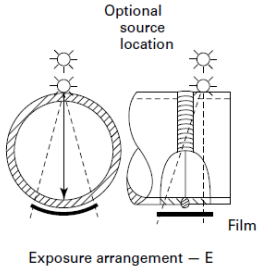
Tensione Voltage	Corrente Current	Dimens. sorgente Source size	Attività Ir 192 Ir 192 activity	Tipo Film Film type	Densità Density	Sensibilità Sensitivity	Geometric unsharpness (Ug)	Film
250 KV	3.0 mA	3.0 mm	//	AGFA D4	Required 1.8÷4.0 / Actual 2.7-3.1	Required 6 / Actual 6	0.08 mm	Single ☒ / Double

Film system class/Classification	**AGFA D4 = C3/Class I**	**AGFA D5 = C4/Class I**	**AGFA D7 = C5/Class II**	**Processing**	**AUTOMATIC**

LEGENDA **OK = BUONO – Good** **RRX = RIPARARE – Repair** **NX = RIPETERE FILM – Repeat the exposure**
SWE= Single Wall Exposure **DWE = Double Wall Exposure** **SWV = Single Wall Viewing** **DWV = Double Wall Viewing**

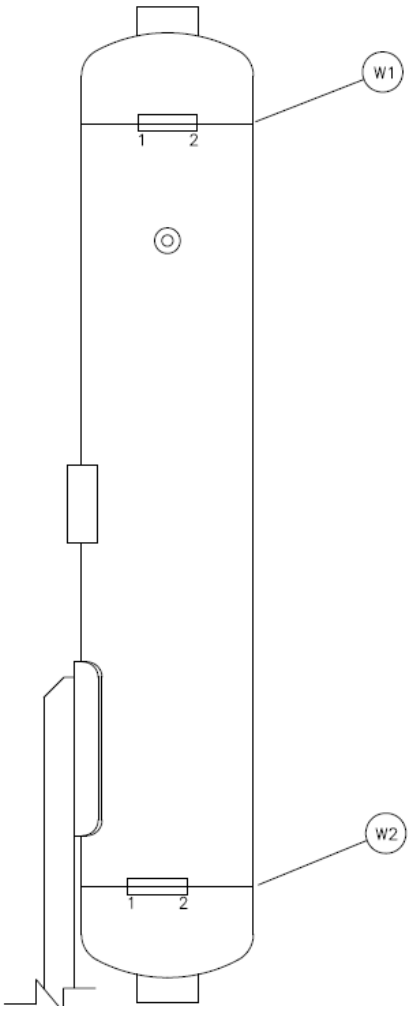
1	Cricche	Cracks	12	Mancanza di penetrazione	Lack of penetration
2a	Pori e porosità - Passata singola	Pores and porosity Single pass	13	Cricche di cratere	Crater cracks
2b	Pori e Porosità - Multipass	Pores and porosity Multipass	14a	Incisioni marginali	Undercuts
3	Porosità localizzata	Localized cluster porosity	14b	Incisioni al vertice	Root undercuts
4a	Porosità allineata - Passata singola	Linear porosity - Single pass	15a	Eccesso di penetrazione	Excess penetration
4b	Porosità allineata - Multipass	Linear porosity - Multipass	16	Colpi d'arco	Stray arc
5	Cavità allungate e tarli	Elongated cavities and wormholes	17	Spruzzi	Spatters
6	Cavità di ritiro (escluse cavità di cratere)	Shrinkage cavities(other than crater pipes)	18	Insellamento	Root concavity
7	Cavità di cratere	Crater pipe	19	Ripresa difettosa	Poor restart
8	Inclusione di scoria o ossido	Slag or oxide inclusion	20	Riempimento scarso	Incompletely filled groove
9	Inclusioni metalliche (escluso Cu)	Metallic inclusions (other than Cu)	21	Slivellamento	Misalignment
10	Inclusioni di Rame	Copper inclusions	22	Difetto film	Process or film defect
11	Incollature	Lack of fusion	/	Nessun difetto	No defect

NOTE REMARKS	**EXAMINATION COVERAGE : 10% WELDS**
OPERATORE OPERATOR	Lorefice-Nicolò Level 2 RT SNT-TC-1A - IRTEC certificate No. 17

Any	Double- Wall: T-271.2(a) at least 3 Exposures 120 deg to Each Other for Complete Coverage	Single-Wall	 Exposure arrangement — E	T-276 and Table T-276	Source Side T-277.1(a) / Film Side T-277.1(b)	Film Side T-275.1(b) (1)

PROVE ESEGUITE DA Test conducted by	PER IL LABORATORIO For the laboratory	L'ISPETTORE DEL CLIENTE Customer inspector	IL COLLAUDATORE The inspector
Lorefice Nicolò RT Liv. II SNT-TC-1A	Francesco Morandi RT Liv. II SNT-TC-1A		

SALDATURA WELD	TECNICA TECNIQUE	POSIZIONE POSITION	DIFETTI DEFECTS	ESITO RESULT	SALDATURA WELD	TECNICA TECNIQUE	POSIZIONE POSITION	DIFETTI DEFECTS	ESITO RESULT
S240123	1-Fig.E DWE-SWV	W1 1-2	/	OK	S240125	1-Fig.E DWE-SWV	W1 1-2	/	OK
		W2 1-2	3	OK			W2 1-2	/	OK
S240124		W1 1-2	/	OK	S240126		W1 1-2	14a	OK
		W2 1-2	14a	OK			W2 1-2	/	OK



Document end

PROVE ESEGUITE DA Test conducted by	PER IL LABORATORIO For the laboratory	L'ISPETTORE DEL CLIENTE Customer inspector	IL COLLAUDATORE The inspector
Lorefice Nicolò RT Liv. II SNT-TC-1A	Francesco Morandi RT Liv. II SNT-TC-1A		

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RAPP.DI PROVA N° RDP No	RA-240855
RIF. REF.	JA240331
DATA DATE	2024/09/23
FOGLIO SHEET	1 DI OF 2

RADIOGRAPHIC EXAMINATION REPORT

CLIENTE CUSTOMER	COES S.R.L. VIA PONTIDA , 265 - 24040 STEZZANO (BG)
COMMESSA JOB	C. 166/24
OGGETTO SUBJECT	RADIOGRAPHIC TESTING OF: PIPING // DRAWING: CCO54154
SPECIFICA SPECIFICATION	EXECUTION: ASME V ART.2 : 2023 IRTEC PROCEDURE: PT A4W VR0 ACCEPTABILITY STANDARD: ASME VIII DIV.1 UW52 : 2023

Stadio di lavorazione Working step	After welding	**Superficie** Surface	As welded	**Materiali** Materials	Pipe : SA312TP316L :
Fittings : SA403WP316L Flanges: SA182WP316L					

	Materiale Material	Dimensioni Dimensions	Tipo di sorgente Source type	Tecnica Technique	Distanze - Distances: Oggetto-Film Object to Film	Distanze - Distances: Sorgente-Oggetto Source to object	Spessore saldatura Weld thickness	Tipo IQI IQI Type	Posizione IQI IQI Position
1	See mat.table	Ø60.3 x 2.77 mm Ø48.3 x 3.68 mm Ø21.3 x 2.77 mm	X Ray	Fig. G	60.3 mm 48.3 mm 21.3 mm	900 mm	4.7 mm 5.6 mm 4.7 mm	ASTM1A6	Source side ☒ Film side

Tensione Voltage	Corrente Current	Dimens. sorgente Source size	Attività Ir 192 Ir 192 activity	Tipo Film Film type	Densità Density	Sensibilità Sensitivity	Geometric unsharpness (Ug)	Film
240 KV	3.0 mA	3.0 mm	//	AGFA D4	Required 1.8÷4.0 Actual 2.7-2.8	Required 5/6 Actual 5	0.10÷0.46 mm	Single ☒ Double

Film system class/Classification	**AGFA D4 = C3/Class I**	**AGFA D5 = C4/Class I**	**AGFA D7 = C5/Class II**	**Processing AUTOMATIC**

LEGENDA **OK = BUONO – Good** **RRX = RIPARARE – Repair** **NX = RIPETERE FILM – Repeat the exposure**
SWE= Single Wall Exposure **DWE = Double Wall Exposure** **SWV = Single Wall Viewing** **DWV = Double Wall Viewing**

1	Cricche	Cracks	12	Mancanza di penetrazione	Lack of penetration
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10	Inclusioni di Rame	Copper inclusions	22	Difetto film	Process or film defect
11	Incollature	Lack of fusion	/	Nessun difetto	No defect

NOTE REMARKS	**EXAMINATION COVERAGE : 10% WELDS**
OPERATORE OPERATOR	Lorefice-Nicolò Level 2 RT SNT-TC-1A - IRTEC certificate No. 17

PROVE ESEGUITE DA Test conducted by	PER IL LABORATORIO For the laboratory	L'ISPETTORE DEL CLIENTE Customer inspector	IL COLLAUDATORE The inspector
Lorefice Nicolò RT LEVEL II SNT-TC-1A	Francesco Morandi RT LEVEL II SNT-TC-1A		

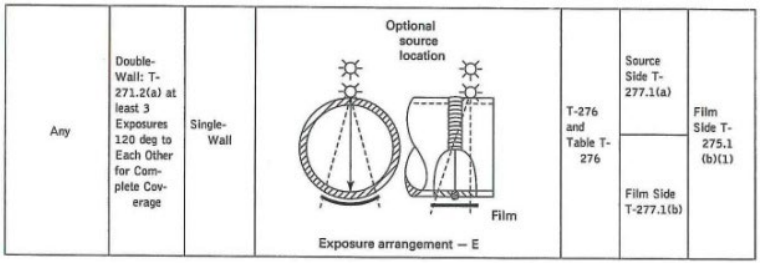
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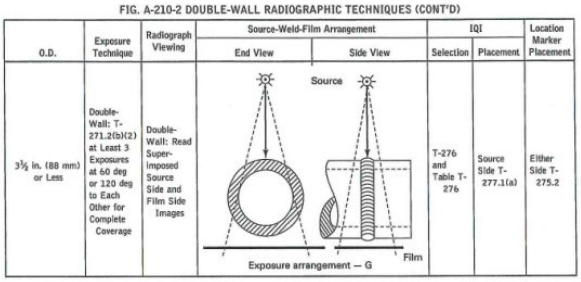
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RAPP.DI PROVA N° RDP No	RA-240855
RIF. REF.	JA240331
DATA DATE	2024/09/23
FOGLIO SHEET	2 DI OF 2

SALDATURA WELD	TECNICA TECNIQUE	POSIZIONE POSITION	DIFETTI DEFECTS	ESITO RESULT	SALDATURA WELD	TECNICA TECNIQUE	POSIZIONE POSITION	DIFETTI DEFECTS	ESITO RESULT
CCO54154 SHEET 2 W2 – 2”	2-Fig.G DWE-DWV	A	/	OK	CCO54154 SHEET 7 W12 – 2”	2-Fig.G DWE-DWV	A	/	OK
		B	3	OK			B	/	OK
		C	/	OK			C	/	OK
CCO54154 SHEET 2 W2 – 2”		A	/	OK	CCO54154 SHEET 7 W17 – 1/2”		A	/	OK
		B	/	OK			B	/	OK
		C	/	OK			C	/	OK
CCO54154 SHEET 5 W5 – 2”		A	/	OK	CCO54154 SHEET 9 W8 – 2”		A	/	OK
		B	/	OK			B	/	OK
		C	/	OK			C	14a	OK
CCO54154 SHEET 5 W4 – 1.1/2”		A	/	OK	CCO54154 SHEET 9 W9 – 2”		A	/	OK
		B	9	OK			B	/	OK
		C	/	OK			C	/	OK
CCO54154 SHEET 5 W7 – 1.1/2”		A	/	OK	CCO54154 SHEET 11 W2 – 2”		A	/	OK
		B	/	OK			B	/	OK
		C	/	OK			C	/	OK





Document end

PROVE ESEGUITE DA Test conducted by	PER IL LABORATORIO For the laboratory	L'ISPETTORE DEL CLIENTE Customer inspector	IL COLLAUDATORE The inspector
Lorefice Nicolò RT LEVEL II SNT-TC-1A	Francesco Morandi RT LEVEL II SNT-TC-1A		

IRTEC SRL
SISTEMA DI QUALITA' CERTIFICATO ISO 9001:2008

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RAPP.DI PROVA No. RDP No	RA-240880
RIF. REF.	JA240331
DATA DATE	2024/11/22
FOGLIO SHEET	1 DI OF 2

RADIOGRAPHIC EXAMINATION REPORT

CLIENTE CUSTOMER	COES S.R.L. VIA PONTIDA , 265 - 24040 STEZZANO (BG)
COMMESSA JOB	C.166/24
OGGETTO SUBJECT	RADIOGRAPHIC TESTING OF : PRE-FILTERS AND POST-FILTERS DRWING: CCO54155 SERIAL NUMBERS: S240121/S240122/S240128/S124129
SPECIFICA SPECIFICATION	EXECUTION: ASME V ART.2 : 2023 IRTEC PROCEDURE: PT A4W VR0 ACCEPTABILITY STANDARD: ASME VIII DIV.1 UW52 : 2023

Stadio di lavorazione Working step	After welding	**Superficie** Surface	As welded	**Materiali** Materials	Plates: SA312TP316L / Flanges SA182F316L

	Materiale Material	Dimensioni Dimensions	Tipo di sorgente Source type	Tecnica Technique	Distanze - Distances: Oggetto-Film Object to Film	Distanze - Distances: Sorgente-Oggetto Source to object	Spessore saldatura Weld thickness	Tipo IQI IQI Type	Posizione IQI IQI Position
1	See mat.table	Ø168 x 7.11 mm	X Ray	Fig. E	10 mm	168 mm	10 mm	ASTM1B11	Source side Film side ☒

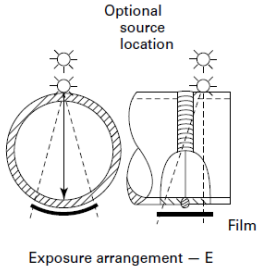
Tensione Voltage	Corrente Current	Dimens. sorgente Source size	Attività Ir 192 Ir 192 activity	Tipo Film Film type	Densità Density	Sensibilità Sensitivity	Geometric unsharpness (Ug)	Film
250 KV	3.0 mA	3.0 mm	//	AGFA D4	Required 1.8÷4.0 Actual 2.7-3.1	Required 6 Actual 6	0.08 mm	Single ☒ Double

Film system class/Classification	AGFA D4 = C3/Class I	AGFA D5 = C4/Class I	AGFA D7 = C5/Class II	Processing AUTOMATIC

LEGENDA	OK = BUONO – Good	RRX = RIPARARE – Repair	NX = RIPETERE FILM – Repeat the exposure
	SWE= Single Wall Exposure	DWE = Double Wall Exposure	SWV = Single Wall Viewing DWV = Double Wall Viewing

1	Cricche	Cracks	12	Mancanza di penetrazione	Lack of penetration
2a	Pori e porosità - Passata singola	Pores and porosity Single pass	13	Cricche di cratere	Crater cracks
2b	Pori e Porosità - Multipass	Pores and porosity Multipass	14a	Incisioni marginali	Undercuts
3	Porosità localizzata	Localized cluster porosity	14b	Incisioni al vertice	Root undercuts
4a	Porosità allineata - Passata singola	Linear porosity - Single pass	15a	Eccesso di penetrazione	Excess penetration
4b	Porosità allineata - Multipass	Linear porosity - Multipass	16	Colpi d'arco	Stray arc
5	Cavità allungate e tarli	Elongated cavities and wormholes	17	Spruzzi	Spatters
6	Cavità di ritiro (escluse cavità di cratere)	Shrinkage cavities(other than crater pipes)	18	Insellamento	Root concavity
7	Cavità di cratere	Crater pipe	19	Ripresa difettosa	Poor restart
8	Inclusione di scoria o ossido	Slag or oxide inclusion	20	Riempimento scarso	Incompletely filled groove
9	Inclusioni metalliche (escluso Cu)	Metallic inclusions (other than Cu)	21	Slivellamento	Misalignment
10	Inclusioni di Rame	Copper inclusions	22	Difetto film	Process or film defect
11	Incollature	Lack of fusion	/	Nessun difetto	No defect

NOTE REMARKS	**EXAMINATION COVERAGE : 10% WELDS**
OPERATORE OPERATOR	Lorefice-Nicolò Level 2 RT SNT-TC-1A - IRTEC certificate No. 17

Any	Double- Wall: T-271.2(a) at least 3 Exposures 120 deg to Each Other for Complete Coverage	Single-Wall	 Exposure arrangement — E	T-276 and Table T-276	Source Side T-277.1(a) Film Side T-277.1(b)	Film Side T-275.1(b) (1)

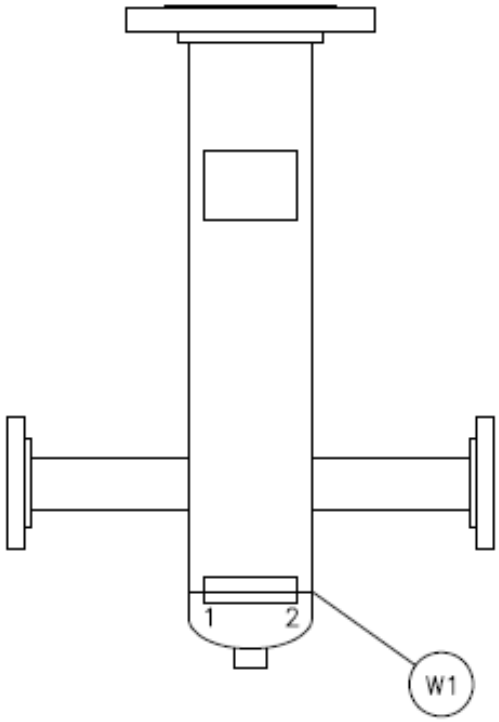
PROVE ESEGUITE DA Test conducted by	PER IL LABORATORIO For the laboratory	L'ISPETTORE DEL CLIENTE Customer inspector	IL COLLAUDATORE The inspector
Lorefice Nicolò RT Liv. II SNT-TC-1A	Francesco Morandi RT Liv. II SNT-TC-1A		

IR TEC SRL
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SALDATURA WELD	TECNICA TECNIQUE	POSIZIONE POSITION	DIFETTI DEFECTS	ESITO RESULT	SALDATURA WELD	TECNICA TECNIQUE	POSIZIONE POSITION	DIFETTI DEFECTS	ESITO RESULT
S240121	1-Fig.E DWE-SWV	W1 1-2	/	OK	S240128	1-Fig.E DWE-SWV	W1 1-2	/	OK
S240122		W1 1-2	/	OK	S240129		W1 1-2	/	OK



Document end

PROVE ESEGUITE DA Test conducted by	PER IL LABORATORIO For the laboratory	L'ISPETTORE DEL CLIENTE Customer inspector	IL COLLAUDATORE The inspector
Lorefice Nicolò RT Liv. II SNT-TC-1A	Francesco Morandi RT Liv. II SNT-TC-1A		

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24040 COMUN NUOVO – Via Europa, 9

TEST REPORT LIQUID PENETRANT EXAMINATION

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000428
Project:	HOLLANDSE KUST NOORD WIND PARK Project	**Supply:**	AIR RECEIVER
Item:	A-63000	**Tag:**	V-63001
Coes Job:	166/24	**Serial Number:**	S240119

Sample:	100% OF WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO52811 REV.4**		
Test standards:	ASME V Article 6 Ed.2023		
Test procedure:	CTP03682 Rev.5		
Acceptance standard:	ASME VIII div.1 Ed.2023		
Material:	CARBON STEEL		
Area inspected:	Tightness welds	**Surface condition:**	Welded
Surface Temperature:	+18°C	**Examination coverage:**	100%
Inspection method:	Visible light water washable penetrant	**Illumination type:**	Lamp 100W >1076Lx
Equipment:	Thermometer with probe (S/N: A0038)		
Manufacturer:	N.D.T.		
Pre-cleaner:	MET-L-CHECK E59A	**Drying time:**	5'
Penetrant:	MET-L-CHECK VP30	**Penetration time:**	10' ÷ 60'
Remover:	Water (P<345kPa, T<40°C)	**Drying time:**	5 ÷ 30'
Developer:	MET-L-CHECK D70	**Developing time:**	10'
Post cleaning:	Clothes soaked in solvent	**Interpretation time:**	10'÷60'
Examination results:	No indications were noticed		
Evaluation:	Acceptable		

Operators	
Level II Acc. to SNT TC 1A	
MICHEL GRITTI	COES Srl QUALITY ASSURANCE DATE 25 SET 2024 WITNESSED REVIEWED

COES SRL Via Pontida, 265 24040 Stezzano Italy	NDE QUALIFICATION CERTIFICATE Certificato di qualifica PnD

We certify that
Si certifica che

GRITTI MICHEL

SURNAME / NAME

Birth date / Data di nascita: 18/05/1989
Birth place / Luogo di nascita: Alzano Lombardo (BG)

In accordance to the requirements of our Written Practice nr. NDE-WP-SNT rev. 5 which satisfies the ASNT Recommended Practice SNT-TC-1A edition 2016 plus Addendum 1 is qualified to

Level / Livello: II
Method / Metodo: PT – Liquid Penetrant

Technique / Tecnica: Water Washable

Limitation / Limitazioni: None

Certification date / Data della certificazione: 10/09/2024
Expiring date / Data di scadenza: End of September 2029

COES Srl
QUALITY ASSURANCE
DATE 25 SET 2024
☐ WITNESSED ☒ REVIEWED

This certificate is based on

School graduation	Grammar school	obtained on year:	2004
Training satisfactorily performed on year:	2019	for a total hours:	40
Initial experience duration of:	>210	hours in the method	
and	>400	total hours in the NDE	
First qualification examination performed on:		11/09/2019	
	with a composite grade of:	83.3%	
Satisfactory continuity from:		2019 to actual	
Latest Technical Performance Evaluation satisfactorily performed on:		10/09/2024	
Latest Examination for renewal performed on:		Not applicable	
	with a composite grade of:	Not applicable	
Latest visual acuity verified on:		26/04/2024	

The level III evaluator
Il livello III valutatore

10/09/2024

The President
Il Presidente

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TEST REPORT LIQUID PENETRANT EXAMINATION

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000428
Project:	HOLLANDSE KUST NOORD WIND PARK Project	**Supply:**	DRYER PRE-FILTER
Item:	A-63000	**Serial Number:**	S240121 / S240122
Coes Job:	166/24		

Sample:	100% OF WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54155 REV.0**		
Test standards:	ASME V Article 6 Ed.2023		
Test procedure:	CTP03682 Rev.5		
Acceptance standard:	ASME VIII div.1 Ed.2023		
Material:	STAINLESS STEEL		
Area inspected:	Tightness welds	**Surface condition:**	Welded
Surface Temperature:	+18°C	**Examination coverage:**	100%
Inspection method:	Visible light water washable penetrant	**Illumination type:**	Lamp 100W >1076Lx
Equipment:	Thermometer with probe (S/N: A0038)		
Manufacturer:	N.D.T.		
Pre-cleaner:	MET-L-CHECK E59A	**Drying time:**	5'
Penetrant:	MET-L-CHECK VP30	**Penetration time:**	10' ÷ 60'
Remover:	Water (P<345kPa, T<40°C)	**Drying time:**	5 ÷ 30'
Developer:	MET-L-CHECK D70	**Developing time:**	10'
Post cleaning:	Clothes soaked in solvent	**Interpretation time:**	10'÷60'
Examination results:	No indications were noticed		
Evaluation:	Acceptable		

Operators	
Level II Acc. to SNT TC 1A	
MICHEL GRITTI	

COES Srl
QUALITY ASSURANCE
DATE 02 OTT 2024
WITNESSED REVIEWED

Doc. N°: CPT58124

COES SRL Via Pontida, 265 24040 Stezzano Italy	NDE QUALIFICATION CERTIFICATE Certificato di qualifica PnD

We certify that
Si certifica che

GRITTI MICHEL

SURNAME / NAME

Birth date / Data di nascita: 18/05/1989
Birth place / Luogo di nascita: Alzano Lombardo (BG)

In accordance to the requirements of our Written Practice nr. NDE-WP-SNT rev. 5 which satisfies the ASNT Recommended Practice SNT-TC-1A edition 2016 plus Addendum 1 is qualified to

Level / Livello: II
Method / Metodo: PT – Liquid Penetrant

Technique / Tecnica: Water Washable

Limitation / Limitazioni: None

Certification date / Data della certificazione: 10/09/2024
Expiring date / Data di scadenza: End of September 2029

COES Srl
QUALITY ASSURANCE
DATE 02 OTT 2024
WITNESSED REVIEWED

This certificate is based on

School graduation	Grammar school	obtained on year:	2004
Training satisfactorily performed on year:	2019	for a total hours:	40
Initial experience duration of:	>210	hours in the method	
and	>400	total hours in the NDE	
First qualification examination performed on:		11/09/2019	
	with a composite grade of:	83.3%	
Satisfactory continuity from:		2019 to actual	
Latest Technical Performance Evaluation satisfactorily performed on:		10/09/2024	
Latest Examination for renewal performed on:		Not applicable	
	with a composite grade of:	Not applicable	
Latest visual acuity verified on:		26/04/2024	

The level III evaluator
Il livello III valutatore
Oliviero DODANI
10/09/2024

The President
Il Presidente
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24040 COMUN NUOVO – Via Europa, 9

TEST REPORT LIQUID PENETRANT EXAMINATION

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000428
Project:	HOLLANDSE KUST NOORD WIND PARK Project	**Supply:**	DRYER AFTER-FILTER
Item:	A-63000	**Serial Number:**	S240127 / S240128
Coes Job:	166/24		

Sample:	100% OF WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54155 REV.0**		
Test standards:	ASME V Article 6 Ed.2023		
Test procedure:	CTP03682 Rev.5		
Acceptance standard:	ASME VIII div.1 Ed.2023		
Material:	STAINLESS STEEL		
Area inspected:	Tightness welds	**Surface condition:**	Welded
Surface Temperature:	+18°C	**Examination coverage:**	100%
Inspection method:	Visible light water washable penetrant	**Illumination type:**	Lamp 100W >1076Lx
Equipment:	Thermometer with probe (S/N: A0038)		
Manufacturer:	N.D.T.		
Pre-cleaner:	MET-L-CHECK E59A	**Drying time:**	5'
Penetrant:	MET-L-CHECK VP30	**Penetration time:**	10' ÷ 60'
Remover:	Water (P<345kPa, T<40°C)	**Drying time:**	5 ÷ 30'
Developer:	MET-L-CHECK D70	**Developing time:**	10'
Post cleaning:	Clothes soaked in solvent	**Interpretation time:**	10'÷60'
Examination results:	No indications were noticed		
Evaluation:	Acceptable		

Operators	
Level II Acc. to SNT TC 1A	
MICHEL GRITTI	

COES Srl
QUALITY ASSURANCE
DATE 02 OTT 2024
WITNESSED REVIEWED

COES SRL Via Pontida, 265 24040 Stezzano Italy	NDE QUALIFICATION CERTIFICATE Certificato di qualifica PnD

We certify that
Si certifica che

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Birth place / Luogo di nascita: Alzano Lombardo (BG)

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Level / Livello: II
Method / Metodo: PT – Liquid Penetrant

Technique / Tecnica: Water Washable

Limitation / Limitazioni: None

Certification date / Data della certificazione: 10/09/2024
Expiring date / Data di scadenza: End of September 2029

COES Srl
QUALITY ASSURANCE
DATE 02 OTT 2024
☐ WITNESSED ☒ REVIEWED

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Latest Technical Performance Evaluation satisfactorily performed on:		10/09/2024	
Latest Examination for renewal performed on:		Not applicable	
	with a composite grade of:	Not applicable	
Latest visual acuity verified on:		26/04/2024	

The level III evaluator
Il livello III valutatore

10/09/2024

The President
Il Presidente

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24040 COMUN NUOVO – Via Europa, 9

TEST REPORT LIQUID PENETRANT EXAMINATION

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000428
Project:	HOLLANDSE KUST NOORD WIND PARK Project	**Supply:**	DRYER VESSEL
Item:	A-63000	**Serial Number:**	S240123 / S240124
Coes Job:	166/24		

Sample:	100% OF WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54156 REV.0**		
Test standards:	ASME V Article 6 Ed.2023		
Test procedure:	CTP03682 Rev.5		
Acceptance standard:	ASME VIII div.1 Ed.2023		
Material:	STAINLESS STEEL		
Area inspected:	Tightness welds	**Surface condition:**	Welded
Surface Temperature:	+18°C	**Examination coverage:**	100%
Inspection method:	Visible light water washable penetrant	**Illumination type:**	Lamp 100W >1076Lx
Equipment:	Thermometer with probe (S/N: A0038)		
Manufacturer:	N.D.T.		
Pre-cleaner:	MET-L-CHECK E59A	**Drying time:**	5'
Penetrant:	MET-L-CHECK VP30	**Penetration time:**	10' ÷ 60'
Remover:	Water (P<345kPa, T<40°C)	**Drying time:**	5 ÷ 30'
Developer:	MET-L-CHECK D70	**Developing time:**	10'
Post cleaning:	Clothes soaked in solvent	**Interpretation time:**	10'÷60'
Examination results:	No indications were noticed		
Evaluation:	Acceptable		

Operators	
Level II Acc. to SNT TC 1A	
MICHEL GRITTI	COES Srl QUALITY ASSURANCE DATE 04 OTT 2024 WITNESSED REVIEWED

Doc. N°: CPT58128

COES SRL Via Pontida, 265 24040 Stezzano Italy	NDE QUALIFICATION CERTIFICATE Certificato di qualifica PnD

We certify that
Si certifica che

GRITTI MICHEL

SURNAME / NAME

Birth date / Data di nascita: 18/05/1989
Birth place / Luogo di nascita: Alzano Lombardo (BG)

In accordance to the requirements of our Written Practice nr. NDE-WP-SNT rev. 5 which satisfies the ASNT Recommended Practice SNT-TC-1A edition 2016 plus Addendum 1 is qualified to

Level / Livello: II
Method / Metodo: PT – Liquid Penetrant

Technique / Tecnica: Water Washable

Limitation / Limitazioni: None

Certification date / Data della certificazione: 10/09/2024
Expiring date / Data di scadenza: End of September 2029

COES Srl
QUALITY ASSURANCE
DATE 04 OTT 2024
☐ WITNESSED ☒ REVIEWED

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Satisfactory continuity from:		2019 to actual	
Latest Technical Performance Evaluation satisfactorily performed on:		10/09/2024	
Latest Examination for renewal performed on:		Not applicable	
	with a composite grade of:	Not applicable	
Latest visual acuity verified on:		26/04/2024	

The level III evaluator
Il livello III valutatore

10/09/2024

The President
Il Presidente

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24040 COMUN NUOVO – Via Europa, 9

TEST REPORT LIQUID PENETRANT EXAMINATION

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000428
Project:	HOLLANDSE KUST NOORD WIND PARK Project	**Supply:**	DRYER VESSEL
Item:	A-63000	**Serial Number:**	S240125 / S240126
Coes Job:	166/24		

Sample:	100% OF WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54156 REV.0**		
Test standards:	ASME V Article 6 Ed.2023		
Test procedure:	CTP03682 Rev.5		
Acceptance standard:	ASME VIII div.1 Ed.2023		
Material:	STAINLESS STEEL		
Area inspected:	Tightness welds	**Surface condition:**	Welded
Surface Temperature:	+18°C	**Examination coverage:**	100%
Inspection method:	Visible light water washable penetrant	**Illumination type:**	Lamp 100W >1076Lx
Equipment:	Thermometer with probe (S/N: A0038)		
Manufacturer:	N.D.T.		
Pre-cleaner:	MET-L-CHECK E59A	**Drying time:**	5'
Penetrant:	MET-L-CHECK VP30	**Penetration time:**	10' ÷ 60'
Remover:	Water (P<345kPa, T<40°C)	**Drying time:**	5 ÷ 30'
Developer:	MET-L-CHECK D70	**Developing time:**	10'
Post cleaning:	Clothes soaked in solvent	**Interpretation time:**	10'÷60'
Examination results:	No indications were noticed		
Evaluation:	Acceptable		
Operators			
Level II Acc. to SNT TC 1A			
MICHEL GRITTI	COES Srl QUALITY ASSURANCE DATE 04 OTT 2024 WITNESSED REVIEWED		

COES SRL Via Pontida, 265 24040 Stezzano Italy	NDE QUALIFICATION CERTIFICATE Certificato di qualifica PnD

We certify that
Si certifica che

GRITTI MICHEL

SURNAME / NAME

Birth date / Data di nascita: 18/05/1989
Birth place / Luogo di nascita: Alzano Lombardo (BG)

In accordance to the requirements of our Written Practice nr. NDE-WP-SNT rev. 5 which satisfies the ASNT Recommended Practice SNT-TC-1A edition 2016 plus Addendum 1 is qualified to

Level / Livello: II
Method / Metodo: PT – Liquid Penetrant

Technique / Tecnica: Water Washable

Limitation / Limitazioni: None

Certification date / Data della certificazione: 10/09/2024
Expiring date / Data di scadenza: End of September 2029

COES Srl
QUALITY ASSURANCE
DATE 04 OTT 2024
☐ WITNESSED ☒ REVIEWED

This certificate is based on

School graduation	Grammar school	obtained on year:	2004
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and	>400	total hours in the NDE	
First qualification examination performed on:		11/09/2019	
with a composite grade of:		83.3%	
Satisfactory continuity from:		2019 to actual	
Latest Technical Performance Evaluation satisfactorily performed on:		10/09/2024	
Latest Examination for renewal performed on:		Not applicable	
with a composite grade of:		Not applicable	
Latest visual acuity verified on:		26/04/2024	

The level III evaluator
Il livello III valutatore

10/09/2024

The President
Il Presidente

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TEST REPORT LIQUID PENETRANT EXAMINATION

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000428
Project:	HOLLANDSE KUST NOORD WIND PARK Project	**Supply:**	AIR PIPING
Item:	A-63000		
Coes Job:	166/24		

Sample:	100% OF WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54154 REV.1**		
Test standards:	ASME V Article 6 Ed.2023		
Test procedure:	CTP03682 Rev.5		
Acceptance standard:	ASME VIII div.1 Ed.2023		
Material:	CARBON STEEL		
Area inspected:	Tightness welds	**Surface condition:**	Welded
Surface Temperature:	+18°C	**Examination coverage:**	100%
Inspection method:	Visible light water washable penetrant	**Illumination type:**	Lamp 100W >1076Lx
Equipment:	Thermometer with probe (S/N: A0038)		
Manufacturer:	N.D.T.		
Pre-cleaner:	MET-L-CHECK E59A	**Drying time:**	5'
Penetrant:	MET-L-CHECK VP30	**Penetration time:**	10' ÷ 60'
Remover:	Water (P<345kPa, T<40°C)	**Drying time:**	5 ÷ 30'
Developer:	MET-L-CHECK D70	**Developing time:**	10'
Post cleaning:	Clothes soaked in solvent	**Interpretation time:**	10'÷60'
Examination results:	No indications were noticed		
Evaluation:	Acceptable		

Operators	
Level II Acc. to SNT TC 1A	
MICHEL GRITTI	COES Srl QUALITY ASSURANCE DATE 26 SET 2024 WITNESSED REVIEWED

COES SRL Via Pontida, 265 24040 Stezzano Italy	NDE QUALIFICATION CERTIFICATE Certificato di qualifica PnD

We certify that
Si certifica che

GRITTI MICHEL

SURNAME / NAME

Birth date / Data di nascita: 18/05/1989
Birth place / Luogo di nascita: Alzano Lombardo (BG)

In accordance to the requirements of our Written Practice nr. NDE-WP-SNT rev. 5 which satisfies the ASNT Recommended Practice SNT-TC-1A edition 2016 plus Addendum 1 is qualified to

Level / Livello: II
Method / Metodo: PT – Liquid Penetrant

Technique / Tecnica: Water Washable

Limitation / Limitazioni: None

Certification date / Data della certificazione: 10/09/2024
Expiring date / Data di scadenza: End of September 2029

COES Srl
QUALITY ASSURANCE
DATE 26 SET 2024
☐ WITNESSED ☒ REVIEWED

This certificate is based on

School graduation	Grammar school	obtained on year:	2004
Training satisfactorily performed on year:	2019	for a total hours:	40
Initial experience duration of:	>210	hours in the method	
and	>400	total hours in the NDE	
First qualification examination performed on:		11/09/2019	
	with a composite grade of:	83.3%	
Satisfactory continuity from:		2019 to actual	
Latest Technical Performance Evaluation satisfactorily performed on:		10/09/2024	
Latest Examination for renewal performed on:		Not applicable	
	with a composite grade of:	Not applicable	
Latest visual acuity verified on:		26/04/2024	

The level III evaluator
Il livello III valutatore

Olivier OLDANI
NDE III
UT-PT-MT-RT-UT-VT
ISO 9712 PT-MT-RT-UT-VT
SNT-TC-1A MT-PT-RT-UT-VT
10/09/2024

The President
Il Presidente

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TEST REPORT MAGNETIC PARTICLE TESTING

NUMBER:	CMT58120	**DATE:**	20 SET 2024
CUSTOMER:	ROSETTI MARINO	**N° ORDER:**	1724000428
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project	**ITEM:**	A-63000
SCOPE OF SUPPLY:	BASEPLATE	**COES JOB:**	166/24
SAMPLE:	100% LIFTING LUGS		
IDENTIFICATION:	CONSTRUCTION DWG: **CCO53359 REV.0**		
TEST STANDARDS:	ASME V PAR.7 ED.2023		
TEST PROCEDURE	NDE-MT-001 R2		
ACCEPTANCE STANDARD:	NDE-MT-001 R2		
MATERIAL:	CARBON STEEL	**SURFACE CONDITION:**	WELDED
AREA INSPECTED:	EXTERNAL WELDS OF SEAL	**EXAMINATION COVERAGE:**	100%
MAGNETIZATION MODE:	LONGITUDINAL	**METHOD:**	CONTINUOUS BY WET PARTICLE
DETECTION MODE:	CONTRAST COLOR	**LIGHT TYPE:**	NATURAL
EQUIPMENT:	ELECTROMAGNETIC YOKE (Y6050V YOKE – 001Y022), PIE-SHAPED MAGNETIC PARTICLE FIELD INDICATOR (MFS – PGOI), (ASME PROBE)		
CURRENT TYPE:	A.C.	**DISTANCE POLES:**	80 ÷ 120
CURRENT INTENSITY:	----	**MAGNETIC FIELD STRENGTH:**	ACCORDING TO ASME V ART.7
MANUFACTURER:	MAGNAFLUX	**PRE-CLEANER:**	MET-L-CHECK E59A
BACKGROUND CONTRAST:	WCP-2 QFBQCP24010	**PARTICLES TYPE:**	7HF (BLACK LIQUID) QMNHN7HF510
DEMAGNETIZATION:	NOT REQUIRED	**POST CLEANING:**	NOT REQUIRED
OPERATOR (*LEVEL II ACC. TO SNT TC 1A*)			
MARCO CHIAPPA	COES Srl QUALITY ASSURANCE DATE 20 SET 2024 WITNESSED REVIEWED		

COES SRL Via Pontida, 265 24040 Stezzano Italy	NDE QUALIFICATION CERTIFICATE Certificato di qualifica PnD

We certify that
Si certifica che

CHIAPPA MARCO

SURNAME / NAME

Birth date / Data di nascita: 17/01/1968
Birth place / Luogo di nascita: Palermo (PA)

In accordance to the requirements of our Written Practice nr. NDE-WP-SNT rev. 5 which satisfies the ASNT Recommended Practice SNT-TC-1A edition 2016 plus Addendum 1 is qualified to

Level / Livello: II
Method / Metodo: MT – Magnetic Particle

Technique / Tecnica: Yoke

Limitation / Limitazioni: None

Certification date / Data della certificazione: 06/12/2024
Expiring date / Data di scadenza: End of December 2029

COES Srl
QUALITY ASSURANCE
DATE 20 SET 2024
☐ WITNESSED ☒ REVIEWED

This certificate is based on

School graduation	Technical High School Diploma	obtained on year:	1987
Training satisfactorily performed on year:	2010	for a total hours:	40
Initial experience duration of:	>800	hours in the method	
and	>2000	total hours in the NDE	
First qualification examination performed on:		20/12/2011	
	with a composite grade of:	94.4 %	
Satisfactory continuity from:		2011 to actual	
Latest Technical Performance Evaluation satisfactorily performed on:		06/12/2024	
Latest Examination for renewal performed on:		Not applicable	
	with a composite grade of:	Not applicable	
Latest visual acuity verified on:		08/12/2024	

The level III evaluator
Il livello III valutatore

Oliviero OLDANI
NDE Level III
ISO 9712 CICPND MT-PT-RT-UT-VT
SNT-TC-1A MT-PT-RT-UT-VT
06/12/2024

The President
Il Presidente

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VISUAL TEST EXAMINATION OF WELDS

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000428
Project:	HOLLANDSE KUST NOORD WIND PARK Project	**Item:**	A-63000
Supply:	BASEPLATE	**Coes Job:**	166/24

Sample:	100% VISUAL WELDS		
Identification:	CONSTRUCTION DRAWING **CCO53359 REV.0**		
Test standards:	ASME V Article 9 Ed.2023		
Test procedure:	IQ07-11-e-rev.1		
Acceptance standard:	AWS D1.1 Table 6.1		
Material:	CARBON STEEL		
Area inspected:	ALL WELDS	**Surface condition:**	WELDED / BRUSHING
Examination method:	---	**Examination coverage**	100%
Inspection method:	DIRECT	**Illumination type:**	NATURAL LIGHT
Equipment:	*Welding caliber (SND – 0641)*		
Evaluation:	ACCEPTABLE		

Operator	
LEVEL II Acc. to ASNT TC 1A	
MICHEL GRITTI	COES Srl QUALITY ASSURANCE DATE 20 SET 2024 WITNESSED REVIEWED

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24040 COMUN NUOVO – Via Europa, 9

NDE QUALIFICATION CERTIFICATE

Certificato di qualifica PnD

We certify that
Si certifica che

GRITTI MICHEL

SURNAME / NAME

Birth date / Data di nascita: 18/05/1989

Birth place / Luogo di nascita: Alzano Lombardo (BG)

In accordance to the requirements of our Written Practice nr. NDE-VT-001 rev. 1 which referes to the ASNT Recommended Practice SNT-TC-1A edition 2006 is qualified to

Level / Livello: Certified Operator

Method / Metodo: VT - Visual Examination

Technique / Tecnica: Direct unaided and aided

Certification date / Data della certificazione: 23/05/2024

Expiring date / Data di scadenza: 22/05/2030

This certificate is based on
Training satisfactorily performed on: 2019 for a total hours: 4
Initial experience duration of: 6 months
Satisfactory continuity from: 2018
Latest Technical Performance Evaluation satisfactorily performed on: 22/05/2024
Visual acuity verified on: 23/05/2024

COES Srl
QUALITY ASSURANCE
DATE 20 SET 2024
☐ WITNESSED ☑ REVIEWED

The Quality Control Manager
Il Responsabile Controllo Qualità

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VISUAL TEST EXAMINATION OF WELDS

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000428
Project:	HOLLANDSE KUST NOORD WIND PARK Project	**Supply:**	AIR RECEIVER
Item:	A-63000	**Tag:**	V-63001
Coes Job:	166/24	**Serial Number:**	S240119

Sample:	100% VISUAL WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO52811 REV.4**		
Test standards:	ASME V Article 9 Ed.2023		
Test procedure:	IQ07-11-e-rev.1		
Acceptance standard:	ASME B31.3		
Material:	CARBON STEEL		
Area inspected:	ALL WELDS	**Surface condition:**	WELDED / BRUSHING
Distance eye-object:	< 600 mm	**Examination coverage**	100%
Inspection method:	DIRECT	**Illumination type:**	Artificial light >1076Lx
Equipment:	Cambridge Caliper		
Evaluation:	All the detected indications are ACCEPTABLE		
Operator			
COES Qualification			
MICHEL GRITTI	COES Srl QUALITY ASSURANCE DATE 25 SET 2024 WITNESSED REVIEWED		

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24040 COMUN NUOVO – Via Europa, 9

NDE QUALIFICATION CERTIFICATE

Certificato di qualifica PnD

We certify that
Si certifica che

GRITTI MICHEL

SURNAME / NAME

Birth date
Data di nascita: 18/05/1989

Birth place
Luogo di nascita: Alzano Lombardo (BG)

In accordance to the requirements of our Written Practice nr. NDE-VT-001 rev. 1 which referes to the ASNT Recommended Practice SNT-TC-1A edition 2006 is qualified to

Level
Livello: Certified Operator

Method
Metodo: VT - Visual Examination

Technique
Tecnica: Direct unaided and aided

Certification date
Data della certificazione: 23/05/2024

Expiring date
Data di scadenza: 22/05/2030

This certificate is based on
Training satisfactorily performed on: 2019 for a total hours: 4
Initial experience duration of: 6 months
Satisfactory continuity from: 2018
Latest Technical Performance Evaluation satisfactorily performed on: 22/05/2024
Visual acuity verified on: 23/05/2024

COES Srl
QUALITY ASSURANCE
DATE 25 SET 2024
WITNESSED REVIEWED

The Quality Control Manager
Il Responsabile Controllo Qualità

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VISUAL TEST EXAMINATION OF WELDS

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000428
Project:	HOLLANDSE KUST NOORD WIND PARK Project	**Supply:**	DRYER PRE-FILTER
Item:	A-63000	**Tag:**	S240121 / S240122
Coes Job:	166/24		

Sample:	100% VISUAL WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54155 REV.0**		
Test standards:	ASME V Article 9 Ed.2023		
Test procedure:	IQ07-11-e-rev.1		
Acceptance standard:	ASME B31.3		
Material:	STAINLESS STEEL		
Area inspected:	ALL WELDS	**Surface condition:**	WELDED / BRUSHING
Distance eye-object:	< 600 mm	**Examination coverage**	100%
Inspection method:	DIRECT	**Illumination type:**	Artificial light >1076Lx
Equipment:	Cambridge Caliper		
Evaluation:	All the detected indications are ACCEPTABLE		
Operator			
COES Qualification			
MICHEL GRITTI			

COES Srl
QUALITY ASSURANCE
DATE 02 OTT 2024
WITNESSED REVIEWED

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NDE QUALIFICATION CERTIFICATE

Certificato di qualifica PnD

We certify that
Si certifica che

GRITTI MICHEL

SURNAME / NAME

Birth date / Data di nascita: 18/05/1989

Birth place / Luogo di nascita: Alzano Lombardo (BG)

In accordance to the requirements of our Written Practice nr. NDE-VT-001 rev. 1 which referes to the ASNT Recommended Practice SNT-TC-1A edition 2006 is qualified to

COES SRL
QUALITY ASSURANCE
02 OTT 2024
WITNESSED REVIEWED

Level / Livello: Certified Operator

Method / Metodo: VT - Visual Examination

Technique / Tecnica: Direct unaided and aided

Certification date / Data della certificazione: 23/05/2024

Expiring date / Data di scadenza: 22/05/2030

This certificate is based on
Training satisfactorily performed on: 2019 for a total hours: 4
Initial experience duration of: 6 months
Satisfactory continuity from: 2018
Latest Technical Performance Evaluation satisfactorily performed on: 22/05/2024
Visual acuity verified on: 23/05/2024

The Quality Control Manager
Il Responsabile Controllo Qualità

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VISUAL TEST EXAMINATION OF WELDS

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000428
Project:	HOLLANDSE KUST NOORD WIND PARK Project	**Supply:**	DRYER AFTER-FILTER
Item:	A-63000	**Tag:**	S240127 / S240128
Coes Job:	166/24		

Sample:	100% VISUAL WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54155 REV.0**		
Test standards:	ASME V Article 9 Ed.2023		
Test procedure:	IQ07-11-e-rev.1		
Acceptance standard:	ASME B31.3		
Material:	STAINLESS STEEL		
Area inspected:	ALL WELDS	**Surface condition:**	WELDED / BRUSHING
Distance eye-object:	< 600 mm	**Examination coverage**	100%
Inspection method:	DIRECT	**Illumination type:**	Artificial light >1076Lx
Equipment:	Cambridge Caliper		
Evaluation:	All the detected indications are ACCEPTABLE		
Operator			
COES Qualification			
MICHEL GRITTI	COES Srl QUALITY ASSURANCE DATE 02 OTT 2024 WITNESSED REVIEWED		

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NDE QUALIFICATION CERTIFICATE

Certificato di qualifica PnD

We certify that
Si certifica che

GRITTI MICHEL

SURNAME / NAME

Birth date / Data di nascita: 18/05/1989

Birth place / Luogo di nascita: Alzano Lombardo (BG)

In accordance to the requirements of our Written Practice nr. NDE-VT-001 rev. 1 which referes to the ASNT Recommended Practice SNT-TC-1A edition 2006 is qualified to

COES Srl
QUALITY ASSURANCE
0 / OTT 2024
WITNESSED REVIEWED

Level / Livello: Certified Operator

Method / Metodo: VT - Visual Examination

Technique / Tecnica: Direct unaided and aided

Certification date / Data della certificazione: 23/05/2024

Expiring date / Data di scadenza: 22/05/2030

This certificate is based on
Training satisfactorily performed on: 2019 for a total hours: 4
Initial experience duration of: 6 months
Satisfactory continuity from: 2018
Latest Technical Performance Evaluation satisfactorily performed on: 22/05/2024
Visual acuity verified on: 23/05/2024

The Quality Control Manager
Il Responsabile Controllo Qualità

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VISUAL TEST EXAMINATION OF WELDS

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000428
Project:	HOLLANDSE KUST NOORD WIND PARK Project	**Supply:**	DRYER VESSEL
Item:	A-63000	**Serial Number:**	S240123 / S240124
Coes Job:	166/24		

Sample:	100% VISUAL WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54156 REV.0**		
Test standards:	ASME V Article 9 Ed.2023		
Test procedure:	IQ07-11-e-rev.1		
Acceptance standard:	ASME B31.3		
Material:	STAINLESS STEEL		
Area inspected:	ALL WELDS	**Surface condition:**	WELDED / BRUSHING
Distance eye-object:	< 600 mm	**Examination coverage**	100%
Inspection method:	DIRECT	**Illumination type:**	Artificial light >1076Lx
Equipment:	Cambridge Caliper		
Evaluation:	All the detected indications are ACCEPTABLE		
Operator			
COES Qualification			
MICHEL GRITTI	COES Srl QUALITY ASSURANCE DATE 04 OTT 2024 WITNESSED REVIEWED		

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NDE QUALIFICATION CERTIFICATE

Certificato di qualifica PnD

We certify that
Si certifica che

GRITTI MICHEL

SURNAME / NAME

Birth date / Data di nascita: 18/05/1989

Birth place / Luogo di nascita: Alzano Lombardo (BG)

In accordance to the requirements of our Written Practice nr. NDE-VT-001 rev. 1 which referes to the ASNT Recommended Practice SNT-TC-1A edition 2006 is qualified to

Level / Livello: Certified Operator

Method / Metodo: VT - Visual Examination

Technique / Tecnica: Direct unaided and aided

Certification date / Data della certificazione: 23/05/2024

Expiring date / Data di scadenza: 22/05/2030

This certificate is based on
Training satisfactorily performed on: 2019 for a total hours: 4
Initial experience duration of: 6 months
Satisfactory continuity from: 2018
Latest Technical Performance Evaluation satisfactorily performed on: 22/05/2024
Visual acuity verified on: 23/05/2024

The Quality Control Manager
Il Responsabile Controllo Qualità

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COES Srl
QUALITY ASSURANCE
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REVIEWED

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VISUAL TEST EXAMINATION OF WELDS

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000428
Project:	HOLLANDSE KUST NOORD WIND PARK Project	**Supply:**	DRYER VESSEL
Item:	A-63000	**Serial Number:**	S240125 / S240126
Coes Job:	166/24		

Sample:	100% VISUAL WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54156 REV.0**		
Test standards:	ASME V Article 9 Ed.2023		
Test procedure:	IQ07-11-e-rev.1		
Acceptance standard:	ASME B31.3		
Material:	STAINLESS STEEL		
Area inspected:	ALL WELDS	**Surface condition:**	WELDED / BRUSHING
Distance eye-object:	< 600 mm	**Examination coverage**	100%
Inspection method:	DIRECT	**Illumination type:**	Artificial light >1076Lx
Equipment:	Cambridge Caliper		
Evaluation:	All the detected indications are ACCEPTABLE		
Operator			
COES Qualification			
MICHEL GRITTI	COES Srl QUALITY ASSURANCE DATE 04 OTT 2024 WITNESSED REVIEWED		

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24040 COMUN NUOVO – Via Europa, 9

NDE QUALIFICATION CERTIFICATE

Certificato di qualifica PnD

We certify that
Si certifica che

GRITTI MICHEL

SURNAME / NAME

Birth date
Data di nascita: 18/05/1989

Birth place
Luogo di nascita: Alzano Lombardo (BG)

In accordance to the requirements of our Written Practice nr. NDE-VT-001 rev. 1 which referes to the ASNT Recommended Practice SNT-TC-1A edition 2006 is qualified to

Level
Livello: Certified Operator

Method
Metodo: VT - Visual Examination

Technique
Tecnica: Direct unaided and aided

Certification date
Data della certificazione: 23/05/2024

Expiring date
Data di scadenza: 22/05/2030

This certificate is based on
Training satisfactorily performed on: 2019 for a total hours: 4
Initial experience duration of: 6 months
Satisfactory continuity from: 2018
Latest Technical Performance Evaluation satisfactorily performed on: 22/05/2024
Visual acuity verified on: 23/05/2024

The Quality Control Manager
Il Responsabile Controllo Qualità

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COES Srl
QUALITY ASSURANCE
DATA 04 OTT 2024
WITNESSED & REVIEWED

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24040 COMUN NUOVO – Via Europa, 9

VISUAL TEST EXAMINATION OF WELDS

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000428
Project:	HOLLANDSE KUST NOORD WIND PARK Project	**Supply:**	AIR PIPING
Item:	A-63000		
Coes Job:	166/24		

Sample:	100% VISUAL WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54154 REV.1**		
Test standards:	ASME V Article 9 Ed.2023		
Test procedure:	IQ07-11-e-rev.1		
Acceptance standard:	ASME B31.3		
Material:	CARBON STEEL		
Area inspected:	ALL WELDS	**Surface condition:**	WELDED / BRUSHING
Distance eye-object:	< 600 mm	**Examination coverage**	100%
Inspection method:	DIRECT	**Illumination type:**	Artificial light >1076Lx
Equipment:	Cambridge Caliper		
Evaluation:	All the detected indications are ACCEPTABLE		

Operator	
COES Qualification	
MICHEL GRITTI	COES Srl QUALITY ASSURANCE DATE 26 SET 2024 WITNESSED REVIEWED

COES Srl
24040 STEZZANO - ITALY - Via Pontida, 265
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e.mail: coes@coessrl.com

Sedi operative
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NDE QUALIFICATION CERTIFICATE

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We certify that
Si certifica che

GRITTI MICHEL

SURNAME / NAME

Birth date
Data di nascita: 18/05/1989

Birth place
Luogo di nascita: Alzano Lombardo (BG)

In accordance to the requirements of our Written Practice nr. NDE-VT-001 rev. 1 which referes to the ASNT Recommended Practice SNT-TC-1A edition 2006 is qualified to

Level
Livello: Certified Operator

Method
Metodo: VT - Visual Examination

Technique
Tecnica: Direct unaided and aided

Certification date
Data della certificazione: 23/05/2024

Expiring date
Data di scadenza: 22/05/2030

This certificate is based on
Training satisfactorily performed on: 2019 for a total hours: 4
Initial experience duration of: 6 months
Satisfactory continuity from: 2018
Latest Technical Performance Evaluation satisfactorily performed on: 22/05/2024
Visual acuity verified on: 23/05/2024

COES Srl
QUALITY ASSURANCE
DATE 26 SET 2024
WITNESSED REVIEWED

The Quality Control Manager
Il Responsabile Controllo Qualità

COES SRL
Via Pontida, 265
24040 STEZZANO (BG)
P.I./C.F. 02529570166
Tel. 035 2050511

unoprima

RAPPORTO DI VERNICIATURA - Painting report

Data / Date: 18/10/24 — Nr.: 840 24

CLIENTE / Customer	OGGETTO / Object	COMMESSA / Job
COES	INSTRUMENT AIR PACKAGE : SKID STRUCTURE / PIPING SUPPORTS / INSTRUMENT AIR RECEIVER / MANUAL VALVES	166/24

COMMITTENTE FINALE / Final costumer	PROGETTO / Project	CICLO VERNICIATURA / Painting System
ROSETTI MARINO	Base Load Power Hub (BLPH)	CSV 52827 Rev 1 SYSTEM 1

PREPARAZIONE DELLA SUPERFICIE - Surface preparation

DATA / Date	ORA (DALLE - ALLE) / Hour (From - To)	CLEANING DEGREE ISO 8501-1	ANCHOR PROFILE ISO 8503-2	SALT TEST ISO 8502-6/9	DUST TEST ISO 8502-3
10/10/2024	08:00 - 12:20	SA 2½	MEDIUM G Rz 62,80µm	11,30 mg/m²	CLASS 1

TEMPERATURA AMBIENTE / Air temperature	UMIDITA' RELATIVA / Relative umidity	PUNTO DI RUGIADA / Dew point	TEMPERATURA SUPPORTO / Surface temperature
21°C	66%	14,8°C	21°C

VERNICIATURA - Painting

DATA APPLICAZIONE / *Application Date*	10/10/2024	11/10/2024	14/10/2024	//////////
ORA APPLICAZIONE(DALLE - ALLE) / *Application Hour (From - To)*	13:25 - 16:50	15:00 - 18:00	09:40 - 12:50	//////////
TEMPERATURA AMBIENTE / Air temperature	22°C	21°C	18°C	ELCOMETER 319 TOP SN ZF 29428
UMIDITA' RELATIVA / Relative Humidity	54%	66%	53%	ELCOMETER 319 TOP SN ZF 29428
PUNTO DI RUGIADA / Dew point	12,4°C	14,8°C	8,4°C	ELCOMETER 319 TOP SN ZF 29428
TEMPERATURA SUPPORTO / Surface temperature	22°C	21°C	18°C	ELCOMETER 319 TOP SN ZF 29428
METODO DI APPLICAZIONE / Application method	ROLLER/BRUSH CONVENTIONAL SPRAY	ROLLER/BRUSH CONVENTIONAL SPRAY	ROLLER/BRUSH CONVENTIONAL SPRAY	//////////
PRODOTTO VERNICIANTE / Paint product / Batch	ZINC RICH PRIMER AVANTGUARD 750 044085900-044075619	EPOXY HEMPADUR M. 45880 224026744-223065286	POLYURETHANE HEMPATHANE 55610 224017499-224046936	//////////
COLORE / Color	GREY	GREY	RAL 9002	//////////
CONTROLLO FILM UMIDO µm / Wet film thickness check	150	275	125	ELCOMETER 3236 S.N. XB04087
D.F.T. RICHIESTO µm / D.F.T. required µm	60	190	50	//////////
D.F.T. MEDIO µm / D.F.T. average µm	**95**	**330**	**420**	ELCOMETER 456TOP Instrument S.N.: SG00559 Probe S.N.: ZC29693
CONTROLLO MEK - Mek test - ASTM D 4752-03	N.A.	N.A.	N.A.	//////////

NOTE / Remarks

* PAINTING APPLICATION AS PER MANUFACTURER INSTRUCTION
* ALL PARTS DEGREASED AS PER SSPC - SP1 BEFORE BLASTING
* BLOTTER TEST AS PER ASTM D4285 SATISFACTORY
* VISUAL TEST AFTER BLASTING AND PAINTING SATISFACTORY

ISPETTORE UNOPRIMA / Unoprima Inspector	ISPETTORE CLIENTE / Customer Inspector	ISPETTORE COMMITTENTE FINALE / Final customer Inspector
DATA - Date	DATA - Date	DATA - Date

SALVI - UNOPRIMA NS 476 FROSIO cert. 2023 LEV. III — CONTROLLO UNOPRIMA SRL QUALITÀ

unoprima

RAPPORTO DI VERNICIATURA - Painting report

Data / Date: 11/10/24 — Nr.: 841 24

CLIENTE / Customer	OGGETTO / Object	COMMESSA / Job
COES	INSTRUMENT AIR PACKAGE : PIPING - MANUAL & ACTUATED VALVES	166/24

COMMITTENTE FINALE / Final costumer	PROGETTO / Project	CICLO VERNICIATURA / Painting System
ROSETTI MARINO	Base Load Power Hub (BLPH)	CSV 52827 Rev 1 SYSTEM 6A

PREPARAZIONE DELLA SUPERFICIE - Surface preparation

DATA / Date	ORA (DALLE - ALLE) / Hour (From - To)	CLEANING DEGREE *SSPC*	ANCHOR PROFILE *ISO 8503-4*	SALT TEST *ISO 8502-6/9*	DUST TEST *ISO 8502-3*
10/10/2024	08:00 - 12:20	SSPC SP16	FINE G Rz 40,50µm	10,60 mg/m²	CLASS 1

TEMPERATURA AMBIENTE / Air temperature	UMIDITA' RELATIVA / Relative umidity	PUNTO DI RUGIADA / Dew point	TEMPERATURA SUPPORTO / Surface temperature
21°C	66%	14,8°C	21°C

VERNICIATURA - Painting

DATA APPLICAZIONE *Application Date*	10/10/2024	11/10/2024	14/10/2024	//////////
ORA APPLICAZIONE(DALLE - ALLE) *Application Hour (From - To)*	13:25 - 16:50	15:00 - 18:00	09:40 - 12:50	//////////
TEMPERATURA AMBIENTE Air temperature	22°C	21°C	18°C	ELCOMETER 319 TOP SN ZF 29428
UMIDITA' RELATIVA Relative Humidity	54%	66%	53%	ELCOMETER 319 TOP SN ZF 29428
PUNTO DI RUGIADA Dew point	12,4°C	14,8°C	8,4°C	ELCOMETER 319 TOP SN ZF 29428
TEMPERATURA SUPPORTO Surface temperature	22°C	21°C	18°C	ELCOMETER 319 TOP SN ZF 29428
METODO DI APPLICAZIONE Application method	CONVENTIONAL SPRAY	CONVENTIONAL SPRAY	CONVENTIONAL SPRAY	//////////
PRODOTTO VERNICIANTE Paint product / Batch	EPOXY HEMPADUR 15570 224085032-224055078	EPOXY HEMPADUR M. 45880 224026744-223065286	POLYURETHANE HEMPATHANE 55610 224017499-224046936	//////////
COLORE Color	GREY	GREY	RAL 9002	//////////
CONTROLLO FILM UMIDO µm Wet film thickness check	125	150	125	ELCOMETER 3236 S.N. XB04087
D.F.T. RICHIESTO µm D.F.T. required µm	50	100	75	//////////
D.F.T. MEDIO µm D.F.T. average µm	**89**	**243**	**325**	ELCOMETER 456TOP Instrument S.N.: SG00559 Probe S.N.: NF ZC12732
CONTROLLO MEK - Mek test - ASTM D 4752-03	N.A.	N.A.	N.A.	//////////

NOTE / Remarks

* PAINTING APPLICATION AS PER MANUFACTURER INSTRUCTION
* ALL PARTS DEGREASED AS PER SSPC - SP1 BEFORE BLASTING
* BLOTTER TEST AS PER ASTM D4285 SATISFACTORY
* VISUAL TEST AFTER SANDBLASTING AND PAINTING SATISFACTORY

ISPETTORE UNOPRIMA / Unoprima Inspector	ISPETTORE CLIENTE / Customer Inspector	ISPETTORE COMMITTENTE FINALE / Final customer Inspector
DATA - Date	DATA - Date	DATA - Date

CONTROLLO QUALITÀ UNOPRIMA SRL — SALVI - UNOPRIMA NS 476 — FROSIO — cert. 7023

Hempel Paints (Poland) Sp. z o.o.
ul. Modrzewiowa 2,
Niepruszewo
64-320 Buk
Poland

Tel.: +48 58 521 89 00
Fax:
E-mail: general.pl@hempel.com

Batch certificate

Quality	1736U
Base colour	19840
Product delivered	1736U19840
Batch number	044085900
Batch date	23.08.2024
Expiration date	Aug 2025
Page	1 / 1

Product name: Hempadur Avantguard 750 Base

Description	Measured value	Unit	Min	Max
VISC, KU - ASTM D 562	105	KU	90	110
SPECIFIC GRAVITY - ISO 2811-1:2002	2.5100	G/ML	2.4300	2.6300
COLOUR MATCH	E		E	
DRY BKIII - ASTM D 5895-03	1.0000	hr	0.0000	2.0000
SOLIDS WEIGHT	87.39	W%	86.00	90.00
ACQPA	27241			

Hempel Quality Control

IZN Date 15.10.2024

Batch Certificate according to DIN EN 10204 – 3.1

This is to certify that the above material has been manufactured, tested and approved according to procedures given in Hempel Quality Management System approved under ISO 9001; and that it complies with the specifications and approval criteria for the product in question.

Hempel (Portugal) Lda
Vale de Cantadores
2954-002 Palmela
Portugal

Tel.: +351 212 351 022
Fax: +351 212 352 292
E-mail: sales-pt@hempel.com

hempel.pt

Batch certificate

Quality	9588W
Base colour	00000
Product delivered	9588W00000
Batch number	223065286
Batch date	11/07/2023
Expiration date	Jul 2024
Page	1 / 1

Product name: Hempel's Curing Agent 9588W

Description	Measured value	Unit	Min	Max
VISC, KU - ASTM D 562	80.50	...	72.00	88.00
SPECIFIC GRAVITY - ISO 2811-1:2002	0.9700	G/ML	0.9300	1.0000

Hempel Quality Control

CATM Date 15/10/2024

Batch Certificate according to DIN EN 10204 – 3.1

This is to certify that the above material has been manufactured, tested and approved according to procedures given in Hempel Quality Management System approved under ISO 9001; and that it complies with the specifications and approval criteria for the product in question.

Hempel (Portugal) Lda
Vale de Cantadores
2954-002 Palmela
Portugal

Tel.: +351 212 351 022
Fax: +351 212 352 292
E-mail: sales-pt@hempel.com

hempel.pt

Batch certificate

Quality	45889
Base colour	00050
Product delivered	4588900050
Batch number	224026744
Batch date	24/02/2024
Expiration date	Feb 2027
Page	1 / 1

Product name: Hempadur Mastic 45889 Base

Description	Measured value	Unit	Min	Max
VISC, KU - ASTM D 562	110	KU	102	123
SPECIFIC GRAVITY - ISO 2811-1:2002	1.5210	G/ML	1.4600	1.6000
COLOUR MATCH	OK			A

Hempel Quality Control

TG Date 15/10/2024

Batch Certificate according to DIN EN 10204 – 3.1

This is to certify that the above material has been manufactured, tested and approved according to procedures given in Hempel Quality Management System approved under ISO 9001; and that it complies with the specifications and approval criteria for the product in question.

Hempel Paints (Poland) Sp. z o.o.
ul. Modrzewiowa 2,
Niepruszewo
64-320 Buk
Poland

Tel.: +48 58 521 89 00
Fax:
E-mail: general.pl@hempel.com

Batch certificate

Quality	97043
Base colour	00000
Product delivered	9704300000
Batch number	044075619
Batch date	12.07.2024
Expiration date	Jul 2027
Page	1 / 1

Product name: Hempel's Curing Agent 97043

Description	Measured value	Unit	Min	Max
VISC, KU - ASTM D 562	53	KU	45	65
SPECIFIC GRAVITY - ISO 2811-1:2002	0.9420	G/ML	0.9100	0.9700
SOLIDS WEIGHT	45.98	W%	43.00	47.00
ACQPA	27241			

Hempel Quality Control

MARZ Date 15.10.2024

Batch Certificate according to DIN EN 10204 – 3.1

This is to certify that the above material has been manufactured, tested and approved according to procedures given in Hempel Quality Management System approved under ISO 9001; and that it complies with the specifications and approval criteria for the product in question.

Hempel (Portugal) Lda
Vale de Cantadores
2954-002 Palmela
Portugal

Tel.: +351 212 351 022
Fax: +351 212 352 292
E-mail: sales-pt@hempel.com

hempel.pt

Batch certificate

Quality	97050
Base colour	00000
Product delivered	9705000000
Batch number	224046936
Batch date	23/05/2024
Expiration date	May 2026
Page	1 / 1

Product name: Hempel's Curing Agent 97050

Description	Measured value	Unit	Min	Max
SPECIFIC GRAVITY - ISO 2811-1:2002	1.1300	G/ML	1.0800	1.1800
DRY EXTRACT - NF EN ISO 3251	90.0	%	88.3	92.3
ACQPA	35331/37011/37711			

Hempel Quality Control

ANMSO Date 15/10/2024

Batch Certificate according to DIN EN 10204 – 3.1

This is to certify that the above material has been manufactured, tested and approved according to procedures given in Hempel Quality Management System approved under ISO 9001; and that it complies with the specifications and approval criteria for the product in question.

Hempel (Portugal) Lda
Vale de Cantadores
2954-002 Palmela
Portugal

Tel.: +351 212 351 022
Fax: +351 212 352 292
E-mail: sales-pt@hempel.com

hempel.pt

Batch certificate

Quality	15579
Base colour	11320
Product delivered	1557911320
Batch number	224085032
Batch date	07/08/2024
Expiration date	Aug 2027
Page	1 / 1

Product name: Hempadur 15579 Base

Description	Measured value	Unit	Min	Max
VISC, KU - ASTM D 562	98	KU	89	101
SPECIFIC GRAVITY - ISO 2811-1:2002	1.3990	G/ML	1.3300	1.4400
COLOUR MATCH	OK		C	

Hempel Quality Control

SOVA Date 15/10/2024

Batch Certificate according to DIN EN 10204 – 3.1

This is to certify that the above material has been manufactured, tested and approved according to procedures given in Hempel Quality Management System approved under ISO 9001; and that it complies with the specifications and approval criteria for the product in question.

Hempel (Portugal) Lda
Vale de Cantadores
2954-002 Palmela
Portugal

Tel.: +351 212 351 022
Fax: +351 212 352 292
E-mail: sales-pt@hempel.com

hempel.pt

Batch certificate

Quality	55619
Base colour	00050
Product delivered	5561900050
Batch number	224017499
Batch date	10/02/2024
Expiration date	Feb 2027
Page	1 / 1

Product name: Hempathane HS 55619 Base

Description	Measured value	Unit	Min	Max
VISC, KU - ASTM D 562	81	KU	77	93
SPECIFIC GRAVITY - ISO 2811-1:2002	1.3650	G/ML	1.3000	1.4100
COLOUR MATCH	OK			A
GLOSS 60° - ISO 2813:1994	86.00	..	72.00	93.00
ACQPA	35331			

Hempel Quality Control

ANMSO Date 15/10/2024

Batch Certificate according to DIN EN 10204 – 3.1

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Hempel (Portugal) Lda
Vale de Cantadores
2954-002 Palmela
Portugal

Tel.: +351 212 351 022
Fax: +351 212 352 292
E-mail: sales-pt@hempel.com

hempel.pt

Batch certificate

Quality	95570
Base colour	00000
Product delivered	9557000000
Batch number	224055078
Batch date	18/05/2024
Expiration date	May 2027
Page	1 / 1

Product name: Hempel's Curing Agent 95570

Description	Measured value	Unit	Min	Max
VISC, KU - ASTM D 562	83	KU	72	103
SPECIFIC GRAVITY - ISO 2811-1:2002	0.9510	G/ML	0.9300	0.9900
DRY EXTRACT - NF EN ISO 3251	59.5	%	57.5	61.5
ACQPA	26512			

Hempel Quality Control

ANLA Date 15/10/2024

Batch Certificate according to DIN EN 10204 – 3.1

This is to certify that the above material has been manufactured, tested and approved according to procedures given in Hempel Quality Management System approved under ISO 9001; and that it complies with the specifications and approval criteria for the product in question.

Via S. Silvestro, 92
21100 Varese
Tel + 39 0332 213045
212639 - 220185
Fax +39 0332 822553
www.assicontrol.com
e-mail: info@assicontrol.com
C.F. e P.I. 02436670125

STRUMENTI & SERVIZI
per il sistema qualità

Nr. 86990/A/0001/UK/IT
Sistema di Gestione Qualità Assicontrol
certificato secondo la norma ISO 9001:2015

Laboratorio Metrologico

CERTIFICATO DI TARATURA

N° 10194/24

Destinatario: **UNOPRIMA S.r.l.**

Oggetto della taratura: **Conduttivimetro digitale portatile**

Metodo: verifica con soluzioni di valore noto

Utilizzo: misurazione di valori di conducibilità

Modello: **ECTESTR 11+** Matricola: **2568656**

Campo di misura: **0 – 20 mS**

Elettrodo tipo: **incorporato** Matricola: */*

Procedura utilizzata per la verifica: CP031

Data: 25-09-24

Esecuzione attività c/o Assicontrol S.r.l.

Il responsabile di laboratorio: C. Alborghetti firma _____

Procedura di verifica
La procedura utilizzata per effettuare la verifica prevede l'impiego di strumenti e/o campioni primari certificati da centri Accredia o equivalenti riconosciuti a livello internazionale (ove disponibili).
Le verifiche vengono effettuate per confronto diretto o indiretto tra lo strumento/campione in taratura e lo strumento/campione di riferimento primario con l'utilizzo delle attrezzature di supporto.
Si predispone l'oggetto della verifica e gli strumenti/campioni di confronto pronti ad effettuare misurazioni lasciandoli per circa due ore nella camera di prova a temperatura ed umidità controllate. Si effettuano una serie di misure significative annotandole sulla scheda tecnica interna. Si calcola la media aritmetica degli scostamenti rilevati. Si verifica poi la ripetibilità di lettura. Si determina quindi l'incertezza di misura derivante dagli scostamenti rilevati, dalla ripetibilità di lettura, dall'incertezza degli strumenti e/o campioni utilizzati per la prova, da deriva termica, rumore, ove applicabili. Si determina poi l'esito della verifica o la conformità alla normativa di riferimento, se previsti. Alla fine della compilazione della scheda tecnica interna, può essere redatto il documento di verifica. Si appone infine sullo strumento/campione l'etichetta di avvenuta certificazione.

La riproduzione del presente documento è ammessa in copia conforme integrale. La riproduzione parziale è consentita soltanto a seguito di autorizzazione scritta del Centro di emissione del documento.

SCHEDA TECNICA

Verifica rilevazioni conduttivimetro digitale
Tipo: **ECTESTR 11+**
Elettrodo tipo: **incorporato**

matricola: **2568656**
matricola: */*

Procedura: CP031

soluzioni primarie utilizzate:			
Numero lotto	22911119	20106202	20807112
Valore nominale	84.2 uS/cm	1402 uS/cm	12890 uS/cm
Temperatura di riferimento	25 °C	25 °C	25 °C
Certificato P/N	1527889	1528005	1528123
Tracciabilità primaria NIST Standards Reference Material 999b			

Risultati della verifica

Punto	Scala (uS)	Coefficiente cella (K)	valore di riferimento * (uS)	valore letto (uS)	scostamento dal valore nominale (uS)
1	200	/	84,2	86,6	2,4
2	2000	/	1402	1440	38
	(mS)	(K)	(mS)	(mS)	(mS)
3	20,00	/	12,890	13,76	0,870
			Incertezza di misura:	3,61	(% v.l.)

Note: misure effettuate con compensazione termica (*rif. temp. soluz. 25°C). I valori letti sono la media di più misurazioni.

Considerazioni: /

Le incertezze di misura dichiarate in questo documento, associate alle letture effettuate, sono espresse come due volte lo scarto tipo corrispondente, nel caso di distribuzione normale, ad un livello di confidenza di circa 95%.

Le misure sono state effettuate nelle seguenti condizioni ambientali:
Temperatura: 23°C ± 1°C
Umidità: 50% u.r. ± 10% u.r.

Data delle prove: 25-09-24

Tecnico di laboratorio _____

La riproduzione del presente documento è ammessa in copia conforme integrale. La riproduzione parziale è consentita soltanto a seguito di autorizzazione scritta del Centro di emissione del documento.

Calibration Certificate • Certificat d'étalonnage • Kalibrierzertifikat

elcometer®
www.elcometer.com

Elcometer GmbH
Ulmer Straße 68
Aalen
D-73431
Germany

Our Reference:
Notre Référence: 14117
Unser Zeichen:

Customer Reference:
Référence Client: 821965
Kundenreferenz:

Elcometer BV
Ravenswade 150 G & H
3439 LD Nieuwegein
Netherlands

Certificate Number:
Numéro de certificat: 1347
Zertifikat Nummer:

Serial Number:
Numéro de série: ZF29428
Seriennummer des Geräts:

Issue Date:^
Date d'émission: 19/06/2024
Ausstellungsdatum

Part Number:
Code Article d'instrument: G319----T
Artikelnummer des Geräts:

Calibration Date:
Date d'étalonnage: 18/06/2024
Kalibrierdatum:

Model: Elcometer 319 Top Dewpoint Meter
Modèle: Elcometer 319 Mesureur de point de rosée Top certifié
Modell: Elcometer 319 Modell Top Taupunktmessgerät

Measurement Results • Résultats de Mesure • Messergebnisse

Table 1: Air Temperature (Ta) And Relative Humidity (RH)
Table 1: Température de l'air (Ta) et Humidité Relative (HR)
Tabelle 1: Lufttemperatur (Tl) und Relative Feuchtigkeit (RF)

Probe Serial No No Série Sonde Seriennummer der Sonde	Parameter Paramétre Parameter	Units Unités Einheiten	Reference Référence Referenz	Gauge Jauge Messgerät	Difference Différence Unterschied	Tolerance Tolérance Toleranz
FF4FABA4717EFFFF	**RH Low** • Valeur Basse HR • RF Untere	%RH	46.69	48.28	1.59	± 3.00
	Ta Low • Valeur Basse Ta • Tl Untere	°C (°F)	14.99 (59.0)	15.07 (59.1)	0.08 (0.1)	± 0.50 (0.9)
	RH High • Valeur Haute HR • RF Obere	%RH	70.15	69.37	-0.78	± 3.00
	Ta High • Valeur Haute Ta • Tl Obere	°C (°F)	34.89 (94.8)	35.16 (95.3)	0.27 (0.5)	± 0.50 (0.9)

Table 2: Surface Temperature (Ts)
Table 2: Surface Temperature (Ts)
Tabelle 2: Oberflächentemperatur (To)

Probe Serial No No Série Sonde Seriennummer der Sonde	Parameter Paramétre Parameter	Units Unités Einheiten	Reference Référence Referenz	Gauge Jauge Messgerät	Difference Différence Unterschied	Tolerance Tolérance Toleranz
ZF12335	**Ts Low** • Valeur Basse Ts • RF Untere	°C (°F)	15.36 (59.6)	15.05 (59.1)	-0.31 (-0.5)	± 0.50 (0.9)
	Ts High • Valeur Haute Ts • To Obere	°C (°F)	35.01 (95.0)	34.94 (94.9)	-0.07 (-0.1)	± 0.50 (0.9)

Table 3: External Probe Temperature (Te)
Table 3: Température de sonde extérieure (Te)
Tabelle 3: Externe Sondentemperatur (Te)

Probe Serial No No Série Sonde Seriennummer der Sonde	Parameter Paramétre Parameter	Units Unités Einheiten	Reference Référence Referenz	Gauge Jauge Messgerät	Difference Différence Unterschied	Tolerance Tolérance Toleranz
—	**Test 1** • Essai 1 • Prüfung 1	°C (°F)	-40.00 (-40.0)	-40.31 (-40.6)	-0.31 (-0.6)	± 0.50 (0.9)
	Test 2 • Essai 2 • Prüfung 2	°C (°F)	30.00 (86.0)	29.80 (85.6)	-0.20 (-0.4)	± 0.50 (0.9)
	Test 3 • Essai 3 • Prüfung 3	°C (°F)	100.00 (212.0)	99.78 (211.6)	-0.22 (-0.4)	± 0.50 (0.9)
	Test 4 • Essai 4 • Prüfung 4	°C (°F)	200.00 (392.0)	199.80 (391.6)	-0.20 (-0.4)	± 0.50 (0.9)

Calibration Traceability
Traçabilité de calibration
Rückführbarkeit der Kalibrierung

Traceability to National Standards and/or International Standards.
Traçabilité selon les standards nationaux et/ou internationaux
Rückführbarkeit zu Nationalen und/oder internationalen Standards

Equipment Equipement Ausrüstung	Serial Number Numéro de série Seriennummer	Calibration Certificate Certificat de calibration Kalibrierzertifikat
ISOTECH TTI-7	NL01650	2311-08232
Hygroclip2	NL01664	41166
Beamex	NL01651	K026-23E7874

Name:
Nom:
Name: A Smith

Quality Manager • Responsable Qualité • Qualitätsverantwortlicher

ZF29428CC-2

^This Certificate is valid from the Issue Date • Ce certificat est valable à partir de la date d'émission • Das Zertifikat ist gültig ab Erstellungsdatum

Test Certificate

Certificat d'essai • Testzertifikat

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www.elcometer.com

Certificate Number:
Numéro de Certificat:
Bescheinigungsnummer:
456-ZC29693-P

Probe Part Number:
Code Article de la Sonde:
Artikelnummer der Sonde:
T456CFNF1R

Probe Type:
Sonde:
Sondentyp:
Elcometer 456 Dual FNF Probe: Right Angle; Scale 1: 0-1500µm/0-60mils
Elcometer 456 Sonde Dual FNF: Angle Droit; Echelle 1: 0-1500µm/0-60mils
Elcometer 456 Kombi-Sonde FNF: Rechtwinklig; Skala 1: 0-1500µm/0-60mils

Probe Serial Number:
Sonde Numéro de Série:
Seriennummer des Sonden:
ZC29693

Measurement Date:
Date de Mesure:
Maß-datum:
17/04/2023

The probe was calibrated using factory reference gauge Serial Number TG10156, using a smooth calibration, with the factory zero plate and the thickest certified foil listed below in accordance with Elcometer's Certification Procedure.

La Sonde a été étalonné à l'aide d'un étalonnage lisse, en utilisant une jauge de référance (Nr de Série TG10156),une plaque zéro et la feuille d'étalonnage certifié la plus épaisse qui est énumérés ci-dessous, selon les Procédures d'Etalonnage d'Elcometer.

Die Sonde wurde mit einem Referenz-Gerät (Seriennummer TG10156) nach einer glatten Kalibriermethode kalibriert, durch Einsetzen einer Nullplatte und die dickste zertifizierter Folie, die unten aufgelistet ist. Die Kalibriermethode wurde gemäß Elcometer's Zertifizierungsprotokolls.

Measurement Results: Ferrous • Resultats de Mesure: Ferreux • Messergebnisse: Eisenmetall

Foil / Substrate[1] Feuille d'Etalonnage / Substrat[1] Folie / Untergrund[1]			Actual Measured Value[1] Valeur mesurée exacte[1] Aktuelle Messwert[1]			Allowable Value[1] Valeur admissible[1] Zulässigen Wert[1]		
Value • Valeur • Wert		Serial Number[2] Numéro de Série[2] Seriennummer[2]	µm	mils		µm	mils	
µm	mils							
1480.0	58.27	TB07723	1479.8	58.26	±1%	1465.2 - 1494.8	57.69 - 58.85	Pass • Réussi • Bestanden
744.0	29.29	TH11503	748.1	29.45	±3%	721.7 - 766.3	28.41 - 30.17	Pass • Réussi • Bestanden
0.0	0.00	WE16274	0.0	0.00	±1µm	-1.0 - 1.0	-0.04 - 0.04	Pass • Réussi • Bestanden

Measurement Results: Non Ferrous • Resultats de Mesure: Non-Ferreux • Messergebnisse: Nichteisenmetall

Foil / Substrate[1] Feuille d'Etalonnage / Substrat[1] Folie / Untergrund[1]			Actual Measured Value[1] Valeur mesurée exacte[1] Aktuelle Messwert[1]			Allowable Value[1] Valeur admissible[1] Zulässigen Wert[1]		
Value • Valeur • Wert		Serial Number[2] Numéro de Série[2] Seriennummer[2]	µm	mils		µm	mils	
µm	mils							
1480.0	58.27	TB07723	1480.4	58.28	±1%	1465.2 - 1494.8	57.69 - 58.85	Pass • Réussi • Bestanden
744.0	29.29	TH11503	743.2	29.26	±3%	721.7 - 766.3	28.41 - 30.17	Pass • Réussi • Bestanden
0.0	0.00	YF16048	-0.1	-0.01	±1µm	-1.0 - 1.0	-0.04 - 0.04	Pass • Réussi • Bestanden

Signed on behalf of Elcometer Limited • Signé au nom d'Elcometer Limited • Unterzeichnet im Namen Elcometer Limited

Name:
Nom:
Name:
A Smith

Quality Manager • Responsable Qualité • Qualitätsbetriebsleiter

[1] Measurements taken in microns, mils values are calculated using 1µm = 0.03937mil
[1] Les valeurs sont prises en microns. Les valeurs en 'mils' sont calculées en utilisant 1µm = 0.03937mil
[1] Messwerte sind in Microns gezeigt. Um auf „mils" umzurechnen, benutzen Sie 1µm = 0.03937mil

[2] Certificate Number: 54212, 54212
[2] Numéro de Certificat: 54212, 54212
[2] Bescheinigungsnummer: 54212, 54212

Test Certificate

Certificat d'essai • Testzertifikat

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www.elcometer.com

Certificate Number:
Numéro de Certificat:
Bescheinigungsnummer: 456-ZC12732-P

Probe Part Number:
Code Article de la Sonde:
Artikelnummer der Sonde: T456CN1R

Probe Type:
Sonde:
Sondentyp: Elcometer 456 Non Ferrous Probe: Right Angle; Scale 1: 0-1500µm/0-60mils
Elcometer 456 Sonde Non Ferreuse: Angle Droit; Echelle 1: 0-1500µm/0-60mils
Elcometer 456 Sonde für Nicht-Eisen: Rechtwinklig; Skala 1: 0-1500µm/0-60mils

Probe Serial Number:
Sonde Numéro de Série:
Seriennummer des Sonden: ZC12732

Measurement Date:
Date de Mesure:
Maß-datum: 30/03/2023

The probe was calibrated using factory reference gauge Serial Number NA00000, using a smooth calibration, with the factory zero plate and the thickest certified foil listed below in accordance with Elcometer's Certification Procedure.

La Sonde a été étalonné à l'aide d'un étalonnage lisse, en utilisant une jauge de référance (Nr de Série NA00000),une plaque zéro et la feuille d'étalonnage certifié la plus épaisse qui est énumérés ci-dessous, selon les Procédures d'Etalonnage d'Elcometer.

Die Sonde wurde mit einem Referenz-Gerät (Seriennummer NA00000) nach einer glatten Kalibriermethode kalibriert, durch Einsetzen einer Nullplatte und die dickste zertifizierter Folie, die unten aufgelistet ist. Die Kalibriermethode wurde gemäß Elcometer's Zertifizierungsprotokolls.

Measurement Results: Non Ferrous • Resultats de Mesure: Non-Ferreux • Messergebnisse: Nichteisenmetall

Foil / Substrate[1] Feuille d'Etalonnage / Substrat[1] Folie / Untergrund[1]			Actual Measured Value[1] Valeur mesurée exacte[1] Aktuelle Messwert[1]		Allowable Value[1] Valeur admissible[1] Zulässigen Wert[1]			
Value • Valeur • Wert		Serial Number[2] Numéro de Série[2] Seriennummer[2]	µm	mils		µm	mils	
µm	mils							
1487.0	58.54	TB07720	1485.9	58.50	±1%	1472.1 - 1501.9	57.96 - 59.13	Pass • Réussi • Bestanden
741.0	29.17	TA05399	744.1	29.30	±3%	718.8 - 763.2	28.30 - 30.05	Pass • Réussi • Bestanden
0.0	0.00	WF09950	0.0	0.00	±1µm	-1.0 - 1.0	-0.04 - 0.04	Pass • Réussi • Bestanden

Signed on behalf of Elcometer Limited • Signé au nom d'Elcometer Limited • Unterzeichnet im Namen Elcometer Limited

Name:
Nom:
Name: A. Smith

Quality Manager • Responsable Qualité • Qualitätsbetriebsleiter

[1] Measurements taken in microns, mils values are calculated using 1µm = 0.03937mil
[1] Les valeurs sont prises en microns. Les valeurs en 'mils' sont calculées en utilisant 1µm = 0.03937mil
[1] Messwerte sind in Microns gezeigt. Um auf „mils" umzurechnen, benutzen Sie 1µm = 0.03937mil
[2] Certificate Number: 53495
[2] Numéro de Certificat: 53495
[2] Bescheinigungsnummer: 53495

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e.mail: coes@coessrl.com

Sedi operative
24040 STEZZANO – Via Pontida, 265
24040 COMUN NUOVO – Via Europa, 9

HYDROSTATIC TEST CERTIFICATE

Date: 01/10/2024

N°CDC54575

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000428
COES JOB:	166/24
ITEM:	no. 1 vessel
SERIAL NUMBER:	S240119
DRAWING:	1724000428-MAC-DD-00006_01

ACTIVITY	RESULT
VISUAL AND DIMENSIONAL CHECK	POSITIVE
HYDROSTATIC TEST	POSITIVE

NOTE			
TEST MEDIUM: WATER	TEST PRESSURE: 17.2 barg	POSITION: VERTICAL	TEST DURATION: 60 min
TEST PROCEDURE:	1724000428-QC-PRO-00023_03		

PRESSURE GAUGES	RANGE	CALIBRATION EXPIRY
S141	0 ÷ 60 bar	19/01/2025
S137	0 ÷ 60 bar	19/01/2025

NOTES

1/10/24
COES SRL
W R

LUCA DEL CASTELLO
on behalf of CROSSWIND
2024 -10- 01
W ☒ R ☐ M

COES SRL Via Pontida, 265 24040 Stezzano Italy	ASME Quality System

SCHEDA DI TARATURA
CALIBRATION SHEET

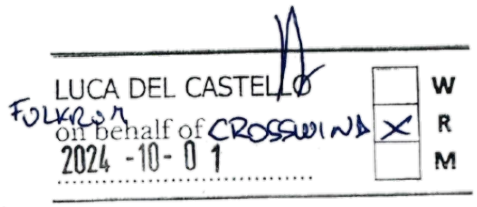
STRUMENTO: MANOMETRO DN 100 **INSTRUMENT:** PRESSURE GAUGE DN100	**CENTRO DI TARATURA:** Termaf **CALIBRATION CENTRE:**
MATRICOLA COES: S141 **COES TAG**:	**CERTIFICATO DI TARATURA:** 494 **CERTIFICATE OF CALIBRATION:**
RANGE: 0 ÷ 60 bar	
ACCURATEZZA MISURA: 1% FS (ERRORE MAX 0,6 bar) **MEASURE ACCURACY:** 1% SPAN (MAX ERROR 0,6 bar)	**SCADENZA TARATURA:** 19/01/2025 **CALIBRATION EXPIRY:** **FREQUENZA DI CALIBRAZIONE:** 1 ANNO **FREQUENCY OF CALIBRATION:** 1 YEAR
CODICE COES: D7547 **COES CODE:**	
	NOTE:
COSTRUTTORE: Tube & Socket (Termaf) **MANUFACTURER:**	

DATA: 19/01/2024
DATE:

FIRMA QCI
QCI SIGNATURA

FIRMA QCM
QCM SIGNATURE





TERMAF
di Gemini G. e Gozzini Obizio snc
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Azienda Certificata ISO EN 9001:2015
TÜV reg. n. 73 100 4283

Rapporto taratura - *Certificate of Calibration* ***N° 494*** ***Pressione -*** *Pressure*

Emesso - Date of issue	**19/01/2024**
Destinatario - Addressee	**COES SRL**
Strumento - Instrument	**Manometro -** Manometer
Modello - Model	**MI/A1**
Matricola - Serial n°	**85335**
Campo di misura - Range	**0 ÷ 60 bar**
Classe di precisione - Accuracy	**1,00%**
Errore max. - Maximum error	**0,6 bar**
Costruttore - Manufacturer	**TERMAF**
Diametro - Diameter	**100**
Attacco - Pivot	**1/2 NPT**
Note	

LUCA DEL CASTELLO
FULKRUM on behalf of CROSSWIND
2024 -10- 01
W X R M

MANOMETRO CAMPIONE - STANDARD MANOMETER
MAN. DIGITALE MOD. LAB DMM N° 935685 CERT. LAT N° 159522P del 22/06/2022 CENTRO LAT N° 093 -

Lettura - Reading in: Bar

PRESSIONE DI RIFERIMENTO REFERENCE PRESSURE	**PRESSIONE INDICATA** INDICATED PRESSURE	**ERRORE DI INDICAZIONE** INDICATION ERROR	**ERRORE ESPRESSO IN %** INDICATION ERROR %
0	0	0	0,00%
10	9,50	-0,5	-0,83%
20	19,50	-0,5	-0,83%
30	29,50	-0,5	-0,83%
40	39,50	-0,5	-0,83%
50	49,50	-0,5	-0,83%
60	60	0	0,00%

Tecnico di laboratorio

Il Resp. di laboratorio

TERMAF STRUMENTAZIONE TERMOMETRICA E MANOMETRICA
DR. ING. GIUSEPPE GEMINI

Gli strumenti di misura utilizzati per la calibratura fanno parte del sistema ciclico di sorveglianza ISO 9001:2015.
The measuring instruments used for the calibration are part of the ISO 9001:2015 cyclic surveillance system.

Le misurazioni indicate nel presente rapporto sono state ottenute seguendo le nostre procedure elaborate in conformità alla ISO IEC 17025 e su richiesta possono essere prese in visione presso il nostro laboratorio.
The measuments stated in this report have been obtained following our procedures, carried out according to the ISO IEC 17025 Regulation and upon request they can be examined in our laboratory.

I dati riportati nel presente certificato sono da ritenersi validi con lo strumento nelle condizioni ambientali in cui è stata effettuata la taratura.
The data printed in this certificate are to be considered valid at the time of the ambience conditions in which the instrument has been calibrated.

CONDIZIONI AMBIENTALI - AMBIENCE CALIBRATION CONDITIONS
Temperatura ambiente - Ambience temperature: 23°C ± 3°C U.R. - R.H.: 60% ± 10%

COES SRL Via Pontida, 265 24040 Stezzano Italy	ASME Quality System

SCHEDA DI TARATURA
CALIBRATION SHEET

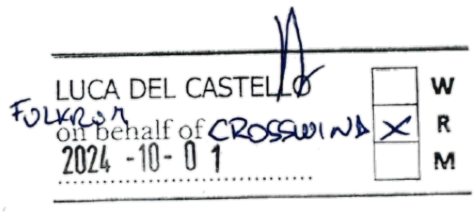
STRUMENTO: MANOMETRO DN 100 **INSTRUMENT:** PRESSURE GAUGE DN100	**CENTRO DI TARATURA:** Termaf **CALIBRATION CENTRE:**
MATRICOLA COES: S137 **COES TAG**:	**CERTIFICATO DI TARATURA:** 490 **CERTIFICATE OF CALIBRATION:**
RANGE: 0 ÷ 60 bar	
ACCURATEZZA MISURA: 1% FS (ERRORE MAX 0,6 bar) **MEASURE ACCURACY:** 1% SPAN (MAX ERROR 0,6 bar)	**SCADENZA TARATURA:** 19/01/2025 **CALIBRATION EXPIRY:** **FREQUENZA DI CALIBRAZIONE:** 1 ANNO **FREQUENCY OF CALIBRATION:** 1 YEAR
CODICE COES: D7547 **COES CODE:**	
COSTRUTTORE: Tube & Socket (Termaf) **MANUFACTURER:**	**NOTE:**

DATA: 19/01/2024
DATE:

FIRMA QCI
QCI SIGNATURA

FIRMA QCM
QCM SIGNATURE





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TÜV reg. n. 73 100 4283

Rapporto taratura - *Certificate of Calibration* ***N° 490*** ***Pressione -*** *Pressure*

Emesso - Date of issue	**19/01/2024**
Destinatario - Addressee	**COES SRL**
Strumento - Instrument	**Manometro -** Manometer
Modello - Model	**MI/A1**
Matricola - Serial n°	**85302**
Campo di misura - Range	**0 ÷ 60 bar**
Classe di precisione - Accuracy	**1,00%**
Errore max. - Maximum error	**0,6 bar**
Costruttore - Manufacturer	**TERMAF**
Diametro - Diameter	**100**
Attacco - Pivot	**1/2 NPT**
Note	

LUCA DEL CASTELLO
on behalf of CROSSWIND
2024-10-01
W R M

MANOMETRO CAMPIONE - STANDARD MANOMETER
MAN. DIGITALE MOD. LAB DMM N° 935685 CERT. LAT N° 159522P del 22/06/2022 CENTRO LAT N° 093 -

Lettura - Reading in: Bar

PRESSIONE DI RIFERIMENTO REFERENCE PRESSURE	**PRESSIONE INDICATA** INDICATED PRESSURE	**ERRORE DI INDICAZIONE** INDICATION ERROR	**ERRORE ESPRESSO IN %** INDICATION ERROR %
0	0	0	0,00%
10	9,50	-0,5	-0,83%
20	19,50	-0,5	-0,83%
30	29,50	-0,5	-0,83%
40	39,50	-0,5	-0,83%
50	49,50	-0,5	-0,83%
60	59,50	-0,5	-0,83%

Tecnico di laboratorio

Il Resp. di laboratorio

TERMAF STRUMENTAZIONE TERMOMETRICA E MANOMETRICA
DR. ING. GIUSEPPE GEMINI

Gli strumenti di misura utilizzati per la calibratura fanno parte del sistema ciclico di sorveglianza ISO 9001:2015.
The measuring instruments used for the calibration are part of the ISO 9001:2015 cyclic surveillance system.

Le misurazioni indicate nel presente rapporto sono state ottenute seguendo le nostre procedure elaborate in conformità alla ISO IEC 17025 e su richiesta possono essere prese in visione presso il nostro laboratorio.
The measuments stated in this report have been obtained following our procedures, carried out according to the ISO IEC 17025 Regulation and upon request they can be examined in our laboratory.

I dati riportati nel presente certificato sono da ritenersi validi con lo strumento nelle condizioni ambientali in cui è stata effettuata la taratura.
The data printed in this certificate are to be considered valid at the time of the ambience conditions in which the instrument has been calibrated.

CONDIZIONI AMBIENTALI - AMBIENCE CALIBRATION CONDITIONS
Temperatura ambiente - Ambience temperature: 23°C ± 3°C U.R. - R.H.: 60% ± 10%

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24040 COMUN NUOVO – Via Europa, 9

HYDROSTATIC TEST CERTIFICATE

Date: 10/10/2024 **N°CDC54726**

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000428
COES JOB:	166/24
ITEM:	no. 4 vessels
SERIAL NUMBER:	S240123 – S240124 – S240125 – S240126
DRAWING:	CCO54156

ACTIVITY	RESULT
VISUAL AND DIMENSIONAL CHECK	POSITIVE
HYDROSTATIC TEST	POSITIVE

NOTE			
TEST MEDIUM: WATER	TEST PRESSURE: 17.2 barg	POSITION: HORIZONTAL	TEST DURATION: 60 min
TEST PROCEDURE:	1724000428-QC-PRO-00023_03		

PRESSURE GAUGES	RANGE	CALIBRATION EXPIRY
S133	0÷40 bar	10/11/2024
S134	0÷40 bar	10/11/2024
S131	0÷40 bar	10/11/2024
S132	0÷40 bar	10/11/2024

NOTES

10/10/24
COES SRL
☒W ☐R

LUCA DEL CASTELLO
FOLKRUM on behalf of CROSSOVER
2024-10-10
☑ W ☐ R ☐ M

COES SRL Via Pontida, 265 24040 Stezzano Italy	**ASME Quality System**

SCHEDA DI TARATURA
CALIBRATION SHEET

STRUMENTO: MANOMETRO DN 100 **INSTRUMENT:** PRESSURE GAUGE DN 100	**CENTRO DI TARATURA:** Termaf **CALIBRATION CENTRE:**
MATRICOLA COES: S133 **COES TAG:**	**CERTIFICATO DI TARATURA:** 4777 **CERTIFICATE OF CALIBRATION:**
RANGE: 0÷40 bar	**SCADENZA TARATURA:** 10/11/2024 **CALIBRATION EXPIRY:**
ACCURATEZZA MISURA: 1% FS (ERRORE MAX 0,4 bar) **MEASURE ACCURACY:** 1% SPAN (MAX ERROR 0,4 bar)	**FREQUENZA DI CALIBRAZIONE:** 1 ANNO **FREQUENCY OF CALIBRATION:** 1 YEAR
CODICE COES: C3734 **COES CODE:**	**NOTE:**
COSTRUTTORE: TUBE & SOCKET (Termaf) **MANUFACTURER:** **Serial number: 70208**	

DATA: 10/11/2023
DATE:

FIRMA CQ
CQ SIGNATURE

FIRMA RGQ
RGQ SIGNATURE

LUCA DEL CASTELLO
FULKRUM
on behalf of CROSSOVER
2024 -10- 10

W
R ✓
M

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di Gemini G. e Gozzini Obizio snc
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TÜV reg. n. 73 100 4263

Rapporto taratura - Certificate of Calibration N° 4777 *Pressione - Pressure*

Emesso - Date of issue	**10/11/2023**
Destinatario - Addressee	**COES SRL**
Strumento - Instrument	**Manometro** - Manometer
Modello - Model	**MI/A1**
Matricola - Serial n°	**70208**
Campo di misura - Range	**0 ÷ 40 bar**
Classe di precisione - Accuracy	**1,00%**
Errore max. - Maximum error	**0,4 bar**
Costruttore - Manufacturer	**TERMAF**
Diametro - Diameter	**100**
Attacco - Pivot	**1/2 NPT**
Note	

LUCA DEL CASTELLO
on behalf of COESSRL
2024 -10- 10
W [ ] R [X] M [ ]

MANOMETRO CAMPIONE - STANDARD MANOMETER
MAN. DIGITALE MOD. LAB DMM N° 609633 CERT. LAT N° 1716-22 del 05/05/2022 CENTRO LAT N° 238 -

Lettura - Reading in: Bar

PRESSIONE DI RIFERIMENTO REFERENCE PRESSURE	PRESSIONE INDICATA INDICATED PRESSURE	ERRORE DI INDICAZIONE INDICATION ERROR	ERRORE ESPRESSO IN % INDICATION ERROR %
0	0	0	0,00%
10	10	0	0,00%
20	20	0	0,00%
30	30	0	0,00%
40	40,20	0,2	0,50%

Tecnico di laboratorio

Il Resp. di laboratorio

STRUMENTAZIONE TERMOMETRICA E MANOMETRICA * TERMAF
DR. ING. GIUSEPPE GEMINI

Gli strumenti di misura utilizzati per la calibratura fanno parte del sistema ciclico di sorveglianza ISO 9001:2015.
The measuring instruments used for the calibration are part of the ISO 9001:2015 cyclic surveillance system.

Le misurazioni indicate nel presente rapporto sono state ottenute seguendo le nostre procedure elaborate in conformità alla ISO IEC 17025 e su richiesta possono essere prese in visione presso il nostro laboratorio.
The measuments stated in this report have been obtained following our procedures, carried out according to the ISO IEC 17025 Regulation and upon request they can be examined in our laboratory.

I dati riportati nel presente certificato sono da ritenersi validi con lo strumento nelle condizioni ambientali in cui è stata effettuata la taratura.
The data printed in this certificate are to be considered valid at the time of the ambience conditions in which the instrument has been calibrated.

CONDIZIONI AMBIENTALI - AMBIENCE CALIBRATION CONDITIONS
Temperatura ambiente - Ambience temperature: 23°C ± 3°C U.R. - R.H.: 60% ± 10%

COES SRL Via Pontida, 265 24040 Stezzano Italy	**ASME Quality System**

SCHEDA DI TARATURA
CALIBRATION SHEET

STRUMENTO: MANOMETRO DN 100 **INSTRUMENT:** PRESSURE GAUGE DN 100	**CENTRO DI TARATURA:** Termaf **CALIBRATION CENTRE:**
MATRICOLA COES: S134 **COES TAG:**	**CERTIFICATO DI TARATURA:** 4778 **CERTIFICATE OF CALIBRATION:**
RANGE: 0÷40 bar	**SCADENZA TARATURA:** 10/11/2024 **CALIBRATION EXPIRY:**
ACCURATEZZA MISURA: 1% FS (ERRORE MAX 0,4 bar) **MEASURE ACCURACY:** 1% SPAN (MAX ERROR 0,4 bar)	**FREQUENZA DI CALIBRAZIONE:** 1 ANNO **FREQUENCY OF CALIBRATION:** 1 YEAR
CODICE COES: C3734 **COES CODE:**	**NOTE:**
COSTRUTTORE: TUBE & SOCKET (Termaf) **MANUFACTURER:** **Serial number: 70230**	

DATA: 10/11/2023
DATE:

FIRMA CQ
CQ SIGNATURE

FIRMA RGQ
RGQ SIGNATURE

LUCA DEL CASTELLO
FULKRUM on behalf of CROSSWIND
2024-10-10

W
R
M

TERMAF
di Gemini G. e Gozzini Obizio snc
Via Cà Treviglio, 1/3 Pontirolo Nuovo (BG)
Tel. 0363/880123 Fax. 0363/881133 - 330891
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Azienda Certificata ISO EN 9001:2015
TÜV reg. n. 73 100 4263

Rapporto taratura - Certificate of Calibration **N° 4778** ***Pressione - Pressure***

Emesso - Date of issue	**10/11/2023**
Destinatario - Addressee	**COES SRL**
Strumento - Instrument	**Manometro** - Manometer
Modello - Model	**MI/A1**
Matricola - Serial n°	**70230**
Campo di misura - Range	**0 ÷ 40 bar**
Classe di precisione - Accuracy	**1,00%**
Errore max. - Maximum error	**0,4 bar**
Costruttore - Manufacturer	**TERMAF**
Diametro - Diameter	**100**
Attacco - Pivot	**1/2 NPT**
Note	

LUCA DEL CASTELLO
on behalf of CROSSWIND
2024.10.10
W X R M

MANOMETRO CAMPIONE - STANDARD MANOMETER
MAN. DIGITALE MOD. LAB DMM N° 609633 CERT. LAT N° 1716-22 del 05/05/2022 CENTRO LAT N° 238 -

Lettura - Reading in: Bar

PRESSIONE DI RIFERIMENTO REFERENCE PRESSURE	PRESSIONE INDICATA INDICATED PRESSURE	ERRORE DI INDICAZIONE INDICATION ERROR	ERRORE ESPRESSO IN % INDICATION ERROR %
0	0	0	0,00%
10	10	0	0,00%
20	19,90	-0,1	-0,25%
30	29,90	-0,1	-0,25%
40	40	0	0,00%

Tecnico di laboratorio

Il Resp. di laboratorio

STRUMENTAZIONE TERMOMETRICA E MANOMETRICA TERMAF
DR. ING. GIUSEPPE GEMINI

Gli strumenti di misura utilizzati per la calibratura fanno parte del sistema ciclico di sorveglianza ISO 9001:2015.
The measuring instruments used for the calibration are part of the ISO 9001:2015 cyclic surveillance system.

Le misurazioni indicate nel presente rapporto sono state ottenute seguendo le nostre procedure elaborate in conformità alla ISO IEC 17025 e su richiesta possono essere prese in visione presso il nostro laboratorio.
The measuments stated in this report have been obtained following our procedures, carried out according to the ISO IEC 17025 Regulation and upon request they can be examined in our laboratory.

I dati riportati nel presente certificato sono da ritenersi validi con lo strumento nelle condizioni ambientali in cui è stata effettuata la taratura.
The data printed in this certificate are to be considered valid at the time of the ambience conditions in which the instrument has been calibrated.

CONDIZIONI AMBIENTALI - AMBIENCE CALIBRATION CONDITIONS
Temperatura ambiente - Ambience temperature: 23°C ± 3°C U.R. - R.H.: 60% ± 10%

COES SRL Via Pontida, 265 24040 Stezzano Italy	**ASME Quality System**

SCHEDA DI TARATURA
CALIBRATION SHEET

STRUMENTO: MANOMETRO DN 100 **INSTRUMENT:** PRESSURE GAUGE DN 100	**CENTRO DI TARATURA:** Termaf **CALIBRATION CENTRE:**
MATRICOLA COES: S131 **COES TAG:**	**CERTIFICATO DI TARATURA:** 4775 **CERTIFICATE OF CALIBRATION:**
RANGE: 0÷40 bar	**SCADENZA TARATURA:** 10/11/2024 **CALIBRATION EXPIRY:**
ACCURATEZZA MISURA: 1% FS (ERRORE MAX 0,4 bar) **MEASURE ACCURACY:** 1% SPAN (MAX ERROR 0,4 bar)	**FREQUENZA DI CALIBRAZIONE:** 1 ANNO **FREQUENCY OF CALIBRATION:** 1 YEAR
CODICE COES: C3734 **COES CODE:**	**NOTE:**
COSTRUTTORE: TUBE & SOCKET (Termaf) **MANUFACTURER:** **Serial number: 70196**	

DATA: 10/11/2023
DATE:

FIRMA CQ
CQ SIGNATURE

FIRMA RGQ
RGQ SIGNATURE

LUCA DEL CASTELLO
FULKRUM
on behalf of CROSSWIND

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2024 -10- 10

TERMAF
di Gemini G. e Gozzini Obizio snc
Via Cà Treviglio, 1/3 Pontirolo Nuovo (BG)
Tel. 0363/880123 Fax. 0363/881133 - 330891
www.termaf.it info@termaf.it
Azienda Certificata ISO EN 9001:2015
TÜV reg. n. 73 100 4283

Rapporto taratura - Certificate of Calibration N° 4775 *Pressione - Pressure*

Emesso - Date of issue	**10/11/2023**
Destinatario - Addressee	**COES SRL**
Strumento - Instrument	**Manometro** - Manometer
Modello - Model	**MI/A1**
Matricola - Serial n°	**70196**
Campo di misura - Range	**0 ÷ 40** bar
Classe di precisione - Accuracy	**1,00%**
Errore max. - Maximum error	**0,4 bar**
Costruttore - Manufacturer	**TERMAF**
Diametro - Diameter	**100**
Attacco - Pivot	**1/2 NPT**
Note	

LUCA DEL CASTELLO
Fouksman on behalf of CROSSO.NA
2024-10-10
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MANOMETRO CAMPIONE - STANDARD MANOMETER
MAN. DIGITALE MOD. LAB DMM N° 609633 CERT. LAT N° 1716-22 del 05/05/2022 CENTRO LAT N° 238 -

Lettura - Reading in: Bar

PRESSIONE DI RIFERIMENTO REFERENCE PRESSURE	PRESSIONE INDICATA INDICATED PRESSURE	ERRORE DI INDICAZIONE INDICATION ERROR	ERRORE ESPRESSO IN % INDICATION ERROR %
0	0	0	0,00%
10	10	0	0,00%
20	20	0	0,00%
30	30,20	0,2	0,50%
40	40,40	0,4	1,00%

Tecnico di laboratorio

Il Resp. di laboratorio

STRUMENTAZIONE TERMOMETRICA E MANOMETRICA
DR. ING. GIUSEPPE GEMINI

Gli strumenti di misura utilizzati per la calibratura fanno parte del sistema ciclico di sorveglianza ISO 9001:2015.
The measuring instruments used for the calibration are part of the ISO 9001:2015 cyclic surveillance system.

Le misurazioni indicate nel presente rapporto sono state ottenute seguendo le nostre procedure elaborate in conformità alla ISO IEC 17025 e su richiesta possono essere prese in visione presso il nostro laboratorio.
The measuments stated in this report have been obtained following our procedures, carried out according to the ISO IEC 17025 Regulation and upon request they can be examined in our laboratory.

I dati riportati nel presente certificato sono da ritenersi validi con lo strumento nelle condizioni ambientali in cui è stata effettuata la taratura.
The data printed in this certificate are to be considered valid at the time of the ambience conditions in which the instrument has been calibrated.

CONDIZIONI AMBIENTALI - AMBIENCE CALIBRATION CONDITIONS
Temperatura ambiente - Ambience temperature: 23°C ± 3°C U.R. - R.H.: 60% ± 10%

COES SRL Via Pontida, 265 24040 Stezzano Italy	**ASME Quality System**

SCHEDA DI TARATURA
CALIBRATION SHEET

STRUMENTO: MANOMETRO DN 100 **INSTRUMENT:** PRESSURE GAUGE DN 100	**CENTRO DI TARATURA:** Termaf **CALIBRATION CENTRE:**
MATRICOLA COES: S132 **COES TAG:**	**CERTIFICATO DI TARATURA:** 4776 **CERTIFICATE OF CALIBRATION:**
RANGE: 0÷40 bar	**SCADENZA TARATURA:** 10/11/2024 **CALIBRATION EXPIRY:**
ACCURATEZZA MISURA: 1% FS (ERRORE MAX 0,4 bar) **MEASURE ACCURACY:** 1% SPAN (MAX ERROR 0,4 bar)	**FREQUENZA DI CALIBRAZIONE:** 1 ANNO **FREQUENCY OF CALIBRATION:** 1 YEAR
CODICE COES: C3734 **COES CODE:**	**NOTE:**
COSTRUTTORE: TUBE & SOCKET (Termaf) **MANUFACTURER:** **Serial number: 70197**	

DATA: 10/11/2023
DATE:

FIRMA CQ
CQ SIGNATURE

FIRMA RGQ
RGQ SIGNATURE

LUCA DEL CASTELLO
FULVIO on behalf of CROSSWIND
2024-10-10

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TERMAF
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TÜV reg. n. 73 100 4283

Rapporto taratura - Certificate of Calibration N° 4776 ***Pressione - Pressure***

Emesso - Date of issue	**10/11/2023**
Destinatario - Addressee	**COES SRL**
Strumento - Instrument	**Manometro** - Manometer
Modello - Model	**MVA1**
Matricola - Serial n°	**70197**
Campo di misura - Range	**0 ÷ 40** **bar**
Classe di precisione - Accuracy	**1,00%**
Errore max. - Maximum error	**0,4 bar**
Costruttore - Manufacturer	**TERMAF**
Diametro - Diameter	**100**
Attacco - Pivot	**1/2 NPT**
Note	

LUCA DEL CASTELLO
Fovm on behalf of CROSSERVIS
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MANOMETRO CAMPIONE - STANDARD MANOMETER
MAN. DIGITALE MOD. LAB DMM N° 609633 CERT. LAT N° 1716-22 del 05/05/2022 CENTRO LAT N° 238 -

Lettura - Reading in: Bar

PRESSIONE DI RIFERIMENTO REFERENCE PRESSURE	PRESSIONE INDICATA INDICATED PRESSURE	ERRORE DI INDICAZIONE INDICATION ERROR	ERRORE ESPRESSO IN % INDICATION ERROR %
0	0	0	0,00%
10	10	0	0,00%
20	20,20	0,2	0,50%
30	30,20	0,2	0,50%
40	40,10	0,1	0,25%

Tecnico di laboratorio

Il Resp. di laboratorio

STRUMENTAZIONE TERMOMETRICA E MANOMETRICA
DR. ING. GIUSEPPE GEMINI

Gli strumenti di misura utilizzati per la calibratura fanno parte del sistema ciclico di sorveglianza ISO 9001:2015.
The measuring instruments used for the calibration are part of the ISO 9001:2015 cyclic surveillance system.

Le misurazioni indicate nel presente rapporto sono state ottenute seguendo le nostre procedure elaborate in conformità alla ISO IEC 17025 e su richiesta possono essere prese in visione presso il nostro laboratorio.
The measuments stated in this report have been obtained following our procedures, carried out according to the ISO IEC 17025 Regulation and upon request they can be examined in our laboratory.

I dati riportati nel presente certificato sono da ritenersi validi con lo strumento nelle condizioni ambientali in cui è stata effettuata la taratura.
The data printed in this certificate are to be considered valid at the time of the ambience conditions in which the instrument has been calibrated.

CONDIZIONI AMBIENTALI - AMBIENCE CALIBRATION CONDITIONS
Temperatura ambiente - Ambience temperature: 23°C ± 3°C U.R. - R.H.: 60% ± 10%

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Sedi operative
24040 STEZZANO – Via Pontida, 265
24040 COMUN NUOVO – Via Europa, 9

HYDROSTATIC TEST CERTIFICATE

Date: 10/10/2024 **N°CDC54728-A**

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000428
COES JOB:	166/24
ITEM:	no. 4 FILTERS
SERIAL NUMBER:	S240121 – S240122 – S240127 – S240128
DRAWING:	CCO54155

ACTIVITY	RESULT
VISUAL AND DIMENSIONAL CHECK	POSITIVE
HYDROSTATIC TEST	POSITIVE

NOTE			
TEST MEDIUM: WATER	TEST PRESSURE: 17.2 barg	POSITION: HORIZONTAL	TEST DURATION: 60 min
TEST PROCEDURE:	1724000428-QC-PRO-00023_03		
PRESSURE GAUGES	RANGE	CALIBRATION EXPIRY	
S133	0÷40 bar	10/11/2024	
S134	0÷40 bar	10/11/2024	

NOTES

10/10/24
COES SRL
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LUCA DEL CASTELLO
on behalf of CROSSWIND
2024 -10- 10

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e.mail: coes@coessrl.com

Sedi operative
24040 STEZZANO – Via Pontida, 265
24040 COMUN NUOVO – Via Europa, 9

HYDROSTATIC TEST CERTIFICATE

Date: 10/10/2024 **N°CDC54728-B**

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000428
COES JOB:	166/24
ITEM:	no. 4 FILTERS
SERIAL NUMBER:	S240122
DRAWING:	CCO54155

ACTIVITY	RESULT
VISUAL AND DIMENSIONAL CHECK	POSITIVE
HYDROSTATIC TEST	POSITIVE

NOTE			
TEST MEDIUM: WATER	TEST PRESSURE: 17.2 barg	POSITION: HORIZONTAL	TEST DURATION: 60 min
TEST PROCEDURE:	1724000428-QC-PRO-00023_03		

PRESSURE GAUGES	RANGE	CALIBRATION EXPIRY
S133	0÷40 bar	10/11/2024
S134	0÷40 bar	10/11/2024

NOTES

10/10/24
COES SRL
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LUCA DEL CASTELLO
FOLKRA on behalf of CROSSWIND
2024 -10- 10
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Sedi operative
24040 STEZZANO – Via Pontida, 265
24040 COMUN NUOVO – Via Europa, 9

HYDROSTATIC TEST CERTIFICATE

Date: 10/10/2024

N°CDC54728-C

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000428
COES JOB:	166/24
ITEM:	no. 4 FILTERS
SERIAL NUMBER:	S240127
DRAWING:	CCO54155

ACTIVITY	RESULT
VISUAL AND DIMENSIONAL CHECK	POSITIVE
HYDROSTATIC TEST	POSITIVE

NOTE			
TEST MEDIUM: WATER	TEST PRESSURE: 17.2 barg	POSITION: HORIZONTAL	TEST DURATION: 60 min
TEST PROCEDURE:	1724000428-QC-PRO-00023_03		

PRESSURE GAUGES	RANGE	CALIBRATION EXPIRY
S133	0÷40 bar	10/11/2024
S134	0÷40 bar	10/11/2024

NOTES

10/10/24 COES SRL W R		LUCA DEL CASTELLO on behalf of CROSSWIND 2024-10-10 W R M

COES Srl
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tel +39 035 2050 511
e.mail: coes@coessrl.com

Sedi operative
24040 STEZZANO – Via Pontida, 265
24040 COMUN NUOVO – Via Europa, 9

HYDROSTATIC TEST CERTIFICATE

Date: 10/10/2024 **N°CDC54728-D**

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000428
COES JOB:	166/24
ITEM:	no. 4 FILTERS
SERIAL NUMBER:	S240128
DRAWING:	CCO54155

ACTIVITY	RESULT
VISUAL AND DIMENSIONAL CHECK	POSITIVE
HYDROSTATIC TEST	POSITIVE

NOTE			
TEST MEDIUM: WATER	TEST PRESSURE: 17.2 barg	POSITION: HORIZONTAL	TEST DURATION: 60 min
TEST PROCEDURE:	1724000428-QC-PRO-00023_03		

PRESSURE GAUGES	RANGE	CALIBRATION EXPIRY
S133	0÷40 bar	10/11/2024
S134	0÷40 bar	10/11/2024

NOTES

10/10/24 COES SRL W R		LUCA DEL CASTELLO on behalf of CROSSWIND 2024-10-10 W R M

COES SRL Via Pontida, 265 24040 Stezzano Italy	**ASME Quality System**

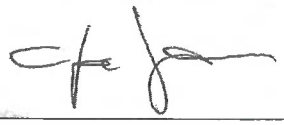
SCHEDA DI TARATURA
CALIBRATION SHEET

STRUMENTO: MANOMETRO DN 100 **INSTRUMENT:** PRESSURE GAUGE DN 100	**CENTRO DI TARATURA:** Termaf **CALIBRATION CENTRE:**
MATRICOLA COES: S134 **COES TAG:**	**CERTIFICATO DI TARATURA:** 4778 **CERTIFICATE OF CALIBRATION:**
RANGE: 0÷40 bar	**SCADENZA TARATURA:** 10/11/2024 **CALIBRATION EXPIRY:**
ACCURATEZZA MISURA: 1% FS (ERRORE MAX 0,4 bar) **MEASURE ACCURACY:** 1% SPAN (MAX ERROR 0,4 bar)	**FREQUENZA DI CALIBRAZIONE:** 1 ANNO **FREQUENCY OF CALIBRATION:** 1 YEAR
CODICE COES: C3734 **COES CODE:**	**NOTE:**
COSTRUTTORE: TUBE & SOCKET (Termaf) **MANUFACTURER:** **Serial number: 70230**	

DATA: 10/11/2023
DATE:

FIRMA CQ
CQ SIGNATURE

FIRMA RGQ
RGQ SIGNATURE



LUCA DEL CASTELLO
FOLKAM
on behalf of CROSSOVER
2024-10-10

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TERMAF
di Gemini G. e Gozzini Obizio snc
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Tel. 0363/880123 Fax. 0363/881133 - 330891
www.termaf.it info@termaf.it
Azienda Certificata ISO EN 9001:2015
TÜV reg. n. 73 100 4283

Rapporto taratura - Certificate of Calibration **N° 4778** ***Pressione - Pressure***

Emesso - Date of issue	**10/11/2023**
Destinatario - Addressee	**COES SRL**
Strumento - Instrument	**Manometro** - Manometer
Modello - Model	**MI/A1**
Matricola - Serial n°	**70230**
Campo di misura - Range	**0 ÷ 40 bar**
Classe di precisione - Accuracy	**1,00%**
Errore max. - Maximum error	**0,4 bar**
Costruttore - Manufacturer	**TERMAF**
Diametro - Diameter	**100**
Attacco - Pivot	**1/2 NPT**
Note	

LUCA DEL CASTELLO
Fulvio on behalf of Grossoni
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MANOMETRO CAMPIONE - STANDARD MANOMETER
MAN. DIGITALE MOD. LAB DMM N° 609633 CERT. LAT N° 1716-22 del 05/05/2022 CENTRO LAT N° 238 -

Lettura - Reading in: Bar

PRESSIONE DI RIFERIMENTO REFERENCE PRESSURE	PRESSIONE INDICATA INDICATED PRESSURE	ERRORE DI INDICAZIONE INDICATION ERROR	ERRORE ESPRESSO IN % INDICATION ERROR %
0	0	0	0,00%
10	10	0	0,00%
20	19,90	-0,1	-0,25%
30	29,90	-0,1	-0,25%
40	40	0	0,00%

Tecnico di laboratorio

Il Resp. di laboratorio

STRUMENTAZIONE TERMOMETRICA E MECCANICA
DR. ING. GIUSEPPE GEMINI

Gli strumenti di misura utilizzati per la calibratura fanno parte del sistema ciclico di sorveglianza ISO 9001:2015.
The measuring instruments used for the calibration are part of the ISO 9001:2015 cyclic surveillance system.

Le misurazioni indicate nel presente rapporto sono state ottenute seguendo le nostre procedure elaborate in conformità alla ISO IEC 17025 e su richiesta possono essere prese in visione presso il nostro laboratorio.
The measuments stated in this report have been obtained following our procedures, carried out according to the ISO IEC 17025 Regulation and upon request they can be examined in our laboratory.

I dati riportati nel presente certificato sono da ritenersi validi con lo strumento nelle condizioni ambientali in cui è stata effettuata la taratura.
The data printed in this certificate are to be considered valid at the time of the ambience conditions in which the instrument has been calibrated.

CONDIZIONI AMBIENTALI - AMBIENCE CALIBRATION CONDITIONS
Temperatura ambiente - Ambience temperature: 23°C ± 3°C U.R. - R.H.: 60% ± 10%

COES SRL Via Pontida, 265 24040 Stezzano Italy	**ASME Quality System**

SCHEDA DI TARATURA
CALIBRATION SHEET

STRUMENTO: MANOMETRO DN 100 **INSTRUMENT:** PRESSURE GAUGE DN 100	**CENTRO DI TARATURA:** Termaf **CALIBRATION CENTRE:**
MATRICOLA COES: S133 **COES TAG:**	**CERTIFICATO DI TARATURA:** 4777 **CERTIFICATE OF CALIBRATION:**
RANGE: 0÷40 bar	**SCADENZA TARATURA:** 10/11/2024 **CALIBRATION EXPIRY:**
ACCURATEZZA MISURA: 1% FS (ERRORE MAX 0,4 bar) **MEASURE ACCURACY:** 1% SPAN (MAX ERROR 0,4 bar)	**FREQUENZA DI CALIBRAZIONE:** 1 ANNO **FREQUENCY OF CALIBRATION:** 1 YEAR
CODICE COES: C3734 **COES CODE:**	**NOTE:**
COSTRUTTORE: TUBE & SOCKET (Termaf) **MANUFACTURER:** **Serial number: 70208**	

DATA: 10/11/2023
DATE:

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FIRMA RGQ
RGQ SIGNATURE

LUCA DEL CASTELLO
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on behalf of CROSSWIND
2024-10-10

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TERMAF
di Gemini G. e Gozzini Obizio snc
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Tel. 0363/880123 Fax. 0363/881133 - 330891
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Azienda Certificata ISO EN 9001:2015
TÜV reg. n. 73 100 4283

Rapporto taratura - Certificate of Calibration **N° 4777** ***Pressione - Pressure***

Emesso - Date of issue	**10/11/2023**
Destinatario - Addressee	**COES SRL**
Strumento - Instrument	**Manometro** - Manometer
Modello - Model	**MI/A1**
Matricola - Serial n°	**70208**
Campo di misura - Range	**0 ÷ 40** **bar**
Classe di precisione - Accuracy	**1,00%**
Errore max. - Maximum error	**0,4 bar**
Costruttore - Manufacturer	**TERMAF**
Diametro - Diameter	**100**
Attacco - Pivot	**1/2 NPT**
Note	

LUCA DEL CASTELLO
on behalf of COESSRL
2024 -10- 10

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MANOMETRO CAMPIONE - STANDARD MANOMETER
MAN. DIGITALE MOD. LAB DMM N° 609633 CERT. LAT N° 1716-22 del 05/05/2022 CENTRO LAT N° 238 -

Lettura - Reading in: Bar

PRESSIONE DI RIFERIMENTO REFERENCE PRESSURE	PRESSIONE INDICATA INDICATED PRESSURE	ERRORE DI INDICAZIONE INDICATION ERROR	ERRORE ESPRESSO IN % INDICATION ERROR %
0	0	0	0,00%
10	10	0	0,00%
20	20	0	0,00%
30	30	0	0,00%
40	40,20	0,2	0,50%

Tecnico di laboratorio

Il Resp. di laboratorio

STRUMENTAZIONE TERMOMETRICA E MECCANICA
DR. ING. GIUSEPPE GEMINI

Gli strumenti di misura utilizzati per la calibratura fanno parte del sistema ciclico di sorveglianza ISO 9001:2015.
The measuring instruments used for the calibration are part of the ISO 9001:2015 cyclic surveillance system.

Le misurazioni indicate nel presente rapporto sono state ottenute seguendo le nostre procedure elaborate in conformità alla ISO IEC 17025 e su richiesta possono essere prese in visione presso il nostro laboratorio.
The measuments stated in this report have been obtained following our procedures, carried out according to the ISO IEC 17025 Regulation and upon request they can be examined in our laboratory.

I dati riportati nel presente certificato sono da ritenersi validi con lo strumento nelle condizioni ambientali in cui è stata effettuata la taratura.
The data printed in this certificate are to be considered valid at the time of the ambience conditions in which the instrument has been calibrated.

CONDIZIONI AMBIENTALI - AMBIENCE CALIBRATION CONDITIONS
Temperatura ambiente - Ambience temperature: 23°C ± 3°C U.R. - R.H.: 60% ± 10%

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Sedi operative
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24040 COMUN NUOVO – Via Europa, 9

HYDROSTATIC TEST CERTIFICATE

Date: 30/09/2024 **N°CDC55699**

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000428
COES JOB:	166/24
ITEM:	Interconnecting piping
SERIAL NUMBER:	N/A
DRAWING:	CCO54154 (1724000428-MAC-DD-00008)

ACTIVITY	RESULT
VISUAL AND DIMENSIONAL CHECK	POSITIVE
HYDROSTATIC TEST	POSITIVE

NOTE			
TEST MEDIUM: WATER	TEST PRESSURE: 18 barg	POSITION: HORIZONTAL	TEST DURATION: 60 min
TEST PROCEDURE:	1724000428-QC-PRO-00023_03		

PRESSURE GAUGES	RANGE	CALIBRATION EXPIRY
S133	0÷40 bar	10/11/2024
S134	0÷40 bar	10/11/2024

NOTES

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COES SRL Via Pontida, 265 24040 Stezzano Italy	**ASME Quality System**

SCHEDA DI TARATURA
CALIBRATION SHEET

STRUMENTO: MANOMETRO DN 100 **INSTRUMENT:** PRESSURE GAUGE DN 100	**CENTRO DI TARATURA:** Termaf **CALIBRATION CENTRE:**
MATRICOLA COES: S133 **COES TAG**:	**CERTIFICATO DI TARATURA:** 4777 **CERTIFICATE OF CALIBRATION:**
RANGE: 0÷40 bar	**SCADENZA TARATURA:** 10/11/2024 **CALIBRATION EXPIRY:**
ACCURATEZZA MISURA: 1% FS (ERRORE MAX 0,4 bar) **MEASURE ACCURACY:** 1% SPAN (MAX ERROR 0,4 bar)	**FREQUENZA DI CALIBRAZIONE:** 1 ANNO **FREQUENCY OF CALIBRATION:** 1 YEAR
CODICE COES: C3734 **COES CODE:**	**NOTE:**
COSTRUTTORE: TUBE & SOCKET (Termaf) **MANUFACTURER:** **Serial number: 70208**	

DATA: 10/11/2023
DATE:

FIRMA CQ
CQ SIGNATURE

FIRMA RGQ
RGQ SIGNATURE



TERMAF
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Azienda Certificata ISO EN 9001:2015
TÜV reg. n. 73 100 4283

Rapporto taratura - Certificate of Calibration **N° 4777** ***Pressione - Pressure***

Emesso - Date of issue	**10/11/2023**
Destinatario - Addressee	**COES SRL**
Strumento - Instrument	**Manometro** - Manometer
Modello - Model	**MI/A1**
Matricola - Serial n°	**70208**
Campo di misura - Range	**0 ÷ 40 bar**
Classe di precisione - Accuracy	**1,00%**
Errore max. - Maximum error	**0,4 bar**
Costruttore - Manufacturer	**TERMAF**
Diametro - Diameter	**100**
Attacco - Pivot	**1/2 NPT**
Note	

MANOMETRO CAMPIONE - STANDARD MANOMETER
MAN. DIGITALE MOD. LAB DMM N° 609633 CERT. LAT N° 1716-22 del 05/05/2022 CENTRO LAT N° 238 -

Lettura - Reading in: Bar

PRESSIONE DI RIFERIMENTO REFERENCE PRESSURE	PRESSIONE INDICATA INDICATED PRESSURE	ERRORE DI INDICAZIONE INDICATION ERROR	ERRORE ESPRESSO IN % INDICATION ERROR %
0	0	0	0,00%
10	10	0	0,00%
20	20	0	0,00%
30	30	0	0,00%
40	40,20	0,2	0,50%

Tecnico di laboratorio

Il Resp. di laboratorio

TERMAF STRUMENTAZIONE TERMOMETRICA E MANOMETRICA
DR. ING. GIUSEPPE GEMINI

Gli strumenti di misura utilizzati per la calibratura fanno parte del sistema ciclico di sorveglianza ISO 9001:2015.
The measuring instruments used for the calibration are part of the ISO 9001:2015 cyclic surveillance system.

Le misurazioni indicate nel presente rapporto sono state ottenute seguendo le nostre procedure elaborate in conformità alla ISO IEC 17025 e su richiesta possono essere prese in visione presso il nostro laboratorio.
The measuments stated in this report have been obtained following our procedures, carried out according to the ISO IEC 17025 Regulation and upon request they can be examined in our laboratory.

I dati riportati nel presente certificato sono da ritenersi validi con lo strumento nelle condizioni ambientali in cui è stata effettuata la taratura.
The data printed in this certificate are to be considered valid at the time of the ambience conditions in which the instrument has been calibrated.

CONDIZIONI AMBIENTALI - AMBIENCE CALIBRATION CONDITIONS
Temperatura ambiente - Ambience temperature: 23°C ± 3°C U.R. - R.H.: 60% ± 10%

COES SRL Via Pontida, 265 24040 Stezzano Italy	**ASME Quality System**

SCHEDA DI TARATURA
CALIBRATION SHEET

STRUMENTO: MANOMETRO DN 100
INSTRUMENT: PRESSURE GAUGE DN 100

MATRICOLA COES: S134
COES TAG:

RANGE: 0÷40 bar

ACCURATEZZA MISURA: 1% FS
(ERRORE MAX 0,4 bar)
MEASURE ACCURACY: 1% SPAN
(MAX ERROR 0,4 bar)

CODICE COES: C3734
COES CODE:

COSTRUTTORE: TUBE & SOCKET (Termaf)
MANUFACTURER:
Serial number: 70230

CENTRO DI TARATURA: Termaf
CALIBRATION CENTRE:

CERTIFICATO DI TARATURA: 4778
CERTIFICATE OF CALIBRATION:

SCADENZA TARATURA: 10/11/2024
CALIBRATION EXPIRY:

FREQUENZA DI CALIBRAZIONE: 1 ANNO
FREQUENCY OF CALIBRATION: 1 YEAR

NOTE:

DATA: 10/11/2023
DATE:

FIRMA CQ
CQ SIGNATURE

FIRMA RGQ
RGQ SIGNATURE



TERMAF
di Gemini G. e Gozzini Obizio snc
Via Cà Treviglio, 1/3 Pontirolo Nuovo (BG)
Tel. 0363/880123 Fax. 0363/881133 - 330891
www.termaf.it info@termaf.it
Azienda Certificata ISO EN 9001:2015
TÜV reg. n. 73 100 4283

Rapporto taratura - Certificate of Calibration **N° 4778** ***Pressione - Pressure***

Emesso - Date of issue	**10/11/2023**
Destinatario - Addressee	**COES SRL**
Strumento - Instrument	**Manometro** - Manometer
Modello - Model	**MI/A1**
Matricola - Serial n°	**70230**
Campo di misura - Range	**0 ÷ 40 bar**
Classe di precisione - Accuracy	**1,00%**
Errore max. - Maximum error	**0,4 bar**
Costruttore - Manufacturer	**TERMAF**
Diametro - Diameter	**100**
Attacco - Pivot	**1/2 NPT**
Note	

MANOMETRO CAMPIONE - STANDARD MANOMETER
MAN. DIGITALE MOD. LAB DMM N° 609633 CERT. LAT N° 1716-22 del 05/05/2022 CENTRO LAT N° 238 -

Lettura - Reading in: Bar

PRESSIONE DI RIFERIMENTO REFERENCE PRESSURE	PRESSIONE INDICATA INDICATED PRESSURE	ERRORE DI INDICAZIONE INDICATION ERROR	ERRORE ESPRESSO IN % INDICATION ERROR %
0	0	0	0,00%
10	10	0	0,00%
20	19,90	-0,1	-0,25%
30	29,90	-0,1	-0,25%
40	40	0	0,00%

Tecnico di laboratorio

Il Resp. di laboratorio

TERMAF STRUMENTAZIONE TERMOMETRICA E MANOMETRICA
DR. ING. GIUSEPPE GEMINI

Gli strumenti di misura utilizzati per la calibratura fanno parte del sistema ciclico di sorveglianza ISO 9001:2015.
The measuring instruments used for the calibration are part of the ISO 9001:2015 cyclic surveillance system.

Le misurazioni indicate nel presente rapporto sono state ottenute seguendo le nostre procedure elaborate in conformità alla ISO IEC 17025 e su richiesta possono essere prese in visione presso il nostro laboratorio.
The measuments stated in this report have been obtained following our procedures, carried out according to the ISO IEC 17025 Regulation and upon request they can be examined in our laboratory.

I dati riportati nel presente certificato sono da ritenersi validi con lo strumento nelle condizioni ambientali in cui è stata effettuata la taratura.
The data printed in this certificate are to be considered valid at the time of the ambience conditions in which the instrument has been calibrated.

CONDIZIONI AMBIENTALI - AMBIENCE CALIBRATION CONDITIONS
Temperatura ambiente - Ambience temperature: 23°C ± 3°C U.R. - R.H.: 60% ± 10%

+39 035 2050 511 | www.coessrl.eu | coes@coessrl.com |
Via Pontida, 265 - 24040 STEZZANO (BG) ITALY | Via Europa, 9 - 24040 COMUN NUOVO (BG) ITALY

MATERIAL CERTIFICATES LIST

DOCUMENT No: CML58119	**REV. 0**	**SHEET 1 OF 99**

CUSTOMER:	ROSETTI MARINO S.P.A.
PROJECT:	HOLLANDSE KIST NOORD WIND PARK PROJECT
OBJECT:	AIR RECEIVER V-63001
SERIAL No.:	S240119
DRAWING:	CCO52811
COES JOB:	166/24

0	V. Girardello	C. Pilenga	01/10/2024	FIRST ISSUE
REV.	**ISSUED BY**	**CONTROLLED BY**	**DATE**	**DESCRIPTION**

+39 035 2050 511 | www.coessrl.eu | coes@coessrl.com |
Via Pontida, 265 - 24040 STEZZANO (BG) ITALY | Via Europa, 9 - 24040 COMUN NUOVO (BG) ITALY

POS	QTY	DESCRIPTION	MATERIAL	MFR	CERT	HEAT	REF.COES
1	1	SHELL 0e2500 Thk. 18 L=1950 (Manhole 24" slde)	SA 516 Gr.70	MARCEGAGLIA PLATES	16021371540	2101999	24 2246
2	1	SHELL 0e2500 Thk. 18 L=1950	SA 516 Gr.70	MARCEGAGLIA PLATES	16021371540	2101999	24 2246
3	2	ELL. HEAD 012464 Thk. 18mm (Thk. 15.3mm mln.)	SA 516 Gr.70	SIFEA SRL	170149	STAD90	24 2111
4	4	PLATE 400x400 thk=40 - N° 6 holes 038	SA 516 Gr.70	MARCEGAGLIA PLATES	51NL110723_C	SB61491	24 2206
5	5760.000 mm	PROFILE HEB 200 L=1440	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	1078 2024	145148	24 2167
6	4	PAD 350x300 lhk=15	SA 516 Gr.70	ARCELORMITTAL MEDITERRANEE	730/0243573	730213436	24 2214
7	1	FLANGE W.N.24'" Sch. 40 150# RF	SA 350 Gr. LF2 Cl.1	FIL-PEMTO SPA	CER-4492/24	267027	24 2217
8	1	PAD thk=18 for Man Hole 24"	SA 516 Gr.70	METINVEST TRAMETAL SPA	610751	RTAA63	24 2339
9	1	SHELL 0e610 Thk. 18 L=200	SA 516 Gr.70	METINVEST TRAMETAL SPA	610751	RTAA63	24 2339
10	2	PAD 0e=320 01=222 thk=18 lor Trunnlon	SA 516 Gr.70	METINVEST TRAMETAL SPA	610751	RTAA63	24 2339
11	2	DISK 0273 thk=15	SA 516 Gr.70	METINVEST TRAMETAL SPA	589518	STAD09	24 2171
12	200.000 mm	PIPE SMLSS 8 Sch.80	SA 333 Gr. 6	LIBERTY OSTRAVA AS	30723/22	46426K	24 2202
13	1	LIFTING LUGA=250 E=150 HOLE 060 THK=20	SA 516 Gr.70	METINVEST TRAMETAL SPA	609144	YNAA39	24 2172
14	2	FLANGE W.N.1" Sch. XXS 150# RF	SA 350 Gr. LF2 Cl.1	METALFAR PRODOTTI INDUSTRIALI SPA	2024-C_MFF-01849	23/70335	24 2226
15	1	FLANGE W.N.2" Sch. 160 150# RF	SA 350 Gr. LF2 Cl.1	METALFAR PRODOTTI INDUSTRIALI SPA	2024-C_MFF-01849	23/70486	24 2228
16	100.000 mm	PIPE SMLSS 2 Sch.160	SA 333 Gr. 6	ZELEZIARNE PODBREZOVA	13219/01/2024	40870	24 2199
17	2	COUPLING 1/2" NPT-F 6000#	SA 350 Gr. LF2 Cl.1	OMSA SRL	001950	SS3	24 1710
18	2	FLANGE W.N.1 1/2" Sch. 160 150# RF	SA 350 Gr. LF2 Cl.1	METALFAR PRODOTTI INDUSTRIALI SPA	2024-C_MFF-01849	22/76569	24 2227
19	200.000 mm	PIPE SMLSS 11/2 Sch.160	SA 333 Gr. 6	ZELEZIARNE PODBREZOVA	33586/1/2023	31856	24 2203
20	65,000 mm	PIPE SMLSS 1 Sch.XXS	SA 333 Gr. 6	TUBOS REUNIDOS GROUP SLU	0000361075	129075	24 2198
22	1	FLANGE BLIND B16.5 24"' 150# RF	SA 350 Gr. LF2 Cl.1	FAD SPA	7318/24	284888	24 2942
24	20	STUD-BOLT 1.1/4" UN x 190	SA320Gr.L7	IPL SRL	2402469	243901	24 2458
25	40	NUT 1114 UN	SA 194 Gr.7	IPL SRL	2402469	71771	24 2458
26	1	SUPPORT NAMEPLATE 140x120 Thk.4mm	SA 516 Gr.70	ARCELORMITTAL MEDITERRANEE	730/0177224	730119028	23 2874
27	1	ELBOW L.R. 90° 1" Sch. XXS	SA 420 WPL6	IRC SPA	6674	F6J23-610619	24 2311
28	98,675 mm	PIPE SMLSS 1 Sch.XXS	SA 333 Gr. 6	TUBOS REUNIDOS GROUP SLU	0000361075	129075	24 2198
29	902.528 mm	PIPE SMLSS 1 Sch.XXS	SA 333 Gr. 6	TUBOS REUNIDOS GROUP SLU	0000361075	129075	24 2198
30	1	BENDING PIPE SMLSS 2"' SCH. 40 L=1130 (DAVIT 24"' 150#)	SA 333 Gr. 6	ZELEZIARNE PODBREZOVA	26883/01/2024	41788	24 2200
31	1	PLATE 200x52.5 thk=18 (DAVIT 24" 150#)	SA 516 Gr.70	MARCEGAGLIA PLATES	16021197247	2010434	24 2173
32	2	PLATE 50x70 Thk. 15 mm FOR DAVIT 24"	SA 516 Gr.70	METINVEST TRAMETAL SPA	589518	STAD09	24 2171
33	1	LIFTING EYE M22x260	SA 350 Gr. LF2 Cl.1	IPL SRL	2402549	255812	24 2650
35	3	NUT M22 UNI 5587	SA 194 Gr.7	IPL SRL	2402671	85925	24 2862
36	1	ROD 0e=100 01=74 Thk=12	SA 516 Gr.70	METINVEST TRAMETAL SPA	603511	STAD26	24 2169
37	1	ROD 0e=100 01=61 Thk=12	SA 516 Gr.70	METINVEST TRAMETAL SPA	603511	STAD26	24 2169
38	1	DISK 0e=48 thk=6	SA 516 Gr.70	METINVEST TRAMETAL SPA	601191	KTAB75	24 2170
39	1	DISK 0e=48 01=12 thk=6	SA 516 Gr.70	METINVEST TRAMETAL SPA	601191	KTAB75	24 2170
40	256.000 mm	PIPE SMLSS 2 1/2 Sch.40 L=256	SA 333 Gr. 6	ZELEZIARNE PODBREZOVA	48223/1/2023	33447	24 2201
41	242.500 mm	PLATE 50x6 L=242.5	SA 516 Gr.70	METINVEST TRAMETAL SPA	601191	KTAB75	24 2170
42	90,000 mm	PIPE SMLSS 3 Sch.160	SA 333 Gr. 6	TUBOS REUNIDOS GROUP SLU	0000363296/1	130741	24 2204
43	1	FLANGE W.N.3" Sch. 160 150# RF	SA 350 Gr. LF2 Cl.1	FAD SPA	6238/24	34225	24 2229
44	1	SCREW- M22 x 100- UNI 5739	SA 320 Gr.L7	IPL SRL	2402671	38454	24 2862

INSPECTION CERTIFICATE — NF EN 10204-3.1/DIN 50049-3.1.B/ISO 10474

N° 730/0177224 — Page 2 / FIN

ArcelorMittal
ARCELORMITTAL MEDITERRANEE Site de FOS
13776 FOS SUR MER CEDEX - FRANCE
T:+33(0)44247-3314 F:+33(0)44247-3231
E: un.scu(a)arcelormittal.com

Sigle du producteur / Mill's identification: FOS

T Re=260 MINI MPA Rm=485 -620 MPA A%(50)=21 MINI (5)

CDC: Conforme cahier charges / According specifications
BL : Brut de laminage / As rolled
LN : Laminage normalisant / Normalization rolling
R : Revenu / Tempering
TE : Trempé à l'eau / Water quenching
LTC : Laminé temp. contrôlée / Control rolling
TM : Laminage thermomécanique / Thermo-mechanical forming
N : Normalisé / Normalising
D : Détensionné / Stress relieving
A : Adouci par recuit / Soft annealing

Organisme et/ou service de contrôle / Inspection organism: RECEPTION USINE (A05)

Client et/ou destinataire / Customer and/or consignee: SIDERURGICA ASTICO SPA, VIA ASTICO 44, I-36030 FARA VICENTINO ITALIE (A06)

N° Commande Courtier/Client / Customer's Order Nbr: 210287 (A07)

N° Commande Usine / Mill's Order Nbr: GH2ASAM004 000160 (A08)

Nuances et spécifications techniques / Grade and technical specifications: SA516G70-SA20/S5 ASME_SA516M-15 ✓
HOT ROLLED COIL, AS ROLLED
CONE02309M4310000 (B01 B02)

Etat de livraison / Delivery condition: LTC : LN (B04)

Traitement de référence / Treatment of test samples: BL (B05)

Identification du produit / Product identification		Poste	Nombre de pièces / Number of pieces	Dimensions / Sizes (mm)			Masse / Weight	Emplacement	Traction / Tensile requirements												Emplacement	Résilience / Impact testing							
Repère pièce / Plate number	Coulée / Heat	Item		Epaisseur / Thickness	Largeur / Width	Longueur / Length	(kg) (7)	Loc (2)	S (3)	Pos. Z(4)	Type	Réf Ref (5)	Temp.	Re05	Rm	A%					Loc (2)	Réf Ref	Type	S (3)	Temp.	Pos. Z(4)	Valeurs individuelles / Individual values	Moyenne / Average
B07	B07	A07	B08	B09	B10	B11	B13	C01	C02	C062	C10		C03	C11	C12	C13	<-C14-C29		C60-C89->		C01		C40	C02	C08	C62	<- - -C42- - ->	C43
5239073	730119028 ✓	001	1	4,000	1500,00		24148	1	T	P	PRISM	BL	20	454	578	27,9												

COES G.Q. — Ricezione data 12/09/2023 — Sigla V.S. — Verificato data 30/10/2023 — Sigla V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 516 Ed. 2021
V.S.

AC:C =0,200 MAXI MN=0,850-1,620 P =0,035 MAXI S =0,035 MAXI SI=0,150-0,400 AL=0,020 MINI CU=0,400 MAXI NI=0,400 MAXI CR=0,300 MAXI NB=0,020 MAXI V =0,030 MAXI
TI=0,030 MAXI B =,0010 MAXI MO=0,120 MAXI CBN23=CR+MO =0,320 MAXI CBN13=CU+NI+CR+MO =1,000 MAXI
AP:MN=0,790-1,600 SI=0,130-0,450 CU=0,430 MAXI NI=0,430 MAXI CR=0,340 MAXI NB=0,030 MAXI V =0,040 MAXI TI=0,040 MAXI MO=0,130 MAXI

Meth. (6) of steel making	Repère Pièce / Plate number	N° Coulée / Heat number	* Analyse sur produit / Check analysis																									
			C%	Mn%	P%	S%	Si%	AL%	B %	CR%	CU%	MO%	N %	NB%	NI%	TI%	V %					CBN23	CBN13					
C70/93	B07	B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91	C92	C96	C97		
O/YCC		730119028	0,165	1,408	0,015	0,002	0,208	0,032	0,0001	0,026	0,019	0,004	0,004	0,008	0,020	0,015	0,002					0,029	0,068					

Emplacement/Location(2): 1 Tête / Head; 2 Pied / Bottom; 3 1/2 longueur / Length; X:Divers / Mix — C01

(3) Sens/Direction: L:Long / Longitudinal; T:Travers / Transverse; Z:Travers court / Through thick — C02

(4) Position: C:Coeur / Core sample; P:Peau / Rolled surface; D:1/3 Epais. / Thickness; Q:1/4 Epais. / Thickness; F:1/5 Epais. / Thickness; K:Divers / Mix — C62

(6)Mode élab.Meth.Coulée: T: Thomas M: Martin E: Electrique / Electric O/Y: Oxy.pur / Basic oxyg. CC: Coulée Continue / Continuous casting — C70/93

(7) Masse et nb pieces a titre indicatif. Mass and quantity of pieces as a rough guide

We hereby certify that the above cited shipment was produced according to the technical specifications of the contract and that, with inspection and tests completed, it meets those specifications as well as all norms and standards referred to in the contract.

Contrôle de marquage, d'aspect et de dimensions : satisfaisants
Inspection of markings, surface, sizes : satisfactory. D01

Date 13/02/22
Agent / Receiving Agent
F. SIXDENIERS Z02

044

23 2874

24 1710

CERTIFICATO DI COLLAUDO / TEST CERTIFICATE IN ACC. TO EN 10204 3.1 - 2004

Cliente/Customer: MATERIND SRL
Ordine cliente/Customer order n°: OF/STD/2402545 DEL 09/05/2024
DDT/Delivery note/Packing list: 2024/DDT/001950

Certificate N°: 001950
Omsa Job: 2024/ODV/007885
Data/Date: 13/05/2024

COES G.Q. | Ricezione data 16/05/2024 | Sigla U.S. | Verificato data 16/05/2024 | Sigla U.S.

Item	Quantity	Descrizione	Material	Heat code	Heat n.	Steel mill	Mill cert	Country of origin
001	25.0	MANICOTTO 6000 1/2" NPT LF2 CL1	ASTM/ASME SA/A350LF2 CL1	S53	22/77946	RIVA SPA	1483	

ANALISI CHIMICA DI ACCIAIERIA / STEEL MILL CHEMICAL ANALYSIS

C%	Mn%	Si%	P%	S%	Ni%	Cr%	Mo%	Ti%	Al%	V%	Cu%	Nb%	N%	Zr%	Co%	Pb%	Fe%	Sn%	W%	C.E%	Pre%
0,1850	0,9100	0,2300	0,0080	0,0080	0,0700	0,0900	0,0100	0,0200	0,0250	0,0200	0,1800	0,0020	0,0102	0,0000	0,0000	0,0000	0,0000	0,0070	0,0000	0,3800	0,0000

CARATTERISTICHE MECCANICHE / MECHANICAL PROPERTIES

R Tens. strengh N/mmq	S Yeld point N/mmq	A Elongation %	C Reduction od Area %	Bending Test	Flatting Test	Hydraulic Test	1^HBW Hardness test	2^HBW Hardness test	1^Impact test J/cm2	2^Impact test J/cm2	3^Impact test J/cm2	Impact test temp °C	Heat treatment
543,00	306,00	39,00	67,00	0,00	0,00	0,00	165,00	166,00	52,00	67,00	49,00	-50,00	NORMALIZED AT 900°C

RACCORDI SECONDO / FITTINGS IN ACC. TO

According with ANSI B16.11 -21 & BS 3799-74, Marking in acc. with MSS SP25-18, NACE MR0175/ISO15156-18, NACE MR0103-18 - ANSI B1.20.1 -13 - UNI EN ISO 148-1-2016, Carbon steel fully killed & fine grained practice

Item	Quantity	Descrizione	Material	Heat code	Heat n.	Steel mill	Mill cert	Country of origin
002	6.0	MANICOTTO 3000 1" ISO7RP LF2 CL1	ASTM/ASME SA/A350LF2 CL1	RV3	23/78432	RIVA ACC.SPA	2480	

ANALISI CHIMICA DI ACCIAIERIA / STEEL MILL CHEMICAL ANALYSIS

C%	Mn%	Si%	P%	S%	Ni%	Cr%	Mo%	Ti%	Al%	V%	Cu%	Nb%	N%	Zr%	Co%	Pb%	Fe%	Sn%	W%	C.E%	Pre%
0,2000	0,9500	0,2200	0,0130	0,0040	0,0900	0,1800	0,0200	0,0140	0,0220	0,0020	0,1900	0,0010	0,0105	0,0000	0,0000	0,0000	0,0000	0,0070	0,0000	0,4200	0,0000

CARATTERISTICHE MECCANICHE / MECHANICAL PROPERTIES

R Tens. strengh N/mmq	S Yeld point N/mmq	A Elongation %	C Reduction od Area %	Bending Test	Flatting Test	Hydraulic Test	1^HBW Hardness test	2^HBW Hardness test	1^Impact test J/cm2	2^Impact test J/cm2	3^Impact test J/cm2	Impact test temp °C	Heat treatment
524,00	356,00	46,00	52,00	0,00	0,00	0,00	166,00	57,50	49,90	65,90	66,00	-50,00	Normalized at 900°C - Cooled in still air

RACCORDI SECONDO / FITTINGS IN ACC. TO

According with ANSI B16.11 -21 & BS 3799-74, Marking in acc. with MSS SP25-18, NACE MR0175/ISO15156-18, NACE MR0103-18 - UNI EN 10226-1-03 - UNI EN ISO 148-1-2016, Carbon steel fully killed & fine grained practice

Item	Quantity	Descrizione	Material	Heat code	Heat n.	Steel mill	Mill cert	Country of origin
003	3.0	TAPPO FEMMINA 6000 3/4" SW A105 B16	ASTM/ASME S/A105N	RV3	23/78432	RIVA ACC.SPA	2480	

ANALISI CHIMICA DI ACCIAIERIA / STEEL MILL CHEMICAL ANALYSIS

C%	Mn%	Si%	P%	S%	Ni%	Cr%	Mo%	Ti%	Al%	V%	Cu%	Nb%	N%	Zr%	Co%	Pb%	Fe%	Sn%	W%	C.E%	Pre%
0,2000	0,9500	0,2200	0,0130	0,0040	0,0900	0,1800	0,0200	0,0140	0,0220	0,0020	0,1900	0,0010	0,0105	0,0000	0,0000	0,0000	0,0000	0,0070	0,0000	0,4200	0,0000

CARATTERISTICHE MECCANICHE / MECHANICAL PROPERTIES

R Tens. strengh N/mmq	S Yeld point N/mmq	A Elongation %	C Reduction od Area %	Bending Test	Flatting Test	Hydraulic Test	1^HBW Hardness test	2^HBW Hardness test	1^Impact test J/cm2	2^Impact test J/cm2	3^Impact test J/cm2	Impact test temp °C	Heat treatment
533,00	326,00	45,00	69,00	0,00	0,00	0,00	162,00	164,00	39,30	58,30	70,20	-50,00	Normalized at 900°C - Cooled in still air

RACCORDI SECONDO / FITTINGS IN ACC. TO

According with ANSI B16.11 -21 & BS 3799-74, Marking in acc. with MSS SP25-18, NACE MR0175/ISO15156-18, NACE MR0103-18 - UNI EN ISO 148-1-2016, Carbon steel fully killed & fine grained practice

The values of chemical analysis are a true and correct copy of the steel mill test certificate.
The mechanical tests are the correct records of the certificate issued from the company that has executed the last transformation of the material.
We declare that the certified material complies with the above standards and to the client's order requirements.

ANNUAL BOOK OF ASTM STANDARDS - 2024
MATERIAL DUAL CERTIFIED ASTM/ASME SEC. II PART A ED. 2023
MATERIAL MANUFACTURER APPROVED BY LRQA CERT. NR. 003001 PED 2014/68/EU ANNEX I CHAPTER 4.3

ENTE COLLAUDO / TPI INSPECTOR

C. QUALITA' / QUALITY CONTROL
O.M.S.A. SRL
Barbara Orlandi

Barbara Orlandi

Cliente:531211 COES S.R.L.
Quantità: 10,000

Certificato N. 2008/08
T 0363-958244

DDT BL/VEN/3787 16/05/2024
Riferimento ordine cliente:. ORD. 1672/24 DEL 14/
Articolo: F096012000L2AA MAN. LF2 1/2" NPT S6000
N di colata:SS3-25
CERTIFICATO CONFORME ALL'ORIGINALE TRUE COPY

S.I.F.E.B.

Società Italiana Fondi Bombati e Affini

Rapporto di collaudo - Inspection certificate - Abnahmeprufzeügnis

In accordo - According-Nach: UNI EN10204 3.1 **Mod. 8.5-03**

Certificate number: 170149 **of** 02/07/2024

Customer: COES S.r.l.

Purchase order: 1935/24 del 07/06/2024 **Client job:** 166/24-167/24

Item.	Q.ty:	Product type	Code	Client reference code / drawing
1	2	ELLIPSOIDAL HEAD 2:1	ASME VIII Div.1 Ed.'23 UG-32(c), UG-79, UG-81	DIS L3728 JOB 166/24

Diam. Max Max Diameter	Circ. Esterna Ext. Circle	Spessore Lamiera Plate's thk.	Spessore Min. Min thk.	Raggio bomb. Max Rad.	Raggio bord. Knuc. Rad.	Collarino Straight flange	Altezza Tot. Height	Foro Hole	Beading		
									Diametro Min. Min. Diameter	Raggio Sbord. Knuc. Rad.	Collarino Straight Flange
D.I. 2464	7854	18	15,3	2150	400	57	691				

Forming Type	Heat treatment type (1)	Heat treatment certificate nr.
Cold formed		

Our Serial Number	Material Quality	Heat	Plate	Plate's Producer	Certificate Nr.	Date
	SA 516-70	STAD90	0204A	METINVEST TRAMETAL S.p.A. ITA (EU)	614161/-160/-158/-157/-154/-155	05/06/2024
	SA 516-70	STAD90	0204A	METINVEST TRAMETAL S.p.A. ITA (EU)	614161/-160/-158/-157/-154/-155	05/06/2024

COES G.Q.	Ricezione data	Sigla
	02/07/2024	U.S.
	Verificato data	Sigla
	02/07/2024	U.S.

24 2111

S.I.F.E.B.

Società Italiana Fondi Bombati e Affini

Rapporto di collaudo - Inspection certificate - Abnahmeprufzeügnis

In accordo - According-Nach: **UNI EN10204 3.1** **Mod. 8.5-03**

Item.	Q.ty:	Product type	Code	Client reference code / drawing
2	2	ELLIPSOIDAL HEAD 2:1 √	ASME VIII Div.1 Ed.'23 UG-32(c), UG-79, UG-81 √	DIS L3716 JOB 167/24

									Beading		
Diam. Max Max Diameter	Circ. Esterna Ext. Circle	Spessore Lamiera Plate's thk.	Spessore Min. Min thk.	Raggio bomb. Max Rad.	Raggio bord. Knuc. Rad.	Collarino Straight flange	Altezza Tot. Height	Foro Hole	Diametro Min. Min. Diameter	Raggio Sbord. Knuc. Rad.	Collarino Straight Flange
D.I. 1970	6283	15	12,5	1720	350	57	565				

Forming Type	Heat treatment type (1)	Heat treatment certificate nr.
Cold formed		

Our Serial Number	Material Quality	Heat	Plate	Plate's Producer	Certificate Nr.	Date
	SA 516-70 √	RTAA56 √	0402A	METINVEST TRAMETAL S.p.A. ITA (EU)	611426/-425/-424/-423/-421/-422	14/05/2024
	SA 516-70 √	RTAA56 √	0402A	METINVEST TRAMETAL S.p.A. ITA (EU)	611426/-425/-424/-423/-421/-422	14/05/2024

Società Italiana Fondi Bombati e Affini

Rapporto di collaudo - Inspection certificate - Abnahmeprufzeügnis

In accordo - According-Nach: **UNI EN10204 3.1** **Mod. 8.5-03**

Controllo visivo e dimensionale dopo formatura: non si riscontrano difetti visivi. Le dimensioni sono entro le tolleranze e i processi di formatura sono conformi al codice applicato, alle specifiche e ordine del cliente.
Visual and dimensional test check after forming: no visual defects has been found. Dimensions are under tollerances and forming processes are according to code apply, client's specifications and purchase order.

Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036, (Certification no. DGR-0036-QS-W 182/2003/MUC-001).

S.I.F.E.A. S.r.l.	Authorized Inspector	Client's Inspector	SIFEA 's Stamp
S.I.F.E.A. S.r.l. Via L. Da Vinci, 3 35020 Legnaro PD			SIFEA

Formatura in accordo alle procedure S.I.F.E.A. S.r.l. "QA.PR.FONDI" e "IO7.5-02 rev.2".
(1): se il trattamento termico non è stato eseguito, sarà a cura del cliente eseguire il trattamento termico in conformità alla normativa e specifiche applicate.
(1): if heat treatment is not be executed, it will be performed by client in according to code and project's procedure.
(1): ref. AD2000HP7/2 P.to 2.5 = wall thickness < 8 mm, h1 < 40 mm, Temperature -10°C to 120°C.

A02

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

A04/A05

METINVEST
METINVEST TRAMETAL SPA

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A01
Società per azioni con socio unico soggetta a direzione e coordinamento di Metinvest B.V
Registered office: Via XII Ottobre 1, 5° piano - 16121 Genova, Italy
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Works: Via E. Fermi, 44 - 33058 San Giorgio di Nogaro UD, Italy
Phone +39 0431 629989 - Fax +39 0431 629985
Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

A06 Cliente / Customer

S.I.F.E.A. SRL

Via leonardo da vinci 3
35020 LEGNARO 35020 IT
PD ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
614161	05/06/2024
A08 N° Ordine Trametal / Works order	A07 N° Ordine cliente / Customer's order
32400847	24/00135
DDT	del / date
BOL 32410395	31/05/2024
Pratica / File no.	
del / date	

B06 Marcatura di prodotto / Marking of the product
LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	P355NH - AD2000W1
Normativa / Specification	EN10028-3:2017

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI DIMENSIONS [mm]	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURE (Q) °C	HOLDING TIME (Q) Min	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	HOLDING TIME (T) Min	RAFFREDDAMENTO COOLING
3	STAD410802A	1953845	8.00X3000X12000	2,26	795761	BO	N	GF177																	
8	STAD870403A	1952183	13.00X3150X12000	3,86	795667	BO	N	GF136																	
8	STAD870403B	1952183	13.00X3150X12000	3,86	795667	BO	N	GF136																	
15	STAD880203A	1952622	18.00X3000X12000	5,09	795674	BO	N	GF140																	
15	STAD900203A	1952611	18.00X3000X12000	5,09	795659	BO	N	GF129																	
15	STAD900204A	1952620	18.00X3000X12000	5,09	795660	BO	N	GF130																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07 COLATA HEAT	C71 C %	C72 Mn %	C73 Si %	C74 P %	C75 S %	C76 Cu %	C77 Ni %	C78 Cr %	C79 Mo %	C80 Al %	C81 V %	C82 Nb %	C83 Ti %	C84 Sn %	C85 Ca %	C86 N %	C87 B %	C88 H %	C89 Ceq1 % (D)	C90 Ceq2 % (D)	C91 Pcm % (D)
Ordine Min 15			0,14																		
Ordine Max 15			0,25																	0,43	
Ordine Min 3			0,14																		
Ordine Max 3			0,25																	0,43	
Ordine Min 8			0,14																		
Ordine Max 8			0,25																	0,43	
P355NH Min 0.00 - 60.00		1,10								0,020											
P355NH Max 0.00 - 60.00	0,18	1,70	0,50	0,025	0,010	0,300	0,500	0,300	0,080		0,100	0,050	0,030			0,0120				0,43	
STAD41	0,15	1,38	0,19	0,018	0,004	0,010	0,010	0,020	<0.005	0,036	0,002	0,002	0,002	<0.005	0,0000	0,0038	0,0002	0,0000	0,38	0,39	0,23
STAD87	0,17	1,50	0,19	0,013	0,002	0,010	0,010	0,020	<0.005	0,034	0,002	0,002	0,002	<0.005	0,0000	0,0031	0,0002	0,0000	0,42	0,43	0,25
STAD88	0,17	1,49	0,21	0,018	0,003	0,010	0,010	0,040	<0.005	0,040	0,002	0,001	0,003	<0.005	0,0000	0,0020	0,0002	0,0000	0,42	0,43	0,26
STAD90	0,17	1,50	0,20	0,017	0,003	0,020	0,010	0,020	<0.005	0,039	0,002	0,002	0,003	<0.005	0,0000	0,0030	0,0002	0,0000	0,42	0,43	0,26

			PROVA DI TRAZIONE TENSILE TEST									PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	ReH [Mpa] YIELD STRENGTH	Rm [Mpa] TENSILE STRENGTH	ReH/Rm	A% ELONGATION	Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDRINO [mm] MANDREL	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 15													L	-46		16	20										
ORDINE Min 3													L	-46		16	20										
ORDINE Min 8													L	-46		16	20										
P355NH Min 0.00 - 16.00					20	355	490		22,0																		
P355NH Min 0.00 - 16.00					300					232																	
P355NH Max 0.00 - 16.00					20		630																				
P355NH Min 16.10 - 40.00					20	345	490		22,0																		
P355NH Min 16.10 - 40.00					300					225																	
P355NH Max 16.10 - 40.00					20		630																				
P355NH Min 6.00 - 999.00													T	-20			30										
GF129	18,00	2	P	T	20	370	525	0,71	33,4		P	10,00	L	-46	P	249 253 220	241						HB	169 166 163	166		
GF129	18,00	2	P	T	300					262	C	10,00	T	-20	P	176 208 223	202										
GF129	18,00	2										10,00	T	-50	P	189 143 174	169										
GF130	18,00	2	P	T	20	368	519	0,71	35,1		P	10,00	L	-46	P	228 219 235	227						HB	168 159 167	165		
GF130	18,00	2	P	T	300					270	C	10,00	T	-20	P	226 212 219	219										
GF130	18,00	2										10,00	T	-50	P	137 148 136	141										
GF136	13,00	2	P	T	20	388	532	0,73	31,2		P	10,00	L	-46	P	215 230 256	234						HB	171 162 164	166		
GF136	13,00	2	P	T	300					273	C	10,00	T	-20	P	220 192 220	210										
GF136	13,00	2										10,00	T	-50	P	129 113 94	112										
GF140	18,00	2	P	T	20	376	523	0,72	33,8		P	10,00	L	-46	P	207 230 211	216						HB	169 160 157	162		
GF140	18,00	2	P	T	300					284	C	10,00	T	-20	P	185 188 224	199										
GF140	18,00	2										10,00	T	-50	P	109 127 135	124										
GF177	8,00	2	P	T	20	398	512	0,78	37,0		P	7,50	L	-46	P	165 162 145	157						HB	155 167 158	160		
GF177	8,00	2	P	T	300					272	C	7,50	T	-20	P	130 118 106	118										
GF177	8,00	2										7,50	T	-50	P	76 73 80	76										

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
STAD900203A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD900204A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD870403A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD870403B		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD880203A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD410802A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50

D18	D19	D20
NOTE REMARKS	ENTE ISPETTIVO INSPECTOR	FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.a. F. Andrian III Liv. EN ISO 9712

Z01						
ITEM		**TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS**	**TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH**	**TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH**	**CONDIZIONI SUPERFICIALI SURFACE FINISH**	**PLANARITÀ FLATNESS**
3		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
8		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
15		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

HARDNESS IN ACC. TO NACE MR 0103

STEEL VACUUM DEGASSED

IN ACC. TO MATERIAL SPECIFICATION VDTUV-WB354/1

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 84/2003/MUC-03).	**TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE**	**METINVEST TRAMETAL S.p.a/ F. Andrian CQ Manager**

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

A04/A05

METINVEST
METINVEST TRAMETAL SPA

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A01

Società per azioni con socio unico soggetta a direzione e coordinamento di Metinvest B.V
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Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

A06 Cliente / Customer

S.I.F.E.A. SRL

Via leonardo da vinci 3
35020 LEGNARO 35020 IT
PD ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
614160	05/06/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32400847	24/00135
DDT	del / date
BOL 32410395	31/05/2024
Pratica / File no.	
del / date	

B06 Marcatura di prodotto / Marking of the product
LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	P355GH - AD2000W1
Normativa / Specification	EN10028-2:2017

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI DIMENSIONS [mm]	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION PROCESSO ELAB. (A)	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT BEGINNING TEMPERATURA INIZIO °C	TEMPERATURA HEATING RATE	VELOCITA' RISCALDO C/h	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	HOLDING TIME PERMANENZA Min	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	HOLDING TIME PERMANENZA (Q) Min	COOLING RAFFREDDAMENTO	TEMPERATURA (T) °C TEMPERATURE	HOLDING TIME PERMANENZA (T) Min	COOLING RAFFREDDAMENTO
3	STAD410802A	1953845	8.00X3000X12000	2,26	795761	BO	N	GF177																	
8	STAD870403A	1952183	13.00X3150X12000	3,86	795667	BO	N	GF136																	
8	STAD870403B	1952183	13.00X3150X12000	3,86	795667	BO	N	GF136																	
15	STAD880203A	1952622	18.00X3000X12000	5,09	795674	BO	N	GF140																	
15	STAD900203A	1952611	18.00X3000X12000	5,09	795659	BO	N	GF129																	
15	STAD900204A	1952620	18.00X3000X12000	5,09	795660	BO	N	GF130																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA	C	Mn	Si	P	S	Cu	Ni	Cr	Mo	Al	V	Nb	Ti	Sn	Ca	N	B	H	Ceq1	Ceq2	Pcm
HEAT	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	% (D)	% (D)	% (D)
Ordine Min 15			0,14																		
Ordine Max 15			0,25																	0,43	
Ordine Min 3			0,14																		
Ordine Max 3			0,25																	0,43	
Ordine Min 8			0,14																		
Ordine Max 8			0,25																	0,43	
P355GH Min 0.00 - 150.00	0,10	1,10								0,020											
P355GH Max 0.00 - 150.00	0,22	1,70	0,60	0,025	0,010	0,300	0,300	0,300	0,080		0,020	0,040	0,030			0,0120					
STAD41	0,15	1,38	0,19	0,018	0,004	0,010	0,010	0,020	<0.005	0,036	0,002	0,002	0,002	<0.005	0,0000	0,0038	0,0002	0,0000	0,38	0,39	0,23
STAD87	0,17	1,50	0,19	0,013	0,002	0,010	0,010	0,020	<0.005	0,034	0,002	0,002	0,002	<0.005	0,0000	0,0031	0,0002	0,0000	0,42	0,43	0,25
STAD88	0,17	1,49	0,21	0,018	0,003	0,010	0,010	0,040	<0.005	0,040	0,002	0,001	0,003	<0.005	0,0000	0,0020	0,0002	0,0000	0,42	0,43	0,26
STAD90	0,17	1,50	0,20	0,017	0,003	0,020	0,010	0,020	<0.005	0,039	0,002	0,002	0,003	<0.005	0,0000	0,0030	0,0002	0,0000	0,42	0,43	0,26

			PROVA DI TRAZIONE TENSILE TEST									PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	ReH [Mpa] YIELD STRENGTH	Rm [Mpa] TENSILE STRENGTH	ReH/Rm	A% ELONGATION	Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDRINO [mm] MANDREL	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 15													L	-46		16	20										
ORDINE Min 3													L	-46		16	20										
ORDINE Min 8													L	-46		16	20										
P355GH Min 0.00 - 16.00					20	355	510		20,0																		
P355GH Min 0.00 - 16.00					300					232																	
P355GH Max 0.00 - 16.00					20		650																				
P355GH Min 16.10 - 40.00					20	345	510		20,0																		
P355GH Min 16.10 - 40.00					300					225																	
P355GH Max 16.10 - 40.00					20		650																				
P355GH Min 6.00 - 999.00													T	-20			27										
GF129	18,00	2	P	T	20	370	525	0,71	33,4		P	10,00	L	-46	P	249 253 220	241						HB	169 166 163	166		
GF129	18,00	2	P	T	300					262	C	10,00	T	-20	P	176 208 223	202										
GF129	18,00	2										10,00	T	-50	P	189 143 174	169										
GF130	18,00	2	P	T	20	368	519	0,71	35,1		P	10,00	L	-46	P	228 219 235	227						HB	168 159 167	165		
GF130	18,00	2	P	T	300					270	C	10,00	T	-20	P	226 212 219	219										
GF130	18,00	2										10,00	T	-50	P	137 148 136	141										
GF136	13,00	2	P	T	20	388	532	0,73	31,2		P	10,00	L	-46	P	215 230 256	234						HB	171 162 164	166		
GF136	13,00	2	P	T	300					273	C	10,00	T	-20	P	220 192 220	210										
GF136	13,00	2										10,00	T	-50	P	129 113 94	112										
GF140	18,00	2	P	T	20	376	523	0,72	33,8		P	10,00	L	-46	P	207 230 211	216						HB	169 160 157	162		
GF140	18,00	2	P	T	300					284	C	10,00	T	-20	P	185 188 224	199										
GF140	18,00	2										10,00	T	-50	P	109 127 135	124										
GF177	8,00	2	P	T	20	398	512	0,78	37,0		P	7,50	L	-46	P	165 162 145	157						HB	155 167 158	160		
GF177	8,00	2	P	T	300					272	C	7,50	T	-20	P	130 118 106	118										
GF177	8,00	2										7,50	T	-50	P	76 73 80	76										

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
STAD900203A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD900204A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD870403A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD870403B		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD880203A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD410802A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50

D18	D19	D20
NOTE REMARKS	ENTE ISPETTIVO INSPECTOR	FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.a. F. Andrian III Liv. EN ISO 9712

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
3		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
8		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
15		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

HARDNESS IN ACC. TO NACE MR 0103

STEEL VACUUM DEGASSED

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 84/2003/MUC-03).	**TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE**	METINVEST TRAMETAL S.p.A/ F. Andrian CQ Manager

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

A04/A05

METINVEST

METINVEST TRAMETAL SPA

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A01

Società per azioni con socio unico soggetta a direzione e coordinamento di Metinvest B.V
Registered office: Via XII Ottobre 1, 5° piano - 16121 Genova, Italy
Phone +39 010 5762911 - Fax +39 010 5762990
Works: Via E. Fermi, 44 - 33058 San Giorgio di Nogaro UD, Italy
Phone +39 0431 629989 - Fax +39 0431 629985
Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

A03 N° Certificato / Certificate no.	Z02 Data / Date
614158	05/06/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32400847	24/00135
DDT	del / date
BOL 32410395	31/05/2024
Pratica / File no.	
del / date	

A06 Cliente / Customer

S.I.F.E.A. SRL

Via leonardo da vinci 3
35020 LEGNARO 35020 IT
PD ITALIA

B06 Marcatura di prodotto / Marking of the product

LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	P295GH - AD2000W1
Normativa / Specification	EN10028-2:2017

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI DIMENSIONS [mm]	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	HOLDING TIME PERMANENZA (Q) Min	COOLING RAFFREDDAMENTO	TEMPERATURA (T) °C TEMPERATURE	HOLDING TIME PERMANENZA (T) Min	COOLING RAFFREDDAMENTO
3	STAD410802A	1953845	8.00X3000X12000	2,26	795761	BO	N	GF177																
8	STAD870403A	1952183	13.00X3150X12000	3,86	795667	BO	N	GF136																
8	STAD870403B	1952183	13.00X3150X12000	3,86	795667	BO	N	GF136																
15	STAD880203A	1952622	18.00X3000X12000	5,09	795674	BO	N	GF140																
15	STAD900203A	1952611	18.00X3000X12000	5,09	795659	BO	N	GF129																
15	STAD900204A	1952620	18.00X3000X12000	5,09	795660	BO	N	GF130																

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA	C	Mn	Si	P	S	Cu	Ni	Cr	Mo	Al	V	Nb	Ti	Sn	Ca	N	B	H	Ceq1	Ceq2	Pcm
HEAT	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	% (D)	% (D)	% (D)
Ordine Min 15			0,14																		
Ordine Max 15			0,25																	0,43	
Ordine Min 3			0,14																		
Ordine Max 3			0,25																	0,43	
Ordine Min 8			0,14																		
Ordine Max 8			0,25																	0,43	
P295GH Min 0.00 - 150.00	0,08	0,90								0,020											
P295GH Max 0.00 - 150.00	0,20	1,50	0,40	0,025	0,010	0,300	0,300	0,300	0,080		0,020	0,030	0,030			0,0120					
STAD41	0,15	1,38	0,19	0,018	0,004	0,010	0,010	0,020	<0.005	0,036	0,002	0,002	0,002	<0.005	0,0000	0,0038	0,0002	0,0000	0,38	0,39	0,23
STAD87	0,17	1,50	0,19	0,013	0,002	0,010	0,010	0,020	<0.005	0,034	0,002	0,002	0,002	<0.005	0,0000	0,0031	0,0002	0,0000	0,42	0,43	0,25
STAD88	0,17	1,49	0,21	0,018	0,003	0,010	0,010	0,040	<0.005	0,040	0,002	0,001	0,003	<0.005	0,0000	0,0020	0,0002	0,0000	0,42	0,43	0,26
STAD90	0,17	1,50	0,20	0,017	0,003	0,020	0,010	0,020	<0.005	0,039	0,002	0,002	0,003	<0.005	0,0000	0,0030	0,0002	0,0000	0,42	0,43	0,26

			PROVA DI TRAZIONE TENSILE TEST								PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	ReH [Mpa] YIELD STRENGTH	Rm [Mpa] TENSILE STRENGTH	ReH/Rm	A% ELONGATION	Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDRINO [mm] MANDREL	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 15													L	-46		16	20										
ORDINE Min 3													L	-46		16	20										
ORDINE Min 8													L	-46		16	20										
P295GH Min 0.00 - 16.00					20	295	460		21,0																		
P295GH Min 0.00 - 16.00					300					192																	
P295GH Max 0.00 - 16.00					20		580																				
P295GH Min 16.10 - 40.00					20	290	460		21,0																		
P295GH Min 16.10 - 40.00					300					189																	
P295GH Max 16.10 - 40.00					20		580																				
P295GH Min 6.00 - 999.00													T	-20			27										
GF129	18,00	2	P	T	20	370	525	0,71	33,4		P	10,00	L	-46	P	249 253 220	241						HB	169 166 163	166		
GF129	18,00	2	P	T	300					262	C	10,00	T	-20	P	176 208 223	202										
GF129	18,00	2										10,00	T	-50	P	189 143 174	169										
GF130	18,00	2	P	T	20	368	519	0,71	35,1		P	10,00	L	-46	P	228 219 235	227						HB	168 159 167	165		
GF130	18,00	2	P	T	300					270	C	10,00	T	-20	P	226 212 219	219										
GF130	18,00	2										10,00	T	-50	P	137 148 136	141										
GF136	13,00	2	P	T	20	388	532	0,73	31,2		P	10,00	L	-46	P	215 230 256	234						HB	171 162 164	166		
GF136	13,00	2	P	T	300					273	C	10,00	T	-20	P	220 192 220	210										
GF136	13,00	2										10,00	T	-50	P	129 113 94	112										
GF140	18,00	2	P	T	20	376	523	0,72	33,8		P	10,00	L	-46	P	207 230 211	216						HB	169 160 157	162		
GF140	18,00	2	P	T	300					284	C	10,00	T	-20	P	185 188 224	199										
GF140	18,00	2										10,00	T	-50	P	109 127 135	124										
GF177	8,00	2	P	T	20	398	512	0,78	37,0		P	7,50	L	-46	P	165 162 145	157						HB	155 167 158	160		
GF177	8,00	2	P	T	300					272	C	7,50	T	-20	P	130 118 106	118										
GF177	8,00	2										7,50	T	-50	P	76 73 80	76										

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
STAD900203A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD900204A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD870403A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD870403B		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD880203A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD410802A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50

D18	D19	D20
NOTE REMARKS	ENTE ISPETTIVO INSPECTOR	FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.A. F. Andrian III Liv. EN ISO 9712

Z01						
ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
3		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
8		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
15		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06		
FULLY KILLED FINE GRAIN STEEL **HARDNESS IN ACC. TO NACE MR 0175 / ISO15156** **HARDNESS IN ACC. TO NACE MR 0103** **STEEL VACUUM DEGASSED**		
Z07	**Z03 ENTE COLLAUDO / INSPECTION BODY**	**Z02**
Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 84/2003/MUC-03).	**TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE**	**METINVEST TRAMETAL S.p.a. F. Andrian CQ Manager**

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

METINVEST
METINVEST TRAMETAL SPA

Società per azioni con socio unico soggetta a direzione e coordinamento di Metinvest B.V
Registered office: Via XII Ottobre 1, 5° piano - 16121 Genova, Italy
Phone +39 010 5762911 - Fax +39 010 5762990
Works: Via E. Fermi, 44 - 33058 San Giorgio di Nogaro UD, Italy
Phone +39 0431 629989 - Fax +39 0431 629985
Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A03 N° Certificato / Certificate no.: 614157
A02 Data / Date: 05/06/2024
A08 N° Ordine Trametal / Works order: 32400847
A07 N° Ordine cliente / Customer's order: 24/00135
DDT: BOL 32410395
del / date: 31/05/2024
Pratica / File no.:
del / date:

A06 Cliente / Customer

S.I.F.E.A. SRL

Via leonardo da vinci 3
35020 LEGNARO 35020 IT
PD ITALIA

B06 Marcatura di prodotto / Marking of the product
LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	P355NL2
Normativa / Specification	EN10028-3:2017

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI DIMENSIONS [mm]	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	HOLDING TIME (Q) Min	PERMANENZA COOLING	RAFFREDDAMENTO	TEMPERATURA (T) °C TEMPERATURE	HOLDING TIME (T) Min	PERMANENZA COOLING	RAFFREDDAMENTO
3	STAD410802A	1953845	8.00X3000X12000	2,26	795761	BO	N	GF177																			
8	STAD870403A	1952183	13.00X3150X12000	3,86	795667	BO	N	GF136																			
8	STAD870403B	1952183	13.00X3150X12000	3,86	795667	BO	N	GF136																			
15	STAD880203A	1952622	18.00X3000X12000	5,09	795674	BO	N	GF140																			
15	STAD900203A	1952611	18.00X3000X12000	5,09	795659	BO	N	GF129																			
15	STAD900204A	1952620	18.00X3000X12000	5,09	795660	BO	N	GF130																			

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C %	Mn %	Si %	P %	S %	Cu %	Ni %	Cr %	Mo %	Al %	V %	Nb %	Ti %	Sn %	Ca %	N %	B %	H %	Ceq1 % (D)	Ceq2 % (D)	Pcm % (D)
Ordine Min 15			0,14																		
Ordine Max 15			0,25																	0,43	
Ordine Min 3			0,14																		
Ordine Max 3			0,25																	0,43	
Ordine Min 8			0,14																		
Ordine Max 8			0,25																	0,43	
P355NL2 Min 0.00 - 60.00		1,10								0,020											
P355NL2 Max 0.00 - 60.00	0,18	1,70	0,50	0,020	0,005	0,300	0,500	0,300	0,080		0,100	0,050	0,030			0,0120				0,43	
STAD41	0,15	1,38	0,19	0,018	0,004	0,010	0,010	0,020	<0.005	0,036	0,002	0,002	0,002	<0.005	0,0000	0,0038	0,0002	0,0000	0,38	0,39	0,23
STAD87	0,17	1,50	0,19	0,013	0,002	0,010	0,010	0,020	<0.005	0,034	0,002	0,002	0,002	<0.005	0,0000	0,0031	0,0002	0,0000	0,42	0,43	0,25
STAD88	0,17	1,49	0,21	0,018	0,003	0,010	0,010	0,040	<0.005	0,040	0,002	0,001	0,003	<0.005	0,0000	0,0020	0,0002	0,0000	0,42	0,43	0,26
STAD90	0,17	1,50	0,20	0,017	0,003	0,020	0,010	0,020	<0.005	0,039	0,002	0,002	0,003	<0.005	0,0000	0,0030	0,0002	0,0000	0,42	0,43	0,26

			PROVA DI TRAZIONE TENSILE TEST									PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEST TEMPERATURA [°C] TEMPERATURE	YIELD STRENGTH ReH [Mpa]	TENSILE STRENGTH Rm [Mpa]	ReH/Rm	ELONGATION A%	PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	SHAPE OF TEST PIECE FORMA PROVINO (4)	WIDTH LARGHEZZA [mm]	ORIENTATION DIREZIONE (3)	TEST TEMPERATURE TEMPERATURA [°C]	LOCATION POSIZIONE (2)	INDIVIDUAL VALUES SINGOLI VALORI [J]	MEAN VALUE MEDIA [J]	ORIENTATION DIREZIONE (3)	MANDREL MANDRINO [mm]	ANGLE ANGOLO [°]	RESULT ESITO (5)	LOCATION POSIZIONE (2)	TEST METHOD METODO	INDIVIDUAL VALUES SINGOLI VALORI	MEAN VALUE MEDIA	Z% INDIVIDUAL VALUES Z% SINGOLI VALORI	Z% MEAN VALUE Z% VALORE MEDIO
ORDINE Min 15													L	-46		16	20										
ORDINE Min 3													L	-46		16	20										
ORDINE Min 8													L	-46		16	20										
P355NL2 Min 0.00 - 16.00					20	355	490		22,0																		
P355NL2 Max 0.00 - 16.00					20		630																				
P355NL2 Min 16.10 - 40.00					20	345	490		22,0																		
P355NL2 Max 16.10 - 40.00					20		630																				
P355NL2 Min 6.00 - 999.00													T	-50			27										
GF129	18,00	2	P	T	20	370	525	0,71	33,4		P	10,00	L	-46	P	249 253 220	241						HB	169 166 163	166		
GF129	18,00	2	P	T	300					262	C	10,00	T	-20	P	176 208 223	202										
GF129	18,00	2										10,00	T	-50	P	189 143 174	169										
GF130	18,00	2	P	T	20	368	519	0,71	35,1		P	10,00	L	-46	P	228 219 235	227						HB	168 159 167	165		
GF130	18,00	2	P	T	300					270	C	10,00	T	-20	P	226 212 219	219										
GF130	18,00	2										10,00	T	-50	P	137 148 136	141										
GF136	13,00	2	P	T	20	388	532	0,73	31,2		P	10,00	L	-46	P	215 230 256	234						HB	171 162 164	166		
GF136	13,00	2	P	T	300					273	C	10,00	T	-20	P	220 192 220	210										
GF136	13,00	2										10,00	T	-50	P	129 113 94	112										
GF140	18,00	2	P	T	20	376	523	0,72	33,8		P	10,00	L	-46	P	207 230 211	216						HB	169 160 157	162		
GF140	18,00	2	P	T	300					284	C	10,00	T	-20	P	185 188 224	199										
GF140	18,00	2										10,00	T	-50	P	109 127 135	124										
GF177	8,00	2	P	T	20	398	512	0,78	37,0		P	7,50	L	-46	P	165 162 145	157						HB	155 167 158	160		
GF177	8,00	2	P	T	300					272	C	7,50	T	-20	P	130 118 106	118										
GF177	8,00	2										7,50	T	-50	P	76 73 80	76										

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
STAD900203A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD900204A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD870403A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD870403B		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD880203A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD410802A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50

D18	D19	D20
NOTE REMARKS	ENTE ISPETTIVO INSPECTOR	FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.a. F. Andrian III Liv. EN ISO 9712

Z01						
ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
3		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
8		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
15		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

HARDNESS IN ACC. TO NACE MR 0103

STEEL VACUUM DEGASSED

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 84/2003/MUC-03).	**TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE**	**METINVEST TRAMETAL S.p.a/ F. Andrian CQ Manager**

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

A04/A05

METINVEST
METINVEST TRAMETAL SPA

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A01
Società per azioni con socio unico soggetta a direzione e coordinamento di Metinvest B.V
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Phone +39 0431 629989 - Fax +39 0431 629985
Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

A06 Cliente / Customer

S.I.F.E.A. SRL

Via leonardo da vinci 3
35020 LEGNARO 35020 IT
PD ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
614154	05/06/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32400847	24/00135
DDT	del / date
BOL 32410395	31/05/2024
Pratica / File no.	
del / date	

B06 Marcatura di prodotto / Marking of the product
LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	SA516GR70MT/LTV
Normativa / Specification	ASME

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI DIMENSIONS [mm]	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	PERMANENZA (Q) Min HOLDING TIME	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	PERMANENZA (T) Min HOLDING TIME	RAFFREDDAMENTO COOLING
3	STAD410802A	1953845	8.00X3000X12000	2,26	795761	BO	N	GF177																	
8	STAD870403A	1952183	13.00X3150X12000	3,86	795667	BO	N	GF136																	
8	STAD870403B	1952183	13.00X3150X12000	3,86	795667	BO	N	GF136																	
15	STAD880203A	1952622	18.00X3000X12000	5,09	795674	BO	N	GF140																	
15	STAD900203A	1952611	18.00X3000X12000	5,09	795659	BO	N	GF129																	
15	STAD900204A	1952620	18.00X3000X12000	5,09	795660	BO	N	GF130																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C %	Mn %	Si %	P %	S %	Cu %	Ni %	Cr %	Mo %	Al %	V %	Nb %	Ti %	Sn %	Ca %	N %	B %	H %	Ceq1 % (D)	Ceq2 % (D)	Pcm % (D)
Ordine Min 15			0,14																		
Ordine Max 15			0,25																	0,43	
Ordine Min 3			0,14																		
Ordine Max 3			0,25																	0,43	
Ordine Min 8			0,14																		
Ordine Max 8			0,25																	0,43	
SA51670LTV Min 0.00 - 12.50		0,85	0,15																		
SA51670LTV Max 0.00 - 12.50	0,27	1,20	0,40	0,025	0,025																
SA51670LTV Min 12.60 - 50.00		0,85	0,15																		
SA51670LTV Max 12.60 - 50.00	0,28	1,20	0,40	0,025	0,025																
STAD41	0,15	1,38	0,19	0,018	0,004	0,010	0,010	0,020	<0.005	0,036	0,002	0,002	0,002	<0.005	0,0000	0,0038	0,0002	0,0000	0,38	0,39	0,23
STAD87	0,17	1,50	0,19	0,013	0,002	0,010	0,010	0,020	<0.005	0,034	0,002	0,002	0,002	<0.005	0,0000	0,0031	0,0002	0,0000	0,42	0,43	0,25

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C	Mn	Si	P	S	Cu	Ni	Cr	Mo	Al	V	Nb	Ti	Sn	Ca	N	B	H	Ceq1	Ceq2	Pcm
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	% (D)	% (D)	% (D)
STAD88	0,17	1,49	0,21	0,018	0,003	0,010	0,010	0,040	<0.005	0,040	0,002	0,001	0,003	<0.005	0,0000	0,0020	0,0002	0,0000	0,42	0,43	0,26
STAD90	0,17	1,50	0,20	0,017	0,003	0,020	0,010	0,020	<0.005	0,039	0,002	0,002	0,003	<0.005	0,0000	0,0030	0,0002	0,0000	0,42	0,43	0,26

			PROVA DI TRAZIONE TENSILE TEST									PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	YIELD STRENGTH ReH [Mpa]	TENSILE STRENGTH Rm [Mpa]	ReH/Rm	ELONGATION A%	PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	SHAPE OF TEST PIECE FORMA PROVINO (4)	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDREL [mm] MANDRINO	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 15													L	-46		16	20										
ORDINE Min 3													L	-46		16	20										
ORDINE Min 8													L	-46		16	20										
SA51670LTV Min 0.00 - 20.00					20		485		17,0	260																	
SA51670LTV Max 0.00 - 20.00					20		620																				
SA51670LTV Min 0.00 - 25.00													L	-46			20										
GF129	18,00	2	P	T	20		525		33,4	361	P	10,00	L	-46	P	249 253 220	241						HB	169 166 163	166		
GF129	18,00	2	P	T	300					262	C	10,00	T	-20	P	176 208 223	202										
GF129	18,00	2										10,00	T	-50	P	189 143 174	169										
GF130	18,00	2	P	T	20		519		35,1	363	P	10,00	L	-46	P	228 219 235	227						HB	168 159 167	165		
GF130	18,00	2	P	T	300					270	C	10,00	T	-20	P	226 212 219	219										
GF130	18,00	2										10,00	T	-50	P	137 148 136	141										
GF136	13,00	2	P	T	20		532		31,2	377	P	10,00	L	-46	P	215 230 256	234						HB	171 162 164	166		
GF136	13,00	2	P	T	300					273	C	10,00	T	-20	P	220 192 220	210										
GF136	13,00	2										10,00	T	-50	P	129 113 94	112										
GF140	18,00	2	P	T	20		523		33,8	362	P	10,00	L	-46	P	207 230 211	216						HB	169 160 157	162		
GF140	18,00	2	P	T	300					284	C	10,00	T	-20	P	185 188 224	199										
GF140	18,00	2										10,00	T	-50	P	109 127 135	124										
GF177	8,00	2	P	T	20		512		37,0	383	P	7,50	L	-46	P	165 162 145	157						HB	155 167 158	160		
GF177	8,00	2	P	T	300					272	C	7,50	T	-20	P	130 118 106	118										
GF177	8,00	2										7,50	T	-50	P	76 73 80	76										

C10

ASME SA-370 FIG. 3 AND FIG. 10 / 11 - SAMPLE TAKEN AFTER PLATE HEAT TREATMENT. Elongation in 8" for thk ≤ 20mm, in 2" for thk > 20mm. IMPACT TEST IN ACC. TO ASME SA20 OPTION S5

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
STAD900203A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD900204A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD870403A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD870403B		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD880203A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD410802A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50

D18 NOTE REMARKS	D19 ENTE ISPETTIVO INSPECTOR	D20 FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.a. F. Andrian III Liv. EN ISO 9712

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
3		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
8		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
15		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

HARDNESS IN ACC. TO NACE MR 0103

STEEL VACUUM DEGASSED

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
PRODUCED FROM CONTINOUS CAST SLAB AND HAVE A MINIMUN REDUCTION RATIO OF 3 TO 1. ACCORDING TO ASME II PART A ED. 2023. FULLY KILLED, FINE GRAIN STEEL. Value of Mn maximun in derogation permitted up to 1.50% Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 84/2003/MUC-03).	TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE	METINVEST TRAMETAL S.p.a. F. Andrian CQ Manager

A02

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

A04/A05

METINVEST

METINVEST TRAMETAL SPA

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A01

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Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

A06 Cliente / Customer

S.I.F.E.A. SRL

Via leonardo da vinci 3
35020 LEGNARO 35020 IT
PD ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
614155	05/06/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32400847	24/00135
DDT	del / date
BOL 32410395	31/05/2024
Pratica / File no.	
del / date	

B06 Marcatura di prodotto / Marking of the product

LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	A516GR70MT/LTV
Normativa / Specification	ASTM

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI DIMENSIONS [mm]	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT BEGINNING TEMPERATURA INIZIO °C	TEMPERATURA INIZIO °C	VELOCITA' RISCALDO C/h	TEMPERATURE TRATTAMENTO °C	HOLDING TIME	PERMANENZA Min	VELOCITA' RAFFREDDAMENTO °C/h	END TEMPERATURE	TEMPERATURA FINE °C	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURE	TEMPERATURA (Q) °C	HOLDING TIME	PERMANENZA (Q) Min	COOLING	RAFFREDDAMENTO	TEMPERATURE	TEMPERATURA (T) °C	HOLDING TIME	PERMANENZA (T) Min	COOLING	RAFFREDDAMENTO
3	STAD410802A	1953845	8.00X3000X12000	2,26	795761	BO	N	GF177																									
8	STAD870403A	1952183	13.00X3150X12000	3,86	795667	BO	N	GF136																									
8	STAD870403B	1952183	13.00X3150X12000	3,86	795667	BO	N	GF136																									
15	STAD880203A	1952622	18.00X3000X12000	5,09	795674	BO	N	GF140																									
15	STAD900203A	1952611	18.00X3000X12000	5,09	795659	BO	N	GF129																									
15	STAD900204A	1952620	18.00X3000X12000	5,09	795660	BO	N	GF130																									

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C %	Mn %	Si %	P %	S %	Cu %	Ni %	Cr %	Mo %	Al %	V %	Nb %	Ti %	Sn %	Ca %	N %	B %	H %	Ceq1 % (D)	Ceq2 % (D)	Pcm % (D)
A51670LTV Min 0.00 - 12.50		0,85	0,15																		
A51670LTV Max 0.00 - 12.50	0,27	1,20	0,40	0,025	0,025																
A51670LTV Min 12.60 - 50.00		0,85	0,15																		
A51670LTV Max 12.60 - 50.00	0,28	1,20	0,40	0,025	0,025																
Ordine Min 15			0,14																		
Ordine Max 15			0,25																	0,43	
Ordine Min 3			0,14																		
Ordine Max 3			0,25																	0,43	
Ordine Min 8			0,14																		
Ordine Max 8			0,25																	0,43	
STAD41	0,15	1,38	0,19	0,018	0,004	0,010	0,010	0,020	<0.005	0,036	0,002	0,002	0,002	<0.005	0,0000	0,0038	0,0002	0,0000	0,38	0,39	0,23
STAD87	0,17	1,50	0,19	0,013	0,002	0,010	0,010	0,020	<0.005	0,034	0,002	0,002	0,002	<0.005	0,0000	0,0031	0,0002	0,0000	0,42	0,43	0,25

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C	Mn	Si	P	S	Cu	Ni	Cr	Mo	Al	V	Nb	Ti	Sn	Ca	N	B	H	Ceq1	Ceq2	Pcm
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	% (D)	% (D)	% (D)
STAD88	0,17	1,49	0,21	0,018	0,003	0,010	0,010	0,040	<0.005	0,040	0,002	0,001	0,003	<0.005	0,0000	0,0020	0,0002	0,0000	0,42	0,43	0,26
STAD90	0,17	1,50	0,20	0,017	0,003	0,020	0,010	0,020	<0.005	0,039	0,002	0,002	0,003	<0.005	0,0000	0,0030	0,0002	0,0000	0,42	0,43	0,26

			PROVA DI TRAZIONE TENSILE TEST								PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE LOCATION (1)	POSIZIONE LOCATION (2)	DIREZIONE ORIENTATION (3)	TEMPERATURA TEST TEMPERATURE [°C]	YIELD STRENGTH ReH [Mpa]	TENSILE STRENGTH Rm [Mpa]	ReH/Rm	ELONGATION A%	PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	SHAPE OF TEST PIECE FORMA PROVINO (4)	LARGHEZZA WIDTH [mm]	ORIENTATION DIREZIONE (3)	TEST TEMPERATURE TEMPERATURA [°C]	POSIZIONE LOCATION (2)	SINGOLI VALORI INDIVIDUAL VALUES [J]	MEDIA MEAN VALUE [J]	ORIENTATION DIREZIONE (3)	MANDREL MANDRINO [mm]	ANGLE ANGOLO [°]	RESULT ESITO (5)	LOCATION POSIZIONE (2)	TEST METHOD METODO	INDIVIDUAL VALUES SINGOLI VALORI	MEAN VALUE MEDIA	Z% INDIVIDUAL VALUES Z% SINGOLI VALORI	Z% MEAN VALUE Z% VALORE MEDIO
A51670LTV Min 0.00 - 20.00					20		485		17,0	260																	
A51670LTV Max 0.00 - 20.00					20		620																				
A51670LTV Min 0.00 - 25.00													L	-46			20										
ORDINE Min 15													L	-46		16	20										
ORDINE Min 3													L	-46		16	20										
ORDINE Min 8													L	-46		16	20										
GF129	18,00	2	P	T	20		525		33,4	361	P	10,00	L	-46	P	249 253 220	241						HB	169 166 163	166		
GF129	18,00	2	P	T	300					262	C	10,00	T	-20	P	176 208 223	202										
GF129	18,00	2										10,00	T	-50	P	189 143 174	169										
GF130	18,00	2	P	T	20		519		35,1	363	P	10,00	L	-46	P	228 219 235	227						HB	168 159 167	165		
GF130	18,00	2	P	T	300					270	C	10,00	T	-20	P	226 212 219	219										
GF130	18,00	2										10,00	T	-50	P	137 148 136	141										
GF136	13,00	2	P	T	20		532		31,2	377	P	10,00	L	-46	P	215 230 256	234						HB	171 162 164	166		
GF136	13,00	2	P	T	300					273	C	10,00	T	-20	P	220 192 220	210										
GF136	13,00	2										10,00	T	-50	P	129 113 94	112										
GF140	18,00	2	P	T	20		523		33,8	362	P	10,00	L	-46	P	207 230 211	216						HB	169 160 157	162		
GF140	18,00	2	P	T	300					284	C	10,00	T	-20	P	185 188 224	199										
GF140	18,00	2										10,00	T	-50	P	109 127 135	124										
GF177	8,00	2	P	T	20		512		37,0	383	P	7,50	L	-46	P	165 162 145	157						HB	155 167 158	160		
GF177	8,00	2	P	T	300					272	C	7,50	T	-20	P	130 118 106	118										
GF177	8,00	2										7,50	T	-50	P	76 73 80	76										

C10

ASME SA-370 FIG. 3 AND FIG. 10 / 11 - SAMPLE TAKEN AFTER PLATE HEAT TREATMENT. Elongation in 8" for thk ≤ 20mm, in 2" for thk > 20mm. IMPACT TEST IN ACC. TO ASTM A20 OPTION S5

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
STAD900203A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD900204A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD870403A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD870403B		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD880203A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
STAD410802A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50

D18 NOTE REMARKS	D19 ENTE ISPETTIVO INSPECTOR	D20 FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.a. F. Andrian III Liv. EN ISO 9712

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
3		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
8		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
15		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

HARDNESS IN ACC. TO NACE MR 0103

STEEL VACUUM DEGASSED

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
PRODUCED FROM CONTINOUS CAST SLAB AND HAVE A MINIMUN REDUCTION RATIO OF 3 TO 1. ACC. TO ASTM ED. 2023. FULLY KILLED, FINE GRAIN STEEL. Value of Mn maximun in derogation permitted up to 1.50% Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 84/2003/MUC-03).	TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE	METINVEST TRAMETAL S.p.a. F. Andrian CQ Manager

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

METINVEST
METINVEST TRAMETAL SPA

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Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A01

A02

A03 N° Certificato / Certificate no.: 611426

A02 Data / Date: 14/05/2024

A08 N° Ordine Trametal / Works order: 32400843

A07 N° Ordine cliente / Customer's order: 24/00134

DDT: BOL 32408641

del / date: 13/05/2024

Pratica / File no.:

del / date:

B01/B02/B03

Prodotto / Product: Lamiere / Hot rolled plates

Qualità / Steel grade: P355NH - AD2000W1

Normativa / Specification: EN10028-3:2017

A06 Cliente / Customer

S.I.F.E.A. SRL

Via leonardo da vinci 3
35020 LEGNARO 35020 IT
PD ITALIA

B06 Marcatura di prodotto / Marking of the product

LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI [mm] DIMENSIONS	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	PERMANENZA (Q) Min HOLDING TIME	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	PERMANENZA (T) Min HOLDING TIME	RAFFREDDAMENTO COOLING
14	RTAA560402A	1946900	15.00X2500X12000	3,53	793395	BO	N	GD807																	
14	RTAA560402B	1946900	15.00X2500X12000	3,53	793395	BO	N	GD807																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C %	Mn %	Si %	P %	S %	Cu %	Ni %	Cr %	Mo %	Al %	V %	Nb %	Ti %	Sn %	Ca %	N %	B %	H %	Ceq1 % (D)	Ceq2 % (D)	Pcm % (D)
Ordine Min 14			0,14																		
Ordine Max 14			0,25																	0,43	
P355NH Min 0.00 - 60.00		1,10								0,020											
P355NH Max 0.00 - 60.00	0,18	1,70	0,50	0,025	0,010	0,300	0,500	0,300	0,080		0,100	0,050	0,030			0,0120				0,43	
RTAA56	0,17	1,45	0,25	0,014	0,005	0,000	0,010	0,010	<0.005	0,032	<0.005	<0.010	0,001	<0.005	0,0000	0,0061	0,0004	0,0003	0,41	0,41	0,25

	PROVA DI TRAZIONE TENSILE TEST										PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	YIELD STRENGTH ReH [Mpa]	TENSILE STRENGTH Rm [Mpa]	ReH/Rm	ELONGATION A%	PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDREL MANDREL [mm]	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 14													L	-46		16	20										
P355NH Min 0.00 - 16.00					20	355	490		22,0																		
P355NH Min 0.00 - 16.00					300					232																	

			PROVA DI TRAZIONE TENSILE TEST										PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10		C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	YIELD STRENGTH ReH [Mpa]	TENSILE STRENGTH Rm [Mpa]	ReH/Rm	A% ELONGATION	PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDREL MANDRINO [mm]	ANGLE ANGOLO [°]	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
P355NH Max 0.00 - 16.00					20		630																					
P355NH Min 6.00 - 999.00													T	-20			30											
GD807	15,00	2	P	T	20	408	530	0,77	36,0		P	10,00	L	-46	P	226 231 234	230						HB	160 170 162	164		
GD807	15,00	2	P	T	300					256	C	10,00	T	-20	P	190 204 200	198										
GD807	15,00	2										10,00	T	-50	P	123 120 114	119										

C10
UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
RTAA560402A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
RTAA560402B		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50

D18 NOTE REMARKS	D19 ENTE ISPETTIVO INSPECTOR	D20 FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.a. F. Andrian III Liv. EN ISO 9712

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
14		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

HARDNESS IN ACC. TO NACE MR 0103

STEEL VACUUM DEGASSED

IN ACC. TO MATERIAL SPECIFICATION VDTUV-WB354/1

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 84/2003/MUC-03).	TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE	METINVEST TRAMETAL S.p.a. F. Andrian CQ Manager

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

METINVEST
METINVEST TRAMETAL SPA

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Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A03 N° Certificato / Certificate no.: 611425
Z02 Data / Date: 14/05/2024
A08 N° Ordine Trametal / Works order: 32400843
A07 N° Ordine cliente / Customer's order: 24/00134
DDT: BOL 32408641
del / date: 13/05/2024
Pratica / File no.:
del / date:

A06 Cliente / Customer

S.I.F.E.A. SRL

Via leonardo da vinci 3
35020 LEGNARO 35020 IT
PD ITALIA

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	P355GH - AD2000W1
Normativa / Specification	EN10028-2:2017

B06 Marcatura di prodotto / Marking of the product
LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI DIMENSIONS [mm]	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	HOLDING TIME PERMANENZA (Q) Min	COOLING RAFFREDDAMENTO	TEMPERATURA (T) °C TEMPERATURE	HOLDING TIME PERMANENZA (T) Min	COOLING RAFFREDDAMENTO
14	RTAA560402A	1946900	15.00X2500X12000	3,53	793395	BO	N	GD807																	
14	RTAA560402B	1946900	15.00X2500X12000	3,53	793395	BO	N	GD807																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C %	Mn %	Si %	P %	S %	Cu %	Ni %	Cr %	Mo %	Al %	V %	Nb %	Ti %	Sn %	Ca %	N %	B %	H %	Ceq1 % (D)	Ceq2 % (D)	Pcm % (D)
Ordine Min 14			0,14																		
Ordine Max 14			0,25																	0,43	
P355GH Min 0.00 - 150.00	0,10	1,10								0,020											
P355GH Max 0.00 - 150.00	0,22	1,70	0,60	0,025	0,010	0,300	0,300	0,300	0,080		0,020	0,040	0,030			0,0120					
RTAA56	0,17	1,45	0,25	0,014	0,005	0,000	0,010	0,010	<0.005	0,032	<0.005	<0.010	0,001	<0.005	0,0000	0,0061	0,0004	0,0003	0,41	0,41	0,25

C00 CAMPIONE SAMPLE		C01 POSIZIONE (1) LOCATION SPESSORE LAMIERA PLATE THICKNESS	PROVA DI TRAZIONE TENSILE TEST C01 POSIZIONE (2) LOCATION	C02 DIREZIONE (3) ORIENTATION	C03 TEMPERATURA [°C] TEST TEMPERATURE	C11 YIELD STRENGTH ReH [Mpa]	C12 TENSILE STRENGTH Rm [Mpa]	C13 Reh/Rm	C14 A% ELONGATION	C10 FORMA PROVINO (4) SHAPE OF TEST PIECE PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST C41 LARGHEZZA [mm] WIDTH	C02 DIREZIONE (3) ORIENTATION	C03 TEMPERATURA [°C] TEST TEMPERATURE	C01 POSIZIONE (2) LOCATION	C42 SINGOLI VALORI [J] INDIVIDUAL VALUES	C43 MEDIA [J] MEAN VALUE	PROVA DI PIEGA BEND TEST C02 DIREZIONE (3) ORIENTATION	C51 MANDREL MANDRINO [mm]	C52 ANGOLO [°] ANGLE	C50 ESITO (5) RESULT	PROVA DI DUREZZA HARDNESS TEST C01 POSIZIONE (2) LOCATION	C30 METODO TEST METHOD	C31 SINGOLI VALORI INDIVIDUAL VALUES	C32 MEDIA MEAN VALUE	PROVA DI STRIZIONE Z% TEST C53 Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	C54 Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 14												L	-46		16	20										
P355GH Min 0.00 - 16.00					20	355	510		20,0																	
P355GH Min 0.00 - 16.00					300					232																

			PROVA DI TRAZIONE TENSILE TEST									PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	ReH [Mpa] YIELD STRENGTH	Rm [Mpa] TENSILE STRENGTH	Re/Rm	A% ELONGATION	Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDRINO [mm] MANDREL	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
P355GH Max 0.00 - 16.00					20		650																				
P355GH Min 6.00 - 999.00													T	-20			27										
GD807	15,00	2	P	T	20	408	530	0,77	36,0		P	10,00	L	-46	P	226 231 234	230						HB	160 170 162	164		
GD807	15,00	2	P	T	300					256	C	10,00	T	-20	P	190 204 200	198										
GD807	15,00	2										10,00	T	-50	P	123 120 114	119										

C10
UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
RTAA560402A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
RTAA560402B		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50

D18 NOTE REMARKS	D19 ENTE ISPETTIVO INSPECTOR	D20 FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.a. F. Andrian III Liv. EN ISO 9712

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
14		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

HARDNESS IN ACC. TO NACE MR 0103

STEEL VACUUM DEGASSED

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 84/2003/MUC-03).	TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE	METINVEST TRAMETAL S.p.a. F. Andrian CQ Manager

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

METINVEST
METINVEST TRAMETAL SPA

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Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A03 N° Certificato / Certificate no.: 611424
Z02 Data / Date: 14/05/2024
A08 N° Ordine Trametal / Works order: 32400843
A07 N° Ordine cliente / Customer's order: 24/00134
DDT: BOL 32408641
del / date: 13/05/2024
Pratica / File no.:
del / date:

A06 Cliente / Customer

S.I.F.E.A. SRL

Via leonardo da vinci 3
35020 LEGNARO 35020 IT
PD ITALIA

B06 Marcatura di prodotto / Marking of the product
LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03
Prodotto / Product: Lamiere / Hot rolled plates
Qualità / Steel grade: P295GH
Normativa / Specification: EN10028-2:2017

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI DIMENSIONS [mm]	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	HOLDING TIME PERMANENZA (Q) Min	COOLING RAFFREDDAMENTO	TEMPERATURA (T) °C TEMPERATURE	HOLDING TIME PERMANENZA (T) Min	COOLING RAFFREDDAMENTO
14	RTAA560402A	1946900	15.00X2500X12000	3,53	793395	BO	N	GD807																	
14	RTAA560402B	1946900	15.00X2500X12000	3,53	793395	BO	N	GD807																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C %	Mn %	Si %	P %	S %	Cu %	Ni %	Cr %	Mo %	Al %	V %	Nb %	Ti %	Sn %	Ca %	N %	B %	H %	Ceq1 % (D)	Ceq2 % (D)	Pcm % (D)
Ordine Min 14			0,14																		
Ordine Max 14			0,25																	0,43	
P295GH Min 0.00 - 150.00	0,08	0,90								0,020											
P295GH Max 0.00 - 150.00	0,20	1,50	0,40	0,025	0,010	0,300	0,300	0,300	0,080		0,020	0,030	0,030			0,0120					
RTAA56	0,17	1,45	0,25	0,014	0,005	0,000	0,010	0,010	<0.005	0,032	<0.005	<0.010	0,001	<0.005	0,0000	0,0061	0,0004	0,0003	0,41	0,41	0,25

C00 CAMPIONE SAMPLE		C01 SPESSORE LAMIERA PLATE THICKNESS / POSIZIONE (1) LOCATION	PROVA DI TRAZIONE TENSILE TEST: C01 POSIZIONE (2) LOCATION	C02 DIREZIONE (3) ORIENTATION	C03 TEMPERATURA [°C] TEST TEMPERATURE	C11 YIELD STRENGTH ReH [Mpa]	C12 TENSILE STRENGTH Rm [Mpa]	C13 Reh/Rm	C14 ELONGATION A%	C10 FORMA PROVINO (4) SHAPE OF TEST PIECE / Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST: C41 LARGHEZZA [mm] WIDTH	C02 DIREZIONE (3) ORIENTATION	C03 TEMPERATURA [°C] TEST TEMPERATURE	C01 POSIZIONE (2) LOCATION	C42 SINGOLI VALORI [J] INDIVIDUAL VALUES	C43 MEDIA [J] MEAN VALUE	PROVA DI PIEGA BEND TEST: C02 DIREZIONE (3) ORIENTATION	C51 MANDREL MANDRINO [mm]	C52 ANGOLO [°] ANGLE	C50 ESITO (5) RESULT	PROVA DI DUREZZA HARDNESS TEST: C01 POSIZIONE (2) LOCATION	C30 METODO TEST METHOD	C31 SINGOLI VALORI INDIVIDUAL VALUES	C32 MEDIA MEAN VALUE	PROVA DI STRIZIONE Z% TEST: C53 Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	C54 Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 14												L	-46		16	20										
P295GH Min 0.00 - 16.00					20	295	460		21,0																	
P295GH Min 0.00 - 16.00					300					192																

			PROVA DI TRAZIONE TENSILE TEST										PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10		C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	ReH [Mpa] YIELD STRENGTH	Rm [Mpa] TENSILE STRENGTH	ReH/Rm	A% ELONGATION	Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDRINO [mm] MANDREL	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
P295GH Max 0.00 - 16.00					20		580																					
P295GH Min 6.00 - 999.00														T	-20			27										
GD807	15,00	2	P	T	20	408	530	0,77	36,0		P	10,00	L	-46	P	226 231 234	230						HB	160 170 162	164		
GD807	15,00	2	P	T	300					256	C	10,00	T	-20	P	190 204 200	198										
GD807	15,00	2										10,00	T	-50	P	123 120 114	119										

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
RTAA560402A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
RTAA560402B		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50

D18	D19	D20
NOTE REMARKS	ENTE ISPETTIVO INSPECTOR	FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.a. F. Andrian III Liv. EN ISO 9712

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
14		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

HARDNESS IN ACC. TO NACE MR 0103

STEEL VACUUM DEGASSED

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 84/2003/MUC-03).	TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE	METINVEST TRAMETAL S.p.a. F. Andrian CQ Manager

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

METINVEST
METINVEST TRAMETAL SPA

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Phone +39 0431 629989 - Fax +39 0431 629985
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C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A06 Cliente / Customer

S.I.F.E.A. SRL

Via leonardo da vinci 3
35020 LEGNARO 35020 IT
PD ITALIA

A03 N° Certificato / Certificate no.	A02 Data / Date
611423	14/05/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32400843	24/00134
DDT	del / date
BOL 32408641	13/05/2024
Pratica / File no.	
del / date	

B06 Marcatura di prodotto / Marking of the product
LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	P355NL2
Normativa / Specification	EN10028-3:2017

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI DIMENSIONS [mm]	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	C00 N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	PERMANENZA (Q) Min HOLDING TIME	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	PERMANENZA (T) Min HOLDING TIME	RAFFREDDAMENTO COOLING
14	RTAA560402A	1946900	15.00X2500X12000	3,53	793395	BO	N	GD807																	
14	RTAA560402B	1946900	15.00X2500X12000	3,53	793395	BO	N	GD807																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C %	Mn %	Si %	P %	S %	Cu %	Ni %	Cr %	Mo %	Al %	V %	Nb %	Ti %	Sn %	Ca %	N %	B %	H %	Ceq1 % (D)	Ceq2 % (D)	Pcm % (D)
Ordine Min 14			0,14																		
Ordine Max 14			0,25																	0,43	
P355NL2 Min 0.00 - 60.00		1,10								0,020											
P355NL2 Max 0.00 - 60.00	0,18	1,70	0,50	0,020	0,005	0,300	0,500	0,300	0,080		0,100	0,050	0,030			0,0120				0,43	
RTAA56	0,17	1,45	0,25	0,014	0,005	0,000	0,010	0,010	<0.005	0,032	<0.005	<0.010	0,001	<0.005	0,0000	0,0061	0,0004	0,0003	0,41	0,41	0,25

	PROVA DI TRAZIONE TENSILE TEST										PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEST TEMPERATURA [°C]	YIELD STRENGTH ReH [Mpa]	TENSILE STRENGTH Rm [Mpa]	ReH/Rm	A% ELONGATION	PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDREL MANDRINO [mm]	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 14													L	-46		16	20										
P355NL2 Min 0.00 - 16.00					20	355	490		22,0																		
P355NL2 Max 0.00 - 16.00					20		630																				

			PROVA DI TRAZIONE TENSILE TEST									PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	ReH [Mpa] YIELD STRENGTH	Rm [Mpa] TENSILE STRENGTH	ReH/Rm	A% ELONGATION	Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDRINO [mm] MANDREL	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
P355NL2 Min 6.00 - 999.00													T	-50			27										
GD807	15,00	2	P	T	20	408	530	0,77	36,0		P	10,00	L	-46	P	226 231 234	230						HB	160 170 162	164		
GD807	15,00	2	P	T	300					256	C	10,00	T	-20	P	190 204 200	198										
GD807	15,00	2										10,00	T	-50	P	123 120 114	119										

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
RTAA560402A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
RTAA560402B		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50

D18 NOTE REMARKS	D19 ENTE ISPETTIVO INSPECTOR	D20 FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.a. F. Andrian III Liv. EN ISO 9712

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
14		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

HARDNESS IN ACC. TO NACE MR 0103

STEEL VACUUM DEGASSED

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 84/2003/MUC-03).	TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE	METINVEST TRAMETAL S.p.a. F. Andrian CQ Manager

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

METINVEST
METINVEST TRAMETAL SPA

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Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A03 N° Certificato / Certificate no.: 611421
Z02 Data / Date: 14/05/2024
A08 N° Ordine Trametal / Works order: 32400843
A07 N° Ordine cliente / Customer's order: 24/00134
DDT: BOL 32408641
del / date: 13/05/2024
Pratica / File no.:
del / date:

A06 Cliente / Customer

S.I.F.E.A. SRL

Via leonardo da vinci 3
35020 LEGNARO 35020 IT
PD ITALIA

B06 Marcatura di prodotto / Marking of the product
LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03
Prodotto / Product: Lamiere / Hot rolled plates
Qualità / Steel grade: SA516GR70MT/LTV
Normativa / Specification: ASME

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI DIMENSIONS [mm]	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	PERMANENZA (Q) Min HOLDING TIME	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	PERMANENZA (T) Min HOLDING TIME	RAFFREDDAMENTO COOLING
14	RTAA560402A	1946900	15.00X2500X12000	3,53	793395	BO	N	GD807																	
14	RTAA560402B	1946900	15.00X2500X12000	3,53	793395	BO	N	GD807																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C %	Mn %	Si %	P %	S %	Cu %	Ni %	Cr %	Mo %	Al %	V %	Nb %	Ti %	Sn %	Ca %	N %	B %	H %	Ceq1 % (D)	Ceq2 % (D)	Pcm % (D)
Ordine Min 14			0,14																		
Ordine Max 14			0,25																	0,43	
SA51670LTV Min 12.60 - 50.00		0,85	0,15																		
SA51670LTV Max 12.60 - 50.00	0,28	1,20	0,40	0,025	0,025																
RTAA56	0,17	1,45	0,25	0,014	0,005	0,000	0,010	0,010	<0.005	0,032	<0.005	<0.010	0,001	<0.005	0,0000	0,0061	0,0004	0,0003	0,41	0,41	0,25

C00 CAMPIONE SAMPLE		C01 POSIZIONE LOCATION (1) SPESSORE LAMIERA PLATE THICKNESS	PROVA DI TRAZIONE TENSILE TEST: C01 POSIZIONE LOCATION (2)	C02 DIREZIONE ORIENTATION (3)	C03 TEMPERATURA TEST TEMPERATURE [°C]	C11 YIELD STRENGTH ReH [Mpa]	C12 TENSILE STRENGTH Rm [Mpa]	C13 ELONGATION A%	C14 PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	C10 FORMA PROVINO (4) SHAPE OF TEST PIECE	PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST: C41 LARGHEZZA WIDTH [mm]	C02 DIREZIONE ORIENTATION (3)	C03 TEMPERATURA TEST TEMPERATURE [°C]	C01 POSIZIONE LOCATION (2)	C42 SINGOLI VALORI INDIVIDUAL VALUES [J]	C43 MEDIA MEAN VALUE [J]	PROVA DI PIEGA BEND TEST: C02 DIREZIONE ORIENTATION (3)	C51 MANDREL MANDRINO [mm]	C52 ANGOLO ANGLE [°]	C50 ESITO RESULT (5)	PROVA DI DUREZZA HARDNESS TEST: C01 POSIZIONE LOCATION (2)	C30 METODO TEST METHOD	C31 SINGOLI VALORI INDIVIDUAL VALUES	C32 MEDIA MEAN VALUE	PROVA DI STRIZIONE Z% TEST: C53 Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	C54 Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 14												L	-46		16	20										
SA51670LTV Min 0.00 - 20.00					20		485	17,0	260																		
SA51670LTV Max 0.00 - 20.00					20		620																				

			PROVA DI TRAZIONE TENSILE TEST								PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEST TEMPERATURA [°C] TEMPERATURE	ReH [Mpa] YIELD STRENGTH	Rm [Mpa] TENSILE STRENGTH	ReH/Rm	A% ELONGATION	Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDRINO [mm] MANDREL	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
SA51670LTV Min 0.00 - 25.00													L	-46			20										
GD807	15,00	2	P	T	20		530		36,0	403	P	10,00	L	-46	P	226 231 234	230						HB	160 170 162	164		
GD807	15,00	2	P	T	300					256	C	10,00	T	-20	P	190 204 200	198										
GD807	15,00	2										10,00	T	-50	P	123 120 114	119										

C10

ASME SA-370 FIG. 3 AND FIG. 10 / 11 - SAMPLE TAKEN AFTER PLATE HEAT TREATMENT. Elongation in 8" for thk ≤ 20mm, in 2" for thk > 20mm. IMPACT TEST IN ACC. TO ASME SA20 OPTION S5

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
RTAA560402A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
RTAA560402B		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50

D18 NOTE REMARKS	D19 ENTE ISPETTIVO INSPECTOR	D20 FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.a. F. Andrian III Liv. EN ISO 9712

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
14		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

HARDNESS IN ACC. TO NACE MR 0103

STEEL VACUUM DEGASSED

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
PRODUCED FROM CONTINOUS CAST SLAB AND HAVE A MINIMUN REDUCTION RATIO OF 3 TO 1. ACCORDING TO ASME II PART A ED. 2023. FULLY KILLED, FINE GRAIN STEEL. Value of Mn maximun in derogation permitted up to 1.50% Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 84/2003/MUC-03).	TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE	METINVEST TRAMETAL S.p.a. F. Andrian CQ Manager

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

METINVEST
METINVEST TRAMETAL SPA

Società per azioni con socio unico soggetta a direzione e coordinamento di Metinvest B.V
Registered office: Via XII Ottobre 1, 5° piano - 16121 Genova, Italy
Phone +39 010 5762911 - Fax +39 010 5762990
Works: Via E. Fermi, 44 - 33058 San Giorgio di Nogaro UD, Italy
Phone +39 0431 629989 - Fax +39 0431 629985
Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A06 Cliente / Customer

S.I.F.E.A. SRL

Via leonardo da vinci 3
35020 LEGNARO 35020 IT
PD ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
611422	14/05/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32400843	24/00134
DDT	del / date
BOL 32408641	13/05/2024
Pratica / File no.	
del / date	

B06 Marcatura di prodotto / Marking of the product
LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	A516GR70MT/LTV
Normativa / Specification	ASTM

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI DIMENSIONS [mm]	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C	PERMANENZA (Q) Min HOLDING TIME	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C	PERMANENZA (T) Min HOLDING TIME	RAFFREDDAMENTO COOLING
14	RTAA560402A	1946900	15.00X2500X12000	3,53	793395	BO	N	GD807																	
14	RTAA560402B	1946900	15.00X2500X12000	3,53	793395	BO	N	GD807																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C %	Mn %	Si %	P %	S %	Cu %	Ni %	Cr %	Mo %	Al %	V %	Nb %	Ti %	Sn %	Ca %	N %	B %	H %	Ceq1 % (D)	Ceq2 % (D)	Pcm % (D)
A51670LTV Min 12.60 - 50.00		0,85	0,15																		
A51670LTV Max 12.60 - 50.00	0,28	1,20	0,40	0,025	0,025																
Ordine Min 14			0,14																		
Ordine Max 14			0,25																	0,43	
RTAA56	0,17	1,45	0,25	0,014	0,005	0,000	0,010	0,010	<0.005	0,032	<0.005	<0.010	0,001	<0.005	0,0000	0,0061	0,0004	0,0003	0,41	0,41	0,25

	PROVA DI TRAZIONE TENSILE TEST										PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	YIELD STRENGTH ReH [Mpa]	Rm [Mpa] TENSILE STRENGTH	ReH/Rm	A% ELONGATION	Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDREL MANDRINO [mm]	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
A51670LTV Min 0.00 - 20.00					20		485		17,0	260																	
A51670LTV Max 0.00 - 20.00					20		620																				
A51670LTV Min 0.00 - 25.00													L	-46			20										

			PROVA DI TRAZIONE TENSILE TEST									PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	ORIENTATION (3) DIREZIONE	TEST TEMPERATURE TEMPERATURA [°C]	YIELD STRENGTH ReH [Mpa]	TENSILE STRENGTH Rm [Mpa]	ReH/Rm	ELONGATION A%	PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	SHAPE OF TEST PIECE FORMA PROVINO (4)	LARGHEZZA [mm] WIDTH	ORIENTATION (3) DIREZIONE	TEST TEMPERATURE TEMPERATURA [°C]	LOCATION POSIZIONE (2)	INDIVIDUAL VALUES SINGOLI VALORI [J]	MEAN VALUE MEDIA [J]	ORIENTATION (3) DIREZIONE	MANDREL MANDRINO [mm]	ANGLE ANGOLO [°]	RESULT ESITO (5)	LOCATION POSIZIONE (2)	TEST METHOD METODO	INDIVIDUAL VALUES SINGOLI VALORI	MEAN VALUE MEDIA	Z% INDIVIDUAL VALUES Z% SINGOLI VALORI	Z% MEAN VALUE Z% VALORE MEDIO
ORDINE Min 14													L	-46		16	20										
GD807	15,00	2	P	T	20		530		36,0	403	P	10,00	L	-46	P	226 231 234	230						HB	160 170 162	164		
GD807	15,00	2	P	T	300					256	C	10,00	T	-20	P	190 204 200	198										
GD807	15,00	2										10,00	T	-50	P	123 120 114	119										

C10

ASME SA-370 FIG. 3 AND FIG. 10 / 11 - SAMPLE TAKEN AFTER PLATE HEAT TREATMENT. Elongation in 8" for thk ≤ 20mm, in 2" for thk > 20mm. IMPACT TEST IN ACC. TO ASTM A20 OPTION S5

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
RTAA560402A		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50
RTAA560402B		mm 20	5 MHz	0	ASME-SA578/A		OK	NO INDICATIONS FOUND	mm 225x225	50

D18 NOTE REMARKS	D19 ENTE ISPETTIVO INSPECTOR	D20 FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.a. F. Andrian III Liv. EN ISO 9712

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
14		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

HARDNESS IN ACC. TO NACE MR 0103

STEEL VACUUM DEGASSED

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
PRODUCED FROM CONTINOUS CAST SLAB AND HAVE A MINIMUN REDUCTION RATIO OF 3 TO 1. ACC. TO ASTM ED. 2023. FULLY KILLED, FINE GRAIN STEEL. Value of Mn maximun in derogation permitted up to 1.50% Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 84/2003/MUC-03).	TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE	METINVEST TRAMETAL S.p.a. F. Andrian CQ Manager

S.I.F.E.A.

Società Italiana Fondi Bombati e Affini

Riporto marcature - *Marking transfer*

S.I.F.E.A.				Cliente / Client					
Comm. n° *Job n°*	170149FP/2/1	Pos. n° *Item No*	001-002	Nome *Name*	COES S.r.l.	Ordine n° *P.O. No.*	1935/24	Ref. / Job	166/24-167/24
								Article	DIS L3716 JOB 167/24

Marcatura lamiera originale / *Original Marking of plate*

Pos. *Item*	Prodotto *Article*	Marcatura Originale *Original Marking*	Colata *Heat number*	N° lamiera o prova *Plate Number*	Produttore *Manufacturer*	N° certificato *Inspection Certificate No*	Data *Date*
001 002	lamiera / sheet metal SA516-70 Sp. / Thk. 15 mm	SA516-70MTLTV RTAA56 0402A UT A578/A	RTAA56	0402A	METINVEST TRAMETAL S.p.A. ITA (EU)	611426/-425/-424/-423/-421/-422	14/05/2024

Riporto marcature / *Marking transfer*

Pos. *Item*	Effettuato su: ***lamiera*** *Carried out on: **plate***		Riporto *Transfer*	Materiale prodotto *End-item*	Norma *Standard*	N° certificato *Certificate no.*	Ente ispettivo (E.N.) *Inspection agency (N.B.)*	Data *Date*
	Matricola	NF/SN						
001 002	170149FP/2/1/001 170149FP/2/1/002		SIFEA SA516-70 RTAA56 0402A SIFEA	FONDO PSEUDOELLITTICO 2:1 ELLIPSOIDAL HEAD 2:1				

Località - *Location*	Data - *Date*	Incaricato – *Person in charge*
Legnaro (PD)	**07/06/2024**	S.I.F.E.A. S.R.L. CONTROLLO QUALITÀ **Nicola Fierro**

S.I.F.E.A.

Società Italiana Fondi Bombati e Affini

Riporto marcature - *Marking transfer*

S.I.F.E.A.				Cliente / Client					
Comm. n° *Job n°*	170149FP/1/1	Pos. n° *Item No*	001-002	Nome *Name*	COES S.r.l.	Ordine n° *P.O. No.*	1935/24	Ref. / Job	166/24-167/24
								Article	DIS L3728 JOB 166/24

Marcatura lamiera originale / *Original Marking of plate*

Pos. *Item*	Prodotto *Article*	Marcatura Originale *Original Marking*	Colata *Heat number*	N° lamiera o prova *Plate Number*	Produttore *Manufacturer*	N° certificato *Inspection Certificate No*	Data *Date*
001 002	lamiera / sheet metal SA516-70 Sp. / Thk. 18 mm	SA516-70MTLTV STAD90 0204A UT A578/A	STAD90	0204A	METINVEST TRAMETAL S.p.A. ITA (EU)	614161/-160/-158/-157/-154/-155	05/06/2024

Riporto marcature / *Marking transfer*

Pos. *Item*	Effettuato su: ***lamiera*** *Carried out on: **plate***		Riporto *Transfer*	Materiale prodotto *End-item*	Norma *Standard*	N° certificato *Certificate no.*	Ente ispettivo (E.N.) *Inspection agency (N.B.)*	Data *Date*
	Matricola	NF/SN						
001 002	170149FP/1/1/001 170149FP/1/1/002		SIFEA SA516-70 STAD90 0204A SIFEA	FONDO PSEUDOELLITTICO 2:1 ELLIPSOIDAL HEAD 2:1				

Località - *Location*	Data - *Date*	Incaricato – *Person in charge*
Legnaro (PD)	**07/06/2024**	S.I.F.E.A. S.R.L. CONTROLLO QUALITÀ **Nicola Fierro**

A01

Duferco TRAVI E PROFILATI

Azienda certificata ISO 9001:2015 ISO 14001:2015 ISO 45001:2018

TRAVI E PROFILATI DI PALLANZENO S.p.A.
SOCIETÀ A SOCIO UNICO
SEDE LEGALE
VIA SEMPIONE, 7 – 28884 PALLANZENO (VB)
TEL. 0345011 – FAX. 003452705
PARTITA IVA IT 01910110038
CODICE FISCALE 01910110038
R.E.A. V.C.O. 191072 – REGISTRO IMPRESE (VB) N. 01910110038
CAPITALE SOCIALE € 30.000,000 I.V.
SEDE AMMINISTRATIVA
VIA A.DIAZ, 248 – 25010 SAN ZENO NAVIGLIO (BS)
STABILIMENTO DI SAN ZENO NAVIGLIO
VIA A. DIAZ, 248 - 25010 SAN ZENO NAVIGLIO (BS)
TELEFONO +3903021691 - FAX +390302667598

INSPECTION CERTIFICATE

A02 **Normativa** EN 10204:2004 3.1

A03 **Numero:** 1078 2024 ✓ **del** 19/04/24

Pag. 1

Your Ref.: 181-2024 bis / 17/04/24

A09 **DdT / *SHIPPING DOCUMENT:*** DDT/DELIVNOTE BA/1078

B01 Prodotto e Dimensioni / *Product and Dimension* | B11 B02 Qualità acciaio / *Steel Grade* | B08 N. Fasci / *Number of Bundles* | B10 Lunghezza / *Lenght (m)*

Norma del prodotto / *Standard product* | Norma qualità / *Standard quality* | B08 N. Barre / *Number of Pieces* | B13 Quantità / *Mass (Kg)*

B07 Colata - Lotto / *Heat - Item* | A07 Ordine cliente N. / *Customer's order N.* | A08 Nostro ordine N. / *Our Order N.*

ANALISI CHIMICHE / *CHEMICAL COMPOSITION*

	C71 C %	C72 Mn %	C73 Si %	C74 P %	C75 S %	C76 Al %	C77 Cu %	C78 N %	C87 CEV
	C79 Cr %	C80 Ni %	C81 Mo %	C82 V %	C83 Nb %	C84 Sn %	C85 Ti %	C86 B %	
~~HEB 200~~	~~S355J2 +AR~~	~~3~~	~~12,10~~	~~0,09~~	~~0,66~~	~~0,19~~	~~0,012~~	~~0,0130~~	~~0,006~~	~~0,318~~	~~0,011~~	~~0,253~~
~~EN 10365:2017~~	~~EN10025-2/EN10034:1~~	~~10~~	~~13.536~~	~~0,064~~	~~0,126~~	~~0,026~~	~~0,001~~	~~0,002~~	~~0,020~~	~~0,001~~		
~~No. 145168~~	~~181-2024~~		~~44/00096~~	~~340~~	~~491~~	~~30~~	~~10,0~~	~~57,0~~	~~60,5~~	~~51,1~~	~~50,0~~	~~0~~
~~HEB 200~~	~~S355J2 +AR~~	~~1~~	~~12,10~~	~~0,09~~	~~0,66~~	~~0,19~~	~~0,012~~	~~0,0130~~	~~0,006~~	~~0,318~~	~~0,011~~	~~0,253~~
~~EN 10365:2017~~	~~EN10025-2/EN10034:1~~	~~10~~	~~4.060~~	~~0,064~~	~~0,126~~	~~0,026~~	~~0,001~~	~~0,002~~	~~0,020~~	~~0,001~~		
~~No. 141903~~	~~181-2024 bis~~		~~44/00096~~	~~371~~	~~491~~	~~29~~	~~7,5~~	~~110,0~~	~~120,6~~	~~101,5~~	~~126,0~~	~~0~~
HEB 200 ✓	S355J2 +AR ✓	2	12,10	0,09	0,66	0,19	0,012	0,0130	0,006	0,318	0,011	0,253
EN 10365:2017	EN 10025-2/EN10034:1	12	9.026	0,064	0,126	0,026	0,001	0,002	0,028	0,001		
No. 145148 ✓	S 181-2024		44/00095	404	566	30	10,0	46,9	53,8	48,1	49,6	- 20

CARATTERISTICHE MECCANICHE / *MECHANICAL PROPERTIES*

C11 Snervamento *Yield point* ReH - N / mm² | C12 Resistenza *Tensile strenght* Rm - N / mm² | C13 Allungamento *Elongation* A% | C40 Prova di Resilienza - *Impact Test KV (J)*

	C41 h (mm)	C42 KV1	C42 KV2	C42 KV3	C43 KVm	C03 Temp. °C
~~HEB 200~~	~~S355J2 +AR~~	~~3~~	~~12,10~~	~~0,09~~	~~0,66~~	~~0,19~~	~~0,012~~	~~0,0130~~	~~0,006~~	~~0,318~~	~~0,011~~	~~0,253~~
~~EN 10365:2017~~	~~EN10025-2/EN10034:1~~	~~10~~	~~13.536~~	~~0,064~~	~~0,126~~	~~0,026~~	~~0,001~~	~~0,002~~	~~0,020~~	~~0,001~~		
~~No. 145168~~	~~181-2024~~		~~44/00096~~	~~340~~	~~491~~	~~30~~	~~10,0~~	~~57,0~~	~~60,5~~	~~51,1~~	~~50,0~~	~~0~~
~~HEB 200~~	~~S355J2 +AR~~	~~1~~	~~12,10~~	~~0,09~~	~~0,66~~	~~0,19~~	~~0,012~~	~~0,0130~~	~~0,006~~	~~0,318~~	~~0,011~~	~~0,253~~
~~EN 10365:2017~~	~~EN10025-2/EN10034:1~~	~~10~~	~~4.060~~	~~0,064~~	~~0,126~~	~~0,026~~	~~0,001~~	~~0,002~~	~~0,020~~	~~0,001~~		
~~No. 141903~~	~~181-2024 bis~~		~~44/00096~~	~~371~~	~~491~~	~~29~~	~~7,5~~	~~110,0~~	~~120,6~~	~~101,5~~	~~126,0~~	~~0~~
HEB 200 ✓	S355J2 +AR ✓	2	12,10	0,09	0,66	0,19	0,012	0,0130	0,006	0,318	0,011	0,253
EN 10365:2017	EN 10025-2/EN10034:1	12	9.026	0,064	0,126	0,026	0,001	0,002	0,028	0,001		
No. 145148 ✓	S 181-2024		44/00095	404	566	30	10,0	46,9	53,8	48,1	49,6	- 20

COPIA CONFORME ALL'ORIGINALE
CERTIFICATO VALIDO PER KG 7.5 S
FORNITO ALLA DITTA COES SRL
CON NS. DDT DI CONSEGNA N° 7690 del 12/7/24
BRESCIA 12/7/24
p. SIDERURGICA FERRO BULLONI SPA

COES G.Q.	Ricezione data 12/07/2024	Sigla V.S.
	Verificato data 13/07/2024	Sigla V.S.

RADIOACTIVITY FREE (0,1 Bq/g)

Impiego previsto: Edilizia Civile - Durabilità: nessuna prescrizione determinata
Sostanza regolamentata: Nessuna prescrizione determinata - Saldabilità: Secondo EN 1011-2
Si dichiara che i risultati delle prove sono conformi all'ordine.

(*) Stabilimento produttore
Z = San Zeno Naviglio (BS)
P = Pallanzeno (VB)

Marchio del produttore Z Duferco TRAVI E PROFILATI

T.P.P. s.p.a.
Samuele Bottari

24 2167

Duferco
TRAVI E PROFILATI

Azienda certificata
ISO 9001:2015
ISO 14001:2015
ISO 45001:2018

TRAVI E PROFILATI DI PALLANZENO S.p.A.

DICHIARAZIONE DI PRESTAZIONE
DECLARED PERFORMANCE

03 N° 2024 DDT / BA/1078

1. Tipo, qualità: laminati a caldo in accordo con EN 10025-2:2004.
   Tipo: S355 grado: JR,J0,J2, K2

   Type, quality: hot rolled product in agreement with EN 10025-2:2004.
   Type: S355 grade: JR,J0,J2, K2

2. Uso previsto del prodotto da costruzione: Prodotti laminati a caldo di acciai per impieghi strutturali.
   Intended use of the construction product: hot rolled products of structural steel.

3. Nome e indirizzo del fabbricante:
   Name and address of the manufacturer:

   Travi e Profilati di Pallanzeno S.p.A.
   Stabilimento di San Zeno Naviglio

   Via A.Diaz, 248 – 25010 San Zeno Naviglio (BS)

   Telefono +3903021691 – Fax +390302667598

4. NA

5. Sistema di valutazione e verifica della costanza delle prestazioni del prodotto da costruzione:
   System of evaluation and verification of constancy of performance of the construction product:
   2+

6a. Norma armonizzata: EN 10025-1:2004
   Harmonized standard: EN 10025-1:2004
   Organismo Notificato che ha rilasciato il certificato di conformità del controllo di produzione in fabbrica / *Notified body that issued the certificate of conformity of the factory production control:*

   N° 1608 IGQ

7. Prestazione dichiarata / *Declaration performance*

Caratteristiche Essenziali / *Essential caratteristic*	Prestazione / *performance*			Norma armonizzata/ *Harmonized technical specification*
Tolleranze dimensionali e di forma / *tolerances on dimensions and shape*	EN10034 : 1993	-Travi / *sections HEA/B from 100 to400 HEM 400*		EN 10025-1:2004
	EN10034 : 1993	-Travi/*sections I from* IPE100 to IPE 750		
	EN10024 : 1995	-Travi / *sections* IPN from 160 to 280		
	EN10279 : 2000	-Travi ad U ed UPN/ *U and UPN sections from 140 to 400*		
Carico di Snervamento / *yield strength (MPA)*	Tipo /grado Type /grade	Spessore nominale / *nominal thickness in mm*		
		≤ 16	>16 to ≤40	
	S355 JR/J0/J2/K2	355	345	
Carico di rottura / *tensile strength (MPA)*	Tipo /grado Type /grade	Spessore nominale / *nominal thickness in mm*		
		≥03 ≤100		
	S355 JR/J0/J2/K2	470 to 630		
Allungamento / *elongation %*	Tipo /grado Type /grade	Spessore nominale / *nominal thickness in mm*		
		≥3 ≤ 40		
	S355 JR/J0	22		
	S355 J2	22		
	S355 K2	20		
Resilienza / *impact strength*	Tipo /grado Type /grade	Spessore nominale / *nominal thickness in mm*		
		≤ 150		
		Temperatura /temperature	KV min (joule)	
	S355 JR	+20	27	
	S355 J0	0	27	
	S355 J2	-20	27	
	S355 K2	-20	40	
Saldabilità / *weldability CEV% max*	Tipo /grado Type /grade	Spessore nominale / *nominal thickness in mm*		
		≤ 30	>30 to ≤ 40	
	S355 JR/J0/J2/K2	0,46	0,48	
Durabilità / *durability*	S355 JR/J0/J2/K2	NPD		

- La prestazione del prodotto è conforme alla prestazione dichiarata nel presente documento.
  Si rilascia la presente dichiarazione di prestazione sotto la responsabilità esclusiva del fabbricante.
  The performance of the product is in conformity with the declared performance in this document. This declaration of performance is issued under the sole responsibility of the manufacturer mentioned above.
  Firmato a nome e per conto del fabbricante / *Signed for and on behalf of the manufactured by:*

Gabriele Comandini direttore di stabilimento/ Plant manager

San Zeno Naviglio 22/11/23

03 N° 2024 DDT / BA/1078

Duferco
TRAVI E PROFILATI

TRAVI E PROFILATI DI PALLANZENO S.p.A.

Azienda certificata
ISO 9001:2015
ISO 14001:2015
ISO 45001:2018

CE

1608

Travi e Profilati di Pallanzeno Spa Via A. Diaz, 248 - 25010 San Zeno Naviglio BS - IT

23

1608 CPR P239

EN10025-1:2004

S355J2

Destinati ad essere utilizzati su prodotti per impieghi strutturali.
Intended to be used on products for structural steel

Tollerance /tolerances: Carico di snervamento / *Yeld strength* Carico di rottura / *tensile strength* Allungamento / *elongation* Resilienza / *impact strength* Saldabilità / *weldability CEV*	:	Espressamente indicati nella DoP *Espressed as indicated in the DoP*

Durabilità / *durability:* NPD

03 N° 2024 DDT / BA/1078

24 2169

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

A04/A05

METINVEST

METINVEST TRAMETAL SPA

A01

Società per azioni con socio unico soggetta a direzione e coordinamento di Metinvest B.V
Registered office: Via XII Ottobre 1, 5° piano - 16121 Genova, Italy
Phone +39 010 5762911 - Fax +39 010 5762990
Works: Via E. Fermi, 44 - 33058 San Giorgio di Nogaro UD, Italy
Phone +39 0431 629989 - Fax +39 0431 629985
Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A03 N° Certificato / Certificate no.: 603511

Z02 Data / Date: 07/02/2024

A08 N° Ordine Trametal / Works order: 32306384

A07 N° Ordine cliente / Customer's order: mail

DDT: BOL 32401917

del / date: 06/02/2024

Pratica / File no.:

del / date:

B01/B02/B03

Prodotto / Product: Lamiere / Hot rolled plates

Qualità / Steel grade: SA516GR70MT/LTV

Normativa / Specification: ASME

A06 Cliente / Customer

COSIDER S.P.A.

Via giuseppe di vittorio 14
43014 MEDESANO 43014 IT
PR ITALIA

B06 Marcatura di prodotto / Marking of the product

LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI [mm] DIMENSIONS	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO °C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	PERMANENZA (Q) Min HOLDING TIME	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	PERMANENZA (T) Min HOLDING TIME	RAFFREDDAMENTO COOLING
2	STAD132001B	1923753	10.00X2450X12000	2,31	785395	BO	N	GA737																	
2	STAD132001C	1923753	10.00X2450X12000	2,31	785395	BO	N	GA737																	
4	STAD260603A	1924093	12.00X2000X12000	2,26	785383	BO	N	GA736																	
4	STAD260603B	1924093	12.00X2000X12000	2,26	785383	BO	N	GA736																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07 COLATA HEAT	C71 C %	C72 Mn %	C73 Si %	C74 P %	C75 S %	C76 Cu %	C77 Ni %	C78 Cr %	C79 Mo %	C80 Al %	C81 V %	C82 Nb %	C83 Ti %	C84 Sn %	C85 Ca %	C86 N %	C87 B %	C88 H %	C89 Ceq1 % (D)	C90 Ceq2 % (D)	C91 Pcm % (D)
Ordine Min 2																					
Ordine Max 2		1,50			0,004						0,100						0,0005			0,43	
Ordine Min 4																					
Ordine Max 4		1,50			0,004						0,100						0,0005			0,43	
SA51670LTV Min 0.00 - 12.50		0,85	0,15																		
SA51670LTV Max 0.00 - 12.50	0,27	1,20	0,40	0,025	0,025																
STAD13	0,15	1,40	0,18	0,018	0,002	0,010	0,010	0,030	<0.005	0,037	0,002	0,003	0,002	<0.005	0,0000	0,0032	0,0001	0,0000	0,38	0,39	0,23
STAD26	0,16	1,48	0,20	0,017	0,002	0,010	0,010	0,020	<0.005	0,036	0,002	0,002	0,003	<0.005	0,0000	0,0025	0,0001	0,0000	0,41	0,41	0,24

COES G.Q.
Ricezione data 18/07/2024 Sigla V.S.
Verificato data 18/07/2024 Sigla V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 516 Ed. 2023
V.S.

			PROVA DI TRAZIONE TENSILE TEST									PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	ReH [Mpa] YIELD STRENGTH	Rm [Mpa] TENSILE STRENGTH	ReH/Rm	A8" ELONGATION	Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDREL [mm] MANDRINO	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 2													L	-46		16	20										
ORDINE Min 4													L	-46		16	20										
SA51670LTV Min 0.00 - 20.00					20		485		17,0	260																	
SA51670LTV Max 0.00 - 20.00					20		620																				
SA51670LTV Min 0.00 - 25.00													L	-46			20										
GA736	12,00	2	P	T	20		521		34,6	376	P	10,00	T	-50	P	125 124 117	122						HRC <	22			
GA736	12,00	2	P	T	300					265	C	10,00	L	-46	P	241 244 230	238										
GA736	12,00	2										10,00	T	-20	P	190 196 207	198										
GA737	10,00	2	P	T	20		516		39,5	382	P	7,50	T	-50	P	89 87 98	91						HRC <	22			
GA737	10,00	2	P	T	300					268	C	7,50	L	-46	P	195 209 207	204										
GA737	10,00	2										7,50	T	-20	P	154 142 163	153										

C10

ASME SA-370 FIG. 3 AND FIG. 10 / 11 - SAMPLE TAKEN AFTER PLATE HEAT TREATMENT

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
2		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B2	EN 10029 CL. N
4		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B2	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
PRODUCED FROM CONTINOUS CAST SLAB AND HAVE A MINIMUN REDUCTION RATIO OF 3 TO 1. ACCORDING TO ASME II PART A ED. 2021. FULLY KILLED, FINE GRAIN STEEL. Value of Mn maximun in derogation permitted up to 1.50% **Issued in agreement with TÜV SÜD Industrie Service GmbH.** **QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 084/2003/MUC-002).**	**TIMBRO DELL'ISPETTORE** **STAMP OF THE INSPECTION REPRESENTATIVE**	**METINVEST TRAMETAL S.p.a.** **F. Andrian** **CQ Manager**

24 2170

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

A04/A05

METINVEST

METINVEST TRAMETAL SPA

A01

Società per azioni con socio unico soggetta a direzione e coordinamento di Metinvest B.V
Registered office: Via XII Ottobre 1, 5° piano - 16121 Genova, Italy
Phone +39 010 5762911 - Fax +39 010 5762990
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Phone +39 0431 629989 - Fax +39 0431 629985
Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A03 N° Certificato / Certificate no.: 601191 ✓

Z02 Data / Date: 10/01/2024

A08 N° Ordine Trametal / Works order: 32305806

A07 N° Ordine cliente / Customer's order: 203793

DDT: BOL 32400170

del / date: 09/01/2024

Pratica / File no.:

del / date:

B01/B02/B03

Prodotto / Product: Lamiere / Hot rolled plates

Qualità / Steel grade: SA516GR70MT/LTV ✓

Normativa / Specification: ASME

A06 Cliente / Customer

EUSIDER HEAVY PLATES SPA

Via Tortona 25
00000 Milano 20144 IT
MI

EUSIDER HEAVY PLATES — COPIA CONFORME ALL'ORIGINALE

B06 Marcatura di prodotto / Marking of the product

LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

DDT 81083445
N°2FOGLI 6X2000X12000

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI [mm] DIMENSIONS	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	PERMANENZA (Q) Min HOLDING TIME	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	PERMANENZA (T) Min HOLDING TIME	RAFFREDDAMENTO COOLING
2	KTAB751206A	1912565	6.00X2000X12000	1,13	780335	BO	N	GO181																	
2	KTAB751206B	1912565	6.00X2000X12000	1,13	780335	BO	N	GO181																	
2	KTAB760405B	1912561	6.00X2000X12000	1,13	780343	BO	N	GO189																	
2	KTAB760406A	1912566	6.00X2000X12000	1,13	780344	BO	N	GO190																	
2	KTAB760406B	1912566	6.00X2000X12000	1,13	780344	BO	N	GO190																	
5	KTAB300304A	1910629	8.00X2000X12000	1,51	779316	BO	N	GN761																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07 COLATA HEAT	C71 C %	C72 Mn %	C73 Si %	C74 P %	C75 S %	C76 Cu %	C77 Ni %	C78 Cr %	C79 Mo %	C80 Al %	C81 V %	C82 Nb %	C83 Ti %	C84 Sn %	C85 Ca %	C86 N %	C87 B %	C88 H %	C89 Ceq1 % (D)	C90 Ceq2 % (D)	C91 Pcm % (D)
Ordine Min 2																					
Ordine Max 2	0,18			0,020	0,005						0,030	0,040								0,43	
Ordine Min 5																					
Ordine Max 5	0,18			0,020	0,005						0,030	0,040								0,43	
SA51670LTV Min 0.00 - 12.50		0,85	0,15																		
SA51670LTV Max 0.00 - 12.50	0,27	1,20	0,40	0,025	0,025																
KTAB30	0,14	1,42	0,21	0,017	0,004	0,010	0,010	0,010	<0.005	0,038	0,002	0,002	0,002	<0.005	0,0000	0,0040	0,0002	0,0000	0,38	0,38	0,22
KTAB75 ✓	0,14	1,41	0,19	0,011	0,005	0,010	0,010	0,020	<0.005	0,039	0,002	0,002	0,002	<0.005	0,0000	0,0090	0,0002	0,0000	0,38	0,38	0,22
KTAB76	0,16	1,46	0,19	0,010	0,005	0,010	0,010	0,010	<0.005	0,039	0,002	0,002	0,002	<0.005	0,0000	0,0060	0,0002	0,0000	0,40	0,41	0,24

COES SRL
VERIFIED IDENTICAL TO
SA 516 Ed. 2023
V.S.

COES G.Q.
Ricezione data 18/07/2024 Sigla V.S.
Verificato data 18/07/2024 Sigla V.S.

			PROVA DI TRAZIONE TENSILE TEST										PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54	
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	YIELD STRENGTH ReH [Mpa]	TENSILE STRENGTH Rm [Mpa]	ReH/Rm	ELONGATION A8"	PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	SHAPE OF TEST PIECE FORMA PROVINO (4)	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDRINO [mm] MANDREL	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 2													L	-50		16	27										
ORDINE Min 5													L	-50		16	27										
SA51670LTV Min 0.00 - 20.00					20		485		17,0	260																	
SA51670LTV Max 0.00 - 20.00					20		620																				
SA51670LTV Min 0.00 - 25.00													L	-46			20										
GN761	8,00	2	P	T	20		512		37,0	371	P	7,50	T	-50	P	104 114 100	106						HB	160 160 164	161		
GN761	8,00	2										7,50	L	-50	P	129 135 142	135										
GO181	6,00	2	P	T	20		514		35,0	401	P	5,00	T	-50	P	73 85 62	73						HB	156 141 167	155		
GO181	6,00	2										5,00	L	-50	P	121 130 160	137										
GO189	6,00	2	P	T	20		512		35,9	388	P	5,00	T	-50	P	76 70 74	73						HB	156 150 153	153		
GO189	6,00	2										5,00	L	-50	P	96 104 90	97										
GO190	6,00	2	P	T	20		518		37,1	385	P	5,00	T	-50	P	99 85 73	86						HB	158 143 169	156		
GO190	6,00	2										5,00	L	-50	P	154 134 148	145										

C10

ASME SA-370 FIG. 3 AND FIG. 10 / 11 - SAMPLE TAKEN AFTER PLATE HEAT TREATMENT

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
KTAB300304A		mm 20	5 MHz	0	ASME-SA578/B		OK	NO INDICATIONS FOUND	mm 225x225	50
KTAB751206A		mm 20	5 MHz	0	ASME-SA578/B		OK	NO INDICATIONS FOUND	mm 225x225	50
KTAB751206B		mm 20	5 MHz	0	ASME-SA578/B		OK	NO INDICATIONS FOUND	mm 225x225	50
KTAB760405B		mm 20	5 MHz	0	ASME-SA578/B		OK	NO INDICATIONS FOUND	mm 225x225	50
KTAB760406A		mm 20	5 MHz	0	ASME-SA578/B		OK	NO INDICATIONS FOUND	mm 225x225	50
KTAB760406B		mm 20	5 MHz	0	ASME-SA578/B		OK	NO INDICATIONS FOUND	mm 225x225	50

D18	D19	D20
NOTE REMARKS	ENTE ISPETTIVO INSPECTOR	FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.a. F. Andrian III Liv. EN ISO 9712

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
2		EN 10029 CL.C	-0+100 MM	-0+200 MM	EN 10163/2 CL B2	EN 10029 CL. N
5		EN 10029 CL.C	-0+100 MM	-0+200 MM	EN 10163/2 CL B2	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06		
FULLY KILLED FINE GRAIN STEEL HARDNESS IN ACC. TO NACE MR 0103		
Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
PRODUCED FROM CONTINOUS CAST SLAB AND HAVE A MINIMUN REDUCTION RATIO OF 3 TO 1. ACCORDING TO ASME II PART A ED. 2021. FULLY KILLED, FINE GRAIN STEEL. Value of Mn maximun in derogation permitted up to 1.50% Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 084/2003/MUC-002).	TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE	METINVEST TRAMETAL S.p.a F. Andrian CQ Manager

24 2171

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

METINVEST
METINVEST TRAMETAL SPA

Società per azioni con socio unico soggetta a direzione e coordinamento di Metinvest B.V
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Phone +39 0431 629989 - Fax +39 0431 629985
Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A06 Cliente / Customer

COSIDER S.P.A.

Via giuseppe di vittorio 14
43014 MEDESANO 43014 IT
PR ITALIA

COES SRL
VERIFIED IDENTICAL TO
SA 516 Ed. 2023
U.S.

A03 N° Certificato / Certificate no.	Z02 Data / Date
589518	28/08/2023
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32303447	223/LM
DDT	del / date
BOL 32315544	21/08/2023
Pratica / File no.	
del / date	

B06 Marcatura di prodotto / Marking of the product
LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	SA516GR70MT/LTV
Normativa / Specification	ASME

COES G.Q.
Ricezione data 18107/2024 Sigla U.S.
Verificato data 18107/2024 Sigla U.S.

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI [mm] DIMENSIONS	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	PERMANENZA (Q) Min HOLDING TIME	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	PERMANENZA (T) Min HOLDING TIME	RAFFREDDAMENTO COOLING
1	STAC481802A	1884366	8.00X2450X12000	1,85	769452	BO	N	GJ404																	
4	HTAA060701A	1885354	15.00X2000X12000	2,83	769549	BO	N	GJ448																	
4	STAD091104A	1884816	15.00X2000X12000	2,83	769529	BO	N	GJ438																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C %	Mn %	Si %	P %	S %	Cu %	Ni %	Cr %	Mo %	Al %	V %	Nb %	Ti %	Sn %	Ca %	N %	B %	H %	Ceq1 % (D)	Ceq2 % (D)	Pcm % (D)
Ordine Min 1																					
Ordine Max 1		1,50			0,004						0,100						0,0005			0,43	
Ordine Min 4																					
Ordine Max 4		1,50			0,004						0,100						0,0005			0,43	
SA51670LTV Min 0.00 - 12.50		0,85	0,15																		
SA51670LTV Max 0.00 - 12.50	0,27	1,20	0,40	0,025	0,025																
SA51670LTV Min 12.60 - 50.00		0,85	0,15																		
SA51670LTV Max 12.60 - 50.00	0,28	1,20	0,40	0,025	0,025																
HTAA06	0,16	1,49	0,19	0,015	0,001	0,010	0,030	0,040	0,010	0,035	0,001	0,001	0,002	<0.005	0,0000	0,0023	0,0002	0,0002	0,41	0,42	0,25
STAC48	0,16	1,41	0,18	0,014	0,004	0,020	0,020	0,030	<0.005	0,039	0,002	0,002	0,004	<0.005	0,0000	0,0032	0,0002	0,0000	0,40	0,40	0,24
STAD09	0,16	1,49	0,20	0,019	0,003	0,020	0,010	0,020	<0.005	0,027	0,002	0,003	0,002	<0.005	0,0000	0,0032	0,0001	0,0000	0,41	0,41	0,24

			PROVA DI TRAZIONE TENSILE TEST									PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	ReH [Mpa] YIELD STRENGTH	Rm [Mpa] TENSILE STRENGTH	Re/Rm	A8" ELONGATION	Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDRINO [mm] MANDREL	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 1													L	-46		16	20										
ORDINE Min 4													L	-46		16	20										
SA51670LTV Min 0.00 - 20.00					20		485		17,0	260																	
SA51670LTV Max 0.00 - 20.00					20		620																				
SA51670LTV Min 0.00 - 25.00													L	-46			20										
GJ404	8,00	2	P	T	20		519		33,2	379	P	7,50	T	-50	P	75 78 83	79						HRC <	22			
GJ404	8,00	2	P	T	300					280	C	7,50	L	-46	P	156 164 158	159										
GJ404	8,00	2										7,50	T	-20	P	188 189 198	192										
GJ438	15,00	2	P	T	20		527		31,0	383	P	10,00	T	-50	P	87 97 99	94						HRC <	22			
GJ438	15,00	2	P	T	300					282	C	10,00	L	-46	P	175 204 189	189										
GJ438	15,00	2										10,00	T	-20	P	223 252 229	235										
GJ448	15,00	2	P	T	20		515		33,4	356	P	10,00	T	-50	P	116 126 98	113						HRC <	22			
GJ448	15,00	2	P	T	300					263	C	10,00	T	-20	P	180 130 189	167										
GJ448	15,00	2										10,00	L	-46	P	230 265 278	257										

C10

ASME SA-370 FIG. 3 AND FIG. 10 / 11 - SAMPLE TAKEN AFTER PLATE HEAT TREATMENT

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
1		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B2	EN 10029 CL. N
4		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B2	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
PRODUCED FROM CONTINOUS CAST SLAB AND HAVE A MINIMUN REDUCTION RATIO OF 3 TO 1. ACCORDING TO ASME II PART A ED. 2021. FULLY KILLED, FINE GRAIN STEEL. Value of Mn maximun in derogation permitted up to 1.50% **Plates acc. to PED 2014/68/EU**	**TIMBRO DELL'ISPETTORE** **STAMP OF THE INSPECTION REPRESENTATIVE**	**METINVEST TRAMETAL S.p.a/** **F. Andrian** **CQ Manager**

24 2172

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

A04/A05

METINVEST
METINVEST TRAMETAL SPA

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A01
Società per azioni con socio unico soggetta a direzione e coordinamento di Metinvest B.V
Registered office: Via XII Ottobre 1, 5° piano - 16121 Genova, Italy
Phone +39 010 5762911 - Fax +39 010 5762990
Works: Via E. Fermi, 44 - 33058 San Giorgio di Nogaro UD, Italy
Phone +39 0431 629989 - Fax +39 0431 629985
Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

A06 Cliente / Customer

SIDERURGICA LEONESSA S.R.L.

Via don. Milani 13-19
25020 FLERO 25020 IT
BS ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
609144	18/04/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32400604	22-2024
DDT	**del / date**
BOL 32407011	17/04/2024
Pratica / File no.	
del / date	

B06 Marcatura di prodotto / Marking of the product
LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	SA516GR70MT/LTV
Normativa / Specification	ASME

COPIA CONFORME ALL'ORIGINALE
Controllo Qualità
Siderurgica Leonessa s.r.l

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI DIMENSIONS [mm]	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	HOLDING TIME PERMANENZA Min	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	HOLDING TIME PERMANENZA (Q) Min	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	HOLDING TIME PERMANENZA (T) Min	RAFFREDDAMENTO COOLING
9	YTAA170202B	1942903	15.00X2000X12000	2,83	791344	BO	N	GC989																	
10	YNAA391705A	1935807	20.00X2450X12000	4,62	788888	BO	N	GC085																	
21	RNAA010902B	1939909	6.00X2450X12000	1,38	790622	BO	N	GC698																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C %	Mn %	Si %	P %	S %	Cu %	Ni %	Cr %	Mo %	Al %	V %	Nb %	Ti %	Sn %	Ca %	N %	B %	H %	Ceq1 % (D)	Ceq2 % (D)	Pcm % (D)
Ordine Min 10																					
Ordine Max 10		1,50										0,050									
Ordine Min 21																					
Ordine Max 21		1,50										0,050									
Ordine Min 9																					
Ordine Max 9		1,50										0,050									
SA51670LTV Min 0.00 - 12.50		0,85	0,15																		
SA51670LTV Max 0.00 - 12.50	0,27	1,20	0,40	0,025	0,025																
SA51670LTV Min 12.60 - 50.00		0,85	0,15																		
SA51670LTV Max 12.60 - 50.00	0,28	1,20	0,40	0,025	0,025																
RNAA01	0,17	1,46	0,24	0,016	0,005	0,020	0,010	0,020	<0.005	0,036	0,002	0,025	0,002	<0.005	0,0000	0,0064	0,0005	0,0003	0,41	0,42	0,26
YNAA39	0,15	1,45	0,22	0,015	0,002	0,040	0,020	0,050	0,010	0,033	0,002	0,022	0,002	<0.005	0,0000	0,0048	0,0004	0,0001	0,39	0,41	0,24
YTAA17	0,16	1,49	0,20	0,013	0,002	0,010	0,010	0,030	<0.005	0,034	0,002	0,001	0,003	<0.005	0,0000	0,0048	0,0003	0,0001	0,41	0,42	0,25

			PROVA DI TRAZIONE TENSILE TEST										PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54	
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE LOCATION (1)	POSIZIONE LOCATION (2)	ORIENTATION DIREZIONE (3)	TEMPERATURA TEST TEMPERATURE [°C]	YIELD STRENGTH ReH [Mpa]	TENSILE STRENGTH Rm [Mpa]	ReH/Rm	ELONGATION A8"	PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	SHAPE OF TEST PIECE FORMA PROVINO (4)	LARGHEZZA WIDTH [mm]	ORIENTATION DIREZIONE (3)	TEST TEMPERATURE TEMPERATURA [°C]	LOCATION POSIZIONE (2)	INDIVIDUAL VALUES SINGOLI VALORI [J]	MEAN VALUE MEDIA [J]	ORIENTATION DIREZIONE (3)	MANDREL MANDRINO [mm]	ANGLE ANGOLO [°]	RESULT ESITO (5)	LOCATION POSIZIONE (2)	TEST METHOD METODO	INDIVIDUAL VALUES SINGOLI VALORI	MEAN VALUE MEDIA	Z% INDIVIDUAL VALUES Z% SINGOLI VALORI	Z% MEAN VALUE Z% VALORE MEDIO
ORDINE Min 10													L	-46		27	0											
ORDINE Min 21													L	-46		27	0											
ORDINE Min 9													L	-46		27	0											
SA51670LTV Min 0.00 - 20.00					20		485		17,0	260																		
SA51670LTV Max 0.00 - 20.00					20		620																					
SA51670LTV Min 0.00 - 25.00													L	-46			20											
GC085	20,00	2	P	T	20		518		36,2	391	P	10,00	L	-46	P	227 226 220	224						HRC <	22				
GC085	20,00	2										10,00	T	-50	P	118 129 132	126											
GC698	6,00	2	P	T	20		552		37,8	415	P	5,00	L	-46	P	118 124 136	126						HRC <	22				
GC698	6,00	2										5,00	T	-50	P	75 64 69	69											
GC989	15,00	2	P	T	20		522		40,1	377	P	10,00	L	-46	P	239 244 241	241						HRC <	22				
GC989	15,00	2										10,00	T	-50	P	162 135 152	150											

C10

ASME SA-370 FIG. 3 AND FIG. 10 / 11 - SAMPLE TAKEN AFTER PLATE HEAT TREATMENT

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
9		EN 10029 CL.C	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
10		EN 10029 CL.C	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
21	vd	EN 10029 CL.C	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

STEEL VACUUM DEGASSED

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
PRODUCED FROM CONTINOUS CAST SLAB AND HAVE A MINIMUN REDUCTION RATIO OF 3 TO 1. ACCORDING TO ASME II PART A ED. 2023. FULLY KILLED, FINE GRAIN STEEL. Value of Mn maximun in derogation permitted up to 1.50% **Issued in agreement with TÜV SÜD Industrie Service GmbH.** **QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 084/2003/MUC-002).**	**TIMBRO DELL'ISPETTORE** **STAMP OF THE INSPECTION REPRESENTATIVE**	**METINVEST TRAMETAL S.p.A.** **F. Andrian** **CQ Manager**

COES G.Q.	Ricezione data 18/07/2024	Sigla V.S.
	Verificato data 18/07/2024	Sigla V.S.

MARCEGAGLIA PLATES

Marcegaglia
46040 via Bresciani 16-Gazoldo degli Ippoliti Mantova-Italy
Tel. +39 - 0376 685 1 Fax. +39 - 0376 685 600
www.marcegaglia.com

Stab. di S.Giorgio di Nogaro:
via Enrico Fermi 33, 33058 S.Giorgio di Nogaro-Udine
tel+390431624111 fax 0431624222

Type/Tipo 3.1 CERTIFICATO DI COLLAUDO EN10204 | THIS DOCUMENT WAS PRODUCED AUTOMATICALLY AND IS VALID WITHOUT SIGNATURE | Number/Numero 16021197247 | Creato il 11/03/2021

Product: Hot Rolled Heavy Plates
NormaCollaudoLamieraTreno: ASME-SA516
Steel grade:: GR-70N

Customer/Cliente
COSIDER S.P.A.
V.G.DI VITTORIO LOC.CORNACCINA
43014 MEDESANO IT

Code: 0000016233

Del. Address/Destinatario Merci
COSIDER S.P.A.
V.G.DI VITTORIO LOC.CORNACCINA
43014 MEDESANO IT

Delivery/N° Consegna 8272118464
Of/Del 11/03/2021
Delivery note nr/N° doc. di trasp. 1060002473

Quality Control/Controllo Qualità
Q.M.D./RESP. M.Quargnali
Plant/Stab. S. Giorgio di Nogaro

Pages/Pagine 1/1

Material/Codice Materiale
LTS

Description/Descrizione
LTS 2500,0X12000,0X 18,00 GR-70N

Surface Quality: EN10163-2 CL B2
Flatness: rif EN 10029 cl. N
Thickness tolerance: EN10029 CLASSE B

Delivery Condition: Normalizzato in Forno
Steel Making Process: BO= Basic oxigen

Order Nr/ordine **1191276706/50**
Materiale Cliente
Client Order/Ordine cliente **625/LM**
Client Date/data cliente **10/11/2020**

Item	Batch/N° Partita	Heat/Colata	Quantity/Q.tà KG	Quantity/Q.tà PZZ
1	21EG001006	2010434	4320	1
2	21EG001022	2010434	4320	1

Remarks/Note:
Manufacturer has a Quality-Assurance System with specific assessment for materials acc. to AD2000-Merkblatt W0/W1/W10 - Certificate Nr. 01 202 I/Q-10 8279 issued by TUV Rheinland
Manufacturer has a Quality-Assurance System with specific assessment for materials 2014/68/EU - ANNEX I - SECTION 4.3 Certified by TÜV Rheinland®
CONTROLLO ULTRASONORO: EN 10160 S1E1
Mechanical tests acc. to: ASTM A370 - 19e1
ASME SA516 BPVC.II.A - Ed.2019 / Markings: acc. to SA20 Par. 12.1.7 & 13.1 "LTV" SA516"MT"
A/SA20 Supplementary Requirements S5: Charpy V-Notch Impact TestHeat treatment : temperature 910 +/- 10°C, soaking time: 30 min/Inc , cooling in still airFully Killed Steel - Fine Grain Steel

COES SRL
VERIFIED IDENTICAL TO
SA 516 Ed. 2023
U.S.

Batch/N° Partita	C (%)	Mn (%)	Si (%)	S (%)	P (%)	Cr (%)	Ni (%)	Cu (%)	Al (%)	Mo (%)	Nb (%)	V (%)	Ti (%)	N (%)	B (%)	Ceq (%)
	0.27	0.85 1.5	0.15 0.4	0.025		0.3	0.4	0.4	0.02	0.12	0.05	0.02	0.03	0.012		
21EG001006	.150	1.460	.190	.0050	.0120	.040	.030	.050	.035	.0050	.026	.005	.0050	.0090	.0000	.41
21EG001022	.150	1.460	.190	.0050	.0120	.040	.030	.050	.035	.0050	.026	.005	.0050	.0090	.0000	.41

COSIDER s.p.a.
Via Di Vittorio, 14 - MEDESANO (PR)
MATERIALE RELATIVO A
BOLLA 131
DEL 1801202
Copi 2

Batch/N° Partita	Forma	(1)	(2)	(3)	Tst [°C]	Rm [N/mmq]	Rp 0.2 [N/mmq]	E-2in (%)	(1b	(2b	(3b	T [°C]	Kv1 [J]	Kv2 [J]	Kv3 [J]	Kv [J]	HB	TESTN
					20 20	485 620	260	21										
21EG001006	P	1	P	T	20	544	405	31.0	1	P	L	-52	155	148	161	154	164	20-15948N
21EG001022	P	1	P	T	20	545	408	32.0	1	P	L	-52	181	177	190	182	165	20-15942N

Controllo ad ultrasuoni

Apparecchiatura	Numero di serie	Condizioni di superficie	Accoppiante	Mod. operativie	Taratura
Gilardoni RDG/700	I001288	As Rolled	Acqua	Secondo le specifiche	Secondo le specifiche

Item	Norma di riferimento	Classe accettabilità	Esito	Indicazioni	Reticolo	Bordi	Sonda	Frequenza	Angolo
1	EN10160	CL.S1 E1	Ok	Not founded	200x200mm	50	BDD20/4	4 MHz	0°
2	EN10160	CL.S1 E1	Ok	Not founded	200x200mm	50	BDD20/4	4 MHz	0°

- Material Free of radioactive contamination
- Dimensional check and visual examination of the surface condition: without objection
- We Declare that the above mentioned plates are in compliance with the order prescription

Firma
IIIlivEN/ISO9712
Q.M.D. M.Quargnali

MARCEGAGLIA PLATES

(1)Posizione:1=Testa;2=Piede.(2)Posizione:1/2=1/2 spessore;P=Pelle;1/4=1/4 spessore.(3)Direzione:L=Longitudinale;T=Trasversale

DescrizioneMarchi

COES G.Q.	Ricezione data 18/07/2024	Sigla U.S.
	Verificato data 18/07/2024	Sigla U.S.

24 2173

COES S.R.L. P.O. 2283/24 (comm. 166/24 + 137/24) TAL JOB N°424004025 OUR DDT N°402401593 OF 19/07/24
N° 1 MT 5,79 HEAT 129075 DIMENSIONS 33,4 x 9,09 ITEM POS. 10 - ART. D9604

TUBOS REUNIDOS GROUP, S.L.U

Barrio Sagarribai, 2 - 01470 AMURRIO (Spain)
Mill: TUBOS

QUALITY MANAGEMENT SYSTEM certified by LRQA

EN 10204:2004 / 3.1

CERTIFICADO DE CALIDAD
MILL TEST CERTIFICATE

THE BILLETS AND THE MATERIAL COVERED BY THIS CERTIFICATE ARE MANUFACTURED AT OUR STEEL PLANT IN AMURRIO, SPAIN.

Nº 0000361075/1 Rev. 000

CLIENTE: CUSTOMER	T.A.L. S.p.A. TUBI ACCIAIO LOMBARDA CON SOCIO UNICO	PEDIDO / PARTIDA: P.ORDER / ITEM	OF220448 7.
PRODUCTO: ARTICLE	TUBERÍA SIN SOLDADURA LAMINADA EN CALIENTE HOT FINISHED SEAMLESS TUBES	REF. FABRICA: WORK ORDER	300022223 000070
EXTREMOS: ENDS	BISELADOS BEVELLED ENDS	PROTECCIÓN SUPERF: EXT. COATING	LACA EXTERIOR EXTERNALLY DRY LACQUERED
NORMA / GRADO: APL.STANDARD AND GRADE	ASTM A333/A333M-18/ ASME II SA-333/SA-333M-21/ API 5L 2018 46TH ED. PSL1 6/X52	PROCESO FUSION: MELTING PROCESS	HORNO ELECTRICO ACERO TOTALMENTE CALMADO ELECTRIC FURNACE // FULLY KILLED FINE GRAIN PRACTICE
		DIMENSIONAL STD:	ANSI/ASME B36.10M
ESPEC. ADICIONALES: ADITIONAL SPECS.	TS 02 REV 06 (13 JANUARY 2021) NACE MR0175 2015/ISO15156 2020 NACE MR0103/ISO 17945 ED. 2015 ASME II.PART D.TABLE Y1	FAB. DE PALANQUILLA: BILLETS MANUFACTURE	COLADA CONTINUA CONTINUOUS CASTING

DIMENSIONES: DIMENSIONS 33,40 X 9,09 MM. X 5-7 M.

MARCAS: MARKING
- ESTAMPADO: DIE STAMPING — HN (HEAT)
- PINTADO: STENCILLED — TUBOS API SPEC 5L 5L-0011 (SELLO API) (MM/AA) 33,4 9,1 L360 / X52 PSL1 SMLS HN (HEAT) 20,5 MPA (LENGTH IN METERS) M ASTM/ASME A/SA 333 GR.6 HFS LT -50 C (WEIGHT IN KGS) KG S
- CODIGO COLOR: COLOUR CODE

EST. SUMINISTRO: SUPPLYING COND — NORMALIZADO. ENFRIADO AL AIRE / NORMALIZED. COOLED IN STILL AIR 960 °C 14 MIN

DESCRIPCION SUMINISTRO / DESCRIPTION OF DELIVERY

ITEM FAB. T.R. ITEM	ITEM CLI. CLIENTS ITEM	LONG.INDIV (M) INDIVIDUAL LENGTH	COLADA CAST NR.	Nº TUBOS QUANTITY	LONG. TOTAL (M) LENGTH	PESO(KG) WEIGHT
000070	7.	5,000 - 7,000	129075	235	1.360,820	7.349
TOTAL				235	1.360,820	7.349

Albaran/Delivery note/Lieferschein/ Bon de livraison: 80391234

COES G.Q. | Ricezione data 19/07/2024 Sigla V.S. | Verificato data 22/07/2024 Sigla V.S.

TUBOS REUNIDOS GROUP (MILL: TUBOS) GARANTIZA QUE TODOS LOS TUBOS CUBIERTOS POR ESTE CERTIFICADO CUMPLEN LOS REQUISITOS DEL PEDIDO Y CON LAS ESPECIFICACIONES ARRIBA MENCIONADAS.
TUBOS REUNIDOS GROUP (MILL: TUBOS) CERTIFY THAT ALL THE TUBES COVERED BY THIS CERTIFICATE COMPLY WITH ORDER REQUIREMENTS AND ABOVE MENTIONED SPECIFICATIONS.

AMURRIO 30.01.2023

COES SRL VERIFIED IDENTICAL TO SA 333 Ed. 2023 V.S.

CONTROL DE CALIDAD DE TUBOS REUNIDOS GROUP
Mill: TUBOS
TUBOS REUNIDOS GROUP (QUALITY CONTROL)
Borja Eguizabal

Approved by QUALITY1 on 02/02/23

COES S.R.L. P.O. 2283/24 (comm. 166/24 + 137/24) TAL JOB N°424004025 OUR DDT N°402401593 OF 19/07/24
N° 1 MT 5,79 HEAT 129075 DIMENSIONS 33,4 x 9,09 ITEM POS. 10 - ART. D9604

TUBOS REUNIDOS GROUP, S.L.U

Barrio Sagarribai, 2 - 01470 AMURRIO (Spain)
Mill: TUBOS

QUALITY MANAGEMENT SYSTEM certified by LRQA

EN 10204:2004 / 3.1

CERTIFICADO DE CALIDAD
MILL TEST CERTIFICATE

Nº 0000361075/1 Rev. 000

ENSAYOS NO DESTRUCTIVOS / NON DESTRUCTIVE TESTS

ENSAYO / TEST	%CONTROL / TEST RATE(%)	REQUISITOS / REQUIREMENTS	RESULTADO / RESULT
VISUAL Y DIMENSIONAL/ VISUAL & DIMENSIONAL INSP.	100%		O.K.
P.HIDROSTATICA/ HYDROTEST	100%	20,5 MEGAPASCAL 5 SEC.	O.K.
CORRIENTES INDUCIDAS/ EDDY CURRENTS	100%	ASTM E 309	O.K.
MAGNETISMO RESIDUAL/ RESIDUAL MAGNETISM		LESS THAN 30 GAUSS	

ENSAYOS TECNOLÓGICOS Y METALÚRGICOS / TECHNOLOGICAL AND METALLURGICAL TEST

APLASTADO /FLATTENING: AC/ A/SA333/5L2018. PSL1 -OK

TAMAÑO GRANO /GRAIN SIZE (FERRITIC): 8

ANALISIS DE COLADA / CAST ANALYSYS

	C	Mn	Si	P	S	Cr	Ni	Mo	Cu	V	Al	Ti	Nb	B	C.E.
MIN.		0,29	0,15								0,0150				
MAX.	0,20	1,35	0,35	0,020	0,0100	0,200	0,400	0,1200	0,3000	0,0800	0,0600	0,0400	0,0200	0,0010	**0,42**
129075	0,1400	1,30	0,26	0,010	0,0022	0,060	0,070	0,0200	0,1700	0,0660	0,0240	0,0020	0,0020	0,0004	**0,40**

ANALISIS DE PRODUCTO / PRODUCT ANALYSIS

	C	Mn	Si	P	S	Cr	Ni	Mo	Cu	V	Al	Ti	Nb	B	C.E.
MIN.		0,29	0,15								0,0150				
MAX.	0,20	1,35	0,35	0,020	0,0100	0,200	0,400	0,1200	0,3000	0,0800	0,0600	0,0400	0,0200	0,0010	**0,42**
129075	0,1410	1,30	0,25	0,010	0,0022	0,060	0,070	0,0200	0,1600	0,0680	0,0240	0,0020	0,0010	0,0001	**0,40**
129075	0,1410	1,30	0,25	0,010	0,0022	0,060	0,070	0,0200	0,1600	0,0680	0,0240	0,0020	0,0010	0,0001	**0,40**

FORMULAS

	(01)	(02)	(03)
MIN.			
MAX.	0,140	0,600	0,090
129075	0,071	0,311	0,069
129075	0,071	0,311	0,069

(01) Nb + Ti + V
(02) Cr + Mo + Cu + Nb + V + Ti
(03) Nb + V

AMURRIO 30.01.2023

CONTROL DE CALIDAD DE TUBOS REUNIDOS GROUP
Mill: TUBOS
TUBOS REUNIDOS GROUP (QUALITY CONTROL)
Borja Eguizabal

Approved by QUALITY1 on 02/02/23

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

TUBOS REUNIDOS GROUP, S.L.U
Barrio Sagarribai, 2 - 01470 AMURRIO (Spain)
Mill: TUBOS

QUALITY MANAGEMENT SYSTEM certified by LRQA

EN 10204:2004 / 3.1

CERTIFICADO DE CALIDAD
MILL TEST CERTIFICATE

Nº 0000361075/1 Rev. 000

ENSAYOS DE TRACCIÓN / TENSILE TEST

COLADA CAST	Nº	TA	L/T (1)	TP (2)	DIMENSION (mm)	L.ELAST. YIELD POINT (Mpa) (3)	R.TRACC. T.STRENGTH (Mpa)	ALARG. ELONG. (%) F (4)	Estricción Reduction of Area (%)	DUREZA HARDNESS (HRB)		MEDIA MEAN	
MIN.						360	460						
MAX.													99
129075	1		L	T	33,40 x 9,500	409	562	48		84	83	84	84
129075	2		L	T	33,30 x 10,000	412	555	47		84	85	85	85

(1) : L = LONGITUDINAL // T = TRANSVERSAL
(2) : I = ISO SPECIMEN // A = ASTM / API SPECIMEN
(3) : T = Full size tube // P = Strip specimen // C = Cylindrical // F = Flat specimen
(3) : yield point (0,5%)
(4) : F = (Lo = 2" (50 mm)) // P = (Proporcional = 5,65 x So½)

ENSAYOS DE IMPACTO - CHARPY V / IMPACT TEST

COLADA CAST	Nº	L/T (1)	DIMENS (mm)		Tª (°C)	RESILIENCIA IMPACT TEST (J)			AVG (J)	AREA DUCTIL SHEAR AREA (%)
			10	10,00	-50	27 /		40		90
129075	1	L	10	7,50	-50	213	214	239	222	90

(1) : L = LONGITUDINAL // T = TRANSVERSAL

ANEXOS / ANNEX

FULLY KILLED
RADIATION FREE
MERCURY FREE
NO WELD REPAIR
ROLLING TEMPERATURE : 910°C
FINE GRAIN WITH SIZE >=8 DE Acc STM E112
T.R.G. HAS A QUALITY MANAGEMENT SYSTEM APPROVED BY
LRQA IN AGREEMENT WITH POINT 4.3 AND 7.5 ANNEX I OF THE PED 2014/68/EU."

AMURRIO 30.01.2023

CONTROL DE CALIDAD DE TUBOS REUNIDOS GROUP
Mill: TUBOS
TUBOS REUNIDOS GROUP (QUALITY CONTROL)
Borja Eguizabal

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COES S.R.L. P.O. 2283/24 (comm. 166/24 + 137/24) TAL JOB N°424004025 OUR DDT N°402401593 OF 19/07/24
N° 1 MT 6,04 HEAT 40870 DIMENSIONS 60,3 x 8,74 ITEM POS. 20 - ART. C1399

ŽELEZIARNE® PODBREZOVÁ

Inšpekčný certifikát
Inspection certificate
Certificato di collaudo
EN 10204 :2004 3.1

Číslo
Number
Numero
13219/01/2024

Č.ext.obj. - External order No. - Numero dell'ordine esterno:
IT240262

Číslo položky - Item number - Numero di articolo:
3

Č.obj.príj. - Consignee order No. - Numero dell'ordine del destinatario:
OF240117

Číslo zákazky výrobcu - Manufakturer's works order number - Conferma d´ordine dello stabilimento:
BM 271957 / 1/ 1 3413B29

Číslo dopravného prostriedku - Transport No. - Camion Nr.:
RS732CS RS264YH

Číslo ložného listu - Loading Bill No. - Polizza di carico:
3033181

Číslo avíza - Dispatch note - Avviso di spedizione:
3421633

Výrobca - Manufacturer´s works - Produttore:
Železiarne Podbrezová a.s.
Kolkáreň 35 976 81 Podbrezová SLOVAKIA

Zakaznik/Prijemca - Purchaser/Consignee - Committente/Destinatario:

T.A.L. Tubi Acciaio Lombarda S.p.A.
Via G. di Vittorio, 6
29017 Fiorenzuola d'Arda, Piacenza
ITALY

COES G.Q.	Ricezione data 19/07/2024	Sigla V.S.
	Verificato data 22/07/2024	Sigla V.S.

Výrobok - Product - Prodotto:
Rúry oceľové bezošvé, valcované za tepla - rúry pre potrubia pre horľavé médiá
Seamless hot finished steel tubes - Pipelines for combustible fluids
Tubi d´ acciaio senza saldatura, laminati a caldo - tubi per condotti dei fluidi infiammabili

Rozmery - Dimensions - Dimensioni:

Vonkajší priemer - Outside diameter - Diametro esterno:	**60,320 mm**
Hrúbka steny - Wall thickness - Spessore:	**8,740 mm**
Dĺžka - Length - Lunghezza:	**6000,00 mm [0,000 + 100,000 mm]**
Počet kusov - Number of pieces - Numero di pezzi:	**169**
Celková dĺžka - Total length - Lunghezza totale:	**1019.00 [m]**
Celková hmotnosť - Total mass - Peso totale:	**11459.00 [kg]**

Označenie ocele - Steel designation - Qualitá dell acciaio:
L360 PSL1 API SPEC. 5L Ed.46th2018Err.2018; X52 PSL1 API SPEC. 5L Ed.46th2018Err.2018; Grade 6 ASME SA-333/SA-333M Ed.2023; Grade 6 ASTM A 333/A 333M -18

Stav dodania - Products as delivered condition - Stato di fornitura:
NORMALIZING CONDITION AT MIN. 900C Normalizačné tvárnenie - Normalized forming - Formatura a temperatura di normalizzazione

Technicko - dodacie podmienky - Technical delivery conditions - Condizioni tecniche e di consegna:
ASTM A 999/A 999M -18; ASME SA-333/SA-333M Ed.2023; API SPEC. 5L Ed.46th2018Err.2018; ASME SA-999/SA-999M Ed.2023; ASTM A 333/A 333M -18

Rozmerová norma - Dimensional Standard - Norma dimensionale:
ASME B36.10M :2022

Technická špecifikácia - Technical specification - Specificazione tecnica:
TS 02 rev.6 :2021

Technický predpis - Technical regulation - Regolamento tecnico:
ANSI-NACE MR0175/ISO 15156 pt.1+pt.2; NACE MR0103 /ISO 17945 :2015

Číslo tavby Cast No. Numero di colata	Počet kusov Number of pieces Numero di pezzi	Celková dĺžka Total length Lunghezza totale	Celková hmotnosť Total mass Peso totale	Druh tavenia Steelmaking process Procedimento di elaborazione dell´acciaio
40870	**169**	**1019.00**	**11459.00**	**E**

E - elektrická oblúková pec-electric arc furnace-forno elettrico ad arco

Miesto Location Localitá	**v Podbrezovej** **sag**	Dátum Date Data	**15.03.2024** **sag**	Závodný znalec Works Inspector Ispettore della fabbrica	**Ing. Čižmárik Miroslav**

Železiarne Podbrezová a.s. Kolkáreň 35, 976 81 Podbrezová Slovakia
Phone: + 421 48 645 3031, Fax: + 421 48 645 3032 www.steeltube.sk
Company ID: 31 562 141 ,VAT ID: SK2020458704
Bank Contact: Slovenská sporiteľňa, a.s. (Slovakia) IBAN: SK69 0900 0000 0000 7990 0086, SWIFT (BIC): GIBASKBX
The Company is registered in the Commercial Register of the District Court Banská Bystrica, Section Sa, Insert No. 69/S

ŽELEZIARNE® PODBREZOVÁ akciová spoločnosť 976 81 Podbrezová Oddelenie kontroly a zabezpečovania kvality -1-

Approved by S.COZZANI on 18/03/24

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Druh ocele - Type of steel - Acciaio:
úplne uklúdnená oceľ hliníkom - fully killed steel with Aluminium - acciaio totalmente calmato (Al)
Úprava povrchu - Surface protection - Protezione della superficie:
Ochrana povrchu UV lakom - Surface protection with UV lacquer - Protezione della superficie con vernice UV
Chemické zloženie - Chemical composition - Composizione chimica:

Číslo tavby Cast No. Numero di colata		C [%]	Mn [%]	Si [%]	P [%]	S [%]	Cu [%]	Cr [%]	Ni [%]	Al [%]	Mo [%]	Ti [%]
		Predpis - Requirements - Requisiti										
	min.			0,15						0,015		
	max.	0,20	1,30	0,35	0,020	0,010	0,30	0,20	0,40	0,060	0,12	0,040
40870		**0,17**	**1,17**	**0,22**	**0,015**	**0,005**	**0,16**	**0,06**	**0,07**	**0,021**	**0,02**	**0,001**

Číslo tavby Cast No. Numero di colata		V [%]	Nb [%]	B [%]	Exp.1 [%]	Exp.2 [%]	Exp.3 [%]	Exp.4 [%]
	min.	0,055						
	max.	0,070	0,020	0,0010	0,150	0,060	0,600	0,43
40870		**0,058**	**0,001**	**0,0002**	**0,060**	**0,059**	**0,300**	**0,41**

Exp.1 Nb + Ti + V
Exp.2 Nb + V
Exp.3 Nb+Ti+V+Cu+Mo+Cr
Exp.4 = CEV = C+Mn/6+(Cr+Mo+V)/5+(Cu+Ni)/15

Výrobková analýza - Product analysis - Analisi di prodotto:

Číslo tavby Cast No. Numero di colata	por.	C [%]	Mn [%]	Si [%]	P [%]	S [%]	Cu [%]	Cr [%]	Ni [%]	Al [%]	Mo [%]	Ti [%]
40870	**1**	**0,17**	**1,16**	**0,21**	**0,014**	**0,005**	**0,17**	**0,07**	**0,07**	**0,021**	**0,01**	**0,001**
40870	**2**	**0,17**	**1,16**	**0,21**	**0,014**	**0,004**	**0,17**	**0,07**	**0,07**	**0,020**	**0,01**	**0,001**

Číslo tavby Cast No. Numero di colata	por.	V [%]	Nb [%]	B [%]
40870	**1**	**0,058**	**0,001**	**<0,0001**
40870	**2**	**0,058**	**0,001**	**<0,0001**

Skúška ťahom - Tensile test - Prova di trazione:
Izbová teplota - Room temperature - Temperatura ambiente

Č. No. Nr.	Číslo tavby Cast No. Numero di colata	Číslo vzorky Test sample No. No. di provino	Rozmery Dimensions Dimensioni [mm]	Smer odberu/typ vzorky Direction/Type of the test piece Orientamento/Tipo della provetta	Výrazná/zmluvná medza kĺzu Yield/Proof strength Limite di snervamento		Pevnosť v ťahu Tensile strength Carico di rottura	Ťažnosť Elongation after fracture Allungamento	
					Rp0,2 [MPa]	Rt0,5 [MPa]	Rm [MPa]	A 5,65 [%]	A 2" [%]
	Predpis - Requirements - Requisiti			min.	240	360	460	14.0	30.0 *
				max.	---	---	---	---	---
1	**40870**	A014846/24	18.51 x 8.74	L/V	**425**	**425**	**565**	**26.4**	**32.6**
2	**40870**	A014847/24	18.52 x 8.75	L/V	**424**	**423**	**565**	**26.4**	**32.4**

Miesto	**v Podbrezovej**	Dátum	**15.03.2024**	Závodný znalec	**Ing. Čižmárik Miroslav**
Location	**sag**	Date	**sag**	Works Inspector	
Localitá		Data		Ispettore della fabbrica	

Železiarne Podbrezová a.s. Kolkáreň 35, 976 81 Podbrezová Slovakia
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ŽELEZIARNE® PODBREZOVÁ akciová spoločnosť 976 81 Podbrezová Oddelenie kontroly a zabezpečovania kvality -1-

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Number
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Č. No. Nr.	Číslo tavby Cast No. Numero di colata	Číslo vzorky Test sample No. No. di provino	Rozmery Dimensions Dimensioni [mm]	Smer odberu/typ vzorky Direction/Type of the test piece Orientamento/Tipo della provetta	Výrazná/zmluvná medza kĺzu Yield/Proof strength Limite di snervamento		Pevnosť v ťahu Tensile strength Carico di rottura	Ťažnosť Elongation after fracture Allungamento	
					Rp0,2 [MPa]	Rt0,5 [MPa]	Rm [MPa]	A 5,65 [%]	A 2" [%]
	Predpis - Requirements - Requisiti			min.	240	360	480	14.0	30.0 *
				max.	---	---	---	---	---
3	**40870**	A014848/24	18.51 x 8.72	L/V	**426**	**425**	**566**	**26.1**	**33.0**
4	**40870**	A014849/24	18.52 x 8.71	L/V	**426**	**426**	**565**	**26.7**	**33.0**
5	**40870**	A014850/24	18.51 x 8.72	L/V	**426**	**426**	**566**	**26.7**	**32.8**
6	**40870**	A014851/24	18.52 x 8.72	L/V	**425**	**424**	**566**	**26.4**	**32.4**
7	**40870**	A014852/24	18.53 x 8.71	L/V	**426**	**426**	**566**	**26.3**	**32.6**
8	**40870**	A014853/24	18.51 x 8.72	L/V	**426**	**425**	**567**	**26.3**	**32.7**
9	**40870**	A014854/24	18.52 x 8.73	L/V	**425**	**425**	**566**	**26.3**	**33.0**

L = Pozdĺžny - Longitudinal - Longitudinale
V = Výrez - Strip test - Striscia
*** - Ťažnosť - Elongation after fracture - Allungamento min. (1940*So**0.2)/(Rm**0.9)**
So[mm2] = počiatočný prierez vzorky - initial cross-section of the test specimen - sezione trasversale iniziale del campione di prova
Rm[MPa] = predpísaná minimálna pevnosť v ťahu - specified minimum tensile strength - resistenza alla trazione minima prescritta

Skúška rázom v ohybe Charpy - Charpy impact test - Prova di resilienza Charpy:
ASTM A 370 -52 [°C]

Č. No. Nr.	Číslo tavby Cast No. Numero di colata	Číslo vzorky Test sample No. No. di provino	Rozmery Dimensions Dimensioni [mm]	Smer odberu vzorky Direction of the test piece Orientamento della provetta	Nárazová práca - priemerná hodnota Impact energy-Mean value Resilienza-Valore medio	Nárazová práca - jednotlivé hodnoty Impact energy-Individual values Resilienza-Valori singoli	Podiel húževnatého lomu - priemerná hodnota Shear area-Mean value Rata di frattura tenace - valore medio
					KV [J]	KV [J]	PHL [%]
	Predpis - Requirements - Requisiti			min.	40.0	27.0	---
				max.	---	---	---
1	**40870**	A014832/24	10.00 x 7.50	L	**163.0**	**172.0,161.0,156.0**	**72.0**

Miesto **v Podbrezovej** Dátum **15.03.2024** Závodný znalec **Ing. Čižmárik Miroslav**
Location **sag** Date **sag** Works Inspector
Località Data Ispettore della fabbrica

Železiarne Podbrezová a.s. Kolkáreň 35, 976 81 Podbrezová Slovakia
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Approved by S.COZZANI on 18/03/24

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EN 10204 :2004 3.1

Číslo
Number
Numero
13219/01/2024

Č. No. Nr.	Číslo tavby Cast No. Numero di colata	Číslo vzorky Test sample No. No. di provino	Rozmery Dimensions Dimensioni [mm]	Smer odberu vzorky Direction of the test piece Orientamento della provetta	Podiel húževnatého lomu - jednotlivé hodnoty Shear area-Individual values Rata di frattura tenace - val... singoli
					PHL [%]
	Predpis - Requirements - Requisiti			min.	---
				max.	---
1	**40870**	A014832/24	10.00 x 7.50	L	**70.0,72.0,74.0**

L = Pozdĺžny - Longitudinal - Longitudinale

Skúška stlačením vyhovela.
Flattening test without objections.
Prova di schiaccio di esito soddisfacente.

Skúška nepriepustnosti elektromagnetická vyhovela
Electromagnetic leak tightness test without objections
Il test di impermeabilità elettromagnetica è stato adatto
Skúška vírivými prúdmi,Eddy current test,Controllo eddy current
ASME SA 999/SA 999M/E309 100 [%]
Typ etalónu - Type of the reference standard - Tipo de etalón: **Vývrt,Bored hole,Buco**
Priemer vývrtu - Drilled hole - Diametro del difetto artificiale: **2,20 [mm]**

Skúška nepriepustnosti elektromagnetická vyhovela
Electromagnetic leak tightness test without objections
Il test di impermeabilità elettromagnetica è stato adatto
Skúška vírivými prúdmi,Eddy current test,Controllo eddy current
ASTM A 999/A 999 M/E309 100 [%]
Typ etalónu - Type of the reference standard - Tipo de etalón: **Vývrt,Bored hole,Buco**
Priemer vývrtu - Drilled hole - Diametro del difetto artificiale: **2,20 [mm]**

Skúška nepriepustnosti vnútorným pretlakom vyhovela **API 5L 5 [sec] 20,50 [MPa] 100 [%]**
Hydrostatic leak tightness test without objections
Il test di impermeabilità mediante la sovrapressione interna é stato adatto

Kontrola rozmerov vyhovela. **100 [%]**
Dimensional check without objections.
Controllo dimesionale con esito soddisfacente.

Vizuálna kontrola vyhovela. **100 [%]**
Visual inspection without objections.
Ispezione visiva con esito soddisfacente.

Rádioizotopická aktivita je max. 100 Bq/kg.
Radioisotopic activity is max. 100 Bq/kg.
Massima attività radioisotopica 100 Bq/kg.

Miesto	**v Podbrezovej**	Dátum	**15.03.2024**	Závodný znalec	**Ing. Čižmárik Miroslav**
Location	**sag**	Date	**sag**	Works Inspector	
Localitá		Data		Ispettore della fabbrica	

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Všetky výrobky vyhovujú vyššie uvedeným normám a požiadavkám v objednávke.
All products meet requirements of above mentioned standards and requirements specified in the order.
Tutti i prodotti corrispondono alle norme sopra menzionate e alle specifiche richieste dall` ordine.

Úkos je podľa ASME B 16.25.
Bevelled as per ASME B 16.25.
Il taglio è conforme alla ASME B 16.25.

Potvrdzujeme, že minimálne hodnoty medze klzu za zvýšenej teploty sa zhodujú s minimálnymi hodnotami medze klzu pre všetky zvýšené teploty, ktoré sú predpísané normou ASTM ASME II, časť D, tabuľka Y1.
We certify that min. hot yield point values are in compliance with the min. hot yield point values for all the elevated temperatures prescribed by ASTM ASME II,part D,table Y1.
Si attesta che i valori minimi di snervamento a caldo sono conformi ai valori minimi di snervamento a caldo per tutte le alte temperature prescritte dalla norma ASTM ASME II,part D,tabella Y1.

Veľkost zrna je min. 8 podľa ASTM E 112.
Grain size is min. 8 acc. to ASTM E 112.
Dimensione del grano é min. 8 secondo ASTM E 112.

Zbytkový magnetizmus je max. 30.0 gauss.
Residual magnetism is max. 30.0 gauss.
Magnetismo residuo max. 30.0 gauss.

Potvrdzujeme, že vstupné oceľové bloky vyrobili Železiarne Podbrezová,a.s. Slovensko.
We declare that the relevant billets have been produced in Železiarne Podbrezová a.s., Slovakia.
Confermiamo che le relative billette di acciaio sono state prodotto in Železiarne Podbrezová a.s.

Tvrdosť HRC max. 22.
Hardness HRC max. 22.
Durezza HRC max. 22.

Rúry sú vyrobené z jemnozrnnej ocele.
The tubes are made of fine-grained steel.
I tubi sono realizzati in acciaio a grana fine.

Ťažnosť po roztrhnutí podľa PED, príloha 7.5 je väčšia ako 14% pri Lo: 5.65√So. Teplota normalizačného tvárnenia je 780°C – 980°C.
Elongation after rupture acc. to PED, Annex 7.5 (not less then 14%) with Lo: 5.65√So. Temperature of Normalising forming 780°C – 980°C.
L´allungamento dopo rottura secondo PED, allegato 7.5 è superiore al 14% e Lo: 5.65 √ So. La formatura a temperatura di normalizzazione avviene ad una temperatura di 780°C – 980°C.

Systém kvality výrobcu je certifikovaný fy SGS podľa ISO 9001, číslo certifikátu SK20/3261, platnosť certifikátu je do 15.6.2026.
Producer´s Quality Assurance Sytem is certified according to ISO 9001 by SGS, certificate no. SK20/3261, validity: 15.6.2026.
Il sistema della qualitá é certificata secondo ISO 9001 da SGS, numero del certificato SK20/3261, validitá al 15.6.2026.

Výrobky spĺňajú základné požiadavky na materiály pre tlakové zariadenia uvedené v Prílohe I Smernice pre tlakové zariadenia (PED) 2014/68 EU.
The products are in compliance with the material basic requirements according to the Pressure Equipment Directive (PED) 2014/68 EU, Annex I.
I prodotti soddisfano le richieste fondamentali della Direttiva (PED) 2014/68 EU, Allegato I.

Overenie základných parametrov dokumentu kontroly v informačnom systéme výrobcu ŽP a. s.:
Verification of basic parameters of inspection document in the ZP information system (Manufacturers information system):
Verifica dei parametri di base del documento di ispezione nel sistema informativo di ZP (Sistema informativo del produttore):
https://check.zelpo.sk/certchkN.php?ID=526123859

Miesto	**v Podbrezovej**	Dátum	**15.03.2024**	Závodný znalec	**Ing. Čižmárik Miroslav**
Location	**sag**	Date	**sag**	Works Inspector	
Localitá		Data		Ispettore della fabbrica	

Železiarne Podbrezová a.s. Kolkáreň 35, 976 81 Podbrezová Slovakia
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ŽELEZIARNE® PODBREZOVÁ akciová spoločnosť 976 81 Podbrezová Oddelenie kontroly a zabezpečovania kvality -1-

Approved by S.COZZANI on 18/03/24

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COES S.R.L. P.O. 2283/24 (comm. 166/24 + 137/24) TAL JOB N°424004025 OUR DDT N°402401593 OF 19/07/24
N° 1 MT 6 HEAT 41788 DIMENSIONS 60,3 x 3,91 ITEM POS. 30 - ART. D0426

ŽELEZIARNE® PODBREZOVÁ

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Číslo
Number
Numero
26883/01/2024

Č.ext.obj. - External order No. - Numero dell'ordine esterno:
IT240707

Číslo položky - Item number - Numero di articolo:
5

Č.obj.príj. - Consignee order No. - Numero dell'ordine del destinatario:
OF240304

Číslo zákazky výrobcu - Manufakturer's works order number - Conferma d´ordine dello stabilimento:
BM 274490 / 1/ 1 3423836

Číslo dopravného prostriedku - Transport No. - Camion Nr.:
TV458DI TV378YH

Číslo ložného listu - Loading Bill No. - Polizza di carico:
3034628

Číslo avíza - Dispatch note - Avviso di spedizione:
3423259

Výrobca - Manufacturer´s works - Produttore:
Železiarne Podbrezová a.s.
Kolkáreň 35 976 81 Podbrezová SLOVAKIA

Zakaznik/Prijemca - Purchaser/Consignee - Committente/Destinatario:

T.A.L. Tubi Acciaio Lombarda S.p.A.
Via G. di Vittorio, 6
29017 Fiorenzuola d'Arda, Piacenza
ITALY

COES G.Q.	Ricezione data 19/07/2024	Sigla U.S.
	Verificato data 22/07/2024	Sigla U.S.

Výrobok - Product - Prodotto:
Rúry oceľové bezošvé, valcované za tepla - rúry pre potrubia pre horľavé médiá
Seamless hot finished steel tubes - Pipelines for combustible fluids
Tubi d´ acciaio senza saldatura, laminati a caldo - tubi per condotti dei fluidi infiammabili

Rozmery - Dimensions - Dimensioni:

Vonkajší priemer - Outside diameter - Diametro esterno:	**60,320 mm**
Hrúbka steny - Wall thickness - Spessore:	**3,910 mm**
Dĺžka - Length - Lunghezza:	**6000,00 mm [0,000 + 100,000 mm]**
Počet kusov - Number of pieces - Numero di pezzi:	**158**
Celková dĺžka - Total length - Lunghezza totale:	**948.00 [m]**
Celková hmotnosť - Total mass - Peso totale:	**5287.00 [kg]**

Označenie ocele - Steel designation - Qualitá dell acciaio:
Grade 6 ASME SA-333/SA-333M Ed.2023; Grade 6 ASTM A 333/A 333M -18; L360 PSL1 API SPEC. 5L Ed.46th2018Err.2018; X52 PSL1 API SPEC. 5L Ed.46th2018Err.2018

Stav dodania - Products as delivered condition - Stato di fornitura:
NORMALIZING CONDITION AT MIN. 900C Normalizačné tvárnenie - Normalized forming - Formatura a temperatura di normalizzazione

Technicko - dodacie podmienky - Technical delivery conditions - Condizioni tecniche e di consegna:
ASTM A 333/A 333M -18; ASME SA-333/SA-333M Ed.2023; API SPEC. 5L Ed.46th2018Err.2018; ASTM A 999/A 999M -23; ASME SA-999/SA-999M Ed.2023

Rozmerová norma - Dimensional Standard - Norma dimensionale:
ASME B36.10M :2022

Technická špecifikácia - Technical specification - Specificazione tecnica:
TS 02 rev.6 :2021

Technický predpis - Technical regulation - Regolamento tecnico:
ANSI-NACE MR0175/ISO 15156 pt.1+pt.2; NACE MR0103 /ISO 17945 :2015

Číslo tavby Cast No. Numero di colata	Počet kusov Number of pieces Numero di pezzi	Celková dĺžka Total length Lunghezza totale	Celková hmotnosť Total mass Peso totale	Druh tavenia Steelmaking process Procedimento di elaborazione dell´acciaio
41788	**158**	**948.00**	**5287.00**	**E**

Miesto Location Localitá	**v Podbrezovej**	Dátum Date Data	**04.06.2024**	Závodný znalec Works Inspector Ispettore della fabbrica	**Ing. Čižmárik Miroslav**

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Approved by S.COZZANI on 06/06/24

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E - elektrická oblúková pec-electric arc furnace-forno elettrico ad arco

Druh ocele - Type of steel - Acciaio:

úplne uklúdnená oceľ hliníkom - fully killed steel with Aluminium - acciaio totalmente calmato (Al)

Úprava povrchu - Surface protection - Protezione della superficie:

Ochrana povrchu UV lakom - Surface protection with UV lacquer - Protezione della superficie con vernice UV

Chemické zloženie - Chemical composition - Composizione chimica:

Číslo tavby Cast No. Numero di colata		C [%]	Mn [%]	Si [%]	P [%]	S [%]	Cu [%]	Cr [%]	Ni [%]	Al [%]	Mo [%]	Ti [%]
		Predpis - Requirements - Requisiti										
	min.			0,15						0,015		
	max.	0,20	1,30	0,35	0,020	0,010	0,30	0,20	0,40	0,060	0,12	0,040
41788		**0,17**	**1,22**	**0,18**	**0,013**	**0,010**	**0,19**	**0,06**	**0,07**	**0,024**	**0,03**	**0,001**

Číslo tavby Cast No. Numero di colata		V [%]	Nb [%]	B [%]	Exp.1 [%]	Exp.2 [%]	Exp.3 [%]	Exp.4 [%]
	min.							
	max.	0,070	0,020	0,0010	0,150	0,600	0,060	0,42
41788		**0,007**	**0,001**	**0,0003**	**0,009**	**0,289**	**0,008**	**0,41**

Exp.1 Nb + Ti + V
Exp.2 Nb+Ti+V+Cu+Mo+Cr
Exp.3 Nb + V
Exp.4 = Ceq = C+Mn/6+(Cr+Mo+V)/5+(Cu+Ni)/15

Výrobková analýza - Product analysis - Analisi di prodotto:

Číslo tavby Cast No. Numero di colata	por.	C [%]	Mn [%]	Si [%]	P [%]	S [%]	Cu [%]	Cr [%]	Ni [%]	Al [%]	Mo [%]	Ti [%]
41788	**1**	**0,17**	**1,22**	**0,19**	**0,013**	**0,009**	**0,20**	**0,05**	**0,08**	**0,025**	**0,03**	**0,000**
41788	**2**	**0,18**	**1,22**	**0,19**	**0,014**	**0,010**	**0,20**	**0,05**	**0,08**	**0,025**	**0,03**	**0,000**

Číslo tavby Cast No. Numero di colata	por.	V [%]	Nb [%]	B [%]
41788	**1**	**0,007**	**0,000**	**0,0003**
41788	**2**	**0,007**	**0,000**	**0,0003**

Skúška ťahom - Tensile test - Prova di trazione:

Izbová teplota - Room temperature - Temperatura ambiente

Č. No. Nr.	Číslo tavby Cast No. Numero di colata	Číslo vzorky Test sample No. No. di provino	Rozmery Dimensions Dimensioni [mm]	Smer odberu/typ vzorky Direction/Type of the test piece Orientamento/Tipo della provetta	Výrazná/zmluvná medza kĺzu Yield/Proof strength Limite di snervamento		Pevnosť v ťahu Tensile strength Carico di rottura	Ťažnosť Elongation after fracture Allungamento	
					Rp0,2 [MPa]	Rt0,5 [MPa]	Rm [MPa]	A 2" [%]	A 5,65 [%]
	Predpis - Requirements - Requisiti			min.	240	360	460	--- *	14.0
				max.	---	---	---	---	---
1	**41788**	A026207/24	19.65 x 4.26	L/V	**426**	**430**	**556**	**31.8**	**31.8**
2	**41788**	A026208/24	19.66 x 4.25	L/V	**424**	**428**	**554**	**32.0**	**32.0**

Miesto	**v Podbrezovej**	Dátum	**04.06.2024**	Závodný znalec	**Ing. Čižmárik Miroslav**
Location	**ma**	Date	**ma**	Works Inspector	
Localitá		Data		Ispettore della fabbrica	

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Č. No. Nr.	Číslo tavby Cast No. Numero di colata	Číslo vzorky Test sample No. No. di provino	Rozmery Dimensions Dimensioni [mm]	Smer odberu/typ vzorky Direction/Type of the test piece Orientamento/Tipo della provetta	Výrazná/zmluvná medza klzu Yield/Proof strength Limite di snervamento		Pevnosť v ťahu Tensile strength Carico di rottura	Ťažnosť Elongation after fracture Allungamento	
					Rp0,2 [MPa]	Rt0,5 [MPa]	Rm [MPa]	A 2" [%]	A 5,65 [%]
	Predpis - Requirements - Requisiti			min.	240	360	460	— *	14.0
				max.	---	---	---	---	---
3	**41788**	A026209/24	19.64 x 4.23	L/V	**425**	**429**	**555**	**32.2**	**32.2**
4	**41788**	A026210/24	19.68 x 4.22	L/V	**430**	**434**	**566**	**31.4**	**31.4**
5	**41788**	A026211/24	19.45 x 3.79	L/V	**447**	**447**	**575**	**32.7**	**32.7**
6	**41788**	A026212/24	19.43 x 3.80	L/V	**448**	**448**	**577**	**32.4**	**32.4**
7	**41788**	A026213/24	19.46 x 3.77	L/V	**441**	**442**	**574**	**32.9**	**32.9**
8	**41788**	A026214/24	19.44 x 3.82	L/V	**435**	**437**	**567**	**33.0**	**33.0**

L = Pozdĺžny - Longitudinal - Longitudinale
V = Výrez - Strip test - Striscia
*** - Ťažnosť - Elongation after fracture - Allungamento min. (1.87*t)+15**
t[mm] = skutočná hrúbka vzorky - actual specimen thickness - spessore effettivo del provino

Skúška rázom v ohybe Charpy - Charpy impact test - Prova di resilienza Charpy:
ASTM A 370 -56 [°C]

Č. No. Nr.	Číslo tavby Cast No. Numero di colata	Číslo vzorky Test sample No. No. di provino	Rozmery Dimensions Dimensioni [mm]	Smer odberu vzorky Direction of the test piece Orientamento della provetta	Nárazová práca - priemerná hodnota Impact energy-Mean value Resilienza-Valore medio	Nárazová práca - jednotlivé hodnoty Impact energy-Individual values Resilienza-Valori singoli	Podiel húževnatého lomu - priemerná hodnota Shear area-Mean value Rata di frattura tenace - valore medio
					KV [J]	KV [J]	PHL [%]
	Predpis - Requirements - Requisiti			min.	40.0	27.0	—
				max.	---	---	---
1	**41788**	A026207/24	10.00 x 2.50	L	**116.0**	**116.0,116.0,116.0**	**80.0**

Miesto	**v Podbrezovej**	Dátum	**04.06.2024**	Závodný znalec	**Ing. Čižmárik Miroslav**
Location	**ma**	Date	**ma**	Works Inspector	
Localitá		Data		Ispettore della fabbrica	

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Č. No. Nr.	Číslo tavby Cast No. Numero di colata	Číslo vzorky Test sample No. No. di provino	Rozmery Dimensions Dimensioni [mm]	Smer odberu vzorky Direction of the test piece Orientamento della provetta	Podiel húževnatého lomu - jednotlivé hodnoty Shear area-Individual values Rata di frattura tenace - val... singoli
					PHL [%]
	Predpis - Requirements - Requisiti				min. — max. —
1	**41788**	A026207/24	10.00 x 2.50	L	**82.0,78.0,80.0**

L = Pozdĺžny - Longitudinal - Longitudinale

Skúška stlačením vyhovela.
Flattening test without objections.
Prova di schiaccio di esito soddisfacente.

Skúška nepriepustnosti elektromagnetická vyhovela
Electromagnetic leak tightness test without objections
Il test di impermeabilità elettromagnetica è stato adatto
Skúška vírivými prúdmi,Eddy current test,Controllo eddy current
ASTM A 999/A 999 M/E309 100 [%]
Typ etalónu - Type of the reference standard - Tipo de etalón: **Vývrt,Bored hole,Buco**
Priemer vývrtu - Drilled hole - Diametro del difetto artificiale: **2,20 [mm]**

Skúška nepriepustnosti elektromagnetická vyhovela
Electromagnetic leak tightness test without objections
Il test di impermeabilità elettromagnetica è stato adatto
Skúška vírivými prúdmi,Eddy current test,Controllo eddy current
ASME SA 999/SA 999M/E309 100 [%]
Typ etalónu - Type of the reference standard - Tipo de etalón: **Vývrt,Bored hole,Buco**
Priemer vývrtu - Drilled hole - Diametro del difetto artificiale: **2,20 [mm]**

Skúška nepriepustnosti vnútorným pretlakom vyhovela **API 5L 5 [sec] 20,50 [MPa] 100 [%]**
Hydrostatic leak tightness test without objections
Il test di impermeabilità mediante la sovrapressione interna é stato adatto

Kontrola rozmerov vyhovela. **100 [%]**
Dimensional check without objections.
Controllo dimesionale con esito soddisfacente.

Vizuálna kontrola vyhovela. **100 [%]**
Visual inspection without objections.
Ispezione visiva con esito soddisfacente.

Rádioizotopická aktivita je max. 100 Bq/kg.
Radioisotopic activity is max. 100 Bq/kg.
Massima attività radioisotopica 100 Bq/kg.

Miesto	**v Podbrezovej**	Dátum	**04.06.2024**	Závodný znalec	**Ing. Čižmárik Miroslav**
Location	**ma**	Date	**ma**	Works Inspector	
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Všetky výrobky vyhovujú vyššie uvedeným normám a požiadavkám v objednávke.
All products meet requirements of above mentioned standards and requirements specified in the order.
Tutti i prodotti corrispondono alle norme sopra menzionate e alle specifiche richieste dall` ordine.

Úkos je podľa ASME B 16.25.
Bevelled as per ASME B 16.25.
Il taglio è conforme alla ASME B 16.25.

Potvrdzujeme, že minimálne hodnoty medze klzu za zvýšenej teploty sa zhodujú s minimálnymi hodnotami medze klzu pre všetky zvýšené teploty, ktoré sú predpísané normou ASTM ASME II, časť D, tabuľka Y1.
We certify that min. hot yield point values are in compliance with the min. hot yield point values for all the elevated temperatures prescribed by ASTM ASME II,part D,table Y1.
Si attesta che i valori minimi di snervamento a caldo sono conformi ai valori minimi di snervamento a caldo per tutte le alte temperature prescritte dalla norma ASTM ASME II,part D,tabella Y1.

Veľkost zrna je min. 8 podľa ASTM E 112.
Grain size is min. 8 acc. to ASTM E 112.
Dimensione del grano é min. 8 secondo ASTM E 112.

Zbytkový magnetizmus je max. 30.0 gauss.
Residual magnetism is max. 30.0 gauss.
Magnetismo residuo max. 30.0 gauss.

Potvrdzujeme, že vstupné oceľové bloky vyrobili Železiarne Podbrezová,a.s. Slovensko.
We declare that the relevant billets have been produced in Železiarne Podbrezová a.s., Slovakia.
Confermiamo che le relative billette di acciaio sono state prodotto in Železiarne Podbrezová a.s.

Tvrdosť HRC max. 22.
Hardness HRC max. 22.
Durezza HRC max. 22.

Rúry sú vyrobené z jemnozrnnej ocele.
The tubes are made of fine-grained steel.
I tubi sono realizzati in acciaio a grana fine.

Ťažnosť po roztrhnutí podľa PED, príloha 7.5 je väčšia ako 14% pri Lo: 5.65√So. Teplota normalizačného tvárnenia je 780°C – 980°C.
Elongation after rupture acc. to PED, Annex 7.5 (not less then 14%) with Lo: 5.65√So. Temperature of Normalising forming 780°C – 980°C.
L´allungamento dopo rottura secondo PED, allegato 7.5 è superiore al 14% e Lo: 5.65 √ So. La formatura a temperatura di normalizzazione avviene ad una temperatura di 780°C – 980°C.

Systém kvality výrobcu je certifikovaný fy SGS podľa ISO 9001, číslo certifikátu SK20/3261, platnosť certifikátu je do 15.6.2026.
Producer´s Quality Assurance Sytem is certified according to ISO 9001 by SGS, certificate no. SK20/3261, validity: 15.6.2026.
Il sistema della qualitá é certificata secondo ISO 9001 da SGS, numero del certificato SK20/3261, validitá al 15.6.2026.

Výrobky spĺňajú základné požiadavky na materiály pre tlakové zariadenia uvedené v Prílohe I Smernice pre tlakové zariadenia (PED) 2014/68 EU.
The products are in compliance with the material basic requirements according to the Pressure Equipment Directive (PED) 2014/68 EU, Annex I.
I prodotti soddisfano le richieste fondamentali della Direttiva (PED) 2014/68 EU, Allegato I.

Overenie základných parametrov dokumentu kontroly v informačnom systéme výrobcu ŽP a. s.:
Verification of basic parameters of inspection document in the ZP information system (Manufacturers information system):
Verifica dei parametri di base del documento di ispezione nel sistema informativo di ZP (Sistema informativo del produttore):
https://check.zelpo.sk/certchkN.php?ID=1767120147

Miesto Location Localitá	**v Podbrezovej** **ma**	Dátum Date Data	**04.06.2024** **ma**	Závodný znalec Works Inspector Ispettore della fabbrica	**Ing. Čižmárik Miroslav**

Železiarne Podbrezová a.s. Kolkáreň 35, 976 81 Podbrezová Slovakia
Phone: + 421 48 645 3031, Fax: + 421 48 645 3032 www.steeltube.sk
Company ID: 31 562 141 ,VAT ID: SK2020458704
Bank Contact: Slovenská sporiteľňa, a.s. (Slovakia) IBAN: SK69 0900 0000 0000 7990 0086, SWIFT (BIC): GIBASKBX
The Company is registered in the Commercial Register of the District Court Banská Bystrica, Section Sa, Insert No. 69/S

ŽELEZIARNE® PODBREZOVÁ akciová spoločnosť 976 81 Podbrezová Oddelenie kontroly a zabezpečovania kvality -1-

Approved by S.COZZANI on 06/06/24

24 2201

COES S.R.L. P.O. 2283/24 (comm. 166/24 + 137/24) TAL JOB N°424004025 OUR DDT N°402401593 OF 19/07/24
N° 1 MT 6 HEAT 33447 DIMENSIONS 73 x 5,16 ITEM POS. 40 - ART. G6831

ŽELEZIARNE® PODBREZOVÁ

Inšpekčný certifikát
Inspection certificate
Certificato di collaudo
EN 10204:2004/3.1

Číslo
Number
Numero
48223/1/2023

Č.ext.obj. - External order No. - Numero dell'ordine esterno:
IT231584

Číslo položky - Item number - Numero di articolo:
8

Č.obj.príj. - Consignee order No. - Numero dell'ordine del destinatario:
OF230675

Číslo zákazky výrobcu - Manufacturer's works order number
- Conferma d´ordine dello stabilimento:
BM 267384/1/1 3343823

Číslo dopravného prostriedku - Transport No. - Camion Nr.:
ZM442CY ZM589YE

Číslo ložného listu - *Loading Bill No.* - *Polizza di carico*:
3030928

Číslo avíza - *Dispatch note* - *Avviso di spedizione*:
3326184

Zákazník/Príjemca. - Customer/Consignee
- Committente/Destinatario:

T.A.L. Tubi Acciaio Lombarda S.p.A.
Via G. di Vittorio, 6
29017 Fiorenzuola d'Arda, Piacenza
ITALY

COES G.Q.	Ricezione data 19/07/2024	Sigla V.S.
	Verificato data 22/07/2024	Sigla V.S.

Výrobok - *Product* - *Prodotto*:

Rúry oceľové bezošvé, valcované za tepla - rúry pre potrubia pre horľavé médiá
Seamless hot finished steel tubes - pipelines for combustible fluids
Tubi di acciaio senza saldatura laminati a caldo – tubi per condotte per fluidi combustibili

Vonkajší priemer - Outside diameter - Diametro esterno:	**73.020** mm
Hrúbka steny - Wall thickness - Spessore:	**5.160** mm
Dĺžka - Length - Lunghezza:	**6000.000** mm [-0 +100] mm
Počet kusov - Number of pieces - Numero di pezzi:	**59**
Celková dĺžka - Total length - Lunghezza totale:	**354.00** m
Celková hmotnosť - Total mass - Peso totale:	**3092.00** kg

COES SRL
VERIFIED IDENTICAL TO
SA 333 Ed 2023
V.S.

Materiál - *Material* - *Materiale*:

Grade 6 ASME SA-333/SA-333M Ed.2021, Grade 6 ASTM A 333/A 333M -18,
L360 PSL1 API SPEC. 5L Ed.46th2018Err.2018, X52 PSL1 API SPEC. 5L Ed.46th2018Err.2018

Stav dodania - *Products as delivered condition* - *Stato di fornitura*:

NORMALIZING CONDITION AT MIN. 900C - Normalizačné tvárnenie - *Normalizing forming* - *Formatura a temperatura di normalizzazione*

Technické predpisy - *Technical requirements/Demand* - *Requisiti tecnici*:

API SPEC. 5L Ed.46th2018Err.2018, ASME SA-333/SA-333M Ed.2021, ASME SA-999/SA-999M Ed.2021,
ASTM A 333/A 333M -18, ASTM A 999/A 999M -18, ASME B36.10M :2022, TS 02 rev.6 :2021,
ANSI-NACE MR0175/ISO 15156 pt.1+pt.2, NACE MR0103 /ISO 17945 :2015

Miesto **v Podbrezovej** Dátum **30.10.2023** Závodný znalec **Ing. Vojtas Miroslav**
Location **Moc** *Date* *Works Inspector*
Localitá *Data* *Ispettore della fabbrica*

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ŽELEZIARNE® PODBREZOVÁ akciová spoločnosť 976 81 Podbrezová Oddelenie kontroly a zabezpečovania kvality -1-

Approved by D.MOLINARI on 02/11/23

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

ŽELEZIARNE PODBREZOVÁ

Inšpekčný certifikát
Inspection certificate
Certificato di collaudo
EN 10204:2004/3.1

Číslo / *Number* / *Numero*: **48223/1/2023**

Číslo tavby *Cast number* *Numero di colata*	Počet kusov *Number of pieces* *Numero di pezzi*	Dĺžka *Length* *Lunghezza* [m]	Hmotnosť *Mass* *Peso* [kg]	Druh tavenia *Steelmaking process* *Procedimento di elaborazione dell'acciaio*
33447	**59**	**354**	**3092**	**E**

E = elektrická oblúková pec - *electric arc furnace - forno elettrico ad arco*

Druh ocele - *Steel grade - Acciaio*:

úplne uklʼudnená oceľ hliníkom - *fully killed steel with Aluminium - acciaio totalmente calmato (Al)*

Úprava povrchu - *Surface protection - Protezione della superficie*:

Ochrana povrchu UV lakom - *Surface protection with UV lacquer - Protezione della superficie con vernice UV*

Chemické zloženie - *Chemical composition - Composizione chimica*:

Číslo tavby *Cast number* *Numero di colata*		C [%]	Mn [%]	Si [%]	P [%]	S [%]	Cu [%]	Cr [%]	Ni [%]	Al [%]	Mo [%]	Ti [%]	V [%]	Nb [%]
	Predpis - *Requirements - Requisiti*													
	min.			0.15						0.015				
	max.	0.20	1.30	0.35	0.020	0.010	0.30	0.20	0.40	0.060	0.12	0.040	0.070	0.020
33447		**0.17**	**1.21**	**0.22**	**0.013**	**0.004**	**0.16**	**0.07**	**0.11**	**0.026**	**0.04**	**0.001**	**0.004**	**0.001**

Číslo tavby *Cast number* *Numero di colata*		B [%]	Exp.1 [%]	Exp.2 [%]	Exp.3 [%]	Exp.4 [%]
	min.					
	max.	0.0010	0.42	0.600	0.150	0.060
33447		**0.0002**	**0.41**	**0.276**	**0.006**	**0.005**

Exp.1 = CEV = C + Mn/6 + (V+Mo+Cr)/5 + (Ni+Cu)/15

Exp.2 = Nb + V + Ti + Cu + Mo + Cr

Exp.3 = V + Nb + Ti

Exp.4 = V + Nb

Výrobková analýza - *Product analysis - Analisi di prodotto*:

Číslo tavby *Cast number* *Numero di colata*		C [%]	Mn [%]	Si [%]	P [%]	S [%]	Cu [%]	Cr [%]	Ni [%]	Al [%]	Mo [%]	Ti [%]	V [%]	Nb [%]
33447	**1**	**0.17**	**1.22**	**0.23**	**0.013**	**0.005**	**0.17**	**0.07**	**0.11**	**0.027**	**0.04**	**0.001**	**0.004**	**0.001**
33447	**2**	**0.17**	**1.22**	**0.23**	**0.014**	**0.005**	**0.17**	**0.07**	**0.11**	**0.027**	**0.04**	**0.001**	**0.004**	**0.001**

Číslo tavby *Cast number* *Numero di colata*		B [%]
33447	**1**	**0.0002**
33447	**2**	**0.0002**

Miesto / *Location* / *Località*: **v Podbrezovej** **Moc**

Dátum / *Date* / *Data*: **30.10.2023**

Závodný znalec / *Works Inspector* / *Ispettore della fabbrica*: **Ing. Vojtas Miroslav**

Železiarne Podbrezová a.s., Kolkáreň 35, 976 81 Podbrezová, Slovak Republic
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ŽELEZIARNE PODBREZOVÁ akciová spoločnosť 976 81 Podbrezová
Oddelenie kontroly a zabezpečovania kvality -1-

Approved by D.MOLINARI on 02/11/23

ŽELEZIARNE PODBREZOVÁ

Inšpekčný certifikát
Inspection certificate
Certificato di collaudo
EN 10204:2004/3.1

Číslo *Number* *Numero* **48223/1/2023**

Skúška ťahom - *Tensile test* - *Prova di trazione* : **20** °C

C. Nr	Číslo tavby *Cast number* *Numero di colata*	Vzorka č. *Test sample No.* *No. di provino*	Rozmery *Dimensions* *Dimensioni* [mm]	Smer odberu/typ vzorky *Direction/Type of the test piece* *Orientamento/Tipo della provetta*	Medza klzu *Yield point - Proof stress* *Limite di snervamento* Rp0,2 [MPa]	Medza klzu Rt0,5 [MPa]	Pevnosť v ťahu *Tensile strength* *Carico di rottura* Rm [MPa]	Ťažnosť *Elongation* *Allungamento* A5,65 [%]	Ťažnosť 2" [%]
	Predpis - Requirements - Requisiti:				min.	240	360	460	14.0	*
					max.	---	---	---	---	---
1	**33447**	A052857/23	19.25x5.17	L / V	**406**	**405**	**550**	**29.1**	**36.0**
2	**33447**	A052858/23	19.26x5.16	L / V	**407**	**406**	**550**	**29.3**	**36.2**

* Ťažnosť - *Elongation* - *Allungamento* : min. 1.87*t+15

t [mm] = skutočná hrúbka vzorky na skúšku ťahom - *actual tensile test specimen thickness* - .

L = Pozdĺžny - *Longitudinal* - *Longitudinale*

V = Výrez - *Strip test* - *Striscia*

Skúška rázom v ohybe Charpy - *Charpy impact test* - *Prova di resilienza Charpy*: **ASTM A 370**

C. Nr	Číslo tavby *Cast number* *Numero di colata*	Vzorka č. *Test sample No.* *No. di provino*	Predpis *Requirements* *Requisiti* min.-max. [J]	Jednotlivé hodnoty *Individual values* *Valori singoli* [J]	Priemerná hodnota *Mean value* *Valore medio* [J]	Teplota skúšania *Test temperature* *Temperatura di prova* [°C]
1	**33447**	A052857/23	KV 40 - ---	**105, 108, 111**	**108**	**-54**

C. Nr	Vzorka č. *Test sample No.* *No. di provino*	Rozmery *Dimensions* *Dimensioni* [mm]	Smer odberu vzorky *Direction of the test piece* *Orientamento della provetta*
1	A052857/23	10.00x3.33	L

Poznámky - *Remarks* - *Osservazioni*

Cast No. 33447: Shear area 45%

Skúška stlačením vyhovela.
Flattening test without objections.
Prova di schiaccio di esito soddisfacente.

Skúška vodným tlakom vyhovela.
Hydraulic pressure test without objections.
Prova idraulica con esito soddisfacente.

API 5 L 20.50 MPa **5** sec 100%

Skúška vírivými prúdmi vyhovela
Eddy current test without objections
Controllo eddy current con esito positivo

ASTM A 999/E 309 **100 %**

Priemer vývrtu
Drilled hole
Diametro del difetto artificiale
2.20 mm

Skúška vírivými prúdmi vyhovela
Eddy current test without objections
Controllo eddy current con esito positivo

ASME SA-999/E309 **100 %**

Priemer vývrtu
Drilled hole
Diametro del difetto artificiale
2.20 mm

Miesto **v Podbrezovej** Dátum **30.10.2023** Závodný znalec **Ing. Vojtas Miroslav**
Location **Moc** *Date* *Works Inspector*
Localitá *Data* *Ispettore della fabbrica*

Železiarne Podbrezová a.s., Kolkáreň 35, 976 81 Podbrezová, Slovak Republic
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ŽELEZIARNE PODBREZOVÁ akciová spoločnosť 976 81 Podbrezová Oddelenie kontroly a zabezpečovania kvality -1-

Approved by D.MOLINARI on 02/11/23

ŽELEZIARNE PODBREZOVÁ

Inšpekčný certifikát
Inspection certificate
Certificato di collaudo
EN 10204:2004/3.1

Číslo
Number
Numero

48223/1/2023

Systém kvality výrobcu je certifikovaný fy SGS podľa ISO 9001, číslo certifikátu SK20/3261, platnosť certifikátu je do 15.6.2026.
Producer´s Quality Assurance Sytem is certified according to ISO 9001 by SGS, certificate no. SK20/3261, validity: 15.6.2026.
Il sistema della qualitá é certificata secondo ISO 9001 da SGS, numero del certificato SK20/3261, validitá al 15.6.2026.

Potvrdzujeme, že minimálne hodnoty medze klzu za zvýšenej teploty sa zhodujú s minimálnymi hodnotami medze klzu pre všetky zvýšené teploty, ktoré sú predpísané normou ASTM ASME II, časť D, tabuľka Y1.
We certify that min. hot yield point values are in compliance with the min. hot yield point values for all the elevated temperatures prescribed by ASTM ASME II,part D,table Y1.
Si attesta che i valori minimi di snervamento a caldo sono conformi ai valori minimi di snervamento a caldo per tutte le alte temperature prescritte dalla norma ASTM ASME II,part D,tabella Y1.

Úkos je podľa ASME B 16.25.
Bevelled as per ASME B 16.25.
Il taglio è conforme alla ASME B 16.25.

Veľkost zrna je min. 8 podľa ASTM E 112.
Grain size is min. 8 acc. to ASTM E 112.
Dimensione del grano é min. 8 secondo ASTM E 112.

Rúry sú vyrobené z jemnozrnnej ocele.
The tubes are made of fine-grained steel.
I tubi sono realizzati in acciaio a grana fine.

HRC max. 22.

Potvrdzujeme, že vstupné oceľové bloky vyrobili Železiarne Podbrezová,a.s. Slovensko.
WE DECLARE THAT THE RELEVANT BILLETS HAVE BEEN PRODUCED IN ZELEZIARNE PODBREZOVA A.S.- SLOVAKIA.
Confermiamo che le relative billette di acciaio sono state prodotto in Železiarne Podbrezová a.s.

Rádioizotopická aktivita je max. 100 Bq/kg.
Radioisotopic activity is max. 100 Bq/kg.
Massima attivitá radioisotopica 100 Bq/kg.

Zbytkový magnetizmus je max. 30.0 gauss.
Residual magnetism is max. 30.0 gauss.
Magnetismo residuo max. 30.0 gauss.

Ťažnosť po roztrhnutí podľa PED, príloha 7.5 je väčšia ako 14% pri Lo: 5.65√So. Teplota normalizačného tvárnenia je 780°C – 980°C.
Elongation after rupture acc. to PED, Annex 7.5 (not less then 14%) with Lo: 5.65√So. Temperature of Normalising forming 780°C – 980°C.
L´allungamento dopo rottura secondo PED, allegato 7.5 è superiore al 14% e Lo: 5.65 √ So. La formatura a temperatura di normalizzazione avviene ad una temperatura di 780°C – 980°C.

Výrobky spĺňajú základné požiadavky na materiály pre tlakové zariadenia uvedené v Prílohe I Smernice pre tlakové zariadenia (PED) 2014/68 EU.
The products are in compliance with the material basic requirements according to the Pressure Equipment Directive (PED) 2014/68 EU, Annex I.
I prodotti soddisfano le richieste fondamentali della Direttiva (PED) 2014/68 EU, Allegato I.

Všetky výrobky vyhovujú vyššie uvedeným normám a požiadavkám v objednávke.
All products meet requirements of above mentioned standards and requirements specified in the order.
Tutti i prodotti corrispondono alle norme sopra menzionate e alle specifiche richieste dall` ordine.

Vizuálna kontrola a rozmery vyhoveli (100 %).
Visual inspection and dimensional check without objections (100 %).
Ispezione e controllo dimesionale con esito soddisfacente(100 %).

Overenie základných parametrov dokumentu kontroly v informačnom systéme výrobcu ŽP a. s.:
Verification of basic parameters of inspection document in the ZP information system (Manufacturers information system):
Verifica dei parametri di base del documento di ispezione nel sistema informativo di ZP (Sistema informativo del produttore):
https://check.zelpo.sk/certchk.php?ID=1562155200

Miesto *Location* *Località*	Dátum *Date* *Data*	Závodný znalec *Works Inspector* *Ispettore della fabbrica*
v **Podbrezovej** **Moc**	**30.10.2023**	**Ing. Vojtas Miroslav**

Železiarne Podbrezová a.s., Kolkáreň 35, 976 81 Podbrezová, Slovak Republic
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ŽELEZIARNE PODBREZOVÁ akciová spoločnosť 976 81 Podbrezová
Oddelenie kontroly a zabezpečovania kvality -1-

Approved by D.MOLINARI on 02/11/23

COES S.R.L. P.O. 2283/24 (comm. 166/24 + 137/24) TAL JOB N°424004025 OUR DDT N°402401593 OF 19/07/24
N° 1 MT 10,81 HEAT 46426K DIMENSIONS 219,1 x 12,7 ITEM POS. 50 - ART. D9560

COES G.Q. | Ricezione data 19/07/2024 | Sigla U.S. | Verificato data 22/07/2024 | Sigla U.S.

LIBERTY

A02 **Inspection certificate '3.1' (EN 10 204)**

A03 Document No.: **30723/22** ✓ Page: **1/1**

A07	Customer's Order (P.O.) No./Item No.: **OF210736**	A08	Manufacturer's Works Order No.: **59061/0/22**
A11	Supplier's Order No.: **3151018150**	A10	Advice - Note No.: **8150085284**
B08, B12/13	Quantity delivered: pcs / bdls: **20**; mtrs / feet: **216,933**; B13 Actual mass kgs / lbs: **14281**	A06	Customer / Consignee: **T.A.L. S.P.A. TUBI ACCIAIO LOMBARDA con socio unico VIA G.DI VITTORIO, 6-ZONA IND. 29017 FIORENZUOLA ARDA Italy**
B09-11	Dimensions: **219,1 X 12,70 mm (8" SCH80)** ✓		
B02	Steel designation: **L360/X52 PSL1 Grade 6**		

B01,B03, B04 Product, conditions and terms of delivery:

Seamless steel tubes,
ASME B36.10M-18, ASTM A999/A999M-18, ASME SA999/SA999M-19,
API Spec.5L-46th edit.18 PSL1, EN ISO 3183/19, ASTM A333/A333M-18, ASME SA333/SA333M-21 – PED 2014/68/EU. ✓
ASME II Part.D Table Y1-11a. ANSI/NACE MR0175/ISO 15156-15, ANSI/NACE MR0103/ISO 17945-15.
Normalized (min. 860°C). **TS02 Rev.6 for T.A.L.+ LO deviation**

A04, B06 Marking: Manufacturer's mark, mill inspector's stamp

LIBERTY OSTRAVA 1 2

C71-92 Heat (H) and product (P) chemical analyses (%) C70 Steel made by basic oxygen process, fully killed, strand cast.

B07 Heat No.:		C	MN	SI	P	S	CU	NI	CR	AI	MO	V	TI	NB	CEQ
✓ 46426K	H	**0,16**	**1,27**	**0,199**	**0,016**	**0,007**	**0,10**	**0,03**	**0,05**	**0,026**	**0,006**	**0,043**	**0,002**	**<0,003**	**0,40**
	P	0,16	1,24	0,192	0,015	0,007	0,09	0,03	0,04	0,025	0,005	0,042	0,002	<0,001	0,39
	P	0,15	1,24	0,192	0,015	0,007	0,09	0,03	0,04	0,025	0,005	0,042	0,002	<0,001	0,39

Z99 ☐

B07 C04 Test results: Heat No. C00 Specimen No. / Requirements:	MPa C11 Yield Point	MPa C12 Tensile Strength	% (2") C13 Elongation	C40-43 Impact test (KCV2)	HRB C30-32 Hardness
				A) L-10-40J / - 52°C B) INF: SHEAR AREA (%)	
				Ø / min	
Requirements: L360/X52 Grade 6	**min. 360**	**min. 460**	**min. 27,0**		**max. 99**
	min. 240	**min. 415**	**min. 30,0**		
	Longitudinal strip specimen 38,1 mm				
46426K	**432**	**555**	**40,2**	**A) 120** **116 124 120**	**79 ; 79**
	392	**526**	**39,1**	**B) 42** **37 44 47**	

Z99 ☐

D01	Visual and dimensional inspection with satisfactory results	X	D51	Hydrostatic test - min. test pressure MPa / sec.	**20,5 / 5**
C50	Flattening test - satisfactory	X	D02	The pipes tested on tightness by NDT in acc. to	
C51	Expanding test - satisfactory				
C52	Bending test - satisfactory				
C53	Ring expanding test - satisfactory		D03	Nondestructive Electromagnetic Testing	
C54	Ring tensile test - satisfactory				

The manufacturer has an established and certified management system according to ISO 9001:2015, ISO 14001:2015, ISO 50001:2011, ISO 45001:2018.

QA System has been subjected to a specific assessment acc. to directive 2014/68/EU, annex I, point 4.3 and AD 2000-Mbl. W0 by TÜV NORD Systems GmbH & Co. KG. Welding process, personnel for welding and NDT are approved acc. to PED 2014/68/EU.

Elongation (A5) = min. 14% guaranteed (L0= 5.65 * $\sqrt{S0}$)

Residual magnetic field [mT] max.3 - satisfactory **MANUFACTURER OF BILLETS: LIBERTY OSTRAVA**

Mass activity value of the ionising radiation in the heat analysis does not exceed 100 Bq/kg.

22HRC=99HRBmax. **Grain size min. 7 acc. ASTM E112 is guaranteed.**

Guarantee of tensile properties acc.to ASME Sec.II Part.D Table Y1.

Z01 All pipes conform to the above mentioned standards and ordering requirements and agreements.

Z02 Date of issue **20.04.2022/TR**

Tel.:++420 595683644

COES SRL VERIFIED IDENTICAL TO SA 333 Ed. 2023 U.S.

LIBERTY

A01 Liberty Ostrava a.s.
A05 QA Department
Vratimovská 689/117
719 00 Ostrava-Kunčice
Czech Republic

Liberty Ostrava a.s.
Vratimovská 689/117, 719 00 Ostrava - Kunčice
QA - WORKS INSPECTOR
IDENTIFICATION No. 4

Bc. Petr Pastucha
Work's Inspector
Z02 Validation

58

E.z. 2574/16/15/P

Approved by MBRONZINI on 02/05/22

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

COES S.R.L. P.O. 2283/24 (comm. 166/24 + 137/24) TAL JOB N°424004025 OUR DDT N°402401593 OF 19/07/24
N° 1 MT 6,03 HEAT 31856 DIMENSIONS 48,3 x 7,14 ITEM POS. 60 - ART. H0405

ŽELEZIARNE® PODBREZOVÁ

Inšpekčný certifikát
Inspection certificate
Certificato di collaudo
EN 10204:2004/3.1

Číslo
Number
Numero
33586/1/2023

List č. - *Sheet No.* - *Pagina No.*: **1 / 5**

Č.ext.obj. - External order No. - Numero dell'ordine esterno:
IT231031

Číslo položky - Item number - Numero di articolo:
9

Č.obj.príj. - Consignee order No. - Numero dell'ordine del destinatario:
OF230484

Číslo zákazky výrobcu - Manufacturer's works order number
- Conferma d´ordine dello stabilimento:
BM 264032/1/1 3333A00

Číslo dopravného prostriedku - Transport No. - Camion Nr.:
RS672DL RS189YI

Číslo ložného listu - *Loading Bill No.* - *Polizza di carico*:
3029339

Číslo avíza - *Dispatch note* - *Avviso di spedizione*:
3324410

Zákazník/Príjemca. - Customer/Consignee
- Committente/Destinatario:

T.A.L. Tubi Acciaio Lombarda S.p.A.
Via G. di Vittorio, 6
29017 Fiorenzuola d'Arda, Piacenza
ITALY

COES G.Q.	Ricezione data 19/07/2024	Sigla V.S.
	Verificato data 22/07/2024	Sigla V.S.

Výrobok - *Product* - *Prodotto*:

Rúry oceľové bezošvé, valcované za tepla - rúry pre potrubia pre horľavé médiá
Seamless hot finished steel tubes - pipelines for combustible fluids
Tubi di acciaio senza saldatura laminati a caldo – tubi per condotte per fluidi combustibili

Vonkajší priemer - Outside diameter - Diametro esterno:	**48.260** mm
Hrúbka steny - Wall thickness - Spessore:	**7.140** mm
Dĺžka - Length - Lunghezza:	**6000.000** mm [-0 +100] mm
Počet kusov - Number of pieces - Numero di pezzi:	**72**
Celková dĺžka - Total length - Lunghezza totale:	**434.00** m
Celková hmotnosť - Total mass - Peso totale:	**3157.00** kg

COES SRL
VERIFIED IDENTICAL TO
SA 333 Ed. 2023
V.S.

Materiál - *Material* - *Materiale*:

Grade 6 ASME SA-333/SA-333M Ed.2021, Grade 6 ASTM A 333/A 333M -18,
L360 PSL1 API SPEC. 5L Ed.46th2018Err.2018, X52 PSL1 API SPEC. 5L Ed.46th2018Err.2018

Stav dodania - *Products as delivered condition* - *Stato di fornitura*:

NORMALIZING CONDITION AT MIN. 900C - Normalizačné tvárnenie - *Normalizing forming* - *Formatura a temperatura di normalizzazione*

Technické predpisy - *Technical requirements/Demand* - *Requisiti tecnici*:

API SPEC. 5L Ed.46th2018Err.2018, ASME SA-333/SA-333M Ed.2021, ASME SA-999/SA-999M Ed.2021,
ASTM A 333/A 333M -18, ASTM A 999/A 999M -18, ASME B36.10M :2022, TS 02 rev.6 :2021,
ANSI-NACE MR0175/ISO 15156 pt.1+pt.2, NACE MR0103 /ISO 17945 :2015

Miesto *Location* *Località*: **v Podbrezovej** **Taz**
Dátum *Date* *Data*: **17.07.2023**
Závodný znalec *Works Inspector* *Ispettore della fabbrica*: **Ing. Vojtas Miroslav**

Železiarne Podbrezová a.s., Kolkáreň 35, 976 81 Podbrezová, Slovak Republic
Phone: +421 48 645 3031, Fax: +421 48 645 3032, www.steeltube.sk
CIN: 31 562 141, VAT No: SK2020458704
Bank account: Slovenská sporiteľňa, a.s., IBAN: SK69 0900 0000 0000 7990 0086, SWIFT (BIC): GIBASKBX
Registered in Register of Business Names in the District Court Banská Bystrica, Section Sa, Entry No. 69/S

ŽELEZIARNE® PODBREZOVÁ akciová spoločnosť 976 81 Podbrezová Oddelenie kontroly a zabezpečovania kvality -1-

Approved by MBRONZINI on 31/07/23

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

ŽELEZIARNE® PODBREZOVÁ

Inšpekčný certifikát
Inspection certificate
Certificato di collaudo
EN 10204:2004/3.1

Číslo
Number
Numero

33586/1/2023

Číslo tavby *Cast number* *Numero di colata*	Počet kusov *Number of pieces* *Numero di pezzi*	Dĺžka *Length* *Lunghezza* [m]	Hmotnosť *Mass* *Peso* [kg]	Druh tavenia *Steelmaking process* *Procedimento di elaborazione dell'acciaio*
31856	**72**	**434**	**3157**	**E**

E = elektrická oblúková pec - *electric arc furnace - forno elettrico ad arco*

Druh ocele - *Steel grade - Acciaio*:

úplne ukľudnená oceľ hliníkom - *fully killed steel with Aluminium - acciaio totalmente calmato (Al)*

Úprava povrchu - *Surface protection - Protezione della superficie*:

Ochrana povrchu UV lakom - *Surface protection with UV lacquer - Protezione della superficie con vernice UV*

Chemické zloženie - *Chemical composition - Composizione chimica*:

Číslo tavby *Cast number* *Numero di colata*		C [%]	Mn [%]	Si [%]	P [%]	S [%]	Cu [%]	Cr [%]	Ni [%]	Al [%]	Mo [%]	Ti [%]	V [%]	Nb [%]
	Predpis - *Requirements - Requisiti*													
	min.			0.15						0.015				
	max.	0.20	1.30	0.35	0.020	0.010	0.30	0.20	0.40	0.060	0.12	0.040	0.070	0.020
31856		**0.17**	**1.23**	**0.22**	**0.019**	**0.008**	**0.18**	**0.05**	**0.07**	**0.025**	**0.02**	**0.001**	**0.003**	**0.000**

Číslo tavby *Cast number* *Numero di colata*		B [%]	Exp.1 [%]	Exp.2 [%]	Exp.3 [%]	Exp.4 [%]
	min.					
	max.	0.0010	0.42	0.600	0.150	0.060
31856		**0.0002**	**0.41**	**0.254**	**0.004**	**0.003**

Exp.1 = CEV = C + Mn/6 + (V+Mo+Cr)/5 + (Ni+Cu)/15

Exp.2 = Nb + V + Ti + Cu + Mo + Cr

Exp.3 = V + Nb + Ti

Exp.4 = V + Nb

Výrobková analýza - *Product analysis - Analisi di prodotto*:

Číslo tavby *Cast number* *Numero di colata*		C [%]	Mn [%]	Si [%]	P [%]	S [%]	Cu [%]	Cr [%]	Ni [%]	Al [%]	Mo [%]	Ti [%]	V [%]	Nb [%]
31856	**1**	**0.18**	**1.23**	**0.22**	**0.018**	**0.009**	**0.19**	**0.05**	**0.08**	**0.024**	**0.02**	**0.001**	**0.002**	**0.001**
31856	**2**	**0.18**	**1.23**	**0.21**	**0.019**	**0.008**	**0.19**	**0.05**	**0.08**	**0.024**	**0.02**	**0.001**	**0.002**	**0.001**

Číslo tavby *Cast number* *Numero di colata*		B [%]
31856	**1**	**0.0003**
31856	**2**	**0.0003**

Miesto **v Podbrezovej**
Location **Taz**
Localitá

Dátum **17.07.2023**
Date
Data

Závodný znalec
Works Inspector
Ispettore della fabbrica

Ing. Vojtas Miroslav

Železiarne Podbrezová a.s., Kolkáreň 35, 976 81 Podbrezová, Slovak Republic
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ŽELEZIARNE® PODBREZOVÁ akciová spoločnosť 976 81 Podbrezová Oddelenie kontroly a zabezpečovania kvality -I-

Approved by MBRONZINI on 31/07/23

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

ŽELEZIARNE® PODBREZOVA

Inšpekčný certifikát
Inspection certificate
Certificato di collaudo
EN 10204:2004/3.1

Číslo *Number* *Numero* **33586/1/2023**

Skúška ťahom - *Tensile test* - *Prova di trazione* : **20** °C

C. Nr	Číslo tavby *Cast number* *Numero di colata*	Vzorka č. *Test sample No.* *No. di provino*	Rozmery *Dimensions* *Dimensioni* [mm]	Smer odberu/typ vzorky *Direction/Type of the test piece* *Orientamento/Tipo della provetta*	Medza klzu *Yield point - Proof stress* *Limite di snervamento* Rp0,2 [MPa]	Medza klzu Rt0,5 [MPa]	Pevnosť v ťahu *Tensile strength* *Carico di rottura* Rm [MPa]	Ťažnosť *Elongation* *Allungamento* A5,65 [%]	Ťažnosť 2" [%]
	Predpis - Requirements - Requisiti:				min.	240	360	460	14.0	*
					max.	---	---	---	---	---
1	**31856**	A035957/23	12.52x7.48	L / V	**367**	**365**	**535**	**28.9**	**32.0**
2	**31856**	A035958/23	12.50x7.50	L / V	**367**	**365**	**535**	**28.7**	**32.2**
3	**31856**	A035959/23	12.55x7.40	L / V	**370**	**373**	**547**	**29.1**	**32.0**
4	**31856**	A035960/23	12.53x7.43	L / V	**369**	**373**	**545**	**29.3**	**33.2**

* Ťažnosť - *Elongation* - *Allungamento* : min. 1.87*t+15

t [mm] = skutočná hrúbka vzorky na skúšku ťahom - *actual tensile test specimen thickness* - .

L = Pozdĺžny - *Longitudinal* - *Longitudinale*

V = Výrez - *Strip test* - *Striscia*

Skúška rázom v ohybe Charpy - *Charpy impact test* - *Prova di resilienza Charpy*: **ASTM A 370**

C. Nr	Číslo tavby *Cast number* *Numero di colata*	Vzorka č. *Test sample No.* *No. di provino*	Predpis *Requirements* *Requisiti* min.-max. [J]	Jednotlivé hodnoty *Individual values* *Valori singoli* [J]	Priemerná hodnota *Mean value* *Valore medio* [J]	Teplota skúšania *Test temperature* *Temperatura di prova* [°C]
1	**31856**	A035957/23	KV 40 - ---	**120, 132, 142**	**131**	**-53**

C. Nr	Vzorka č. *Test sample No.* *No. di provino*	Rozmery *Dimensions* *Dimensioni* [mm]	Smer odberu vzorky *Direction of the test piece* *Orientamento della provetta*
1	A035957/23	10.00x5.00	L

Poznámky - *Remarks* - *Osservazioni*

CAST NO. 31856 : Shear area: 64%

Skúška stlačením vyhovela.
Flattening test without objections.
Prova di schiaccio di esito soddisfacente.

Skúška vodným tlakom vyhovela.
Hydraulic pressure test without objections.
Prova idraulica con esito soddisfacente.

API 5 L 20.50 MPa **5** sec 100%

Skúška vírivými prúdmi vyhovela
Eddy current test without objections
Controllo eddy current con esito positivo

ASTM A 999/E 309 **100 %**

Priemer vývrtu
Drilled hole
Diametro del difetto artificiale
1.80 mm

Miesto **v Podbrezovej**
Location **Taz**
Localitá

Dátum **17.07.2023**
Date
Data

Závodný znalec
Works Inspector
Ispettore della fabbrica
Ing. Vojtas Miroslav

Železiarne Podbrezová a.s., Kolkáreň 35, 976 81 Podbrezová, Slovak Republic
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ŽELEZIARNE® PODBREZOVA akciová spoločnosť 976 81 Podbrezová Oddelenie kontroly a zabezpečovania kvality

Approved by MBRONZINI on 31/07/23

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

ŽELEZIARNE PODBREZOVÁ

Inšpekčný certifikát
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Certificato di collaudo
EN 10204:2004/3.1

Číslo / *Number* / *Numero* **33586/1/2023**

Skúška vírivými prúdmi vyhovela *Eddy current test without objections* *Controllo eddy current con esito positivo*	**ASME SA-999/E309**	**100 %**	Priemer vývrtu *Drilled hole* *Diametro del difetto artificiale*	**1.80** mm

Systém kvality výrobcu je certifikovaný fy SGS podľa ISO 9001, číslo certifikátu SK20/3261, platnosť certifikátu je do 15.6.2026.
Producer´s Quality Assurance Sytem is certified according to ISO 9001 by SGS, certificate no. SK20/3261, validity: 15.6.2026.
Il sistema della qualitá é certificata secondo ISO 9001 da SGS, numero del certificato SK20/3261, validitá al 15.6.2026.

Potvrdzujeme, že minimálne hodnoty medze klzu za zvýšenej teploty sa zhodujú s minimálnymi hodnotami medze klzu pre všetky zvýšené teploty, ktoré sú predpísané normou ASTM ASME II, časť D, tabuľka Y1.
We certify that min. hot yield point values are in compliance with the min. hot yield point values for all the elevated temperatures prescribed by ASTM ASME II,part D,table Y1.
Si attesta che i valori minimi di snervamento a caldo sono conformi ai valori minimi di snervamento a caldo per tutte le alte temperature prescritte dalla norma ASTM ASME II,part D,tabella Y1.

Úkos je podľa ASME B 16.25.
Bevelled as per ASME B 16.25.
Il taglio è conforme alla ASME B 16.25.

Veľkost zrna je min. 8 podľa ASTM E 112.
Grain size is min. 8 acc. to ASTM E 112.
Dimensione del grano é min. 8 secondo ASTM E 112.

Rúry sú vyrobené z jemnozrnnej ocele.
The tubes are made of fine-grained steel.
I tubi sono realizzati in acciaio a grana fine.

HRC max. 22.

Potvrdzujeme, že vstupné oceľové bloky vyrobili Železiarne Podbrezová,a.s. Slovensko.
WE DECLARE THAT THE RELEVANT BILLETS HAVE BEEN PRODUCED IN ZELEZIARNE PODBREZOVA A.S.- SLOVAKIA.
Confermiamo che le relative billette di acciaio sono state prodotto in Železiarne Podbrezová a.s.

Rádioizotopická aktivita je max. 100 Bq/kg.
Radioisotopic activity is max. 100 Bq/kg.
Massima attività radioisotopica 100 Bq/kg.

Zbytkový magnetizmus je max. 30.0 gauss.
Residual magnetism is max. 30.0 gauss.
Magnetismo residuo max. 30.0 gauss.

Ťažnosť po roztrhnutí podľa PED, príloha 7.5 je väčšia ako 14% pri Lo: 5.65√So. Teplota normalizačného tvárnenia je 780°C – 980°C.
Elongation after rupture acc. to PED, Annex 7.5 (not less then 14%) with Lo: 5.65√So. Temperature of Normalising forming 780°C – 980°C.
L´allungamento dopo rottura secondo PED, allegato 7.5 è superiore al 14% e Lo: 5.65 √ So. La formatura a temperatura di normalizzazione avviene ad una temperatura di 780°C – 980°C.

Výrobky spĺňajú základné požiadavky na materiály pre tlakové zariadenia uvedené v Prílohe I Smernice pre tlakové zariadenia (PED) 2014/68 EU.
The products are in compliance with the material basic requirements according to the Pressure Equipment Directive (PED) 2014/68 EU, Annex I.
I prodotti soddisfano le richieste fondamentali della Direttiva (PED) 2014/68 EU, Allegato I.

Všetky výrobky vyhovujú vyššie uvedeným normám a požiadavkám v objednávke.
All products meet requirements of above mentioned standards and requirements specified in the order.
Tutti i prodotti corrispondono alle norme sopra menzionate e alle specifiche richieste dall` ordine.

Vizuálna kontrola a rozmery vyhoveli (100 %).
Visual inspection and dimensional check without objections (100 %).
Ispezione e controllo dimesionale con esito soddisfacente(100 %).

Miesto / *Location* / *Località*: **v Podbrezovej** **Taz**
Dátum / *Date* / *Data*: **17.07.2023**
Závodný znalec / *Works Inspector* / *Ispettore della fabbrica*: **Ing. Vojtas Miroslav**

Železiarne Podbrezová a.s., Kolkáreň 35, 976 81 Podbrezová, Slovak Republic
Phone: +421 48 645 3031, Fax: +421 48 645 3032, www.steeltube.sk
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ŽELEZIARNE PODBREZOVÁ akciová spoločnosť 976 81 Podbrezová Oddelenie kontroly a zabezpečovania kvality -1-

Approved by MBRONZINI on 31/07/23

ŽELEZIARNE® PODBREZOVÁ

Inšpekčný certifikát
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Číslo
Number
Numero

33586/1/2023

List č. - *Sheet No.* - *Pagina No.*: **5 / 5**

Overenie základných parametrov dokumentu kontroly v informačnom systéme výrobcu ŽP a. s.:
Verification of basic parameters of inspection document in the ZP information system (Manufacturers information system):
Verifica dei parametri di base del documento di ispezione nel sistema informativo di ZP (Sistema informativo del produttore):
https://check.zelpo.sk/certchk.php?ID=510262889

Miesto **v Podbrezovej**
Location
Località
Taz

Dátum **17.07.2023**
Date
Data

Závodný znalec
Works Inspector
Ispettore della fabbrica

Ing. Vojtas Miroslav

Železiarne Podbrezová a.s., Kolkáreň 35, 976 81 Podbrezová, Slovak Republic
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ŽELEZIARNE® PODBREZOVÁ
akciová spoločnosť 976 81 Podbrezová
Oddelenie kontroly a zabezpečovania kvality

Approved by MBRONZINI on 31/07/23

COES S.R.L. P.O. 2283/24 (comm. 166/24 + 137/24) TAL JOB N°424004025 OUR DDT N°402401593 OF 19/07/24
N° 1 MT 11,32 HEAT 130741 DIMENSIONS 88,9 x 11,13 ITEM POS. 70 - ART. F8721

TUBOS REUNIDOS GROUP, S.L.U

Barrio Sagarribai, 2 - 01470 AMURRIO (Spain)
Mill: TUBOS

QUALITY MANAGEMENT SYSTEM certified by LRQA

EN 10204:2004 / 3.1

CERTIFICADO DE CALIDAD
MILL TEST CERTIFICATE

THE BILLETS AND THE MATERIAL COVERED BY THIS CERTIFICATE ARE MANUFACTURED AT OUR STEEL PLANT IN AMURRIO, SPAIN.

Nº 0000363296/1 Rev. 000

CLIENTE: CUSTOMER	T.A.L. S.p.A. TUBI ACCIAIO LOMBARDA CON SOCIO UNICO	PEDIDO / PARTIDA: P.ORDER / ITEM	OF230465 220.
PRODUCTO: ARTICLE	TUBERÍA SIN SOLDADURA LAMINADA EN CALIENTE HOT FINISHED SEAMLESS TUBES	REF. FABRICA: WORK ORDER	300022656 000220
EXTREMOS: ENDS	BISELADOS BEVELLED ENDS	PROTECCIÓN SUPERF: EXT. COATING	LACA EXTERIOR EXTERNALLY DRY LACQUERED
NORMA / GRADO: APL.STANDARD AND GRADE	ASTM A333/A333M-18/ ASME II SA-333/SA-333M-21/ API 5L 2018 46TH ED. PSL1 6/X52	PROCESO FUSION: MELTING PROCESS	HORNO ELECTRICO ACERO TOTALMENTE CALMADO ELECTRIC FURNACE // FULLY KILLED
		DIMENSIONAL STD:	ANSI/ASME B36.10M
ESPEC. ADICIONALES: ADITIONAL SPECS.	TS 02 REV 06 (13 JANUARY 2021) NACE MR0175 2021/ISO15156 2020 NACE MR0103/ISO 17945 ED. 2015 ASME II.PART D.TABLE Y1	FAB. DE PALANQUILLA: BILLETS MANUFACTURE	COLADA CONTINUA CONTINUOUS CASTING
DIMENSIONES: DIMENSIONS	88,90 X 11,13 MM. X 10-11,8 M.		
MARCAS: MARKING	ESTAMPADO: DIE STAMPING	HN (HEAT)	
	PINTADO: STENCILLED	TUBOS API SPEC 5L 5L-0011 (SELLO API) (MM/AA) 88,9 11,1 L360 / X52 PSL 1 SMLS HN (HEAT) 20,5 MPA (LENGTH IN METERS) M ASTM/ASME A/SA 333 GR.6 HFS LT -50 C (WEIGHT IN KGS) KG S SCH160	
	CODIGO COLOR: COLOUR CODE		
EST. SUMINISTRO: SUPPLYING COND	NORMALIZADO. ENFRIADO AL AIRE / NORMALIZED. COOLED IN STILL AIR 960 °C 23 MIN		

DESCRIPCION SUMINISTRO / DESCRIPTION OF DELIVERY

ITEM FAB. T.R. ITEM	ITEM CLI. CLIENTS ITEM	LONG.INDIV (M) INDIVIDUAL LENGTH	COLADA CAST NR.	Nº TUBOS QUANTITY	LONG. TOTAL (M) LENGTH	PESO(KG) WEIGHT
000220	220.	10,000 - 11,800	130741	42	477,850	10.228
TOTAL				42	477,850	10.228

Albaran/Delivery note/Lieferschein/ Bon de livraison: 80398438

COES G.Q.	Ricezione data 19/07/2024	Sigla V.S.
	Verificato data 22/07/2024	Sigla V.S.

TUBOS REUNIDOS GROUP (MILL: TUBOS) GARANTIZA QUE TODOS LOS TUBOS CUBIERTOS POR ESTE CERTIFICADO CUMPLEN LOS REQUISITOS DEL PEDIDO Y CON LAS ESPECIFICACIONES ARRIBA MENCIONADAS.
TUBOS REUNIDOS GROUP (MILL: TUBOS) CERTIFY THAT ALL THE TUBES COVERED BY THIS CERTIFICATE COMPLY WITH ORDER REQUIREMENTS AND ABOVE MENTIONED SPECIFICATIONS.

AMURRIO 14.09.2023

COES SRL
VERIFIED IDENTICAL TO
SA 333 Ed. 2023
V.S.

CONTROL DE CALIDAD DE TUBOS REUNIDOS GROUP
Mill: TUBOS
TUBOS REUNIDOS GROUP (QUALITY CONTROL)
Borja Eguzabal
P.O.:

Approved by QUALITY1 on 20/09/23

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

TUBOS REUNIDOS GROUP, S.L.U
Barrio Sagarribai, 2 - 01470 AMURRIO (Spain)
Mill: TUBOS

QUALITY MANAGEMENT SYSTEM certified by LRQA

EN 10204:2004 / 3.1

CERTIFICADO DE CALIDAD
MILL TEST CERTIFICATE

Nº 0000363296/1 Rev. 000

ENSAYOS NO DESTRUCTIVOS / NON DESTRUCTIVE TESTS

ENSAYO / TEST	%CONTROL / TEST RATE(%)	REQUISITOS / REQUIREMENTS	RESULTADO / RESULT
VISUAL Y DIMENSIONAL/ VISUAL & DIMENSIONAL INSP.	100%		O.K.
P.HIDROSTATICA/ HYDROTEST	100%	20,5 MEGAPASCAL 5 SEC.	O.K.
CORRIENTES INDUCIDAS/ EDDY CURRENTS	100%	ASTM E 309	O.K.

ENSAYOS TECNOLÓGICOS Y METALÚRGICOS / TECHNOLOGICAL AND METALLURGICAL TEST

APLASTADO /FLATTENING: AC/ A/SA333/5L2018. PSL1 -OK

TAMAÑO GRANO /GRAIN SIZE (FERRITIC): 8

ANALISIS DE COLADA / CAST ANALYSYS

	C	Mn	Si	P	S	Cr	Ni	Mo	Cu	V	Al	Ti	Nb	B	C.E.
MIN.		0,29	0,15								0,0150				
MAX.	0,20	1,35	0,35	0,020	0,0100	0,200	0,400	0,1200	0,3000	0,0800	0,0600	0,0400	0,0200	0,0010	**0,42**
130741	0,1410	1,32	0,26	0,009	0,0026	0,059	0,069	0,0900	0,1700	0,0660	0,0300	0,0020	0,0010	0,0004	**0,42**

ANALISIS DE PRODUCTO / PRODUCT ANALYSIS

	C	Mn	Si	P	S	Cr	Ni	Mo	Cu	V	Al	Ti	Nb	B	C.E.
MIN.		0,29	0,15								0,0150				
MAX.	0,20	1,35	0,35	0,020	0,0100	0,200	0,400	0,1200	0,3000	0,0800	0,0600	0,0400	0,0200	0,0010	**0,42**
130741	0,1340	1,27	0,24	0,008	0,0019	0,050	0,070	0,0800	0,1800	0,0610	0,0250	0,0010	0,0010	0,0003	**0,40**
130741	0,1340	1,27	0,24	0,008	0,0019	0,050	0,070	0,0800	0,1800	0,0610	0,0250	0,0010	0,0010	0,0004	**0,40**

FORMULAS

	(01)	(02)	(03)
MIN.			
MAX.	0,140	0,600	0,090
130741	0,063	0,373	0,062
130741	0,063	0,373	0,062

(01) Nb + Ti + V
(02) Cr + Mo + Cu + Nb + V + Ti
(03) Nb + V

AMURRIO 14.09.2023

CONTROL DE CALIDAD DE TUBOS REUNIDOS GROUP
Mill: TUBOS
TUBOS REUNIDOS GROUP (QUALITY CONTROL)
Borja Eguzabal
P.O.

Approved by QUALITY1 on 20/09/23

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

TUBOS REUNIDOS GROUP, S.L.U

Barrio Sagarribai, 2 - 01470 AMURRIO (Spain)
Mill: TUBOS

QUALITY MANAGEMENT SYSTEM certified by LRQA

EN 10204:2004 / 3.1

CERTIFICADO DE CALIDAD
MILL TEST CERTIFICATE

Nº 0000363296/1 Rev. 000

ENSAYOS DE TRACCIÓN / TENSILE TEST

COLADA CAST	Nº	TA	L/T (1)	TP (2)	DIMENSION (mm)	L.ELAST. YIELD POINT (Mpa) (3)	R.TRACC. T.STRENGTH (Mpa)	ALARG. ELONG. (%) F(4) P(4)	Estricción Reduction of Area (%)	DUREZA HARDNESS (HRB)			MEDIA MEAN
MIN.						360	460						
MAX.													99
130741	201-186	F	L	P	19,30 x 11,300	395	542	38		81	83	82	82
130741	201-186-2	F	L	P	19,20 x 11,300	390	539	38		80	79	80	80

(1) : L = LONGITUDINAL // T = TRANSVERSAL
(2) : T = Full size tube // P = Strip specimen // C = Cylindrical // F = Flat specimen
(3) : YS= F=(0,5%) // P=(0,2%)
(4) : F = (Lo = 2" (50 mm)) // P = (Proporcional = 5,65 x So½)

ENSAYOS DE IMPACTO - CHARPY V / IMPACT TEST

COLADA CAST	Nº	L/T (1)	DIMENS (mm)		Tª (ºC)	RESILIENCIA IMPACT TEST (J)			AVG (J)	AREA DUCTIL SHEAR AREA (%)
			10	10,00	-50	27 / 40				90
130741	201-186	L	10	10,00	-50	151	139	95	128	95

(1) : L = LONGITUDINAL // T = TRANSVERSAL

ANEXOS / ANNEX

FULLY KILLED
RADIATION FREE
MERCURY FREE
NO WELD REPAIR

T.R.G. HAS A QUALITY MANAGEMENT SYSTEM APPROVED BY
LRQA IN AGREEMENT WITH POINT 4.3 AND 7.5 ANNEX I OF THE PED 2014/68/EU.

ROLLING TEMPERATURE : 910°C

FINE GRAIN WITH SIZE acc ASTM E112

AMURRIO 14.09.2023

CONTROL DE CALIDAD DE TUBOS REUNIDOS GROUP
Mill: TUBOS
TUBOS REUNIDOS GROUP (QUALITY CONTROL)

Borja Eguzabal

P.O.:

Approved by QUALITY1 on 20/09/23

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

A 01

MARCEGAGLIA PLATES

Via: E.Fermi, 33 33058 San Giorgio di Nogaro - UD- Italy
tel. +39 0431 624201- Fax 0431 624 222

A 02 **INSPECTION CERTIFICATE 3.1 EN10204:2004**

A 06 Customer:
SE.TA.L. SRL
VIA G. LA PIRA 30
25020 FLERO IT

DDT 1028 DEL 12-07-2024

A 03 Certificate Nr.	date	Page Nr.
51NL110723_C	11/07/23	3/3

A 07 Purchase order: 23*251, 23*363
A 08 Marcegaglia P.O.: 1191602117, 1191628218
Delivery Nr.: of
Delivery Note Nr.:

B 01 Product : Hot Rolled Heavy Plates

B 02 Norm : **ASME SA 516 Ed.2021/ASTM A516 Ed.2017**
Steel grade : **GRADE-70N MT LTV**

B06 Markings: acc. to A/SA20 Par. 12.1.7 & 13.1 "LTV" A/SA516"MT"

DIE STAMPING: Manufacturer Trademark, applicable Steel Grade, Heat Nr, Plate ID Nr., Dimensions

B 04 Delivery condition: +N Normalized in Furnace

C 70 Steelmaking process: BOF = basic oxigen furnace

B 08	DESCRIPTION							TENSILE TEST - A/SA 370								IMPACT TEST - A/SA 370								HARDNESS TEST			
ITEM	B 07 Plate Id Nr	B 09 Dimensions (mm)	B 10	B 11	B 07 Heat Nr	B 12 Weight Ton	C 00 Sample	C 10 Shape	C 01 (1)	(2)	C 02 (3)	C 03 (4)	C 12 Rm Mpa	C 11 ReH Mpa	C 11 Rp 0,2 Mpa	C 13 E % 2inch	C 41 Width	C 01 (1)	(2)	C 02 (3)	C 03 (4)	C 42 Kv J	C 42 Kv J	C 42 Kv J	C 43 Mean Value J	C 31 HBW	C 31 HBW	C 31 HBW	C 32 Average
16	23EG005085	80	2000	6000	2373000540	7,54	23-7803N	ROUND	1	1/4	T	RT	527		348	35,1	10 mm	1	1/4	T	-50	85	74	96	85	154	159	159	157
							5116	ROUND	1	1/4	T	300			251														
17	23EG005068	50	2000	6000	SB61436	4,71	23-7782N	ROUND	1	1/4	T	RT	520		365	34,4	10 mm	1	1/4	T	-50	175	154	189	173	159	157	152	156
							5117	ROUND	1	1/4	T	300			251														
18	23EG004911	40	2500	12000	SB61491	9,42	23-7547N	ROUND	1	1/4	T	RT	518		371	32,9	10 mm	1	P	T	-50	190	205	188	194	157	152	150	153
19	23EG004931	40	2500	12000	SB61491	9,42	23-7551N	ROUND	1	1/4	T	RT	519		372	34,2	10 mm	1	P	T	-50	179	221	201	200	152	154	157	154
							5119	ROUND	1	1/4	T	300			259														
20	23EG004893	50	2000	6000	SB64390	4,71	23-7508N	ROUND	1	1/4	T	RT	517		356	34,5	10 mm	1	1/4	T	-50	165	191	171	176	154	154	162	157
							5120	ROUND	1	1/4	T	300			250														

(1) LOCATION: 1=Top; 2= Bottom. (2) LOCATION: 1/2=1/2 thickness; P=surface; 1/4=1/4 thickness. (3) DIRECTION, L=longitudinal; T= Transverse. (4) Test temperature, RT = Room Temperature.

C 00 Sample	B 07 Heat Nr	CHEMICAL COMPOSITION - Heat Analysis / (*) Product Analysis															
		C 71 C	C 72 Mn	C 73 Si	C 74 S	C 75 P	C 76 Cr	C 77 Ni	C 78 Cu	C 79 Al	C 80 Mo	C 81 Nb	C 82 V	C 83 Ti	C 84 N	C 85 B	C 86 Ceq
	2373000540	0,17	1,46	0,21	0,003	0,018	0,030	0,010	0,020	0,034	0,000	0,029	0,002	0,015	0,003	<0,0005	0,42
	SB61436	0,16	1,48	0,22	0,002	0,010	0,030	0,016	0,036	0,039	0,002	0,037	0,003	0,001	0,004	<0,0005	0,41
	SB61491	0,15	1,47	0,22	0,002	0,009	0,028	0,015	0,034	0,040	0,003	0,037	0,003	0,001	0,004	<0,0005	0,41
	SB64390	0,16	1,47	0,22	0,003	0,008	0,022	0,007	0,012	0,030	0,004	0,032	0,002	0,001	0,003	<0,0005	0,41

Z 01 Thickness Tollerance	Flatness	Surface Quality
acc. To EN 10029 Cl.B	acc. To EN 10029 Cl.N	acc. To EN 10163 cl. B2

D 02 ULTRASONIC EXAMINATION

INSTRUMENT: MAKE and MODEL	SERIAL NO.	SURFACE CONDITION	COUPLANT	PROCEDURE	CALIBRATION	FREQUENCY	ANGLE
GILARDONI RDG/700	I002993	AS ROLLED	WATER	ACCORDING TO SPECIFICATION	ACCORDING TO SPECIFICATION		

	Id. Plate	Dimensions			Heat	Standard of reference	Acceptance criteria	INDICATIONS	Scanning grid Reticle	Scanning grid Edges	PROBE	FREQUENCY	ANGLE
16	23EG005085	80	2000	6000	2373000540	EN 10160	S1E1	No record indication found	200 x 200 mm	75	DP25/2	2MHz	0°
17	23EG005068	50	2000	6000	SB61436	EN 10160	S1E1	No record indication found	200 x 200 mm	50	DP25/2	2MHz	0°
18	23EG004911	40	2500	12000	SB61491	EN 10160	S1E1	No record indication found	200 x 200 mm	50	DP25/2	2MHz	0°
19	23EG004931	40	2500	12000	SB61491	EN 10160	S1E1	No record indication found	200 x 200 mm	50	DP25/2	2MHz	0°
20	23EG004893	50	2000	6000	SB64390	EN 10160	S1E1	No record indication found	200 x 200 mm	50	DP25/2	2MHz	0°

Remarks:
- Heat treatment: temperature 910 +/- 10°C. Soaking time: 30 min/inc, cooling in still air.
- Fully killed steel. Fine grain steel / Material free of radioactive contamination
- Material acc. to NACE MR0175 requirements
- Code numbers according to EN10168:2004
- Dimensional check and visual examination of the surface condition: without objection
- We declare that the above mentioned plates are in compliance with the order prescriptions
- We hereby declare that the above mentioned material have been rolled in Italy, thus of European Community origin
- Material produced acc. to customer technical specification No. 23*251, 23*363

Remarks:
COES SRL
VERIFIED IDENTICAL TO
SA 516 Ed. 2023
U.S.

Signature:
III liv. EN ISO 9712:2012

COPIA CONFORME ALL'ORIGINALE
IL PRESENTE CERTIFICATO VALE PER

Z 03 Inspection Body
LA QUANTITA' DEL NS. DDT 284 DEL 30/01/2024
SETAL S.P.A.

Z 02 Quality Control
Q.M.D. M. QUARGNALI

MARCEGAGLIA PLATES
Michele Quargnali

COES G.Q.	Ricezione data 19/07/2024	Sigla U.S.
	Verificato data 23/07/2024	Sigla U.S.

24 2206

INSPECTION CERTIFICATE — NF EN 10204-3.1/DIN 50049-3.1.B/ISO 10474

A02 — N° 730/0243573 — Page 2 / FIN — A09/A03

ArcelorMittal
ARCELORMITTAL MEDITERRANEE Site de FOS
13776 FOS SUR MER CEDEX - FRANCE
T:+33(0)44247-3314 F:+33(0)44247-3231
E: un.scu(a)arcelormittal.com

Sigle du producteur / Mill's identification: **FOS**

T Re=260 MINI MPA Rm=485 -620 MPA A%(50)=21 MINI
KV T - 51dgC 14 J MINI/IND 18 J MINI/MOY (5) B03

CDC: Conforme cahier charges / According specifications
BL : Brut de laminage / As rolled
LN : Laminage normalisant / Normalization rolling
R : Revenu / Tempering
TE : Trempé à l'eau / Water quenching
LTC : Laminé temp. contrôlés / Control rolling
TM : Laminage thermomécanique / Thermo-mechanical forming
N : Normalisé / Normalizing
D : Détensionné / Stress relieving
C : Adouci par recuit / Soft annealing
(1)

Organisme et/ou service de contrôle / Inspection organism	Client et/ou destinataire / Customer and/or consignee	N° Commande Courtier/Client / Customer's Order Nbr	N° Commande Usine / Mill's Order Nbr	Nuances et spécifications techniques / Grade and technical specifications	Etat de livraison / Delivery condition (1)
RECEPTION USINE A05	SIDERURGICA ASTICO SPA VIA ASTICO 44 I-36030 FARA VICENTINO ITALIE A06	220103 A07	GH2FSAM023 000070 A08	SA516G70-SA20/S5 ASME_SA516M-15 √ HOT ROLLED COIL, AS ROLLED CONE02309M4310000 B01 B02	LTC : LN B04

Traitement de référence / Treatment of test samples (1): BL,N B05

Identification du produit / Product identification		Poste	Nombre de pièces / Number of pieces	Dimensions / Sizes (mm)			Masse / Weight	Empla.	Traction / Tensile requirements												Empla.	Résilience / Impact testing									
Repère pièce / Plate number	Coulée / Heat	Item		Epaisseur / Thickness	Largeur / Width	Longueur / Length	(kg) (7)	Loc (2)	S (3)	Pos Z(4)	Type	Réf Ref (5)	Temp.	Re05	Rm	A%					Loc (2)	Réf Ref	Type	S (3)	Temp.	Pos. Z(4)	Valeurs individuelles / Individual values			Moyenne / Average		
B07	B07	A07	B08	B09	B10	B11	B13	C01	C02	C06	C10		C03	C11	C12	C13	<-C14-C29		C60-C69->		C01		C40	C07	C08	C62	<-	-C42-	->	C43		
8813028	730213436 √	001	1	15,000	1500,00		25519	1	T	P	PRISM	BL	20	412	568	27,0					1	N	KV	T	- 51	P	34	20	115	56		

Ricezione data 19/07/2024 Sigla U.S.
COES G.Q.
Verificato data 23/07/2024 Sigla U.S.

COES SRL
VERIFIED IDENTICAL TO
SA 516 Ed. 2023
U.S.

AC:C =0,200 MAXI MN=0,850-1,620 P =0,035 MAXI S =0,035 MAXI SI=0,150-0,400 AL=0,020 MINI CU=0,400 MAXI NI=0,400 MAXI CR=0,300 MAXI NB=0,020 MAXI V =0,030 MAXI
TI=0,030 MAXI B =,0010 MAXI MO=0,120 MAXI CBN23=CR+MO =0,320 MAXI CBN13=CU+NI+CR+MO =1,000 MAXI
AP:MN=0,790-1,600 SI=0,130-0,450 CU=0,430 MAXI NI=0,430 MAXI CR=0,340 MAXI NB=0,030 MAXI V =0,040 MAXI TI=0,040 MAXI MO=0,130 MAXI

Meth. (6) of steel making	Repère Pièce / Plate number	N° Coulée / Heat number	* Analyse sur produit / Check analysis																										
			C%	Mn%	P%	S%	Si%	AL%	B %	CR%	CU%	MO%	N %	NB%	NI%	TI%	V %					CBN23	CBN13						
C70/93 O/YCC	B07	B07 730213436	C71 0,168	C72 1,388	C73 0,014	C74 0,002	C75 0,218	C76 0,036	C77 0,0002	C78 0,040	C79 0,011	C80 0,008	C81 0,004	C82 0,008	C83 0,019	C84 0,016	C85 0,001	C86	C87	C88	C89	C90 0,048	C91 0,077	C92	C96	C97			

Emplacement/Location(2): 1 Tête / Head; 2 Pied / Bottom; 3 1/2 longueur / Length; X:Divers Mix — C01

(3) Sens/Direction: L:Long / Longitudinal; T:Travers / Transverse; Z:Travers court / Through thick — C02

(4) Position: C:Coeur / Core sample; P:Peau / Rolled surface; D:1/3 Epais. / Thickness; Q:1/4 Epais. / Thickness; F:1/5 Epais. / Thickness; K:Divers / Mix — C62

(6) Mode élab.Meth.Coulée: T: Thomas M: Martin E: Electrique / Electric O/Y: Oxy.pur / Basic oxyg. CC: Coulée Continue / Continuous casting — C70/93

(7) Masse et nb pieces a titre indicatif. Mass and quantity of pieces as a rough guide

We hereby certify that the above cited shipment was produced according to the technical specifications of the contract and that, with inspection and tests completed, it meets those specifications as well as all norms and standards referred to in the contract.

Contrôle de marquage, d'aspect et de dimensions : satisfaisants
Inspection of markings, surface, sizes : satisfactory. D01

Date 15/12/22
Agent / Receiving Agent
F. SIXDENIERS
Z02

349

24 2214

INSPECTION CERTIFICATE — NF EN 10204-3.1/DIN 50049-3.1.B/ISO 10474

N° 730/0243573 Page 1 — A02 — A09/A03

ArcelorMittal
ARCELORMITTAL MEDITERRANEE Site de FOS
13776 FOS SUR MER CEDEX - FRANCE
T:+33(0)44247-3314 F:+33(0)44247-3231
E: un.scu(a)arcelormittal.com

Sigle du producteur / Mill's identification: **FOS**

T Re=260 MINI MPA Rm=485 -620 MPA A%(50)=21 MINI
KV T - 51dgC 14 J MINI/IND 18 J MINI/MOY (5) — B03

CDC: Conforme cahier charges / According specifications
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TM : Laminage thermomécanique / Thermo-mechanical forming
N : Normalisé / Normalizing
D : Détensionné / Stress relieving
AD : Adouci par recuit / Soft annealing
(1)

Organisme et/ou service de contrôle / Inspection organism	Client et/ou destinataire / Customer and/or consignee	N° Commande Courtier/Client / Customer's Order Nbr	N° Commande Usine / Mill's Order Nbr	Nuances et spécifications techniques / Grade and technical specifications	Etat de livraison / Delivery condition (1)
RECEPTION USINE — A05	SIDERURGICA ASTICO SPA VIA ASTICO 44 I-36030 FARA VICENTINO ITALIE — A06	220103 — A07	GH2FSAM023 000070 — A08	SA516G70-SA20/S5 ASME_SA516M-15 HOT ROLLED COIL, AS ROLLED CONE02309M4310000 — B01 B02	LTC : LN — B04 Traitement de référence / Treatment of test samples (1): BL,N — B05

Identification du produit / Product identification		Poste	Nombre de pièces / Number of pieces	Dimensions / Sizes (mm)			Masse / Weight	Emplacement	Traction / Tensile requirements												Emplacement	Résilience / Impact testing									
Repère pièce / Plate number	Coulée / Heat	Item		Epaisseur / Thickness	Largeur / Width	Longueur / Length	(kg) (7)	Loc (2)	S (3)	Pos. Z(4)	Type	Réf Ref (5)	Temp.	Re05	Rm	A%					Loc (2)	Réf Ref	Type	S (3)	Temp.	Pos. Z(4)	Valeurs individuelles / Individual values			Moyenne / Average
B07	B07	A07	B08	B09	B10	B11	B13	C01	C02	C062	C10		C03	C11	C12	C13	<-C14-C29			C60-C69->	C01		C40	C02	C08	C62	<- -	-C42-	- - >	C43

C:C =0,200 MAXI MN=0,850-1,620 P =0,035 MAXI S =0,035 MAXI SI=0,150-0,400 AL=0,020 MINI CU=0,400 MAXI NI=0,400 MAXI CR=0,300 MAXI NB=0,020 MAXI V =0,030 MAXI
TI=0,030 MAXI B =,0010 MAXI MO=0,120 MAXI CBN23=CR+MO =0,320 MAXI CBN13=CU+NI+CR+MO =1,000 MAXI
P:MN=0,790-1,600 SI=0,130-0,450 CU=0,430 MAXI NI=0,430 MAXI CR=0,340 MAXI NB=0,030 MAXI V =0,040 MAXI TI=0,040 MAXI MO=0,130 MAXI

Meth. (6) of steel making	Repère Pièce / Plate number	N° Coulée / Heat number	*	Analyse sur produit / Check analysis					AL%	B %	CR%	CU%	MO%	N %	NB%	NI%	TI%	V %					CBN23	CBN13			
				C%	Mn%	P%	S%	Si%																			
C70/93 O/YCC	B07 8813028	B07 730213436	*	C71 0,166	C72 1,366	C73 0,014	C74 0,002	C75 0,217	C76 0,029	C77	C78 0,040	C79 0,011	C80 0,000	C81 0,006	C82 0,008	C83 0,019	C84 0,014	C85 0,001	C86	C87	C88	C89	C90	C91	C92	C96	C97

Emplacement/Location(2): 1 Tête / Head; 2 Pied / Bottom; 3 1/2 longueur / Length; X:Divers / Mix — C01
(3) Sens/Direction: L:Long / Longitudinal; T:Travers / Transverse; Z:Travers court / Through thick — C02
(4) Position: C:Coeur / Core sample; P:Peau / Rolled surface; D:1/3 Epais. / Thickness; Q:1/4 Epais. / Thickness; F:1/5 Epais. / Thickness; K:Divers / Mix — C62
(6)Mode élab.Meth.Coulée: T: Thomas M: Martin E: Electrique / Electric O/Y: Oxy.pur / Basic oxyg. CC: Coulée Continue / Continuous casting — C70/93
(7) Masse et nb pieces a titre indicatif. Mass and quantity of pieces as a rough guide

We hereby certify that the above cited shipment was produced according to the technical specifications of the contract and that, with inspection and tests completed, it meets those specifications as well as all norms and standards referred to in the contract.

Contrôle de marquage, d'aspect et de dimensions : satisfaisants
Inspection of markings, surface, sizes : satisfactory. — D01

Date 15/12/22
Agent / Receiving Agent
F. SIXDENIERS — Z02

349

FIL-PEMTO s.p.a.
Valvole & raccordi
Sede di: 21042 CARONNO PERTUSELLA (Varese)
Via Asiago, 1880 - Telefax 02.9657200
Telefono 02.9657141 (r.a.)

CERTIFICATO DI COLLAUDO 3.1 EN 10204:2004

INSPECTION CERTIFICATE *CERTIFICAT DE RECEPTION*

COMPANY WITH QUALITY SYSTEM CERTIFIED BY RINA - ISO 9001 -

MATERIALE: - *MATERIAL:* - *MATERIEL:*
SA350LF2 CL.1

CLIENTE - *CUSTOMER* - *CLIENT*
COES S.R.L.
VIA PONTIDA 265
STEZZANO

ORDINE - *ORDER* - *COMMANDE*
ORD.2179/24

SIGLA PRODUTTORE FLANGE *MARK* *SIGLE* **NOV**

N° CER-4492/24
DATE 17/07/2024
BOLLA DI CONSEGNA - *DELIVERY NOTE - BORDEREAU LIVRAISON* N° 5847
17/07/2024 pag. **1 di 1**

ANALISI CHIMICA: - CHEMICAL COMPOSITION - COMPOSTION CHIMIQUE

Colata *Heat* *Coulée*	QTY	DESCRIZIONE PRODOTTO PRODUCT DESCRIPTION DESCRIPTION DE PRODUIT	C %	Si %	Mn %	S %	P %	Ni %	Cr %	Mo %	Al %	N %	Cu %	Ti %	V %	Nb %	C.Eq.
267027	1	FLANGE SA350LF2 CL.1 A150 WN RF 24" S.40 COD.H5869 - POS.20	0.170	0.218	1.12	0.003	0.011	0.156	0.121	0.021	0.028	0.009	0.137	0.002	0.025	0.003	0,409
214728	1	FLANGE SA350LF2 CL.1 ANSI 150 BL RF 16" COD.L3727 - POS.50	0.18	0.19	0.98	0.028	0.020	0.15	0.07	0.04	0.004	0.010	0.26	0.000	0.000	0.000	0,392

COES G.Q. | Ricezione data 17/07/2024 Sigla V.S. | Verificato data 23/07/2024 Sigla V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 350 Ed. 2023
V.S.

CARATTERISTICHE MECCANICHE - *MECHANICAL TESTS* - *ESSAIS MECANIQUES*

Acciaieria Steel manufactory Fournisseur	Colata Heat Culée	Provetta / Test specimen Sez. mm Sect. mm	Lung. mm Lenght. mm	Forma Shape	Sez.	Rottura Tensile str. Resistence N/mm^2	Snervamento Yield point Limite él. N/mm^2	Allungamento E longation Allongem %	Contrazione Red. of area Contraction %	Durezza Hardness Dureté Hb	Resilienza - *Impact Value - Resilience - Joule/cm^2* TIPO *Type*	1.	2.	3.	Media	°C
ACCIAIERIE VENETE S.p.a.	267027	12,50	50	◯	T	540	345	30.8	71.0	172-174	KV	53	55	56	55	-46
	214728	12,50	50	◯	T	536	367	26.8	58.4	174-177	KCU	53	54	55		-46

MANUFACTURED IN ACCORDANCE WITH ORDER AND SPECIFICATIONS

STEEL PROCESS INFORMATION:
SUPPLY STATEMENT:

ADDITIONAL TEST RESULT

Note:
DIMENSION FLANGES ACCORDING TO ASME/ANSI B16.5 Ed.2020 AND EN1092-1 Ed 2018
ASME II PART A ED.2019 - ACCORDING TO NACE MR 01-75 - MR01-03 /ISO15156
ACCORDING TO PED 2014/68/UE FULLY KILLED FINE GRAIN

TRATTAMENTO TERMICO *HEAT TREATMENT - TRAITMENT TERMIQUE*
NORMALIZED AT 920 °C
AND COOLED IN STILL AIR

CONTROLLO VISIVO E DIMENSIONALE *VISUAL AND DIMENSIONAL CONTROL*
SATISFACTORY

UFFICIO CONTROLLO QUALITA' *QUALITY CONTROL DEPARTMENT*
FIL- PEMTO S.p.A.

ENTE COLLAUDATORE (RESPONSABILE COLLAUDO) *INSPECTION AUTHORITY (INSPECTOR)*

24 2217

24 2226

COMPANY WITH MANAGEMENT SYSTEM CERTIFIED BY DNV ISO 9001 ■ ISO 14001	METALFAR PRODOTTI INDUSTRIALI SPA A01 23861 CESANA BRIANZA (LC) - ITALY VIA G. PARINI, 28 PHONE + 39 031 655441 - FAX +39 031 655149 certificate@metalfaritaly.com	COMPANY WITH MANAGEMENT SYSTEM CERTIFIED BY DNV ISO 9001 ■ ISO 14001

INSPECTION CERTIFICATE EN 10204:2004 (3.1) A02 — Nr A03 2024-C_MFF-01849 — Data / Dated 19.07.2024 Z02

FERRAMENTA INDUSTRIALE BONACINA SRL A06 VIALE EUROPA, 2G - FRAZ. CURNASCO 24048 TREVIOLO BG IT	Ordine / PO	52 A07
	Item	001 A07
	DDT / Delivery note	2024-3E301-0001798 A10
	Packing List	2024-3E401-0001805 A11
	Fattura / Invoice	2024-3E401-0001805 A12
	Ns. rif. / Our ref.	2024-3E201-0001182-0001 A08

Cod. colata / Heat Code B07	Nr. colata / Heat Nr B07	Quantità / Quantity B08	Descrizione / Description B01 - (B09 - B11)
	23/70335	4,00	W/N 150 RF 1" XXS LF2CL1

Mat. in acc. a / Mat. in acc. to B02
ASTM A 350M -23 ,ASME SA 350 M - 23 ,ASME CODE SECT. II, PART A, ED. 2023
ASTM A350 LF2 CL1
NACE MR-0175/2021 ISO 15156-2 :2020
NACE MR-0103/2015 ISO 17945 :2015
Q.A.S.IN ACCORD.WITH PRESS.EQUIPM.DIRECT.2014/68/EU(PED) ANNEX I,PARAGRAPH 4.3
& PRESSURE EQUIPMENT(SAFETY) REGULATION 2016 No.1105 SCHEDULE 2, PART 4 PARA.31

Ann. mat. / Mat. remarks D02-B03: FULLY KILLED STEEL AND FINE GRAIN PRACTICED

Elementi / Elements (C71 - C82)

	C	Si	Mn	S	P	Cr	Ni	Mo	Ti	Cu	V	Nb	N
LADLE ANALYSIS	0,180	0,230	1,000	0,009	0,012	0,140	0,110	0,020	0,019	0,200	0,002	0,002	0,010
PRODUCT ANALYSIS	0,182	0,235	1,002	0,010	0,009	0,144	0,106	0,018	0,020	0,196	0,003	0,002	0,011

	Al	B	Ca	CE LF	CE SF	F1	F2	PREN
LADLE ANALYSIS	0,026	0,0000	0,002	0,400	0,347	0,472	0,160	--
PRODUCT ANALYSIS	0,025	0,0000	0,002	0,402	0,349	0,467	0,162	--

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

Provetta / Test specimen C10		Forma / Shape C10	°C C03	Snervamento>0,2% / Yield Strength>0,2% C11	Snervamento>1,0% / Yield Strength>1,0% C11	Rottura / Tensile C12	Allungamento / Elongation C13	Contrazione / Reduction of area C14
Sez/Sect mm2	Gauge L.mm	1=O - 2=□		MPa	MPa	MPa	%	%
126,60	50,80	1	20	350,0	--	545,0	30,3	65,4

DUREZZA / HARDNESS C30

HBW C31	Tipo/Type C40	Provetta / Test Specimen C41
160,0 ; 163,0	KV	10x10x55 mm

RESILIENZA / IMPACT TEST

°C C03	1-Joule C42	2-Joule C42	3-Joule C42	Media/Average C43
-46	52	35	72	53,0

Tratt. Term. / Heat treatment B04	NORMALIZED AT 930 °C - COOLED IN STILL AIR	C70	GAS FURNACE
Dim in acc. a / Dim. acc. to B14	ASME/ANSI B16.5 -2020 ; ASME/ANSI B36.10M -2022		
Finitura / Roughness B15	ASME/ANSI B46.1 -2019 ; RF FINISHING 125-250 µin AARH		

Marcatura in acc. / Marking in acc. to B06	ANSI/MSS SP-25-2018	Vis. & Dim. D01	SATISFACTORY	Origine / Origin of Steel B16	EUROPEAN UNION

Note / Notes Z01-B03
MATERIAL 100% MANUFACTURED IN ITALY; MATERIAL IN ACCORDANCE WITH ORDER AND SPECIFICATION
Issued in agreement with TÜV SÜD Industrie Service GmbH August 12th, 2021" .
Certification no.DGR-0036-QS-W 1025/2021/MUC-01
TENSILE TEST AND CHARPY KV IMPACT TEST PERFORMED IN ACCORDANCE WITH ASTM A370 -22.

COPIA CONFORME ALL'ORIGINALE

IL PRESENTE CERTIFICATO E' VALIDO PE
CLIENTE COES
ORDINE N° 2282/24 DEL
N° 4 MT KG
FERR. IND. BONACINA S.r.l. IL 24-07-2024

UFFICIO CONTROLLO QUALITA' / QUALITY CONTROL DEPARTMENT A05	ENTE UFFICIALE DI COLLAUDO / INSPECTION AUTHORITY Z03	MARCHIO PRODUZIONE / MANUFACTURER'S SYMBOL A04
D. Gaffuri		MFF

MIM30800 del 29/08/2023

	Ricezione data	Sigla
COES	22/07/2024	U.S.
G.Q.	Verificato data	Sigla
	25/07/2024	U.S.

24 2227

COMPANY WITH MANAGEMENT SYSTEM CERTIFIED BY DNV ISO 9001 ■ ISO 14001	METALFAR PRODOTTI INDUSTRIALI SPA A01 23861 CESANA BRIANZA (LC) - ITALY VIA G. PARINI, 28 PHONE + 39 031 655441 - FAX +39 031 655149 certificate@metalfaritaly.com	COMPANY WITH MANAGEMENT SYSTEM CERTIFIED BY DNV ISO 9001 ■ ISO 14001

INSPECTION CERTIFICATE EN 10204:2004 (3.1) A02 — Nr A03 2024-C_MFF-01849 — Data / Dated 19.07.2024 Z02

FERRAMENTA INDUSTRIALE BONACINA SRL A06
VIALE EUROPA, 2G - FRAZ. CURNASCO
24048 TREVIOLO BG IT

Ordine / PO	52	A07
Item	002	A07
DDT / Delivery note	2024-3E301-0001798	A10
Packing List	2024-3E401-0001805	A11
Fattura / Invoice	2024-3E401-0001805	A12
Ns. rif. / Our ref.	2024-3E201-0001182-0002	A08

Cod. colata / Heat Code B07	Nr. colata / Heat Nr B07	Quantità / Quantity B08	Descrizione / Description B01 - (B09 - B11)
	22/76569	2,00	W/N 150 RF 1.1/2" 160 LF2CL1

Mat. in acc. a / Mat. in acc. to B02
ASTM A 350M -23 ,ASME SA 350 M - 23 ,ASME CODE SECT. II, PART A, ED. 2023
ASTM A350 LF2 CL1
NACE MR-0175/2021 ISO 15156-2 :2020
NACE MR-0103/2015 ISO 17945 :2015
Q.A.S.IN ACCORD.WITH PRESS.EQUIPM.DIRECT.2014/68/EU(PED) ANNEX I,PARAGRAPH 4.3
& PRESSURE EQUIPMENT(SAFETY) REGULATION 2016 No.1105 SCHEDULE 2, PART 4 PARA.31

Ann. mat. / Mat. remarks D02-B03: FULLY KILLED STEEL AND FINE GRAIN PRACTICED

Elementi / Elements (C71 - C92)	C	Si	Mn	S	P	Cr	Ni	Mo	Ti	Cu	V	Nb	N
LADLE ANALYSIS	0,180	0,210	1,040	0,009	0,014	0,120	0,060	0,020	0,021	0,160	0,002	0,001	0,010
PRODUCT ANALYSIS	0,181	0,214	1,043	0,008	0,015	0,123	0,058	0,023	0,025	0,159	0,004	0,003	0,013

	Al	B	Ca	CE LF	CE SF	F1	F2	PREN
LADLE ANALYSIS	0,025	0,0000	0,002	0,396	0,353	0,362	0,140	--
PRODUCT ANALYSIS	0,026	0,0000	0,002	0,399	0,355	0,367	0,146	--

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

Provetta / Test specimen C10		Forma / Shape C10	°C C03	Snervamento>0,2% / Yield Strength>0,2% C11	Snervamento>1,0% / Yield Strength>1,0% C11	Rottura / Tensile C12	Allungamento / Elongation C13	Contrazione / Reduction of area C14
Sez/Sect mm2	Gauge L.mm	1=O - 2=□		MPa	MPa	MPa	%	%
126,60	50,80	1	20	328,0	--	515,0	30,8	58,5

DUREZZA / HARDNESS C30

HBW C31	Tipo / Type C40	RESILIENZA / IMPACT TEST Provetta / Test Specimen C41	°C C03	1-Joule C42	2-Joule C42	3-Joule C42	Media / Average C43
153,0 ; 157,0	KV	10x10x55 mm	-46	55	59	54	56,0

Tratt. Term. / Heat treatment B04	NORMALIZED AT 930 °C - COOLED IN STILL AIR	C70	GAS FURNACE
Dim in acc. a / Dim. acc. to B14	ASME/ANSI B16.5 -2020 ; ASME/ANSI B36.10M -2022		
Finitura / Roughness B15	ASME/ANSI B46.1 -2019 ; RF FINISHING 125-250 µin AARH		

Marcatura in acc. / Marking in acc. to B06					
ANSI/MSS SP-25-2018	Vis. & Dim. D01	SATISFACTORY	Origine / Origin of Steel B16	EUROPEAN UNION

Note / Notes Z01-B03
MATERIAL 100% MANUFACTURED IN ITALY; MATERIAL IN ACCORDANCE WITH ORDER AND SPECIFICATION
Issued in agreement with TÜV SÜD Industrie Service GmbH August 12th, 2021" .
Certification no.DGR-0036-QS-W 1025/2021/MUC-01
TENSILE TEST AND CHARPY KV IMPACT TEST PERFORMED IN ACCORDANCE WITH ASTM A370 -22.

COPIA CONFORME AL L'ORIGINALE

IL PRESENTE CERTIFICATO E' VALIDO PER
CLIENTE COES
ORDINE N° 2282/24 DEL
N° 2 MT KG
FERR. IND. BONACINA S.r.l. IL 24-07-2024

UFFICIO CONTROLLO QUALITA' / QUALITY CONTROL DEPARTMENT A05	ENTE UFFICIALE DI COLLAUDO / INSPECTION AUTHORITY Z03	MARCHIO PRODUZIONE / MANUFACTURER'S SYMBOL A04
D. Gaffuri		MFF

	Ricezione data	Sigla
COES	22/09/2024	U.S.
G.Q.	Verificato data	Sigla
	25/09/2024	U.S.

COMPANY WITH MANAGEMENT SYSTEM CERTIFIED BY DNV ISO 9001 ■ ISO 14001	METALFAR PRODOTTI INDUSTRIALI SPA A01 23861 CESANA BRIANZA (LC) - ITALY VIA G. PARINI, 28 PHONE + 39 031 655441 - FAX +39 031 655149 certificate@metalfaritaly.com	COMPANY WITH MANAGEMENT SYSTEM CERTIFIED BY DNV ISO 9001 ■ ISO 14001

INSPECTION CERTIFICATE EN 10204:2004 / 3.1 A02 — Nr A03 2024-C_MFF-01849 — Data / Dated 19.07.2024 Z02

FERRAMENTA INDUSTRIALE BONACINA SRL A06
VIALE EUROPA, 2G - FRAZ. CURNASCO
24048 TREVIOLO BG IT

Ordine / PO	52	A07
Item	003	A07
DDT / Delivery note	2024-3E301-0001798	A10
Packing List	2024-3E401-0001805	A11
Fattura / Invoice	2024-3E401-0001805	A12
Ns. rif. / Our ref.	2024-3E201-0001182-0003	A08

Cod. colata / Heat Code B07	Nr. colata / Heat Nr B07	Quantità / Quantity B08	Descrizione / Description B01 - (B09 - B11)
	23/70486	2,00	W/N 150 RF 2" 160 LF2CL1

Mat. in acc. a / Mat. in acc. to B02
ASTM A 350M -23 ,ASME SA 350 M - 23 ,ASME CODE SECT. II, PART A, ED. 2023
ASTM A350 LF2 CL1
NACE MR-0175/2021 ISO 15156-2 :2020
NACE MR-0103/2015 ISO 17945 :2015
Q.A.S.IN ACCORD.WITH PRESS.EQUIPM.DIRECT.2014/68/EU(PED) ANNEX I,PARAGRAPH 4.3
& PRESSURE EQUIPMENT(SAFETY) REGULATION 2016 No.1105 SCHEDULE 2, PART 4 PARA.31

Ann. mat. / Mat. remarks D02-B03: FULLY KILLED STEEL AND FINE GRAIN PRACTICED

Elementi / Elements (C71 - C92)	C	Si	Mn	S	P	Cr	Ni	Mo	Ti	Cu	V	Nb	N
LADLE ANALYSIS	0,200	0,190	1,000	0,005	0,009	0,100	0,070	0,010	0,018	0,200	0,002	0,001	0,010
PRODUCT ANALYSIS	0,197	0,195	1,018	0,007	0,011	0,106	0,067	0,012	0,016	0,197	0,003	0,002	0,010
	Al	B	Ca						CE LF	CE SF	F1	F2	PREN
LADLE ANALYSIS	0,025	0,0000	0,002						0,407	0,367	0,382	0,110	--
PRODUCT ANALYSIS	0,027	0,0000	0,002						0,408	0,367	0,385	0,118	--

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

Provetta / Test specimen C10		Forma / Shape C10	°C C03	Snervamento>0,2% / Yield Strength>0,2% C11	Snervamento>1,0% / Yield Strength>1,0% C11	Rottura / Tensile C12	Allungamento / Elongation C13	Contrazione / Reduction of area C14
Sez/Sect mm2	Gauge L.mm	1=O - 2=□		MPa	MPa	MPa	%	%
126,60	50,80	1	20	390,0	--	548,0	31,3	72,4

DUREZZA / HARDNESS C30

HBW C31	Tipo/Type C40	RESILIENZA / IMPACT TEST Provetta / Test Specimen C41	°C C03	1-Joule C42	2-Joule C42	3-Joule C42	Media/Average C43
166,0 ; 173,0	KV	10x10x55 mm	-46	125	126	140	130,3

Tratt. Term. / Heat treatment B04	NORMALIZED AT 930 °C - COOLED IN STILL AIR	C70	GAS FURNACE
Dim in acc. a / Dim. acc. to B14	ASME/ANSI B16.5 -2020 ; ASME/ANSI B36.10M -2022		
Finitura / Roughness B15	ASME/ANSI B46.1 -2019 ; RF FINISHING 125-250 µin AARH		

Marcatura in acc. / Marking in acc. to B06	ANSI/MSS SP-25-2018	Vis. & Dim. D01	SATISFACTORY	Origine / Origin of Steel B16	EUROPEAN UNION

Note / Notes Z01-B03
MATERIAL 100% MANUFACTURED IN ITALY; MATERIAL IN ACCORDANCE WITH ORDER AND SPECIFICATION Issued in agreement with TÜV SÜD Industrie Service GmbH August 12th, 2021" .
Certification no.DGR-0036-QS-W 1025/2021/MUC-01
TENSILE TEST AND CHARPY KV IMPACT TEST PERFORMED IN ACCORDANCE WITH ASTM A370 -22.

COPIA CONFORME AL L'ORIGINALE

IL PRESENTE CERTIFICATO E' VALIDO PER
CLIENTE COES
ORDINE N° 2282/24 DEL
N° 2 MT KG
FERR. IND. BONACINA S.r.l. il 24-07-2024

UFFICIO CONTROLLO QUALITA' / QUALITY CONTROL DEPARTMENT A05	ENTE UFFICIALE DI COLLAUDO / INSPECTION AUTHORITY Z03	MARCHIO PRODUZIONE / MANUFACTURER'S SYMBOL A04
D. Gaffuri		MFF

COES G.Q.	Ricezione data	Sigla
	22/07/2024	V.S.
	Verificato data	Sigla
	25/07/2024	V.S.

24 2229

FAD FLANGE ACCIAIO & DERIVATI s.p.a.

SEDE LEGALE: VIA BONESCHI , 1 - 20040 CAMBIAGO (MI) ITALIA
TEL : +39 02 959420 FAX : + 39 02 95942323 INTERNET: www.fadflange.it - E-MAIL: info@fadflange.it
CAPITALE SOCIALE / SHARE EQUITY € 3.000.000,00 REG.IMP. MONZA BRIANZA /C.F. 03840080158
PARTITA IVA / V.A.T. No. IT 00763980968 - REA MI/975057 - N.MECCANOGRAFICO MI 100012

CERTIFICATO PROVE MATERIALI N.6238/24

4- 4

Test certificate - Certificat d'epreuves - Werksabnahmezeugniss
EN 10204 (3.1)

CLIENTE / Customer - Client - Kunde
FERRAMENTA INDUSTRIALE
BONACINA SRL
Via EUROPA 2 G

24048 CURNASCO DI TREVIOLO BG ITALIA

DATA / Date - Date - Datum 22/07/2024
COMMESSA / Mill order / Comf. de commande / Komm 2413555
ORDINE / Order / Commande / Auftrag EMAIL 18/07/24
D.D.T. / Delivery note / Bulletin de livraison / Lieferschein 6.238

CODICE Line code / Code / Kode	COLATA Heat / Coulè / Schmelze	CERTIFICATO ORIGINE Certificate of origin / Certificat d'usine / Werkszugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description / Norme / Matériél / Description / Standard / Werkstoff / Gegenstand	POS.ORD. Item order / Pos. de comm / Auftragslabe	QUANTITA Quantity / Quantite / Stuckzahl
	34225 √	RIVA	F.FLG.ASME B16.5 A/SA350LF2-1 WN √ 150 3" √ S.160 RF √	12	1

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE % (5)
0,175	0,970	0,009	0,005	0,220	0,170	0,070	0,010	0,007	0,140	0,001	0,010	0,001	0,028	0,014	0,390
B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %						
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,0000						

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght / Rupture / Zugfestigkeit	MPA Yield point / Limite elasticite / Streckgrenze	4D % Elongation / Allongement / Dehnung	Reduction of area / Striction % / Einschnürung	HB Hardness / Dureté / Harte	Impact test / Resilience / Kerbschlagzähigkeit	(1)	(2)	(3)	(4)
520,0	319,0	45,0	67,0	155 155	10/10 KV -50°C 52 58 60 J √	A	A	X	X

NACE MR 0103 ED16

Material manufactured in accordance with PED 2014/68/UE PAR.4.3 under quality assurance system ISO 9001 cert. 206967 issued by Bureau Veritas

COPIA CONFORME ALL'ORIGINALE

IL PRESENTE CERTIFICATO E' VALIDO PER
CLIENTE COES
ORDINE N° 2282/24 DEL
N° 1 MT KG
FERR. IND. BONACINA S.r.l. il 26-07-2024

COES G.Q.	Ricezione data 22/07/2024	Sigla U.S.
	Verificato data 25/07/2024	Sigla U.S.

COES SRL
VERIFIED IDENTICAL TO
SA 350 Ed. 2023
U.S.

(1) PRODUZIONE ACCIAIO / Steel production / Production acier / Stahl produktion
- A - CALMATO E ELABORATO AL FORNO ELETTRICO / Killed steel made by electric furnace / Acier calmé produit au four electrique / Beruhigt stahl ausgearbeitet im elektrofen.
- B - ELABORATO AL FORNO ELETTRICO / Made by electric furnace / Produit au four electrique / Ausgearbeitet im elektrofen.

(2) TRATT. TERMICO / Heat treatment / Traitment termique / Warmebehandlung
- A - NORMALIZZATO / Normalized / Normalisè / Normalgeglüht.
- B - NORMALIZZATO E RINVENUTO / Normalized and tempered/ Normalisè et revenu / Normalisiert angelasst.
- C - BONIFICATO / Quenched and tempered / Bonifiè / Harten und anlassen.
- D - SOLUBILIZZATO / Solution treat and quench / Solubilisè / Lösungsgeglüht.

(3) X - CERTIFICATO SECONDO ASME SA II ED.: 21 AD.:

(4) X - CONTROLLO VISIVO E DIMENSIONALE SODDISFACENTE / Satisfactory visual and dimensional check / Inspection et controle dimensionel satisfasant / Besichtigung und massokontrolle bestanden.

X NACE MR 01-75 ED.: 15

- I VALORI DELLE ANALISI CHIMICHE SONO RICAVATI DAL CERTIFICATO DI FERRERIA / Chemical analysis values are taken from mill certificate / Le valeur de certificat ont été obtenus par le certificat d'usine / Del werte des zeugnisses sin vom original werksabnahmezegniss erhalten.

(5) DOUBLE CERTIFICATION: C.S:A/SA105/SA350LF2-1 - S.S:A/SA182F316/316L & A/SA182F304/304L

$$CE = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$$

RESP. CONTROLLO CERTIFICATI / Issued by / Cert. contrôle / Zeugnissprüfungsamt	ENTE UFFICIALE DI COLLAUDO / Inspection authority / Service inspection officiel / Abnahme verein	CAPO COLLAUDO / Chief Inspector / Chef de la reception / Chef de abnahmeabteilung

MARCEGAGLIA PLATES

Marcegaglia
46040 via Bresciani 16-Gazoldo degli Ippoliti Mantova-Ita
Tel. +39 - 0376 685 1 Fax. +39 - 0376 685 600
www.marcegaglia.com

Stab. di S.Giorgio di Nogaro:
via Enrico Fermi 33, 33058 S.Giorgio di Nogaro-Udine
tel+390431624111 fax 0431624222

Type/Tipo 3.1 CERTIFICATO DI COLLAUDO EN10204

THIS DOCUMENT WAS PRODUCED AUTOMATICALLY AND IS VALID WITHOUT SIGNATURE

Number/Numero 16021371540 Creato il 11/05/2021

Product: Hot Rolled Heavy Plates
NormaCollaudoLamieraTreno: ASME-SA516
Steel grade:: GR-70N

Customer/Cliente
SE.TA.L. SRL
VIA G. LA PIRA 30
25020 FLERO IT

Code: 0000028587

Del. Address/Destinatario Merci
SE.TA.L. SRL
VIA G. LA PIRA 30
25020 FLERO IT

Delivery/N° Consegna 8272132329
Of/Del 11/05/2021
Delivery note nr/N° doc. di trasp. 1060004926

Quality Control/Controllo Qualità
Q.M.D./RESP. M.Quargnali
Plant/Stab. S. Giorgio di Nogaro

Pages/Pagine 1/1

Material/Codice Materiale
LTS

Description/Descrizione
LTS 2000,0X12000,0X 18,00 GR-70N

Surface Quality: EN10163-2 CL B2
Flatness: rif EN 10029 cl. N
Thickness tolerance: EN10029 CLASSE B

Delivery Condition: Normalizzato in Forno
Steel Making Process: BO= Basic oxigen

Order Nr/ordine **1191340763/40**
Materiale Cliente

Client Order/Ordine cliente **21*028**
Client Date/data cliente **23/03/2021**

Item	Batch/N° Partita	Heat/Colata	Quantity/Q.tà KG	Quantity/Q.tà PZZ
1	21EG004200	2101999	3456	1
~~2~~	~~21EG004336~~	~~2101999~~	~~3456~~	~~1~~

Remarks/Note:
Manufacturer has a Quality-Assurance System with specific assessment for materials acc. to AD2000-Merkblatt W0/W1/W10 - Certificate Nr. 01 202 I/Q-10 8279 issued by TUV Rheinland
Manufacturer has a Quality-Assurance System with specific assessment for materials 2014/68/EU - ANNEX I - SECTION 4.3 Certified by TÜV Rheinland®
CONTROLLO ULTRASONORO: EN 10160 S1E1
Mechanical tests acc. to: ASTM A370 - 19e1
ASME SA516 BPVC.II.A - Ed.2019 / Markings: acc. to SA20 Par. 12.1.7 & 13.1 "LTV" SA516"MT"
A/SA20 Supplementary Requirements S5: Charpy V-Notch Impact TestHeat treatment : temperature 910 +/- 10°C, soaking time: 30 min/inc , cooling in still airFully Killed Steel - Fine Grain Steel

Batch/N° Partita	C (%)	Mn (%)	Si (%)	S (%)	P (%)	Cr (%)	Ni (%)	Cu (%)	Al (%)	Mo (%)	Nb (%)	V (%)	Ti (%)	N (%)	B (%)	Ceq (%)
		0.85	0.15						0.02							
	0.27	1.5	0.4	0.025		0.3	0.4	0.4		0.12	0.05	0.02	0.03	0.012		
21EG004200	.160	1.420	.200	.0050	.0150	.030	.030	.060	.037	.0050	.026	.005	.0050	.0090	.0000	.41
21EG004336	.160	1.420	.200	.0050	.0150	.030	.030	.060	.037	.0050	.026	.005	.0050	.0090	.0000	.41

Batch/N° Partita	Forma	(1)	(2)	(3)	Tst [°C]	Rm [N/mmq]	Rp 0.2 [N/mmq]	E-2in (%)	(1b	(2b	(3b	T [°C]	Kv1 [J]	Kv2 [J]	Kv3 [J]	Kv° [J]	HB	TESTN
					20	485	260	21										
					20	620												
21EG004200	P	1	P	T	20	524	391	32.0	1	P	L	-46	237	234	237	236	158	21-4523N
21EG004336	P	1	P	T	20	524	393	29.0	1	P	L	-46	223	225	220	222	158	21-4662N

COPIA CONFORME ALL'ORIGINALE
IL PRESENTE CERTIFICATO VALE PER
LA QUANTITA' DEL NS. DDT 1728 DEL 24/06/2024
SETAL S.P.A.

COES SRL
VERIFIED IDENTICAL TO
SA 516 Ed. 2023
V.S.

Controllo ad ultrasuoni

Apparecchiatura	Numero di serie	Condizioni di superficie	Accoppiante	Mod. operativie	Taratura
Gilardoni RDG/700	I001288	As Rolled	Acqua	Secondo le specifiche	Secondo le specifiche

Firma
IIIIivEN/ISO9712
Q.M.D. M.Quargnali

MARCEGAGLIA PLATES

Item	Norma di riferimento	Classe accettabilità	Esito	Indicazioni	Reticolo	Bordi	Sonda	Frequenza	Angolo
1	EN10160	CL.S1 E1	Ok	Not founded	200x200mm	50	BDD20/4	4 MHz	0°
2	EN10160	CL.S1 E1	Ok	Not founded	200x200mm	50	BDD20/4	4 MHz	0°

(1)Posizione:1=Testa;2=Piede.(2)Posizione:1/2=1/2 spessore;P=Pelle;1/4=1/4 spessore.(3)Direzione:L=Longitudinale;T=Trasversale

DescrizioneMarchi

- Material Free of radioactive contamination
- Dimensional check and visual examination of the surface condition: without objection
- We Declare that the above mentioned plates are in compliance with the order prescription

COES G.Q.
Ricezione data 11/07/2024 Sigla V.S.
Verificato data 29/07/2024 Sigla V.S.

24 22 46

24 2311

I.R.C. S.p.A.
SEDE LEGALE:
Via Guarneri del Gesù, 3 - I-26100 Cremona (CR) - Italy
STABILIMENTO E UFFICI:
Via E. Fermi, 7 - 29016 Cortemaggiore (PC) - Italy
Telefono: 0039 - 0523-839600 - Telefax: 0039 - 0523-836132
Web: www.ircbwf.it - E-mail: irc@ircbwf.it
EEC. CODE: IT 01224220192
Cod. Fisc./Reg.Imprese: 00150030336 - P.IVA/EORI IT01224220192
REA CR 152967 - Export CR 011012 - Cap. Soc. EURO 20.134.400 I.V.

IRC SPA
FITTING CONNECTIONS
Quality Management System Certified Company

TÜV SÜD ISO 9001

Inspection Report
EN 10204-2004 3.1

PRESENTE CERTIFICATO E' VALIDO PER
CLIENTE COES
ORDINE N° 2282/24 DEL
N° 2 MT KG
FERR. IND. BONACINA S.r.l. IL 30-07-2024

Document no.	6674
Date	24/07/2024
Page	1 / 1
Job order	6674
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	32

COPIA CONFORME ALL'ORIGINALE

	Item	Supplier	Quantity	Heat id.
1	CURVA 8" SCH 60 90° LR WPB		9,00	996-890996
2	TEE 4" XXS WPB		1,00	441500
3	R.C. 4" x 3" XXS WPB	ERNE FITTINGS GMBH (A)	1,00	UVNCW-971312
4	CURVA 457 SP.6,3 90° LR P235GH-W		8,00	4051847
5	CURVA 3" STD 45° SR WPB		4,00	105844
6	R.C. 2" x 1" SCH 160 WPB		1,00	330220
7	CURVA 1" XXS 90° LR WPL6	ERNE FITTINGS GMBH (A)	2,00	F6J23-610619
8	CURVA 2" XXS 90° SR WPB		3,00	660A
9	CURVA 2.1/2" XXS 90° SR WPB		1,00	1100830
10	CURVA 3" XXS 90° SR WPB		1,00	01922
11	CURVA 4" XXS 90° SR WPB		7,00	453608
12	CURVA 2" XXS 90° LR WPB		8,00	4012-884012
13	CURVA 2.1/2" XXS 90° LR WPB	ERNE FITTINGS GMBH (A)	14,00	WWA84-874893
14	CURVA 3" XXS 90° LR WPB		12,00	922
15	CURVA 1.1/2" XS 90° LR WPL6		6,00	413640
16	FONDELLO 4" SCH 160 WPL6		1,00	16H3173
17	FONDELLO 6" SCH 160 WPL6		1,00	3BM05
18	CURVA 1" SCH 160 90° LR WPL6	ERNE FITTINGS GMBH (A)	1,00	F42FW-812151
19	CURVA 1.1/2" SCH 160 90° SR WPL6		1,00	622842
20	R.C. 2" x 1" SCH 160 WPL6		1,00	104129
21	TEE 2" x 1" SCH 160 WPL6		1,00	104129
22	CURVA 6" XS 90° SR WPL6		1,00	23832

COES G.Q.	Ricezione data 25/07/2024	Sigla U.S.
	Verificato data 08/08/2024	Sigla U.S.

COES SRL
VERIFIED IDENTICAL TO
SA 420 Ed. 2023
U.S.

The products were manufactured, sampled, tested and inspected in accordance with the specifications and purchase order and were found to meet the requirements.
Visual and dimensional check with satisfactory result - Marking: Manufacturer / Size / Wall thickness / Material / Heat Id.

Mfr Authorized Inspector Quality Department **Official Designated Inspector** **Purchaser Authorized Inspector**

Luca Alessandrini

This certificate is issued by a computerized system and is valid without stamp and signature

This certificate is not a declaration of origin nor may it be used as a declaration of origin

Legenda: RC=Concentric Reducer RE=Eccentric Reducer TEE=Tee Curva=Elbow Fondello=Cap Croce=Cross Tubo=Pipe

I.R.C. S.p.A.
SEDE LEGALE:
Via Guameri del Gesù, 3 - I-26100 Cremona (CR) - Italy
STABILIMENTO E UFFICI:
Via E. Fermi, 7 - 29016 Cortemaggiore (PC) - Italy
Telefono: 0039 - 0523-839600 - Telefax: 0039 - 0523-836132
Web: www.ircbwf.it - E-mail: irc@ircbwf.it
EEC. CODE: IT 01224220192
Cod. Fisc./Reg.Imprese: 00150030336 - P.IVA/EORI IT01224220192
REA CR 152967 - Export CR 011012 - Cap. Soc. EURO 20.134.400 I.V.

FITTING CONNECTIONS
Quality Management System Certified Company

Inspection Certificate
EN 10204-2004 3.1

Document no.	6674-P7
	24/07/2024
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	32

	Item	Quantity	Heat id.
7	CURVA 1" XXS 90° LR WPL6	2,00	F6J23-610619

Specification	ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6
Method of Fabrication	COLD FORMED
Heat Treatment	NORMALIZED AT 920°C AND COOLING IN FORCED AIR
Type of construction	SEAMLESS MANUFACTURED FROM PIPE (FULLY KILLED STEEL AND FINE GRAIN PRACTICE)
Manufacture standard	ASME B16.9 - 2018 / ASME B16.25 - 2018 FIG.2A/3A (AS APPLICABLE)

Ladle Analysis

C%	Mn%	Si%	P%	S%	Ni%	Cr%	Mo%	Cu%	V%	Al%	N%	Ti%	Nb%	B%
0,160	0,870	0,230	0,010	0	0,090	0,120	0,050	0,120	0	0,032	0,0100	0	0	0,0002

CE_{IIW} 0,35

Legenda: CE_{IIW} = C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15 Pcm = C+Si/30+Mn/20+Cu/20+Ni/60+Cr/20+Mo/15+V/10+5*B J-Factor = (Si+Mn)*(P+Sn)*10000 CE = C+F*(Mn/6+Si/24+Cu/15+Ni/20+(Cr+Mo+V+Nb)/5+5*B)

Tensile Test

Base Metal Direction L

Unit	Y.S.	T.S.	Elongation %
MPA	322	499	33

Impact Test

Direction L Test Temperature -50 °C Test Type ISO-V

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
7.5 X 10	0,6	Base Mat.	124	86	124	111

Hardness Test

Base Metal Avg 159 HBW

NACE MR0175/ISO15156-2:2015 A.2 / NACE MR0103/ISO17945:2015, 13.1 & 15

Visual and dimensional check with satisfactory result - Marking: Manufacturer / Size / Wall thickness / Material / Heat Id.

Quality Assurance System in accordance with the Pressure Equipment Directive 2014/68/EU (PED) Annex I, Paragraph 4.3, certified by TÜV Italia S.r.l. (No.Bo. 0948)

The products were manufactured, sampled, tested and inspected in accordance with the specifications and purchase order and were found to meet the requirements.

Mfr Authorized Inspector	Quality Department	Official Designated Inspector	Purchaser Authorized Inspector
Luca Alessandrini			

This certificate is issued by a computerized system and is valid without stamp and signature

This certificate is not a declaration of origin nor may it be used as a declaration of origin

Legenda: RC=Concentric Reducer RE=Eccentric Reducer TEE=Tee Curva=Elbow Fondello=Cap Croce=Cross Tubo=Pipe

24 2339

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

A04/A05

METINVEST
METINVEST TRAMETAL SPA

A01

Società per azioni con socio unico soggetta a direzione e coordinamento di Metinvest B.V
Registered office: Via XII Ottobre 1, 5° piano - 16121 Genova, Italy
Phone +39 010 5762911 - Fax +39 010 5762990
Works: Via E. Fermi, 44 - 33058 San Giorgio di Nogaro UD, Italy
Phone +39 0431 629989 - Fax +39 0431 629985
Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = *LONGITUDINALE / LONGITUDINAL* ; T = *TRASVERSALE / TRANSVERSE*
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A06 Cliente / Customer

SIDERURGICA LEONESSA S.R.L.

Via don. Milani 13-19
25020 FLERO 25020 IT
BS ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
610751 ✓	08/05/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32401618	61-2024
DDT	**del / date**
BOL 32408270	07/05/2024
Pratica / File no.	
del / date	

B06 Marcatura di prodotto / Marking of the product
LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	SA516GR70MT/LTV ✓
Normativa / Specification	ASME

COPIA CONFORME ALL'ORIGINALE
Controllo Qualità
Siderurgica Leonessa s.r.l

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI [mm] DIMENSIONS	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE HEAT TREATMENT (C)	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	PERMANENZA (Q) Min HOLDING TIME	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	PERMANENZA (T) Min HOLDING TIME	RAFFREDDAMENTO COOLING
9	RTAA630803A	1945791	18.00X2450X12000	4,15	792647	BO	N	GE064																	
11	LNAA760202A	1947858	20.00X2450X12000	4,62	793476	BO	N	GD881																	
11	LNAA780102A	1947024	20.00X2450X12000	4,62	793479	BO	N	GD884																	
11	LNAA780102B	1947024	20.00X2450X12000	4,62	793479	BO	N	GD884																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91
COLATA HEAT	C %	Mn %	Si %	P %	S %	Cu %	Ni %	Cr %	Mo %	Al %	V %	Nb %	Ti %	Sn %	Ca %	N %	B %	H %	Ceq1 % (D)	Ceq2 % (D)	Pcm % (D)
Ordine Min 11																					
Ordine Max 11		1,50										0,050									
Ordine Min 9																					
Ordine Max 9		1,50										0,050									
SA51670LTV Min 12.60 - 50.00		0,85	0,15																		
SA51670LTV Max 12.60 - 50.00	0,28	1,20	0,40	0,025	0,025																
LNAA76	0,16	1,44	0,22	0,015	0,002	0,010	0,010	0,020	<0.005	0,035	0,001	0,023	0,002	<0.005	0,0000	0,0059	0,0003	0,0000	0,40	0,41	0,24
LNAA78	0,17	1,44	0,23	0,015	0,002	0,010	0,010	0,010	<0.005	0,031	0,001	0,024	0,002	<0.005	0,0000	0,0056	0,0003	0,0000	0,41	0,41	0,25
RTAA63 ✓	0,16	1,46	0,25	0,018	0,005	0,010	0,010	0,020	<0.005	0,033	<0.005	<0.010	0,001	<0.005	0,0000	0,0061	0,0004	0,0003	0,40	0,41	0,25

COES G.Q.	Ricezione data 02/08/2024	Sigla U.S.
	Verificato data 02/08/2024	Sigla U.S.

			PROVA DI TRAZIONE TENSILE TEST									PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	YIELD STRENGTH ReH [Mpa]	Rm [Mpa] TENSILE STRENGTH	ReH/Rm	A% ELONGATION	Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDRINO [mm] MANDREL	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 11													L	-46		27	0										
ORDINE Min 9													L	-46		27	0										
SA51670LTV Min 0.00 - 20.00					20		485		17,0	260																	
SA51670LTV Max 0.00 - 20.00					20		620																				
SA51670LTV Min 0.00 - 25.00													L	-46			20										
GD881	20,00	2	P	T	20		518		30,1	378	P	10,00	T	-50	P	119 125 100	115						HRC <	22			
GD881	20,00	2										10,00	L	-46	P	234 211 227	224										
GD884	20,00	2	P	T	20		515		33,0	375	P	10,00	T	-50	P	106 103 102	104						HRC <	22			
GD884	20,00	2										10,00	L	-46	P	225 225 226	225										
GE064	18,00	2	P	T	20		525		33,5	381	P	10,00	T	-50	P	84 100 76	87						HRC <	22			
GE064	18,00	2										10,00	L	-46	P	223 174 199	199										

C10

ASME SA-370 FIG. 3 AND FIG. 10 / 11 - SAMPLE TAKEN AFTER PLATE HEAT TREATMENT. Elongation in 8" for thk ≤ 20mm, in 2" for thk > 20mm. IMPACT TEST IN ACC. TO ASME SA20 OPTION S5

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
9		EN 10029 CL.C	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
11		EN 10029 CL.C	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

STEEL VACUUM DEGASSED

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
PRODUCED FROM CONTINOUS CAST SLAB AND HAVE A MINIMUN REDUCTION RATIO OF 3 TO 1. ACCORDING TO ASME II PART A ED. 2023. FULLY KILLED, FINE GRAIN STEEL. Value of Mn maximun in derogation permitted up to 1.50% **Issued in agreement with TÜV SÜD Industrie Service GmbH.** **QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 84/2003/MUC-03).**	**TIMBRO DELL'ISPETTORE** **STAMP OF THE INSPECTION REPRESENTATIVE**	**METINVEST TRAMETAL S.p.A/** **F. Andrian** **CQ Manager**

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

TÜV NORD Italia S.r.l. ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 10-09-24 **Our Ref.** DDT 3185 / OC 1587 **of** 10-09-24 **Your Ref.** 2341/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402469

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5587G7100P00B	HEAVY HEX NUT TAB.10 ANSI B18.2.2 - A/SA194 G7 D. 1" - 8UNC ZINC.PLATED 20 - 166/24 E 167/24	40,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	834334	129388

MECHANICAL PROPERTIES

values	HT (min-max) ASTM A370+E10	HT after 24 hrs ASTM A370+E10	PROOF LOAD ASTM A962	HT (min - max) ASTM A370+E18	HT after 24 hrs ASTM A370+E18	I.T. -101°C ASTM A370+E23
required	248 - 327 HB	201 HB min.		24-35 HRc	94 HRb min.	20 min. 27 av. (J)
actual	274 - 297	269 - 288	OK @ 471,5 KN			40 - 42 - 42

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25
actual	0,42	0,73	0,20	0,013	0,006	0,97	0,21

COES G.Q.	Ricezione data 10/09/2024	Sigla VS.
	Verificato data 10/09/2024	Sigla VS.

remarks: chemical and mechanical values, at delivery condition, are quoted by the relevant steel work certificate. VISUAL AND DIMENSIONAL TEST SATISFACTORY nuts hardness test after 24 HRS tempering at 590°C. According to: ASME II part. A ed. 2023. Macroetch test according to ASTM E381 result: equivalent to max.S2-R2-C3.

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

24 24 58

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 10-09-24 **Our Ref.** DDT 3185 / OC 1587 **of** 10-09-24 **Your Ref.** 2341/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402469

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPL7114190B	STUD BOLT ANSIB1.1 CL.2A - A/SA320 L7 D. 1"1/4 - 8UN x 190 ZINC PLATED √	20,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	834364	243901 √
	40 - 166/24 E 167/24					

MECHANICAL PROPERTIES

values	R (MPa)	Rs 0,2 (MPa)	A4 (%)	Z (%)	HT ASTM A370+E10	I.T. -101°C ASTM A370+E23
required	860 min.	725 min.	16 min.	50 min.	HB 321 max	20 min. 27 av. (J)
actual	911	875	20,0	54,1	277 - 277	25 - 27 - 29

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)	Al (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25	
actual	0,440	0,840	0,250	0,009	0,0060	0,990	0,211	0,021

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. 2023. 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

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BULLONERIA - TIRANTERIA
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21040 UBOLDO (VA)

TÜV NORD Italia S.r.l. ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 10-09-24 **Our Ref.** DDT 3185 / OC 1587 **of** 10-09-24 **Your Ref.** 2341/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402469

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPL7100155B	STUD BOLT ANSI B1.1 CL.2A A/SA320 L7 D.1" - 8 UNC x 155 ZINC PLATED √	20,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	834365	296675 √

50 - 166/24 E 167/24

MECHANICAL PROPERTIES

values	R (MPa)	Rs 0,2 (MPa)	A4 (%)	Z (%)	HT ASTM A370+E10	I.T. -101°C ASTM A370+E23
required	860 min.	725 min.	16 min.	50 min.	HB 321 max	20 min. 27 av. (J)
actual	1031,6	867,9	23,2	50,2	316	35 - 33 - 34

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)	Al (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25	
actual	0,424	0,820	0,267	0,009	0,0100	1,041	0,211	0,024

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. 2023. 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)

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 10-09-24 **Our Ref.** DDT 3185 / OC 1587 **of** 10-09-24 **Your Ref.** 2341/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402469

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5587G7114P00B	HEAVY HEX NUT TAB.10 ANSI B18.2.2 - A/SA194 G7 D. 1"1/4 - 8UN ZINC.PLATED √	40,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	834361	71771 √
	10 - 166/24 E 167/24					

MECHANICAL PROPERTIES

values	HT (min-max) ASTM A370+E10	HT after 24 hrs ASTM A370+E10	PROOF LOAD ASTM A962	HT (min - max) ASTM A370+E18	HT after 24 hrs ASTM A370+E18	I.T. -101°C ASTM A370+E23
required	248 - 327 HB	201 HB min.		24-35 HRc	94 HRb min.	20 min. 27 av. (J)
actual	296 - 318	291 - 313	OK @ 778,4 KN			56 - 46 - 47

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25
actual	0,41	0,76	0,30	0,013	0,022	1,07	0,20

remarks: chemical and mechanical values, at delivery condition, are quoted by the relevant steel work certificate. VISUAL AND DIMENSIONAL TEST SATISFACTORY nuts hardness test after 24 HRS tempering at 590°C. According to: ASME II part. A ed. 2023. Macroetch test according to ASTM E381 result: S2; R2; 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)

TÜV NORD Italia S.r.l. ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 18-09-24 **Our Ref.** DDT 3289 / OC 1480 **of** 18-09-24 **Your Ref.** 2200/24 03-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402549

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
DIS.60L4375	EYEBOLT DWG. L4375 - SA350 LF2 M 22 x 260 THREADED 200	5,00	quenched and tempered		834323	255812

20 - 687/23-166/24-167/24

MECHANICAL PROPERTIES

values	R (MPa)	Rs 0,2 (MPa)	A4 (%)	Z (%)	HB	I.T. KV (J) -45,6°C
required	485 – 655	250 min.	22,0 min.	30,0 min.	197 max	16 min. 20 min. av.
actual	639	520	23,9	63,0	187	234-241-254

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Ni (%)	Cr (%)	Mo (%)	Nb (%)	Cu (%)	V (%)
required	0,30 max	0,60 - 1,35	0,15 – 0,30	0,035 max	0,040 max	0,40 max	0,30 max	0,12 max	0,02 max	0,40 max	0,05 max
actual	0,164	1,170	0,250	0,012	0,001	0,060	0,090	0,020	0,003	0,100	0,005

remarks: Chemical and mechanical values, at delivery condition, are quoted by the relevant steel work certificate. Visual and dimensional check: SATISFACTORY
According to: ASME II part. A ed. 2023. MECHANICAL VALUES REFERRING TOTHE STARTING RAW MATERIAL D.50,0 mm

COES G.Q.	Ricezione data 18/09/2024	Sigla U.S.
	Verificato data 18/09/2024	Sigla U.S.

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

24 2650

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

TÜV NORD
TÜV NORD Italia S.r.l.
ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 30-09-24 **Our Ref.** DDT 3462 / OC 1587 **of** 30-09-24 **Your Ref.** 2341/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402671

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5739L7022100B	H.H. SCREW UNI 5739/DIN933 - A/SA320 L7 M 22 x 100 ZINC. PLATED 60 - 166/24 E 167/24	40,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	834366	38454

MECHANICAL PROPERTIES

values	R (MPa)	Rs 0,2 (MPa)	A4 (%)	Z (%)	HT ASTM A370+E10	I.T. -101°C ASTM A370+E23
required	860 min.	725 min.	16 min.	50 min.	HB 321 max	20 min. 27 av. (J)
actual	950 - 958	841 - 850	19,4	59,0 - 60,0	285	42-44-45 43-41-42

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)	Al (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25	
actual	0,42	0,84	0,29	0,008	0,014	1,04	0,23	0,058

COES G.Q.
Ricezione data 30/09/2024 Sigla U.S.
Verificato data 30/09/2024 Sigla U.S.

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. 2023. 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

24 2862

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

TÜV NORD Italia S.r.l. ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 30-09-24 **Our Ref.** DDT 3462 / OC 1587 **of** 30-09-24 **Your Ref.** 2341/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402671

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5587G7022000B	HEX NUT UNI 5587/H=D - A/SA194 G7 M 22 ZINC. PLATED ✓	40,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	834363	85925 * ✓

30 - 166/24 E 167/24

MECHANICAL PROPERTIES

values	HT (min-max) ASTM A370+E10	HT after 24 hrs ASTM A370+E10	PROOF LOAD ASTM A962	HT (min - max) ASTM A370+E18	HT after 24 hrs ASTM A370+E18	I.T. -101°C ASTM A370+E23
required	248 - 327 HB	201 HB min.		24-35 HRc	94 HRb min.	20 min. 27 av. (J)
actual	293 - 307	288 - 300	OK @ 365,1 KN			36 - 42 - 31

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25
actual	0,43	0,79	0,24	0,009	0,007	1.06	0,22

remarks: chemical and mechanical values, at delivery condition, are quoted by the relevant steel work certificate. VISUAL AND DIMENSIONAL TEST SATISFACTORY nuts hardness test after 24 HRS tempering at 590°C. According to ASME II part. A ed. 2023.

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

24 2942

CERTIFICATO PROVE MATERIALI N.7318/24 ✓

1- 1

Test certificate - Certificat d'epreuves - Werksabnahmezeugniss
EN 10204 (3.1)

FAD FLANGE ACCIAIO & DERIVATI s.p.a.

SEDE LEGALE: VIA BONESCHI , 1 - 20040 CAMBIAGO (MI) ITALIA
TEL : +39 02 959420 FAX : + 39 02 95942323 INTERNET: www.fadflange.it - E-MAIL: info@fadflange.it
CAPITALE SOCIALE / SHARE EQUITY € 3.000.000,00 REG.IMP. MONZA BRIANZA /C.F. 03840080158
PARTITA IVA / V.A.T. No. IT 00763980968 - REA MI/975057 - N.MECCANOGRAFICO MI 100012

CLIENTE / Customer - Client - Kunde
COES SRL

Via Pontida, 265

24040 STEZZANO BG ITALIA

DATA / Date - Date - Datum 16/09/2024
COMMESSA / Mill order / Comf. de commande / Komm 2416167
ORDINE / Order / Commande / Auftrag 2852/24
D.D.T. / Delivery note / Bullettin de livraison / Lieferschein 7.318

CODICE Line code Code Kode	COLATA Heat Coulè Schmeize	CERTIFICATO ORIGINE Certificate of origin Certificat d'usine Werkszugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description Norme / Materiél / Description Standard / Werkstoff / Gegenstand	POS.ORD. Item order Pos. de comm Auftragslabe	QUANTITA Quantity Quantite Stuckzahl
	284888 ✓	VENETE	F.FLG.ASME B16.5 A/SA350LF2-1 BL ✓ 150 24" ✓ . RF ✓	10	1

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,160	1,168	0,013	0,004	0,233	0,143	0,146	0,037	0,007	0,193	0,001	0,013	0,006	0,024	0,007	0,414

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,004	0,000	0,000	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght Rupture Zugfestigkeit	MPA Yield point Limite elasticite Streckgrenze	4D % Elongation Allongement Dehnung	Reduction of area Striction % Einschnürung	HB Hardness Dureté Harte	Impact test Resilience Kerbschkagzähigkeit	1	2	3	4
536,0	352,0	32,0	67,0	157 159	10/10 KV -50°C 61 77 65 J	A	A	X	X

CODICE Line code Code Kode	COLATA Heat Coulè Schmeize	CERTIFICATO ORIGINE Certificate of origin Certificat d'usine Werkszugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description Norme / Materiél / Description Standard / Werkstoff / Gegenstand	POS.ORD. Item order Pos. de comm Auftragslabe	QUANTITA Quantity Quantite Stuckzahl
	264199 ✓	ABS	F.FLG.ASME B16.5 A/SA350LF2-1 WN ✓ 150 16" ✓ S.XS RF ✓	20	1

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,183	1,150	0,014	0,004	0,190	0,120	0,070	0,020	0,002	0,160	0,001	0,008	0,005	0,023	0,007	0,419

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,001	0,000	0,000	0,000	0,001	0,005	0,000	0,008	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght Rupture Zugfestigkeit	MPA Yield point Limite elasticite Streckgrenze	4D % Elongation Allongement Dehnung	Reduction of area Striction % Einschnürung	HB Hardness Dureté Harte	Impact test Resilience Kerbschkagzähigkeit	1	2	3	4
486,9	319,9	67,6	62,0	144 146	10/10 KV -50°C 44 39 41 J	A	A	X	X

NACE MR 0103 ED16

Material manufactured in accordance with PED 2014/68/UE PAR.4.3 under quality assurance system ISO 9001 cert. 206967 issued by Bureau Veritas

COES G.Q.	Ricezione data 16/09/2024	Sigla V.S.
	Verificato data 01/10/2024	Sigla V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 350 Ed. 2023
V.S.

(1) PRODUZIONE ACCIAIO / Steel production / Produktion acier / Stahl produktion
- A - CALMATO E ELABORATO AL FORNO ELETTRICO / Killed steel made by electric furnace / Acier calmé produit au four electrique / Beruhigt stahl ausgearbeitet im elektrofen.
- B - ELABORATO AL FORNO ELETTRICO / Made by electric furnace / Produit au four electrique / Ausgearbeitet im elektrofen.

(2) TRATT. TERMICO / Heat treatment / Traitment termique / Warmebehandlung
- A - NORMALIZZATO / Normalized / Normalisè / Normalgeglüht.
- B - NORMALIZZATO E RINVENUTO / Normalized and tempered/ Normalisè et revenu / Normalisiert angelasst.
- C - BONIFICATO / Quenched and tempered / Bonifié / Harten und anlassen.
- D - SOLUBILIZZATO / Solution treat and quench / Solubilisè / Lösungsgeglüht.

(3) X - CERTIFICATO SECONDO ASME SA II Ed.: (21) AD.:

(4) X - CONTROLLO VISIVO E DIMENSIONALE SODDISFACENTE / Satisfactory visual and dimensional check / Inspection et controle dimensionel satisfasant / Besichtigung und massokontrolle bestanden.

- I VALORI DELLE ANALISI CHIMICHE SONO RICAVATI DAL CERTIFICATO DI FERRERIA / Chemical analysis values are taken from mill certificate / Le valeur de certificat ont été obtenus par le certificat d'usine / Del werte des zeugnisses sin vom original werksabnahmezegniss erhalten.

(5) $CE = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$

X NACE MR 01-75 ED.: 15

(5) DOUBLE CERTIFICATION: C.S:A/SA105/SA350LF2-1 - S.S:A/SA182F316/316L & A/SA182F304/304L

RESP. CONTROLLO CERTIFICATI Issued by Cert. contrôle Zeugnisprüfungsamt	ENTE UFFICIALE DI COLLAUDO Inspection authority Service inspection officiel Abnahme verein	CAPO COLLAUDO Chief Inspector Chef de la reception Chef de abnahmeabteilung
Viviana Bonfanti		

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Via Pontida, 265 - 24040 STEZZANO (BG) ITALY | Via Europa, 9 - 24040 COMUN NUOVO (BG) ITALY

MATERIAL CERTIFICATES LIST

DOCUMENT No: CML58152	**REV. 0**	**SHEET 1 OF 22**

CUSTOMER:	ROSETTI MARINO S.P.A.
PROJECT:	HOLLANDSE KIST NOORD WIND PARK PROJECT
OBJECT:	BASEPLATE
SERIAL No.:	//
DRAWING:	CCO53359
COES JOB:	166/24

REV.	ISSUED BY	CONTROLLED BY	DATE	DESCRIPTION
0	V. Girardello	C. Pilenga	01/10/2024	FIRST ISSUE

+39 035 2050 511 | www.coessrl.eu | coes@coessrl.com |
Via Pontida, 265 - 24040 STEZZANO (BG) ITALY | Via Europa, 9 - 24040 COMUN NUOVO (BG) ITALY

POS	QTY	DESCRIPTION	MATERIAL	MFR	CERT	HEAT	REF.COES
1	4	LIFTING LUG 300x120 Thk.20	S 355 J2	FABBRICA ITALIANA LAMIERE SRL	240000014847	420350	24 2641
3	920,000 mm	PLATE 60 x 10 L=115,000 mm	S 355 J2	ACCIAIERIE VENETE SPA	655532	3108971	24 0046
4	4	EARTHING LUG 70 x 50 Thk.6	SA 516 Gr.70	METINVEST TRAMETAL SPA	601191	KTAB30	24 2643
5	540,000 mm	PLATE 140 x 10 L=270,000 mm	S 355 J2	ACCIAIERIE VENETE SPA	685006	3112446	24 2696
6	13	PLATE 130x130x25mm	SA 516 Gr.70	METINVEST TRAMETAL SPA	589244	HNAA04	24 2552
7	200,000 mm	ANGLE L60x60x6 L=100,000 mm	S 355 J2	AFV BELTRAME GROUP	401331	BE216352	23 1451
9	8	PLATE120x80 thk=25 - N° 2 HOLES M12	SA 516 Gr.70	METINVEST TRAMETAL SPA	589244	HNAA04	24 2552
10	8	TONDO Ø30 H=39 foro centrale M12	SA 350 Gr. LF2 Cl.1	IPL SRL	2402998	278967	24 3404
11	8	SCREW - M12 x 30 - UNI 5739	SA 193 Gr.B7	IPL SRL	2402551	BJ3907	24 2651
13	10	SCREW - M12 x 80 - UNI 5739	SA 193 Gr.B7	IPL SRL	2402551	BJ3907	24 2651
14	20	NUT M12 UNI 5587	SA 194 Gr.2H	IPL SRL	2402551	53864	24 2651
15	404,500 mm	PROFILE - U 100x50x6 L=404,5 mm	S 355 J2	AFV BELTRAME GROUP	458893	BE 224005	24 2697
16	914,500 mm	PROFILE - U 100x50x6 L=914,5 mm	S 355 J2	AFV BELTRAME GROUP	458893	BE 224005	24 2697
17	1114,500 mm	PROFILE - U 100x50x6 L=1114,5 mm	S 355 J2	AFV BELTRAME GROUP	458893	BE 224005	24 2697
18	404,500 mm	PROFILE - U 100x50x6 L=404,5 mm	S 355 J2	AFV BELTRAME GROUP	458893	BE 224005	24 2697
19	404,500 mm	PROFILE - U 100x50x6 L=404,5 mm	S 355 J2	AFV BELTRAME GROUP	458893	BE 224005	24 2697
20	914,500 mm	PROFILE - U 100x50x6 L=914,5 mm	S 355 J2	AFV BELTRAME GROUP	458893	BE 224005	24 2697
21	1114,500 mm	PROFILE - U 100x50x6 L=1114,5 mm	S 355 J2	AFV BELTRAME GROUP	458893	BE 224005	24 2697
22	404,500 mm	PROFILE - U 100x50x6 L=404,5 mm	S 355 J2	AFV BELTRAME GROUP	458893	BE 224005	24 2697
23	1086,300 mm	PROFILE - U 100x50x6 L=543,2 mm	S 355 J2	AFV BELTRAME GROUP	458893	BE 224005	24 2697
24	1086,300 mm	PROFILE - U 100x50x6 L=543,2 mm	S 355 J2	AFV BELTRAME GROUP	458893	BE 224005	24 2697
25	6354,500 mm	PROFILE HEA 140 L=6354,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
26	6354,500 mm	PROFILE HEA 140 L=6354,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
27	3000,000 mm	PROFILE HEA 140 L=3000 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
28	3000,000 mm	PROFILE HEA 140 L=3000 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
29	2854,500 mm	PROFILE HEA 140 L=2854,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
30	2854,500 mm	PROFILE HEA 140 L=2854,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
31	2854,500 mm	PROFILE HEA 140 L=2854,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
32	2854,500 mm	PROFILE HEA 140 L=2854,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
33	854,500 mm	PROFILE HEA 140 L=854,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
34	774,500 mm	PROFILE HEA 140 L=774,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
35	1379,500 mm	PROFILE HEA 140 L=1379,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
36	1379,500 mm	PROFILE HEA 140 L=1379,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
37	854,500 mm	PROFILE HEA 140 L=854,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
38	2854,500 mm	PROFILE HEA 140 L=2854,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
39	774,500 mm	PROFILE HEA 140 L=774,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
40	854,500 mm	PROFILE HEA 140 L=854,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
41	774,500 mm	PROFILE HEA 140 L=774,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
42	1379,500 mm	PROFILE HEA 140 L=1379,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
43	1379,500 mm	PROFILE HEA 140 L=1379,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
44	774,500 mm	PROFILE HEA 140 L=774,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
45	854,500 mm	PROFILE HEA 140 L=854,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
46	854,500 mm	PROFILE HEA 140 L=854,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
47	774,500 mm	PROFILE HEA 140 L=774,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
48	1379,500 mm	PROFILE HEA 140 L=1379,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
49	1379,500 mm	PROFILE HEA 140 L=1379,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
50	774,500 mm	PROFILE HEA 140 L=774,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
51	854,500 mm	PROFILE HEA 140 L=854,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
52	2854,500 mm	PROFILE HEA 140 L=2854,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
53	304,500 mm	PROFILE HEA 140 L=304,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
54	304,500 mm	PROFILE HEA 140 L=304,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699
55	304,500 mm	PROFILE HEA 140 L=304,5 mm	S 355 J2	TRAVI E PROFILATI DI PALLANZENO SPA	9237 2023	141177A	24 2699

AFV BELTRAME GROUP A04

Z04 CE 0398

complete CE Marking on next page

A06

A03 INSPECTION DOCUMENT N.: **401331**

OFFICIAL REGULATION: **EN 10025-2/2019**

A02 INSPECTION CERTIFICATE 3.1 **EN10204**

ENCLOSE CERTIFICATION CE

C70 **Steel from electric arc furnace**

A10 **Environmental product declaration : ICQM - 17029EPD**

AGENT ORDER N.

CUSTOMER CODE

A07 CUSTOMER ORDER N.

CONSIGNEE

B02 B04 GRADE **S355J2+AR**

LOADING NUMBER: 713685 **LOADING DATE: 12/05/2023** A08 **INTERNAL ORDER: I 876002**

IT.	B07 CAST	B01 SECTION	B09 - B10 - B11 DIMENSIONS mm	CE	LENGTH mt	C71->C92 C	Si	Mn	P	S	Cu	Cr	Ni	V	Mo	Ti	Nb	AlT	N	Ceq
43	BE 216352	ANGLE	60X60X6	0398	12,00	0,14	0,15	1,20	0,014	0,010	0,24	0,13	0,15	0,070	0,03	0,0104	0,001	0,025	0,0083	0,41

IT.	B07 CAST	A01 ORIGIN	PRODUCT REGULATION	C00 TEST NUM	B08 Bdls n.	B13 WEIGHT Kg	TENSILE TEST C11 ReH/MPa	C12 Rm/MPa	C13 A5%	Z%	IMPACT TEST C42 KV	C42 300/10 J	C42	C43 Mean	C03 °C	C41 w/mm	RATIO REDUC.	BEND <	TEST D	GRAIN	HARDNESS	INSPECTION SUP.INSIDE	ANTI MIX.
43	BE 216352	VICENZA	EN 10056-1	6052891	2	4.790	387	523	27,5		133	167	137	146	-20	5.0							

Inspector | Factory: VICENZA | Z02 Date: 12/05/23 | A05 Quality Control Dept | Z02 Manufacturer's authorized inspection representative: Silvia Ghini

COES G.Q.	Ricezione data 03/07/2023	Sigla V.S.
	Verificato data 05/07/2023	Sigla V.S.

AFV Acciaierie Beltrame S.p.A. - Sede Legale e Direzione Centrale: Viale della Scienza, 81 - 36100 Vicenza (Italy)
Ph +39 0444 967111 - Fax +39 0444 348577 Sales Dept. +39 0444 348591 - Purchasing Dept. +39 0444 348579
Codice Fiscale, Registro Imprese Vicenza e Partita IVA 13017310155 - R.E.A. Vicenza nr. 292852
Codice identificazione CEE IT 13017310155 - Cap. Soc. € 113.190.480,00 I.V. - info@beltrame.it - www.gruppobeltrame.com

Z01 We hereby certify that above mentioned materials have been delivered in accordance with the terms of order.
D01 Surface control and dimensional check = satisfactory
C42 and C43 recalculated Impact test results respect to 10x10 standard section

23 14511

AFV BELTRAME GROUP

CE

0398

MARCATURA DI CONFORMITA' CE
CE CONFORMITY MARKING

INSPECTION DOCUMENT N.: 401331/

EN 10025-1 PRODOTTI IN ACCIAIO LAMINATI A CALDO HOT ROLLED STRUCTURAL STEEL PRODUCTS USO: - STRUTTURE METALLICHE - STRUTTURE COMPOSTE DI ACCIAIO-CALCESTRUZZO USE: - METALLIC STRUCTURES - MIXED STEEL-CONCRETE STRUCTURE	Allungamento - Elongation Resistenza a trazione - Tensile Strength Carico unitario di Snervatura - Yeld Strength Resilienza - Impact Strength Saldabilità - Weldability	**S355 J2+AR - EN 10025-2/2019** DOP N. AFV - 09_06
	Durabilità - Durability Sostanza regolamentata - Regulated substance	NPD

Stabilimento Factory	Indirizzo Address	Anno Year	Certificato di controllo della produzione Production Control Certificate
VICENZA	V.le della Scienza 81/A	23	CE 0398 0398/CPR/MP/15.068

COPIA CONFORME ALL'ORIGINALE
CERTIFICATO VALIDO PER KIS 33
FORNITO ALLA DITTA COESIM
CON NS. DDT DI CONSEGNA N° 7103 del 31/7/23
BRESCIA 31/7/23
p. SIDERURGICA FERRO BULLONI SPA

AFV Acciaierie Beltrame S.p.A. - Sede Legale e Direzione Centrale: Viale della Scienza, 81 - 36100 Vicenza (Italy)
Ph +39 0444 967111 - Fax +39 0444 348577 Sales Dept. +39 0444 348591 - Purchasing Dept. +39 0444 348579
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Z01 We hereby certify that above mentioned materials have been delivered in accordance with the terms of order.
D01 Surface control and dimensional check = satisfactory
C42 and C43 recalculated Impact test results respect to 10x10 standard section

OLIVINI GIUSEPPE SPA - DDT n: 478 del: 18/1/2024

- Articolo FERRO LAMINATO PIATTO 60 X 10 S355J2 - Lotto 2612475 - Lunghezza 6100 mm

ACCIAIERIE VENETE SPA

CERTIFICATO DI COLLAUDO - INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION – ABNAHMEPRÜFZEUGNIS

EN 10204 3.1

N° 635532

DATE: 09/06/2023

Acciaierie Venete Spa C.S. € 63.000.000,00 i.v C.F. e P.IVA 00224180281
R.I di Trento 00224180281 V.A.T. N° IT 00224180281
Sede Legale: 38051 Borgo Valsugana (TN) Via Puisle, 4 - Italy
Direzione/Amministrazione: 35127 Padova Z.I. Sud - Riviera Francia, 9 - Italy Tel. 049 828.28.20 (r.a.)
Azienda con sistema di gestione per la qualità certificato da IGQ secondo ISO 9001

CLIENTE – CUSTOMER – CLIENT – KUNDE

107587 - OLIVINI GIUSEPPE SPA
VIA ETTORE MAJORANA 8
25020 FLERO (BS)

ORDINE CLIENTE - PURCHASE ORDER – COMMANDE CLIENT - KUNDENAUFTRAG: 258AF

ORDINE - ORDER – COMMANDE - AUFTRAG: 176928 / 40

ARTICOLO (ACCIAIO)- ITEM (STEEL) - ITEM (ACIER) - ARTIKEL (STAHL)

PROFILO - PROFILE – PROFIL - ABMESSUNG: **PIATTO 60X 10 mm**

STATO DI FORNITURA- DELIVERY CONDITION – CONDITION DE LIVRAISON – LIEFERZUSTAND: **NATURALE**

STATO DI ESECUZIONE - STATE OF EXECUTION – ETAT DE L'ÉXECUTION - AUSFÜHRUNG: **LAMINATO**

PESO - WEIGHT – POIDS - GEWICHT (Kg): **1843**

COLLI - ITEMS – COLIS - KOLLI (Nr): **1**

DDT - DELIVERY NOTE – BON DE LIVRAISON - LIEFERSCHEIN: **F1002493** **09/06/2023**

COLATA - HEAT - COULEE - SCHMELZE: **3108971**

MARCA ACCIAIO - STEEL GRADE - MARQUE ACIER - STAHLGÜTE: **S355J2+AR**

NORMA - SPECIFICATION - NORME - NORM: **EN 10025-2:2019**

BLUMO - BLOOM – BLOOM - KNÜPPEL

RIDUZIONE - REDUCTION – REDUCTION - UMFORMUNGSGRAD

STAB. SPEDIZIONE: DOLCE' (VR)

COMPOSIZIONE CHIMICA (%) - CHEMICAL COMPOSITION (%) - COMPOSITION CHIMIQUE (%) - CHEMISCHE ZUSAMMENSETZUNG (%)

C	Si	Mn	P	S	Cu	Cr	Ni	Al	Mo	V	Ti	Nb
0.1400	0.2099	1.3397	0.0150	0.0150	0.2911	0.1588	0.2290	0.0302	0.0615	0.0380	0.0120	0.0017

ANALISI GAS - GAS ANALYSIS - ANALYSE GAZ - GAS ANALYSE

H_2= (ppm) | O_2= (ppm) | N_2= 83 (ppm) 0.0083 (%)

CEV= 0,450% CEV=C+(MN/6)+(CR+MO+V)/5+(NI+CU)/15

D.I. (ASTM A255)

FUSIONE: FORNO ELETTRICO (EAF) - ELABORAZIONE FUORI FORNO: AFFINAZIONE (LF) - COLAGGIO: COLATA CONTINUA (CC)

CARATTERISTICHE MECCANICHE - MECHANICAL PROPERTIES – CARACTERISTIQUES MECANIQUES-MECHANISCHE EIGENSCHAFTEN

TRAZIONE-TENSILE TESTING-TRACTION-ZUGVERSUCH – **EN ISO 6892-1**

RESILIENZA - IMPACT TEST - RESILIENCE - ZÄHIGKEIT – **EN ISO 148-1**

DUREZZA - HARDNESS - DURETE - HÄRTE

PROVINO - SAMPLE – EPROUVETTE - MUSTER	mm	STATO - CONDITION – ETAT - ZUSTAND	TRATTAMENTO TERMICO - HEAT TREATMENT – TRAITMENT TERMIQUE - WÄRMEBEHANDLUNG	Rm MPa	Re MPa	A %	Z %	TIPO - TYPE - TYPE - ART	KV °C	KV J	KV J	KV J	Mean J	DUREZZA
COLATA - HEAT – COULEE-SCHMELZE														
VALORI ALLO STATO DI FORNITURA - VALUES IN DELIVERY CONDITION - WERTE IM LIEFERZUSTAND ▶				528	372	29			-20	60	61	63	61	

THE PRODUCT COMPLIES WITH THE REQUIREMENTS OF THE EUROPEAN DIRECTIVE 2000/53/EC

RADIOACTIVITY MEETS SPECIFICATION 2013/59/EURATOM

TEMPRABILITA' - HARDENABILITY – TREMPABILITE - HÄRTBARKEIT

GRANO - GRAIN – GRAIN - KORNGRÖSSE: **EN ISO 643 AUSTENITICO 7 - 8**

INCLUSIONI NON METALLICHE - NON METALLIC INCLUSIONS - INCLUSIONS NON METALLIQUES - NICHTMETALLISCHE EINSCHLÜSSE

A (SS) Thin	A (SS) Heavy	B (OA) Thin	B (OA) Heavy	C (OS) Thin	C (OS) Heavy	D (OG) Thin	D (OG) Heavy

MACRO - MACROETCHING – MACRO - MAKRO ÄTZUNG

MACROINCLUSIONI - MACROINCLUSIONS – MACRO INCLUSIONS - MAKRO EINSCHLÜSSE

CONTROLLO ANTIMESCOLAMENTO - ANTIMIXING CONTROL – CONTROLE ANTIMELANGE - VERWECHSLUNGSPRÜFUNG: **100%**

ENTI COLLAUDATORI – INSPECTION AUTHORITIES – SERVICE D'ESSAI – ABNAHMEBEHÖRDE

NOTE – NOTES – NOTES - ANMERKUNGEN

COES G.Q.	Ricezione data 18/01/2024	Sigla V.S.
	Verificato data 18/01/2024	Sigla V.S.

CONTROLLO QUALITA' - QUALITY CONTROL - CONTROLE QUALITE - QUALITÄTSTELLE

ACCIAIERIE VENETE S.P.A. Stab. di Dolcè – Metallbauprodukte EN 1090 EN 10083 – PRÜFSTELLE PROF. DR. ING. G. REHM

CE 1608 CPR P046 06 / 1608 CPR P048 06 / 1608 CPR P049 06 / 1608 CPR P050 06 / 1608 CPR P051 06 / 1608 CPR P146 13 – TÜV NORD AD-2000 MERKBLATT W0

UKCA 1224-CPR-1041 / 1224-CPR-1042 / 1224-CPR-1043 / 1224-CPR-1044 / 1224-CPR-1045

F.Soardo

CERTIFICATO CONFORME AL CAPITOLATO E SPECIFICHE DI RIFERIMENTO -CERTIFICATE IN COMPLIANCE WITH THE SPECIFICATION AND ITS REFERENCES-CERTIFICAT EN ACCOMPLIANCE AVEC LE CAHIER DES CHARGES ET SES REFERENCES-ZERTIFIKAT IN ÜBEREINSTIMMUNG MIT DER SPEZIFIKATION UND DESSEN BEZÜGE

24 0046

OLIVINI GIUSEPPE SPA - DDT n: 478 del: 18/1/2024
- Articolo:FERRO LAMINATO PIATTO 60 X 10 S355J2 Lotto 23/2475 - Lunghezza:6100 mm

ACCIAIERIE VENETE SPA

Capitale Sociale € 63.000.000,00 i.v. – Cod. Fisc. e Part. IVA 00224180281
Sede Legale Via Puisle, 4 Borgo Valsugana (TN)
Tel. +39 049 8282820 Fax +39 049 8703063
R.I. TN 00224180281 e-mail : info@acciaierievenete.com

DICHIARAZIONE DI PRESTAZIONI N. AVDL0003

1 Codice di identificazione unico del prodotto tipo : S355JR, S355J0, S355J2 EN 10025-2:2004

2 Numero di tipo : S355JR DL, S355J0 DL, S355J2 DL

3 Uso previsto del prodotto da costruzione, in conformità alla norma : EN 10025-2 : 2004 2004 Prodotti Laminati a Caldo di Acciai Strutturali

4 Nome ed indirizzo del fabbricante :

ACCIAIERIE VENETE SPA
Stabilimento di Dolcè
Via Passo di Napoleone, 829
I-37020 Volargne di Dolcè (VR) - Italy

6 Sistema di valutazione e verifica della costanza delle prestazioni del prodotto da costruzione : 2+

7 Organismo notificato : IGQ – Viale Sarca 336, 20126 Milano (I), Id No. 1608, ha effettuato l'ispezione iniziale della fabbrica e del controllo della produzione in fabbrica ed esegue la sorveglianza continua, la valutazione e l'approvazione del controllo della produzione in fabbrica, rilasciando il Certificato del Controllo di produzione in fabbrica (FPC) n. P050.

9 Prestazioni dichiarate :

Caratteristiche essenziali	Prestazioni						Specifiche armonizzate
Tolleranze sulle dimensioni e tolleranze di forma	Passa						Piatti : EN 10058 : 2003 Quadri :EN 10059 : 2003
Nominal thickness	≤ 16	>16 ≤ 40					EN 10025-2 : 2004
Elongation %	≥ 22	≥ 22					
Tensile Strength (MPa)	470 to 630	470 to 630					
Yield Strength (MPa)	≥ 355	≥ 345					
Resilienza a 20 °C in J (S355 JR) Resilienza a 0 °C in J (S355 J0) Resilienza a -20 °C in J (S355 J2)	≥ 27						
Saldabilità (CEV %)	Spessore ≤ 30			Spessore >30≤ 40			
	≤ 0,45			≤ 0,47			
Durabilità	NDP						

10 Le prestazioni del prodotto di cui ai punti 1 e 2 sono conformi alle prestazioni dichiarate al punto 9.
Si rilascia la presente dichiarazione di prestazioni sotto la responsabilità esclusiva del fabbricante di cui al punto 4.

Firmato a nome e per conto di Acciaierie Venete S.p.A. da :

Gelsomino Ceola
Responsabile Qualità

Dolcè, 01.04.2019

Mod. AV 372 rev. 1 2015

24 2552

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

A04/A05

METINVEST

METINVEST TRAMETAL SPA

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + NI/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A01

Società per azioni con socio unico soggetta a direzione e coordinamento di Metinvest B.V
Registered office: Via XII Ottobre 1, 5° piano - 16121 Genova, Italy
Phone +39 010 5762911 - Fax +39 010 5762990
Works: Via E. Fermi, 44 - 33058 San Giorgio di Nogaro UD, Italy
Phone +39 0431 629989 - Fax +39 0431 629985
Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

A06 Cliente / Customer

COSIDER S.P.A.

Via giuseppe di vittorio 14
43014 MEDESANO 43014 IT
PR ITALIA

COES SRL
VERIFIED IDENTICAL TO
SA 516 Ed. 2023
U.S.

A03 N° Certificato / Certificate no.	Z02 Data / Date
589244 √	11/08/2023
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32303447	223/LM
DDT	del / date
BOL 32315360	10/08/2023
Pratica / File no.	
del / date	

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	SA516GR70MT/LTV √
Normativa / Specification	ASME

B06 Marcatura di prodotto / Marking of the product

LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

COES G.Q.
Ricezione data 13/09/2024 Sigla U.S.
Verificato data 13/09/2024 Sigla U.S.

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI [mm] DIMENSIONS	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	PERMANENZA (Q) Min HOLDING TIME	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	PERMANENZA (T) Min HOLDING TIME	RAFFREDDAMENTO COOLING
12	HNAA040105A	1885524	25.00X2450X12000	5,77	769430	BO	N	GJ385																
12	HNAA060405A	1885686	25.00X2450X12000	5,77	769421	BO	N	GJ377																
12	SNAC180705A	1885298	25.00X2450X12000	5,77	769440	BO	N	GJ395																
15	HNAA060305A	1884325	30.00X2450X12000	6,92	769428	BO	N	GJ384																
15	HNAA060401A	1884448	30.00X2450X12000	6,92	769417	BO	N	GJ373																

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07 COLATA HEAT	C71 C %	C72 Mn %	C73 Si %	C74 P %	C75 S %	C76 Cu %	C77 Ni %	C78 Cr %	C79 Mo %	C80 Al %	C81 V %	C82 Nb %	C83 Ti %	C84 Sn %	C85 Ca %	C86 N %	C87 B %	C88 H %	C89 Ceq1 % (D)	C90 Ceq2 % (D)	C91 Pcm % (D)
Ordine Min 12																					
Ordine Max 12		1,50			0,004						0,100						0,0005			0,43	
Ordine Min 15																					
Ordine Max 15		1,50			0,004						0,100						0,0005			0,43	
SA51670LTV Min 12.60 - 50.00		0,85	0,15																		
SA51670LTV Max 12.60 - 50.00	0,28	1,20	0,40	0,025	0,025																
HNAA04 √	0,16	1,40	0,20	0,008	0,000	0,010	0,020	0,020	<0.005	0,034	0,001	0,024	0,002	<0.005	0,0000	0,0042	0,0001	0,0001	0,39	0,40	0,24
HNAA06	0,16	1,41	0,18	0,010	0,001	0,010	0,040	0,030	<0.005	0,037	0,001	0,025	0,002	<0.005	0,0000	0,0024	0,0002	0,0001	0,40	0,40	0,24
SNAC18	0,17	1,44	0,20	0,012	0,002	0,010	0,010	0,020	<0.005	0,036	0,001	0,025	0,001	<0.005	0,0000	0,0035	0,0001	0,0000	0,41	0,42	0,25

			PROVA DI TRAZIONE TENSILE TEST										PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10		C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	ReH [Mpa] YIELD STRENGTH	Rm [Mpa] TENSILE STRENGTH	ReH/Rm	A2" ELONGATION	Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	FORMA PROVINO (4) SHAPE OF TEST PIECE		LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDRINO [mm] MANDREL	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 12														L	-46		16	20										
ORDINE Min 15														L	-46		16	20										
SA51670LTV Min 0.00 - 25.00														L	-46			20										
SA51670LTV Min 20.10 - 120.00					20		485		21,0	260																		
SA51670LTV Max 20.10 - 120.00					20		620																					
SA51670LTV Min 25.10 - 50.00														L	-40			20										
GJ373	30,00	2	P	T	20		513		35,1	371	P		10,00	T	-50	P	75 92 114	94						HRC <	22			
GJ373	30,00	2	P	T	300					260	C		10,00	L	-46	P	148 185 122	152										
GJ373	30,00	2											10,00	L	-20	P	241 217 220	226										
GJ377	25,00	2	P	T	20		516		34,3	378	P		10,00	T	-50	P	76 103 107	95						HRC <	22			
GJ377	25,00	2											10,00	L	-46	P	184 200 193	192										
GJ377	25,00	2											10,00	L	-20	P	267 229 223	240										
GJ384	30,00	2	P	T	20		511		35,7	363	P		10,00	T	-50	P	76 84 99	86						HRC <	22			
GJ384	30,00	2											10,00	L	-46	P	166 155 184	168										
GJ384	30,00	2											10,00	L	-20	P	251 215 238	235										
GJ385	25,00	2	P	T	20		521		34,7	369	P		10,00	T	-50	P	80 73 88	80						HRC <	22			
GJ385	25,00	2	P	T	300					252	C		10,00	L	-46	P	182 164 193	180										
GJ385	25,00	2											10,00	L	-20	P	231 267 216	238										
GJ395	25,00	2	P	T	20		525		34,1	406	P		10,00	T	-50	P	78 83 109	90						HRC <	22			
GJ395	25,00	2	P	T	300					288	C		10,00	L	-46	P	200 174 183	186										
GJ395	25,00	2											10,00	L	-20	P	262 246 253	254										

C10

ASME SA-370 FIG. 3 AND FIG. 10 / 11 - SAMPLE TAKEN AFTER PLATE HEAT TREATMENT

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
12		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B2	EN 10029 CL. N
15		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B2	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06

FULLY KILLED FINE GRAIN STEEL

HARDNESS IN ACC. TO NACE MR 0175 / ISO15156

Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
PRODUCED FROM CONTINOUS CAST SLAB AND HAVE A MINIMUN REDUCTION RATIO OF 3 TO 1. ACCORDING TO ASME II PART A ED. 2021. FULLY KILLED, FINE GRAIN STEEL. Value of Mn maximun in derogation permitted up to 1.50% Plates acc. to PED 2014/68/EU	**TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE**	**METINVEST TRAMETAL S.p.a/ F. Andrian CQ Manager**

Fabbrica Italiana Lamiere srl

Sede legale/head office
Via Sant'Agnese 12
20123 Milano
Stabilimento/Rolling mill
Via natale Gallino, 63
16164 Genova Pontedecimo

Tipo certificato/Type certificate 3.1 EN 10204
Numero certificato/Number 240000014847
Data/Date 04/09/2024

Cliente/Customer

S.I.A.T. S.P.A.
XII OTTOBRE 12, B7
16100 GENOVA

Destinatario merce/Destination

VIA DEI CAVALLARI 37
15077 PREDOSA(AL)

Ordine/Order 2024.1.474.5
Data ordine/Date order 20/07/2024
Nota/Note

Firma/Signature
Timbro/Stamp

ARTICOLO LAMIERA S355J2+N 20x2450x12000 mm — S355J2+N — UNI EN 10025-2 — kg 4621 — LC

Partita/placca/Plate	Colata/Heat	C [%]	Mn [%]	Si [%]	S [%]	P [%]	Cr [%]	Ni [%]	Cu [%]	Al [%]	MO [%]	Nb [%]	V [%]	Ti [%]	N [%]	Ceq [%]	HB	Verso	ReH [N/mm²]	Rm [N/mm²]	A% [%]	Verso	T [°C]	Kv_1 [J]	Kv_2 [J]	Kv_3 [J]	Kv_a [J]	Saggio	Data
		0,20	1,60		0,025	0,025			0,55							0,45			345	470 630	20			27	27	27	27		
24LT015735 N35P119	420350	**0,18**	**1,35**	**0,24**	**0,008**	**0,014**	**0,04**	**0,01**	**0,01**	**0,027**	**0,003**	**0,001**	**0,003**	**0,002**	**0,006**	**0,42**		**T**	**356**	**526**	**30,4**	**KVL**	**-20**	**133**	**128**	**132**	**131**		

COES G.Q.
Ricezione data 17/09/2024 Sigla V.S.
Verificato data 17/09/2024 Sigla V.S.

S-P-08994 EPD®
www.environdec.com
THE INTERNATIONAL EPD® SYSTEM

Toll. Spess/Toll. thick	EN10029 Cl B
Toll. Largh./toll. Width	-0 +100
Toll. lLung/toll. Length	-0 +200
Toll. Plan/toll plan.	EN10029 N
Cond superf/cond. superf.	EN 10163 B2
Stato di fornitura LC:	laminazione controllata
Supply status	Normalizing rolling
Stato di fornitura AR:	in as rolled condition
Supply status AR	in as rolled condition

NOTA:
Lamiere elencate sono conformi alla prescrizione all'ordine, e i controlli di marcatura, aspetto superficiale e dimensionale hanno dato esito positivo. Prodotto esente da radiazioni
The above mentioned are consistent with the order prescriptions: marking, inspection and measurement without objection. Product free from all types of radiactive materials
Le lamiere sono state controllate in accordo alla normativa vigente / We declare that the plates were controlled according to standard

FABBRICA ITALIANA LAMIERE SRL
Via natale Gallino, 63
16164 Genova Pontedecimo

EN 10025 - 1
EN 10025 - 2

17
0474 - CPR - 1673

CE

24 2641

24 2643

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

A04/A05

METINVEST

METINVEST TRAMETAL SPA ✓

(A) PROCESSO DI ELABORAZIONE / STEELMAKING PROCESS: E = ELECTRIC ; BO = BASIC OXYGEN
(B) STATO DI FORNITURA / DELIVERY CONDITION: AR = GREZZO DI LAMINAZIONE / AS ROLLED ;
N* = LAMINAZIONE A TEMPERATURA CONTROLLATA / NORMALIZING ROLLING ;
N = NORMALIZZATO / NORMALIZED at 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR;
R = RICOTTO / ANNEALED;
N+R = NORMALIZZATO + RINVENUTO / NORMALIZED + TEMPERED
(C) TRATTAMENTO TERMICO DEL CAMPIONE / HEAT TREATMENT OF SAMPLE:
N = 910°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
R = 650°C, 1,5 min/mm ; ARIA CALMA / STILL AIR
(D) Ceq_1 = C + Mn/6 ; Ceq_2 = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15 ;
Pcm = C + Si/30 + (Mn + Cu + Cr)/20 + Ni/60 + Mo/15 + V/10 + B*5
(1) POSIZIONE / LOCATION: 1 = TESTA / TOP ; 2 = PIEDE / BOTTOM
(2) POSIZIONE / LOCATION: C = CUORE / 1/2 THICKNESS ; P = PELLE / SURFACE ; D = 1/4 SPESSORE / THICKNESS
(3) DIREZIONE / DIRECTION: L = LONGITUDINALE / LONGITUDINAL ; T = TRASVERSALE / TRANSVERSE
(4) FORMA DEL PROVINO / SHAPE OF TEST PIECE: P = PRISMATICO / PRISMATIC ; C = CILINDRICO / CYLINDRICAL
(5) ESITO PROVA DI PIEGA / RESULT: OK = COMPLYING ; NO = NOT COMPLYING

A01
Società per azioni con socio unico soggetta a direzione e coordinamento di Metinvest B.V
Registered office: Via XII Ottobre 1, 5° piano - 16121 Genova, Italy
Phone +39 010 5762911 - Fax +39 010 5762990
Works: Via E. Fermi, 44 - 33058 San Giorgio di Nogaro UD, Italy
Phone +39 0431 629989 - Fax +39 0431 629985
Cap. Soc. Euro 300.120.000,00 i.v.
C.F., P.IVA e Iscr. Reg. Imp. GE 05956630965 - REA 437720/GE
http://trametal.metinvestholding.com

A06 Cliente / Customer

EUSIDER HEAVY PLATES SPA

Via Tortona 25
00000 Milano 20144 IT
MI

EUSIDER HEAVY PLATES — COPIA CONFORME ALL'ORIGINALE

A03 N° Certificato / Certificate no.	Z02 Data / Date
601191 ✓	10/01/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32305806	203793
DDT	del / date
BOL 32400170	09/01/2024
Pratica / File no.	del / date

B06 Marcatura di prodotto / Marking of the product

LAMIERA/ORDINE/N° INFORNAMENTO/DIMENSIONI/QUALITÀ/MARCHIO DEL PRODUTTORE
PLATE/ORDER/INTERNAL N°/DIMENSIONS/STEEL GRADE/MANUFACTURER'S MARK

B01/B02/B03

Prodotto / Product	Lamiere / Hot rolled plates
Qualità / Steel grade	SA516GR70MT/LTV ✓
Normativa / Specification	ASME

DDT 81083445
N°2FOGLI 6X2000X12000

B07 ITEM	B07 LAMIERA PLATE	B07 N° INFORN. INTERNAL NUMBER	B09/B11 DIMENSIONI [mm] DIMENSIONS	B12 MASSA TEORICA [t] THEORICAL WEIGHT	B07 LOTTO BATCH NO.	C70 PROCESSO ELAB. (A) STEELMAKING PROCESS	B04 STATO FORNITURA LAMIERA (B) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT TEMPERATURA INIZIO °C BEGINNING TEMPERATURE	VELOCITA' RISCALDO °C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	PERMANENZA Min HOLDING TIME	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	TEMPERATURA FINE °C END TEMPERATURE	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	PERMANENZA (Q) Min HOLDING TIME	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	PERMANENZA (T) Min HOLDING TIME	RAFFREDDAMENTO COOLING
2	KTAB751206A	1912565	6.00X2000X12000	1,13	780335	BO	N	GO181	←																
2	KTAB751206B	1912565	6.00X2000X12000	1,13	780335	BO	N	GO181																	
2	KTAB760405B	1912561	6.00X2000X12000	1,13	780343	BO	N	GO189																	
2	KTAB760406A	1912566	6.00X2000X12000	1,13	780344	BO	N	GO190	←																
2	KTAB760406B	1912566	6.00X2000X12000	1,13	780344	BO	N	GO190																	
5	KTAB300304A	1910629	8.00X2000X12000	1,51	779316	BO	N	GN761																	

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

B07 COLATA HEAT	C71 C %	C72 Mn %	C73 Si %	C74 P %	C75 S %	C76 Cu %	C77 Ni %	C78 Cr %	C79 Mo %	C80 Al %	C81 V %	C82 Nb %	C83 Ti %	C84 Sn %	C85 Ca %	C86 N %	C87 B %	C88 H %	C89 Ceq1 % (D)	C90 Ceq2 % (D)	C91 Pcm % (D)
Ordine Min 2																					
Ordine Max 2	0,18			0,020	0,005						0,030	0,040								0,43	
Ordine Min 5																					
Ordine Max 5	0,18			0,020	0,005						0,030	0,040								0,43	
SA51670LTV Min 0.00 - 12.50		0,85	0,15																		
SA51670LTV Max 0.00 - 12.50	0,27	1,20	0,40	0,025	0,025																
KTAB30	0,14	1,42	0,21	0,017	0,004	0,010	0,010	0,010	<0.005	0,038	0,002	0,002	0,002	<0.005	0,0000	0,0040	0,0002	0,0000	0,38	0,38	0,22
KTAB75 ✓	0,14	1,41	0,19	0,011	0,005	0,010	0,010	0,020	<0.005	0,039	0,002	0,002	0,002	<0.005	0,0000	0,0090	0,0002	0,0000	0,38	0,38	0,22
KTAB76	0,16	1,46	0,19	0,010	0,005	0,010	0,010	0,010	<0.005	0,039	0,002	0,002	0,002	<0.005	0,0000	0,0060	0,0002	0,0000	0,40	0,41	0,24

COES G.Q. — Ricezione data 19/09/2024 — Sigla U.S. — Verificato data 19/09/2024 — Sigla U.S.

COES SRL — VERIFIED IDENTICAL TO SA ...516.... Ed. 2023 — U.S.

			PROVA DI TRAZIONE TENSILE TEST									PROVA DI RESILIENZA IMPACT TEST - CHARPY V-NOTCH TEST						PROVA DI PIEGA BEND TEST				PROVA DI DUREZZA HARDNESS TEST				PROVA DI STRIZIONE Z% TEST	
C00		C01	C01	C02	C03	C11	C12		C13	C14	C10	C41	C02	C03	C01	C42	C43	C02	C51	C52	C50	C01	C30	C31	C32	C53	C54
CAMPIONE SAMPLE	SPESSORE LAMIERA PLATE THICKNESS	POSIZIONE (1) LOCATION	POSIZIONE (2) LOCATION	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	YIELD STRENGTH ReH [Mpa]	TENSILE STRENGTH Rm [Mpa]	ReH/Rm	A8" ELONGATION	PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA [mm] WIDTH	DIREZIONE (3) ORIENTATION	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE (3) ORIENTATION	MANDRINO [mm] MANDREL	ANGOLO [°] ANGLE	ESITO (5) RESULT	POSIZIONE (2) LOCATION	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
ORDINE Min 2													L	-50		16	27										
ORDINE Min 5													L	-50		16	27										
SA51670LTV Min 0.00 - 20.00					20		485		17,0	260																	
SA51670LTV Max 0.00 - 20.00					20		620																				
SA51670LTV Min 0.00 - 25.00													L	-46			20										
GN761	8,00	2	P	T	20		512		37,0	371	P	7,50	T	-50	P	104 114 100	106						HB	160 160 164	161		
GN761	8,00	2										7,50	L	-50	P	129 135 142	135										
GO181	6,00	2	P	T	20		514		35,0	401	P	5,00	T	-50	P	73 85 62	73						HB	156 141 167	155		
GO181	6,00	2										5,00	L	-50	P	121 130 160	137										
GO189	6,00	2	P	T	20		512		35,9	388	P	5,00	T	-50	P	76 70 74	73						HB	156 150 153	153		
GO189	6,00	2										5,00	L	-50	P	96 104 90	97										
GO190	6,00	2	P	T	20		518		37,1	385	P	5,00	T	-50	P	99 85 73	86						HB	158 143 169	156		
GO190	6,00	2										5,00	L	-50	P	154 134 148	145										

C10

ASME SA-370 FIG. 3 AND FIG. 10 / 11 - SAMPLE TAKEN AFTER PLATE HEAT TREATMENT

D02-D50 CONTROLLO ULTRASONORO / ULTRASONIC EXAMINATION

D02	D03	D04	D05	D06	D07
APPARECCHIATURA EQUIPMENT	N° SERIE SERIAL NO	CONDIZIONI SUPERFICIALI SURFACE CONDITIONS	ACCOPPIANTE COUPLANT	MODALITÀ OPERATIVE PROCEDURE	TARATURA CALIBRATION
GILARDONI RDG2000	RDG2000-053188003	GREZZO DI LAMINAZIONE AS ROLLED	ACQUA WATER	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION	IN ACCORDO ALLA SPECIFICA ACCORDING TO SPECIFICATION

B07 LAMIERA PLATE	D08 SONDE PROBE	D09 DIAMETRO DIAMETER MM	D10 FREQUENZA FREQUENCE MHZ	D11 ANGOLO Angle °	D12 NORMA DI RIFERIMENTO STANDARD SPECIFICATION	D13 CLASSE DI ACCETTABILITÀ ACCEPTANCE SPECIFICATIONS	D14 ESITO RESULT	D15 INDICAZIONI INDICATIONS	D16 RETICOLO RETICLE	D17 BORDI EDGES
KTAB300304A		mm 20	5 MHz	0	ASME-SA578/B		OK	NO INDICATIONS FOUND	mm 225x225	50
KTAB751206A		mm 20	5 MHz	0	ASME-SA578/B		OK	NO INDICATIONS FOUND	mm 225x225	50
KTAB751206B		mm 20	5 MHz	0	ASME-SA578/B		OK	NO INDICATIONS FOUND	mm 225x225	50
KTAB760405B		mm 20	5 MHz	0	ASME-SA578/B		OK	NO INDICATIONS FOUND	mm 225x225	50
KTAB760406A		mm 20	5 MHz	0	ASME-SA578/B		OK	NO INDICATIONS FOUND	mm 225x225	50
KTAB760406B		mm 20	5 MHz	0	ASME-SA578/B		OK	NO INDICATIONS FOUND	mm 225x225	50

D18	D19	D20
NOTE REMARKS	ENTE ISPETTIVO INSPECTOR	FIRMA SIGNATURE
		METINVEST TRAMETAL S.p.a. F. Andrian III Liv. EN ISO 9712

Z01

ITEM		TOLLERANZA DI SPESSORE TOLERANCE ON THICKNESS	TOLLERANZE DI LARGHEZZA TOLERANCE ON WIDTH	TOLLERANZE DI LUNGHEZZA TOLERANCE ON LENGTH	CONDIZIONI SUPERFICIALI SURFACE FINISH	PLANARITÀ FLATNESS
2		EN 10029 CL.C	-0+100 MM	-0+200 MM	EN 10163/2 CL B2	EN 10029 CL. N
5		EN 10029 CL.C	-0+100 MM	-0+200 MM	EN 10163/2 CL B2	EN 10029 CL. N

CERTIFICHIAMO che le lamiere elencate sono conformi alla prescrizione dell'ordine, che i controlli della marcatura, dell'aspetto superficiale e dimensionale hanno dato esito positivo.
WE CERTIFY that the above mentioned plates are consistent with the order prescriptions: marking, inspection and measurement without objection.
DICHIARIAMO CHE LE LAMIERE SONO STATE CONTROLLATE IN ACCORDO ALLA NORMATIVA VIGENTE E CHE LE RADIAZIONI IONIZZANTI NON ECCEDONO IL VALORE DEL FONDO NATURALE.
WE DECLARE THAT THE PLATES WERE CONTROLLED ACCORDING TO STANDARD AND RADIATION DO NOT EXCEED THE NATURAL RADIATION.

Z06		
FULLY KILLED FINE GRAIN STEEL HARDNESS IN ACC. TO NACE MR 0103		
Z07	Z03 ENTE COLLAUDO / INSPECTION BODY	Z02
PRODUCED FROM CONTINOUS CAST SLAB AND HAVE A MINIMUN REDUCTION RATIO OF 3 TO 1. ACCORDING TO ASME II PART A ED. 2021. FULLY KILLED, FINE GRAIN STEEL. Value of Mn maximun in derogation permitted up to 1.50% Issued in agreement with TÜV SÜD Industrie Service GmbH. QS approved acc. to PED, Annex I, Para. 4.3 by Notified Body 0036 (Certification no. DGR-0036-QS-W 084/2003/MUC-002).	TIMBRO DELL'ISPETTORE STAMP OF THE INSPECTION REPRESENTATIVE	METINVEST TRAMETAL S.p.a. F. Andrian CQ Manager

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

TÜV NORD Italia S.r.l. ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 18-09-24 **Our Ref.** DDT 3288 / OC 1800 **of** 18-09-24 **Your Ref.** 2704/24 05-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402551

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
55872H012000B	HEX NUT UNI 5587/H=D - A/SA194 2H M 12 ZINC.PLATED 10 - 166/24	70,00	quenched tempered @ 580°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	828117	53864

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	271 - 313	266 - 308	OK @ 101,6 KN		

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	0,45	0,73	0,23	0,011	0,024

COES G.Q. | Ricezione data 18/09/2024 Sigla V.S. | Verificato data 18/09/2024 Sigla V.S.

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: S2; R1; C2 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

24 2651

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 18-09-24 **Our Ref.** DDT 3288 / OC 1800 **of** 18-09-24 **Your Ref.** 2704/24 05-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402551

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5739B7012030B	H.H. SCREW UNI 5739/DIN933 - A/SA193 B7 M 12 x 30 ZINC.PLATED ✓ *20 - 166/24*	10,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	835538	BJ3907 ✓
5739B7012080B	H.H. SCREW UNI 5739/DIN933 - A/SA193 B7 M 12 x 80 INC.PLATED ✓ *40 - 166/24*	10,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	835536	BJ3907 ✓

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	1050,4	817,4	17,8	62,5	318

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	0,412	0,830	0,230	0,007	0,0280	1,070	0,170	0,021

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. 2023. 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

ACCIAIERIE VENETE SPA

CERTIFICATO DI COLLAUDO – INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION – ABNAHMEPRÜFZEUGNIS

EN 10204 3.1

N° 685006

DATE:27/11/2023

Accialerie Venete Spa C.S. € 63.000.000,00 i.v C.F. e P.IVA 00224180281
R.I di Trento 00224180281 V.A.T. N° IT 00224180281
Sede Legale: 38051 Borgo Valsugana (TN) Via Pulsle, 4 - Italy
Direzione/Amministrazione: 35127 Padova Z.I. Sud - Riviera Francia, 9 - Italy Tel. 049 828.28.20 (r.a.)
Azienda con sistema di gestione per la qualità certificato da IGQ secondo ISO 9001

CLIENTE
CUSTOMER
CLIENT
KUNDE

ORDINE CLIENTE - PURCHASE ORDER
COMMANDE CLIENT - KUNDENAUFTRAG: 476AF

ORDINE - ORDER
COMMANDE - AUFTRAG: 185107 / 190

ARTICOLO (ACCIAIO)- ITEM (STEEL) - ITEM (ACIER) - ARTIKEL (STAHL)

PROFILO - PROFILE
PROFIL - ABMESSUNG: **PIATTO 140X 10 mm**

STATO DI FORNITURA- DELIVERY CONDITION
CONDITION DE LIVRAISON – LIEFERZUSTAND: **NATURALE**

STATO DI ESECUZIONE - STATE OF EXECUTION
ETAT DE L'ÉXECUTION - AUSFÜHRUNG: **LAMINATO**

PESO - WEIGHT
POIDS - GEWICHT (Kg): **2354**

COLLI - ITEMS
COLIS - KOLLI (Nr): **1**

DDT - DELIVERY NOTE
BON DE LIVRAISON - LIEFERSCHEIN: **F1004450** **27/11/2023**

COLATA - HEAT - COULEE - SCHMELZE: **3112446**

MARCA ACCIAIO - STEEL GRADE - MARQUE ACIER - STAHLGÜTE: **S355J2+AR**

NORMA - SPECIFICATION - NORME - NORM: **EN 10025-2:2019**

BLUMO - BLOOM
BLOOM - KNÜPPEL

RIDUZIONE - REDUCTION
REDUCTION - UMFORMUNGSGRAD

STAB. SPEDIZIONE: DOLCE' (VR)

COMPOSIZIONE CHIMICA (%) - CHEMICAL COMPOSITION (%) - COMPOSITION CHIMIQUE (%) - CHEMISCHE ZUSAMMENSETZUNG (%)

C 0.1420 Si 0.2074 Mn 1.2034 P 0.0126 S 0.0090 Cu 0.3021 Cr 0.1634 Ni 0.2012 Al 0.0281 Mo 0.0563 V 0.0263 Ti 0.0199 Nb 0.0016

ANALISI GAS - GAS ANALYSIS - ANALYSE GAZ - GAS ANALYSE
H_2= (ppm) | O_2= (ppm) | N_2= 97 (ppm) 0.0097 (%)

CEV= 0,425% CEV=C+(MN/6)+(CR+MO+V)/5+(NI+CU)/15
D.I. (ASTM A255)

FUSIONE: FORNO ELETTRICO (EAF) - ELABORAZIONE FUORI FORNO: AFFINAZIONE (LF) - COLAGGIO: COLATA CONTINUA (CC)

CARATTERISTICHE MECCANICHE - MECHANICAL PROPERTIES
CARACTERISTIQUES MECANIQUES-MECHANISCHE EIGENSCHAFTEN

PROVINO - SAMPLE / EPROUVETTE - MUSTER	mm	STATO - CONDITION / ETAT - ZUSTAND	TRATTAMENTO TERMICO - HEAT TREATMENT / TRAITMENT TERMIQUE - WÄRMEBEHANDLUNG	TRAZIONE-TENSILE TESTING-TRACTION-ZUGVERSUCH EN ISO 6892-1 Rm MPa	Re MPa	A %	Z %	RESILIENZA - IMPACT TEST - RESILIENCE - ZÄHIGKEIT EN ISO 148-1 TIPO - TYPE - TYPE - ART KV °C	J	J	J	Mean J	DUREZZA - HARDNESS - DURETE - HÄRTE
COLATA - HEAT / COULEE-SCHMELZE													
VALORI ALLO STATO DI FORNITURA - VALUES IN DELIVERY CONDITION - WERTE IM LIEFERZUSTAND ▶				556	384	31		-20	48	56	47	50	

THE PRODUCT COMPLIES WITH THE REQUIREMENTS OF THE EUROPEAN DIRECTIVE 2000/53/EC

RADIOACTIVITY MEETS SPECIFICATION 2013/59/EURATOM

TEMPRABILITA' - HARDENABILITY
TREMPABILITE - HÄRTBARKEIT

GRANO - GRAIN
GRAIN - KORNGRÖSSE
EN ISO 643
AUSTENITICO
Min 7 - Max 8

INCLUSIONI NON METALLICHE - NON METALLIC INCLUSIONS - INCLUSIONS NON METALLIQUES - NICHTMETALLISCHE EINSCHLÜSSE

A (SS) Thin	A (SS) Heavy	B (OA) Thin	B (OA) Heavy	C (OS) Thin	C (OS) Heavy	D (OG) Thin	D (OG) Heavy

COES G.Q.
Ricezione data 20/09/2024 Sigla U.S.
Verificato data 24/09/2024 Sigla U.S.

MACRO - MACROETCHING
MACRO - MAKRO ÄTZUNG

MACROINCLUSIONI - MACROINCLUSIONS
MACRO INCLUSIONS - MAKRO EINSCHLÜSSE

CONTROLLO ANTIMESCOLAMENTO - ANTIMIXING CONTROL
CONTROLE ANTIMELANGE - VERWECHSLUNGSPRÜFUNG 100%

ENTI COLLAUDATORI
INSPECTION AUTHORITIES
SERVICE D'ESSAI
ABNAHMEBEHÖRDE

COPIA CONFORME ALL'ORIGINALE
CERTIFICATO VALIDO PER VITEC
FORNITO ALLA DITTA COES SRL
CON NS. DDT DI CONSEGNA N° F2760 del 24/09/24
BRESCIA 24/09/24
p. SIDERURGICA FERRO BULLONI SPA

CONTROLLO QUALITA' - QUALITY CONTROL - CONTROLE QUALITE - QUALITÄTSTELLE

CE 1608 CPR P045 06 · 1608 CPR P048 06 · 1608 CPR P049 06 · 1608 CPR P050 06 · 1608 CPR P052 06 · 1608 CPR P146 13
TÜV NORD AD-2000 MERKBLATT W0
UKCA 1224-CPR-1041 · 1224-CPR-1042 · 1224-CPR-1043 · 1224-CPR-1044 · 1224-CPR-1045
F.Soardo

CERTIFICATO CONFORME AL CAPITOLATO E SPECIFICHE DI RIFERIMENTO -CERTIFICATE IN COMPLIANCE WITH THE SPECIFICATION AND ITS REFERENCES-CERTIFICAT EN ACCOMPLIANCE AVEC LE CAHIER DES CHARGES ET SES REFERENCES-ZERTIFIKAT IN ÜBEREINSTIMMUNG MIT DER SPEZIFIKATION UND DESSEN BEZÜGE

24 2696

AFV BELTRAME GROUP

A04

Z04 CE 0398

complete CE Marking on next page

A06

A03
INSPECTION DOCUMENT N.: 458893
OFFICIAL REGULATION: EN 10025-2/2019

A02
INSPECTION CERTIFICATE 3.1 EN10204
ENCLOSE CERTIFICATION CE

C70 **Steel from electric arc furnace**

A10 **Environmental product declaration : ICQM - 17029EPD**

AGENT ORDER N.
CUSTOMER CODE
A07 CUSTOMER ORDER N.
CONSIGNEE
B02 B04 GRADE **S355J2+AR**

LOADING NUMBER: 756083 **LOADING DATE: 29/05/2024** A08 **INTERNAL ORDER: I 904714**

IT.	B07 CAST	B01 SECTION	B09-B10-B11 DIMENSIONS mm	CE	LENGTH mt	C71->C92 C	Si	Mn	P	S	Cu	Cr	Ni	V	Mo	Ti	Nb	AlT	N	Ceq
5	BE 224005	UPN	100X50X6	0398	12,10	0,13	0,19	1,10	0,021	0,006	0,31	0,19	0,20	0,042	0,04	0,0097	0,0007	0,028	0,0091	0,40

IT.	B07 CAST	A01 ORIGIN	PRODUCT REGULATION	C00 TEST NUM	B08 Bdls n.	B13 WEIGHT Kg	TENSILE TEST C11 ReH/MPa	C12 Rm/MPa	C13 A5%	Z%	IMPACT TEST C42 KV	C42 300/10 J	C42	C43 Mean	C03 °C	C41 w/mm	RATIO REDUC.	BEND <	TEST D	GRAIN	HARDNESS	INSPECTION SUP.INSIDE	ANTI MIX.
5	BE 224005	VICENZA	EN 10279	6056231	2	4.632	397	543	25,9		47	58	55	53	-20	5.0							

Inspector | Factory: VICENZA | Z02 Date: 29/05/24 | A05 Quality Control Dept | Z02 Manufacturer's authorized inspection representative: Silvia Ghini

COES G.Q.	Ricezione data 10/09/2024	Sigla V.S.
	Verificato data 24/09/2024	Sigla V.S.

AFV Acciaierie Beltrame S.p.A. - Sede Legale e Direzione Centrale: Viale della Scienza, 81 - 36100 Vicenza (Italy)
Ph +39 0444 967111 - Fax +39 0444 348577 Sales Dept. +39 0444 348591 - Purchasing Dept. +39 0444 348579
Codice Fiscale, Registro Imprese Vicenza e Partita IVA 13017310155 - R.E.A. Vicenza nr. 292852
Codice identificazione CEE IT 13017310155 - Cap. Soc. € 113.190.480,00 I.V. - info@beltrame.it - www.gruppobeltrame.com

Z01 We hereby certify that above mentioned materials have been delivered in accordance with the terms of order.
D01 Surface control and dimensional check = satisfactory
C42 and C43 recalculated Impact test results respect to 10x10 standard section

This steel was melted and poured in : cast no. starting with: BE=Italy / LM=France / GE=Switzerland

24 29097

AFV BELTRAME GROUP

CE
0398

MARCATURA DI CONFORMITA' CE
CE CONFORMITY MARKING

INSPECTION DOCUMENT N.: 458893/

EN 10025-1 PRODOTTI IN ACCIAIO LAMINATI A CALDO HOT ROLLED STRUCTURAL STEEL PRODUCTS USO: - STRUTTURE METALLICHE - STRUTTURE COMPOSTE DI ACCIAIO-CALCESTRUZZO USE: - METALLIC STRUCTURES - MIXED STEEL-CONCRETE STRUCTURE	Allungamento - Elongation Resistenza a trazione - Tensile Strength Carico unitario di Snervatura - Yeld Strength Resilienza - Impact Strength Saldabilità - Weldability	S355J2+AR - EN 10025-2/2019 DOP N. AFV - 09_06
	Durabilità - Durability Sostanza regolamentata - Regulated substance	NPD

Stabilimento Factory	Indirizzo Address	Anno Year	Certificato di controllo della produzione Production Control Certificate
VICENZA	V.le della Scienza 81/A	24	CE 0398 0398/CPR/MP/15.068

COPIA CONFORME ALL'ORIGINALE
CERTIFICATO VALIDO PER R3124
FORNITO ALLA DITTA COESSM
CON NS. DDT DI CONSEGNA N° 0276 del 16/01/24
BRESCIA 16/01/24
p. SIDERURGICA FERRO BULLONI SPA

AFV Acciaierie Beltrame S.p.A. - Sede Legale e Direzione Centrale: Viale della Scienza, 81 - 36100 Vicenza (Italy)
Ph +39 0444 967111 - Fax +39 0444 348577 Sales Dept. +39 0444 348591 - Purchasing Dept. +39 0444 348579
Codice Fiscale, Registro Imprese Vicenza e Partita IVA 13017310155 - R.E.A. Vicenza nr. 292852
Codice identificazione CEE IT 13017310155 - Cap. Soc. € 113.190.480,00 I.V. - info@beltrame.it - www.gruppobeltrame.com

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This steel was melted and poured in : cast no. starting with: BE=Italy / LM=France / GE=Switzerland

AFV BELTRAME GROUP

DICHIARAZIONE DI PRESTAZIONE DECLARATION OF PERFORMANCE LEISTUNGSERKLÄRUNG	N. AFV - 09_06

1	Codice di identificazione unico del prodotto-tipo Unique identification code of the product-type Eindeutiger Kenncode des Produkttyps	S355J2 + 1.0577
2	Usi previsti Intended uses Verwendungszwecke	Prodotto laminato a caldo di acciai per impieghi strutturali in strutture metalliche o in compositi metallici e strutture in calcestruzzo Hot rolled structural steel products for metal structures or in composite metal and concrete structures Warmgewalzte Erzeugnisse aus Baustahlen fur Metallbauwerke -oder in Metall-/ Betonverbundbauwerken
3	Fabbricante Manufacturer Hersteller	AFV Acciaierie Beltrame SpA Viale della Scienza, 81 36100 VICENZA (VI) - Italia
5	Sistema di VVPC System of AVCP System zur Bewertung und Überprüfung der Leistungsbestandigkeit	2+
6	Norma armonizzata Harmonised standard Harmonisierte Norm	EN 10025-1:2004
	Organismo notificato Notified body Notifizierte Stelle	Apave Italia CPM srl (0398) via artigiani, 63 25040 Bienno (BS) - Italia

7 Prestazione dichiarata - Declared performance - Erklärte Leistungen

Caratteristiche essenziali / Essential characteristics / Wesentliche Eigenschaften		Prestazione / Performance / Leistung						Specifica tecnica / Technical specification Technischen Spezifikationen	
Tolleranze sulle dimensioni e sulla forma Tolerances on dimensions and shape Grenzabmasse und Formtoleranzen		Passa Pass Bestanden						Travi IPE / I sections / IPE Träger	EN 10034
								Profilati a T / Tees / T Profilstahl	EN 10055
								Angolari / Angles / Winkel	EN 10056-2
								Piatti / Flats / Flachstahl	EN 10058
								Larghi piatti/Wide flats/Breitflachstahl	DIN 59200
								Quadri / Squares / Vierkantstahl	EN 10059
								Tondi / Rounds / Rundstahl	EN 10060
								Piatti a bulbo/Bulb flats/Wulstflachstahl	EN 10067
								Profilati U/U channels/ U-Profilstahl	EN 10279
Allungamento Elongation Dehnung	spessore / thickness /dicke (mm)	≥ 3	≤ 40	> 40	≤ 63			EN 10025-2:2019	
	(%)	≥ 22		≥ 21					
Resistenza a trazione Tensile strength Zugfestigkeit	spessore / thickness /dicke (mm)		< 3	≥ 3	≤ 100				
	(MPa)	510 - 680		470 - 630					
Carico unitario di snervamento Yield strength Streckgrenze	spessore / thickness /dicke (mm)		≤ 16	> 16	≤ 40	> 40	≤ 63		
	(MPa)	≥ 355		≥ 345		≥ 335			
Resilienza Impact strength Kerbschlagarbeit		≥ 27J (-20°C)							
Saldabilità (composizione chimica) Weldability (chemical composition) Schweißeignung (chemische Zusammensetzung)	spessore / thickness /dicke (mm)		≤ 30	> 30	≤ 40	> 40	≤ 150		
	CEV (%)	≤ 0,45		≤ 0,47		≤ 0,47			
Durabilità (composizione chimica) Durability (chemical composition) Dauerhaftigkeit (chemische Zusammensetzung)		Idoneo alla zincatura categoria B / Suitable for zinc-coating category B Zum Feuerverzinken geeignet gemäß Kategorie B (0,14% ≤ Si ≤ 0,25%)							

La prestazione del prodotto sopra identificato è conforme all'insieme delle prestazioni dichiarate. La presente dichiarazione di responsabilità viene emessa, in conformità al regolamento (UE) n. 305/2011, sotto la sola responsabilità del fabbricante sopra identificato.

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsability of the manufacturer identified above.

Die Leistung des vorstehenden Produkts entspricht der erklärten Leistung/den erklärten Leistungen. Fur die Erstellung der Leistungserklärung im Einklang mit der Verordung (EU) Nr. 305/2011 ist allein der obengenannte Hersteller verantwortlich.

Firmato a nome e per conto del fabbricante da :
Signed for and on behalf of the manufacturer by:
Unterzeichnet für den Hersteller und im Namen des Herstellers von:

Alessandro Franconi
Country COO AFV

Vicenza, 24/06/2020

A01

Duferco TRAVI E PROFILATI

Azienda certificata ISO 9001:2015 ISO 14001:2015 ISO 45001:2018

TRAVI E PROFILATI DI PALLANZENO S.p.A. ✓

SOCIETÀ A SOCIO UNICO
SEDE LEGALE
VIA SEMPIONE, 7 – 28884 PALLANZENO (VB)
TEL. 0256601 – FAX. 0324/52705
PARTITA IVA IT 01910110038
CODICE FISCALE 01910110038
R.E.A. V.C.O. 191072 – REGISTRO IMPRESE (VB) N. 01910110038
CAPITALE SOCIALE € 30.000.000 I.V.
SEDE AMMINISTRATIVA
VIA A.DIAZ, 245 – 25010 SAN ZENO NAVIGLIO (BS)
STABILIMENTO DI PALLANZENO – VIA SEMPIONE, 7 28884 PALLANZENO (VB)

CERTIFICATO DI CONTROLLO/INSPECTION CERTIFICATE

A02 **Normativa** EN 10204 3.1 :2004

A03 **Numero:** 9237 2023 ✓ **del** 19/10/23

Pag. 1

Your Ref.: 549-2023

A06 **CUSTOMER:**

SIDERURGICA FERRO BULLONI S.P.A.
VIA BRIXIA ZUST 4
25125 BRESCIA (BS)

171145

A09 **DdT / *SHIPPING DOCUMENT:***

DDT/DELIVNOTE PA/9237

B01 Prodotto e Dimensioni / *Product and Dimension*	B11 B02 Qualità acciaio / *Steel Grade*	B08 N. Fasci / *Number of Bundles*	B10 Lunghezza / *Lenght (m)*
Norma del prodotto / *Standard product*	Norma qualità / *Standard quality*	B06 N. Barre / *Number of Pieces*	B13 Quantità / *Mass (Kg)*
B07 Colata - Lotto / *Heat - Item*	A07 Ordine cliente N. / *Customer's order N.*		A08 Nostro ordine N. / *Our Order N.*

ANALISI CHIMICHE / *CHEMICAL COMPOSITION*

C71 C %	C72 Mn %	C73 Si %	C74 P %	C75 S %	C76 Al %	C77 Cu %	C78 N %	C87 CEV
C79 Cr %	C80 Ni %	C81 Mo %	C82 V %	C83 Nb %	C84 Sn %	C85 Ti %	C86 B %	

CARATTERISTICHE MECCANICHE / *MECHANICAL PROPERTIES*

C11 Snervamento *Yield point* ReH – N / mm²	C12 Resistenza *Tensile strength* Rm – N / mm²	C13 Allungamento *Elongation* A5	C40 Prova di Resilienza - *Impact Test KV (J)* C41 h (mm)	C42 KV1	C42 KV2	C42 KV3	C43 KVm	C03 Temp. °C
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]		
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
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[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]		
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
HEA 140 ✓	S355J2 +AR ✓	1	12,10	0,13	1,26	0,20	0,019	0,0110	0,030	0,354	0,009	0,418
EN 10365	EN 10025-2/EN10034:1	16	4.781	0,129	0,182	0,033	0,031	0,001	0,030	0,002		
No. 141177A ✓	P 503-2023		43/003926	415	560	27	7,5	123,0	125,0	148,0	132,0	- 20

COPIA CONFORME ALL'ORIGINALE
CERTIFICATO VALIDO PER V.T.150S
FORNITO ALLA DITTA COESSM
CON NS. DDT DI CONSEGNA N° 276 del 1dt/24
BRESCIA 1dt/24
p. SIDERURGICA FERRO BULLONI SPA

COES G.Q.	Ricezione data 10/09/2024	Sigla V.S.
	Verificato data 24/09/2024	Sigla V.S.

RADIOACTIVITY FREE (0,1 Bq/g)

Impiego previsto: Edilizia Civile - Durabilità: nessuna prescrizione determinata
Sostanza regolamentata: Nessuna prescrizione determinata - Saldabilità: Secondo EN 1011-2
Si dichiara che i risultati delle prove sono conformi all'ordine.

(*) Stabilimento produttore
G = Giammoro (ME)
P = Pallanzeno (VB)

Marchio del produttore P Duferco TRAVI E PROFILATI

T.P.P. s.r.
Andrea Valmaggia

24 26699

Duferco
TRAVI E PROFILATI

TRAVI E PROFILATI DI PALLANZENO S.p.A.

Azienda certificata
ISO 9001:2015
ISO 14001:2015
ISO 45001:2018

DICHIARAZIONE DI PRESTAZIONE
DECLARED PERFORMANCE
03 N° 2023 DDT / PA/9237

1. Tipo, qualità: laminati a caldo in accordo con EN 10025-2:2004.
   Tipo: S355 grado: JR,J0,J2, K2

   Type, quality: hot rolled product in agreement with EN 10025-2:2004.
   Type: S355 grade: JR,J0,J2, K2

2. Uso previsto del prodotto da costruzione: Prodotti laminati a caldo di acciai per impieghi strutturali.
   Intended use of the construction product: hot rolled products of structural steel.

3. Nome e indirizzo del fabbricante:
   Name and address of the manufacturer:

   Travi e Profilati di Pallanzeno S.p.A.
   Via Sempione 7
   28884 Pallanzeno (VB), Italia
   Tel. +3903245011 - fax +39032452705

4. NA

5. Sistema di valutazione e verifica della costanza delle prestazioni del prodotto da costruzione:
   System of evaluation and verification of constancy of performance of the construction product:
   2+

6a. Norma armonizzata: EN 10025-1:2004
   Harmonized standard: EN 10025-1:2004
   Organismo Notificato che ha rilasciato il certificato di conformità del controllo di produzione in fabbrica / *Notified body that issued the certificate of conformity of the factory production control:*
   N° 1608 IGQ

7. Prestazione dichiarata / *Declaration performance*

Caratteristiche Essenziali / *Essential caratteristic*	Prestazione / *performance*			Norma armonizzata/ *Harmonized technical specification*
Tolleranze dimensionali e di forma / *tolerances on dimensions and shape*	EN10034 : 1993	-Travi / *sections HEA/B from 100 to 200. HEM 100*		EN 10025-1:2004
	EN10034 : 1993	-Travi/*sections I from* IPE100 to IPE300.		
	EN10024 : 1995	-Travi / *sections* IPN from 160 to 240.		
	EN10279 : 2000	-Travi ad U ed UPN/ *U and UPN sections from 140 to 300 mm.*		
	EN10056-2 : 1993	--Angolari a lati uguali e disuguali con spessori sino a; / *equal and unequal angle up to: 35 mm*		
	EU91 :1982/ DIN59200:2001	- Larghi piatti in larghezza / *wide flat width 160 to 400 mm, thickness up to 40 mm.*		
	BS04 : 2005	-Profilati secondo BS con spessori di ala sino / *British universal beams and columns with flange thickness up to* 12 mm		
Carico di Snervamento / *yield strength (MPA)*	Tipo /grado Type /grade	Spessore nominale / *nominal thickness in mm*		
		≤ 16	>16 to ≤40	
	S355 JR/J0/J2/K2	355	345	
Carico di rottura / *tensile strength (MPA)*	Tipo /grado Type /grade	Spessore nominale / *nominal thickness in mm*		
		≥03 ≤100		
	S355 JR/J0/J2/K2	470 to 630		
Allungamento / *elongation %*	Tipo /grado Type /grade	Spessore nominale / *nominal thickness in mm*		
		≥3 ≤ 40		
	S355 JR/J0	22		
	S355 J2	22		
	S355 K2	20		
Resilienza / *impact strength*	Tipo /grado Type /grade	Spessore nominale / *nominal thickness in mm*		
		≤ 150		
		Temperatura /temperature	KV min (joule)	
	S355 JR	+20	27	
	S355 J0	0	27	
	S355 J2	-20	27	
	S355 K2	-20	40	
Saldabilità / *weldability CEV% max*	Tipo /grado Type /grade	Spessore nominale / *nominal thickness in mm*		
		≤ 30	>30 to ≤ 40	
	S355 JR/J0/J2/K2	0,46	0,48	
Durabilità / *durability*	S355 JR/J0/J2/K2	NPD		

La prestazione del prodotto è conforme alla prestazione dichiarata nel presente documento.
Si rilascia la presente dichiarazione di prestazione sotto la responsabilità esclusiva del fabbricante.
The performance of the product is in conformity with the declared performance in this document. This declaration of performance is issued under the sole responsibility of the manufacturer mentioned above.
Firmato a nome e per conto del fabbricante / *Signed for and on behalf of the manufactured by:*

Massimo Lama, direttore di stabilimento/ Plant manager

Pallanzeno, 26/01/22

03 N° 2023 DDT / PA/9237

Duferco
TRAVI E PROFILATI

Azienda certificata
ISO 9001:2015
ISO 14001:2015
ISO 45001:2018

TRAVI E PROFILATI DI PALLANZENO S.p.A.

CE

1608
Travi e Profilati di Pallanzeno S.p.A. via Sempione 7 - 28884 (VB), Italia
14
1608 CPR P166

EN10025-1:2004

S355J2

Destinati ad essere utilizzati su prodotti per impieghi strutturali.
Intended to be used on products for structural steel

Tollerance /tolerances:		
Carico di snervamento / *Yeld strength*	:	Espressamente indicati nella DoP
Carico di rottura / *tensile strength*		*Espressed as indicated in the DoP*
Allungamento / *elongation*		
Resilienza / *impact strength*		
Saldabilità / *weldability CEV*		

Durabilità / *durability:* NPD

03 N° 2023 DDT / PA/9237

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

TÜV NORD Italia S.r.l. ISO 9001

Customer: **COES S.R.L.**
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 25-10-24 **Our Ref.** DDT 3858 / OC 1791 **of** 25-10-24 **Your Ref.** 2695/24 04-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402998

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
DIS.60L5194	CYLINDRICAL NUT DWG. L5194 - A/SA350 LF2 D. 30 x 39 TAPPED M 12	8,00	Normalized		835636	278967

20 - 166/24

MECHANICAL PROPERTIES

values	R (MPa)	Rs 0,2 (MPa)	A4 (%)	Z (%)	HB	I.T. KV (J) -45,6°C
required	485 – 655	250 min.	22,0 min.	30,0 min.	197 max	16 min. 20 min. av.
actual	555	411	31.3	70,0	156	107-119-116

COES G.Q. | Ricezione data 25/10/2024 | Sigla U.S. | Verificato data 28/10/2024 | Sigla U.S.

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Ni (%)	Cr (%)	Mo (%)	Nb (%)	Cu (%)	V (%)
required	0,30 max	0,60 - 1,35	0,15 – 0,30	0,035 max	0,040 max	0,40 max	0,30 max	0,12 max	0,02 max	0,40 max	0,05 max
actual	0,188	1,010	0,280	0,008	0,005	0,130	0,130	0,030	0,002	0,160	0,004

remarks: Chemical and mechanical values, at delivery condition, are quoted by the relevant steel work certificate. Visual and dimensional check: SATISFACTORY
According to: ASME II part. a ed. 2023. MECHANICAL VALUES REFERRING TO THE STARTING RAW MATERIAL D. 45,0 mm

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

24 3404

+39 035 2050 511 | www.coessrl.eu | coes@coessrl.com |
Via Pontida, 265 - 24040 STEZZANO (BG) ITALY | Via Europa, 9 - 24040 COMUN NUOVO (BG) ITALY

MATERIAL CERTIFICATES LIST

DOCUMENT No: CML58160	**REV. 0**	**SHEET 1 OF 9**

CUSTOMER:	ROSETTI MARINO S.P.A.
PROJECT:	HOLLANDSE KIST NOORD WIND PARK PROJECT
OBJECT:	DRYER VESSEL
SERIAL No.:	S240123-S240124-S240125-S240126
DRAWING:	CCO54156
COES JOB:	166/24

0	V. Girardello	C. Pilenga	01/10/2024	FIRST ISSUE
REV.	**ISSUED BY**	**CONTROLLED BY**	**DATE**	**DESCRIPTION**

+39 035 2050 511 | www.coessrl.eu | coes@coessrl.com |
Via Pontida, 265 - 24040 STEZZANO (BG) ITALY | Via Europa, 9 - 24040 COMUN NUOVO (BG) ITALY

POS	QTY	DESCRIPTION	MATERIAL	MFR	CERT	HEAT	REF.COES
1	1	SUPPORT NAMEPLATE 140x120 Thk.4mm	SA 240 TP316/316L	OUTOKUMPU	819214/002	85900	24 1707
3	1	PAD 70x70 Thk. 6mm	SA 240 TP316/316L	OUTOKUMPU	6610/1000366974	552684-001	24 2640
4	1	PAD 210x120 Thk. 6mm	SA 240 TP316/316L	OUTOKUMPU	6610/1000366974	552684-001	24 2640
7	2	SPECIAL COUPLING øe73 H=45 (HME 32/42)	SA 312 TP316/316L	ROLDAN SA	2024/005206	3LEK	24 3097
8	2	CAP 10" Sch.10S	SA 403 WP316/316L	PANTECH STAINLESS&ALLOY INDUSTRIES SDN	PSA3-FT-46686	MG357-1	24 3069
9	1189,600 mm	PIPE SMLSS 10" Sch.10S	SA 312 TP316/316L	THAI-GERMAN PRODUCTS PUBLIC COMPANY	T-SXP-23-00054	FMSL08250723AD	24 2530
10	2	HALF COUPLING 1/2 "NPT 6000#	SA 182 F316/316L	TUROZZI F.LLI SRL	67589	026	24 2487

Customer 10470700 OFFICINE FRATELLI TAIOCCHI SPA - Order ref. 090409 - Order LSI n. 0003747 - 29/05/2019 - Doc. BC-2019-0003240 - 05/06/2019
Item L16B004012501 LAM A 316L 2B 4 1250X2500 - (1250 x 2500) - Quantity n 2 Kg 200
Lot. LSI a8T04200 - Heat 85900-5 - Case Y844885

a8T04000

outokumpu

INSPECTION CERTIFICATE 3.1
DIN EN 10204 3.1

Certificate No. / Zeugnis Nr. / N° du certificat: 819214/002
Page / Seite / Page: 1(01)
Date / Datum / Date: 01.08.2018

Delivery address, Empfänger, Lieu de livraison	
L.S.I. LAMIERE SPECIALI INOX S.P.A. VIA GIULIO NATTA 7/A 43100 PARMA ITALY	L.S.I. LAMIERE SPECIALI INOX S.P.A. VIA GIULIO NATTA 7/A 43100 PARMA ITALY

Requirements, Anforderungen, Exigences	Our Order No. / Unser Auftrag Nr. / Notre commande n°	Your order, Ihre Bestellung, Votre commande
EN 10088-4:2009 AD 2000 W2, W10 & EN 10028-7:2016 ASTM A240/A240M ASME SA-240/SA-240M II A ED. 2017	300481835	OF-2018-0000064

Product, Erzeugnisform, Produit	Mark of Manufacturer / Zeichen des Lieferwerkes / Signe de producteur	Process / Erschmelzungsart / Mode de fusion	Inspector's stamp / Zeichen d. Sachverst. / Poinçon de l'expert
COIL , STAINLESS STEEL	outokumpu	AOD	

Grade, Werkstoff, Nuance	Tolerances Toleranzen, Tolérances
1.4404 1.4401 TYPE 316L	EN ISO 9445-2

Marking, Kennzeichnung, Marquage	Marks, Versandzeichen, Marques
1.4404 2B	

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	15	85900 5	4,0 X 1250 MM		21640 KG	2B

CE 14 0045-CPR-0567

Charge no. / Schmelze Nr. / Coulée n°	Chemical composition, Chemische Zusammensetzung, Composition chimiques											
	C %	Si %	Mn %	P %	S %	Cr %	Ni %	MO %	N %			
85900	0,020	0,48	1,13	0,039	0,001	17,0	10,0	2,01	0,041			

Line / Reihe / Ligne	Mechanical properties, Mechanische Eigenschaften, Caracteristiques mecaniques								Tensile test, Zugversuch, Essai de traction
	Sample ID / Proben ID / Échantillon	Rp0.2 MPa	Rp1.0 MPa	Rm MPa	A5 %	A50 %	%	Hardness / Härte, Dureté HBW	ISO 6892-1:2009 A224 SAMPLES PERPENDICULAR TO THE ROLLING DIRECTION
1	01	323	361	617	52	50		181	APPROVED ACC.TO AD2000-W0 WITH VERIFICATION OF THE UNIFORMITY OVER THE STRIP LENGTH. CERTIFIED ACC.TO PED 2014/68/EU BY TÜV NORD REG. NO. 0045. DOPS ACC. TO CPR AVAILABLE ON THE WEB PAGE BY STEEL NUMBER
	02	317	354	613	53	50		180	

Identity test, Verwechslungsprüfung, Controle d'identification	
Sizes, Abmessungen, Dimensions	OK
Surface, Oberfläche, Surface	OK
Test of intergran. corros, Prüfung auf interkrist. Korros, Test de corros. Intercrist.	OK
EN ISO 3651-2 A: OK	

ASTM A240/A240M
ASME SA-240/SA-240M II A ED. 2017
TYPE 316
EN 10088-2:2014/1.4404,1.4401
NACE MR0103/ISO 17945 AND
NACE MR0175/ISO 15156-1 / NACE MR0175/ISO 15156-3

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 / Werkssachverständiger / Inspecteur autorisé: NANNA RIIKKULA

FI-95490 Tornio, Finland
Tel. +358 16 4521,email certificate.tornio@outokumpu.com
www.outokumpu.com
Domicile: Tornio, Finland. Business Identity Code 0923315-9

LSI Lamiere Speciali Inox S.p.A. - CONFORM TO THE ORIGINAL

COES SRL
VERIFIED IDENTICAL TO
SA 240 Ed. 2023
V.S.

COES G.Q.	Ricezione data	Sigla
	08/05/2024	V.S.
	Verificato data	Sigla
	14/05/2024	V.S.

25 2487

2231/25-

BFN Forgings Private Limited √

(Formerly known as Bebitz Flanges Works Private Limited)

Survey No.140/2,Saravali Boisar-Taluka Palghar-Thane 401501-Maharashtra,INDIA
Tel.+91-0-9049991039/42/43-Fax+91-0-2525 274266/67-Email:quality@bfnf.in

Abnahmeprufzeugnis 3.1/ Inspection Certificate 3.1/ Certificate de reception 3.1
nach(A02)/acc.DIN EN 10204 :2005 Nr.(A03)/No.100000098897./Datum(Z02)/Date 25-01-2025

Zeichen des Herstellers(A04) / Manufacturer's brand

Stempel des Abnehmers(Z03) / Stamp of the testing engineer TKO 9

Überprüft als Hersteller nach AD-Merkblatt W0. Approved as manufacturer acc. AD-Merkblatt W0.
Zertifiziert nach DGR 2014/68/EU durch TÜV CERT Zertifzierungsst. für Druckgeräte der TÜV NORD GmbH Co KG, Benannte Stelle Nr. 0045. / Certified acc. to PED 2014/68/EU, certifying body for pressure equipment TÜV NORD GmbH Co KG, registration no. 0045.

Besteller (A06) Customer	BUHLMANN ROHR-FITTINGS-STAHLHANDEL GMBH BLIERSH 47229 DUISBURG DUISBURG - 47229 Nrth Rhine Westfalia Germany	**Bestell-Nr (A07) / Order-No**	PO-24-0010473
		Auftrag (A08) / Order	940002734
		Lieferschein / Delivery No.	800009029
		Position (B07.1) / Item	000110

Stck (B08) Quantity	**Bezeichnung (B01; B09 - B11) Product**	**Schmelze/Prüflos (B07) Heat no./Test no.**
213	EN-1092-1 TYPE-11 PN-40 25X33.7 Form-B1 S=2.6 PLANE-END √	EK565 √

Material(B02; B05) 1.4571 (X6CRNIMOTI17–12–2) - DIN EN 10222-5
SOLUTION ANNEALED AT 1080 °C AND QUENCHED IN WATER √

Anford.(B03) Requirements EN-1092-1 : 2018
AD-2000-MERKBL. W2, W9, W10 - (PED 2014/68/EU)
GESCHMIEDET/ FORGED
PMI-TESTED 100%, IGC-TEST ACC. TO DIN EN ISO 3651-2 TEST A

Schmelzenanalyse (C71 - C92) /Analysis — **Erschmelzung (C70) / Melting process E**

Analysis	C	Si	Mn	P	S	Cr	Ni	Ti	Mo	Nb	V	N	Cu	Al	PREN
Laddle Analysis	0.018	0.42	1.71	0.036	0.005	16.9	10.57	0.19	2.04	0	0	0.0155	0.32	0.026	23.95

Mechanische Prüfungen / Mechanical tests

$$CEV = C + \frac{Mn}{6} + \frac{V + Mo + Cr}{5} + \frac{Ni + Cu}{15} \qquad PREN = Cr + 3{,}3 * Mo + 16 * N$$

Probenlage (C02): q/t / Position of Specimen: q/t
Tensile Test - DIN EN ISO 6892-1 — Io = 5Do

KBV / Charpy Impact Test EN ISO 148-1
(V-notch, Position of specimen: q/t)

Harte (C32) Hardness ISO 6506-1

Temp (C03) ° C	Streckgr. (C11) / 0,2% N/mm²	Yield strength 1,0% N/mm²	Zugfestigk. (C12) Tensile strength N/mm²	Dehng. (C13) Elongation %	Einschnürg. Red. of area %	Temp (C03) ° C	Einzelwerte (C42) Single values J	MW (C43) Average J	HBW>2pcs HBW(10/3000)
20	MIN210	MIN 245	510 TO 710	MIN 35		20	60	60	
20	261.45	300.44	550.69	58.80	72.99	20	198,218,206	207	152

DOT-15-12-2024,EQUIP-LEEB HARDNESS TESTER,BATCH QTY-125,CHK QTY-08

Customer material

Besichtigung und Ausmessung ohne Beanstandungen. (D01) / Results of inspection and dimension without objections.
Die gestellten Anforderungen sind erfüllt. (Z01) / The product sampled, Inspected ,tested and meets the requirement.

AMIT KUMAR,
Inspection Representative of the Manufacturer (Z02)
BFN Forgings Private Limited, Sarawali, Boisar, INDIA

F - QAC-09-04

COES G.Q.	Ricezione data	Sigla
	04/07/2025	U.S.
	Verificato data	Sigla
	04/07/2025	U.S.

Master Page 1 of 1

24 2530

COES S.R.L. P.O. 2697/24 TAL JOB N°424004846 OUR DDT N°402401910 OF 13/09/24
N° 1 MT 6 HEAT FMSL08250723AD DIMENSIONS 273 x 4,19

COES G.Q. | Ricezione data 13/09/2024 | Sigla U.S. | Verificato data 13/09/2024 | Sigla U.S.

Approved by QUALITY2 on 23/04/24

บริษัท ไทย-เยอรมัน โปรดักส์ จำกัด (มหาชน)

THAI-GERMAN PRODUCTS PUBLIC COMPANY LIMITED

ทะเบียนเลขที่ 0107537002371

Mill Test Certificates En 10204 3.1

ISO 9001 BUREAU VERITAS Certification

www.tgpro.co.th

CERTIFICATE NO.: T-SXP-23-00054					INVOICE #	G-IX24-0012	APPROVED CERTIFICATED : QMS ACCORDING TO ISO 9001:2015 (BVQI # TH013924) PED 2014/68/EU AD2000W0												
COMMODITY: SEAMLESS STAINLESS STEEL ACC. TO ASTM A312 TP316/TP316L / ASME SA312 TP316L (NI>10%)					CUSTOMER	T.A.L. TUBI ACCIAIO LOMBARDA S.P.A.													
					ISSUING DATE	02/02/2024									MECHANICAL PROPERTIES				
ITEM	DIMENSION OD X ID (MM)	QTY (Pcs)	QTY (Mrt.)	HEAT PRODUCTION NO #	C	Si	Mn	P	S	Cr	Ni	Mo	N	HARDNESS (HRB)	YS Mpa	TS Mpa	EL %	EDDY CURRENT TEST
					0.030 MAX	1.00 MAX	2.00 MAX	0.04 MAX	0.015 MAX	16.50-18.00	10.00-13.00	2.00-2.50	0.10 MAX	90 MAX	190/210 MIN	490 to 690 MIN	40 MIN	
33	OD 273.05 X 4.19 X 6000 MM	4	24.00	FMSL08250723AD	0.015	0.310	1.330	0.031	0.001	16.020	10.020	2.030	0.070		275	570	59	ACCEPTABLE
34	OD 114.30 X 3.05 X 6000 MM	16	96.00	FMSL01150723AA	0.016	0.340	1.330	0.033	0.001	16.030	10.030	2.020	0.070		260	575	56	ACCEPTABLE
35	OD 114.30 X 6.02 X 6000 MM	21	126.00	FMSL09120823AD	0.013	0.350	1.320	0.029	0.001	16.010	10.010	2.010	0.070		270	580	58	ACCEPTABLE
36	OD 114.30 X 8.56 X 6000 MM	15	90.00	FMSL03260723AC	0.015	0.310	1.310	0.031	0.001	16.010	10.030	2.010	0.080		265	580	56	ACCEPTABLE
37	OD 141.30 X 3.40 X 6000 MM	14	84.00	FMSL05060823AB	0.013	0.310	1.350	0.031	0.001	16.020	10.010	2.030	0.060		255	580	56	ACCEPTABLE
38	OD 168.28 X 3.40 X 6000 MM	6	36.00	FMSL04200723AD	0.014	0.320	1.330	0.032	0.001	16.010	10.020	2.030	0.060		285	560	58	ACCEPTABLE
38	OD 168.28 X 3.40 X 6000 MM	10	60.00	FMSL04050421AA	0.016	0.330	1.210	0.031	0.001	16.030	10.050	2.030	0.070		275	580	59	ACCEPTABLE
39	OD 168.28 X 3.40 X 6000 MM	4	24.00	FMSL05160123AA	0.013	0.350	1.320	0.029	0.001	16.020	10.020	2.020	0.080		270	575	58	ACCEPTABLE
40	OD 168.28 X 7.11 X 6000 MM	101	606.00	FMSL08190723AC	0.013	0.330	1.310	0.030	0.001	16.030	10.010	2.050	0.080		270	575	56	ACCEPTABLE
41	OD 141.30 X 6.55 X 6000 MM	10	60.00	FMSL07150723AA	0.015	0.340	1.320	0.029	0.001	16.020	10.020	2.020	0.060		270	595	57	ACCEPTABLE

REMARK:

1. The Material described herein is certified for no radiation contamination by original Material Manufacturer.
2. The Tolerance of chemical composition is according to ASME SA-1016
3. Heat treatment : Solution Annealed and quenched in water at 1040 c
4. Visual Inspection (Surface), Dimension Check and Marking control 100%
5. We Hereby certify that material descreibed herein has been manufactured and tested with satisfactory results in accordance with the requirement of the above material specification.
6. All material no welding repair
7. ASME BPVC section II Part A, SA-312:2019 ED-19
8. Acc. to NACE MR 0175-ISO 15156-2 and NACE MR 0103 MAX 22HRC (100 HRB)
9. Material does not contain steel products originating in Russia mentioned in Annex XVII to the (EU) Regulation No 833/2014 and further amendment
10. Above 4" the Country of Origin is South Korea, Lower than 4" the Country of Origin is Vietnam.

TEST STANDARD:

1. I.C.T. ASTM A262 Pr. E
2. PMI TEST 100% = Satisfactory results
3. WT<=6 mm Eddy current test ASTM E426/E309 + Hydro test as per ASTM A312
   WT>6 mm UT as per ASTM E213 + Hydro test as per ASTM A312
4. Flattening test as per ASTM A370
5. Material in according to PED2014/68/EU ANNEX I PAR.4.3

THAI-GERMAN PRODUCTS (PUBLIC) CO.,LTD. QA

ASSURED BY .....

QA DIVISION MANAGER

DESCRIPTION OF GOODS : SMLS PIPES ACC. TO ASTM A312 TP316/TP316L / ASME SA312 TP316L (NI>10%)

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

24 2640

outokumpu
high performance stainless steel

CERTIFICATE - ZEUGNIS - CERTIFICAT

EN 10204 3.1
2322721-EN

Invoice No. / Rechnung Nr. / N° de facture: 6610/1000366974
Page / Seite / Page: 1/1

Business Unit / QCM	Date Datum Date	Load, Ladung, Charge No	Acknowledged ID, Bestätigung, Commande ID
Avesta Works / Johan Nordström	14-Jul-2015	IT/121291	6610/300345328

Your ref, Ihre Ref., Votre ref
09 150200

Buyer, Besteller, Acheteur
NICHELCROM ACCIAI INOX S.P.A.
VIA TRENTO, 96/100
IT 20099, SESTO SAN GIOVANNI
ITALY

Consignee, Empfänger, Lieu de livraison
NICHELCROM ACCIAI INOX S.P.A.

Requirements, Anforderungen, Exigences
ASTM A 240M-15a
ASME SEC II PART A SA-240/SA-240M 2013 √
EN 10088-2:2014
EN 10028-7:2007
AD 2000 W2, W10 & EN 10028-7
NACE MR0175/ISO 15156-3:2009
EN 10088-4:2009
NORSOK Standard M-630, Ed 6, MDS S01, Rev 5
NACE MR0103:2012
EN ISO 9444-2 / ASTM A480M

Mark of Manufacturer / Zeichen des Lieferwerkes / Signe de producteur	Process / Erschmelzungsart / Mode de fusion	Inspector's stamp / Zeichen des Sachverständigen / Poicon de l'expert	Grade, Werkstoff, Nuance
outokumpu	E+AOD	AJA	Outokumpu 17-10-2L TYPE 316 TYPE 316L √ 1.4401 1.4404

Product, Erzeugnisform, Produit
Stainless Steel Hot Rolled, Coil √
finish 1D, 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	552684-001 √	6,00 X 2000 mm	1	22160 KG

Chemical composition – Chemische Zusammensetzung – Composition chimiques

	C	Si	Mn	P	S	Cr	Ni	Mo	Nb	Cu	Co	N
Heat	.017	.47	1.37	.029	.001	17.30	10.19	2.07	.008	.32	.34	.048

Radioactive contamination check acc. IAEA recommendations: Approved

Test results – Prüfergebnisse – Results dessais (1N/mm² = 1 MPa) F = Front – Anfan – Debut B = Back – Ende – Fin T = Transverse – Quer – Travers

Test Ref	Temp °C	RP 0.2 N/MM2	RP 1.0 N/MM2	RM N/MM2	A5 %	2" %	HB HB
Min	+20	240	270	530	40	40	
Max				680			217
F T	+20	316	367	615	54	54	167
B T		313	364	613	52	53	167

Material conforms to NACE MR0103 in supplied condition
Material conforms to NACE MR0175/ISO 15156 in supplied condition
Corrosion acc. ASTM A 262-E, EN ISO 3651-2A: Approved
Heat treatment / Solution annealed: Material temperature 1100 °C / Quenched (forced air + water)
Steel grade verification (PMI-spectroscopic): Approved
Marking, visual insp. and gauge measurement: Approved
Approved acc. AD 2000 Merkblatt W0 by TÜV NORD Systems with renounce of countersignment
Certified acc. Pressure Equipment Directive (97/23/EC) by TÜV CERT-Certification body for pressure equipment of the TÜV NORD Systems; notified body, reg-no. 0045.

COES G.Q.	Ricezione data 17/09/2024	Sigla V.S.
	Verificato data 17/09/2024	Sigla V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 240 Ed. 2023
V.S.

Outokumpu Stainless AB
Business Unit Special Coil
BOX 74, S-774 22 AVESTA
SWEDEN
Regoffice: Stockholm SWEDEN, Regno: 556001-8748

Telephone: + 46 (0)226 811 73
Fax: + 46 (0)226 816 46
V.A.T no: SE556001874801

This material is found to comply with order requirements

Joakim Johansson
Authorized Inspector

TÜV NORD ISO 9001

CE 10
0045 – CPR – 0869
Declaration of Performance (DoP): See www.outokumpu.com/Avesta-DoP

24 3069

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

INSPECTION DOCUMENT: EN 10204: 2004 Type 3.1

Certificate No : PSA3-FT-46686

Product: Seamless Austenitic Stainless Steel Fitting

Date : 29 Dec 2023

PO No.	Invoice No.	Product Specification	Dimension & Inspection Specification	Delivery Condition
806820	E000006113	ASTM A403/A403M - 22 / ASME SA 403/SA403M - 21	ASME B16.9 - 18 / ASTM A960/A960M - 23 / ASME SA 960/SA960M - 21 / ASME SECTION II PART A-2021	Solution Treated, Pickled-Passivated

	Heat No.	Product & Size			Quantity (pcs)	Material Grade	Visual / Dimension / PMI Examination	Remarks
	EBA023-01-103ER	3" X 2 1/2"	SCH 40s	ECC-REDUCER	10	WP316/316L-S	PASSED	JMS140893
	MN094-1	4" X 3"	SCH 10s	ECC-REDUCER	20	WP316/316L-S	PASSED	NY230412AT09
	MN075-1	6" X 4"	SCH 10s	ECC-REDUCER	20	WP316/316L-S	PASSED	221220AE10-01
	MB161-1	2"	SCH 10s	CAP	100	WP316/316L-S	PASSED	C00082
	KB386-1	2 1/2"	SCH 40s	CAP	30	WP316/316L-S	PASSED	E07561
	MG437-1	4"	SCH 10s	CAP	30	WP316/316L-S	PASSED	Y230907B23-5
	MB016-1	4"	SCH 40s	CAP	30	WP316/316L-S	PASSED	E10141
	MH246-1	6"	SCH 40s	CAP	30	WP316/316L-S	PASSED	048RY8 A
	MG457-1	8"	SCH 10s	CAP	50	WP316/316L-S	PASSED	Y211113A07-1
X	MG357-1	10"	SCH 10s	CAP	30	WP316/316L-S	PASSED	Y230708A28-6

Specification	Chemical Composition (%)										Tensile Test *1			Hardness	Inter-granular corrosion test
	C	Si	Mn	P	S	Cr	Ni	Mo	Pb		YS (KSI / MPa)	TS	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	-	
EBA023-01-103ER	0.025	0.35	0.82	0.035	0.002	16.73	11.1	2.10	< 0.01		257	556	60	70	PASSED
MN094-1	0.013	0.47	0.80	0.037	0.003	16.62	10.20	2.01	< 0.01		246	588	58	71	PASSED
MN075-1	0.014	0.24	0.96	0.034	0.001	16.41	10.10	2.04	< 0.01		254	587	56	68	PASSED
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
KB386-1	0.025	0.45	1.33	0.027	0.001	16.80	10.00	2.02	< 0.01		345	620	44	89	PASSED
MG437-1	0.026	0.47	1.34	0.030	0.002	16.84	10.04	2.03	< 0.01		335	588	48	81	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
MH246-1	0.019	0.36	1.59	0.036	0.012	16.96	10.03	2.03	< 0.01		374	619	47	89	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
MG357-1	0.018	0.47	1.35	0.032	0.001	16.63	10.02	2.02	< 0.01		337	583	59	84	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 DONE 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

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

Head of Quality Assurance Department

Form :FQA-030b R 6, 04-03-2022

COES G.Q.	Ricezione data 04/10/2024	Sigla U.S.
	Verificato data 04/10/2024	Sigla U.S.

DDT BL/VEN/7260 01/10/2024

Riferimento ordine cliente:. ORD. 3049/24 DEL 27/

Articolo: FS10610 FONDO 316 SCH.10S 10"

Cliente:531211 COES S.R.L.

Quantità: 8,000

N di colata:MG3571-30

CERTIFICATO CONFORME ALL'ORIGINALE TRUE COPY

COES SRL
VERIFIED IDENTICAL TO
SA 403 Ed. 2023
U.S.

MATERIND srl

Certificato N. 200808

0363-958244

ROLDAN, S.A. - Acciai Inossidabili

ACCIAIERIA

Santo Tomás de las Ollas, S/N
Apdo. de Correos 11
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SEDE CENTRALE

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28035 MADRID (ESPAÑA)
TEL.: +34 913 98 52 57
FAX: +34 913 98 51 93
E-MAIL: roldan@acerinox.com

CERTIFICATO D'ISPEZIONE EN 10204 (3.1)

MADE IN SPAIN - EUROPEAN UNION

Sistema de Gestión ISO 9001:2015 ISO 14001:2015 ISO 50001:2018
TÜVRheinland CERTIFICADO
www.tuv.com ID 0091003143

CE 0432 11 0432-CPR-00190-01

CERTIFICATO N° 2024/005206	DATA 17/05/2024	FOGLIO 1	N° DOCUMENTO DI TRASPOSTO 2024/001700

MATERIALE ROLDAMAX-339 EN10088:3 (1.4404.)

CLIENTE

DIMENSIONI 75,00 mm. | Surface finish according EN10088-3 Table 7:1X

LUNGHEZZA 6.100 mm. TOLLERANZA ISO k12

PRODOTTO [330] Barra pelata, bisellata 2 lati 45°

SPECIFICHE EN10088:3

PROVE DI TRAZIONE EN ISO 6892-1

CORRISPONDENTE EN 10272 EDIZIONE AD2000 W0, W2 & W10

CORROSIONE INTERGRANULARE EN ISO 3651-2 method A: SATISFACTORY WITHOUT OBJETIONS

CONTROLLO DIMENSIONALE E VISIVO WITHOUT OBJECTIONS Spektrometrical Identity Test: O.K.

PROVA DI RESILIENZA EN ISO 148-1 MATERIAL FREE FROM RADIOACTIVITY EN 10.088:5

PROCESSO DI FABBRICAZIONE	MARCHIO DEL FORNITORE	MARCHIO	TIMBRO DI RICEZIONE	ISPETTORE DI QUALITA
EAF + AOD +CC	RDN	HEAT NUMBER GRADE (ACX-339)	R3	JUAN JOSE ALVAREZ RODRIGUEZ QUALITY CONTROL REPRESENTATIVE

CARATTERISTICHE MECCANICHE

COLATA	CAMPIONE	DIMENSIONI DEL CAMPIONE mm.	Osserv. T°.	Rm MPa	Rp 0,2% MPa	Rp 1% MPa	Z %	A % L=5Ø	A % L=4Ø	Agt %	RESILIENZA ISO-V (J) 20°C	RESILIENZA ISO-V (J) -196°C		DUREZZA HB	PROVA DI FATICA	PROVA DI TORSIONE	AREA DELLA SEZIONE mm²	Kg / m
3LEK	3LEK	20,00	20°C	560	244	308	68	58	60		237			158				
REQUISITI DELLA NORMA		EN ISO 377		500 700	200	235		40			100			215				

COMPOSIZIONE CHIMICA %

COLATA	C	P	S	Si	Mn	Cr	Ni	Mo	Ti	N	Cu	Co
3LEK	0,0190	0,0290	0,0300	0,2380	1,4310	16,6600	10,3800	2,0450	0,0060	0,0420	0,4690	0,1950
REQUISITI DELLA NORMA						16,5000 18,5000	10,0000 13,0000	2,0000 3,0000		0,1000		
	0,0300	0,0450	0,0300	1,0000	2,0000							

COES G.Q. Ricezione data 26/09/2024 Sigla U.S. Verificato data 04/10/2024 Sigla U.S.

OSSERVAZIONI

ASTM A-182. ASTM A-193 Class 1 Grade B8M. ASTM A-276 Condition A. ASTM A-320 Class 1 Grade B8M. ASTM A-479 Condition A. ASME SA-182. ASME SA-193 Class 1 Grade B8M. ASME SA-320 Class 1 Grade B8M. ASME SA-479 Condition A. AMS 5648. AMS 5653. AMS QQ-S-763. AISI 316/316L. UNS S31600/S31603. NACE MR0175 & MR0103.

MADE IN SPAIN.

ALTRE PROVE REQUISITI DELLA NORMA AD2000 W0,W2,W10|2014/68/EU(PED)|UKCA PER 2016/1105

TRATTAMENTO TERMICO 1.050 °C AND WATERCOOLED | Crack tested acc. to EN10277 table 3 class 2 (Eddy current)

ROLDAN, S.A. - Acciai Inossidabili

ACCIAIERIA

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CERTIFICATO D'ISPEZIONE EN 10204 3.1

MADE IN SPAIN - EUROPEAN UNION

Sistema de Gestión ISO 9001:2015 ISO 14001:2015 ISO 50001:2018
TÜVRheinland CERTIFICADO
www.tuv.com ID 0091003143

CE 0432 11 0432-CPR-00190-01

CERTIFICATO N° 2024/005206	DATA 17/05/2024	FOGLIO 1	N° DOCUMENTO DI TRASPOSTO 2024/001700

MATERIALE ROLDAMAX-339 EN10088:3 (1.4404.)

CLIENTE

DIMENSIONI 75,00 mm. | Surface finish according EN10088-3 Table 7:1X

LUNGHEZZA 6.100 mm. TOLLERANZA ISO k12

PRODOTTO [330] Barra pelata, bisellata 2 lati 45°

SPECIFICHE EN10088:3

PROVE DI TRAZIONE EN ISO 6892-1

CORRISPONDENTE EN 10272 EDIZIONE AD2000 W0, W2 & W10

CORROSIONE INTERGRANULARE EN ISO 3651-2 method A: SATISFACTORY WITHOUT OBJETIONS

CONTROLLO DIMENSIONALE E VISIVO WITHOUT OBJECTIONS Spektrometrical Identity Test: O.K.

PROVA DI RESILIENZA EN ISO 148-1 MATERIAL FREE FROM RADIOACTIVITY EN 10.088:5

PROCESSO DI FABBRICAZIONE	MARCHIO DEL FORNITORE	MARCHIO	TIMBRO DI RICEZIONE	ISPETTORE DI QUALITA
EAF + AOD +CC	RDN	HEAT NUMBER GRADE (ACX-339)	R3	JUAN JOSE ALVAREZ RODRIGUEZ QUALITY CONTROL REPRESENTATIVE

N° ORDINE	LAVORO N°	CASSA / BULTO	NUMERO COLATA	CAMPIONE	PESO
SE24002017 1		75061 / RK53369-	3LEK		431
24002017		75062 / RK53370-	3LEK		431
24002017		75063 / RK53371-	3LEK		431
24002017		75064 / RK53372-	3LEK		430
24002017		75065 / RK53373-	3LEK		430

ADDRESS Via Arno, 3
20029 **TURBIGO (MI)** ITALIA
PHONE 0331 871111 (3 linee r.a.)
FAX 0331 871468
WEB SITE www.turozzi.it
E-MAIL turozzi@turozzi.it

COES G.Q. | Ricezione data 11/09/2024 | Sigla V.S. | Verificato data 11/09/2024 | Sigla V.S.

AZIENDA CON SISTEMA QUALITA' CERTIFICATO — COMPANY WITH QUALITY SYSTEM CERTIFIED

24 2487

turozzi fratelli S.r.l.

Raccordi in acciaio per impianti ad alta pressione
Steel fitting for high pressure plants

CLIENTE / *Purchaser*	CERTIFICATO DI COLLAUDO *Works certificate*		FOGLIO *Sheet*
COES S.r.l. Trattamento Gas		EN 10204 3.1	
ORDINE / *Order*	N. 67589	DEL / *Of* 11/09/2024	1/3
2627 2680 2681 2703 ns.DdT 832			

ITEM *Item*	Q.TA' *Q.ty*	DESCRIZIONE / *Description*	COD.COLATA *Heat Code*	COLATA *Heat*	MATERIALE *Material*	CERTIF. ORIG. *Mill Certificate*	RIF.INT. *Record*	ACCIAIERIA / FORNITORE *Steel plant / Supplier*
		VS.ORD. 2627 DEL 30-08-2024						
20	10	TEE 1/2 3000 ISO7 RP F316L	487900	487900	A182 F316L/316	404084	4542	OLARRA - Spain
		VS.ORD. 2680 DEL 04-09-2024						
10	10	MEZZO MANIC. 1/2 6000 NPT A/SA182 F316L	026	281026	A182 F316L/316	2023000146	3376.3	COGNE - Italy
		VS.ORD. 2681 DEL 04-09-2024						
40	6	MEZZO MANIC. 1/2 6000 NPT A/SA350 LF2cl.1	L6974	13/77964	A350 LF2/CL.1	42399	2784.2	RIVA - Italy
50	9	TAPPO/T.ESAG. 1/4 NPT A/SA350 LF2cl.1	LH5681	H5681	A350 LF2/CL.1	8017	1127.1	RODACCIAI - Italy
70	2	WELDOLET 1-3/4x1/2 S.40 A/SA182 F316L	9617		A182 F316L/316	68842	3920	OLARRA - Spain

ANALISI CHIMICA - *Chemical Analysis*

COD.COLATA *Heat Code*	C %	Mn %	Si %	P %	S %	Ni %	Cr %	Mo %	Ti %	V %	Cu %	Al %	Nb %	N %	W %	C.E. %	PRE %
487900	0,023	1,620	0,360	0,030	0,021	10,000	16,610	2,020						0,026			
026	0,018	1,780	0,330	0,024	0,027	10,100	17,060	2,120						0,080			
L6974	0,180	1,020	0,220	0,015	0,010	0,070	0,140	0,010	0,019	0,020	0,180	0,023	0,002			0,401	
LH5681	0,200	0,990	0,240	0,007	0,020	0,120	0,120	0,040		0,002	0,120	0,023	0,001			0,413	
9617	0,020	1,600	0,360	0,033	0,022	10,000	16,600	2,000						0,029			

COD.COLATA *Heat Code*	Fe %	Co %	Ta %	Sn %	Zn %	Pb %	Zr %	Ca %	B %	%	%	%
487900												
026												
L6974												
LH5681												
9617												

Ferrite %	Grain size ASTM E112

CARATTERISTICHE MECCANICHE - *Mechanical Test*

COD.COLATA *Heat Code*	R Tens.Str. N/mm2	S Yield Point N/mm2	A : 2" Elongation %	C Reuction of area %	Bending Test	Flattening Test	Hydraulic Test	HB Hardness test	Kv Impact test J	Temp. °C	STATO DI FORNIT. (TRATT. TERM.) Supply cond. (heat treatment)	TEMP. °C	NOTE Remarks
487900	566	317	55,0	74,0							SOLUTION TREATED	1050	
026	608	280	48,5	78,4							SOLUT. ANNEALED	1050	
L6974	531	383	29,1	67,0				158 162	78 75 73	-46	NORMALIZED	920	
LH5681	642	538	32,0	51,0				181 183	32 38 37	-46	NORMALIZED	920	
9617	602	332	51,0	72,0							SOLUT. ANNEALED	1060	

NATURA DEL MATERIALE / *Kind of material*	NORMA DI RIFERIMENTO *Referenced standard*	NOTE / *Remarks*
Acciaio elaborato al forno elettrico Steel made by electric furnace	Material: ASTM /ASME latest editions. Dimensions: ASME B16.11, MSS SP83-95-97, ASTM A733 latest editions.	Mat. in accordo a / Mat. according to ASME II, part A, latest edition.

COLLAUDI INTERNI / *Works inspection*	RISULT. *Result.*	COLLAUDI SUPPLEMENTARI / *Supplementary tests*	RISULT. *Result.*
Dimensionale/Visivo Dimensional/Visual	Ok Ok		

RESPONSABILE QUALITA' / *Quality Manager*

COES SRL
VERIFIED IDENTICAL TO
SA 182 Ed. 2023
VS

ENTE COLLAUDATORE / *Inspection agency*

COES SRL
VERIFIED IDENTICAL TO
SA 350 Ed. 2023
VS

turozzi fratelli

ADDRESS Via Arno, 3
20029 **TURBIGO (MI)** ITALIA
PHONE 0331 871111 (3 linee r.a.)
FAX 0331 871468
WEB SITE www.turozzi.it
E-MAIL turozzi@turozzi.it

AZIENDA CON SISTEMA QUALITA' CERTIFICATO

COMPANY WITH QUALITY SYSTEM CERTIFIED

turozzi fratelli S.r.l.

Raccordi in acciaio per impianti ad alta pressione
Steel fitting for high pressure plants

CLIENTE / *Purchaser*	CERTIFICATO DI COLLAUDO *Works certificate*			FOGLIO *Sheet*
COES S.r.l. Trattamento Gas	EN 10204 3.1			
ORDINE / *Order*	N. 67589	DEL / *Of* 11/09/2024		2/3
2627 2680 2681 2703 ns.DdT 832				

ITEM *Item*	Q.TA' *Q.ty*	DESCRIZIONE / *Description*	COD.COLATA *Heat Code*	COLATA *Heat*	MATERIALE *Material*	CERTIF. ORIG. *Mill Certificate*	RIF.INT. *Record*	ACCIAIERIA / FORNITORE *Steel plant / Supplier*
		VS.ORD. 2703 DEL 05-09-2024						
10	4	NIPPLO ES. 3/4 3000 NPT A/SA182 F304L √	2301 √	772301	A182 F304L/304 √	2019025986	3099.3	COGNE - Switzerland
20	2	WELDOLET 2.1/2-2x3/4 S.40 A/SA182 F304L √	425462 √	425462	A182 F304L/304 √	297225	4374	OLARRA - Spain
30	2	MEZZO MANIC. 1/4 6000 NPT A/SA182 F316L √	2187. √	672178	A182 F316L/316 √	2016013666	2907.3	COGNE - Italy
40	1	GOMITO M/F 1/2 3000 NPT A/SA182 F316L √	573121 √	573121	A182 F316L/316 √	545424	4705	OLARRA - Spain
60	10	NIPPLO ES. 1/2 3000 NPT A/SA182 F316L √	6019 √	316019	A182 F316L/316 √	84513920	3387.3	UGITECH - Italia
70	1	N.T.R. 3/4x1/2 S.80 FxF A/SA403 WP316L √	026 √	281026	A182 F316L/316 √	2023000146	3376.3	COGNE - Italy
80	20	TAPPO/T.ESAG. 1/2 NPT A/SA182 F316L √	DP86 √	572207	A182 F316L/316 √	273811/2018	3043.3	VALBRUNA - Italy

ANALISI CHIMICA - *Chemical Analysis*

COD.COLATA *Heat Code*	C %	Mn %	Si %	P %	S %	Ni %	Cr %	Mo %	Ti %	V %	Cu %	Al %	Nb %	N %	W %	C.E. %	PRE %
2301	0,020	1,310	0,380	0,031	0,025	8,050	18,050							0,078			
425462	0,020	1,470	0,420	0,037	0,028	8,050	18,100							0,089			
2187.	0,023	1,750	0,340	0,029	0,027	10,130	16,930	2,060						0,077			
573121	0,020	1,530	0,380	0,034	0,028	10,290	16,620	2,050						0,036			
6019	0,019	1,361	0,427	0,027	0,027	10,262	16,858	2,070						0,040			
026	0,018	1,780	0,330	0,024	0,027	10,100	17,060	2,120						0,080			
DP86	0,016	1,680	0,590	0,029	0,027	12,040	17,700	2,080						0,053			

COD.COLATA *Heat Code*	Fe %	Co %	Ta %	Sn %	Zn %	Pb %	Zr %	Ca %	B %	%	%	%
2301												
425462												
2187.												
573121												
6019												
026												
DP86												

Ferrite %	Grain size ASTM E112

CARATTERISTICHE MECCANICHE - *Mechanical Test*

COD.COLATA *Heat Code*	R Tens.Str. N/mm2	S Yield Point N/mm2	A : 2" Elongation %	C Reuction of area %	Bending Test	Flattening Test	Hydraulic Test	HB Hardness test	Kv Impact test J	Temp. °C	STATO DI FORNIT. (TRATT. TERM.) Supply cond. (heat treatment)	TEMP. °C	NOTE Remarks
2301	692	562	45,6	76,2							SOLUT. TREATED	1050	
425462	660	360	54,0	75,0							SOLUT. ANNEALED	1050	
2187.	616	359	41,4	74,3							SOLUT. ANNEALED	1050	
573121	582	335	52,0	78,0							SOLUT. ANNEALED	1060	
6019	671	507	39,0	71,0							SOLUT.TREATED	1050	
026	608	280	48,5	78,4							SOLUT. ANNEALED	1050	
DP86	657	492	47,0	74,0							SOLUT. TREATED	1050	

NATURA DEL MATERIALE / *Kind of material*	NORMA DI RIFERIMENTO *Referenced standard*	NOTE / *Remarks*
Acciaio elaborato al forno elettrico Steel made by electric furnace	Material: ASTM /ASME latest editions. Dimensions: ASME B16.11, MSS SP83-95-97, ASTM A733 latest editions.	Mat. in accordo a / Mat. according to ASME II, part A, latest edition.

COLLAUDI INTERNI / *Works inspection*	RISULT. *Result.*	COLLAUDI SUPPLEMENTARI / *Supplementary tests*	RISULT. *Result.*
Dimensionale/Visivo	Ok		
Dimensional/Visual	Ok		

RESPONSABILE QUALITA' / *Quality Manager*	ENTE COLLAUDATORE / *Inspection agency*	
		turozzi fratelli

ADDRESS Via Arno, 3
20029 **TURBIGO (MI)** ITALIA
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FAX 0331 871468
WEB SITE www.turozzi.it
E-MAIL turozzi@turozzi.it

AZIENDA CON SISTEMA QUALITA' CERTIFICATO — COMPANY WITH QUALITY SYSTEM CERTIFIED

turozzi fratelli S.r.l.

Raccordi in acciaio per impianti ad alta pressione
Steel fitting for high pressure plants

CLIENTE / *Purchaser*	CERTIFICATO DI COLLAUDO *Works certificate*	EN 10204 3.1	FOGLIO *Sheet*
COES S.r.l. Trattamento Gas			
ORDINE / *Order*	N. 67589	DEL / *Of* 11/09/2024	3/3
2627 2680 2681 2703 ns.DdT 832			

ITEM *Item*	Q.TA' *Q.ty*	DESCRIZIONE / *Description*	COD.COLATA *Heat Code*	COLATA *Heat*	MATERIALE *Material*	CERTIF. ORIG. *Mill Certificate*	RIF.INT. *Record*	ACCIAIERIA / FORNITORE *Steel plant / Supplier*
90	2	TAPPO/T.ESAG. 3/4 NPT A/SA182 F316L	DP83	272143	A182 F316L/316	072946/2017	2959.3	VALBRUNA - Italy
100	2	TEE 1/2 3000 NPT A/SA182 F316L	573196	573196	A182 F316L/316	547205	4708	OLARRA - Spain

ANALISI CHIMICA - *Chemical Analysis*

COD.COLATA *Heat Code*	C %	Mn %	Si %	P %	S %	Ni %	Cr %	Mo %	Ti %	V %	Cu %	Al %	Nb %	N %	W %	C.E. %	PRE %
DP83	0,012	1,410	0,580	0,029	0,028	10,000	16,740	2,020						0,060			
573196	0,024	1,530	0,510	0,035	0,029	10,110	16,560	2,010						0,036			

COD.COLATA *Heat Code*	Fe %	Co %	Ta %	Sn %	Zn %	Pb %	Zr %	Ca %	B %	%	%	%
DP83												
573196												

Ferrite %	Grain size ASTM E112

CARATTERISTICHE MECCANICHE - *Mechanical Test*

COD.COLATA *Heat Code*	R Tens.Str. N/mm2	S Yield Point N/mm2	A : 2" Elongation %	C Reuction of area %	Bending Test	Flattening Test	Hydraulic Test	HB Hardness test	Kv Impact test J	Temp. °C	STATO DI FORNIT. (TRATT. TERM.) Supply cond. (heat treatment)	TEMP. °C	NOTE Remarks
DP83	652	440	48,0	65,0							SOLUT. TREATED	1050	
573196	590	340	51,9	72,8							SOLUT. TREATED	1060	

NATURA DEL MATERIALE / *Kind of material*	NORMA DI RIFERIMENTO *Referenced standard*	NOTE / *Remarks*
Acciaio elaborato al forno elettrico Steel made by electric furnace	Material: ASTM /ASME latest editions. Dimensions: ASME B16.11, MSS SP83-95-97, ASTM A733 latest editions.	Mat. in accordo a / Mat. according to ASME II, part A, latest edition.

COLLAUDI INTERNI / *Works inspection*	RISULT. *Result.*	COLLAUDI SUPPLEMENTARI / *Supplementary tests*	RISULT. *Result.*
Dimensionale/Visivo Dimensional/Visual	Ok Ok		

RESPONSABILE QUALITA' / *Quality Manager*	ENTE COLLAUDATORE / *Inspection agency*
	turozzi fratelli

+39 035 2050 511 | www.coessrl.eu | coes@coessrl.com |
Via Pontida, 265 - 24040 STEZZANO (BG) ITALY | Via Europa, 9 - 24040 COMUN NUOVO (BG) ITALY

MATERIAL CERTIFICATES LIST

DOCUMENT No: CML58161	**REV. 0**	**SHEET 1 OF 30**

CUSTOMER:	ROSETTI MARINO S.P.A.
PROJECT:	HOLLANDSE KIST NOORD WIND PARK PROJECT
OBJECT:	AIR VESSEL
SERIAL No.:	S240119
DRAWING:	CGA53962
COES JOB:	166/24

0	V. Girardello	C. Pilenga	01/10/2024	FIRST ISSUE
REV.	**ISSUED BY**	**CONTROLLED BY**	**DATE**	**DESCRIPTION**

+39 035 2050 511 | www.coessrl.eu | coes@coessrl.com |
Via Pontida, 265 - 24040 STEZZANO (BG) ITALY | Via Europa, 9 - 24040 COMUN NUOVO (BG) ITALY

DRAWING: CCO54154			LINE: L4678		PAGE 2 OF 14		
POS	**QTY**	**DESCRIPTION**	**MATERIAL**	**MFR**	**CERT**	**HEAT**	**REF.COES**
2	1	FLANGE W.N. UNI EN 1092-1 DNSO PN16	SA 182F316/316l	HEBEI XINFENG CO LTD	INT-XF2401	4728	24 2539
3	4	ELBOWL.R.90°2"Sch.10S	SA403WP316/316l	SP UNITED INDUSTRY SDN BHD	MCP2405-00007-104	M240101	24 2665
4	6	FLANGE W.N.2" Sch. 10S 150#RF	SA182F316/316l	FAD SPA	7177/24	N220722AT11	24 2938
6	2	ELBOW L.R. 90° 1/2" Sch.40S	SA403WP316/316l	MAC PIPING MATERIALS SDN BHD	MAC9201757	53UG820	24 2657
7	1	WELDOLET DN 2 1/2 - 2" x 1/2" Sch.40S	SA182F316/316l	TUROZZI F.LLI SRL	67639	2856	24 2859
8	1	TEE 2" Sch.10S	SA403WP316/316l	SP UNITED INDUSTRY SDN BHD	23-07-0354	MT230164	24 2668
9	150,000 mm	PIPE SMLSS 1/2" Sch.40S	SA312TP316l	SURAJ LTD	183	RSL-D1698	24 1398
10	1467,900 mm	PIPE SMLSS 2" Sch.10S	SA312TP316l	VENUS PIPES AND TUBES	VPT/MTC/24/1910	A-8029	24 2418
11	1523,600 mm	PIPE SMLSS 2" Sch.10S	SA312TP316l	VENUS PIPES AND TUBES	VPT/MTC/24/1910	A-8029	24 2418
12	701,561 mm	PIPE SMLSS 2" Sch.10S	SA312TP316l	VENUS PIPES AND TUBES	VPT/MTC/24/1910	A-8029	24 2418
13	1319,000 mm	PIPE SMLSS 2" Sch.10S	SA312TP316l	VENUS PIPES AND TUBES	VPT/MTC/24/1910	A-8029	24 2418
18	72	NUT 5/8 UNC	SA194 Gr.8M	IPL SRL	2402715	432625*	24 3022
19	28	STUD-BOLT 5/8" UNC x 90	SA 193 B8M Cl.1	IPL SRL	2402715	2JDL	24 3022
20	8	STUD-BOLT 5/8" UNC x 85	SA 193 B8M Cl.1	IPL SRL	2402715	2JDL	24 3022

DRAWING: CCO54154			LINE: L4678		PAGE 3 OF 14		
POS	**QTY**	**DESCRIPTION**	**MATERIAL**	**MFR**	**CERT**	**HEAT**	**REF.COES**
2	1	FLANGE W.N. UNI EN 1092-1 DNSO PN16	SA 182F316/316l	HEBEI XINFENG CO LTD	INT-XF2401	4728	24 2539
3	4	ELBOWL.R.90°2"Sch.10S	SA403WP316/316l	SP UNITED INDUSTRY SDN BHD	MCP2405-00007-104	M240101	24 2665
4	6	FLANGE W.N.2" Sch. 10S 150#RF	SA182F316/316l	FAD SPA	7177/24	N220722AT11	24 2938
6	1319,000 mm	PIPE SMLSS 2" Sch.10S	SA312TP316l	VENUS PIPES AND TUBES	VPT/MTC/24/1910	A-8029	24 2418
7	1782,639 mm	PIPE SMLSS 2" Sch.10S	SA312TP316l	VENUS PIPES AND TUBES	VPT/MTC/24/1910	A-8029	24 2418
8	1525,600 mm	PIPE SMLSS 2" Sch.10S	SA3t2TP316l	VENUS PIPES AND TUBES	VPT/MTC/24/1910	A-8029	24 2418
9	1	TEE2"Sch.40S	SA403WP316/316l	SP UNITED INDUSTRY SDN BHD	24-04-0148	MT240120	24 2669

T.L.P. spa Copia conforme all'originale DDT: 2024 BC 892 400 DATE: 27/02/24

24 0614

REGD. OFFICE :
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Email : suraj@surajgroup.com

SURAJ LIMITED

(AN ISO 9001 : 2015 COMPANY)
(AN ISO 14001 : 2015 COMPANY)
(AN ISO 45001 : 2018 COMPANY)
(AN PED 2014/68/EU APPROVED COMPANY)

F / QA / 24 REV. NO. 10

WORKS :
Survey No. 779/A, Thol, Kadi - Sanand Highway,
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Email : quality@surajgroup.com
Visit us at www.surajgroup.com

INSPECTION CERTIFICATE

In Accordance with EN 10204/3.1

Customer: T.L.P. SPA — T.C No : 244 — Date : 30.09.2023
Product : Austenitic S.S Seamless Cold Finish,Solution Annealed,Pickled & Passivated Pipes. — P.O.No : 215260 — Date : 14.04.2023
W.O.No : 2324/OEP400003 — Date : 15.04.2023

Sr. No.	Specification	Grade	Heat No.	Dimensions		Quantity			Hydro Test Pressure (Psi)
				OD (MM)	THK (MM)	Length Mtr	Pcs.	Total Meter	
51	ASTM A-312 Ed.2021 SA-312 of ASME Sec.II Part "A" Ed.2021 EN 10216-5 TC1 NACE MR 0175/ISO 15156-3, NACE MR 0103	TP 316/316L 1.4401/ 1.4404	RSL-E226	48.26	2.77	RL	80	497.400	1800

Chemical Analysis %

Heat No.	Required	C	Mn	P	S	Si	Cr	Ni	Mo	N	Ti
	Min	--	--	--	--	--	16.50	10.00	2.00	--	--
	Max	0.030	2.00	0.040	0.015	1.00	18.00	13.00	2.50	0.100	--
RSL-E226	Heat Analysis	0.022	1.49	0.038	0.008	0.42	16.58	10.08	2.07	0.061	--
	Product Analysis	0.019	1.46	0.035	0.007	0.39	16.55	10.07	2.05	0.059	-

Mechanical Test

Heat No.	Required				Gauge Width	Flattening Test	Hardness Test	IGC Test
	Tensile strength Mpa	Yield strength Rp0.2% Mpa	Yield strength Rp 1 % Mpa	Elongation % GL 5.65√A				
MAX	690	--	--	--				ASTM A-262 Practice"E"
MIN	515	205	240	40			Max-90 HRB	
RSL-E226	626.87	323.24	341.68	55.14	25.40	Satisfactory	76-78	Satisfactory

Heat Treatment : Solution annealing conducted at 1045-1060°C temperature and rapid water quenching after final cold process.

Marking on pipes: SURAJ LTD ASTM/ASME A/SA-312 TP 316/316L __MM OD X ___ MM THK X RL SEAMLESS CFD EN 10216-5 TC1 1.4401/1.4404 HEAT NO.___P O NO.____

Remarks:

* 100% Hydro test done at required pressure for 10 second holding time found satisfactory without any leakage.
* 100% Visual ,Dimensions(OD/THK/LENGTH) & Product Marking checked-satisfy the requirment of specification.
* 100% Positive Material Identification (PMI) done by SL & conforming to grade as per specification- found satisfactory.
* Intergranular Corrosion Test (IGC) Conducted as per ASTM A262 Pr"E"-No crack observed on bend portion at 20X - found satisfactory.
* Pickling and passivation conducted as per ASTM A-380.
* "Approved acc.to AD 2000-MERKBLATT W0 and certified acc.to PED (2014/68/EU) by certification body for pressure equipment of TUV NORD SYSTEMS (NOTIFIED BODY,REG NO;:0045)"
* Tensile test piece taken from the same lot as certified and tested in longitudinal direction.
* Melting process:EAF+AOD & Material is free of mercury & radioactive contamination.

For Suraj Limited.

Prepared by

C.I.Nayak
Dept,Head Quality

TD100398381
Azienda: TLP Pozzo d'Adda
Tipo: Certificati di origine

We hereby certify that the materia ... pecification and results comply with the requirements of the purchase order.

COES G.Q. | Ricezione data 27/02/2024 | Sigla V.S. | Verificato data 27/02/2024 | Sigla V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 312 Ed. 2023
V.S.

Tubo S/S ASTM A 312 316/316L 48,26 x 2,77 Client Order: 615/24 Your Code: Your Item: 10/D0842 Your Job:
HEAT RSL-E226 OUR ORDER: 2024 SC 75123/ 100 QTY: NR 1,00 MT 6,12 KG 19,00

T.L.P. spa Copia conforme all'originale DDT: 2024 BC 892 400 DATE: 27/02/24

SURAJ LIMITED
Mfg. & Exporters of :
Stainless Steel Seamless Pipes, Tubes, 'U' Tubes,
Flanges, Fittings & Electro Polished Finish

REGD. OFFICE :
'Suraj House'
Opp. Usmanpura Garden, Ashram Road,
Ahmedabad - 380 014. Gujarat (INDIA)
Tel. : 0091-79-27540720 / 27540721
Fax : 0091-79-27540722
Email : suraj@surajgroup.com
Subject to Ahmedabad Jurisdiction
CIN : L27100GJ1994PLC021088

Date: 05th October, 2023

MANUFACTURING CERTIFICATE

We hereby declare and certify that the materials listed below are manufactured in INDIA by us, M/S SURAJ LTD. 779/A, Village Thol, Kadi-Sanand Highway. Dist.: Mehsana, GUJARAT, INDIA. We hereby confirm that the country of origin of the goods is : INDIA. Suraj Limited does not incorporate in its production cycle any products of Russian origin listed in Annex XVII of RE 833/2014 and subsequent amendments. Also we confirm that the raw material produced by Indian supplier has Indian Origin. H.S.Code No.722211.

COUNTRY OF ORIGIN : INDIA
COUNTRY OF SHIPMENT : MUNDRA, GUJARAT (INDIA)
COUNTRY OF DESTINATION : ITALY
CONTAINER NUMBER : HLBU 8138900
RAW MATERIAL SUPPLIERS : AMBICA STEEL LIMITED, RAJPUTANA STAINLESS LIMITED, MARUTI INOX (INDIA) PRIVET LIMITED, AVTAR STEEL LIMITED.

SURAJ INVOICE NO	INVOICE DATE	NO. OF PCS.	TOTAL METER	TOTAL GROSS KGS	T.C. NO.	BILL OF LADING NO.	CERTIFICATE OF ORIGIN
T/EXP/135	30.09.2023	765	4924.420	27401.00	244	HLCUBO1230AZHX2	19143/23

We had supplied the goods to M/S TLP (TAD LONG PRODUCTS) S.P.A, ITALY

Also our continue supply in other differ Europe region without any issue of customs. Our supplied materials is verified and authorized by Government of India while issuing Certificate of Origin.

MUMBAI OFFICE :
Kanji Mansion, Block No. 3,
1st Floor, 311/317, S.V.P. Road,
Mumbai - 400 004. (INDIA)
Tel. : 0091-22-23891649, 23891758
Fax : 0091-22-23854979
Email : surajm@surajgroup.com

www.surajgroup.com

WORKS :
Survey No. 779/A, Thol,
Kadi - Sanand Highway,
Tal. - Kadi, Dist. Mehsana (INDIA)
Tel. : (02764) 274216 / 274217
Fax : 0091-2764-274419
Email : surajt@surajgroup.com

STM A 312 316/316L 48,26 x 2,77 Client Order: 615/24 Your Code: Your Item: 10/D0842 Your Job:
226 OUR ORDER: 2024 SC 75123/ 100 QTY: NR 1,00 MT 6,12 KG 19,00

SURAJ LIMITED

Mfg. & Exporters of :
Stainless Steel Seamless Pipes, Tubes, 'U' Tubes,
Flanges, Fittings & Electro Polished Finish

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Opp. Usmanpura Garden, Ashram Road,
Ahmedabad - 380 014. Gujarat (INDIA)
Tel. : 0091-79-27540720 / 27540721
Fax : 0091-79-27540722
Email : suraj@surajgroup.com
Subject to Ahmedabad Jurisdiction
CIN : L27100GJ1994PLC021088

SUPPLIER ADDRESS AS FOLLOWS,

AMBICA STEEL LIMITED
PLOT NO. 32, SITE -2, LONI ROAD INDUSTRIAL AREA,
MOHAN NAGAR, UP. 201007,
INDIA

RAJPUTANA STAINLESS LIMITED
213, MADHAVAS, HALOL KALOL ROAD,
DIST- PANCHMAHAL, VADODRA,
GUJARAT, INDIA

MARUTI INOX (INDIA) PRIVET LIMITED
SURVEY NO-777-778, VILLAGE- INDRAD,
BEHIND RATNAMANI TUBES, CHAATRAL,
AHMEDABAD-MEHSANA HIGHWAY,
DIST- MEHSANA, INDRAD
GUJARAT, INDIA.

AVTAR STEEL LIMITED
UNIT-III, SONEPAT ROAD, BAHALGARH
SONEPAT – 131021
HARYANA, INDIA.

For Suraj Limited,

SURAJ LIMITED A'BAD

Authorized Signatory

MUMBAI OFFICE :
Kanji Mansion, Block No. 3,
1st Floor, 311/317, S.V.P. Road,
Mumbai - 400 004. (INDIA)
Tel. : 0091-22-23891649, 23891758
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WORKS :
Survey No. 779/A, Thol,
Kadi - Sanand Highway,
Tal. - Kadi, Dist. Mehsana (INDIA)
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Fax : 0091-2764-274419
Email : surajt@surajgroup.com

Tubo S/S ASTM A 312 316/316L 48,26 x 2,77 Client Order: 615/24 Your Code: Your Item: 10/D0842 Your Job:
HEAT RSL-E226 OUR ORDER: 2024 SC 75123/ 100 QTY: NR 1,00 MT 6,12 KG 19,00

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Opp. Usmanpura Garden, Ashram Road,
Ahmedabad - 380 014. Gujarat (INDIA)
Tel. : 0091-79-2754 0720 / 2754 0721
Fax : 0091-79-2754 0722
Email : suraj@surajgroup.com

SURAJ LIMITED

(AN ISO 9001 : 2015 COMPANY)
(AN ISO 14001 : 2015 COMPANY)
(AN ISO 45001 : 2018 COMPANY)
(AN PED 2014/68/EU APPROVED COMPANY)

F / QA / 24 REV. NO. 10

WORKS :
Survey No. 779/A, Thol, Kadi - Sanand Highway,
Tal.-Kadi, Dist. Mehsana, Gujarat (India)
Tel. : (02764) 274216 / 27417 Fax : (02764) 274419
Email : quality@surajgroup.com
Visit us at www.surajgroup.com

INSPECTION CERTIFICATE

In Accordance with EN 10204/3.1

Customer: T.L.P. SPA — **T.C No :** 183 — **Date :** 21.08.2023
Product : Austenitic S.S Seamless Cold Finish,Solution Annealed,Pickled & Passivated Pipes. — **P.O.No :** 214555 — **Date :** 21.09.2022
W.O.No : 2223/OEP400032 — **Date :** 21.09.2022

Sr. No.	Specification	Grade	Heat No.	Dimensions		Quantity			Hydro Test Pressure (Psi)
				OD (MM)	THK (MM)	Length Mtr	Pcs.	Total Meter	
28	ASTM A-312 Ed.2019 SA-312 of ASME Sec.II Part "A" Ed.2019 EN 10216-5 TC1 NACE MR 0175/ISO 15156-3, NACE MR 0103	TP 316/316L 1.4401/ 1.4404	RSL-D1698	21.34	2.77	RL	214	1385.250	2500

Chemical Analysis %

Heat No.	Required	C	Mn	P	S	Si	Cr	Ni	Mo	N	Ti
	Min	--	--	--	--	--	16.50	10.00	2.00	--	--
	Max	0.030	2.00	0.040	0.015	1.00	18.00	13.00	2.50	0.100	--
RSL-D1698	Heat Analysis	0.018	1.58	0.038	0.008	0.41	16.85	10.07	2.07	0.062	--
	Product Analysis	0.016	1.57	0.036	0.005	0.38	16.84	10.05	2.04	0.060	--

Mechanical Test

Heat No.	Required				Gauge Width	Flattening Test	Hardness Test	IGC Test
	Tensile strength Mpa	Yield strength Rp0.2% Mpa	Yield strength Rp 1 % Mpa	Elongation % GL 5.65√A				
MAX	690	--	--	--				ASTM A-262 Practice"E"
MIN	515	205	240	40			Max-90 HRB	
RSL-D1698	630.58	328.96	340.22	59.23	Full Section	Satisfactory	72-75	Satisfactory
	626.34	324.17	338.19	58.98			71-73	

Heat Treatment : Solution annealing conducted at 1045-1060°C temperature and rapid water quenching after final cold process.

Marking on pipes: SURAJ LTD ASTM/ASME A/SA-312 TP 316/316L __MM OD X ___ MM THK X RL SEAMLESS CFD EN 10216-5 TC1 1.4401/1.4404 HEAT NO.____ P O NO.____

Remarks:

* 100% Hydro test done at required pressure for 10 second holding time found satisfactory without any leakage.
* 100% Visual ,Dimensions(OD/THK/LENGTH) & Product Marking checked-satisfy the requirment of specification.
* 100% Positive Material Identification (PMI) done by SL & conforming to grade as per specification- found satisfactory.
* Intergranular Corrosion Test (IGC) Conducted as per ASTM A262 Pr"E"-No crack observed on bend portion at 20X - found satisfactory.
* Pickling and passivation conducted as per ASTM A-380.
* **"Approved acc.to AD 2000-MERKBLATT W0 and certified acc.to PED (2014/68/EU) by certification body for pressure equipment of TUV NORD SYSTEMS (NOTIFIED BODY,REG NO,:0045)"**
* Tensile test piece taken from the same lot as certified and tested in longitudinal direction.
* **Melting process:EAF+AOD & Material is free of mercury & radioactive contamination.**

SURAJ LTD. THOL SL-1

For,Suraj Limited.

Prepared by

C.I.Nayak
Dept,Head Quality

TD100394053
Azienda:TLP Pozzo d'Adda
Tipo:Certificati di origine

We hereby certify that the material specification and results comply with the requirements of the purchase order.

COES G.Q.	Ricezione data 24/04/2024	Sigla U.S.
	Verificato data 24/04/2024	Sigla U.S.

COES SRL
VERIFIED IDENTICAL TO
SA 312 Ed. 2023
U.S.

Tubo S/S ASTM A 312 316/316L 21,34 x 2,77 Client Order: 1430/24 Your Code: Your Item: 20/C5215 Your Job:
HEAT RSL-D1698 OUR ORDER: 2024 SC 76595/ 200 QTY: NR 1,00 MT 6,74 KG 9,00

24 2418

Manufacturer of Stainless Steel Seamless and Welded Pipes I Tubes I U-Tubes
an ISO 9001:2015, 14001:2015 and 45001:2018,
PED 2014/68/EU, ADW / AD 2000 - Merkblatt W0 and IBR certified company

Inspection Certificate / Abnahmeprüfzeugniss / Certificat essais

In accordance with / in Übereinstimmung mit/ en accord / EN 10204:2004 Type 3.1

Certificate N°/ Zeugniss N° / N° CCPU	VPT/MTC/24/1910		Date / Datum / Date	28.04.2024	
Work Order No.. Werks Nummer N°	EU23Y-00138	Customer Order No. Kunden Bestellnummer N°	216386 Dtd: 21.02.2024	Country of Origin Ursprungsland Pays d'origin	India Indien Inde
Customer / Besteller / Client	TAD LONG PRODUCTS S.P.A. – T.L.P. SPA				
Product / Produkt / Produit	Stainless seamless tubes cold finished / Nahtlose Edelstahlrohre kaltgefertigt / Tubes inoxydable sans soudure,tâf				CFD
REF. QAP / ITP	---				
Supply Condition / Lieferzustand / Cond. Livraison	Solution annealed, pickled & passivated / lösungsgeglüht, gebeizt, passiviert / recuit décapé-passivé				
Specification / Gemäss / Selon	ASTM A312/A312M-22a / ASME SEC.II, PART A, SA-312/SA-312M-2023 / EN 10216-5-2021 TC1 / NACE MR0103/ISO 17945-MR0175/ISO 15156-3:2015 (en) / PED 2014/68/EU/EN 10027-2 / EN 10088-1 / EN 10088-3				
Tolerance / Toleranzen / Tolérance	EN ISO1127 D3/T3 / ASME B36.19M				HSN code Zolltarif-nummer code douanier
Grade / Werkstoff / Nuance	TP 316/316L / 1.4401/1.4404 / X5CrNiMo17-12-2 / X2CrNiMo17-12-2	Steel making process / Erschmelzungsart / procéde d'élaboration		EAF/AOD	73044100

Article N°. Artikelnummer N° article	Customer Article N°. Kdn Artikelnummer N° article client	Size / Dimension / Abmessung	Length Länge Longueur	Supply Qty / Liefermenge / Qte livré Qty. (Nos.) Stück/pièces	Mtr.	Weight (mt) Gewicht/poids	End Finish Rohrenden
---	---	60.33mm x 2.77mm	6-7m	88	551.66	2.218	PLAIN

Raw material round bar details / Einsatzmaterial Rundstab / Ebauche barre ronde

Mill name Werk Producteur	Raw material HSN code	Size Abmessung Dimension	Grade Werkstoff Nuance:	Heat No. Schmelze coulée	Hot finished size Mutterrohr Tube ebauche	Cold finished size Endabmessung Dimension finale	Finished product HSN Code
AVTAR STEEL LIMITED	72221119	73mm	✓ TP 316/316L / 1.4401/1.4404	✓ A-8029	✓ 76.00mm OD X 7.00mm WT X 4.1-4.3m R/L	✓ 60.33mm x 2.77mm x 6-7m	73044100

CHEMICAL COMPOSITION / Chemische Zusammensetzung / Composition chimique (In Mass %) Acc: (ACC. TO A312/A276, EN 10027-2, EN 10088-1, EN 10088-3)

Heat No. Schmelze Coulée		C	Si	Mn	P	S	Cr	Ni	Mo	N	other
	S	0.030 Max.	1.00 Max.	2.00 Max.	0.040 Max.	0.015 Max.	16.5-18.0	10.0-13.0	2.0-2.5	0.10 Max.	---
	H	0.021	0.37	1.66	0.039	0.010	16.75	10.05	2.02	0.089	---
✓ A-8029	P	0.019	0.35	1.65	0.036	0.009	16.74	10.09	2.05	0.088	---
	P	0.020	0.38	1.68	0.037	0.008	16.77	10.12	2.09	0.087	---

Mechanical tests @ Room temperature (A370, EN ISO 6892-1)
Mechanische Testergebnisse bei Raumemperatur / Essais mécaniques à temperature ambiante

Tensile Strength Zugfestigkeit	Yield Strength Streckdehngrenze Limite d'élasticité , MPa		% Elongation Bruch-dehnung Allongation	Flattening Ringfalt Versuch (A370, EN ISO 8492)	Hardness Härteprüfung dureté (A370,ISO 6508-1)	Intergranular corrosion Intrerkristalline Korrosion
MPa	Rp0.2 %	Rp1.0 %	50mm G.L. / √(CSA)*5.65	Drift Expanding Auf-weitversuch Evasement EN ISO 8493)	(22 HRC Max.)	(EN ISO 3651-2, Method A) Practice 'E' (ASTM A 262)
(515-690 MPa)	(205 MPa Min.)	(240 MPa Min.)	40% Min.- LS			
622.78 639.71	286.71 301.22	322.41 339.14	60.0 / 60.24 (LSW-25.2mm) 63.0 / 62.68 (LSW-25.5mm)	Passed	75-79 HRB	Passed

Non destructive tests
Nicht zerstörende Testergebnisse / Essais non destructifs

Ultrasonic Ultraschall Ultrason	Eddy Current Wirbelstrom	PMI Ver-wechslungstest	Hydro Wasserabdrucktest (A999/EN 10216-5) Test Pressure (psi(g))	Hydro Holding Time (Sec.)	Visual & Dimensional Inspection Dimensions & Masskontrolle Contrôle visuel & dimensionel
(E213/EN ISO 10893-10)	(EN ISO10893-1) (E426/A450 /A999)				
N.A.	Passed	Passed	1400	10	Passed

Heat treatement / Wärmebehandlung / Recuit: SOLUTION TREATED AT 1040-1120°C AND RAPID WATER COOLED.

Marking / Markierung / Marquage: VENUS PIPES & TUBES - ...mm OD X ...mm WT X ...m R/L - EN10216-5 - W.NR - 1.4401/1.4404 - X5CrNiMo17-12-2 / X2CrNiMo17-12-2 - TC1 - CFD - EN ISO 1127 D3/T3 - ASTM/ASME A/SA-312 TP 316/316L - NACE MR0103/ISO 17945 - MR0175/ISO 15156-3 HEAT NO... MADE IN INDIA Q4

Inspection by / Geprüft durch / Testé par: M/s. VENUS PIPES AND TUBES LIMITED

Additional Informations / Zusatzinformation / Informations supplémentaires: MATERIAL CONFIRMS TO GENERAL REQUIREMENTS AS PER ASTM A999/A999M-18 & ASME SEC. II, PART A, SA-999/SA-999M- 2023

APPROVED ACC. TO AD 2000 MERKBLATT W0 AND CERTIFIED ACC. TO PED (2014/68/EU) ANNEXURE-1 SEC. 4.3 BY CERTIFICATION BODY TO PRESSURE EQUIPMENT OF TUV NORD SYSTEMS (NOTIFIED BODY REG. NO. 0045) (CERTIFICATE NO. 0045/202/1409/W2/2188/23 VALID UP TO JUNE 2026)

Material does not contain steel products originating in Russia mentioned in Annex XVII to the (EU) Regulation No 833/2014 and further amendment.

S = Specification, H = Heat analysis, P = Product analysis, FS = Full Section, LSW = Longitudinal Strip Width & TSW = Transverse Strip Width

We hereby certify that material was manufactured, sampled, tested, and inspected in accordance with the requirements of the material specification and has been found to meet the requirements of the specification and order. Final products are 100% produced from Indian raw materials (billets or mother hollows). Wir bescheinigen hiermit, dass das Material in Übereinstimmung mit den Anforderungen der Materialspezifikation hergestellt, bemustert, getestet und inspiziert wurde und den Anforderungen der Spezifikation und der Bestellung entspricht. Endprodukte aus 100% indischem Rohmaterial (Knüppel oder Mutterrohre). Nous certifions par la présente que le matériel a été fabriqué, échantillonné, testé et approuvé conformément à la spécification du matériel, qu'il est conforme aux exigences de la spécification et de la commande. Produits finis fabriqués à partir de matières premières 100% indiennes (billettes ou ebauches).

VENUS PIPES AND TUBES LIMITED

WORK INSPECTOR • VENUS PIPES & TUBES • 04 • INSPECTOR

TD100434182

Azienda: TLP Pozzo d'Adda

Any unauthorized usage of this test certificate will warrant legal action. Photocopy of this certificate is not valid

Venus Pipes and Tubes Limited (Formerly known as Venus Pipes and Tubes Pvt Ltd)
Survey No. 233/2 & 234/1, Bhuj - Bhachau Highway, Village - Dhaneti, Kutch - 370020, Gujarat - India
+91 7048898899 I +91 7048897799 I info@venuspipes.com I www.venuspipes.com
CIN No: U74140GJ201SPLC082306

F/QA/39 REV. 02

COES G.Q.	Ricezione data 06/09/2024	Sigla U.S.
	Verificato data 06/09/2024	Sigla U.S.

Tubo S/S ASTM A 312 316/316L 60,33 x 2,77 Client Order: 2698/24 Your Code: Your Item: 10/D3488 Your Job: HEAT A-8029 OUR ORDER: 2024 SC 79170/ 100 QTY: NR 3,00 MT 18,66 KG 74,00

24 2421

venus PIPES AND TUBES

Manufacturer of Stainless Steel Seamless and Welded Pipes I Tubes I U-Tubes
an ISO 9001:2015, 14001:2015 and 45001:2018,
PED 2014/68/EU, ADW / AD 2000 - Merkblatt W0 and IBR certified company

Inspection Certificate / Abnahmeprüfzeugniss / Certificat essais

In accordance with / in Übereinstimmung mit/ en accord / EN 10204:2004 Type 3.1

Certificate N°/ Zeugniss N° / N° CCPU	VPT/MTC/24/2611		Date / Datum / Date	22.05.2024	
Work Order No.. Werks Nummer N°	EU23Y-00138	Customer Order No. Kunden Bestellnummer N°	216386 Dtd: 21.02.2024	Country of Origin Ursprungsland Pays d'origin	India Indien Inde
Customer / Besteller / Client	TAD LONG PRODUCTS S.P.A. – T.L.P. SPA				
Product / Produkt / Produit	Stainless seamless tubes cold finished / Nahtlose Edelstahlrohre kaltgefertigt / Tubes inoxydable sans soudure,taf				CFD
REF. QAP / ITP	---				
Supply Condition / Lieferzustand / Cond. Livraison	Solution annealed, pickled & passivated / lösungsgeglüht, gebeizt, passiviert / recuit décapé-passivé				
Specification / Gemäss / Selon	ASTM A312/A312M-22a / ASME SEC.II, PART A, SA-312/SA-312M-2023 / EN 10216-5-2021 TC1 / NACE MR0103/ISO 17945-MR0175/ISO 15156-3:2015 (en) / PED 2014/68/EU/EN 10027-2 / EN 10088-1 / EN 10088-3				
Tolerance / Toleranzen / Tolérance	EN ISO1127 D3/T3 / ASME B36.19M				HSN code Zolltarif-nummer code douanier
Grade / Werkstoff / Nuance	TP 316/316L / 1.4401/1.4404 / X5CrNiMo17-12-2 / X2CrNiMo17-12-2	Steel making process / Erschmelzungsart / procédé d'élaboration		EAF/AOD	73044100

Article N°. Artikelnummer N° article	Customer Article N°. Kdn Artikelnummer N° article client	Size / Dimension / Abmessung	Length Länge Longueur	Supply Qty / Liefermenge / Qte livré Qty. (Nos.) Stück/pièces	Mtr.	Weight (mt) Gewicht/poids	End Finish Rohrenden
---	---	33.40mm x 3.38mm	6-7m	27	169.61	0.408	PLAIN

Raw material round bar details / Einsatzmaterial Rundstab / Ebauche barre ronde

Mill name Werk Producteur	Raw material HSN code	Size Abmessung Dimension	Grade Werkstoff Nuance:	Heat No. Schmelze coulée	Hot finished size Mutterrohr Tube ebauche	Cold finished size Endabmessung Dimension finale	Finished product HSN Code
RAJPUTANA STAINLESS LIMITED	72221999	73mm	TP 316/316L / 1.4401/1.4404	RSL-E1686	76.00mm OD X 7.00mm WT X 2.60-2.65m R/L	33.40mm x 3.38mm x 6-7m	73044100

CHEMICAL COMPOSITION / Chemische Zusammensetzung / Composition chimique
(In Mass %) Acc: (ACC. TO A312/A276, EN 10027-2, EN 10088-1, EN 10088-3)

Heat No. Schmelze Coulée	S	C 0.030 Max.	Si 1.00 Max.	Mn 2.00 Max.	P 0.040 Max.	S 0.015 Max.	Cr 16.5-18.0	Ni 10.0-13.0	Mo 2.0-2.5	N 0.10 Max.	other
RSL-E1686	H	0.020	0.39	1.60	0.039	0.007	16.51	10.02	2.01	0.069	---
	P	0.021	0.41	1.62	0.038	0.006	16.55	10.05	2.09	0.068	---
	P	0.022	0.42	1.60	0.036	0.005	16.54	10.08	2.11	0.067	---

Mechanical tests @ Room temperature (A370, EN ISO 6892-1)
Mechanische Testergebnisse bei Raumemperatur / Essais mécaniques à temperature ambiante

Tensile Strength Zugfestigkeit	Yield Strength Streckdehngrenze Limite d'élasticité , MPa		% Elongation Bruch-dehnung Allongation	Flattening Ringfalt Versuch (A370, EN ISO 8492)	Hardness Härteprüfung dureté (A370,ISO 6508-1)	Intergranular corrosion Intrerkristalline Korrosion
MPa	Rp0.2 %	Rp1.0 %	50mm G.L. / √(CSA)*5.65	Drift Expanding Auf-weitversuch Evasement EN ISO 8493)		(EN ISO 3651-2, Method A)
(515-690 MPa)	(205 MPa Min.)	(240 MPa Min.)	40% Min.- FS		(22 HRC Max.)	Practice 'E' (ASTM A 262)
638.97	268.91	302.24	59.0 / 53.78	Passed	75-78 HRB	Passed

Non destructive tests
Nicht zerstörende Testergebnisse / Essais non destructifs

Ultrasonic Ultraschall Ultrason	Eddy Current Wirbelstrom	PMI Ver-	Hydro Wasserabdrucktest (A999/EN 10216-5)		Visual & Dimensional Inspection Dimensions & Masskontrolle Contrôle visuel & dimensionel
(E213/EN ISO 10893-10)	(EN ISO10893-1) (E426/A450 /A999)	wechslungstest	Test Pressure (psi(g))	Holding Time (Sec.)	
N.A.	Passed	Passed	2500	10	Passed

Heat treatement / Wärmebehandlung / Recuit: SOLUTION TREATED AT 1040-1120°C AND RAPID WATER COOLED.

Marking / Markierung / Marquage: venus VENUS PIPES & TUBES - ...mm OD X ...mm WT X ...m R/L - EN10216-5 - W.NR - 1.4401/1.4404 - X5CrNiMo17-12-2 / X2CrNiMo17-12-2 - TC1 - CFD - EN ISO 1127 D3/T3 - ASTM/ASME A/SA-312 TP 316/316L - NACE MR0103/ISO 17945 - MR0175/ISO 15156-3 HEAT NO... MADE IN INDIA Q4

Inspection by / Geprüft durch / Testé par: M/s. VENUS PIPES AND TUBES LIMITED

Additional Informations / Zusatzinformation / Informations supplémentaires: MATERIAL CONFIRMS TO GENERAL REQUIREMENTS AS PER ASTM A999/A999M-18 & ASME SEC. II, PART A, SA-999/SA-999M- 2023

APPROVED ACC. TO AD 2000 MERKBLATT W0 AND CERTIFIED ACC. TO PED (2014/68/EU) ANNEXURE-1 SEC. 4.3 BY CERTIFICATION BODY TO PRESSURE EQUIPMENT OF TUV NORD SYSTEMS (NOTIFIED BODY REG. NO. 0045) (CERTIFICATE NO. 0045/202/1409/W2/2188/23 VALID UP TO JUNE 2026)

Material does not contain steel products originating in Russia mentioned in Annex XVII to the (EU) Regulation No 833/2014 and further amendment.

S = Specification, H = Heat analysis, P = Product analysis, FS = Full Section, LSW = Longitudinal Strip Width & TSW = Transverse Strip Width

We hereby certify that material was manufactured, sampled, tested, and inspected in accordance with the requirements of the material specification and has been found to meet the requirements of the specification and order. Final products are 100% produced from Indian raw materials (billets or mother hollows). Wir bescheinigen hiermit, dass das Material in Übereinstimmung mit den Anforderungen der Materialspezifikation hergestellt, bemustert, getestet und inspiziert wurde und den Anforderungen der Spezifikation und der Bestellung entspricht. Endprodukte aus 100% indischem Rohmaterial (Knüppel oder Mutterrohre). Nous certifions par la présente que le matériel a été fabriqué, échantillonné, testé et approuvé conformément à la spécification du matériel, qu'il est conforme à la spécification et de la commande. Produits finis fabriqués à partir de matières premières 100% indiennes (billettes ou ebauches).

VENUS PIPES AND TUBES LIMITED

WORK INSPECTOR 04 WORK INSPECTOR

TD100437838

Azienda: TLP Pozzo d'Adda

Any unauthorized usage of this test certificate will warrant legal action. Photocopy of this certificate is not valid

F/QA/39 REV. 02

Venus Pipes and Tubes Limited (Formerly known as Venus Pipes and Tubes Pvt Ltd)
Survey No. 233/2 & 234/1, Bhuj - Bhachau Highway, Village - Dhaneti, Kutch - 370020, Gujarat - India
+91 7048898899 I +91 7048897799 I info@venuspipes.com I www.venuspipes.com
CIN No. U74140GJ2015PLC082306

COES G.Q. Ricezione data 06/09/2024 Sigla V.S. Verificato data 06/09/2024 Sigla V.S.

Tubo S/S ASTM A 312 316/316L 33,40 x 3,38 Client Order: 2718/24 Your Code: Your Item: 40/11603 Your Job: HEAT RSL-E1686 OUR ORDER: 2024 SC 79204/ 400 QTY: NR 1,00 MT 6,49 KG 16,00

venus®
PIPES AND TUBES

Manufacturer of Stainless Steel Seamless and Welded Pipes I Tubes I U-Tubes
an ISO 9001:2015, 14001:2015 and 45001:2018,
PED 2014/68/EU, ADW / AD 2000 - Merkblatt W0 and IBR certified company

Inspection Certificate / Abnahmeprüfzeugniss / Certificat essais
In accordance with / in Übereinstimmung mit/ en accord / EN 10204:2004 Type 3.1

MADE IN INDIA

Certificate N°/ Zeugniss N° / N° CCPU	VPT/MTC/24/1366			**Date / Datum / Date**	26.03.2024
Work Order No.. Werks Nummer N°	EQ23Y-00149	**Customer Order No.** Kunden Bestellnummer N°	66 Dtd: 11.03.2024	**Country of Origin** Ursprungsland Pays d'origin	India Indien Inde
Customer / Besteller / Client	SOLUZIONI PIPING SRL				
Product / Produkt / Produit	Stainless seamless tubes cold finished / Nahtlose Edelstahlrohre kaltgefertigt / Tubes inoxydable sans soudure,tâf				**CFD**
REF. QAP / ITP	---				
Supply Condition / Lieferzustand / Cond. Livraison	Solution annealed, pickled & passivated / lösungsgeglüht, gebeizt, passiviert / recuit décapé-passivé				
Specification / Gemäss / Selon	ASTM A312/A312M-22a / ASME SEC.II, PART A, SA-312/SA-312M-2023 / EN 10216-5-2021 TC1 AD 2000 W0 / NACE MR0103/ISO 17945-MR0175/ISO 15156-3:2015 (en) / PED 2014/68/EU / EN 10027-2 / EN 10088-1 / EN 10088-3				
Tolerance / Toleranzen / Tolérance	EN ISO1127 D3/T3 / ASME B36.19M-2022				**HSN code** Zolltarif-nummer code douanier
Grade / Werkstoff / Nuance	TP 316/316L / 1.4401/1.4404	Steel making process / Erschmelzungsart / procédé d'élaboration		EAF/AOD	73044100

Article N°. Artikelnummer N° article	**Customer Article N°.** Kdn Artikelnummer N° article client	**Size** / Dimension / Abmessung	**Length** Länge Longueur	**Supply Qty** / Liefermenge / Qte livré			**End Finish** Rohrenden
				Qty. (Nos.) Stück/pièces	**Mtr.**	**Weight (mt)** Gewicht/poids	
---	---	**48.26mm x 3.68mm**	5.8-7.0m	65	389.59	---	PLAIN

Raw material round bar details / Einsatzmaterial Rundstab / Ebauche barre ronde

Mill name Werk Producteur	**Raw material HSN code**	**Size** Abmessung Dimension	**Grade** Werkstoff Nuance:	**Heat No.** Schmelze coulée	**Hot finished size** Mutterrohr Tube ebauche	**Cold finished size** Endabmessung Dimension finale	**Finished product HSN Code**
AVTAR STEEL LIMITED	72221119	73mm	TP 316/316L / 1.4401/1.4404	A-8029	76.00mm OD X 7.00mm WT X 2.10-2.30m R/L	48.26mm x 3.68mm x 5.8-7.0m	**73044100**

Heat No. Schmelze Coulée	**CHEMICAL COMPOSITION** / Chemische Zusammensetzung / Composition chimique (In Mass %) Acc: (ACC. TO A312/A276, EN 10027-2, EN 10088-1, EN 10088-3)									
		C	**Si**	**Mn**	**P**	**S**	**Cr**	**Ni**	**Mo**	**N**	**other**
	S	**0.030 Max.**	**1.00 Max.**	**2.00 Max.**	**0.040 Max.**	**0.015 Max.**	**16.5-18.0**	**10.0-13.0**	**2.0-2.5**	**0.10 Max.**	---
A-8029	H	0.021	0.37	1.66	0.039	0.010	16.75	10.05	2.02	0.089	---
	P	0.018	0.40	1.68	0.037	0.009	16.73	10.05	2.06	0.089	---
	P	0.021	0.35	1.67	0.037	0.007	16.79	10.08	2.05	0.086	---

Mechanical tests @ Room temperature (A370, EN ISO 6892-1)
Mechanische Testergebnisse bei Raumemperatur / Essais mécaniques à temperature ambiante

Non destructive tests
Nicht zerstörende Testergebnisse / Essais non destructifs

Tensile Strength Zugfestigkeit	**Yield Strength** Streckdehngrenze Limite d'élasticité , MPa		**% Elongation** Bruch-dehnung Allongation	**Flattening** Ringfalt Versuch (A370, EN ISO 8492) **Drift Expanding** Auf-weitversuch Evasement EN ISO 8493)	**Hardness** Härteprüfung dureté (A370,ISO 6508-1)	**Intergranular corrosion** Interkristalline Korrosion (EN ISO 3651-2, Method A)	**Micro Examination** Mikro Untersuchung Micro-examen	**Eddy Current** Wirbelstrom (EN ISO10893-1)	**PMI** Ver-wechslungstest	**Hydro** Wasserabdrucktest (A999/EN 10216-5)		**Visual & Dimensional Inspection** Dimensions & Masskontrolle Contrôle visuel & dimensionel
MPa	Rp0.2 %	Rp1.0 %	G.L. 50mm							Test Pressure (psi(g))	Holding Time (Sec.)	
(515-690 MPa)	(205 MPa Min.)	(240 MPa Min.)	53% Min.- LS		(22 HRC Max.)	Practice 'E' (ASTM A 262)		(E426/A450 / A999)				
625.10	300.25	347.52	58.0 (LSW-25.0mm)	Passed	77-81 HRB	Passed	Passed	Passed	Passed	2300	10	Passed

Heat treatement / Wärmebehandlung / Recuit	SOLUTION TREATED AT 1040-1120°C AND RAPID WATER COOLED.
Marking / Markierung / Marquage	venus VENUS PIPES & TUBES - ...mm OD X ...mm WT X ...m R/L - EN10216-5 - 1.4401/1.4404 – TC1 AD 2000 W0 - CFD -EN ISO 1127 D3/T3 - ASTM/ASME A/SA-312 TP 316/316L NACE MR0103/ISO 17945 – MR0175/ISO 15156-3 HEAT NO... MADE IN INDIA Q4
Inspection by / Geprüft durch / Testé par	M/s. VENUS PIPES AND TUBES LIMITED
Additional Informations / Zusatzinformation / Informations supplémentaires	MATERIAL CONFIRMS TO GENERAL REQUIREMENTS AS PER ASTM A999/A999M-18 & ASME SEC. II, PART A, SA-999/SA-999M- 2023

APPROVED ACC. TO AD 2000 MERKBLATT W0 AND CERTIFIED ACC. TO PED(2014/68/EU) ANNEXURE-1 SEC. 4.3 BY CERTIFICATION BODY TO PRESSURE EQUIPMENT OF TUV NORD SYSTEMS (NOTIFIED BODY REG. NO. 0045) (CERTIFICATE NO. 0045/202/1409/WZ/2188/23 VALID UP TO JUNE 2026)

Material does not contain steel products originating in Russia mentioned in Annex XVII to the (EU) Regulation No 833/2014 and further amendment.

S = Specification, H = Heat analysis, P = Product analysis, FS = Full Section, LSW = Longitudinal Strip Width & TSW = Transverse Strip Width

We hereby certify that material was manufactured, sampled, tested, and inspected in accordance with the requirements of the material specification and has been found to meet the requirements of the specification and order. Final products are 100% produced from Indian raw materials (billets or mother hollows). Wir bescheinigen hiermit, dass das Material in Übereinstimmung mit den Anforderungen der Materialspezifikation hergestellt, bemustert, getestet und inspiziert wurde und den Anforderungen der Spezifikation und der Bestellung entspricht. Endprodukte aus 100% indischem Rohmaterial (Knüppel oder Mutterrohre). Nous certifions par la présente que le matériel a été fabriqué, échantillonné, testé et approuvé conformément à la spécification du matériel, qu'il est conforme aux exigences de la spécification et de la commande. Produits finis fabriqués à partir de matières premières 100% indiennes (billettes ou ebauches).

COES G.Q.	Ricezione data 03/09/2024	Sigla V.S.
	Verificato data 06/09/2024	Sigla V.S.

VENUS PIPES AND TUBES LIMITED

WORK INSPECTOR venus 04 VENUS PIPES & TUBES

Any unauthorized usage of this test certificate will warrant legal action. Photocopy of this certificate is not valid

F/QA/39 REV. 02

24 2539

HEBEI XINFENG HIGH PRESSURE FLANGE AND PIPE FITTING CO., LTD

MATERIALTEST CERTIFICATE(EN 10204-3.1)

Country of Origin of Goods China

Buyer: INTERTUBI S.P.A.
Goods Description: FORGED STAINLESS STEEL FLANGES
Material : STAINLESS STEEL 316/316L
Standard: ASTM A182/A 182M – 14a - ASME SA 182/SA
Standard : EN 10222-5:2017
Temperature of Solution Treat and Quench: 1060°C

Page: 7
Certificate No : INT-XF2401
Date of report : 2024-05-15
Contract No: INT-XF2401

Item No.	Quantity		Description	Heat No.	Specimen No
60	100	PCS	WELDING NECK FLANGES EN 1092-111B PN16 DN 50	4728	XF240515-7
61	150	PCS	WELDING NECK FLANGES EN 1092-1 11B PN40 DN 25	4728	XF240515-7
62	20	PCS	WELDING NECK FLANGES EN 1092-1 11B PN40 DN 32	4728	XF240515-7
63	80	PCS	WELDING NECK FLANGES EN 1092-1 11B PN40 DN 40	4728	XF240515-7
64	50	PCS	WELDING NECK FLANGES EN 1092-1 11B PN40 DN 50	4728	XF240515-7
65	10	PCS	WELDING NECK FLANGES EN 1092-1 11B PN40 DN 65	4728	XF240515-7

Chemical Analysis: (%)

Heat No.	C%	Si%	Mn%	P%	S%	Cr%	Mo%	Ni%	Al%	Ti%	Cu%	V%	Nb%	CE%
Min						16.00	2.00	10.00						
Max	0.030	1.00	2.00	0.045	0.030	18.00	3.00	14.00						
4728	0.026	0.558	1.262	0.025	0.018	16.52	2.42	11.52						

Actual Mechanical Properties :

Specimen No	Dim. Of specimen		Sampling of specime			Test temp	A370-2007					A370-2007		
							Yield strength	Tensile Strength	Elongation	Reduction of area	Hardness	Energy of impact test Room temperature (ISO -V specimen) Charpy size 10mm×10mm×55mm		
	Thickness	Width	Location	Direction	Position		R_{eH} N/mm²	R_m N/mm²	A %	Z %	HB	Joule(>27)		
	mm	mm		Tr		℃/RT	≥205	≥515	≥30	≥60	≤215	1	2	∑/N
XF240515-7	Φ12.5			Tr		20	250	558	45	74	180	41	41	41

T : top, B : bottom, L : longitudinal, Tr : transverse

Visual inspection: Without Complaint
Dimensional check : Without Complaint
Surface crack inspection: Without Complaint

Quality system is approved according to the European Directive 2014/68/EU-PED Annex 1-4.3 by TUV Rheinland Industrie Service GmbH
Specification:AD2000,W2/W9/W10,TRD100

We hereby certify that the materials described herein have been manufactured, inspected and tested in accordance with the customer's specification(s),and that they satisfy the requirements.

河北鑫丰高压法兰管件有限公司
HEBEI XINFENG HIGH-PRESSURE FLANGE AND PIPE FITTING CO., LTD.
张振泉
ZK 振泉

COES G.Q.
Ricezione data 03/09/2024 Sigla V.S.
Verificato data 13/09/2024 Sigla V.S.

DDT BL/VEN/6477 03/09/2024
Riferimento ordine cliente:. ORD. 2655/24 DEL 3/
Articolo: FLDINPN16650 FLG 316 EN1092.1 11B DN50 PN10/16

Cliente:531211 COES S.R.L.
Quantità: 2,000

N di colata:4728-100
CERTIFICATO CONFORME ALL'ORIGINALE TRUE COPY

COES SRL
VERIFIED IDENTICAL TO
SA 182 Ed. 2023
V.S.

MATERIND srl
Certificato N. 200808
☎ 0363-958244

V120458

MAC Piping Materials Sdn. Bhd.
Company No : 1250791-W
Lot 8095, Jalan Sungai Rasau 32,
Kawasan 16, Sungai Rasau, 41300 Klang,
Selangor Darul Ehsan, Malaysia
Tel : +603-3344 9733 Fax : +603-3344 9722
Website : www.macpiping.com
Email : enquiry@macppiping.com

07/202/9030/WZ/2302/18
07/202/9030/WP/2302/18
PED2014/68/EU

TUV SUD Asia Pacific
ISO 9001 : 2015
Certificate Registration
No. :TUV100 13 4226

MILL TEST REPORT

IN ACCORDANCE TO EN 10204 3.1

CERTIFICATE NO : MAC9201757 (12) DATE : 01/04/2021

INVOICE NO. : INVE00440
CONTRACT NO. : SO-000515/525
SHIPPER : MAC PIPING MATERIALS SDN BHD

PURCHASE ORDER N : 31098178/8183/8175/8458
CUSTOMER : DACAPO STAINLESS BV

PRODUCT : STAINLESS STEEL BUTT WELD FITTINGS (SEAMLESS)
SPECIFICATION : ASTM A403/ASME SA403M-19
MATERIAL GRADE : WP316/316L-S (SEAMLESS)

COES SRL
VERIFIED IDENTICAL TO
SA 403 Ed. 2023
U.S.

NO.	DESCRIPTION OF GOODS (PRODUCT, SIZE, SCHEDULE, GRADE)	PO No.	QUANTITY (PCS)	WEIGHT (KGS)	HEAT NUMBER	TENSILE TEST Y.S. N/mm²	T.S. N/mm²	EL % (L)	HARDNESS TEST (HRB)	NON-DESTRUCTIVE TEST (NDT) RT	UT	MT	PT	ET	CHEMICAL COMPOSITION (wt%) C	Si	Mn	P	S	Ni	Cr	Mo
																	X 100	X 1000		X 100		
						205	515	28	AVR						-	-	-	-	-	1000	1600	200 MIN
									187						3.0	100	200	45	30	1400	1800	300 MAX
1	CONC REDUCER 1"X3/4" 40S 316/L (S)	31098178	75	10.50	53DE425	268	579	55	72	N/A	N/A	N/A	N/A	N/A	1.7	31	75	31	3	1005	1650	203
2	CONC REDUCER 1-1/2"X1" 40S 316/L (S)	31098178	50	13.50	53DK142	270	581	60	78	N/A	N/A	N/A	N/A	N/A	1.8	35	80	33	2	1005	1638	205
3	CONC REDUCER 1-1/2"X1/2" 80S 316/L (S)	31098178	25	8.75	53UH209	281	570	56	68	N/A	N/A	N/A	N/A	N/A	1.8	44	91	39	3	1002	1609	212
4	CONC REDUCER 1-1/2"X3/4" 80S 316/L (S)	31098178	25	8.75	53UH209	281	570	56	68	N/A	N/A	N/A	N/A	N/A	1.8	44	91	39	3	1002	1609	212
5	CONC REDUCER 1-1/4"X3/4" 80S 316/L (S)	31098178	25	5.50	53UG857	235	530	45	72	N/A	N/A	N/A	N/A	N/A	2.4	55	126	34	6	1006	1627	211
6	CONC REDUCER 2"X1-1/2" 10S 316/L (S)	31098178	51	16.83	53DK313	268	580	55	73	N/A	N/A	N/A	N/A	N/A	1.8	36	96	35	1	1004	1631	204
7	CONC REDUCER 2"X1-1/2" 10S 316/L (S)	31098178	48	15.84	53DH604	272	576	57	73	N/A	N/A	N/A	N/A	N/A	1.7	36	83	32	2	1007	1642	206
8	CONC REDUCER 2-1/2"X1-1/2" 80S 316/L (S)	31098178	15	15.30	53UG905	238	523	52	80	N/A	N/A	N/A	N/A	N/A	1.6	33	105	36	3	1007	1691	205
9	CONC REDUCER 2-1/2"X1-1/4" 10S 316/L (S)	31098178	20	10.00	53UG968	290	605	61	69	N/A	N/A	N/A	N/A	N/A	1.8	39	82	32	1	1006	1622	206
10	CONC REDUCER 3"X2" 10S 316/L (S)	31098178	100	61.00	53DK115	262	580	58	77	N/A	N/A	N/A	N/A	N/A	1.4	35	94	34	1	1010	1632	202

COES G.Q.
Ricezione data 23/09/2024
Verificato data 23/09/2024
Sigla U.S.
Sigla U.S.

NOTE :

Y S = Yield Strength
T.S = Tensile Strength
E.L. = Elongation In 50mm (or 4D), min, %
1Ksi = 1,000 Psi
1Mpa= 1N/mm2 =0.145038 Ksi

SCH = Schedule
R.T = Radiography Test
U.T = Ultrasonic Test
M.T = Magnetic Practice Test
E.T = Electromagnetic Test
P.T = Dye Penetrant Test

Note

* HEAT TREATMENT : 1080 DEGREE CELSIUS QUENCHED IN WATER
* Products conform to ASME B16.9 2018 and ASME Sec II Part A-2019 SA-403/SA-403M 2019,
  Cold formed , annealed and quenched, bevelled ends to ASME B16.25,
* Materials are in accordance to NACE MR 0175 (ISO 15156-1 & 15156-3 -2015) & NACE MR 0103 -2015.(Latest Edition)
* Intergranular Corrosion Test are in Accordance to ASTM A262 Practice E : Passed
* Surface and dimension check has been carried out 100% to all products
* Pickled and Passivated
* Products are mercury free and free from mercury contamination
* Raw material manufacturer has detected it to be free from radioactive contamination.
* All fittings are confirmed 100% P.M.I tested
* Stainless steelmaking : Electric arc furnace
* Certified according to AD2000 W0 and PED2014/68/EU Annex 1, Paragraph 4.3
* Country of Origin Malaysia

MAC PIPING MATERIALS SDN. BHD. ACCEPTED QUALITY ASSURANCE

QA/QC DEPARTMENT

24 2656

MAC Piping Materials Sdn. Bhd.
Company No : 1250791-W
Lot 8095, Jalan Sungai Rasau 32,
Kawasan 16, Sungai Rasau, 41300 Klang,
Selangor Darul Ehsan, Malaysia
Tel : +603-3344 9733 Fax : +603-3344 9722
Website : www.macpiping.com
Email : enquiry@macppiping.com

07/202/9030/WZ/2302/18
07/202/9030/WP/2302/18
PED2014/68/EU

TUV SUD Asia Pacific
ISO 9001 : 2015
Certificate Registration
No. TUV100 13 4225

MILL TEST REPORT

IN ACCORDANCE TO EN 10204 3.1

CERTIFICATE NO : MAC9201757 (8) DATE : 01/04/2021

INVOICE NO : INVE00440
CONTRACT NO. : SO-000515/525
SHIPPER : MAC PIPING MATERIALS SDN BHD

PURCHASE ORDER N : 31098178/8183/8175/8458
CUSTOMER : DACAPO STAINLESS BV

PRODUCT : STAINLESS STEEL BUTT WELD FITTINGS (SEAMLESS)
SPECIFICATION : ASTM A403/ASME SA403M-19
MATERIAL GRADE : WP316/316L-S (SEAMLESS)

NO.	DESCRIPTION OF GOODS (PRODUCT, SIZE, SCHEDULE, GRADE)	PO No.	QUANTITY (PCS)	WEIGHT (KGS)	HEAT NUMBER	TENSILE TEST Y.S. N/mm²	T.S. N/mm²	EL % (L)	HARDNESS TEST (HRB)	NON-DESTRUCTIVE TEST (NDT) RT	UT	MT	PT	ET	CHEMICAL COMPOSITION (wt%) C	Si	Mn	P	S	Ni	Cr	Mo
																	X 100	X 100		X 100		
						205	515	28	AVR						-	-	-	-	-	1000	1600	200
									187						3.0	100	200	45	30	1400	1800	300
1	ELBOW 90 1" SCH 10S 316/L (S)	31098178	451	54.12	53DJ810	282	587	59	71	N/A	N/A	N/A	N/A	N/A	1.6	32	80	33	7	1006	1625	206
2	ELBOW 90 1" SCH 10S 316/L (S)	31098178	49	5.88	53DJ110	270	581	57	73	N/A	N/A	N/A	N/A	N/A	1.7	33	94	33	2	1002	1636	203
3	ELBOW 90 1/2" SCH 10S 316/L (S)	31098178	500	20.00	53UG850	281	598	61	71	N/A	N/A	N/A	N/A	N/A	2.4	49	123	31	3	1018	1622	217
4	ELBOW 90 1/2" SCH 40S 316/L (S)	31098178	150	7.50	53UG820	240	530	55	71	N/A	N/A	N/A	N/A	N/A	1.2	15	145	22	15	1022	1660	205
5	ELBOW 90 1/2" SCH 80S 316/L (S)	31098178	150	9.00	53UG802	245	530	47	68	N/A	N/A	N/A	N/A	N/A	2.7	16	115	35	18	1029	1637	210
6	ELBOW 90 1-1/2" SCH 40S 316/L (S)	31098178	100	41.00	53DK142	270	581	60	78	N/A	N/A	N/A	N/A	N/A	1.8	35	80	33	7	1005	1638	205
7	ELBOW 90 1-1/2" SCH 80S 316/L (S)	31098178	50	26.50	53DE235	264	579	56	73	N/A	N/A	N/A	N/A	N/A	1.8	35	80	33	2	1005	1638	205
8	ELBOW 90 1-1/4" SCH 10S 316/L (S)	31098178	150	30.00	53DJ111	268	582	61	73	N/A	N/A	N/A	N/A	N/A	1.8	41	93	33	2	1003	1635	200
9	ELBOW 90 1-1/4" SCH 40S 316/L (S)	31098178	100	28.00	53DJ515	269	583	59	77	N/A	N/A	N/A	N/A	N/A	2.5	37	82	35	1	1002	1637	202
10	ELBOW 90 2" SCH 40S 316/L (S)	31098178	200	136.00	53DK343	273	585	55	78	N/A	N/A	N/A	N/A	N/A	1.4	30	82	35	2	1007	1625	204
11	ELBOW 90 2" SCH 80S 316/L (S)	31098178	200	190.00	53DK183	272	583	56	78	N/A	N/A	N/A	N/A	N/A	1.4	30	82	35	2	1007	1625	204

NOTE :

Y.S = Yield Strength
T.S = Tensile Strength
E.L = Elongation in 50mm (or 4D), min, %
1Ksi = 1,000 Psi
1Mpa= 1N/mm2 = 0.145038 Ksi

SCH = Schedule
R.T = Radiography Test
U.T = Ultrasonic Test
M.T = Magnetic Practice Test
E.T = Electromagnetic Test
P.T = Dye Penetrant Test

Note
* HEAT TREATMENT : 1080 DEGREE CELSIUS QUENCHED IN WATER
* Products conform to ASME B16.9 2018 and ASME Sec II Part A-2019 SA-403/SA-403M 2019.
Cold formed , annealed and quenched, bevelled ends to ASME B16.25.
* Materials are in accordance to NACE MR 0175 (ISO 15156-1 & 15156-3 -2015) & NACE MR 0103 -2015.(Latest Edition)
* Intergranular Corrosion Test are in Accordance to ASTM A262 Practice E : Passed
* Surface and dimension check has been carried out 100% to all products
* Pickled and Passivated
* Products are mercury free and free from mercury contamination
* Raw material manufacturer has detected it to be free from radioactive contamination.
* All fittings are confirmed 100% P.M.I tested
* Stainless steelmaking : Electric arc furnace
* Certified according to AD2000 W0 and PED2014/68/EU Annex I Paragraph 4.3
* Country of Origin Malaysia

ACCEPTED QUALITY ASSURANCE QA/QC DEPARTMENT

COES SRL VERIFIED IDENTICAL TO SA 403 Ed. 2003 U.S.

COES G.Q. Ricezione data 13/09/2004 Verificato data 18/09/2004 Sigla U.S. Sigla U.S.

24 2657

INSPECTION CERTIFICATE

EN 10204 : 3.1

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

Cert. to DACAPO STAINLESS B.V

Order No. : 24DCP002 V166752
(注文番号) 31145198

Certification No. : MCP2405-00007-104

Invoice No : SP/FIT24-047

Date (日付) : 02/05/2024

LRQA CERTIFIED ISO 9001

Product	Specification	Specification for Pipe (Raw Material)
STAINLESS STEEL 90 DEG LONG RADIUS ELBOW (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	ASTM A312 TP 316/316L

*	Size	Dimension in mm		Lot No.	Quantity	Surface Inspection	Dimension Inspection	Manufacturing Method	Item Reference No.
		Outside Dia	Thickness						
1	2" X 10S	60.33	2.77	M240101	160	PASSED	PASSED	COLD FORMED	N/A

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) %

*	Heat No.	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	NY230828AW04	1.9	39.6	93.2	34	1	1001	1629	201	
Specification		MAX 3.0	MAX 100	MAX 200	MAX 45	MAX 30	1000 1400	1600 1800	200 300	

Mechanical Properties of Pipe (Raw Material)

Type of Specimen	YS Mpa	TS Mpa	EL% (GL:50mm)		Flattening Test	HT Mpa		Hardness Test HRB
Longitudinal	254	594	54		PASSED	-		78
	MIN 205	MIN 515	MIN 28					

* Hardness acc. to NACE MR0175 / ISO 15156-3: 2015, NACE MR0103:2015. ISO 9001-2015/EN 10204-3.1. PED 2014/68/EU ANNEX I SECTION 4.3 INTERGRANULAR CORROSION TEST (ASTM A262/E) - OK. PMI CHECK GOOD.
HEAT TREATMENT 1050 DEGREE CELCIUS QUENCHED IN WATER. PICKLED AND PASSIVATED.
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 or Indonesia 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.

OTHERS:	DESCRIPTION :
N/A	

We herewith certify that the above products meet the requirements of the relevant standard and of the customer order.

Head of QA/QC Dept.

COES G.Q.	Ricezione data 13/09/2024	Sigla V.S.
	Verificato data 13/09/2024	Sigla V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 403 Ed. 2023
V.S.

24 2665

INSPECTION CERTIFICATE

EN 10204 : 3.1

Certification No. : MCP2405-00007-127

Cert. to DACAPO STAINLESS B.V

Order No. : 24DCP002
(注文番号) 31145198

V166774

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

Invoice No : SP/FIT24-047

Date (日付) : 02/05/2024

LRQA CERTIFIED ISO 9001

Product	Specification	Specification for Pipe (Raw Material)
STAINLESS STEEL CONCENTRIC REDUCER (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	ASTM A312 TP 316/316L

*	Size	Dimension in mm		Lot No.	Quantity	Surface Inspection	Dimension Inspection	Manufacturing Method	Item Reference No.
		Outside Dia	Thickness						
1	2" x 1½" X 40S	60.33 X 48.26	3.91 X 3.68	MR240179	50	PASSED	PASSED	COLD FORMED	N/A

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) %											Mechanical Properties of Pipe (Raw Material)								
*	Heat No.	C x 100	Si x 100	Mn x 100	P x 1000	S x 1000	Ni x 100	Cr x 100	Mo x 100		Type of Specimen	YS Mpa	TS Mpa	EL% (GL:50mm)		Flattening Test	HT Mpa		Hardness Test HRB
1	NY230828AW04	1.9	39.6	93.2	34	1	1001	1629	201		Longitudinal	256	596	56		PASSED	-		79
Specification		MAX 3.0	MAX 100	MAX 200	MAX 45	MAX 30	1000 1400	1600 1800	200 300			MIN 205	MIN 515	MIN 28					

* Hardness acc. to NACE MR0175 / ISO 15156-3: 2015, NACE MR0103:2015. ISO 9001-2015/EN 10204-3.1. PED 2014/68/EU ANNEX I SECTION 4.3 INTERGRANULAR CORROSION TEST (ASTM A262/E) - OK. PMI CHECK GOOD.
HEAT TREATMENT 1050 DEGREE CELCIUS QUENCHED IN WATER. PICKLED AND PASSIVATED.
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 or Indonesia 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.

OTHERS:	DESCRIPTION :
N/A	

We herewith certify that the above products meet the requirements of the relevant standard and of the customer order.

Head of QA/QC Dept.

COES G.Q. | Ricezione data 13/09/2024 | Sigla U.S. | Verificato data 13/09/2024 | Sigla U.S.

COES SRL
VERIFIED IDENTICAL TO
SA 403 Ed. 2023
U.S.

24 2666

24 2668

V166864

Cert. to EN 10204 (3.1)

INSPECTION CERTIFICATE

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

Page (頁) : 1

Date (日付) : JULY 31, 2023

Certificate No. (書類番号) : 23-07-0354

LRQA CERTIFIED ISO 9001

Order No. (注文番号) : 23SAN002

LA SOCRETE S.P. UNITED INDUSTRY SDN. BHD. GARANTT QUE LES PRODUITS OBJET DU PRESENT CERTIFICAT, RESPECTENT EN LEUR TOTALITE LES PRESCRIPTIONS DE L'ARTICLE 15 DE L'ARRETE MINISTERIEL DU 24 MARS 1978, MODIFIE.
C ≤ 0.25%, P ≤ 0.05%, S ≤ 0.05%, R ≤ 800 N/MM², E ≤ 0.9 X R%,
A%(LO=5.65√SO) MIN. 16%, EN LONG, R(A-2) ≥ 10500 N/MM²

P.O. No. : 806596

Product (形状)	Product Specification (規格)	Specification for Pipe (Raw Material) (材料規格)
STAINLESS STEEL STRAIGHT TEE (SEAMLESS)	ASTM A403-2022 / ASME SA403-2019 (ASME SEC II PART A) ASME B16.9-2018 / MSS SP-43-2019 WP-S 316/316L	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.	Manufacturing Method
X 1	FBST-S316L- 2"x10S	60.33	2.77	MT230164	100	GOOD	GOOD	54312000	COLD FORMED
2	FBST-S316L- 3"x10S	88.90	3.05	MT230153	50	GOOD	GOOD	54313000	COLD FORMED
3	FBST-S316L- 6"x10S	168.28	3.40	MT230159	21	GOOD	GOOD	54316000	COLD FORMED

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)

*	Raw Pipe Heat No. (溶解番号)	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	221116AS04	2.4	36.1	101.2	36	1	1002	1616	204	
2	230103AT04	1.2	38.4	89.1	35	1	1004	1630	204	
3	221010BE03	1.8	35.1	105	37	1	1005	1626	202	
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	
	253	593	52		GOOD	GOOD	78	
	253	593	53		GOOD	GOOD	82	
	253	594	53		GOOD	GOOD	80	
	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 ASME SEC.II PART A 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 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

COES G.Q. | Ricezione data 13/09/2024 | Sigla U.S. | Verificato data 13/09/2024 | Sigla U.S.

COES SRL
VERIFIED IDENTICAL TO
SA 403 Ed. 2023
U.S.

V166424

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

Order No. : 23DCP015 (注文番号)

P.O. No. : 31143573

Date (日付) : APRIL 03, 2024

Certificate No. : 24-04-0148 (書類番号)

LRQA CERTIFIED ISO 9001

Approval No.15/9001-0043/E
PED Cert No.0343/PED/MUM/181009/2

COES G.Q.
Ricezione data 13/09/2024
Verificato data 13/09/2024
Sigla U.S.
Sigla U.S.

Product (形状)	Product Specification (規格)	Specification for Pipe (Raw Material) (材料規格)
STAINLESS STEEL STRAIGHT TEE (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)	Dimension in mm (寸法) 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	2"x40S	60.33	3.91	MT240095	20	GOOD	GOOD	54342000	NY230828AW04
2	2"x40S	60.33	3.91	MT240120	30	GOOD	GOOD	54342000	NY231123AS07

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	MT240095	1.9	39.6	93.2	34	1	1001	1629	201	
2	MT240120	1.8	49	82	36	1	1001	1630	202	
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	
1		256	596	56		GOOD	GOOD	79	
2		256	598	55.5		GOOD	GOOD	78	
Specification		MIN 205	MIN 515	MIN 28					

Remarks * Hardness acc. to NACE MR0175 / ISO 15156-3: 2015, NACE MR0103:2015. ISO 9001-2015/EN 10204(3.1.)
PED 2014/68/EU ANNEX I SECTION 4.3 INTERGRANULAR CORROSION TEST (ASTM A262/E) - OK. PMI CHECK GOOD.
HEAT TREATMENT 1050 DEGREE CELCIUS QUENCHED IN WATER. PICKLED AND PASSIVATED.
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

COES SRL
VERIFIED IDENTICAL TO
SA 403 Ed. 2023
U.S.

24 2669

ADDRESS Via Arno, 3
20029 **TURBIGO (MI)** ITALIA
PHONE 0331 871111 (3 linee r.a.)
FAX 0331 871468
WEB SITE www.turozzi.it
E-MAIL turozzi@turozzi.it

COES G.Q.	Ricezione data 23/09/2024	Sigla V.S.
	Verificato data 24/09/2024	Sigla V.S.

AZIENDA CON SISTEMA QUALITA' CERTIFICATO — COMPANY WITH QUALITY SYSTEM CERTIFIED

24 2702

turozzi fratelli S.r.l.

Raccordi in acciaio per impianti ad alta pressione
Steel fitting for high pressure plants

CLIENTE / *Purchaser*	CERTIFICATO DI COLLAUDO *Works certificate*		FOGLIO *Sheet*
COES S.r.l. Trattamento Gas		EN 10204 3.1	
ORDINE / *Order*	N. 67621	DEL / *Of* 23/09/2024	1/2
2472 2703 2795 2821 2881 ns.DdT 864			

ITEM *Item*	Q.TA' *Q.ty*	DESCRIZIONE / *Description*	COD.COLATA *Heat Code*	COLATA *Heat*	MATERIALE *Material*	CERTIF. ORIG. *Mill Certificate*	RIF.INT. *Record*	ACCIAIERIA / FORNITORE *Steel plant / Supplier*
		VS.ORD. 2472 DEL 30-07-2024						
40	2	DIS.L4429 ADAT.M/F 1.1/2x3/4 A/SA182 F316L	0398	290398	A182 F316L/316	16451	3344.3	VALBRUNA - Italy
90	3	TEE 1.1/2 3000 NPT A/SA182 F316L	471219	471219	A182 F316L/316	375590	4511	OLARRA - Spain
		VS.ORD. 2703 DEL 05-09-2024						
50	4	GOMITO 90° 1/2 3000 NPT A/SA182 F316L	291555	291555	A182 F316L/316	113050	4693	VALBRUNA - Italy
		VS.ORD. 2795 DEL 12-09-2024						
10	30	MEZZO MANIC. 1/2 3000 NPT A/SA182 F316L	056	292056	A182 F316L/316	015881	3407.3	VALBRUNA - Italy
20	30	NIP./ES.RID. 1/2x1/4 3000 NPT A/SA182 F316L	8831	588831	A182 F316L/316	33868	3347.3	VALBRUNA - Italy

ANALISI CHIMICA - *Chemical Analysis*

COD.COLATA *Heat Code*	C %	Mn %	Si %	P %	S %	Ni %	Cr %	Mo %	Ti %	V %	Cu %	Al %	Nb %	N %	W %	C.E. %	PRE %
0398	0,014	1,530	0,440	0,029	0,022	10,120	16,730	2,050						0,068			
471219	0,025	1,720	0,370	0,032	0,028	10,010	16,610	2,020						0,038			
291555	0,014	1,480	0,400	0,032	0,028	10,030	16,950	2,030						0,061			
056	0,017	1,600	0,470	0,032	0,028	10,110	16,840	2,030						0,062			
8831	0,021	1,640	0,600	0,029	0,027	12,200	17,610	2,120						0,060			

COD.COLATA *Heat Code*	Fe %	Co %	Ta %	Sn %	Zn %	Pb %	Zr %	Ca %	B %	%	%	%
0398												
471219												
291555												
056												
8831												

Ferrite %	Grain size ASTM E112

CARATTERISTICHE MECCANICHE - *Mechanical Test*

COD.COLATA *Heat Code*	R Tens.Str. N/mm2	S Yield Point N/mm2	A : 2" Elongation %	C Reuction of area %	Bending Test	Flattening Test	Hydraulic Test	HB Hardness test	Kv Impact test J	Temp. °C	STATO DI FORNIT. (TRATT. TERM.) Supply cond. (heat treatment)	TEMP. °C	NOTE Remarks
0398	610	312	53,0	69,0							SOLUT. TREATED	1040	
471219	590	345	50,0	71,0							SOLUT. ANNEALED	1050	
291555	575	296	54,0	75,0							SOLUT. TREATED	1040	
056	669	472	45,0	69,0							SOLUT. ANNEALED	1040	
8831	737	615	32,0	67,0							SOLUT. ANNEALED	1040	

NATURA DEL MATERIALE / *Kind of material*	NORMA DI RIFERIMENTO *Referenced standard*	NOTE / *Remarks*
Acciaio elaborato al forno elettrico Steel made by electric furnace	Material: ASTM /ASME latest editions. Dimensions: ASME B16.11, MSS SP83-95-97, ASTM A733 latest editions.	Mat. in accordo a / Mat. according to ASME II, part A, latest edition.

COLLAUDI INTERNI / *Works inspection*	RISULT. *Result.*	COLLAUDI SUPPLEMENTARI / *Supplementary tests*	RISULT. *Result.*
Dimensionale/Visivo Dimensional/Visual	Ok Ok		

RESPONSABILE QUALITA' / *Quality Manager*

COES SRL
VERIFIED IDENTICAL TO
SA 182 Ed. 2023

ENTE COLLAUDATORE / *Inspection agency*

turozzi fratelli

ADDRESS Via Arno, 3
20029 **TURBIGO (MI)** ITALIA
PHONE 0331 871111 (3 linee r.a.)
FAX 0331 871468
WEB SITE www.turozzi.it
E-MAIL turozzi@turozzi.it

AZIENDA CON SISTEMA QUALITA' CERTIFICATO — COMPANY WITH QUALITY SYSTEM CERTIFIED

turozzi fratelli S.r.l.

Raccordi in acciaio per impianti ad alta pressione
Steel fitting for high pressure plants

CLIENTE / *Purchaser*	CERTIFICATO DI COLLAUDO *Works certificate*		FOGLIO *Sheet*
COES S.r.l. Trattamento Gas		EN 10204 3.1	
ORDINE / *Order*	N. 67621	DEL / *Of* 23/09/2024	2/2
2472 2703 2795 2821 2881 ns.DdT 864			

ITEM *Item*	Q.TA' *Q.ty*	DESCRIZIONE / *Description*	COD.COLATA *Heat Code*	COLATA *Heat*	MATERIALE *Material*	CERTIF. ORIG. *Mill Certificate*	RIF.INT. *Record*	ACCIAIERIA / FORNITORE *Steel plant / Supplier*
		VS.ORD. 2821 DEL 12-09-2024						
30	2	NIP./ES.RID. 1.1/4X1 3000 NPT A/SA182 F316L √	23858 √	423858	A182 F316L/316 √	891754/2010	2472.3	VALBRUNA - Italy
30	2	NIP./ES.RID. 1.1/4X1 3000 NPT A/SA182 F316L √	64840 √	264840	A182 F316L/316 √	603023/2014	2786.3	VALBRUNA - Italy
60	50	NIPPLO ES. 1/2 3000 NPT A/SA182 F316L √	6019 √	316019	A182 F316L/316 √	84513920	3387.3	UGITECH - Italia
		VS.ORD. 2881 DEL 18-09-2024						
20	50	TAPPO/T.ESAG. 1/2 NPT A/SA182 F316L √	DP86 √	572207	A182 F316L/316	273811/2018	3043.3	VALBRUNA - Italy
30	50	TAPPO/T.ESAG. 1/2 NPT A/SA182 F304L √	DP66 √	672076	A182 F304L/304	2016030992	2966.3	COGNE - Italy
40	20	RID.ESAG.M/F 3/4x1/2 NPT A/SA182 F304L √	DP61 √		A182 F304L/304	3686/2713.3		VALBRUNA - Italy

ANALISI CHIMICA - *Chemical Analysis*

COD.COLATA *Heat Code*	C %	Mn %	Si %	P %	S %	Ni %	Cr %	Mo %	Ti %	V %	Cu %	Al %	Nb %	N %	W %	C.E. %	PRE %
23858	0,014	1,510	0,500	0,027	0,030	10,340	17,010	2,000						0,060			
64840	0,012	1,540	0,550	0,029	0,030	10,010	16,660	2,010						0,056			
6019	0,019	1,361	0,427	0,027	0,027	10,262	16,858	2,070						0,040			
DP86	0,016	1,680	0,590	0,029	0,027	12,040	17,700	2,080						0,053			
DP66	0,013	1,320	0,270	0,031	0,027	8,210	18,130							0,084			
DP61	0,013	1,830	0,510	0,030	0,026	8,130	18,260							0,090			

COD.COLATA *Heat Code*	Fe %	Co %	Ta %	Sn %	Zn %	Pb %	Zr %	Ca %	B %	%	%	%
23858												
64840												
6019												
DP86												
DP66												
DP61												

Ferrite %	Grain size ASTM E112

CARATTERISTICHE MECCANICHE - *Mechanical Test*

COD.COLATA *Heat Code*	R Tens.Str. N/mm2	S Yield Point N/mm2	A : 2" Elongation %	C Recuction of area %	Bending Test	Flattening Test	Hydraulic Test	HB Hardness test	Kv Impact test J	Temp. °C	STATO DI FORNIT. (TRATT. TERM.) Supply cond. (heat treatment)	TEMP. °C	NOTE Remarks
23858	669	464	48,0	67,0							SOLUT. TREATED	1050	
64840	661	465	44,0	67,0							SOLUT. TREATED	1050	
6019	671	507	39,0	71,0							SOLUT.TREATED	1050	
DP86	657	492	47,0	74,0							SOLUT. TREATED	1050	
DP66	682	563	37,6	71,6							SOLUT. TREATED	1050	
DP61	710	558	45,0	68,0							SOLUT. TREATED	1050	

NATURA DEL MATERIALE / *Kind of material*	NORMA DI RIFERIMENTO *Referenced standard*	NOTE / *Remarks*
Acciaio elaborato al forno elettrico Steel made by electric furnace	Material: ASTM /ASME latest editions. Dimensions: ASME B16.11, MSS SP83-95-97, ASTM A733 latest editions.	Mat. in accordo a / Mat. according to ASME II, part A, latest edition.

COLLAUDI INTERNI / *Works inspection*	RISULT. *Result.*	COLLAUDI SUPPLEMENTARI / *Supplementary tests*	RISULT. *Result.*
Dimensionale/Visivo	Ok		
Dimensional/Visual	Ok		

RESPONSABILE QUALITA' / *Quality Manager*	ENTE COLLAUDATORE / *Inspection agency*
	turozzi fratelli

V133338

MAC Piping Materials TÜV NORD

MAC Piping Materials Sdn. Bhd.
Company No : 1250791-W
Lot 8095, Jalan Sungai Rasau 32,
Kawasan 16, Sungai Rasau, 41300 Klang,
Selangor Darul Ehsan, Malaysia
Tel : +603-3344 9733 Fax : +603-3344 9722
Website : www.macpiping.com
Email : enquiry@macppiping.com

07/202/9030/WZ/2302/18
07/202/9030/WP/2302/18
PED2014/68/EU

TUV SUD Asia Pacific
ISO 9001 : 2015
Certificate Registration
No. :TUV100 13 4226

MILL TEST REPORT

IN ACCORDANCE TO EN 10204 3.1

CERTIFICATE NO : MAC9202226 (19) DATE : 13/01/2022

INVOICE NO. : INVE00579
CONTRACT NO. : SO-000592/643/687
SHIPPER : MAC PIPING MATERIALS SDN BHD

PURCHASE ORDER N : 31100797/0803/3551/3554/3558
CUSTOMER : 5914/5919/5924/6022
: DACAPO STAINLESS BV
PRODUCT : STAINLESS STEEL BUTT WELD FITTINGS (SEAMLESS)
SPECIFICATION : ASTM A403/ASME SA403M-19
MATERIAL GRADE : WP316/316L-S (SEAMLESS)

NO.	DESCRIPTION OF GOODS (PRODUCT, SIZE, SCHEDULE, GRADE)	PO No.	QUANTITY (PCS)	WEIGHT (KGS)	HEAT NUMBER	TENSILE TEST Y.S. N/mm²	T.S. N/mm²	EL % (L)	HARD-NESS TEST (HRB)	NON-DESTRUCTIVE TEST (NDT) RT	UT	MT	PT	ET	CHEMICAL COMPOSITION (wt%) C	Si	Mn	P	S	Ni	Cr	Mo
																	X 100	X 1000		X 100		
						205	515	28	AVR						-	-	-	-	-	1000	1600	200 MIN
									187						3.0	100	200	45	30	1400	1800	300 MAX
1	TEE 1" SCH 10S 316/L (S)	31105919	100	22.00	53DL808	286	591	62	75	N/A	N/A	N/A	N/A	N/A	2.9	50	96	30	6	1002	1610	202
2	TEE 1" SCH 40S 316/L (S)	31105919	50	12.50	53DL109	266	590	62	75	N/A	N/A	N/A	N/A	N/A	1.6	32	80	33	2	1006	1625	206
3	TEE 1/2" SCH 10S 316/L (S)	31105919	150	10.50	53UT511	281	598	61	71	N/A	N/A	N/A	N/A	N/A	2.4	49	123	31	3	1018	1622	217
4	TEE 1/2" SCH 40S 316/L (S)	31105919	46	3.68	53UT419	240	530	55	71	N/A	N/A	N/A	N/A	N/A	1.2	15	145	22	15	1022	1660	205
5	TEE 2" SCH 80S 316/L (S)	31105919	30	39.00	53DK383	260	583	58	72	N/A	N/A	N/A	N/A	N/A	1.4	30	82	35	2	1007	1625	204
6	TEE 3" SCH 10S 316/L (S)	31105919	70	102.90	53DK115	262	580	58	77	N/A	N/A	N/A	N/A	N/A	1.4	35	94	34	1	1010	1632	202
7	TEE 3/4" SCH 40S 316/L (S)	31105919	50	6.50	53UT666	281	598	61	71	N/A	N/A	N/A	N/A	N/A	2.4	49	123	31	3	1018	1622	217
8	TEE 6" SCH 10S 316/L (S)	31105919	20	105.60	53DK318	272	575	55	76	N/A	N/A	N/A	N/A	N/A	2.2	36	135	34	2	1006	1625	203
9	TEE 6" SCH 40S 316/L (S)	31105919	10	107.40	53DK148	266	581	58	72	N/A	N/A	N/A	N/A	N/A	1.7	42	93	38	1	1002	1645	201
10	TEE 8" SCH 10S 316/L (S)	31105919	10	95.40	53UT566	256	545	47	80	N/A	N/A	N/A	N/A	N/A	1.6	39	95	35	1	1005	1641	203

NOTE :

Y.S = Yield Strength
T.S = Tensile Strength
E.L = Elongation in 50mm (or 4D), min, %
1Ksi = 1,000 Psi
1Mpa = 1N/mm2 = 0.145038 Ksi

SCH = Schedule
R.T = Radiography Test
U.T = Ultrasonic Test
M.T = Magnetic Practice Test
E.T = Electromagnetic Test
P.T = Dye Penetrant Test

Note

* HEAT TREATMENT : 1080 DEGREE CELSIUS QUENCHED IN WATER (15-30 minute holding time)
* Products conform to ASME B16.9 2018 and ASME Sec II Part A-2019 SA-403/SA-403M 2019,
Cold formed , annealed and quenched, bevelled ends to ASME B16.25,
* Materials are in accordance to NACE MR 0175 (ISO 15156-1 & 15156-3 -2015) & NACE MR 0103 -2015.(Latest Edition)
* Intergranular Corrosion Test are in Accordance to ASTM A262 Practice E : Passed
* Surface and dimension check has been carried out 100% to all products
* Pickled and Passivated
* Products are mercury free and free from mercury contamination
* Raw material manufacturer has detected it to be free from radioactive contamination.
* All fittings are confirmed 100% P.M.I tested
* Stainless steelmaking : Electric arc furnace
* Certified according to AD2000 W0 and PED2014/68/EU Annex 1, Paragraph 4.3
* Country of Origin Malaysia

ACCEPTED

QA/QC DEPARTMENT

COES G.Q. Ricezione data 24/01/2024 Sigla U.S.
Verificato data 24/01/2024 Sigla U.S.

COES SRL VERIFIED IDENTICAL TO SA-403 Ed. 2023 U.S.

24 2720

COES G.Q.	Ricezione data 26/09/2024	Sigla U.S.
	Verificato data 27/09/2024	Sigla U.S.

ADDRESS Via Arno, 3
20029 **TURBIGO (MI)** ITALIA
PHONE 0331 871111 (3 linee r.a.)
FAX 0331 871468
WEB SITE www.turozzi.it
E-MAIL turozzi@turozzi.it

AZIENDA CON SISTEMA QUALITA' CERTIFICATO — COMPANY WITH QUALITY SYSTEM CERTIFIED

24 2859

turozzi fratelli S.r.l.

Raccordi in acciaio per impianti ad alta pressione
Steel fitting for high pressure plants

CLIENTE / *Purchaser*	CERTIFICATO DI COLLAUDO *Works certificate*		FOGLIO *Sheet*
COES S.r.l. Trattamento Gas	EN 10204 3.1		
ORDINE / *Order*	N. 67639	DEL / *Of* 26/09/2024	1/1
2472 2627 2680 ns.DdT 882			

ITEM *Item*	Q.TA' *Q.ty*	DESCRIZIONE / *Description*	COD.COLATA *Heat Code*	COLATA *Heat*	MATERIALE *Material*	CERTIF. ORIG. *Mill Certificate*	RIF.INT. *Record*	ACCIAIERIA / FORNITORE *Steel plant / Supplier*
		VS.ORD. 2472 DEL 30-07-2024						
30	2	TEE/RID. 3/4x1/4 3000 NPT A/SA182 F316L	293396	293396	A182 F316L/316	25361	4700	VALBRUNA - Italy
		VS.ORD. 2627 DEL 30-08-2024						
20	20	TEE 1/2 3000 ISO7 RP F316L	573196	573196	A182 F316L/316	547205	4708	OLARRA - Spain
		VS.ORD. 2680 DEL 04-09-2024						
20	10	WELD. 2.1/2-2x1/2 S.40 A/SA182 F316L	2856	502856	A182 F316L/316	432404	4600	OLARRA - Spain

ANALISI CHIMICA - *Chemical Analysis*

COD.COLATA *Heat Code*	C %	Mn %	Si %	P %	S %	Ni %	Cr %	Mo %	Ti %	V %	Cu %	Al %	Nb %	N %	W %	C.E. %	PRE %
293396	0,019	1,545	0,500	0,033	0,022	10,090	16,960	2,020						0,064			
573196	0,024	1,530	0,510	0,035	0,029	10,110	16,560	2,010						0,036			
2856	0,023	1,510	0,350	0,035	0,026	10,090	16,580	2,060						0,033			

COD.COLATA *Heat Code*	Fe %	Co %	Ta %	Sn %	Zn %	Pb %	Zr %	Ca %	B %	%	%	%
293396												
573196												
2856												

Ferrite %	Grain size ASTM E112

CARATTERISTICHE MECCANICHE - *Mechanical Test*

COD.COLATA *Heat Code*	R Tens.Str. N/mm2	S Yield Point N/mm2	A : 2" Elongation %	C Reuction of area %	Bending Test	Flattening Test	Hydraulic Test	HB Hardness test	Kv Impact test J	Temp. °C	STATO DI FORNIT. (TRATT. TERM.) Supply cond. (heat treatment)	TEMP. °C	NOTE Remarks
293396	610	333	49,9	68,9							SOLUT. TREATED	1040	
573196	590	340	51,9	72,8							SOLUT. TREATED	1060	
2856	634	405	48,0	70,0							SOLUTION TREATED	1060	

NATURA DEL MATERIALE / *Kind of material*	NORMA DI RIFERIMENTO *Referenced standard*	NOTE / *Remarks*
Acciaio elaborato al forno elettrico Steel made by electric furnace	Material: ASTM /ASME latest editions. Dimensions: ASME B16.11, MSS SP83-95-97, ASTM A733 latest editions.	Mat. in accordo a / Mat. according to ASME II, part A, latest edition.

COLLAUDI INTERNI / *Works inspection*	RISULT. *Result.*	COLLAUDI SUPPLEMENTARI / *Supplementary tests*	RISULT. *Result.*
Dimensionale/Visivo Dimensional/Visual	Ok Ok		

RESPONSABILE QUALITA' / *Quality Manager*	ENTE COLLAUDATORE / *Inspection agency*
	COES SRL VERIFIED IDENTICAL TO SA 182 Ed. 2023 U.S.

turozzi fratelli

24 2912

ITM Group s.r.l.
Sede Amministrativa e Magazzino/Offices and Warehouse: Tel. ++39 0385 271411
Località Cardazzino 1-3 Tel. ++39 0385 272088
27040 Bosnasco (PV)

INSPECTION CERTIFICATE EN 10204 - 2004 (3.1) N° 114484 DATE: 30/09/2024

CUSTOMER :	COES S.r.l.	JOB N:	0000239/24	MARKED CODE	
CUSTOMER ORDER	2274/24	ITEM : 270		HEAT :	45506
DESCRIPTIONS :	RED.TEE 3"X1"1/2 SCH.40S/40S WP316/316L			QTY :	52

CONSTRUCTIONS STANDARDS :	ASTM/ASME A/SA403M-21/PED/2014/68/UE
SPECIFICATIONS :	
TYPE OF CONSTRUCTIONS :	SEAMLESS BY PIPE - COLD FORMED
HEAT TREATMENT :	SOLUTION ANNEALED AT 1050°C
DESIGN STANDARD :	ASME B 16.9 Ed.2018/16.25 Ed.2017

STEEL MAKER :	SCHOELLER	SMP: E.F	CERT.: 547507

CHEMICAL COMPOSITION

LADLE ANALYSIS % 45506

C%	Si%	Mn%	P%	S%	Cr%	Mo%	Ni%	V%	Al%	Cu%	Nb%	Ti%	W%	N%	Sn%	Ce%
0,0230	0,3300	1,5200	0,0260	0,0010	16,8000	2,1800	11,2500									

PRODUCT ANALYSIS %

C%	Si%	Mn%	P%	S%	Cr%	Mo%	Ni%	V%	Al%	Cu%	Nb%	Ti%	W%	N%	Sn%	Ce%

MECHANICAL PROPERTIES

Bend Test	R.M. Obt.	F.P. Obt.	Flattening	R.M. Obt.	F.P. Obt.	Hydro test	R.M. Obt.	F.P. Obt.

DIRECTION	Mpa	Yield Point Req	Yield Point Obt.	T.S. Req	T.S. Obt.	Elongation Req	Elongation Obt.	Red. Area Req	Red. Area Obt.
R.M.									
F.P.	LONGITUDINAL		296		605		48		

Hardness Test	
HB Req.	HB Obt.
237	171

Impact Test J (KV)			Shear Area %				Lateral Exp. mm			
Temp	Size	Direction	Req.	Obt.1	Obt.2	Obt.3	Req.	Obt.1	Obt.2	Obt.3	Req.	Obt.1	Obt.2	Obt.3
R.M. °C														
F.P. °C														

The following tests have been carried out with satisfactory results	MFR A.I. D.I.	Stamp	
VISUAL, DIMENSIONAL AND MARKING CHECK	W	MFR AUTHORIZED INSPECTOR	ITM
		PURCHASER AUTORIZED INSPECTOR	
		OFFICIAL DESIGNATED INSPECTOR	

REMARKS All fittings marked with low stress die stamps or interrupted dot stamps.

ACCORDING TO NACE MR 01 75 - HRC MAX 22

COES G.Q.	Ricezione data 30/09/2024	Sigla U.S.
	Verificato data 01/10/2024	Sigla U.S.

COES SRL
VERIFIED IDENTICAL TO
SA 403 Ed. 2003
U.S.

MFR AUTHORIZED INSPECTOR	PURCHASER AUTORIZED INSPECTOR	OFFICIAL DESIGNATED INSPECTOR
I.T.M. Group S.r.l. Q.C. DEPT.		
DATE 30/09/2024	DATE	DATE

R.M. = Raw Material - F.P. = Finished Product - Ce= long formula - Tensile test and hardness test carried out at room temperature

24 2938

CERTIFICATO PROVE MATERIALI N.7177/24 1- 2

Test certificate - Certificat d'epreuves - Werksabnahmezeugniss
EN 10204 3.1

FAD FLANGE ACCIAIO & DERIVATI s.p.a.

SEDE LEGALE: VIA BONESCHI , 1 - 20040 CAMBIAGO (MI) ITALIA
TEL : +39 02 959420 FAX : + 39 02 95942323 INTERNET: www.fadflange.it - E-MAIL: info@fadflange.it
CAPITALE SOCIALE / SHARE EQUITY € 3.000.000,00 REG.IMP. MONZA BRIANZA /C.F. 03840080158
PARTITA IVA / V.A.T. No. IT 00763980968 - REA MI/975057 - N.MECCANOGRAFICO MI 100012

CLIENTE / Customer - Client - Kunde
COES SRL

Via Pontida, 265

24040 STEZZANO BG ITALIA

DATA / Date - Date - Datum 12/09/2024
COMMESSA / Mill order / Comf. de commande / Komm 2415328
ORDINE / Order / Commande / Auftrag 2653/24
D.D.T. / Delivery note / Bullettin de livraison / Lieferschein 7.177

CODICE Line code / Code / Kode	COLATA Heat / Coulè / Schmelze	CERTIFICATO ORIGINE Certificate of origin / Certificat d'usine / Werkszugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description / Norme / Materiél / Description / Standard / Werkstoff / Gegenstand	POS.ORD. Item order / Pos. de comm / Auftragslabe	QUANTITA Quantity / Quantite / Stuckzahl
	EB318 √	NIC	F.FLG.ASME B16.5 A/SA182F316L BL √ 150 6" √ RF √	32	4

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,022	1,500	0,034	0,028	0,500	16,520	10,100	2,030	0,000	0,000	0,000	0,071	0,000	0,000	0,000	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght / Rupture / Zugfestigkeit	MPA Yield point / Limite elasticite / Streckgrenze	4D % Elongation / Allongement / Dehnung	Reduction of area / Striction % / Einschnürung	HB Hardness / Dureté / Harte	Impact test / Resilience / Kerbschkagzähigkeit	1	2	3	4
549,5	262,4	57,0	69,1	151 151	10/10 KV -50°C 178 161 174 J	B	D	X	X

CODICE Line code / Code / Kode	COLATA Heat / Coulè / Schmelze	CERTIFICATO ORIGINE Certificate of origin / Certificat d'usine / Werkszugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description / Norme / Materiél / Description / Standard / Werkstoff / Gegenstand	POS.ORD. Item order / Pos. de comm / Auftragslabe	QUANTITA Quantity / Quantite / Stuckzahl
	546689 √	OLARRA	F.FLG.ASME B16.5 A/SA182F316L WN √ 150 1" √ S.STD RF √	52	1

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,024	1,600	0,035	0,027	0,410	16,630	10,070	2,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght / Rupture / Zugfestigkeit	MPA Yield point / Limite elasticite / Streckgrenze	4D % Elongation / Allongement / Dehnung	Reduction of area / Striction % / Einschnürung	HB Hardness / Dureté / Harte	Impact test / Resilience / Kerbschkagzähigkeit	1	2	3	4
579,0	282,0	55,0	68,0	170 172	10/10 KV -50°C 182 200 191 J	B	D	X	X

CODICE Line code / Code / Kode	COLATA Heat / Coulè / Schmelze	CERTIFICATO ORIGINE Certificate of origin / Certificat d'usine / Werkszugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description / Norme / Materiél / Description / Standard / Werkstoff / Gegenstand	POS.ORD. Item order / Pos. de comm / Auftragslabe	QUANTITA Quantity / Quantite / Stuckzahl
	564492 √	OLARRA	F.FLG.ASME B16.5 A/SA182F316L WN √ 150 1.1/2" √ S.STD RF √	62	1

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,026	1,560	0,034	0,027	0,380	16,640	10,040	2,030	0,000	0,000	0,000	0,035	0,000	0,000	0,000	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,220	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght / Rupture / Zugfestigkeit	MPA Yield point / Limite elasticite / Streckgrenze	4D % Elongation / Allongement / Dehnung	Reduction of area / Striction % / Einschnürung	HB Hardness / Dureté / Harte	Impact test / Resilience / Kerbschkagzähigkeit	1	2	3	4
581,0	285,0	52,0	69,0	165 168	10/10 KV -50°C 166 175 155 J	B	D	X	X

CODICE Line code / Code / Kode	COLATA Heat / Coulè / Schmelze	CERTIFICATO ORIGINE Certificate of origin / Certificat d'usine / Werkszugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description / Norme / Materiél / Description / Standard / Werkstoff / Gegenstand	POS.ORD. Item order / Pos. de comm / Auftragslabe	QUANTITA Quantity / Quantite / Stuckzahl
	N220722AT11 √	NIC	F.FLG.ASME B16.5 A/SA182F316L WN √ 150 2" √ S.10S RF √	72	31

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,019	0,880	0,033	0,001	0,350	16,420	10,030	2,010	0,000	0,000	0,000	0,079	0,000	0,000	0,000	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght / Rupture / Zugfestigkeit	MPA Yield point / Limite elasticite / Streckgrenze	4D % Elongation / Allongement / Dehnung	Reduction of area / Striction % / Einschnürung	HB Hardness / Dureté / Harte	Impact test / Resilience / Kerbschkagzähigkeit	1	2	3	4
580,0	271,0	58,0	70,0	168 165	10/10 KV -196°C 201 209 185 J	B	D	X	X

COES G.Q.
Ricezione data 12/09/2024 Sigla V.S.
Verificato data 01/10/2024 Sigla V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 182 Ed. 2023
V.S.

(1) PRODUZIONE ACCIAIO / Steel production / Production acièr / Stahl produktion
A - CALMATO E ELABORATO AL FORNO ELETTRICO / Killed steel made by electric furnace / Acièr calmé produit au four electrique / Beruhigt stahl ausgearbeitet im elektrofen.
B - ELABORATO AL FORNO ELETTRICO / Made by electric furnace / Produit au four electrique / Ausgearbeitet im elektrofen.

(2) TRATT. TERMICO / Heat treatment / Traitment termique / Warmebehandlung
A - NORMALIZZATO / Normalized / Normalisé / Normalgeglüht.
B - NORMALIZZATO E RINVENUTO / Normalized and tempered/ Normalisé et revenu / Normalisiert angelasst.
C - BONIFICATO / Quenched and tempered / Bonoffé / Harten und anlassen.
D - SOLUBILIZZATO / Solution treat and quench / Solubilisé / Lösungsgeglüht.

(3) X - CERTIFICATO SECONDO ASME SA II ED.: 21 AD.:

(4) X - CONTROLLO VISIVO E DIMENSIONALE SODDISFACENTE / Satisfactory visual and dimensional check / Inspection et controle dimensionel satisfasant / Besichtigung und massokontrolle bestanden.

- I VALORI DELLE ANALISI CHIMICHE SONO RICAVATI DAL CERTIFICATO DI FERRERIA / Chemical analysis values are taken from mill certificate / Le valeur de certificat ont été obtenus par le certificat d'usine / Dei werte des zeugnisses sin vom original werksabnahmezegniss erhalten.

(5) $CE = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$

X NACE MR 01-75 ED.: 15

(6) DOUBLE CERTIFICATION: C.S:A/SA105/SA350LF2-1 - S.S:A/SA182F316/316L & A/SA182F304/304L

RESP. CONTROLLO CERTIFICATI / Issued by / Cert. contrôle / Zeugnisprüfungsamt	ENTE UFFICIALE DI COLLAUDO / Inspection authority / Service inspection officiel / Abnahme verein	CAPO COLLAUDO / Chief inspector / Chef de la reception / Chef de abnahmeabteilung

FAD FLANGE ACCIAIO & DERIVATI s.p.a.

SEDE LEGALE: VIA BONESCHI , 1 - 20040 CAMBIAGO (MI) ITALIA
TEL : +39 02 959420 FAX : + 39 02 95942323 INTERNET: www.fadflange.it - E-MAIL: info@fadflange.it
CAPITALE SOCIALE / SHARE EQUITY € 3.000.000,00 REG.IMP. MONZA BRIANZA /C.F. 03840080158
PARTITA IVA / V.A.T. No. IT 00763980968 - REA MI/975057 - N.MECCANOGRAFICO MI 100012

CERTIFICATO PROVE MATERIALI N.7177/24

Test certificate - Certificat d'epreuves - Werksabnahmezeugniss
EN 10204 / 3.1

CLIENTE / Customer - Client - Kunde
COES SRL

Via Pontida, 265

24040 STEZZANO BG ITALIA

DATA / Date - Date - Datum 12/09/2024
COMMESSA / Mill order / Comf. de commande / Komm 2415328
ORDINE / Order / Commande / Auftrag 2653/24
D.D.T. / Delivery note / Bulletin de livraison / Lieferschein 7.177

CODICE Line code Code Kode	COLATA Heat Coulè Schmeize	CERTIFICATO ORIGINE Certificate of origin Certificat d'usine Werkszzugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description Norme / Materiél / Description Standard / Werkstoff / Gegenstand	POS.ORD. Item order Pos. de comm Auftragslabe	QUANTITA Quantity Quantite Stuckzahl
	S30017 √	NIC	F.FLG.ASME B16.5 A/SA182F316L WN √ 300 2" √ S.10S RF √	82	2

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,026	1,600	0,042	0,024	0,330	16,840	10,100	2,060	0,000	0,000	0,000	0,069	0,000	0,000	0,000	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght Rupture Zugfestigkeit	MPA Yield point Limite elasticite Streckgrenze	4D % Elongation Allongement Dehnung	Reduction of area Striction % Einschnürung	HB Hardness Dureté Harte	Impact test Resilience Kerbschkagzähigkeit	(1)	(2)	(3)	(4)
605,8	341,6	55,4	73,4	172 172	10/10 KV -50°C 175 186 182 J	B	D	X	X

CODICE Line code Code Kode	COLATA Heat Coulè Schmeize	CERTIFICATO ORIGINE Certificate of origin Certificat d'usine Werkszzugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description Norme / Materiél / Description Standard / Werkstoff / Gegenstand	POS.ORD. Item order Pos. de comm Auftragslabe	QUANTITA Quantity Quantite Stuckzahl
	S-27961 √	NIC	F.FLG.ASME B16.5 A/SA182F316L WN √ 150 2" √ S.STD RF √	92	8

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,022	1,540	0,043	0,025	0,290	16,860	10,050	2,030	0,000	0,000	0,000	0,065	0,000	0,000	0,000	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght Rupture Zugfestigkeit	MPA Yield point Limite elasticite Streckgrenze	4D % Elongation Allongement Dehnung	Reduction of area Striction % Einschnürung	HB Hardness Dureté Harte	Impact test Resilience Kerbschkagzähigkeit	(1)	(2)	(3)	(4)
598,4	304,7	56,4	73,8	168 168	10/10 KV -50°C 174 168 179 J	B	D	X	X

CODICE Line code Code Kode	COLATA Heat Coulè Schmeize	CERTIFICATO ORIGINE Certificate of origin Certificat d'usine Werkszzugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description Norme / Materiél / Description Standard / Werkstoff / Gegenstand	POS.ORD. Item order Pos. de comm Auftragslabe	QUANTITA Quantity Quantite Stuckzahl
	801128 √	COGNE	F.FLG.ASME B16.5 A/SA182F316L WN √ 150 6" √ S.STD RF √	102	4

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,026	1,890	0,025	0,000	0,470	16,750	10,630	2,040	0,010	0,300	0,039	0,073	0,110	0,022	0,008	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,010	0,000	0,000	0,000	0,000	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght Rupture Zugfestigkeit	MPA Yield point Limite elasticite Streckgrenze	4D % Elongation Allongement Dehnung	Reduction of area Striction % Einschnürung	HB Hardness Dureté Harte	Impact test Resilience Kerbschkagzähigkeit	(1)	(2)	(3)	(4)
590,0	281,0	51,0	66,0	170 171	10/10 KV -50°C 172 175 168 J	B	D	X	X

NACE MR 0103 ED16

Material manufactured in accordance with PED 2014/68/UE PAR.4.3 under quality assurance system ISO 9001 cert. 206967 issued by Bureau Veritas

(1) PRODUZIONE ACCIAIO / Steel production / Production acièr / Stahl produktion
- A - CALMATO E ELABORATO AL FORNO ELETTRICO / Killed steel made by electric furnace / Aciér calmé produit au four electrique / Beruhigt stahl ausgearbeitet im elektrofen.
- B - ELABORATO AL FORNO ELETTRICO / Made by electric furnace / Produit au four electrique / Ausgearbeitet im elektrofen.

(2) TRATT. TERMICO / Heat treatment / Traitment termique / Warmebehandlung
- A - NORMALIZZATO / Normalized / Normalisè / Normalgegluht.
- B - NORMALIZZATO E RINVENUTO / Normalized and tempered/ Normalisè et revenu / Normalisiert angelasst.
- C - BONIFICATO / Quenched and tempered / Bonifiè / Hartan und anlassen.
- D - SOLUBILIZZATO / Solution treat and quench / Solubilisè / Lösungsgeglüht.

(3) X - CERTIFICATO SECONDO ASME SA II ED.: 21 AD.:

(4) X - CONTROLLO VISIVO E DIMENSIONALE SODDISFACENTE / Satisfactory visual and dimensional check / Inspection et controle dimensionel satisfasant / Besichtigung und massokontrolle bestanden.

- I VALORI DELLE ANALISI CHIMICHE SONO RICAVATI DAL CERTIFICATO DI FERRERIA / Chemical analysis values are taken from mill certificate / Le valeur de certificat ont été obtenus par le certificat d'usine / Dei werte des zeugnisses sin vom original werksabnahmezegniss erhalten.

(5) $CE = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$

X NACE MR 01-75 ED.: 15

(5) DOUBLE CERTIFICATION: C.S:A/SA105/SA350LF2-1 - S.S:A/SA182F316/316L & A/SA182F304/304L

RESP. CONTROLLO CERTIFICATI Issued by Cert. contrôle Zeugnissprüfungsamt	ENTE UFFICIALE DI COLLAUDO Inspection authority Service inspection officiel Abnahme verein	CAPO COLLAUDO Chief Inspector Chef de la reception Chef de abnahmeabteilung
Viviana Bonfanti		

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

TÜV NORD Italia S.r.l. ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 03-10-24 **Our Ref.** DDT 3518 / OC 1859 **of** 03-10-24 **Your Ref.** 2800/24 12-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402715

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERP8M058090	STUD BOLT ANSI B1.1 CL.2A - A/SA193/320 B8M D. 5/8" - 11UNC x 90 (3.1/2") √ 40 - 166/24	110,00	carbide solution tr.		835952	2JDL √
TERP8M058085	STUD BOLT ANSI B1.1 CL.2A - A/SA193/320 B8M D. 5/8" - 11UNC x 85 √ 50 - 166/24	5,00	carbide solution tr.		832528	2JDL √
TERP8M058155	STUD BOLT ANSI B1.1 CL.2A - A/SA193 B8M D. 5/8" - 11UNC x 155 √ 60 - 166/24	30,00	carbide solution tr.		835951	2JDL √
TERP8M058100	STUD BOLT ANSI B1.1 CL.2A - A/SA193-A320 B8M D. 5/8" - 11UNC x 100 (3.15/16") √ 70 - 166/24	10,00	carbide solution tr.		828929	2JDL √

COES G.Q.	Ricezione data 03/10/2024	Sigla U.S.
	Verificato data 04/10/2024	Sigla U.S.

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

24 3022

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 03-10-24 **Our Ref.** DDT 3518 / OC 1859 **of** 03-10-24 **Your Ref.** 2800/24 12-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402715

ITEM	QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.

MECHANICAL PROPERTIES

values	R (MPa)	Rp 0,2 (MPa)	A4 (%)	Z (%)	HB (min-max)
required	515 min	205 min	30 min.	50 min.	241 max
actual	744	596	34,0	64,0	234

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Ni (%)	Cr (%)	Mo (%)	N (%)
required	0,08 max	2,00 max	1,00 max	0,045 max	0,030 max	10,00 - 14,00	16,00 - 18,00	2,00 - 3,00	
actual	0,0190	1,4180	0,5000	0,0300	0,0280	10,5200	16,6550	2,0760	0,0350

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. 2023 - NACE MR0175/ISO 15156.

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)

TÜV NORD
TÜV NORD Italia S.r.l.
ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 03-10-24 **Our Ref.** DDT 3518 / OC 1859 **of** 03-10-24 **Your Ref.** 2800/24 12-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402715

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
55878M058P	HEAVY HEX NUT TAB.10 ANSI B18.2.2 - A/SA194 G8M D. 5/8" - 11UNC √	400,00	carbide solution tr.		834166	432625* √
	20 - 166/24					

MECHANICAL PROPERTIES

values	HB (min-max)	PROOF LOAD
required	126 - 300	
actual	283 - 287	POSITIVE

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Ni (%)	Cr (%)	Mo (%)	N (%)
required	0,08 max	2,00 max	1,00 max	0,045 max	0,030 max	10,0 - 14,0	16,0 - 18,0	2,00 - 3,00	
actual	0,018	1,610	0,340	0,031	0,0280	10,000	16,650	2,030	0,0320

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. 2023.

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

COES G.Q.	Ricezione data 28/09/2024	Sigla V.S.
	Verificato data 04/10/2024	Sigla V.S.

24 3066

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.pantechsalloy.com

http://www.pantech-group.com

NSF Certified to NSF/ANSI 61 — LRQA CERTIFIED ISO 9001 Approval No: ISO9001-0042465

MATERIAL MANUFACTURER APPROVAL ACCORDING TO PED 2014/68/EU, ANNEX I, PARA 4.3. PED CERTIFICATE NO.: 0845/PED/MUM/1110006/1

COPIA CONFORME ALL'ORIGINALE

INSPECTION DOCUMENT: EN 10204: 2004 Type 3.1

Customer: Raccorubi S.p.A

Product: Seamless Austenitic Stainless Steel Fitting

Certificate No: PSA3-FT-49115

Date: 1 Apr 2024

PO No.	Invoice No.	Product Specification	Dimension & Inspection Specification	Delivery Condition
00000052 S	E000006270	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
INA002-01-103CR	2" X 1 1/2" SCH 40s CON-REDUCER	3	WP316/316L-S	PASSED	11W561
JO030-1	2" X 1 1/2" SCH 40s CON-REDUCER	17	WP316/316L-S	PASSED	11Y467
LN007-1	2" X 1 1/2" SCH 40s CON-REDUCER	80	WP316/316L-S	PASSED	NY220905AS01

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	-	
INA002-01-103CR	0.017	0.36	1.19	0.034	0.002	16.44	11.14	2.14	<0.01		245	545	52	71	PASSED
JO030-1	0.025	0.35	1.12	0.029	0.002	16.42	11.08	2.06	< 0.01		254	607	59	79	PASSED
LN007-1	0.015	0.39	0.91	0.037	0.001	16.35	10.16	2.09	< 0.01		262	565	67	70	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 DONE 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 MATERIALS' 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(S-6) PANTECH S.A. [PRODUCT TYPE] [SIZE] [SCH] [SIZE] [THICKNESS] ASA403 [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

QAQC MANAGER HASSANUDDIN

Head of Quality Assurance Department

IL PRESENTE CERTIFICATO E' VALIDO PER CLIENTE .....

ORDINE N° 2837/24 DEL .....

N° 2 MT ..... KG .....

Form:FOA-0306 R.7; 30-01-2024

stomer: FERRAMENTA INDUSTRIALE FERR. IND. BONACINA S.r.l. 03-10-2024

scription: RID. CONC. 2"x1.1/2" SCH.40/S SEAMLESS

Order: 39 - 41 - Item n.: 4 - Our ref.: OCVEIT202400004168

ADDRESS Via Arno, 3
20029 **TURBIGO (MI)** ITALIA
PHONE 0331 871111 (3 linee r.a.)
FAX 0331 871468
WEB SITE www.turozzi.it
E-MAIL turozzi@turozzi.it

COES G.Q.	Ricezione data 10/10/2024	Sigla V.S.
	Verificato data 10/10/2024	Sigla V.S.

AZIENDA CON SISTEMA QUALITA' CERTIFICATO — COMPANY WITH QUALITY SYSTEM CERTIFIED

24 3147

turozzi fratelli S.r.l.

Raccordi in acciaio per impianti ad alta pressione
Steel fitting for high pressure plants

CLIENTE / *Purchaser*
COES S.r.l. Trattamento Gas

ORDINE / *Order*
2821 2872 3117 3122 3180 3202 ns.DdT 942

CERTIFICATO DI COLLAUDO *Works certificate* EN 10204 3.1

N. 67699 DEL / *Of* 10/10/2024

FOGLIO *Sheet* 1/3

ITEM *Item*	Q.TA' *Q.ty*	DESCRIZIONE / *Description*	COD.COLATA *Heat Code*	COLATA *Heat*	MATERIALE *Material*	CERTIF. ORIG. *Mill Certificate*	RIF.INT. *Record*	ACCIAIERIA / FORNITORE *Steel plant / Supplier*
		VS.ORD. 2821 DEL 12-09-2024						
10	4	GOMITO 90° 1.1/4 3000 NPT A/SA182 F316H	13521		A182 F316H	1814/1326		VALBRUNA - Italy
20	8	NIPPLO ES. 1.1/4 3000 NPT A/SA182 F316L	80293	280293	A182 F316L/316	489507/2019	3138.3	VALBRUNA - Italy
40	2	TEE 1.1/4 3000 NPT A/SA182 F316L	174016	174016	A182 F316L/316	2021046388	4613	COGNE-Italy
40	1	TEE 1.1/4 3000 NPT A/SA182 F316L	285858	285858	A182 F316L/316	48704/2022	4638	VALBRUNA - Italy
40	1	TEE 1.1/4 3000 NPT A/SA182 F316L	W9JR	W9JR	A182 F316L/316	2019/016345	4533	ROLDAN - Spain
		VS.ORD. 2872 REV.1 DEL 17-09-2024						
~~230~~	~~12~~	~~NIPPLO/T. 3/4x60 S.40 FxF A/SA103 WP304L~~	~~3568~~	~~563568~~	~~A312 TP304L/304~~	~~A/22-997110~~	~~1526.6~~	~~SANDVIK - Sweden~~

ANALISI CHIMICA - *Chemical Analysis*

COD.COLATA *Heat Code*	C %	Mn %	Si %	P %	S %	Ni %	Cr %	Mo %	Ti %	V %	Cu %	Al %	Nb %	N %	W %	C.E. %	PRE %
13521	0,050	1,480	0,480	0,030	0,026	10,130	16,350	2,020									
80293	0,015	1,430	0,550	0,031	0,028	10,070	16,760	2,040						0,054			
174016	0,018	1,800	0,340	0,025	0,024	10,220	17,070	2,070						0,076			
285858	0,014	1,670	0,490	0,029	0,029	10,000	17,090	2,020						0,066			
W9JR	0,020	1,443	0,400	0,028	0,020	10,290	16,560	2,012						0,047			
3568	0,012	1,150	0,370	0,022	0,008	10,090	18,260							0,063			

COD.COLATA *Heat Code*	Fe %	Co %	Ta %	Sn %	Zn %	Pb %	Zr %	Ca %	B %	%	%	%
13521												
80293												
174016												
285858												
W9JR												
3568												

Ferrite %	Grain size ASTM E112

CARATTERISTICHE MECCANICHE - *Mechanical Test*

COD.COLATA *Heat Code*	R Tens.Str. N/mm2	S Yield Point N/mm2	A : 2" Elongation %	C Recuction of area %	Bending Test	Flattening Test	Hydraulic Test	HB Hardness test	Kv Impact test J	Temp. °C	STATO DI FORNIT. (TRATT. TERM.) Supply cond. (heat treatment)	TEMP. °C	NOTE Remarks
13521	572	267	64,2	71,5							SOLUT. TREATED	1100	
80293	673	500	43,0	67,0							SOLUT. ANNEALED	1080	
174016	617	277	52,8	75,9							SOLUT.ANNEALED	1050	
285858	617	344	50,0	68,0							SOLUT. TREATED	1040	
W9JR	590	285	55,0	70,5							SOLUT. TREATED	1050	
3568	655	345	56,0			OK	OK				SOLUT. ANNEALED	1040	

NATURA DEL MATERIALE / *Kind of material*	NORMA DI RIFERIMENTO *Referenced standard*	NOTE / *Remarks*
Acciaio elaborato al forno elettrico Steel made by electric furnace	Material: ASTM /ASME latest editions. Dimensions: ASME B16.11, MSS SP83-95-97, ASTM A733 latest editions.	Mat. in accordo a / Mat. according to ASME II, part A, latest edition.

COLLAUDI INTERNI / *Works inspection*	RISULT. *Result.*	COLLAUDI SUPPLEMENTARI / *Supplementary tests*	RISULT. *Result.*
Dimensionale/Visivo Dimensional/Visual	Ok Ok		

RESPONSABILE QUALITA' / *Quality Manager*

COES SRL
VERIFIED IDENTICAL TO
SA 182 Ed. 2023

ENTE COLLAUDATORE / *Inspection agency*

COES SRL
VERIFIED IDENTICAL TO
SA 105 Ed. 2023

turozzi fratelli

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AZIENDA CON SISTEMA QUALITA' CERTIFICATO — COMPANY WITH QUALITY SYSTEM CERTIFIED

turozzi fratelli S.r.l.

Raccordi in acciaio per impianti ad alta pressione
Steel fitting for high pressure plants

CLIENTE / *Purchaser*	CERTIFICATO DI COLLAUDO *Works certificate*			FOGLIO *Sheet*
COES S.r.l. Trattamento Gas			EN 10204 3.1	
ORDINE / *Order*				
2821 2872 3117 3122 3180 3202 ns.DdT 942	N. 67699	DEL / *Of* 10/10/2024		2/3

ITEM *Item*	Q.TA' *Q.ty*	DESCRIZIONE / *Description*	COD.COLATA *Heat Code*	COLATA *Heat*	MATERIALE *Material*	CERTIF. ORIG. *Mill Certificate*	RIF.INT. *Record*	ACCIAIERIA / FORNITORE *Steel plant / Supplier*
		VS.ORD. 3117 DEL 02-10-2024						
30	16	TAP./T.ESAG. 1/2 NPT A/SA182 F316L √	DP86 √	572207	A182 F316L/316 √	273811/2018	3043.3	VALBRUNA - Italy
		VS.ORD. 3122 DEL 02-10-2024						
10	8	MANICOTTO 1/2 6000 NPT A/SA105	5628	22/75628	A105	9398	1299.1	RIVA - Italy
20	8	WELDOLET 10-6x1 S.40 A/SA105	79633	16/79633	A105	22115	4329	RIVA - Italy
30	10	TAPPO/T.ESAG. 1/2 NPT A/SA105 √	DP24 √	E01222212	A105 √	493731	1287.1	SWISS ST.-Switzerl.
		VS.ORD. 3180 DEL 08-10-2024						
20	23	NIP./ES.RID. 3/4x1/2 3000 NPT A/SA182 F316L √	678 √	291678	A182 F316L/316 √	015884	3409.3	VALBRUNA - Italy

ANALISI CHIMICA - *Chemical Analysis*

COD.COLATA *Heat Code*	C %	Mn %	Si %	P %	S %	Ni %	Cr %	Mo %	Ti %	V %	Cu %	Al %	Nb %	N %	W %	C.E. %	PRE %
DP86	0,016	1,680	0,590	0,029	0,027	12,040	17,700	2,080						0,053			
5628	0,180	0,850	0,260	0,007	0,015	0,060	0,090	0,010	0,014	0,013	0,150	0,025	0,001			0,358	
79633	0,185	0,850	0,190	0,015	0,008	0,060	0,130	0,010	0,015	0,014	0,170	0,023	0,001			0,373	
DP24	0,180	0,740	0,180	0,007	0,019	0,130	0,120	0,020			0,300			0,009		0,360	
678	0,017	1,580	0,580	0,036	0,030	10,150	16,830	2,020						0,062			

COD.COLATA *Heat Code*	Fe %	Co %	Ta %	Sn %	Zn %	Pb %	Zr %	Ca %	B %	%	%	%
DP86												
5628												
79633												
DP24												
678												

Ferrite %	Grain size ASTM E112

CARATTERISTICHE MECCANICHE - *Mechanical Test*

COD.COLATA *Heat Code*	R Tens.Str. N/mm2	S Yield Point N/mm2	A : 2" Elongation %	C Recuction of area %	Bending Test	Flattening Test	Hydraulic Test	HB Hardness test	Kv Impact test J	Temp. °C	STATO DI FORNIT. (TRATT. TERM.) Supply cond. (heat treatment)	TEMP. °C	NOTE Remarks
DP86	657	492	47,0	74,0							SOLUT. TREATED	1050	
5628	495	309	33,2	59,8				154 155					
79633	510	320	33,0	58,0				159 160					
DP24	491	309	27,3	52,0				164 167					
678	705	499	45,0	69,0							SOLUT. TREATED	1060	

NATURA DEL MATERIALE / *Kind of material*	NORMA DI RIFERIMENTO *Referenced standard*	NOTE / *Remarks*
Acciaio elaborato al forno elettrico Steel made by electric furnace	Material: ASTM /ASME latest editions. Dimensions: ASME B16.11, MSS SP83-95-97, ASTM A733 latest editions.	Mat. in accordo a / Mat. according to ASME II, part A, latest edition.

COLLAUDI INTERNI / *Works inspection*	RISULT. *Result.*	COLLAUDI SUPPLEMENTARI / *Supplementary tests*	RISULT. *Result.*
Dimensionale/Visivo	Ok		
Dimensional/Visual	Ok		

RESPONSABILE QUALITA' / *Quality Manager*	ENTE COLLAUDATORE / *Inspection agency*	turozzi fratelli

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AZIENDA CON SISTEMA QUALITA' CERTIFICATO — COMPANY WITH QUALITY SYSTEM CERTIFIED

turozzi fratelli S.r.l.

Raccordi in acciaio per impianti ad alta pressione
Steel fitting for high pressure plants

CLIENTE / *Purchaser*	CERTIFICATO DI COLLAUDO *Works certificate*		FOGLIO *Sheet*
COES S.r.l. Trattamento Gas		EN 10204 3.1	
ORDINE / *Order*			
2821 2872 3117 3122 3180 3202 ns.DdT 942	N. 67699	DEL / *Of* 10/10/2024	3/3

ITEM *Item*	Q.TA' *Q.ty*	DESCRIZIONE / *Description*	COD.COLATA *Heat Code*	COLATA *Heat*	MATERIALE *Material*	CERTIF. ORIG. *Mill Certificate*	RIF.INT. *Record*	ACCIAIERIA / FORNITORE *Steel plant / Supplier*
20	7	NIP./ES.RID. 3/4x1/2 3000 NPT A/SA182 F316L	5088	035088	A182 F316L/316	84249950	3194.3	UGITECH Italia
30	20	GOMITO M/F 1/2 3000 NPT A/SA182 F316L	573121	573121	A182 F316L/316	545424	4705	OLARRA - Spain
40	20	MANICOTTO 3/4 3000 NPT A/SA182 F316L	0913	290913	A182 F316L/316	35900	3412.3	VALBRUNA - Italy
		VS.ORD. 3202 DEL 08-10-2024						
10	10	GOMITO M/F 3/4 3000 NPT A/SA182 F316L	174041	174041	A182 F316L/316	2021051612	4614	COGNE - Italy
20	10	NIPPLO/ES.RID. 3/4x1/2 3000 NPT A/SA105	1967	BD1967	A105	092397	1231.1	RODACCIAI - Italy

ANALISI CHIMICA - *Chemical Analysis*

COD.COLATA *Heat Code*	C %	Mn %	Si %	P %	S %	Ni %	Cr %	Mo %	Ti %	V %	Cu %	Al %	Nb %	N %	W %	C.E. %	PRE %
5088	0,016	1,369	0,419	0,026	0,025	10,099	16,560	2,037						0,045			
573121	0,020	1,530	0,380	0,034	0,028	10,290	16,620	2,050						0,036			
0913	0,011	1,480	0,480	0,030	0,026	10,030	16,690	2,050						0,057			
174041	0,018	1,830	0,370	0,030	0,027	10,070	16,690	2,080						0,077			
1967	0,185	0,930	0,250	0,011	0,027	0,100	0,150	0,030		0,002	0,130	0,022	0,001			0,392	

COD.COLATA *Heat Code*	Fe %	Co %	Ta %	Sn %	Zn %	Pb %	Zr %	Ca %	B %	%	%	%
5088												
573121												
0913												
174041												
1967												

Ferrite %	Grain size ASTM E112

CARATTERISTICHE MECCANICHE - *Mechanical Test*

COD.COLATA *Heat Code*	R Tens.Str. N/mm2	S Yield Point N/mm2	A : 2" Elongation %	C Recuction of area %	Bending Test	Flattening Test	Hydraulic Test	HB Hardness test	Kv Impact test J	Temp. °C	STATO DI FORNIT. (TRATT. TERM.) Supply cond. (heat treatment)	TEMP. °C	NOTE Remarks
5088	660	490	36,0	74,0							SOLUT.TREATED	1050	
573121	582	335	52,0	78,0							SOLUT. ANNEALED	1060	
0913	626	325	53,0	69,0							SOLUT. TREATED	1040	
174041	596	274	53,9	76,3							SOLUT. TREATED	1050	
1967	616	533	33,2	58,0				182 181					

NATURA DEL MATERIALE / *Kind of material*	NORMA DI RIFERIMENTO *Referenced standard*	NOTE / *Remarks*
Acciaio elaborato al forno elettrico Steel made by electric furnace	Material: ASTM /ASME latest editions. Dimensions: ASME B16.11, MSS SP83-95-97, ASTM A733 latest editions.	Mat. in accordo a / Mat. according to ASME II, part A, latest edition.

COLLAUDI INTERNI / *Works inspection*	RISULT. *Result.*	COLLAUDI SUPPLEMENTARI / *Supplementary tests*	RISULT. *Result.*
Dimensionale/Visivo	Ok		
Dimensional/Visual	Ok		

RESPONSABILE QUALITA' / *Quality Manager*	ENTE COLLAUDATORE / *Inspection agency*	turozzi fratelli

+39 035 2050 511 | www.coessrl.eu | coes@coessrl.com |
Via Pontida, 265 - 24040 STEZZANO (BG) ITALY | Via Europa, 9 - 24040 COMUN NUOVO (BG) ITALY

MATERIAL CERTIFICATES LIST

DOCUMENT No: CML58338	**REV. 0**	**SHEET 1 OF 28**

CUSTOMER:	ROSETTI MARINO S.P.A.
PROJECT:	HOLLANDSE KIST NOORD WIND PARK PROJECT
OBJECT:	AIR FILTER
SERIAL No.:	S240121-S240122-S240127-S240128
DRAWING:	CCO54155
COES JOB:	166/24

0	V. Girardello	C. Pilenga	01/10/2024	FIRST ISSUE
REV.	**ISSUED BY**	**CONTROLLED BY**	**DATE**	**DESCRIPTION**

coes
+39 035 2050 511 | www.coessrl.eu | coes@coessrl.com |
Via Pontida, 265 - 24040 STEZZANO (BG) ITALY | Via Europa, 9 - 24040 COMUN NUOVO (BG) ITALY

POS	QTY	DESCRIPTION	MATERIAL	MFR	CERT	HEAT	REF.COES
2	1	CARTRIDGE SUPPORT PLATE	SA 240 TP316/316L	MARCEGAGLIA SPECIALTIES	10723558894	56658	24 2548
3	1	SUPPORT NAMEPLATE 140x120 Thk.4mm	SA 240 TP316/316L	OUTOKUMPU	819214/002	85900	24 1707
5	1	FLANGE BLIND B16.5 6" 150# RF	SA 213 TP316/316L	FAD SPA	7177/24	EB318	24 2938
6	16	NUT 3/4" UNC	SA 194 Gr.7	IPL SRL	240268	598896	24 2460
7	8	STUD-BOLT 3/4 UNC x 120	SA 320 Gr.L7	IPL SRL	2402421	299641	24 2411
8	1	CAP 6" Sch.40S	SA 403 WP316/316L	PANTECH STAINLESS&ALLOY	PSA3-FT-50251	NG001-1	24 2670
9	2	BENDING PLATE L60x60x8 L=530	SA 240 TP316/316L	OUTOKUMPU	5065419.R00	150561	24 2642
10	2	PLATE120x80 thk=10 - N° 2 HOLES Ø14	SA 240 TP316	APERAM GENK	23K0034120-01 V01	336112	24 2550
11	1	FLANGE W.N.6" Sch. 40S 150# RF	SA 182 F316/316L	FAD SPA	7177/24	801128	24 2938
13	1	HALF COUPLING 1/2" NPT 3000#	SA 182 F316/316L	TUROZZI F.LLI SRL	67621	056	24 2702
14	440,000 mm	PIPE SMLSS 6" Sch.40S	SA 312 TP316/316L	SURAJ LTD	300	NJ0217	24 2419
17	2	FLANGE W.N.2" Sch. 40S 150# RF	SA 182 F316/316L	FAD SPA	7177/24	S-27961	24 2938
18	130,000 mm	PIPE SMLSS 2" Sch.40S	SA 312 TP316/316L	STEAMLINE INDUSTRIES LTD	SIL/MTC/2023-24/298	3700	24 2429

Customer 10470700 OFFICINE FRATELLI TAIOCCHI SPA - Order ref. 090409 - Order LSI n. 0003747 - 29/05/2019 - Doc. BC-2019-0003240 - 05/06/2019
Item L16B004012501 LAM A 316L 2B 4 1250X2500 - (1250 x 2500) - Quantity n 2 Kg 200
Lot. LSI a8T04200 - Heat 85900-5 - Case Y844885

a8T04000

outokumpu

INSPECTION CERTIFICATE 3.1
DIN EN 10204 3.1

Certificate No. / Zeugnis Nr. / N° du certificat: 819214/002
Page / Seite / Page: 1(01)
Date / Datum / Date: 01.08.2018

Delivery address, Empfänger, Lieu de livraison	
L.S.I. LAMIERE SPECIALI INOX S.P.A. VIA GIULIO NATTA 7/A 43100 PARMA ITALY	L.S.I. LAMIERE SPECIALI INOX S.P.A. VIA GIULIO NATTA 7/A 43100 PARMA ITALY

Requirements, Anforderungen, Exigences	Our Order No. / Unser Auftrag Nr. / Notre commande n°	Your order, Ihre Bestellung, Votre commande
EN 10088-4:2009 AD 2000 W2, W10 & EN 10028-7:2016 ASTM A240/A240M ASME SA-240/SA-240M II A ED. 2017	300481835	OF-2018-0000064

Product, Erzeugnisform, Produit	Mark of Manufacturer / Zeichen des Lieferwerkes / Signe de producteur	Process / Erschmelzungsart / Mode de fusion	Inspector's stamp / Zeichen d. Sachverst. / Poinçon de l'expert
COIL , STAINLESS STEEL	outokumpu	AOD	

Grade, Werkstoff, Nuance	Tolerances Toleranzen, Tolérances
1.4404 1.4401 TYPE 316L	EN ISO 9445-2

Marking, Kennzeichnung, Marquage	Marks, Versandzeichen, Marques
1.4404 2B	

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	15	85900 5	4,0 X 1250 MM		21640 KG	2B

CE 14 0045-CPR-0567

Charge no. / Schmelze Nr. / Coulée n°	Chemical composition, Chemische Zusammensetzung, Composition chimiques											
	C %	Si %	Mn %	P %	S %	Cr %	Ni %	MO %	N %			
85900	0,020	0,48	1,13	0,039	0,001	17,0	10,0	2,01	0,041			

Line / Reihe / Ligne	Mechanical properties, Mechanische Eigenschaften, Caracteristiques mecaniques								Tensile test, Zugversuch, Essai de traction
	Sample ID / Proben ID / Échantillon	Rp0.2 MPa	Rp1.0 MPa	Rm MPa	A5 %	A50 %	%	Hardness / Härte, Dureté HBW	ISO 6892-1:2009 A224 SAMPLES PERPENDICULAR TO THE ROLLING DIRECTION
1	01	323	361	617	52	50		181	APPROVED ACC.TO AD2000-W0 WITH VERIFICATION OF THE UNIFORMITY OVER THE STRIP LENGTH. CERTIFIED ACC.TO PED 2014/68/EU BY TÜV NORD REG. NO. 0045. DOPS ACC. TO CPR AVAILABLE ON THE WEB PAGE BY STEEL NUMBER
	02	317	354	613	53	50		180	

Identity test, Verwechslungsprüfung, Controle d'identification	
Sizes, Abmessungen, Dimensions	OK
Surface, Oberfläche, Surface	OK
Test of intergran. corros, Prüfung auf interkrist. Korros, Test de corros. Intercrist.	OK
EN ISO 3651-2 A: OK	

ASTM A240/A240M
ASME SA-240/SA-240M II A ED. 2017
TYPE 316
EN 10088-2:2014/1.4404,1.4401
NACE MR0103/ISO 17945 AND
NACE MR0175/ISO 15156-1 / NACE MR0175/ISO 15156-3

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 / Werkssachverständiger / Inspecteur autorisé: NANNA RIIKKULA

FI-95490 Tornio, Finland
Tel. +358 16 4521,email certificate.tornio@outokumpu.com
www.outokumpu.com
Domicile: Tornio, Finland. Business Identity Code 0923315-9

LSI Lamiere Speciali Inox S.p.A. - CONFORM TO THE ORIGINAL

COES SRL
VERIFIED IDENTICAL TO
SA 240 Ed. 2023
V.S.

COES G.Q.	Ricezione data	Sigla
	08/05/2024	V.S.
	Verificato data	Sigla
	14/05/2024	V.S.

2411

24

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

TÜV NORD
TÜV NORD Italia S.r.l.
ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 04-09-24 **Our Ref.** DDT 3132 / OC 1588 **of** 04-09-24 **Your Ref.** 2342/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402421 ✓

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPL7078160B	STUD BOLT ANSI B1.1 CL.2A - A/SA320 L7 D. 7/8" - 9UNC x 160 ZINC.PLATED ✓ 140 - 687/23	40,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	834344	241068 ✓

MECHANICAL PROPERTIES

values	R (MPa)	Rs 0,2 (MPa)	A4 (%)	Z (%)	HT ASTM A370+E10	I.T. -101°C ASTM A370+E23
required	860 min.	725 min.	16 min.	50 min.	HB 321 max	20 min. 27 av. (J)
actual	988,1	771	18,8	57,6	298	30 - 30 - 30

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)	Al (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25	
actual	0,440	0,850	0,230	0,015	0,0080	0,970	0,210	0,023

COES G.Q.
Ricezione data 04/09/2024 Sigla V.S.
Verificato data 04/09/2024 Sigla V.S.

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. 2023. 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.
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ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 04-09-24 **Our Ref.** DDT 3132 / OC 1588 **of** 04-09-24 **Your Ref.** 2342/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402421

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPL7034120B	STUDBOLT ANSI B1.1 CL.2A - A/SA320 L7 D. 3/4" - 10UNC x 120 ZINC. PLATED ✓ 100 - 687/23	80,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	834340	299641 ✓

MECHANICAL PROPERTIES

values	R (MPa)	Rs 0,2 (MPa)	A4 (%)	Z (%)	HT ASTM A370+E10	I.T. -101°C ASTM A370+E23
required	860 min.	725 min.	16 min.	50 min.	HB 321 max	20 min. 27 av. (J)
actual	969	798	17,1	61,0	291	69 - 67 - 79

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)	Al (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25	
actual	0,417	0,804	0,262	0,012	0,0050	1,009	0,200	0,025

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. 2023. 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.

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Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 04-09-24 **Our Ref.** DDT 3132 / OC 1588 **of** 04-09-24 **Your Ref.** 2342/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402421

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5587G7012P00B	HEAVY HEX NUT TAB.10 ANSI B18.2.2 - A/SA194 G7 D. 1/2" - 13UNC ZINC.PLATED ✓ 20 - 687/23	190,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	553384	58444 ✓

MECHANICAL PROPERTIES

values	HT (min-max) ASTM A370+E10	HT after 24 hrs ASTM A370+E10	PROOF LOAD ASTM A962	HT (min - max) ASTM A370+E18	HT after 24 hrs ASTM A370+E18	I.T. -101°C ASTM A370+E23
required	248 - 327 HB	201 HB min.		24-35 HRc	94 HRb min.	20 min. 27 av. (J)
actual	279 - 300	271 - 288	OK @ 110,4 KN			41 - 32 - 35

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25
actual	0,42	0,85	0,27	0,018	0,011	1,06	0,21

remarks: chemical and mechanical values, at delivery condition, are quoted by the relevant steel work certificate. VISUAL AND DIMENSIONAL TEST SATISFACTORY
Nuts hardness test after 24 hrs @ 590°C. According to: ASME II part. A ed. 2023. Macroetch test acc.to ASTM E381: N.A. - inadequate area.

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.

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Date, 04-09-24 **Our Ref.** DDT 3132 / OC 1588 **of** 04-09-24 **Your Ref.** 2342/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402421

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5587G7078P00B	HEAVY HEX NUT TAB.10 ANSI B18.2.2 - A/SA194 G7 D. 7/8" - 9UNC ZINC.PLATED √	80,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	834345	63171* √
	3400 - 687/23					

MECHANICAL PROPERTIES

values	HT (min-max) ASTM A370+E10	HT after 24 hrs ASTM A370+E10	PROOF LOAD ASTM A962	HT (min - max) ASTM A370+E18	HT after 24 hrs ASTM A370+E18	I.T. -101°C ASTM A370+E23
required	248 - 327 HB	201 HB min.		24-35 HRc	94 HRb min.	20 min. 27 av. (J)
actual	282 - 306	277 - 295	OK @ 359,6 KN			33 - 30 - 42

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25
actual	0,42	0,81	0,29	0,025	0,021	0,92	0,23

remarks: Chemical and mechanical values, at delivery condition, are quoted by the relevant steel work certificate. VISUAL AND DIMENSIONAL TEST SATISFACTORY
Nuts hardness test after 24 HRS tempering at 590°C. According to: ASME II part. A ed. 2023. Macroetch test according to ASTM E381 result: Conforming.

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.

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24040 STEZZANO (BG)

Date, 04-09-24 **Our Ref.** DDT 3132 / OC 1588 **of** 04-09-24 **Your Ref.** 2342/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402421

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPL7012080B	STUDBOLT ANSI B1.1 CL.2A - A/SA320 L7 D. 1/2" - 13UNC x 80 ZINC PLATED √ 70 - 687/23	20,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	834337	BD0035 √
TERPL7012085B	STUDBOLT ANSI B1.1 CL.2A - A/SA320 L7 D. 1/2" - 13UNC x 85 ZINC PLATED √ 80 - 687/23	20,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	834338	BD0035 √
TERPL7012090B	STUD BOLT ANSI B1.1 CL.2A - A/SA320 L7 D. 1/2" - 13UNC x 90 ZINC PLATED √ 90 - 687/23	20,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	834339	BD0035 √

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

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Date, 04-09-24 **Our Ref.** DDT 3132 / OC 1588 **of** 04-09-24 **Your Ref.** 2342/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402421

ITEM	QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.

MECHANICAL PROPERTIES

values	R (MPa)	Rs 0,2 (MPa)	A4 (%)	Z (%)	HT ASTM A370+E10	I.T. -101°C ASTM A370+E23
required	860 min.	725 min.	16 min.	50 min.	HB 321 max	20 min. 27 av. (J)
actual	943	746	20,9	60,7	282	N.A.

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)	Al (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25	
actual	0,425	0,830	0,230	0,011	0,0220	1,030	0,170	0,023

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. 2023. Macroetch test according to ASTM E381 result: N.A. - inadequate area.

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)

TÜV NORD
TÜV NORD Italia S.r.l.
ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 04-09-24 **Our Ref.** DDT 3132 / OC 1588 **of** 04-09-24 **Your Ref.** 2342/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402421

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPL7058065B	TIR. L EFF. ANSI B1.1 CL.2A - A/SA320 L7 D. 5/8" - 11UNC x 65 ZINC PLATED ✓ 130 - 687/23	10,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	834343	BF4049 * ✓

MECHANICAL PROPERTIES

values	R (MPa)	Rs 0,2 (MPa)	A4 (%)	Z (%)	HB	I.T. KV - 101°C (J)
required	860 min.	725 min.	16 min.	50 min.	321 max	16 min. 22 av.
actual	1060	800	16,0	53,0	306-306-313	28 - 29 - 32

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)	Al (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25	
actual	0,415	0,860	0,310	0,008	0,0020	1,070	0,210	0,025

remarks: Mechanical values see IRCM certificate n. 1874/22. Chemical values and Macroetch test, at delivery condition, are quoted by the relevant steel work certificate. According to ASME II part. A ed. 2023. Macroetch test according to ASTM E381 result: S1 R1 C1. 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

24 2419

REGD. OFFICE :
'Suraj House',
Opp. Usmanpura Garden, Ashram Road,
Ahmedabad - 380 014. Gujarat (INDIA)
Tel. : 0091-79-2754 0720 / 2754 0721
Fax : 0091-79-2754 0722
Email : suraj@surajgroup.com

SURAJ LIMITED

(AN ISO 9001 : 2015 COMPANY)
(AN ISO 14001 : 2015 COMPANY)
(AN ISO 45001 : 2018 COMPANY)
(AN PED 2014/68/EU APPROVED COMPANY)

F / QA / 24 REV. NO. 10

WORKS :
Survey No. 779/A, Thol, Kadi - Sanand Highway,
Tal.-Kadi, Dist. Mehsana, Gujarat (India)
Tel. : (02764) 274216 / 27417 Fax : (02764) 274419
Email : quality@surajgroup.com
Visit us at www.surajgroup.com

INSPECTION CERTIFICATE

In Accordance with EN 10204/3.1

Customer: T.L.P. SPA — **T.C No :** 300 — **Date :** 11.12.2022
Product : Austenitic S.S Seamless Cold Finish,Solution Annealed,Pickled & Passivated Pipes. — **P.O.No :** 213964 — **Date :** 31.03.2022
W.O.No : 2223/OEP400001 R02 — **Date :** 25.07.2022

Sr. No	Specification	Grade	Heat No.	Dimensions		Quantity			Hydro Test Pressure (Psi)
				OD (MM)	THK (MM)	Length Mtr	Pcs.	Total Meter	
80	ASTM A-312 Ed.2019 SA-312 of ASME Sec.II Part "A" Ed.2019 EN 10216-5 TC1 NACE MR 0175/ISO 15156-3, NACE MR 0103	TP 316/316L 1.4401/ 1.4404	NJ0217	168.30	7.11	RL	44	281.680	1300

Chemical Analysis %

Heat No.	Required	C	Mn	P	S	Si	Cr	Ni	Mo	N	Ti
	Min	--	--	--	--	--	16.50	10.00	2.00	--	--
	Max	0.030	2.00	0.040	0.015	1.00	18.00	13.00	2.50	0.100	--
NJ0217	Heat Analysis	0.027	1.22	0.038	0.010	0.43	16.65	10.08	2.05	0.075	--
	Product Analysis	0.025	1.21	0.035	0.009	0.40	16.62	10.06	2.03	0.072	--

Mechanical Test

Heat No.	Required				Gauge Width	Flattening Test	Hardness Test	IGC Test
	Tensile strength Mpa	Yield strength Rp0.2% Mpa	Yield strength Rp 1 % Mpa	Elongation % GL 5.65√A				
MAX	690	--	--	--				ASTM A-262 Practice"E"
MIN	515	205	240	40			Max-90 HRB	
NJ0217	613.42	310.89	329.34	52.78	25.40	Satisfactory	71-73	Satisfactory

Heat Treatment : Solution annealing conducted at 1045-1060°C temperature and rapid water quenching after final cold process.

Marking on pipes: SURAJ LTD ASTM/ASME A/SA-312 TP 316/316L __MM OD X ___ MM THK X RL SEAMLESS CFD EN 10216-5 TC1 1.4401/1.4404 HEAT NO___ SL NO.___ P O NO.____

Remarks:

* 100% Hydro test done at required pressure for 10 second holding time found satisfactory without any leakage.
* 100% Visual ,Dimensions(OD/THK/LENGTH) & Product Marking checked-satisfy the requirment of specification.
* 100% Positive Material Identification (PMI) done by SL & conforming to grade as per specification- found satisfactory.
* Intergranular Corrosion Test (IGC) Conducted as per ASTM A262 Pr"E"-No crack observed on bend portion at 20X - found satisfactory.
* Pickling and passivation conducted as per ASTM A-380.
* **"Approved acc.to AD 2000-MERKBLATT W0 and certified acc.to PED (2014/68/EU) by certification body for pressure equipment of TUV NORD SYSTEMS (NOTIFIED BODY,REG NO,:0045)"**
* Tensile test piece taken from the same lot as certified and tested in longitudinal direction.
* **Melting process:EAF+AOD & Material is free of mercury & radioactive contamination.**

For Suraj Limited.

Prepared by

C.I.Nayak
Dept,Head Quality

TD100354912
Azienda: TLP Pozzo d'Adda
Tipo: Certificati di origine

We hereby certify that the materi... the specification and results comply with the requirements of the purchase order.

COES G.Q. | Ricezione data 06/09/2024 | Sigla U.S. | Verificato data 06/09/2024 | Sigla U.S.

COES SRL
VERIFIED IDENTICAL TO
SA 312 Ed. 2023
U.S.

Tubo S/S ASTM A 312 316/316L 168,30 x 7,11 Client Order: 2698/24 Your Code: Your Item: 20/d5402 Your Job:
HEAT NJ0217 OUR ORDER: 2024 SC 79170/ 200 QTY: NR 1,00 MT 6,38 KG 183,00

Steamline Industries Limited
(Pipe Division)
AN ISO 9001:2015/PED 2014/68/EU/AD2000
Merkblatt W0 ISO 14001:2015 ISO 45001:2018 Certificate Company

Survey No. 265,
P.O. Nananpur - 383 210,
Taluka : Prantij, Dist.: Sabarkantha,
Gujarat, INDIA.
Ph. : +91-2772-236900 (100 Lines)
Web-Site : www.steamlineind.com
CIN NO : U51900MH1991PLC062917

Form No.:- SIL/QA&QC/F/14(a) Rev01
ISO 9001:2015 ISO 14001:2015 BS OHSAS 18001:2007

INSPECTION CERTIFICATE

EN-10204 3.1

CUSTOMER :	M/s Soluzioni Piping Srl	TEST CERTIFICATE No. :	SIL/MTC/2023-24/298
P. O. No. :	221 DTD : 27/07/2023	DATE :	23/03/2024
SPECIFICATION & GRADE :	ASTM/ASME A/SA 312 /A 999 & EN ISO 1127 D3/T3, 2019ed EN 10216-5 TC1 TP 316/316L 1.4401/1.4404	END FINISH :	Plain ends
PRODUCT :	SEAMLESS S.S.Pipes as per ASTM/ASME A/SA 312 /A 999 & EN ISO 1127 D3/T3, Sec II Part A 2019ed EN 10216-5 TC1 TP 316/316L 1.4401/1.4404 NACE MR0175/NACE MR0103, 2015 PED 2014/68/EU/AD 2000	ITEM STATUS :	Complete
SOC No. :	EX-148 B		

DESCRIPTION

Sr. No.	SIZE (OD X WT X LENGTH)	HEAT NO.	Qty. PCS	QTY (Mtrs)	HTP (Psig) (HOLDING TIME:10 SEC.)	FT	DRIFT	RB	FB	RFT/ ~~RBT~~	VDI
1	60.33 MM OD X 3.91 MM THK X 5.8-7.0 MTR LONG	3700	131	831.20	1700	OK	OK	NA	NA	NA	OK
2	60.33 MM OD X 5.54 MM THK X 5.8-7.0 MTR LONG		82	506.06	2300	OK	OK	NA	NA	NA	OK

MECHANICAL PROPERTIES							CHEMICAL COMPOSITION (%)								
SL No.	Heat No.	PROOF STRENGTH Mpa 0.2%	PROOF STRENGTH Mpa 1.0%	U.T.S. Mpa	EL (%) GL=50mm	HARDNESS (HRB)	LA /PA	C	Mn	P	S	Si	Cr	Mo	Ni	N
REQ. (MAX)		---	---	710	---	90	---	0.035	2.00	0.045	0.030	1.00	18.00	3.00	14.00	---
REQ. (MIN)		205	240	510	40	---	---						16.00	2.00	10.00	---
3700		283.44	302.11	590.23	56	73-75	LA	0.025	1.49	0.038	0.004	0.42	16.88	2.03	10.06	---
		291.24	309.45	586.70	58		PA	0.024	1.47	0.035	0.003	0.40	16.89	2.04	10.04	---
		287.59	305.24	590.12	60	72-74	PA	0.023	1.48	0.036	0.005	0.39	16.87	2.02	10.05	---

REMARKS :

1) Solution Annealing Heat Treatment done by SIL at & above 1040°C (Min) and rapidly water Quenched
2) 100% Hydro Test carried out by SIL as per ASTM/ASME A/SA 312 and found satisfactory.
3) 100% Visual & Dimensions checked by SIL as per ASTM/ASME A/SA 312/A 999 & EN ISO 1127 D3/T3 TP 316/316L 1.4401/1.4404 and found within tolerance limit.
4) Chemical Test carried out by SIL as per ASTM/ASME A/SA 312 and found satisfactory.
5) Mechanical Test carried out by SIL as per EN 10216-5 TC1 and found satisfactory.
6) Test Piece Direction - Longitudinal
7) 100% PMI Test carried out by SIL and found satisfactory.
8) Micro Test carried out by SIL as per ASTM E 112 and found satisfactory.
9) IGC Pr "E" Test carried out by SIL as per ASTM A 262 and Practice "A" carried out by SIL as per EN ISO 3651-2 found satisfactory.
10)Raw material & finished goods: Raw materials are of Indian Origin and Finished goods are produced at Steamline Industries, Gujarat, India. Pre material country of origin is not Russia.
* MATERIAL IS FREE OF RADIOACTIVE CONTAMINATION. Material is FREE of Mercury contamination.
* NO Mercury,NO Welding OR Weld Repairs Done.

MARKING / STENCILLING: STEAMLINE INDUSTRIES LIMITED 60.33 MM OD x ___ MM THK x 5800-7000 MM LONG SMLS PIPE ASTM/ASME A/SA 312 EN 10216-5 TC1 TP 316/316L 1.4401/1.4404 HEAT NO:- 3700

WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED ABOVE CONFORMS TO THE ABOVE SPECIFICATION & P.O. REQUIREMENTS

LEGENDS: HTP – HYDROSTATIC TEST PRESSURE, FT – FLATTENING, FRT – FLARING TEST, RB – ROOT BEND, FB – FACE BEND, RFT – REVERSE FLATTENING, RBT – REVERSE BEND TEST, VDI – VISUAL & DIMENSIONAL INSP., R/L – RANDOM LENGTH, LA – LADDLE ANALYSIS, PA – PRODUCT ANALYSIS,
P.E. – PLAIN END, B.E. – BEVEL END, SITS – SATISFACTORY, NA – NOT APPLICABLE, Y.S. – YIELD STRESS, U.T.S. – ULTIMATE TENSILE STRENGTH, EL - ELONGATION

For STEAMLINE INDUSTRIES LTD.

COES G.Q. | Ricezione data 03/09/2024 | Sigla U.S. | Verificato data 06/09/2024 | Sigla U.S.

QA & C In Charge

Regd. & Corporate Office : 901/904, 9th Floor, Jagdamba Commercial Complex, Near Movie Time Theatre, Link Road, Malad (West) Mumbai-400 064 (INDIA)
Phone : +91-22 - 40999700 (100 Lines), Fax : + 91 - 22 - 40999777, E-mail : info@steamlineind.com

COES SRL
VERIFIED IDENTICAL TO
SA 312 Ed. 2023

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

TÜV NORD Italia S.r.l. ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 10-09-24 **Our Ref.** DDT 3184 / OC 1731 **of** 10-09-24 **Your Ref.** 2569/24 08-08-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402468

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5587G7034P00B	HEAVY HEX NUT TAB.10 ANSI B18.2.2 - A/SA194 G7 D. 3/4" - 10UNC ZINC.PLATED 30 - 167/24	3,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	710269	528252

MECHANICAL PROPERTIES

values	HT (min-max) ASTM A370+E10	HT after 24 hrs ASTM A370+E10	PROOF LOAD ASTM A962	HT (min - max) ASTM A370+E18	HT after 24 hrs ASTM A370+E18	I.T. -101°C ASTM A370+E23
required	248 - 327 HB	201 HB min.		24-35 HRc	94 HRb min.	20 min. 27 av. (J)
actual	313-313-317	313-306-306	OK @ 262,81 KN			45 - 32 - 35

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25
actual	0,40	0,75	0,21	0,012	0,016	0,99	0,17

COES G.Q.	Ricezione data 10/09/2024	Sigla V.S.
	Verificato data 10/09/2024	Sigla V.S.

remarks: Mechanical values see IRCM certificate n. 1877/22. Chemical values and I.T. test, at delivery condition, are quoted by the relevant steel work certificate. Nuts hardness test after 24 HRS tempering at 590°C. According to: ASME II part. A ed. 2023. 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

24 2460

IPL S.r.l.
BULLONERIA - TIRANTERIA
SPECIALE E STANDARD

Via Papa Giovanni Paolo I, 306
21040 UBOLDO (VA)

TÜV NORD
TÜV NORD Italia S.r.l.
ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 10-09-24 **Our Ref.** DDT 3184 / OC 1731 **of** 10-09-24 **Your Ref.** 2569/24 08-08-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402468

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5587G7012P00B	HEAVY HEX NUT TAB.10 ANSI B18.2.2 - A/SA194 G7 D. 1/2" - 13UNC ZINC.PLATED ✓	20,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	553384	58444 ✓

70 - 167/24

MECHANICAL PROPERTIES

values	HT (min-max) ASTM A370+E10	HT after 24 hrs ASTM A370+E10	PROOF LOAD ASTM A962	HT (min - max) ASTM A370+E18	HT after 24 hrs ASTM A370+E18	I.T. -101°C ASTM A370+E23
required	248 - 327 HB	201 HB min.		24-35 HRc	94 HRb min.	20 min. 27 av. (J)
actual	279 - 300	271 - 288	OK @ 110,4 KN			41 - 32 - 35

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25
actual	0,42	0,85	0,27	0,018	0,011	1,06	0,21

remarks: chemical and mechanical values, at delivery condition, are quoted by the relevant steel work certificate. VISUAL AND DIMENSIONAL TEST SATISFACTORY
Nuts hardness test after 24 hrs @ 590°C. According to: ASME II part. A ed. 2023. Macroetch test acc.to ASTM E381: N.A. - inadequate area.

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)

TÜV NORD ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 10-09-24 **Our Ref.** DDT 3184 / OC 1731 **of** 10-09-24 **Your Ref.** 2569/24 08-08-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402468

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5587G7034P00B	HEAVY HEX NUT TAB.10 ANSI B18.2.2 - A/SA194 G7 D. 3/4" - 10UNC ZINC.PLATED ✓ 30 - 167/24	30,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	778133	598896 ✓
5587G7034P00B	HEAVY HEX NUT TAB.10 ANSI B18.2.2 - A/SA194 G7 D. 3/4" - 10UNC ZINC.PLATED ✓ 30 - 167/24	7,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	834735	598896 ✓

MECHANICAL PROPERTIES

values	HT (min-max) ASTM A370+E10	HT after 24 hrs ASTM A370+E10	PROOF LOAD ASTM A962	HT (min - max) ASTM A370+E18	HT after 24 hrs ASTM A370+E18	I.T. -101°C ASTM A370+E23
required	248 - 327 HB	201 HB min.		24-35 HRc	94 HRb min.	20 min. 27 av. (J)
actual	278 - 296	271 - 285	OK @ 260 KN			30 - 38 - 38

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25
actual	0,41	0,79	0,20	0,012	0,007	0,98	0,17

remarks: chemical and mechanical values, at delivery condition, are quoted by the relevant steel work certificate. VISUAL AND DIMENSIONAL TEST SATISFACTORY. nuts hardness test after 24 HRS tempering at 590°C. Macroetch test according to ASTM E381 result: S2; R2; C1. According to: ASME II part. A ed. 2023.

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)

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 10-09-24 **Our Ref.** DDT 3184 / OC 1731 **of** 10-09-24 **Your Ref.** 2569/24 08-08-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402468

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5587G7058P00B	HEAVY HEX NUT TAB.10 ANSI B18.2.2 - A/SA194 G7 D. 5/8" - 11UNC ZINC.PLATED ✓ *40 - 167/24*	20,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	835151	68359* ✓
5587G7058P00B	HEAVY HEX NUT TAB.10 ANSI B18.2.2 - A/SA194 G7 D. 5/8" - 11UNC ZINC.PLATED ✓ *80 - 167/24*	40,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	835151	68359* ✓

MECHANICAL PROPERTIES

values	HT (min-max) ASTM A370+E10	HT after 24 hrs ASTM A370+E10	PROOF LOAD ASTM A962	HT (min - max) ASTM A370+E18	HT after 24 hrs ASTM A370+E18	I.T. -101°C ASTM A370+E23
required	248 - 327 HB	201 HB min.		24-35 HRc	94 HRb min.	20 min. 27 av. (J)
actual	313-313-306	313-306-306	OK @ 179,59 KN			40 - 39 - 35

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25
actual	0,41	0,79	0,23	0,016	0,018	0,91	0,23

remarks: Mechanical values see IRCM certificate n. 1875/22. Chemical and I.T. values at delivery condition, are quoted by the relevant steel work certificate.
Nuts hardness test after 24 HRS tempering at 590°C. According to: ASME II part. A ed. 2023. Macroetch test according to ASTM E381: equivalent to max. S2-R2-C3.

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)

Customer: **COES S.R.L.**
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 10-09-24 **Our Ref.** DDT 3184 / OC 1731 **of** 10-09-24 **Your Ref.** 2569/24 08-08-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402468

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)

Customer: **COES S.R.L.**
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 10-09-24 **Our Ref.** DDT 3184 / OC 1731 **of** 10-09-24 **Your Ref.** 2569/24 08-08-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402468

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPL7012075B	STUD BOLT ANSI B1.1 CL.2A - A/SA320 L7 D. 1/2" - 13UNC x 75 ZINC. PLATED ✓ 110 - 167/24	10,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	679033	BD0035 ✓

MECHANICAL PROPERTIES

values	R (MPa)	Rs 0,2 (MPa)	A4 (%)	Z (%)	HT ASTM A370+E10	I.T. -101°C ASTM A370+E23
required	860 min.	725 min.	16 min.	50 min.	HB 321 max	20 min. 27 av. (J)
actual	943	746	20,9	60,7	282	N.A.

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)	Al (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25	
actual	0,425	0,830	0,230	0,011	0,0220	1,030	0,170	0,023

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. 2023. Macroetch test according to ASTM E381 result: N.A. - inadequate area.

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)

TÜV NORD
TÜV NORD Italia S.r.l.
ISO 9001

Customer: **COES S.R.L.**
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 10-09-24 **Our Ref.** DDT 3184 / OC 1731 **of** 10-09-24 **Your Ref.** 2569/24 08-08-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402468

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPL7058100B	STUD BOLT ANSI B1.1 CL.2A - A/SA320 L7 D. 5/8" - 11UNC x 100 ZINC. PLATED ✓ 120 - 167/24	20,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	834341	BF4049** ✓

MECHANICAL PROPERTIES

values	R (MPa)	Rs 0,2 (MPa)	A4 (%)	Z (%)	HT ASTM A370+E10	I.T. -101°C ASTM A370+E23
required	860 min.	725 min.	16 min.	50 min.	HB 321 max	20 min. 27 av. (J)
actual	1015	801	19,4	57,7	306	39 - 40 - 41

CHEMICAL COMPOSITION

values	C (%)	Mn (%)	Si (%)	P (%)	S (%)	Cr (%)	Mo (%)	Al (%)
required	0,38 - 0,48	0,75 - 1,00	0,15 - 0,35	0,035 max	0,040 max	0,80 - 1,10	0,15 - 0,25	
actual	0,415	0,860	0,310	0,008	0,0020	1,070	0,210	0,025

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. 2023. 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

Order ref. 7207 - Item L316/316L F1 6X1500X3000 - Quantity 2132 UM KG NIM Acciai Vender 2023200858 - Heat 56658 - Supplier Batch - Product Id 2023200858
Delivery num 0101000827 - Confimation Order 2010000541 - Date 05/01/2024 00:00:00

MARCEGAGLIA SPECIALTIES

Type Inspection Certificate 3.1 AD-2000 EN10204 | Number 10723558894 | Issued On 28/08/2023

- QMS approved acc AD-2000 W0 with Cert 01 202 I/Q-08 5131 by TUV Rheinland (0035), cert. PED 2014/68/UE Annex I §4.3 by TUV Rheinland (0035)
- Material acc. AD2000 W2 - W10 in ref to EN10028-7
- Material conforming to NACE MR0175/MR0103 - ISO15156-1/ISO15156-3

Customer
NS.DEP.C/O ACCIAI VENDER SPA
VIA NOBEL 4A-Q.RE IND.LE S.P.I
43100 PARMA IT

ARENA ACCIAI s.r.l.

Consignee
NS.DEP.C/O ACCIAI VENDER SPA
VIA NOBEL 4A-Q.RE IND.LE S.P.I
43100 PARMA IT

Delivery Nn 8920249232
Of 28/08/2023
Delivery note nr 2507002971

Quality Control
Q.M.D./Q.M. A.Venturini
Plant Of Gazoldo

Pages 3/3

Material 50602678
Description CXC003 6,00 x 1500 4404/316L SR 6/14 FINITURA "1D"

Norm/Grade EN10028-7,EN10088-2,EN10088-4, ASTM A240, ASME SA240, ASTM A480, ASME SA480
Quality/Qualità X2CrNiMo17-12-2, WNR1.4404, 316L / AISI316, X5CrNiMo17-12-2, WNR1.4401, 316

Order Nr 1591886666/80
Client Order 2E/0000045
Client Date 7/4/2023

Item	Identification Nr	Heat	Quantity	Dimensional tolerances/
1	23H9008785	56658	11300 KG	EN9444-2

Pacco 190713

DDT 4287 DEL 16-04-2024

Steel Processing/
Electric arc furnace VOD/AOD, continuous casting, heat threatment /annealing at 1050°C, forced air cooling

- ASME norms acc. Sec. II Part A Ed. 2021

Mark Tester/
- Organization inspection: CQ3

Terms of Delivery/

Identification Nr	Chemical Type	Mark	C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Ni (%)	Mo (%)	N (%)
23H9008785		X001061258	.022	.560	.880	.0350	.0010	17.100	10.000	2.050	.0430

Identification Nr	Test position	Test direction	Mark	Rm [N/mm²]	Rp 0.2 [N/mm²]	RP 1 [N/mm²]	A (%)	A2 (%)	HRB	HRB2
23H9008785	B	T	X001061258	581	301	351	53.5	55.6	80	80

COES G.Q.
Ricezione data 13/09/2024 Sigla V.S.
Verificato data 13/09/2024 Sigla V.S.

Test Position/Posizione Prova
B=Coil End
C=Coil middle
T=Coil head

Test Direction/Direzione Prova
T=Transverse Direction
L=Longitudinal Direction

Remarks about tensile test:
- Confirmation of adequate degree of reliability for the uniformity over the strip length with certificate issued by TÜV Rheinland Group dt. June 19, 2019
- Tensile test according EN ISO 6892-1 B / A-SA 370

Other controls:
- Dimensions within tolerances, spectrometrical identity test OK
- Corrosion Test EN ISO3651-2 Method A and ASTM A262 pract.E OK

Remarks:
- We certify that products listed above comply with order requirements
- 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
- surface finish 1D

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

24 2548

24 2550

aperam

Correspondentieadres:
Aperam Genk
Swinnenwijerweg 5. Poort Genk 7523
3600 Genk, Belgium
Tel. +32 (0)89 30 21 11

MILL CERTIFICATE BS EN 10204/3.1
CERTIFICAT DE RECEPTION NF EN 10204/3.1
ABNAHMEPRUEFZEUGNIS DIN EN 10204/3.1

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

N-Nr-N 23K0034120-01 V01

Manufacturer's works order number
N° de la commande usine productrice
Werksauftragsnummer
80872669/01-08518/G42/01

Surveyor's mark
Cachet de l'expert
Stempel des Werkssachverstaendigen
GNK1

Purchaser and/or consignee
Client et/ou destinataire
Besteller und/oder Empfaenger

APERAM SS&S MASSALENGO
Viale Brenta 27/29

20139 MILANO
ITALIE

Purchaser's order number
N° de commande client
Kundenbestellnummer
310589441

Customer article number
N.article client
Artikelnummer des Kunden
ART034044

Product - Produit - Erzeugnis
COILS, HOT ROLLED, ANNEALED AND PICKLED
COILS, LAMINE A CHAUD, RECUITS + DECAPE
COILS, WARMGEWALZT, GEGLUEHT UND GEBEIZT

Steel designation
Désignation de l'acier
Stahlbezeichnung

EN 10028-7-2016 1.4404 / 1.4401
EN 10088-2-2014 1.4404 / 1.4401
ASTM A 240-2023 TYPE 316L / 316
ASME SA 240-2023 TYPE 316L / 316
EN 10088-4-2009 1.4404 / 1.4401

Finish
Présentation
Ausfuehrung

ID
ID
NO I
NO I
ID

Steelmaking process
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
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

ASME-CODE SECT.2 PART A // NACE MR 0175 / ISO 15156-1 / ISO 15156-3 -- NACE MR 0103 / ISO 17945 // ASTM A480 / A480M -- ASME SA480 /SA480M // CORR.
TEST: ASTM A262-E: OK // CORROSION INTERGRANULAIRE SELON ISO 3651/2:OK

Identification of the product
Identification du produit - Identifizierung des Erzeugnisses
MELTED IN BELGIUM, MADE IN BELGIUM

Coil n. N.Bobine - Band Nr.: 33611239
Heat n. N.Coulée - Schmelz Nr.: 336112

Dimensions
Dimensions - Abmessungen

Thickness Epaisseur - Staerke: 10.00 mm
Width Largeur - Breite: 1500.00 mm
Length Longueur - Laenge

Number of pieces Nb de pièces - Stueckzahl: 1

Net weight Poids net - netto Gewicht: 27830 KG

CHEMICAL ANALYSIS - ANALYSE CHIMIQUE - CHEMISCHE ZUSAMMENSETZUNG

	C	Si	Mn	Ni	Cr	Mo	Ti	N	S	P	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	0.41	1.24	10.07	16.64	2.03		0.032	0.002	0.039	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

MECHANICAL PROPERTIES - PROPRIETES MECANIQUES - MECHANISCHE WERTE EN ISO 6892-1 B / A-SA 370
Room temperature - Température ambiante - Raumtemperatur
Test temperature (°C) :

Location (1)	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	A5	50mm	HRBW	Rp0.2%	Rp1%	Rm	A5
		Required Exigé Anforderung mini	220	260	530	40	40					
		maxi			680			95				
1	T	Obtained Obtenu Ergebnisse	335	371	581	55	53	86				
2								89				
			C11	C14	C12	C13	C15	C31	C16	C17	C18	C19

Impact strength test
Essai de résilience
Kerbschlagzaehigkeitstest
C40 t(°c) C44
C42

Corrosion test
Test de corrosion
Korrosionstest
EN ISO 3651/2 - A:OK
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
LieferscheinNummer
2023047345-100333
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

9/10/2023

The inspector
Le responsable
Der Werkssachverstaendige
R. Vliegen
Z02

ZSQ701 - PS5

COES G.Q.
Ricezione data 13/09/2024 Sigla V.S.
Verificato data 13/09/2024 Sigla V.S.

24 2642

CERTIFICATE - ZEUGNIS - CERTIFICAT

Page Seite 1(2)

EN 10 204 3.1

Date – Datum	Load - Ladung - Charge No	Cert.No - Zeugnis Nr
150617	6689	5065419.R00

outokumpu
high performance stainless steel

Your order - Ihre Bestellung - Votre commande	Outokumpu Order - Auftrag - Ordre	Pack - Kolli - Colis No
09 150112	500462	0

Purchaser - Besteller - Acheteur

Nichelcrom Acciai Inox S.P.A.
Via Trento 96/100

IT-20099 SESTO SAN GIOVANNI - MI
ITALIEN

Dest

Certificate via Email

Product - Erzeugnisform - Produit

Stainless steel plate, hot rolled
Solution annealed, pickled/1D/No.1 Finish

Grade - Werkstoff - Nuance *

17-11-2L
1.4401/1.4404/Type 316/Type 316L

Requirements - Anforderungen - Exigences

AD 2000-Mbl. W2/AD 2000-Mbl. W10
/EN 10028-7/PED 97/23/EC
EN 10088-2:14
EN 10088-4:2009
ASME SA-240M Code Sect. II. Part A. Ed.2013
ASTM A240M-15a
NACE Standard MR0175-03/ISO 15156-3
A480/A480M
EN 10 029 - B
EN 10 029 - S
See below for further requirements

Brand-Mark * Herstellerzeichen Signe du Producteur	W	Inspectors stamp * Abnahme - Stempel Estamp de l'expert	DJ 2	Melting process Erschmelzungsart Procédé de fusion	E+AOD

Marking - Kennzeichnung - Marquage

Plate No, Dimension, Heat No, Lot No, Incl. *

Extent of delivery - Lieferumfang - Etendue de livrasion

Item Pos	Pcs Anzahl Nombre	Kg	Dimension Abmessung mm	Heat No Schmelze Nr Coulée	Lot No Los Nr Lot No
17	1		8 * 2500 * 8000	150561	290385

Plate No 2827 4302
Blech Nr
Tôle No

Chemical composition - Chemische Zusammenzetzung - Composition chimique%
Heat - Schmelze - Coulée No

	C	Si	Mn	P	S	Cr	Ni	Mo	Co	N		
Min	0.000	0.00	0.00	0.000	0.000	16.50	10.00	2.00		0.00		
Max	0.030	0.75	2.00	0.045	0.015	18.00	13.00	2.50		0.10		
150561	0.021	0.48	1.39	0.034	0.001	16.98	10.08	2.08	0.389	0.05		

Test results - Prufergebnisse - Résultats des essais (1N/mm² = 1 MPa)

Direc.	Top/Bot	Form	Location
T = Transverse	F = Front	P = Flat	1 = Center
L = Longitudinal	B = Back	C = Round	2 = Close to Surface
			3 = Standard
			4 = At 1/4 of thickness

Mechanical Properties

Tensile testing/Hardness Rockwell B

Plate-No	Direc.	Top/Bot	Location	Form	Temp. C	Rp 0,2 N/mm2	Rp 1,0 N/mm2	Rm N/mm2	A5 %	A50 %	HRB
Min						220	260	520	45	40	0
Max								670			95
4302	T	F	3	P	20	280	309	585	61	62	83

Corrosion

4302 IC-Test acc. to EN ISO 3651-2 Method A : Approved

COES G.Q.
Ricezione data 17/09/2024 Sigla V.S.
Verificato data 17/09/2024 Sigla V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 240 Ed. 2023
V.S.

Outokumpu Stainless AB
Business Area Quarto Plate
Quarto Plate Europe
SE-693 81 Degerfors, Sweden
Tel. +46 586 470 00, Fax +46 586 470 16, www.outokumpu.com
Registered office: Stockholm, Sweden.
Reg. No. 556001-8748, Vat No. SE556001874801

CE 13 0045 – CPR – 0519

TÜV NORD CERT GmbH ISO 9001

Computer generated original
Quality Inspector
Andreas Lekman

Andreas Lekman

CERTIFICATE - ZEUGNIS - CERTIFICAT		Page Seite 2(2)
EN 10 204-3.1		
Date – Datum	Load - Ladung - Charge No	Cert.No - Zeugnis Nr
150617	6689	5065419.R00

outokumpu
high performance stainless steel

Other Information

Heat treated at 1100°C and Quenched in water.
Dimensional control, visual inspection and grade check(PMI) :Approved
Certified acc. to AD2000-Guideline W0 and
Pressure Equipment Directive (97/23/EC)
annex I, sec. 4.3 by Certification body for
pressure equipment of the TÜV NORD Systems
notified body, reg.-no. 0045
Construction Products Regulation (305/2011/EU)
The Declaration of Performance (DoP), see www.outokumpu.com
Here continue the requirements:
Co content shall be mentioned in certificates

Outokumpu Stainless AB
Business Area Quarto Plate
Quarto Plate Europe
SE-693 81 Degerfors, Sweden
Tel. +46 586 470 00, Fax +46 586 470 16, www.outokumpu.com
Registered office: Stockholm, Sweden.
Reg. No. 556001-8748, Vat No. SE556001874801

CE
13
0045 – CPR – 0519

TÜV NORD CERT GmbH ISO 9001

Computer generated original
Quality Inspector
Andreas Lekman
Andreas Lekman

24 2670

MILL TEST CERTIFICATE

V168000

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

INSPECTION DOCUMENT: EN 10204: 2004 Type 3.1

Customer: DACAPO STAINLESS A/S

Product: Seamless Austenitic Stainless Steel Fitting

Certificate No : PSA3-FT-50251 √

Date : 8 Mar 2024

PO No.	Invoice No.	Product Specification	Dimension & Inspection Specification	Delivery Condition
31145179	E000006404	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
MG540-1	2"	SCH 10s	CAP	50	WP316/316L-S	PASSED	Y231103B20-2
MG539-1	3"	SCH 40s	CAP	25	WP316/316L-S	PASSED	Y231103B25-1
NG001-1 √	6" √	SCH 40s √	CAP √	10	WP316/316L-S √	PASSED	Y211112A04-2
NG098-1	12"	SCH 10s	CAP	10	WP316/316L-S	PASSED	Y231206B14-7

Specification / Heat No.	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	0.030	1.00	2.00	0.045	0.030	18.00	14.00	3.00	-	-	-	-	90	
Min	-	-	-	-	-	16.00	10.00	2.00	-	205	515	28	-	
MG540-1	0.024	0.48	1.33	0.026	0.002	16.60	10.04	2.02	< 0.01	337	611	60	85	PASSED
MG539-1	0.026	0.49	1.32	0.030	0.002	16.72	10.04	2.02	< 0.01	382	654	49	82	PASSED
NG001-1	0.019	0.36	1.69	0.030	0.001	16.90	10.02	2.02	< 0.01	374	619	47	89	PASSED
NG098-1	0.023	0.43	1.04	0.031	0.002	16.71	10.03	2.02	< 0.01	341	582	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 DONE 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 MATERIALS 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

QAQC MANAGER HASSANUDDIN

Head of Quality Assurance Department

COES G.Q.

Ricezione data 13/09/2024 Sigla U.S.

Verificato data 13/09/2024 Sigla U.S.

Form :FQA-030b R.7; 30-01-2024

ADDRESS Via Arno, 3
20029 **TURBIGO (MI)** ITALIA
PHONE 0331 871111 (3 linee r.a.)
FAX 0331 871468
WEB SITE www.turozzi.it
E-MAIL turozzi@turozzi.it

COES G.Q.	Ricezione data 23/09/2024	Sigla V.S.
	Verificato data 24/09/2024	Sigla V.S.

AZIENDA CON SISTEMA QUALITA' CERTIFICATO — COMPANY WITH QUALITY SYSTEM CERTIFIED

24 2702

turozzi fratelli S.r.l.

Raccordi in acciaio per impianti ad alta pressione
Steel fitting for high pressure plants

CLIENTE / *Purchaser*	CERTIFICATO DI COLLAUDO *Works certificate*		FOGLIO *Sheet*
COES S.r.l. Trattamento Gas		EN 10204 3.1	
ORDINE / *Order*	N. 67621	DEL / *Of* 23/09/2024	1/2
2472 2703 2795 2821 2881 ns.DdT 864			

ITEM *Item*	Q.TA' *Q.ty*	DESCRIZIONE / *Description*	COD.COLATA *Heat Code*	COLATA *Heat*	MATERIALE *Material*	CERTIF. ORIG. *Mill Certificate*	RIF.INT. *Record*	ACCIAIERIA / FORNITORE *Steel plant / Supplier*
		VS.ORD. 2472 DEL 30-07-2024						
40	2	DIS.L4429 ADAT.M/F 1.1/2x3/4 A/SA182 F316L	0398	290398	A182 F316L/316	16451	3344.3	VALBRUNA - Italy
90	3	TEE 1.1/2 3000 NPT A/SA182 F316L	471219	471219	A182 F316L/316	375590	4511	OLARRA - Spain
		VS.ORD. 2703 DEL 05-09-2024						
50	4	GOMITO 90° 1/2 3000 NPT A/SA182 F316L	291555	291555	A182 F316L/316	113050	4693	VALBRUNA - Italy
		VS.ORD. 2795 DEL 12-09-2024						
10	30	MEZZO MANIC. 1/2 3000 NPT A/SA182 F316L	056	292056	A182 F316L/316	015881	3407.3	VALBRUNA - Italy
20	30	NIP./ES.RID. 1/2x1/4 3000 NPT A/SA182 F316L	8831	588831	A182 F316L/316	33868	3347.3	VALBRUNA - Italy

ANALISI CHIMICA - *Chemical Analysis*

COD.COLATA *Heat Code*	C %	Mn %	Si %	P %	S %	Ni %	Cr %	Mo %	Ti %	V %	Cu %	Al %	Nb %	N %	W %	C.E. %	PRE %
0398	0,014	1,530	0,440	0,029	0,022	10,120	16,730	2,050						0,068			
471219	0,025	1,720	0,370	0,032	0,028	10,010	16,610	2,020						0,038			
291555	0,014	1,480	0,400	0,032	0,028	10,030	16,950	2,030						0,061			
056	0,017	1,600	0,470	0,032	0,028	10,110	16,840	2,030						0,062			
8831	0,021	1,640	0,600	0,029	0,027	12,200	17,610	2,120						0,060			

COD.COLATA *Heat Code*	Fe %	Co %	Ta %	Sn %	Zn %	Pb %	Zr %	Ca %	B %	%	%	%
0398												
471219												
291555												
056												
8831												

Ferrite %	Grain size ASTM E112

CARATTERISTICHE MECCANICHE - *Mechanical Test*

COD.COLATA *Heat Code*	R Tens.Str. N/mm2	S Yield Point N/mm2	A : 2" Elongation %	C Reuction of area %	Bending Test	Flattening Test	Hydraulic Test	HB Hardness test	Kv Impact test J	Temp. °C	STATO DI FORNIT. (TRATT. TERM.) Supply cond. (heat treatment)	TEMP. °C	NOTE Remarks
0398	610	312	53,0	69,0							SOLUT. TREATED	1040	
471219	590	345	50,0	71,0							SOLUT. ANNEALED	1050	
291555	575	296	54,0	75,0							SOLUT. TREATED	1040	
056	669	472	45,0	69,0							SOLUT. ANNEALED	1040	
8831	737	615	32,0	67,0							SOLUT. ANNEALED	1040	

NATURA DEL MATERIALE / *Kind of material*	NORMA DI RIFERIMENTO *Referenced standard*	NOTE / *Remarks*
Acciaio elaborato al forno elettrico Steel made by electric furnace	Material: ASTM /ASME latest editions. Dimensions: ASME B16.11, MSS SP83-95-97, ASTM A733 latest editions.	Mat. in accordo a / Mat. according to ASME II, part A, latest edition.

COLLAUDI INTERNI / *Works inspection*	RISULT. *Result.*	COLLAUDI SUPPLEMENTARI / *Supplementary tests*	RISULT. *Result.*
Dimensionale/Visivo Dimensional/Visual	Ok Ok		

RESPONSABILE QUALITA' / *Quality Manager*

COES SRL
VERIFIED IDENTICAL TO
SA 182 Ed. 2023

ENTE COLLAUDATORE / *Inspection agency*

turozzi fratelli

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20029 **TURBIGO (MI)** ITALIA
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WEB SITE www.turozzi.it
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AZIENDA CON SISTEMA QUALITA' CERTIFICATO — COMPANY WITH QUALITY SYSTEM CERTIFIED

turozzi fratelli S.r.l.

Raccordi in acciaio per impianti ad alta pressione
Steel fitting for high pressure plants

CLIENTE / *Purchaser*	CERTIFICATO DI COLLAUDO *Works certificate*		FOGLIO *Sheet*
COES S.r.l. Trattamento Gas		EN 10204 3.1	
ORDINE / *Order*	N. 67621	DEL / *Of* 23/09/2024	2/2
2472 2703 2795 2821 2881 ns.DdT 864			

ITEM *Item*	Q.TA' *Q.ty*	DESCRIZIONE / *Description*	COD.COLATA *Heat Code*	COLATA *Heat*	MATERIALE *Material*	CERTIF. ORIG. *Mill Certificate*	RIF.INT. *Record*	ACCIAIERIA / FORNITORE *Steel plant / Supplier*
		VS.ORD. 2821 DEL 12-09-2024						
30	2	NIP./ES.RID. 1.1/4X1 3000 NPT A/SA182 F316L √	23858 √	423858	A182 F316L/316 √	891754/2010	2472.3	VALBRUNA - Italy
30	2	NIP./ES.RID. 1.1/4X1 3000 NPT A/SA182 F316L √	64840 √	264840	A182 F316L/316 √	603023/2014	2786.3	VALBRUNA - Italy
60	50	NIPPLO ES. 1/2 3000 NPT A/SA182 F316L √	6019 √	316019	A182 F316L/316 √	84513920	3387.3	UGITECH - Italia
		VS.ORD. 2881 DEL 18-09-2024						
20	50	TAPPO/T.ESAG. 1/2 NPT A/SA182 F316L √	DP86 √	572207	A182 F316L/316	273811/2018	3043.3	VALBRUNA - Italy
30	50	TAPPO/T.ESAG. 1/2 NPT A/SA182 F304L √	DP66 √	672076	A182 F304L/304	2016030992	2966.3	COGNE - Italy
40	20	RID.ESAG.M/F 3/4x1/2 NPT A/SA182 F304L √	DP61 √		A182 F304L/304	3686/2713.3		VALBRUNA - Italy

ANALISI CHIMICA - *Chemical Analysis*

COD.COLATA *Heat Code*	C %	Mn %	Si %	P %	S %	Ni %	Cr %	Mo %	Ti %	V %	Cu %	Al %	Nb %	N %	W %	C.E. %	PRE %
23858	0,014	1,510	0,500	0,027	0,030	10,340	17,010	2,000						0,060			
64840	0,012	1,540	0,550	0,029	0,030	10,010	16,660	2,010						0,056			
6019	0,019	1,361	0,427	0,027	0,027	10,262	16,858	2,070						0,040			
DP86	0,016	1,680	0,590	0,029	0,027	12,040	17,700	2,080						0,053			
DP66	0,013	1,320	0,270	0,031	0,027	8,210	18,130							0,084			
DP61	0,013	1,830	0,510	0,030	0,026	8,130	18,260							0,090			

COD.COLATA *Heat Code*	Fe %	Co %	Ta %	Sn %	Zn %	Pb %	Zr %	Ca %	B %	%	%	%
23858												
64840												
6019												
DP86												
DP66												
DP61												

Ferrite %	Grain size ASTM E112

CARATTERISTICHE MECCANICHE - *Mechanical Test*

COD.COLATA *Heat Code*	R Tens.Str. N/mm2	S Yield Point N/mm2	A : 2" Elongation %	C Recuction of area %	Bending Test	Flattening Test	Hydraulic Test	HB Hardness test	Kv Impact test J	Temp. °C	STATO DI FORNIT. (TRATT. TERM.) Supply cond. (heat treatment)	TEMP. °C	NOTE Remarks
23858	669	464	48,0	67,0							SOLUT. TREATED	1050	
64840	661	465	44,0	67,0							SOLUT. TREATED	1050	
6019	671	507	39,0	71,0							SOLUT.TREATED	1050	
DP86	657	492	47,0	74,0							SOLUT. TREATED	1050	
DP66	682	563	37,6	71,6							SOLUT. TREATED	1050	
DP61	710	558	45,0	68,0							SOLUT. TREATED	1050	

NATURA DEL MATERIALE / *Kind of material*	NORMA DI RIFERIMENTO *Referenced standard*	NOTE / *Remarks*
Acciaio elaborato al forno elettrico Steel made by electric furnace	Material: ASTM /ASME latest editions. Dimensions: ASME B16.11, MSS SP83-95-97, ASTM A733 latest editions.	Mat. in accordo a / Mat. according to ASME II, part A, latest edition.

COLLAUDI INTERNI / *Works inspection*	RISULT. *Result.*	COLLAUDI SUPPLEMENTARI / *Supplementary tests*	RISULT. *Result.*
Dimensionale/Visivo	Ok		
Dimensional/Visual	Ok		

RESPONSABILE QUALITA' / *Quality Manager*	ENTE COLLAUDATORE / *Inspection agency*
	turozzi fratelli

24 2938

CERTIFICATO PROVE MATERIALI N.7177/24 1- 2

Test certificate - Certificat d'epreuves - Werksabnahmezeugniss
EN 10204 3.1

FAD FLANGE ACCIAIO & DERIVATI s.p.a.

SEDE LEGALE: VIA BONESCHI , 1 - 20040 CAMBIAGO (MI) ITALIA
TEL : +39 02 959420 FAX : + 39 02 95942323 INTERNET: www.fadflange.it - E-MAIL: info@fadflange.it
CAPITALE SOCIALE / SHARE EQUITY € 3.000.000,00 REG.IMP. MONZA BRIANZA /C.F. 03840080158
PARTITA IVA / V.A.T. No. IT 00763980968 - REA MI/975057 - N.MECCANOGRAFICO MI 100012

CLIENTE / Customer - Client - Kunde
COES SRL

Via Pontida, 265

24040 STEZZANO BG ITALIA

DATA / Date - Date - Datum 12/09/2024
COMMESSA / Mill order / Comf. de commande / Komm 2415328
ORDINE / Order / Commande / Auftrag 2653/24
D.D.T. / Delivery note / Bullettin de livraison / Lieferschein 7.177

CODICE Line code / Code / Kode	COLATA Heat / Coulè / Schmelze	CERTIFICATO ORIGINE Certificate of origin / Certificat d'usine / Werkszugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description / Norme / Materiél / Description / Standard / Werkstoff / Gegenstand	POS.ORD. Item order / Pos. de comm / Auftragslabe	QUANTITA Quantity / Quantite / Stuckzahl
	EB318 √	NIC	F.FLG.ASME B16.5 A/SA182F316L BL √ 150 6" √ RF √	32	4

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,022	1,500	0,034	0,028	0,500	16,520	10,100	2,030	0,000	0,000	0,000	0,071	0,000	0,000	0,000	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght / Rupture / Zugfestigkeit	MPA Yield point / Limite elasticite / Streckgrenze	4D % Elongation / Allongement / Dehnung	Reduction of area / Striction % / Einschnürung	HB Hardness / Dureté / Harte	Impact test / Resilience / Kerbschkagzähigkeit	1	2	3	4
549,5	262,4	57,0	69,1	151 151	10/10 KV -50°C 178 161 174 J	B	D	X	X

CODICE Line code / Code / Kode	COLATA Heat / Coulè / Schmelze	CERTIFICATO ORIGINE Certificate of origin / Certificat d'usine / Werkszugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description / Norme / Materiél / Description / Standard / Werkstoff / Gegenstand	POS.ORD. Item order / Pos. de comm / Auftragslabe	QUANTITA Quantity / Quantite / Stuckzahl
	546689 √	OLARRA	F.FLG.ASME B16.5 A/SA182F316L WN √ 150 1" √ S.STD RF √	52	1

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,024	1,600	0,035	0,027	0,410	16,630	10,070	2,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght / Rupture / Zugfestigkeit	MPA Yield point / Limite elasticite / Streckgrenze	4D % Elongation / Allongement / Dehnung	Reduction of area / Striction % / Einschnürung	HB Hardness / Dureté / Harte	Impact test / Resilience / Kerbschkagzähigkeit	1	2	3	4
579,0	282,0	55,0	68,0	170 172	10/10 KV -50°C 182 200 191 J	B	D	X	X

CODICE Line code / Code / Kode	COLATA Heat / Coulè / Schmelze	CERTIFICATO ORIGINE Certificate of origin / Certificat d'usine / Werkszugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description / Norme / Materiél / Description / Standard / Werkstoff / Gegenstand	POS.ORD. Item order / Pos. de comm / Auftragslabe	QUANTITA Quantity / Quantite / Stuckzahl
	564492 √	OLARRA	F.FLG.ASME B16.5 A/SA182F316L WN √ 150 1.1/2" √ S.STD RF √	62	1

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,026	1,560	0,034	0,027	0,380	16,640	10,040	2,030	0,000	0,000	0,000	0,035	0,000	0,000	0,000	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,220	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght / Rupture / Zugfestigkeit	MPA Yield point / Limite elasticite / Streckgrenze	4D % Elongation / Allongement / Dehnung	Reduction of area / Striction % / Einschnürung	HB Hardness / Dureté / Harte	Impact test / Resilience / Kerbschkagzähigkeit	1	2	3	4
581,0	285,0	52,0	69,0	165 168	10/10 KV -50°C 166 175 155 J	B	D	X	X

CODICE Line code / Code / Kode	COLATA Heat / Coulè / Schmelze	CERTIFICATO ORIGINE Certificate of origin / Certificat d'usine / Werkszugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description / Norme / Materiél / Description / Standard / Werkstoff / Gegenstand	POS.ORD. Item order / Pos. de comm / Auftragslabe	QUANTITA Quantity / Quantite / Stuckzahl
	N220722AT11 √	NIC	F.FLG.ASME B16.5 A/SA182F316L WN √ 150 2" √ S.10S RF √	72	31

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,019	0,880	0,033	0,001	0,350	16,420	10,030	2,010	0,000	0,000	0,000	0,079	0,000	0,000	0,000	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght / Rupture / Zugfestigkeit	MPA Yield point / Limite elasticite / Streckgrenze	4D % Elongation / Allongement / Dehnung	Reduction of area / Striction % / Einschnürung	HB Hardness / Dureté / Harte	Impact test / Resilience / Kerbschkagzähigkeit	1	2	3	4
580,0	271,0	58,0	70,0	168 165	10/10 KV -196°C 201 209 185 J	B	D	X	X

COES G.Q.
Ricezione data 12/09/2024 Sigla V.S.
Verificato data 01/10/2024 Sigla V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 182 Ed. 2023
V.S.

(1) PRODUZIONE ACCIAIO / Steel production / Production acièr / Stahl produktion
A - CALMATO E ELABORATO AL FORNO ELETTRICO / Killed steel made by electric furnace / Acièr calmé produit au four electrique / Beruhigt stahl ausgearbeitet im elektrofen.
B - ELABORATO AL FORNO ELETTRICO / Made by electric furnace / Produit au four electrique / Ausgearbeitet im elektrofen.

(2) TRATT. TERMICO / Heat treatment / Traitment termique / Warmebehandlung
A - NORMALIZZATO / Normalized / Normalisé / Normalgeglüht.
B - NORMALIZZATO E RINVENUTO / Normalized and tempered/ Normalisé et revenu / Normalisiert angelasst.
C - BONIFICATO / Quenched and tempered / Bonoffé / Harten und anlassen.
D - SOLUBILIZZATO / Solution treat and quench / Solubilisé / Lösungsgeglüht.

(3) X - CERTIFICATO SECONDO ASME SA II ED.: 21 AD.:

(4) X - CONTROLLO VISIVO E DIMENSIONALE SODDISFACENTE / Satisfactory visual and dimensional check / Inspection et controle dimensionel satisfasant / Besichtigung und massokontrolle bestanden.

- I VALORI DELLE ANALISI CHIMICHE SONO RICAVATI DAL CERTIFICATO DI FERRERIA / Chemical analysis values are taken from mill certificate / Le valeur de certificat ont été obtenus par le certificat d'usine / Dei werte des zeugnisses sin vom original werksabnahmezegniss erhalten.

(5) $CE = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$

X NACE MR 01-75 ED.: 15

(6) DOUBLE CERTIFICATION: C.S:A/SA105/SA350LF2-1 - S.S:A/SA182F316/316L & A/SA182F304/304L

RESP. CONTROLLO CERTIFICATI / Issued by / Cert. contrôle / Zeugnisprüfungsamt	ENTE UFFICIALE DI COLLAUDO / Inspection authority / Service inspection officiel / Abnahme verein	CAPO COLLAUDO / Chief inspector / Chef de la reception / Chef de abnahmeabteilung

FAD FLANGE ACCIAIO & DERIVATI s.p.a.

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TEL : +39 02 959420 FAX : + 39 02 95942323 INTERNET: www.fadflange.it - E-MAIL: info@fadflange.it
CAPITALE SOCIALE / SHARE EQUITY € 3.000.000,00 REG.IMP. MONZA BRIANZA /C.F. 03840080158
PARTITA IVA / V.A.T. No. IT 00763980968 - REA MI/975057 - N.MECCANOGRAFICO MI 100012

CERTIFICATO PROVE MATERIALI N.7177/24

Test certificate - Certificat d'epreuves - Werksabnahmezeugniss
EN 10204 / 3.1

CLIENTE / Customer - Client - Kunde
COES SRL

Via Pontida, 265

24040 STEZZANO BG ITALIA

DATA / Date - Date - Datum 12/09/2024
COMMESSA / Mill order / Comf. de commande / Komm 2415328
ORDINE / Order / Commande / Auftrag 2653/24
D.D.T. / Delivery note / Bulletin de livraison / Lieferschein 7.177

CODICE Line code Code Kode	COLATA Heat Coulè Schmeize	CERTIFICATO ORIGINE Certificate of origin Certificat d'usine Werkszzugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description Norme / Materiél / Description Standard / Werkstoff / Gegenstand	POS.ORD. Item order Pos. de comm Auftragslabe	QUANTITA Quantity Quantite Stuckzahl
	S30017 √	NIC	F.FLG.ASME B16.5 A/SA182F316L WN √ 300 2" √ S.10S RF √	82	2

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,026	1,600	0,042	0,024	0,330	16,840	10,100	2,060	0,000	0,000	0,000	0,069	0,000	0,000	0,000	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght Rupture Zugfestigkeit	MPA Yield point Limite elasticite Streckgrenze	4D % Elongation Allongement Dehnung	Reduction of area Striction % Einschnürung	HB Hardness Dureté Harte	Impact test Resilience Kerbschkagzähigkeit	(1)	(2)	(3)	(4)
605,8	341,6	55,4	73,4	172 172	10/10 KV -50°C 175 186 182 J	B	D	X	X

CODICE Line code Code Kode	COLATA Heat Coulè Schmeize	CERTIFICATO ORIGINE Certificate of origin Certificat d'usine Werkszzugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description Norme / Materiél / Description Standard / Werkstoff / Gegenstand	POS.ORD. Item order Pos. de comm Auftragslabe	QUANTITA Quantity Quantite Stuckzahl
	S-27961 √	NIC	F.FLG.ASME B16.5 A/SA182F316L WN √ 150 2" √ S.STD RF √	92	8

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,022	1,540	0,043	0,025	0,290	16,860	10,050	2,030	0,000	0,000	0,000	0,065	0,000	0,000	0,000	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght Rupture Zugfestigkeit	MPA Yield point Limite elasticite Streckgrenze	4D % Elongation Allongement Dehnung	Reduction of area Striction % Einschnürung	HB Hardness Dureté Harte	Impact test Resilience Kerbschkagzähigkeit	(1)	(2)	(3)	(4)
598,4	304,7	56,4	73,8	168 168	10/10 KV -50°C 174 168 179 J	B	D	X	X

CODICE Line code Code Kode	COLATA Heat Coulè Schmeize	CERTIFICATO ORIGINE Certificate of origin Certificat d'usine Werkszzugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description Norme / Materiél / Description Standard / Werkstoff / Gegenstand	POS.ORD. Item order Pos. de comm Auftragslabe	QUANTITA Quantity Quantite Stuckzahl
	801128 √	COGNE	F.FLG.ASME B16.5 A/SA182F316L WN √ 150 6" √ S.STD RF √	102	4

ANALISI CHIMICA / Chemical analysis / Analyse chemique / Chemische zusammensetzung (5)

C %	Mn %	P %	S %	Si %	Cr %	Ni %	Mo %	Ti %	Cu %	Nb %	N %	V %	Al %	Sn %	CE %
0,026	1,890	0,025	0,000	0,470	16,750	10,630	2,040	0,010	0,300	0,039	0,073	0,110	0,022	0,008	0,000

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,010	0,000	0,000	0,000	0,000	0,0000

CARATTERISTICHE MECCANICHE / Mechanical test / Épreuves mechaniques / Mechanische eigenscharte

MPA Tensile strenght Rupture Zugfestigkeit	MPA Yield point Limite elasticite Streckgrenze	4D % Elongation Allongement Dehnung	Reduction of area Striction % Einschnürung	HB Hardness Dureté Harte	Impact test Resilience Kerbschkagzähigkeit	(1)	(2)	(3)	(4)
590,0	281,0	51,0	66,0	170 171	10/10 KV -50°C 172 175 168 J	B	D	X	X

NACE MR 0103 ED16

Material manufactured in accordance with PED 2014/68/UE PAR.4.3 under quality assurance system ISO 9001 cert. 206967 issued by Bureau Veritas

(1) PRODUZIONE ACCIAIO / Steel production / Production acièr / Stahl produktion
- A - CALMATO E ELABORATO AL FORNO ELETTRICO / Killed steel made by electric furnace / Aciér calmé produit au four electrique / Beruhigt stahl ausgearbeitet im elektrofen.
- B - ELABORATO AL FORNO ELETTRICO / Made by electric furnace / Produit au four electrique / Ausgearbeitet im elektrofen.

(2) TRATT. TERMICO / Heat treatment / Traitment termique / Warmebehandlung
- A - NORMALIZZATO / Normalized / Normalisè / Normalgegluht.
- B - NORMALIZZATO E RINVENUTO / Normalized and tempered/ Normalisè et revenu / Normalisiert angelasst.
- C - BONIFICATO / Quenched and tempered / Bonifiè / Hartan und anlassen.
- D - SOLUBILIZZATO / Solution treat and quench / Solubilisè / Lösungsgeglüht.

(3) X - CERTIFICATO SECONDO ASME SA II ED.: 21 AD.:

(4) X - CONTROLLO VISIVO E DIMENSIONALE SODDISFACENTE / Satisfactory visual and dimensional check / Inspection et controle dimensionel satisfasant / Besichtigung und massokontrolle bestanden.

- I VALORI DELLE ANALISI CHIMICHE SONO RICAVATI DAL CERTIFICATO DI FERRERIA / Chemical analysis values are taken from mill certificate / Le valeur de certificat ont été obtenus par le certificat d'usine / Dei werte des zeugnisses sin vom original werksabnahmezegniss erhalten.

(5) $CE = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$

X NACE MR 01-75 ED.: 15

(5) DOUBLE CERTIFICATION: C.S:A/SA105/SA350LF2-1 - S.S:A/SA182F316/316L & A/SA182F304/304L

RESP. CONTROLLO CERTIFICATI Issued by Cert. contrôle Zeugnissprüfungsamt	ENTE UFFICIALE DI COLLAUDO Inspection authority Service inspection officiel Abnahme verein	CAPO COLLAUDO Chief Inspector Chef de la reception Chef de abnahmeabteilung
Viviana Bonfanti		

FINAL BOOK

Valpres Sales order: **2100139835**

Valpres Job Number: **24063**

Purchase Order: **2296/24**

Item: **1**

TAG Numbers:

BLPH-MV-700, BLPH-MV-701
BLPH-MV-702, BLPH-MV-703
BLPH-MV-704, BLPH-MV-705
BLPH-MV-712, BLPH-MV-720
BLPH-MV-719, BLPH-MV-727
BLPH-MV-728, BLPH-MV-729
BLPH-MV-730, BLPH-MV-731
BLPH-MV-738

0	07/04/2025	First Issued	L. Toso RQP	A. Disha RGC
Rev:	**Date:**	Description:	**Emitted by:**	**Approved by:**

Via A. Gitti, 11
25060 Marcheno V.T. (BS)

Phone +39 030 89 69 311
Fax +39 030 89 60 239

FINAL BOOK
PO: 2296/24
VSO: 2100139835
VJN: 24063
ITEM: 1

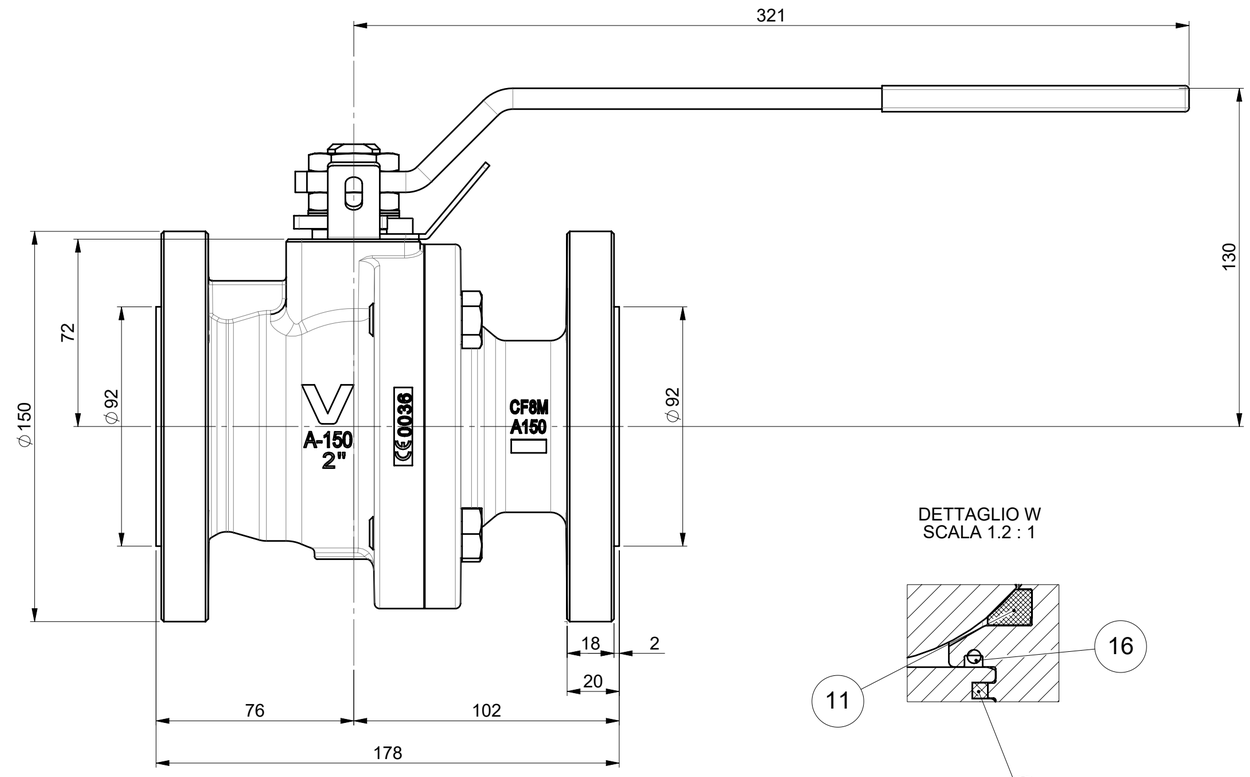
FINAL BOOK Rev. 0

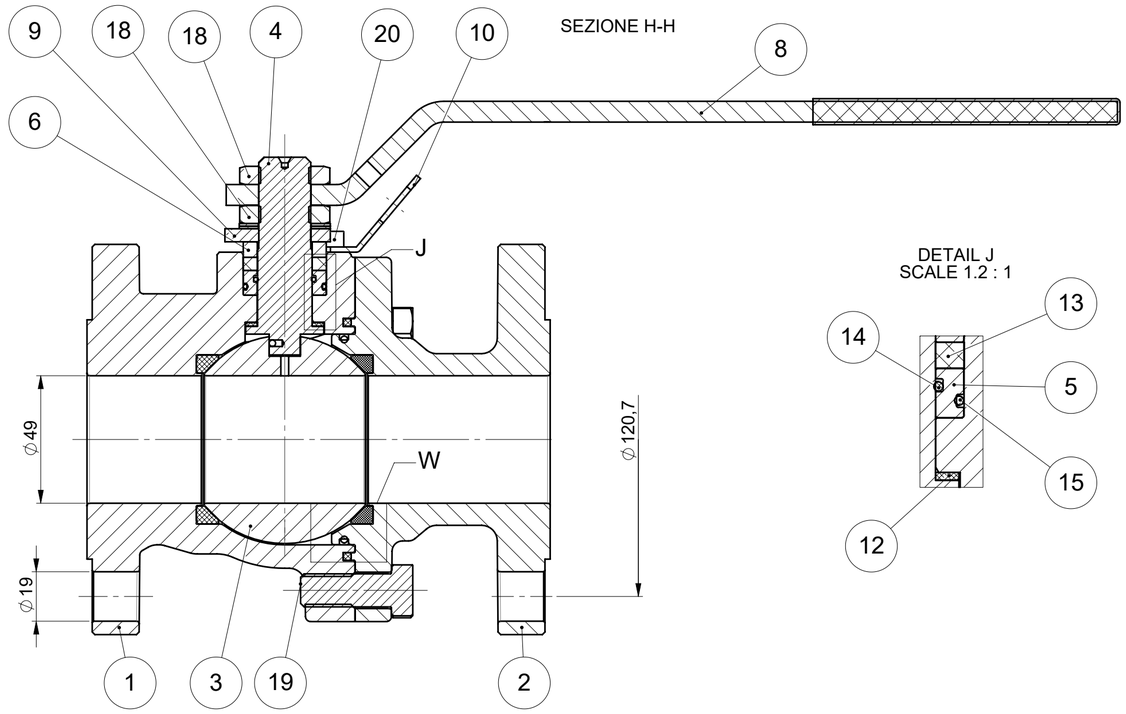
Valve Type: 15x Floating Ball valve Side Entry Bolted Body 2-pcs
2" 150#
VALPRES TYPE: 68J01610

Index

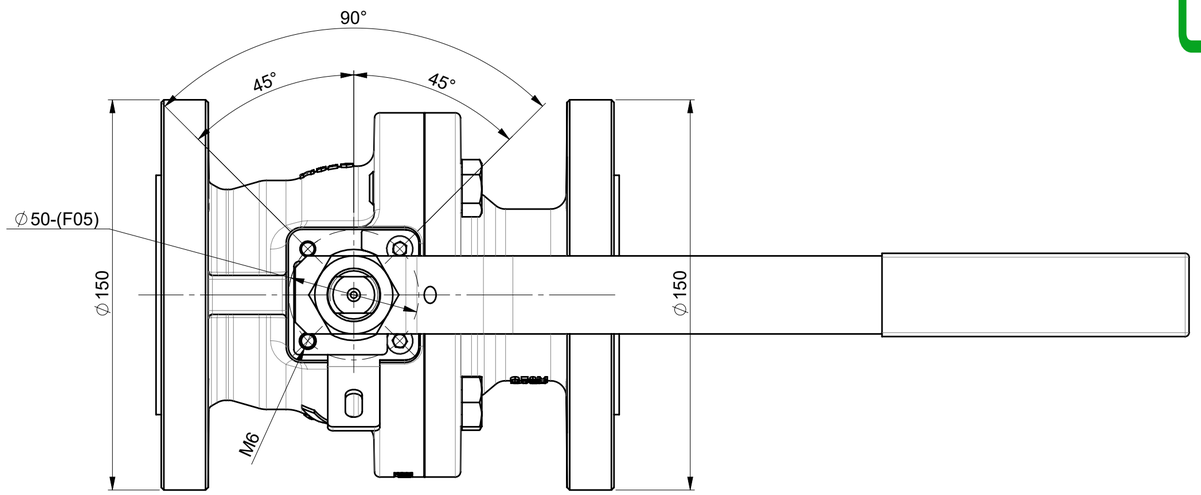
1) As Built Drawing page 1
2) Material Certificate EN 10204 3.1 n. EXP251/20-24/14 , EXP815/22-23/54 – BODY page 2
3) Material Certificate EN 10204 3.1 n. EXP082/20-21/51 – CLOSURE page 4
4) Material Certificate EN 10204 3.1 n. 1090306001 – BALL page 5
5) Material Certificate EN 10204 3.1 n. 2020002078-A – STEM page 6
6) Valpres Final Inspection Certificate page 7
7) Declaration of Compliance with the Order page 10

VALPRES QC REVIEW





POS.	PART NAME	MATERIALS	Q.ty
1	CORPO / BODY	A351-CF8M	1
2	FLANGIA / END CONNECTION	A351-CF8M	1
3	SFERA / BALL	A351-CF8M	1
4	ASTA / STEM	A564 Tp630 H1150D (17-4-PH)	1
5	BUSSOLA PORTA O-RING / O-RING BUSH	A479-Tp316L	1
6	BUSSOLA / PACKING GLAND	A479-Tp316L	1
7	GUARNIZIONE CORPO / BODY SEAT	GRAPHITE	1
8	LEVA / HANDLE	AISI 316	1
9	MEZZOGIRO / 90° STOP	AISI 316	1
10	LOCKING HANDLE	AISI 316	1
11	GUARNIZIONE SFERA / BALL SEAT	RPTFE	2
12	RONDELLA ASTA / THRUST WASHER	RPTFE	1
13	GUARNIZIONE ASTA / STEM SEAT	GRAPHITE	1
14	O-RING	FKM	1
15	O-RING	FKM	1
16	O-RING	FKM	1
17	MOLLA A TAZZA / SPRING WASHER	AISI 304	2
18	DADO / NUT	A2-70	2
19	VITE / SCREW	A193 B8M Cl.2	4
20	VITE / SCREW	A2-70	2



AS BUILT

Valpres Code	Valpres Item	DS N°
68J01610	1	BA01C01RF

Std. Face to Face	ASME B16.10
Std. Design	API 608
Fire Safe	ISO 10497
Std. Flange	ASME B16.5
All valves will be with Antistatic device	
All dimensions are in mm (units)	

REV	DATE	DRAFT	APPR.	DESCRIPTION	IN PLACE OF
					68J01610

SIZE A2 | SCALE 0.6:1 | DATE 05-09-2024 | ENGINEER SIGNATURE Zanetti Paride | ENGINEERING GROUP LEADER SIGNATURE Agorni Alessandra | WEIGHT (Kg) 12.336

DIMENSIONS WITHOUT ANY TOLERANCE INDICATIONS ARE REFERRED TO IT 12 IN ACCORDANCE WITH UNI ISO 286/1
BORE AND SIMILAR: + IT SHAFTING AND SIMILAR: - IT
OTHER PARTICULARS: ±1/2 IT

1 ÷ 3	0.10	10 ÷ 18	0.18	50 ÷ 80	0.30	180 ÷ 250	0.46
3 ÷ 6	0.12	18 ÷ 30	0.21	80 ÷ 120	0.35	250 ÷ 315	0.52
6 ÷ 10	0.15	30 ÷ 50	0.25	120 ÷ 180	0.40	315 ÷ 400	0.57

MATERIAL | TREATMENT

NAME Split Body Ball Valve FB | 68J016 (FLOTTANTE) | 2"-DN50
ANSI150 API608 | FTF - ASME B16.10 | ASME B16.5 RF

PROJECT REFERENCE: COD Commessa 24063 | REV | TAV 01

DRAWING NUMBER: COD 68J01610 | REV A | TAV 01

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VALPRES

RAJAN TECHNO CAST PVT LTD.

Survey No.281/1,Plot No.21/22 At.Shapar,Tal:-Kotda Sangani.,,,RAJKOT,Pin:360024,INDIA
Tel:+91-2827-252160,,Fax:+91-2827-252562,e-mail:info@rajantechcast.com,

TEST CERTIFICATE

EN 10204:2005 - 3.1 F-P-21-17

M/s. VALPRES Via A. Gittti 11- 25060 Marcheno (BS) Italy ITALY	T.C No : EXP251/20-21/14 Invoice No : EXP251/20-21 O.A No : E3578/19-20 P.O No : 40427	Date: 27/08/2020 Date: 27/08/2020 Date: 14/03/2020 Date: 04/03/2020

SPECIFICATION : ASTM A 351 Gr.CF8M/CF3M

CONDITION OF SUPPLY : HEATED UP TO 1120° C SOAKED FOR 1 Hr. PER INCH THICKNESS THEN WATER QUENCHED

CHEMICAL ANALYSIS

HEAT No	C.%	Mn.%	Si.%	S.%	P.%	Cr.%	Ni.%	Mo.%
MIN	-	-	-	-	-	18.000	9.000	2.000
MAX	0.030	1.500	1.500	0.040	0.040	21.000	12.000	3.000
A002	0.026	0.965	0.685	0.009	0.024	18.935	10.020	2.232
CA012	0.026	0.824	0.685	0.006	0.024	18.935	10.020	2.135

VALPRES QC PASSED

MECHANICAL PROPERTIES

HEAT No	YS	YS	T.S	Elgn	Redn	Hardness	Impact Test at -196 °C				LATERAL EXP.			
	Mpa(0.2%)	Mpa(1%)	Mpa	%	in Area	BHN	CHARPY-V MIN. 60 J				(mm) MIN.			
MIN	205	-	485	30	-	-	Size: 10 X10 X 55 MM							
MAX	-	-	-	-	-	237	1	2	3	AVG	1	2	3	AVG
A002	271.55		540.13	45.00	-	165	144	138	148	143	-	-	-	-
CA012	269.56		535.58	44.92	-	164	138	148	152	146	-	-	-	-

DESPATCH DETAILS

HEAT No	DIE No	S.No.	Pos	ITEM DESCRIPTION	PART No	DRAWING No	DESP. QTY
A002	VP021VM	2	4	2" DN 50 SPLIT BODY ANSI 150	00110010055	MOD0011023 REV.F	26
CA012	VP021VM	2	4	2" DN 50 SPLIT BODY ANSI 150	00110010055	MOD0011023 REV.F	51

We hereby certify that items mentioned above confirms to : ASTM A 351 Gr.CF8M/CF3M
NO RADIOACTIVE CONTAMINATION DETECTED.
VISUAL INSPECTION TEST ACCORDING TO MSS SP 55 - FOUND SATISFACTORY.
MATERIAL CONFORMS TO NACE MR 0175/ISO 15156-2009 & MR0103/ISO 17945
NORSOK M-630-2013,MDS SO2-REV.5
PED 2014/68/EU, ANNEX 1 PER, 4.3

Manufacture Logo (r)

Work Expert Signature / Stamp (rd)

For RAJAN TECHNO CAST PVT LTD

CHHAYA BALIYA
Q.A. DEPARTMENT

Tested By:
JAY PRAKASH KUMAR

AN ISO-9001-2015 COMPANY

RAJAN TECHNO CAST PVT LTD.

VALPRES

Survey No.281/1,Plot No.21/22 At.Shapar,Tal:-Kotda Sangani.,,,RAJKOT,Pin:360024,INDIA
Tel:+91-2827-252160,,Fax:+91-2827-252562,e-mail:info@rajantechcast.com,

INSPECTION CERTIFICATE

EN 10204:2004 - 3.1

F-P-21-17/00/01.01.2020

M/s. VALPRES
Via A. Gittti
11- 25060 Marcheno (BS)
C.C.I.A.A.of Brescia-R.E.A. N.599088
ITALY

T.C No : EXP815/22-23/54 Date: 14/03/2023
Invoice No : EXP815/22-23 Date: 14/03/2023
O.A No : E1440/22-23 Date: 10/02/2023
P.O No : 4500027431 Date: 01/02/2023

SPECIFICATION : ASTM A351-2018E1 CF8M/CF3M

CONDITION OF SUPPLY : HEATED UP TO 1120°C SOCKED FOR ONE HOUR PER INCH THICKNESS AND THAN WATER QUENCHED.

CHEMICAL ANALYSIS (AS PER ASTM A 703*)

HEAT No	C.%	Mn.%	Si.%	S.%	P.%	Cr.%	Ni.%	Mo.%
MIN	-	-	-	-	-	18.000	9.000	2.000
MAX	0.030	1.500	1.500	0.040	0.040	21.000	12.000	3.000
BJ516+	0.022	1.180	0.640	0.004	0.033	18.550	10.330	2.260
BM003*	0.028	0.974	0.853	0.008	0.026	18.658	9.185	2.168

VALPRES QC PASSED

MECHANICAL PROPERTIES (AS PER ASTM A 370*)

HEAT No	YS	YS	T.S	Elgn	Redn	Hardness	Impact Test at -196 °C				LATERAL EXP.			
	Mpa(0.2%)	Mpa(1%)	Mpa	%	in Area	BHN	CHARPY-V MIN. 60 J				(mm) MIN.			
MIN	205	-	485	30	-	-	Size: 10 X10 X 55 MM							
MAX	-	-	-	-	-	237	1	2	3	AVG	1	2	3	AVG
BJ516+	286.52		530.00	42.96	-	164	142	148	152	147	-	-	-	-
BM003*	281.20		545.51	42.08	-	165	142	148	150	147	-	-	-	-

DESPATCH DETAILS

HEAT No	DIE No	S.No.	Pos	ITEM DESCRIPTION	PART No	DRAWING No	DESP. QTY
BJ516+	VP021VM	124	1240	2" DN 50 SPLIT BODY ANSI 150	00110010055	MOD0011023 REV.F	2
BM003*	VP021VM	124	1240	2" DN 50 SPLIT BODY ANSI 150	00110010055	MOD0011023 REV.F	5

We hereby certify that items mentioned above confirms to : ASTM A351-2018E1 CF8M/CF3M
NO RADIOACTIVE CONTAMINATION DETECTED.
VISUAL INSPECTION TEST ACCORDING TO MSS SP 55-2011 FOUND SATISFACTORY.
MATERIAL CONFIRMS TO NACE MR0175-2021/ISO 15156-2020 & MR0103-2016/ISO 17945-2016.
DELIVERED CASTING IS ACCORDING TO THE REQUIREMENT OF AD Merkblatt W5 WO 07/203/1409/WP/1258/20
ABOVE ALL CASTING ARE COMPLY WITH PED 2014/68/EU 07/202/1409/WZ/1258/20
3.1 EN 10204 MANUFACTURER APPROVAL ACC. TO ISO9001/2014/68/EU ANNEX I CHAPT. 4.3
NORSOK M-630-2013,MDS S02-REV.5

Manufacture Logo

Work Expert Signature / Stamp

For RAJAN TECHNO CAST PVT LTD.

ATUL NAKADE
Q.A. DEPARTMENT

Prepared By:
PRATIK KACHA

*Latest Revision applicable as on date .

VALPRES QC REVIEW

VALPRES

RAJAN TECHNO CAST PVT LTD.

Survey No.281/1,Plot No.21/22 At.Shapar,Tal:-Kotda Sangani.,,,RAJKOT,Pin:360024,INDIA
Tel:+91-2827-252160,,Fax:+91-2827-252562,e-mail:info@rajantechcast.com,

TEST CERTIFICATE
EN 10204:2005 - 3.1

QAQC-F14/01

M/s. VALPRES
Via A. Gittti
11- 25060 Marcheno (BS)
Italy
ITALY

T.C No : EXP082/20-21/51
Invoice No : EXP082/20-21
O.A No : E3578/19-20
P.O No : 40427

Date: 31/05/2020
Date: 31/05/2020
Date: 14/03/2020
Date: 04/03/2020

SPECIFICATION : ASTM A 351 Gr.CF8M/CF3M

CONDITION OF SUPPLY : HEATED UP TO 1120° C SOAKED FOR 1 Hr. PER INCH THICKNESS THEN WATER QUENCHED

CHEMICAL ANALYSIS

HEAT No	C.%	Mn.%	Si.%	S.%	P.%	Cr.%	Ni.%	Mo.%
MIN	-	-	-	-	-	18.000	9.000	2.000
MAX	0.030	1.500	1.500	0.040	0.040	21.000	12.000	3.000
A002	0.026	0.965	0.685	0.009	0.024	18.935	10.020	2.232
A002	0.026	0.965	0.685	0.009	0.024	18.935	10.020	2.232

VALPRES QC PASSED

MECHANICAL PROPERTIES

HEAT No	YS	YS	T.S	Elgn	Redn	Hardness	Impact Test at -196 °C CHARPY-V MIN. 60 J Size: 10 X10 X 55 MM				LATERAL EXP. (mm) MIN.			
	Mpa(0.2%)	Mpa(1%)	Mpa	%	in Area	BHN	1	2	3	AVG	1	2	3	AVG
MIN	205	-	485	30	-	-								
MAX	-	-	-	-	-	237								
A002	271.55		540.13	45.00	-	165	144	138	148	143	-	-	-	-
A002	271.55		540.13	45.00	-	165	144	138	148	143	-	-	-	-

DESPATCH DETAILS

HEAT No	DIE No	S.No.	Pos	ITEM DESCRIPTION	PART No	DRAWING No	DESP. QTY
A002	VP022NM	3	6	2" DN50 SPLIT CAP ANSI 150	00210010039	MOD0021021 REV.F	250
A002	VP022NM	4	7	2" DN50 SPLIT CAP ANSI 150	00210010039	MOD0021021 REV.F	24

We hereby certify that items mentioned above confirms to : ASTM A 351 Gr.CF8M/CF3M
NO RADIOACTIVE CONTAMINATION DETECTED.
VISUAL INSPECTION TEST ACCORDING TO MSS SP 55 - FOUND SATISFACTORY.
MATERIAL CONFORMS TO NACE MR 0175/ISO 15156-2009 & MR0103/ISO 17945
NORSOK M-630-2013, MDS SO2-REV.05
PED 2014/68/EU, ANNEX 1 PER, 4.3

Manufacture Logo (r)

Work Expert Signature / Stamp (rd)

Tested By:
JAY PRAKASH KUMAR

For RAJAN TECHNO CAST PVT LTD.
CHHAYA BALIYA
Q.A. DEPARTMENT

AN ISO-9001-2015 COMPANY

VALPRES QC REVIEW

Y & L STEELWORKS CO., LTD.

Stainless Steel Valves & Parts, Metal Accessory, CNC Tooling & OEM Application

WORKS CERTIFICATE ACC. TO DIN EN 10204 3.1

MECHANICAL PROPERTIES				
Charge-NR. Chagren-Nr.	Hardness (HB)	0.2%Offset Yield strength(N/mm²)	Tensile Strength (N/mm²)	Elongation %
A20C19	164	245	509	56

Certificate No.: 1090306001
Customer's Order-Date: VALPRES S.R.L. PO#40428, MAR.5,2020
Test Material: VALVE BALL BY CF8M (NACE MR0175)
INVOICE NO.YL-20200420

VALPRES QC PASSED

Material	Charge/Melt-No Chargen-Nr.	Pc. Stock	DRAWING	CODE	DN NW
CF8M	A20C19	425 PCS	00310000105 REV.G	00310000105	80*49

Chemical Values Chemische Werte								
Charge/Melt-No Chargen-Nr.	C	Si	Mn	P	S	Ni	Cr	Mo
A20C19	0.053	0.651	0.912	0.033	0.009	9.61	18.48	2.239

1.We hereby certify that the above material has been tested in accordance with the listed specification(s) and conforms to all applicable requirements thereof.

SIGNATURE: DATE: APR.20,2020

Sales Department

Y & L STEEL WORKS

No.58-7, Ln. 202, JINGZHUANG ST., Dali Dist., Taichung City 412, Taiwan, R.O.C.
P.O. BOX 471, DALI CITY, TAICHUNG, TAIWAN 412
TEL: 886- 4- 24917786 FAX: 886- 4 - 24917785
yl_steelworks@yahoo.com.tw

VALPRES QC REVIEW

Y & L STEELWORKS CO., LTD.

Stainless Steel Valves & Parts, Metal Accessory, CNC Tooling & OEM Application

WORKS CERTIFICATE ACC. TO DIN EN 10204 3.1

MECHANICAL PROPERTIES					
Charge-NR. Chagren-Nr.	Hardness (HRC)	0.2%Offset Yield strength(KSI)	Tensile Strength (KSI)	Elongation %	Reduction %
SK1299-B70	30	121	136	23	73

Certificate No.: 2020002078-A

Customer's Order-Date: VALPRES S.R.L. PO#40428, MAR.5,2020

Test Material: VALVE STEM BY 17-4PH (NACE MR0175)

INVOICE NO.YL-20200420

VALPRES QC PASSED

Material	Charge/Melt-No Chargen-Nr.	Pc. Stock	DRAWING	CODE	DN NW
17-4 PH H1150D	SK1299-B70	414 PCS	00410000042 REV.H	00410000042	30*76

Chemical Values Chemische Werte									
Charge/Melt-No Chargen-Nr.	C	Si	Mn	P	S	Ni	Cr	Mo	Cu
SK1299-B70	0.017	0.45	0.63	0.026	0.021	4.41	15.20	0.10	3.48

1.We hereby certify that the above material has been tested in accordance with the listed specification(s) and conforms to all applicable requirements thereof.

SIGNATURE:

DATE: APR.20,2020

Sales Department

Y & L STEEL WORKS

No.58-7, Ln. 202, JINGZHUANG ST., Dali Dist., Taichung City 412, Taiwan, R.O.C.
P.O. BOX 471, DALI CITY, TAICHUNG, TAIWAN 412
TEL: 886- 4- 24917786 FAX: 886- 4 - 24917785
yl_steelworks@yahoo.com.tw

I-SS-00099 (era S-PSQ-08.2.4/12) – Certificato di collaudo / Insp. certificate

Via A. Gitti,11 - 25060 Marcheno (BS -ITALIA
Tel. +39 030 8969311 - Mail valpres@bonomi.it

Certificato di collaudo finale 3.1 EN 10204 / Final inspection certificate 3.1 EN 10204

Cliente / Customer	COES
Codice Cliente / Customer code	N/A
Ordine Cliente / Customer order	2296/24
Data ordine / Date of order	11/07/2024
VALPRES JOB NUMBER	24063
VALPRES SALES ORDER	2100139835
ITEM	1

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-001
TIPO VALVOLA / VALVE TYPE	68J01610SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	15
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	2"
RATING	150

COLLAUDO / TESTING			
INFORMAZIONI GENERALI / GENERAL INFORMATION			
COLLAUDO PRESENZIATO / WITNESS TESTING	SI ☐		NO ■
TIPO DI COLLAUDO / INSPECTION TEST	IDROSTATICO / HYDRO ■	PNEUMATICO / PNEUMATIC ☐	GAS ☐
FLUIDO / MEDIA	Water with additive	Air	N/A

Test requirements – Hydro / Gas / Pneumatic test:

PRESSIONI E TEMPI DI PROVA / TEST PRESSURES AND TIMES										
SPECIFICA / SPECIFICATION	■ EN 12266									
ACCETTABILITÀ / ACCEPTABILITY	■ EN 12266 R.A									
PROCEDURA / PROCEDURE	CORPO/BODY				SEGGI/SEATS					
	STD HYDROTEST		GAS TEST		STD HYDROTEST		PNEUMATIC TEST		GAS TEST	
VALORI RICHIESTI / REQUIRED VALUES	PRESS. (bar)	DURATA (sec)	PRESS. (bar)	DURATA (sec)	PRESS. (bar)	DURATA (sec)	PRESS. (bar)	DURATA (min)	PRESS. (bar)	DURATA (min)
	29	**15**	**-**	**-**	**21**	**15**	**-**	**-**	**-**	**-**
TENUTA / SEAL	PERDITA / LEAKAGE (mm^3/min)		PERDITA / LEAKAGE (mm^3/min)		PERDITA / LEAKAGE (mm^3/min)		PERDITA / LEAKAGE (mm^3/min)		PERDITA / LEAKAGE (mm^3/min)	
MAX. ACCETTABLE	**0**		**-**		**0**		**-**		**-**	
STRUMENTI / INSTRUMENTS	Banco prova / Test bench: ITALCONTROL vertical 13-870 – Mod. MTS3-100A Gauges: MM0089/1-MM2124/1-MM2127/1–MM0090/1-MM2126/1-MM00127/1-MM0128/1-MM2125/1-MM0095/1									

I-SS-00099 (era S-PSQ-08.2.4/12) – Certificato di collaudo / Insp. certificate

Via A. Gitti,11 - 25060 Marcheno (BS -ITALIA
Tel. +39 030 8969311 - Mail valpres@bonomi.it

Certificato di collaudo finale 3.1 EN 10204 / Final inspection certificate 3.1 EN 10204

Cliente / Customer	COES
Codice Cliente / Customer code	N/A
Ordine Cliente / Customer order	2296/24
Data ordine / Date of order	11/07/2024
VALPRES JOB NUMBER	24063
VALPRES SALES ORDER	2100139835
ITEM	1

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-001
TIPO VALVOLA / VALVE TYPE	68J01610SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	15
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	2"
RATING	150

Summary table of the tested valves:

OBJ.	SERIAL NUMBER	TAG
1	68J01610SL/01	n/a
2	68J01610SL/02	n/a
3	68J01610SL/03	n/a
4	68J01610SL/04	n/a
5	68J01610SL/05	n/a
6	68J01610SL/06	n/a
7	68J01610SL/07	n/a
8	68J01610SL/08	n/a
9	68J01610SL/09	n/a
10	68J01610SL/10	n/a
11	68J01610SL/11	n/a
12	68J01610SL/12	n/a
13	68J01610SL/13	n/a
14	68J01610SL/14	n/a
15	68J01610SL/15	n/a

Inspection test values – Hydro / Gas / Pneumatic test:

OBJ.	BODY			
	Std Hydrotest Detected pressure / Pressione rilevata (bar)	**Std Hydrotest** Detected leakage / Perdita rilevata (mm^3/min)	**Gas Test** Detected pressure / Pressione rilevata (bar)	**Gas Test** Detected leakage / Perdita rilevata (mm^3/min)
1	29	0	-	-
2	29	0	-	-
3	29	0	-	-
4	29	0	-	-
5	29	0	-	-
6	29	0	-	-
7	29	0	-	-
8	29	0	-	-
9	29	0	-	-
10	29	0	-	-
11	29	0	-	-
12	29	0	-	-
13	29	0	-	-
14	29	0	-	-
15	29	0	-	-

I-SS-00099 (era S-PSQ-08.2.4/12) – Certificato di collaudo / Insp. certificate

VALPRES
Via A. Gitti,11 - 25060 Marcheno (BS -ITALIA
Tel. +39 030 8969311 - Mail valpres@bonomi.it

Certificato di collaudo finale 3.1 EN 10204 / Final inspection certificate 3.1 EN 10204

Cliente / Customer	COES
Codice Cliente / Customer code	N/A
Ordine Cliente / Customer order	2296/24
Data ordine / Date of order	11/07/2024
VALPRES JOB NUMBER	24063
VALPRES SALES ORDER	2100139835
ITEM	1

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-001
TIPO VALVOLA / VALVE TYPE	68J01610SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	15
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	2"
RATING	150

OBJ.	SEATS											
	Std Hydrotest Detected pressure / Pressione rilevata (bar)		**Std Hydrotest** Detected leakage / Perdita rilevata (mm^3/min)		**Pneumatic test** Detected pressure / Pressione rilevata (bar)		**Pneumatic test** Detected leakage / Perdita rilevata (mm^3/min)		**Gas Test** Detected pressure / Pressione rilevata (bar)		**Gas Test** Detected leakage / Perdita rilevata (mm^3/min)	
	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX
1	21	21	0	0	-	-	-	-	-	-	-	-
2	21	21	0	0	-	-	-	-	-	-	-	-
3	21	21	0	0	-	-	-	-	-	-	-	-
4	21	21	0	0	-	-	-	-	-	-	-	-
5	21	21	0	0	-	-	-	-	-	-	-	-
6	21	21	0	0	-	-	-	-	-	-	-	-
7	21	21	0	0	-	-	-	-	-	-	-	-
8	21	21	0	0	-	-	-	-	-	-	-	-
9	21	21	0	0	-	-	-	-	-	-	-	-
10	21	21	0	0	-	-	-	-	-	-	-	-
11	21	21	0	0	-	-	-	-	-	-	-	-
12	21	21	0	0	-	-	-	-	-	-	-	-
13	21	21	0	0	-	-	-	-	-	-	-	-
14	21	21	0	0	-	-	-	-	-	-	-	-
15	21	21	0	0	-	-	-	-	-	-	-	-

TEST RESULT: SATISFACTORY

ASSICURAZIONE QUALITA' / QUALITY ASSURANCE	ISPETTORE CLIENTE / CUSTOMER INSPECTOR	ISPETTORE PARTE TERZA / THIRD PART INSPECTOR
Firma / Sign VALPRES QC PASSED Data / Date 09/09/2024	Firma / Sign Data / Date	Firma / Sign Data / Date

EN 10204 2.1 - DECLARATION OF COMPLIANCE WITH THE ORDER

Messrs COES

The Company: **VALPRES S.r.l.**

Address: **Via A. Gitti, 11 – 25060 Marcheno (Brescia) - Italy**

declares under its own responsibility that the products

code	size
68J01610	**2"**
68J01606	**1"**
8PV0050510	**2"**
8PV0050406	**1"**
8PV0050306	**1"**
8PV0050606	**1"**
68F02906	**1"**

comply with your

order/ orders n.	dated
2296/24	**11/07/2024**

The company works according to an integrated QUALITY, ENVIRONMENTAL, SAFETY and ENERGY management system which complies with the standards ISO_9001, ISO_14001, OHSAS_18001 and ISO_50001, recognised by SQS.

Marcheno, 04/04/2025

(place and date)

Carlo Bonomi *

Carlo Bonomi (General Manager)

* electronic signature: the original signature is available in our company

VALPRES S.r.l. - P.O. Box 40 - Via A. Gitti, 11 - 25060 Marcheno (BS) - Italy
Tel. +39 030 89 69 311 - Fax +39 030 89 60 239 - www.valpres.it - email: valpres@bonomi.it

FINAL BOOK

Valpres Sales order: **2100139835**

Valpres Job Number: **24063**

Purchase Order: **2296/24**

Item: **3**

TAG Numbers:

63-XV-055,
63-XV-056
63-XV-057,
63-XV-058,
63-XV-059,
63-XV-060

0	07/04/2025	First Issued	L. Toso RQP	A. Disha RGC
Rev:	**Date:**	Description:	**Emitted by:**	**Approved by:**

Via A. Gitti, 11
25060 Marcheno V.T. (BS)

Phone +39 030 89 69 311
Fax +39 030 89 60 239

FINAL BOOK
PO: 2296/24
VSO: 2100139835
VJN: 24063
ITEM: 3

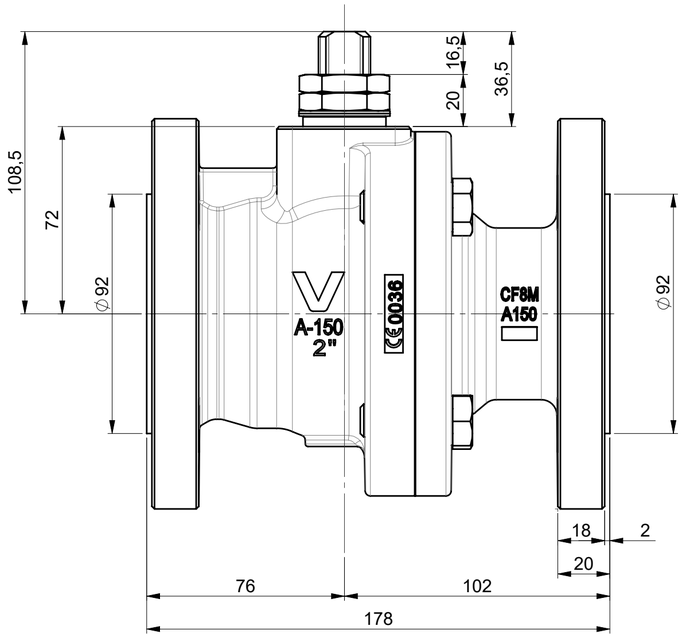
FINAL BOOK Rev. 0

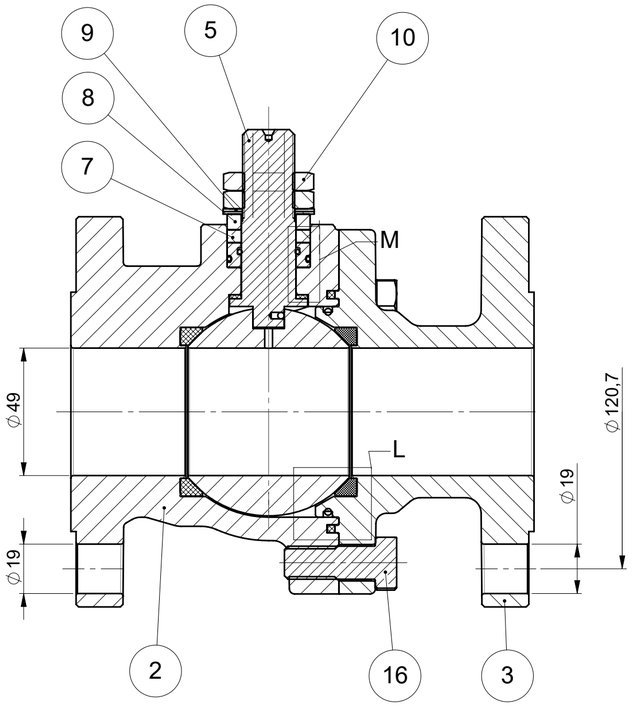
Valve Type: 6x Floating Ball valve Side Entry Bolted Body 2-pcs
2" 150#
VALPRES TYPE: 8PV0050510

Index

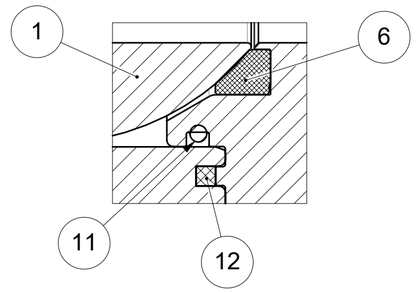
1) As Built Drawing page 1
2) Material Certificate EN 10204 3.1 n. EXP251/20-21/14 – BODY page 3
3) Material Certificate EN 10204 3.1 n. EXP082/20-21/51 – CLOSURE page 4
4) Material Certificate EN 10204 3.1 n. 1090306001 – BALL page 5
5) Material Certificate EN 10204 3.1 n. 2020002078-A – STEM page 6
6) Valpres Final Inspection Certificate page 7
7) Valpres Functional acceptance test report page 9
8) ATEX Declaration page 11
9) Declaration of Compliance with the Order page 12

VALPRES QC REVIEW

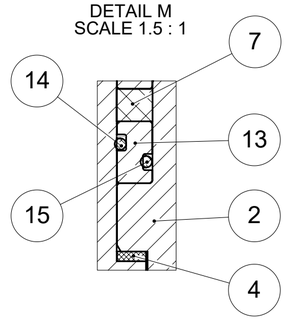


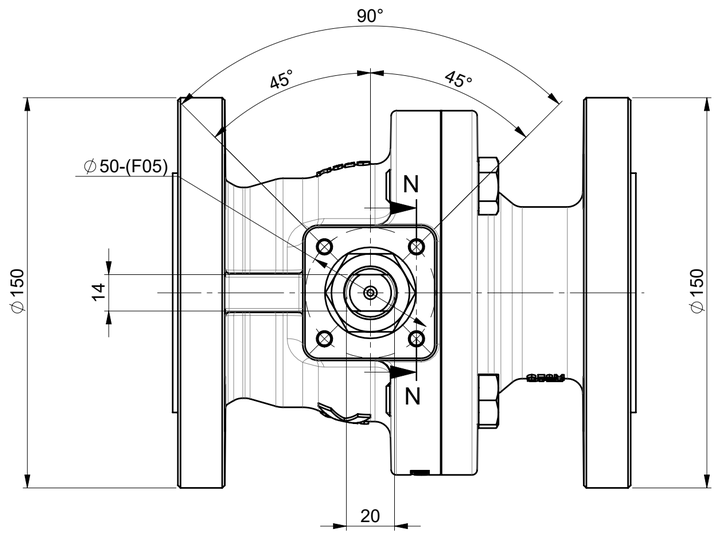


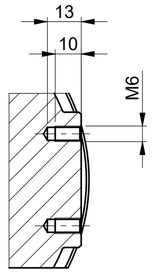
DETAIL L
SCALE 1.5 : 1



DETAIL M
SCALE 1.5 : 1







SEZIONE N-N

AS BUILT

POS.	PART NAME	MATERIALS	Q.ty
1	SFERA / BALL	A351-CF8M	1
2	CORPO / BODY	A351-CF8M	1
3	FLANGIA / END CONNECTION	A351-CF8M	1
4	RONDELLA ASTA / THRUST WASHER	RPTFE	1
5	ASTA / STEM	A564 Tp630 H1150D (17-4-PH)	1
6	GUARNIZIONE SFERA / BALL SEAT	RPTFE	2
7	GUARNIZIONE ASTA / STEM SEAT	GRAPHITE	1
8	BUSSOLA / PACKING GLAND	A479-Tp316L	1
9	MOLLA A TAZZA / SPRING WASHER	AISI 304	2
10	DADO / NUT	A2-70	2
11	O-RING	FKM (VITON) 80 Sh.	1
12	GUARNIZIONE CORPO / BODY SEAT	GRAPHITE	1
13	BUSSOLA PORTA O-RING / O-RING BUSH	A479-Tp316L	1
14	O-RING	FKM	1
15	O-RING	FKM	1
16	VITE / SCREW	A193 B8 Cl.2	4

REV	DATE	DRAFT	APPR.	DESCRIPTION	IN PLACE OF
					68J01610SL

SIZE A2 | SCALE 0.6:1 | DATE 05-09-2024 | ENGINEER SIGNATURE Zanetti Paride | ENGINEERING GROUP LEADER SIGNATURE Agorni Alessandra | WEIGHT (Kg) 11.299

DIMENSIONS WITHOUT ANY TOLERANCE INDICATIONS ARE REFERRED TO IT 12 IN ACCORDANCE WITH UNI ISO 286/1
BORE AND SIMILAR: + IT SHAFTING AND SIMILAR: - IT
OTHER PARTICULARS: ±1/2 IT

1 ÷ 3	0.10	10 ÷ 18	0.18	50 ÷ 80	0.30	180 ÷ 250	0.46
3 ÷ 6	0.12	18 ÷ 30	0.21	80 ÷ 120	0.35	250 ÷ 315	0.52
6 ÷ 10	0.15	30 ÷ 50	0.25	120 ÷ 180	0.40	315 ÷ 400	0.57

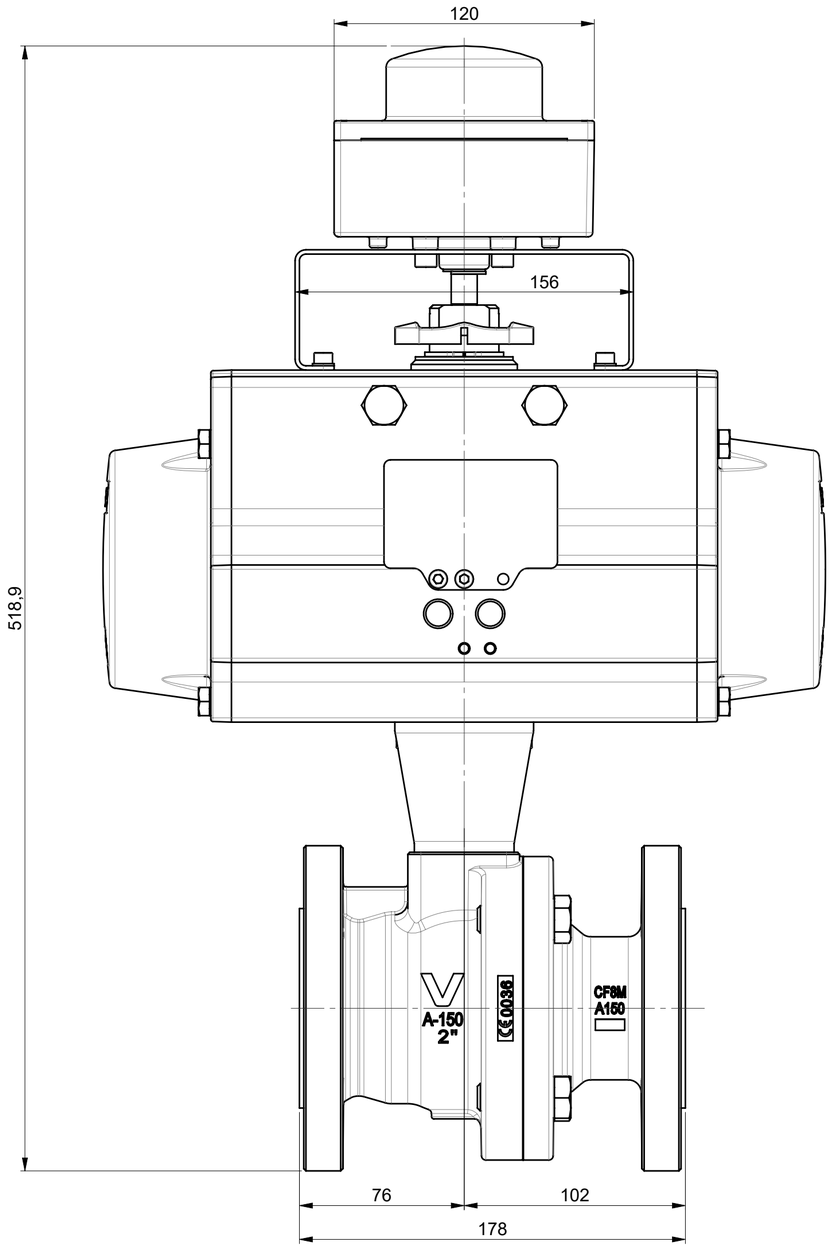
MATERIAL | TREATMENT

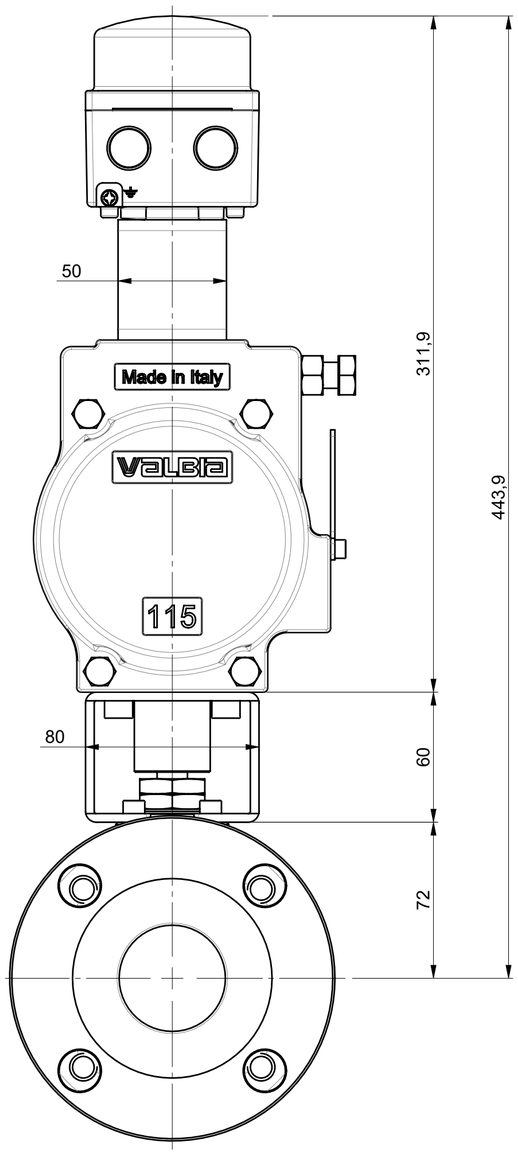
NAME **Split Body Ball Valve FB** **2"-DN50**
ANSI150 API608 **FTF - ASME B16.10** **ASME B16.5 RF**

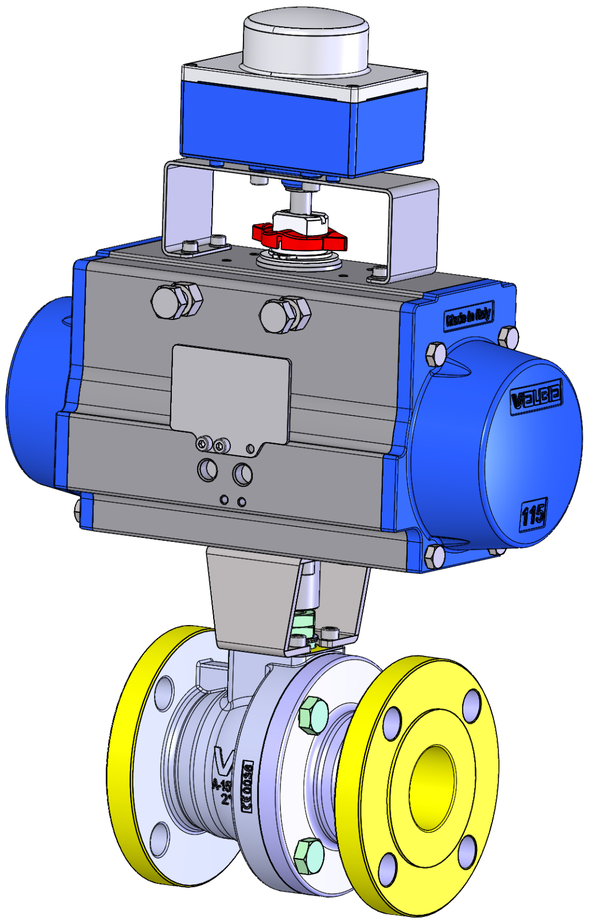
PROJECT REFERENCE: COD Commessa 24063 | REV | TAV 01

DRAWING NUMBER: COD **68J01610SL** | REV **A** | TAV 01

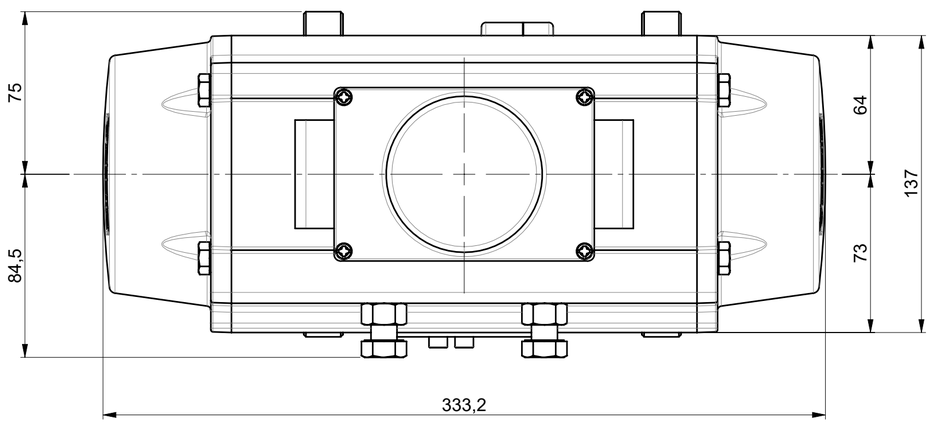
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Fail Position Valve OPEN



AS BUILT

Valpres Code	Valpres Item	DS N°	Weigth (Kg)
8PV0050510	3	BA01C01RF	24.2

REV	DATE	DRAFT	APPR.	DESCRIPTION	IN PLACE OF
					8PV0050510

SIZE A2 | SCALE 1:2 | DATE 09-09-2024 | ENGINEER SIGNATURE Zanetti Paride | ENGINEERING GROUP LEADER SIGNATURE Agorni Alessandra | WEIGHT (Kg)

DIMENSIONS WITHOUT ANY TOLERANCE INDICATIONS ARE REFERRED TO IT 12 IN ACCORDANCE WITH UNI ISO 286/1
BORE AND SIMILAR: + IT SHAFTING AND SIMILAR: - IT
OTHER PARTICULARS: ±1/2 IT

1 ÷ 3	0.10	10 ÷ 18	0.18	50 ÷ 80	0.30	180 ÷ 250	0.46
3 ÷ 6	0.12	18 ÷ 30	0.21	80 ÷ 120	0.35	250 ÷ 315	0.52
6 ÷ 10	0.15	30 ÷ 50	0.25	120 ÷ 180	0.40	315 ÷ 400	0.57

MATERIAL | TREATMENT

NAME Split Body Ball Valve FB + ACTUATOR 2"-DN50
ANSI150 API608 FTF - ASME B16.10 ASME B16.5 RF

PROJECT REFERENCE: COD Commessa 24063 | REV | TAV 01

DRAWING NUMBER: COD 8PV0050510 | REV A | TAV 01

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VALPRES

RAJAN TECHNO CAST PVT LTD.

Survey No.281/1,Plot No.21/22 At.Shapar,Tal:-Kotda Sangani.,,,RAJKOT,Pin:360024,INDIA
Tel:+91-2827-252160,,Fax:+91-2827-252562,e-mail:info@rajantechcast.com,

TEST CERTIFICATE

EN 10204:2005 - 3.1 F-P-21-17

M/s. VALPRES Via A. Gittti 11- 25060 Marcheno (BS) Italy ITALY	T.C No : EXP251/20-21/14 Invoice No : EXP251/20-21 O.A No : E3578/19-20 P.O No : 40427	Date: 27/08/2020 Date: 27/08/2020 Date: 14/03/2020 Date: 04/03/2020

SPECIFICATION : ASTM A 351 Gr.CF8M/CF3M

CONDITION OF SUPPLY : HEATED UP TO 1120° C SOAKED FOR 1 Hr. PER INCH THICKNESS THEN WATER QUENCHED

CHEMICAL ANALYSIS

HEAT No	C.%	Mn.%	Si.%	S.%	P.%	Cr.%	Ni.%	Mo.%
MIN	-	-	-	-	-	18.000	9.000	2.000
MAX	0.030	1.500	1.500	0.040	0.040	21.000	12.000	3.000
A002	0.026	0.965	0.685	0.009	0.024	18.935	10.020	2.232
CA012	0.026	0.824	0.685	0.006	0.024	18.935	10.020	2.135

VALPRES QC PASSED

MECHANICAL PROPERTIES

HEAT No	YS	YS	T.S	Elgn	Redn	Hardness	Impact Test at -196 °C				LATERAL EXP.			
	Mpa(0.2%)	Mpa(1%)	Mpa	%	in Area	BHN	CHARPY-V MIN. 60 J				(mm) MIN.			
MIN	205	-	485	30	-	-	Size: 10 X10 X 55 MM							
MAX	-	-	-	-	-	237	1	2	3	AVG	1	2	3	AVG
A002	271.55		540.13	45.00	-	165	144	138	148	143	-	-	-	-
CA012	269.56		535.58	44.92	-	164	138	148	152	146	-	-	-	-

DESPATCH DETAILS

HEAT No	DIE No	S.No.	Pos	ITEM DESCRIPTION	PART No	DRAWING No	DESP. QTY
A002	VP021VM	2	4	2" DN 50 SPLIT BODY ANSI 150	00110010055	MOD0011023 REV.F	26
CA012	VP021VM	2	4	2" DN 50 SPLIT BODY ANSI 150	00110010055	MOD0011023 REV.F	51

We hereby certify that items mentioned above confirms to : ASTM A 351 Gr.CF8M/CF3M
NO RADIOACTIVE CONTAMINATION DETECTED.
VISUAL INSPECTION TEST ACCORDING TO MSS SP 55 - FOUND SATISFACTORY.
MATERIAL CONFORMS TO NACE MR 0175/ISO 15156-2009 & MR0103/ISO 17945
NORSOK M-630-2013,MDS SO2-REV.5
PED 2014/68/EU, ANNEX 1 PER, 4.3

Manufacture Logo (r)

Work Expert Signature / Stamp (rd)

For RAJAN TECHNO CAST PVT LTD

CHHAYA BALIYA
Q.A. DEPARTMENT

Tested By:
JAY PRAKASH KUMAR

AN ISO-9001-2015 COMPANY

VALPRES

RAJAN TECHNO CAST PVT LTD.

Survey No.281/1,Plot No.21/22 At.Shapar,Tal:-Kotda Sangani.,,,RAJKOT,Pin:360024,INDIA
Tel:+91-2827-252160,,Fax:+91-2827-252562,e-mail:info@rajantechcast.com,

TEST CERTIFICATE
EN 10204:2005 - 3.1

QAQC-F14/01

M/s. VALPRES
Via A. Gittti
11- 25060 Marcheno (BS)
Italy
ITALY

T.C No : EXP082/20-21/51
Invoice No : EXP082/20-21
O.A No : E3578/19-20
P.O No : 40427

Date: 31/05/2020
Date: 31/05/2020
Date: 14/03/2020
Date: 04/03/2020

SPECIFICATION : ASTM A 351 Gr.CF8M/CF3M

CONDITION OF SUPPLY : HEATED UP TO 1120° C SOAKED FOR 1 Hr. PER INCH THICKNESS THEN WATER QUENCHED

CHEMICAL ANALYSIS

HEAT No	C.%	Mn.%	Si.%	S.%	P.%	Cr.%	Ni.%	Mo.%
MIN	-	-	-	-	-	18.000	9.000	2.000
MAX	0.030	1.500	1.500	0.040	0.040	21.000	12.000	3.000
A002	0.026	0.965	0.685	0.009	0.024	18.935	10.020	2.232
A002	0.026	0.965	0.685	0.009	0.024	18.935	10.020	2.232

VALPRES QC PASSED

MECHANICAL PROPERTIES

HEAT No	YS	YS	T.S	Elgn	Redn	Hardness	Impact Test at -196 °C CHARPY-V MIN. 60 J Size: 10 X10 X 55 MM				LATERAL EXP. (mm) MIN.			
	Mpa(0.2%)	Mpa(1%)	Mpa	%	in Area	BHN	1	2	3	AVG	1	2	3	AVG
MIN	205	-	485	30	-	-								
MAX	-	-	-	-	-	237								
A002	271.55		540.13	45.00	-	165	144	138	148	143	-	-	-	-
A002	271.55		540.13	45.00	-	165	144	138	148	143	-	-	-	-

DESPATCH DETAILS

HEAT No	DIE No	S.No.	Pos	ITEM DESCRIPTION	PART No	DRAWING No	DESP. QTY
A002	VP022NM	3	6	2" DN50 SPLIT CAP ANSI 150	00210010039	MOD0021021 REV.F	250
A002	VP022NM	4	7	2" DN50 SPLIT CAP ANSI 150	00210010039	MOD0021021 REV.F	24

We hereby certify that items mentioned above confirms to : ASTM A 351 Gr.CF8M/CF3M
NO RADIOACTIVE CONTAMINATION DETECTED.
VISUAL INSPECTION TEST ACCORDING TO MSS SP 55 - FOUND SATISFACTORY.
MATERIAL CONFORMS TO NACE MR 0175/ISO 15156-2009 & MR0103/ISO 17945
NORSOK M-630-2013, MDS SO2-REV.05
PED 2014/68/EU, ANNEX 1 PER, 4.3

Manufacture Logo (r)

Work Expert Signature / Stamp (rd)

Tested By:
JAY PRAKASH KUMAR

For RAJAN TECHNO CAST PVT LTD.
CHHAYA BALIYA
Q.A. DEPARTMENT

AN ISO-9001-2015 COMPANY

VALPRES QC REVIEW

Y & L STEELWORKS CO., LTD.

Stainless Steel Valves & Parts, Metal Accessory, CNC Tooling & OEM Application

WORKS CERTIFICATE ACC. TO DIN EN 10204 3.1

MECHANICAL PROPERTIES				
Charge-NR. Chagren-Nr.	Hardness (HB)	0.2%Offset Yield strength(N/mm²)	Tensile Strength (N/mm²)	Elongation %
A20C19	164	245	509	56

Certificate No.: 1090306001
Customer's Order-Date: VALPRES S.R.L. PO#40428, MAR.5,2020
Test Material: VALVE BALL BY CF8M (NACE MR0175)
INVOICE NO.YL-20200420

VALPRES QC PASSED

Material	Charge/Melt-No Chargen-Nr.	Pc. Stock	DRAWING	CODE	DN NW
CF8M	A20C19	425 PCS	00310000105 REV.G	00310000105	80*49

Chemical Values Chemische Werte								
Charge/Melt-No Chargen-Nr.	C	Si	Mn	P	S	Ni	Cr	Mo
A20C19	0.053	0.651	0.912	0.033	0.009	9.61	18.48	2.239

1.We hereby certify that the above material has been tested in accordance with the listed specification(s) and conforms to all applicable requirements thereof.

SIGNATURE: DATE: APR.20,2020

Sales Department

Y & L STEEL WORKS

No.58-7, Ln. 202, JINGZHUANG ST., Dali Dist., Taichung City 412, Taiwan, R.O.C.
P.O. BOX 471, DALI CITY, TAICHUNG, TAIWAN 412
TEL: 886- 4- 24917786 FAX: 886- 4 - 24917785
yl_steelworks@yahoo.com.tw

VALPRES QC REVIEW

Y & L STEELWORKS CO., LTD.

Stainless Steel Valves & Parts, Metal Accessory, CNC Tooling & OEM Application

WORKS CERTIFICATE ACC. TO DIN EN 10204 3.1

MECHANICAL PROPERTIES					
Charge-NR. Chagren-Nr.	Hardness (HRC)	0.2%Offset Yield strength(KSI)	Tensile Strength (KSI)	Elongation %	Reduction %
SK1299-B70	30	121	136	23	73

Certificate No.: 2020002078-A

Customer's Order-Date: VALPRES S.R.L. PO#40428, MAR.5,2020

Test Material: VALVE STEM BY 17-4PH (NACE MR0175)

INVOICE NO.YL-20200420

VALPRES QC PASSED

Material	Charge/Melt-No Chargen-Nr.	Pc. Stock	DRAWING	CODE	DN NW
17-4 PH H1150D	SK1299-B70	414 PCS	00410000042 REV.H	00410000042	30*76

Chemical Values Chemische Werte									
Charge/Melt-No Chargen-Nr.	C	Si	Mn	P	S	Ni	Cr	Mo	Cu
SK1299-B70	0.017	0.45	0.63	0.026	0.021	4.41	15.20	0.10	3.48

1.We hereby certify that the above material has been tested in accordance with the listed specification(s) and conforms to all applicable requirements thereof.

SIGNATURE:

DATE: APR.20,2020

Sales Department

Y & L STEEL WORKS

No.58-7, Ln. 202, JINGZHUANG ST., Dali Dist., Taichung City 412, Taiwan, R.O.C.
P.O. BOX 471, DALI CITY, TAICHUNG, TAIWAN 412
TEL: 886- 4- 24917786 FAX: 886- 4 - 24917785
yl_steelworks@yahoo.com.tw

VALPRES QC REVIEW

I-SS-00099 (era S-PSQ-08.2.4/12) – Certificato di collaudo / Insp. certificate

Via A. Gitti,11 - 25060 Marcheno (BS -ITALIA
Tel. +39 030 8969311 - Mail valpres@bonomi.it

Certificato di collaudo finale 3.1 EN 10204 / Final inspection certificate 3.1 EN 10204

Cliente / Customer	COES
Codice Cliente / Customer code	N/A
Ordine Cliente / Customer order	2296/24
Data ordine / Date of order	11/07/2024
VALPRES JOB NUMBER	24063
VALPRES SALES ORDER	2100139835
ITEM	3

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-003
TIPO VALVOLA / VALVE TYPE	68J01610SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	6
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	2"
RATING	150

COLLAUDO / TESTING

INFORMAZIONI GENERALI / GENERAL INFORMATION

COLLAUDO PRESENZIATO / WITNESS TESTING	SI ☐		NO ■
TIPO DI COLLAUDO / INSPECTION TEST	IDROSTATICO / HYDRO ■	PNEUMATICO / PNEUMATIC ☐	GAS ☐
FLUIDO / MEDIA	Water with additive	Air	N/A

Test requirements – Hydro / Gas / Pneumatic test:

PRESSIONI E TEMPI DI PROVA / TEST PRESSURES AND TIMES

SPECIFICA / SPECIFICATION	■ EN 12266										
ACCETTABILITÀ / ACCEPTABILITY	■ EN 12266 R.A										
PROCEDURA / PROCEDURE	CORPO/BODY				SEGGI/SEATS						
	STD HYDROTEST		GAS TEST		STD HYDROTEST		PNEUMATIC TEST		GAS TEST		
VALORI RICHIESTI / REQUIRED VALUES	PRESS. (bar)	DURATA (sec)	PRESS. (bar)	DURATA (sec)	PRESS. (bar)	DURATA (sec)	PRESS. (bar)	DURATA (min)	PRESS. (bar)	DURATA (min)	
	29	**15**	**-**	**-**	**21**	**15**	**-**	**-**	**-**	**-**	
TENUTA / SEAL	PERDITA / LEAKAGE (mm^3/min)		PERDITA / LEAKAGE (mm^3/min)		PERDITA / LEAKAGE (mm^3/min)		PERDITA / LEAKAGE (mm^3/min)		PERDITA / LEAKAGE (mm^3/min)		
MAX. ACCETTABLE	**0**		**-**		**0**		**-**		**-**		
STRUMENTI / INSTRUMENTS	Banco prova / Test bench: ITALCONTROL vertical 13-870 – Mod. MTS3-100A Gauges: MM0089/1-MM2124/1-MM2127/1–MM0090/1-MM2126/1-MM00127/1-MM0128/1-MM2125/1-MM0095/1										

Summary table of the tested valves:

OBJ.	SERIAL NUMBER	TAG
1	8PV0050510/01	n/a
2	8PV0050510/02	n/a
3	8PV0050510/03	n/a
4	8PV0050510/04	n/a
5	8PV0050510/05	n/a
6	8PV0050510/06	n/a

I-SS-00099 (era S-PSQ-08.2.4/12) – Certificato di collaudo / Insp. certificate

Via A. Gitti,11 - 25060 Marcheno (BS -ITALIA
Tel. +39 030 8969311 - Mail valpres@bonomi.it

Certificato di collaudo finale 3.1 EN 10204 / Final inspection certificate 3.1 EN 10204

Cliente / Customer	COES
Codice Cliente / Customer code	N/A
Ordine Cliente / Customer order	2296/24
Data ordine / Date of order	11/07/2024
VALPRES JOB NUMBER	24063
VALPRES SALES ORDER	2100139835
ITEM	3

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-003
TIPO VALVOLA / VALVE TYPE	68J01610SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	6
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	2"
RATING	150

Inspection test values – Hydro / Gas / Pneumatic test:

OBJ.	BODY			
	Std Hydrotest Detected pressure / Pressione rilevata (bar)	**Std Hydrotest** Detected leakage / Perdita rilevata (mm^3/min)	**Gas Test** Detected pressure / Pressione rilevata (bar)	**Gas Test** Detected leakage / Perdita rilevata (mm^3/min)
1	29	0	-	-
2	29	0	-	-
3	29	0	-	-
4	29	0	-	-
5	29	0	-	-
6	29	0	-	-

OBJ.	SEATS											
	Std Hydrotest Detected pressure / Pressione rilevata (bar)		**Std Hydrotest** Detected leakage / Perdita rilevata (mm^3/min)		**Pneumatic test** Detected pressure / Pressione rilevata (bar)		**Pneumatic test** Detected leakage / Perdita rilevata (mm^3/min)		**Gas Test** Detected pressure / Pressione rilevata (bar)		**Gas Test** Detected leakage / Perdita rilevata (mm^3/min)	
	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX
1	21	21	0	0	-	-	-	-	-	-	-	-
2	21	21	0	0	-	-	-	-	-	-	-	-
3	21	21	0	0	-	-	-	-	-	-	-	-
4	21	21	0	0	-	-	-	-	-	-	-	-
5	21	21	0	0	-	-	-	-	-	-	-	-
6	21	21	0	0	-	-	-	-	-	-	-	-

TEST RESULT:	**SATISFACTORY**

ASSICURAZIONE QUALITA' / QUALITY ASSURANCE	ISPETTORE CLIENTE / CUSTOMER INSPECTOR	ISPETTORE PARTE TERZA / THIRD PART INSPECTOR
Firma / Sign VALPRES QC PASSED Data / Date 06/09/2024	Firma / Sign Data / Date	Firma / Sign Data / Date

Via A. Gitti,11 - 25060 Marcheno (BS -ITALIA
Tel. +39 030 8969311 - Mail valpres@bonomi.it

Functional acceptance test report

Cliente / Customer	COES
Codice Cliente / Customer code	N/A
Ordine Cliente / Customer order	2296/24
Data ordine / Date of order	11/07/2024
VALPRES JOB NUMBER	24063
VALPRES SALES ORDER	2100139835
ITEM	3

N° CERTIFICATO / CERTIFICATE No.	24063-FAT-001
TIPO VALVOLA / VALVE TYPE	68J01610SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	6
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	2"
RATING	150
DIBA	8PV0050510

ACTUATOR DATA	
OPERATING SYSTEM	**Pneumatic actuator - Spring return**
MODEL TYPE	**"VALBIA SR115-04-OP"**
COMPONENT CODE	**8P0325AZ70**

TEST CONDITIONS		
ELECTRIC CURRENT FREQUENCY	**N/A**	**Hz**
"DELTA P" PRESSURE APPLIED ON THE VALVES	**0**	**bar**
REQUIRED ACTUATOR AIR PRESSURE	**Min.5.5** **Max. 8**	**Bar** **Bar**
MAX ALLOWABLE CLOSING TIME	**≤ 10**	**sec**
MAX ALLOWABLE OPENING TIME	**≤ 10**	**sec**

MEASURING INSTRUMENTS
Chronometers

I-SS-00103 (era S-PSQ-8.2.4/16) – Controlli in produzione / Production control

Via A. Gitti,11 - 25060 Marcheno (BS -ITALIA
Tel. +39 030 8969311 - Mail valpres@bonomi.it

Functional acceptance test report

Cliente / Customer	COES
Codice Cliente / Customer code	N/A
Ordine Cliente / Customer order	2296/24
Data ordine / Date of order	11/07/2024
VALPRES JOB NUMBER	24063
VALPRES SALES ORDER	2100139835
ITEM	3

N° CERTIFICATO / CERTIFICATE No.	24063-FAT-001
TIPO VALVOLA / VALVE TYPE	68J01610SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	6
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	2"
RATING	150
DIBA	8PV0050510

Summary table of the tested valves:

OBJ.	VALVE SERIAL NUMBER	VALVE TAG
1	8PV0050510/01	n/a
2	8PV0050510/02	n/a
3	8PV0050510/03	n/a
4	8PV0050510/04	n/a
5	8PV0050510/05	n/a
6	8PV0050510/06	n/a

Measured test values:

OBJ.	Detected "Delta P" pressure (bar)		Detected actuator air pressure (bar)		Measured opening time (sec)		Measured closing time (sec)	
	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX
1	-	0	-	6	-	2	-	2
2	-	0	-	6	-	2	-	2
3	-	0	-	6	-	2	-	2
4	-	0	-	6	-	2	-	2
5	-	0	-	6	-	2	-	2
6	-	0	-	6	-	2	-	2

Note: Failure Test in case of electrical supply failure verified with result: **SATISFACTORY**

TEST RESULT:	**SATISFACTORY**

ASSICURAZIONE QUALITA' / QUALITY ASSURANCE	ISPETTORE CLIENTE / CUSTOMER INSPECTOR	ISPETTORE PARTE TERZA / THIRD PART INSPECTOR
Firma / Sign VALPRES QC PASSED Data / Date 17/09/2024	Firma / Sign Data / Date	Firma / Sign Data / Date

VALPRES S.r.l.

Via A. Gitti, 11
25060 - Marcheno V.T. (Brescia)
☎ 030 89 69 311 r.a. - FAX 030 89 60 239
e-mail: valpres@bonomi.it

DECLARATION OF CONFORMITY

DIRECTIVE 2014/34/UE (ATEX – ATMOSPHERE EXPLOSIVE)

Model of this Declaration according to the standard EN ISO / IEC 17050-1

The Company: **VALPRES S.r.l.**
Address: **Via Gitti, 11 – 25060 Marcheno (Brescia) - Italy**

declares under its own responsibility that the product,

Ball valve: series 67, 68, 69, 70 (including 706-707), 71, 72, 73, 75, 76, 77, 78 and 79 (Equipped with anti-static stem and with or without motorized drive)

to which this declaration refers to, comply with the following:

ATEX Directive 2014/ 34/ UE of 26 february 2014
Group II, category 2 , Gas (zone 1), Ex "h", IIC, Temperature class T6…T1 Gb
Group II, category 2 , Dust (zone 21), Ex "h", IIIC, Temperature class T85°C…T450°C Db

according to the following standard:

EN 80079-36	Explosive atmospheres — Part 36: Non-electrical equipment for explosive atmospheres — Basic method and requirements	**2019**

Technical file VALPRES S.R.L. V0354/003
Filed by notified body N.0948 TÜV ITALIA Milano - Italy
Acknowledgement of receipt number TÜV IT 14 ATEX 010 AR Rev.03

Marcheno, 4 aprile 2025
(place and date)

Massimo Bonomi
Massimo Bonomi (Legal Representative)
* electronic signature: original available in factory

The company works according to a QUALITY, ENVIRONMENTAL, SAFETY and ENERGY SYSTEM which complies with the standard **ISO_9001**, **ISO_14001, ISO_45001 and ISO_50001**, recognised by SQS

EN 10204 2.1 - DECLARATION OF COMPLIANCE WITH THE ORDER

Messrs COES

The Company: **VALPRES S.r.l.**

Address: **Via A. Gitti, 11 – 25060 Marcheno (Brescia) - Italy**

declares under its own responsibility that the products

code	size
68J01610	**2"**
68J01606	**1"**
8PV0050510	**2"**
8PV0050406	**1"**
8PV0050306	**1"**
8PV0050606	**1"**
68F02906	**1"**

comply with your

order/ orders n.	dated
2296/24	**11/07/2024**

The company works according to an integrated QUALITY, ENVIRONMENTAL, SAFETY and ENERGY management system which complies with the standards ISO_9001, ISO_14001, OHSAS_18001 and ISO_50001, recognised by SQS.

Marcheno, 04/04/2025

(place and date)

Carlo Bonomi *

Carlo Bonomi (General Manager)

* electronic signature: the original signature is available in our company

VALPRES S.r.l. - P.O. Box 40 - Via A. Gitti, 11 - 25060 Marcheno (BS) - Italy
Tel. +39 030 89 69 311 - Fax +39 030 89 60 239 - www.valpres.it - email: valpres@bonomi.it

FINAL BOOK

Valpres Sales order: **2100139835**

Valpres Job Number: **24063**

Purchase Order: **2296/24**

Item: **7**

TAG Numbers:
BLPH-MV-739, BLPH-MV-740
BLPH-MV-807, BLPH-MV-809
BLPH-MV-821, BLPH-MV-810
BLPH-MV-811, BLPH-MV-812
BLPH-MV-813

0	07/04/2025	First Issued	L. Toso RQP	A. Disha RGC
Rev:	**Date:**	Description:	**Emitted by:**	**Approved by:**

Via A. Gitti, 11
25060 Marcheno V.T. (BS)

Phone +39 030 89 69 311
Fax +39 030 89 60 239

FINAL BOOK
PO: 2296/24
VSO: 2100139835
VJN: 24063
ITEM: 7

FINAL BOOK Rev. 0

Valve Type: 9x Floating Ball valve Side Entry Bolted Body 2-pcs

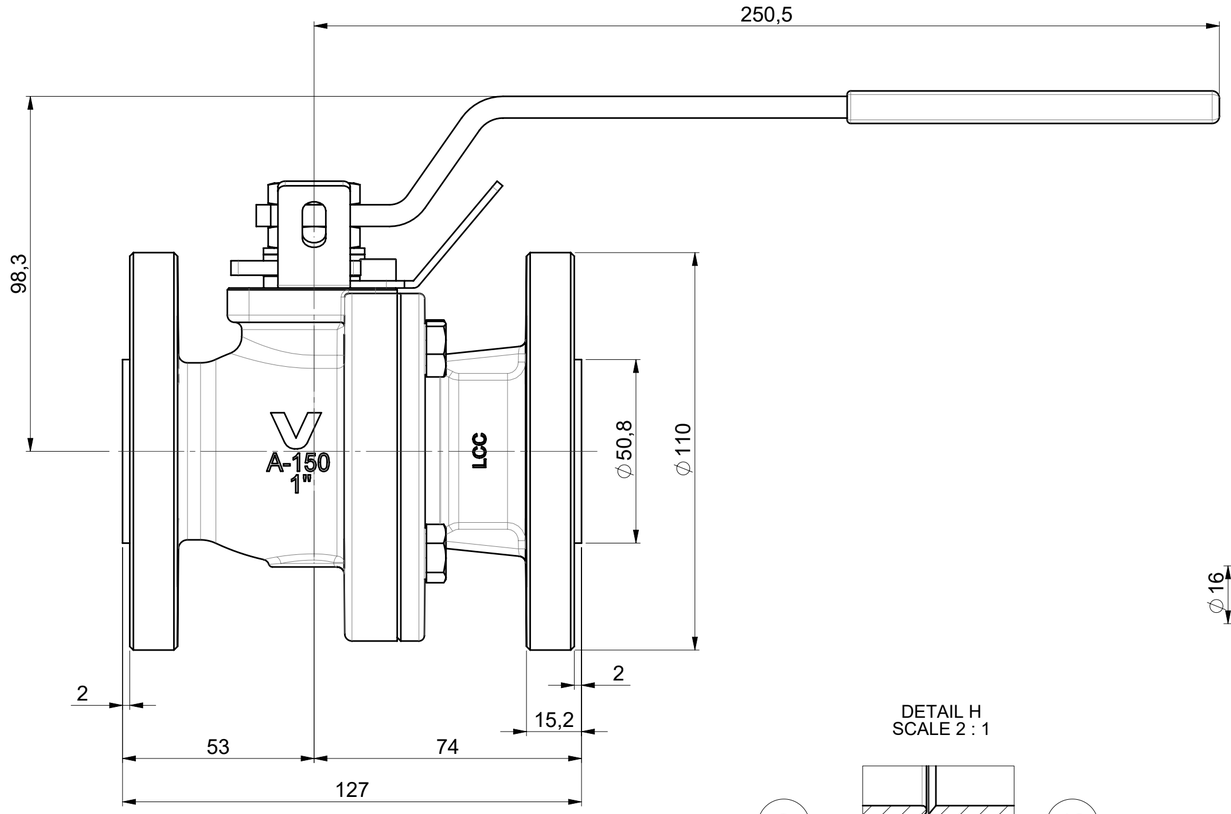
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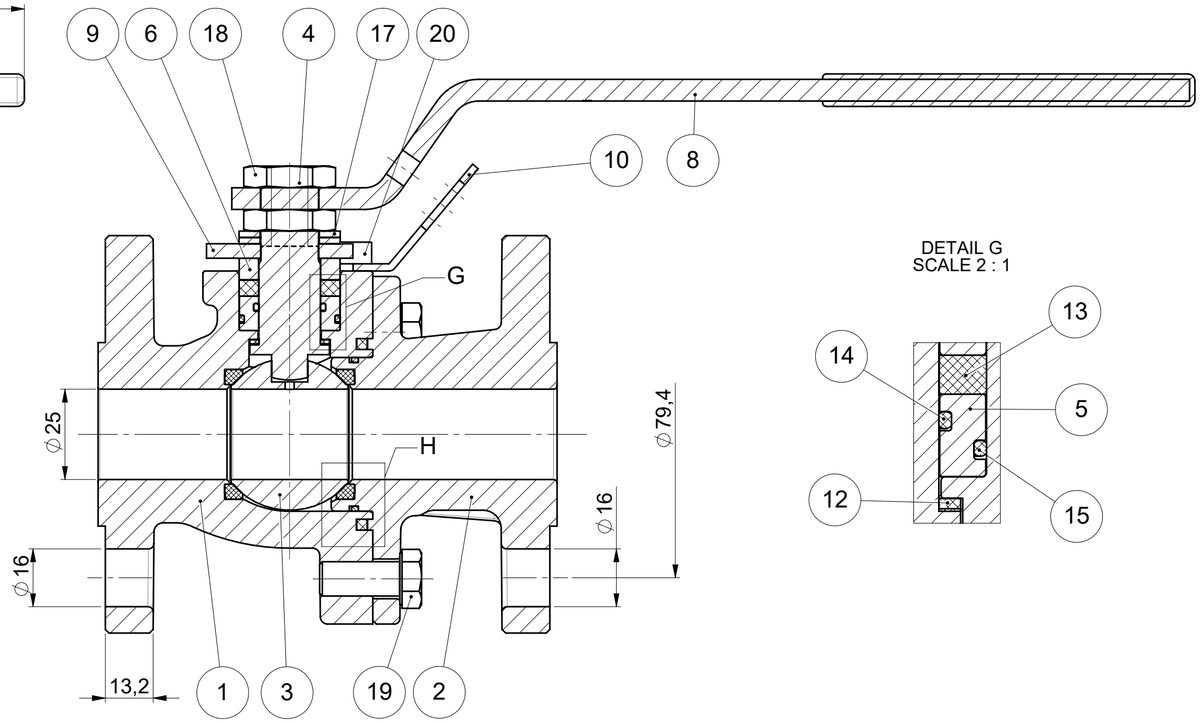
VALPRES TYPE: 8 0290

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3) Material Certificate EN 10204 3.1 n. EXP067/19-20/22 – CLOSURE page 4
4) Material Certificate EN 10204 3.1 n. 2018018697 – BALL page 5
5) Material Certificate EN 10204 3.1 n. BT-37159 – STEM page 14
6) Valpres Final Inspection Certificate page 15
7) Valpres Functional acceptance test report page 17
8) Declaration of Compliance with the Order page 19

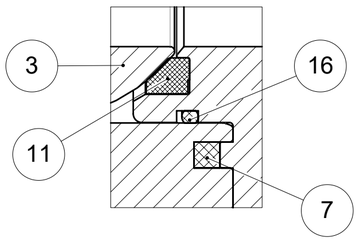
VALPRES QC REVIEW



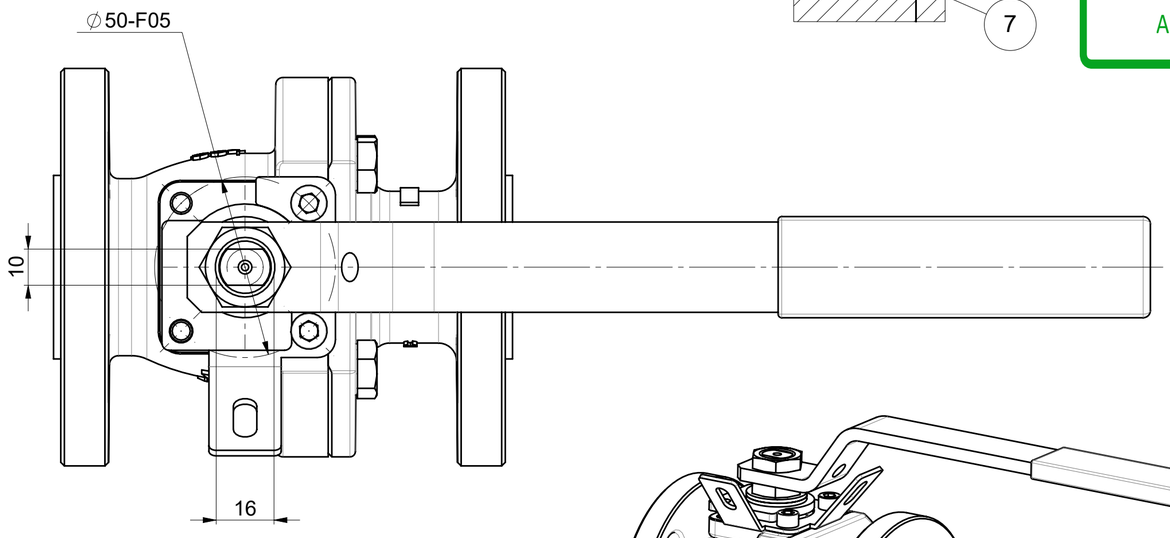


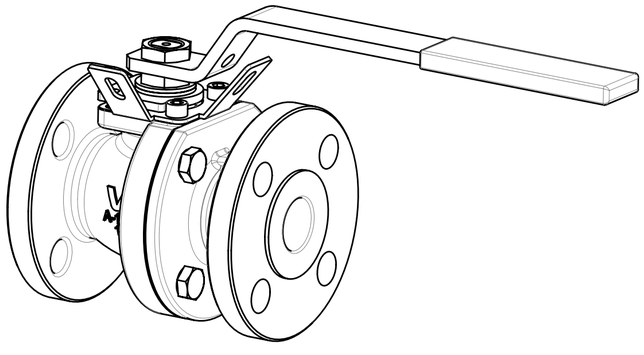
DETAIL G
SCALE 2 : 1

DETAIL H
SCALE 2 : 1



AS BUILT





POS.	PART NAME	MATERIALS	Q.ty
1	CORPO / BODY	A352-LCC	1
2	FLANGIA / END CONNECTION	A352-LCC	1
3	SFERA / BALL	A351-CF8M	1
4	ASTA ANTISTATICA	A564 Tp630 H1150D (17-4-PH)	1
5	BUSSOLA PORTA O-RING / O-RING BUSH	A479-Tp316	1
6	BUSSOLA / PACKING GLAND	A479-Tp316	1
7	GUARNIZIONE CORPO / BODY SEAT	GRAPHITE	1
8	LEVA / HANDLE	A37+Z/P	1
9	MEZZOGIRO / 90° STOP	AISI 316	1
10	LOCKING HANDLE	AISI 316	1
11	GUARNIZIONE SFERA / BALL SEAT	RPTFE	2
12	GUARNIZIONE ANTIATTRITO / ANTIFRICTION RING	RPTFE	1
13	GUARNIZIONE ASTA / STEM SEAT	GRAPHITE	1
14	O-RING	FKM	1
15	O-RING	FKM	1
16	O-RING	FKM	1
17	MOLLA A TAZZA / SPRING WASHER	Carbon Steel	2
18	DADO / NUT	Carbon Steel	2
19	VITE / SCREW	A320 L7+Z/P 5µm	4
20	VITE / SCREW	A2-70	2

Valpres Code	Valpres Item	DS N°
68F02906	7	BS01B01RF

REV	DATE	DRAFT	APPR.	DESCRIPTION	IN PLACE OF
					68F02906

SIZE	SCALE	DATE	ENGINEER SIGNATURE	ENGINEERING GROUP LEADER SIGNATURE	WEIGHT (Kg)
A2	1:1.2	05-09-2024	Zanetti Paride	Agorni Alessandra	4.87

DIMENSIONS WITHOUT ANY TOLERANCE INDICATIONS ARE REFERRED TO IT 12 IN ACCORDANCE WITH UNI ISO 286/1
BORE AND SIMILAR: + IT SHAFTING AND SIMILAR: - IT
OTHER PARTICULARS: ±1/2 IT

1 ÷ 3	0.10	10 ÷ 18	0.18	50 ÷ 80	0.30	180 ÷ 250	0.46
3 ÷ 6	0.12	18 ÷ 30	0.21	80 ÷ 120	0.35	250 ÷ 315	0.52
6 ÷ 10	0.15	30 ÷ 50	0.25	120 ÷ 180	0.40	315 ÷ 400	0.57

MATERIAL

TREATMENT

NAME **SPLIT BODY BALL VALVE** **68F029 (FLOTTANTE)** **1"-DN25**
ANSI150 API608 **FTF - ASME B16.10** **ASME B16.5 RF**

PROJECT REFERENCE
COD Commessa 24063 REV TAV 01

DRAWING NUMBER
COD **68F02906** REV A TAV 01

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VALPRES

RAJAN TECHNO CAST PVT LTD.

Survey No.281/1,Plot No.21/22 At.Shapar,Tal:-Kotda Sangani.,,,RAJKOT,Pin:360024,INDIA
Tel:+91-2827-252160,,Fax:+91-2827-252562,e-mail:info@rajantechcast.com,

TEST CERTIFICATE

EN 10204:2005 - 3.1

F10-QC-06/00

M/s. VALPRES
Via A. Gittti
11- 25060 Marcheno (BS)
Italy
ITALY

T.C No : EXP067/19-20/3 Date: 30/04/2019
Invoice No : EXP067/19-20 Date: 30/04/2019
O.A No : E1670/18-19 Date: 19/02/2019
P.O No : 36762 Date: 18/02/2019

SPECIFICATION : ASTM A 352 Gr.LCC

CONDITION OF SUPPLY : HEAT TREATED AT 920° C SOAKED FOR 1 HRS AND WATER QUENCHED THEN TEMPERED AT675° C SOAKED FOR 5 HRS, THEN FURNACE COOL UP TO 400° C THEN AIR COOL .

CHEMICAL ANALYSIS

HEAT No	C.%	Mn.%	Si.%	S.%	P.%	Cr.%	Ni.%	Mo.%	V.%	Cu.%	CE.%
MIN	-	-	-	-	-	-	-	-	-	-	-
MAX	0.220	1.200	0.600	0.025	0.030	0.500	0.500	0.200	0.030	0.300	0.430
BM024	0.204	1.014	0.548	0.008	0.025	0.087	0.187	0.084	0.002	0.096	0.426

VALPRES QC PASSED

MECHANICAL PROPERTIES

HEAT No	YS	YS	T.S	Elgn	Redn	Hardness	Impact Test at -46 °C				LATERAL EXP.			
	Mpa(0.2%)	Mpa(1%)	Mpa	%	in Area	BHN	CHARPY-V MIN. 27 J				(mm) MIN.			
MIN	275	-	485	22	35	-	Size: 10 X10 X 55 MM							
MAX	-	-	655	-	-	237	1	2	3	AVG	1	2	3	AVG
BM024	282.12		550.22	37.92	56.96	166	42	48	44	45	-	-	-	-

DESPATCH DETAILS

HEAT No	DIE No	Sr. N	Pos	ITEM DESCRIPTION	PART No	DRAWING No	DESP. QTY
BM024	VP033B	2	6	1" DN25 SPLIT BODY ANSI 150		(00106010048)MOD0010615 REV. D	50

We hereby certify that items mentioned above confirms to : ASTM A 352 Gr.LCC
NO RADIOACTIVE CONTAMINATION DETECTED.
VISUAL INSPECTION TEST ACCORDING TO MSS SP 55 - FOUND SATISFACTORY.
MATERIAL CONFORMS TO NACE MR 0175/ISO 15156-2009 & MR0103/ISO 17945-2003
NORSOK M-630-2013,MDS C12-REV.5
PED 2014/68/EU, ANNEX 1 PER. 4.3

Manufacture Logo (r)

Work Expert Signature / Stamp (rd)

For RAJAN TECHNO CAST PVT LTD.

Q.A. DEPARTMENT

Tested By:

AN ISO-9001-2015 COMPANY

VALPRES

RAJAN TECHNO CAST PVT LTD.

Survey No.281/1,Plot No.21/22 At.Shapar,Tal:-Kotda Sangani.,,,RAJKOT,Pin:360024,INDIA
Tel:+91-2827-252160,,Fax:+91-2827-252562,e-mail:info@rajantechcast.com,

TEST CERTIFICATE

EN 10204:2005 - 3.1 F10-QC-06/00

M/s. VALPRES
Via A. Gittti
11- 25060 Marcheno (BS)
Italy
ITALY

T.C No : EXP067/19-20/22 Date: 30/04/2019
Invoice No : EXP067/19-20 Date: 30/04/2019
O.A No : E1656/18-19 Date: 17/02/2019
P.O No : 36734 Date: 15/02/2019

SPECIFICATION : ASTM A 352 Gr.LCC

CONDITION OF SUPPLY : HEAT TREATED AT 920° C SOAKED FOR 1 HRS AND WATER QUENCHED THEN TEMPERED AT675° C SOAKED FOR 5 HRS, THEN FURNACE COOL UP TO 400° C THEN AIR COOL .

CHEMICAL ANALYSIS

HEAT No	C.%	Mn.%	Si.%	S.%	P.%	Cr.%	Ni.%	Mo.%	V.%	Cu.%	CE.%
MIN	-	-	-	-	-	-	-	-	-	-	-
MAX	0.220	1.200	0.600	0.025	0.030	0.500	0.500	0.200	0.030	0.300	0.430
BM024	0.204	1.014	0.548	0.008	0.025	0.087	0.187	0.084	0.002	0.096	0.426

VALPRES QC PASSED

MECHANICAL PROPERTIES

HEAT No	YS	YS	T.S	Elgn	Redn	Hardness	Impact Test at -46 °C				LATERAL EXP.			
	Mpa(0.2%)	Mpa(1%)	Mpa	%	in Area	BHN	CHARPY-V MIN. 27 J				(mm) MIN.			
MIN	275	-	485	22	35	-	Size: 10 X10 X 55 MM							
MAX	-	-	655	-	-	237	1	2	3	AVG	1	2	3	AVG
BM024	282.12		550.22	37.92	56.96	166	42	48	44	45	-	-	-	-

DESPATCH DETAILS

HEAT No	DIE No	Sr. N	Pos	ITEM DESCRIPTION	PART No	DRAWING No	DESP. QTY
BM024	VP034B	20	60	1"DN25 SPLIT CAP ANSI 150		(00206010036)MOD0020613 REV. D	80

We hereby certify that items mentioned above confirms to : ASTM A 352 Gr.LCC
NO RADIOACTIVE CONTAMINATION DETECTED.
VISUAL INSPECTION TEST ACCORDING TO MSS SP 55 - FOUND SATISFACTORY.
MATERIAL CONFORMS TO NACE MR 0175/ISO 15156-2009 & MR0103/ISO 17945-2003
NORSOK M-630-2013,MDS C12-REV.5
PED 2014/68/EU, ANNEX 1 PER. 4.3

Manufacture Logo (r)

Work Expert Signature / Stamp (rd)

For RAJAN TECHNO CAST PVT LTD.

Q.A. DEPARTMENT

Tested By:

AN ISO-9001-2015 COMPANY

COGNE ACCIAI SPECIALI S.p.a.
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CAP. SOC. 115.000.000 EUR INT. VERS.
C.F. 02187360967
VAT: IT00571320076 - R.E.A. n. AO-50474

Company with management systems IGQ approved and certified according to ISO 9001, ISO/TS 16949 e ISO 14001.

VALPRES

INSPECTION CERTIFICATE 3.1 (EN 10204:2004)
DOCUMENT NUMBER 2018018697

CUSTOMER: COGNE DISTRIBUZIONE ITALIA SRL
CUSTOMER'S ORDER: OdA: IT72 4900068879
MANUFACTURER'S WORKS: AOSTA, VIA PARAVERA 16 - ITALY
PRODUCER OF THE DOC: QUALITY DEPARTMENT
MANUFACTURER'S WORKS ORDER NO: 50363020 /10 MARK OF THE MANUFACTURER: **COGNE**
THE CERTIFIED PRODUCTS ARE COMPLYING TO THE PURCHASE ORDER

INTERNAL SPEC:	STOCKBARREW2	TECHNICAL RULE:	AD2000
PRODUCT:	2280 SPE ROUGHPEELED	ROUND BARS TOLERANCE:	+ 1,500 - 0,0000
SURFACE FINISH:	1X Hot Finished		
PRODUCT DELIVERY CONDITION:	RS SOLUTION ANNEALED		
PRODUCT DIMENSIONS (mm):	120,000	LENGTH (mm)	04000 /06000
GRADE:	AISI 316/316L EN1.4401/4404	INTERNAL GRADE:	F316L IMCO
IDENTIFICATION HEAT NO:	770222	IDENTIFICATION LOT NO:	622300
MARKING OF THE PRODUCT:	1.4404	TEST PIECE N:	230

REFERENCE NORMS: EN 10088-3, EN 10272, ASTM A276, ASTM A479, ASTM A193 B8MCLASSE 1D, ASME SA276, ASME SA479, AMS 5653, AMS 5648, ISO15156-3/NACE MR0175, NACE MR0103, NORSOK M630 MDSS01 REV5.
REFERENCE NORMS FOR CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES: ASTM A182, ASME SA182.
REFERENCE NORMS ONLY FOR CHEMICAL COMPOSITION: EN 10222-5,ASTM A403, ASTM A484,ASTM A314, AMS-QQ-S-763.
STEELMAKING EAF + AOD + CONTINUOUS CASTING
ASTM A484 DOES NOT APPLY FOR SIZE AND LENGTH TOLERANCES.
REFERENCE NORM ASME BPVC.II.A-2015.
HOT ROLLED
REDUCTION RATIO 4,6

CHEM. COMP. (%W/W) - LADLE ANALYSIS ACCORDING TO ASTME1019-A751-E1086-E415-A580
Control lot No. - Weight :020000721500 - 83.753 KG

ELEMENTS	C	Si	Mn	P	S	N2	Cr	Mo	Ni	Cu
OBTAINED	0,023	0,34	1,73	0,026	0,025	0,080	16,73	2,07	10,06	0,41
ELEMENTS	Co									
OBTAINED	0,23									

HARDNESS TEST IN AS DELIVERY CONDITION
Control lot No. - Weight :020000722429 - 23.381 KG
SPECIFICATION ENISO6506 HARDNESS TEST HB TESTING METHOD: 10/3000
OBTAINED 164

IMPACT TEST IN AS DELIVERY CONDITION
Control lot No. - Weight :020000722429 - 23.381 KG
SPECIFICATION EN ISO 148-1-KV2 DIRECTION OF THE TEST PIECE: L
TYPE OF TEST PIECE KV
TEST TEMPERATURE °C 20
MEASUREMENT UNIT J

OBTAINED	234	231	242	234	241	243	252	232	249	232
	238	234								

VALPRES QC PASSED

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VALPRES

INSPECTION CERTIFICATE 3.1 (EN 10204:2004)
DOCUMENT NUMBER 2018018697

TENSILE TEST IN AS DELIVERY CONDITION
Control lot No. - Weight :020000722429 - 23.381 KG
SPECIFICATION EN-ISO6892-1 DIRECTION OF THE TEST PIECE: L

MEASUREMENT UNIT	RM MPA	RP02 MPA	A5 % 5.0 D	Z %	RP1 MPA
OBTAINED	552	264	60,6	81,3	301
	545	260	62,6	81,3	302
	546	265	61,0	81,6	291
	555	257	59,2	81,4	296

GRAIN SIZE
Control lot No. - Weight :020000722429 - 23.381 KG
SPECIFICATION ASTME112 --

OBTAINED	4	6

IMPACT TEST
Control lot No. - Weight :020000722429 - 23.381 KG
SPECIFICATION EN ISO 148-1 DIRECTION OF THE TEST PIECE: L
TYPE OF TEST PIECE KV
TEST TEMPERATURE °C 196-
MEASUREMENT UNIT J

OBTAINED	197	215	210	214	202	219	204	216	196	199
	214	193								

TENSILE TEST
Control lot No. - Weight :020000722429 - 23.381 KG
SPECIFICATION ASTMA370-E8-0.5"SPEC DIRECTION OF THE TEST PIECE: L

MEASUREMENT UNIT	TS KSI	YS KSI	RA %	EL % 4,0 D
OBTAINED	77	38	83,9	65,9
	76	37	83,5	64,2
	79	38	83,1	65,2
	78	37	81,2	65,8

COUNTRY OF ORIGIN: ITALY, THE MATERIAL COMPLIES WITH FAR DFARS
252.225-7009 ALT 1.
DOCUMENT ISSUED IN AGREEMENT WITH TUEV BAYERN(11.1972) WAVING OF COUNTERSIGNING (SEE TUEV BAYERN LETTER DATED 17.01.80).
MARKING: SYMBOL OF THE MANUF. WORK, MATERIAL N. , CAST N., LOT N., RECEIVING AGENT STAMP
CORROSION TEST ACCORDING TO ASTM A262/02A Practice.E EN ISO 3651-2 A: SATISFACTORY.
VISUAL INSPECTION OF SURFACE AND DIMENSIONAL CONTROL ACCORDING TO EN 10221 CLASS C AND EN 10060: SATISFACTORY.
ULTRASONIC TEST ACCORDING TO EN 10308 Class 3, equivalent to ASTM A388 FBH 5 (DIAM. 100-250) and FBH 8 (DIAM. 250-400) or to EN10228-4 Class 3: SATISFACTORY.
ANTIMIX TEST WITH PORTABLE SPECTROMETER: SATISFACTORY.
NO WELDING REPAIR ON THE MATERIAL.

VALPRES QC PASSED

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C.F. 02187360967
VAT: IT00571320076 - R.E.A. n. AO-50474

Company with management systems IGQ approved and certified according to ISO 9001, ISO/TS 16949 e ISO 14001.

FREE FROM RADIOACTIVE CONTAMINATION.
ULTRASONIC TEST ACCORDING TO EN 10308 Class.3, EN 10228 Class.3, ASTM A388 FBH 5 (diam. 102-250), FBH 8 (diam. 250,01-400).
THE PRODUCT IS CONFORMING TO THE CONTRACT AGREEMENT AND TO THE RULE AD2000-MERKBLATT W0/W2.
SAMPLING PERFORMED AT T/4 ON A QTC
HEAT TREATMENT PERFORMED ON 20JAN'18 IN FURNACE FELIND4 (CALIBRATION 01JAN'18
ACC. TO API 6A ANN. M/API 6D ANN. F. EXPIRING ON 01JAN'19)
CHARPY-V ASTM A370(-196°C): 190-195-190J - LATERAL EXP. MIN 0.38MM
INSPECTOR'S STAMP LF
THE PRODUCT SATISFIES CE DIRECTIVES: 2011/65 (ROHS2) - 2000/53 - 2002/95(RoHS) - 2003/11 - 2005/618 AND PED 2014/68/EU.
THE MATERIAL IS FREE OF ANY MERCURY, MERCURY COMPOUNDS AND OR RADIUM CONTAMINATION AT TIME OF SHIPMENT AND WAS PRODUCED WITHOUT USING OZONE DEPLETING SUBSTANCES OF CLASS I AND II.
REFERENCE NORMS: EN 10088-3, EN 10272, ASTM A276, ASTM A479, ASTM A193 B8MCLASSE 1D, ASME SA276, ASME SA479, AMS 5653, AMS 5648, ISO15156-3/NACE MR0175, NACE MR0103, NORSOK M630 MDSS01 REV5.
REFERENCE NORMS FOR CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES: ASTM A182, ASME SA182.
REFERENCE NORMS ONLY FOR CHEMICAL COMPOSITION: EN 10222-5,ASTM A403, ASTM A484,ASTM A314, AMS-QQ-S-763.
ALL THE NORMS MENTIONED ARE INTENDED IN THEIR LAST REVISION AT THE DATE OF ISSUE OF THIS DOCUMENT.
ASTM A484 DOES NOT APPLY FOR SIZE AND LENGTH TOLERANCES.

VALPRES QC PASSED

DATE 02.02.2018

BARBARA VIETTI MV(WORKS INSPECTOR) - ELECTRONICALLY GENERATED CERTIFICATE -Cogne

AQM srl
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CENTRO SERVIZI TECNICI ALLE IMPRESE

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO

LAB N° 0095

Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC

Signatory of EA, IAF and ILAC Mutual Recognition Agreements

SUPPLEMENTO N° 2019-0025 AL RAPPORTO DI PROVA N°: *Supplement report nr. 2019-0025 to Test Report Nr.*	2018-2019PM of the 08th November 2018	**Pagina** *Page*	1 di/*of* 20

Vs. referente *Your ref*	Mr. Barillaro	**Cliente** *Customer*	Spett.le **VALPRES SRL** Via A.Gitti, 11 **25060 MARCHENO (BS)**
Ns. referente *Our ref*	Mr. Parzani		
Data emissione *Emission date:*	10th April 2019		
Data delle prove *Test carried out*	From 28th August 2018 to 05th November 2018		
Data ricevimento materiali: *Recivement date*		26th July 2018 19th October 2018	
Documenti di consegna *Delivery documents*	Your Delivery document nr. 50626 of the 25th July 2018 and nr. 50804 of the 18th October 2018		
Offerta n° *Quotation nr.*	2017-371	**Ordine n°** *Order nr.*	Acceptance of order
Campionamento eseguito da *Sampling carried out by*	Customer		

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I risultati delle prove riguardano esclusivamente i saggi, provette o campioni sottoposti a prova, che saranno conservati non oltre 30 gg dalla data della relazione, salvo diversamente concordato all'ordine.
Tests result's exclusively concern the tested samples. They will be stocked a maximum of 30 days from date of report if not otherwise accorded on the order.

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The recording of false, fictitious, or fraudulent statements or entries on the certificate may be punished as a felony under the applicable law.

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SUPPLEMENTO N° 2019-0025 AL RAPPORTO DI PROVA N°: *Supplement report nr. 2019-0025 to Test Report Nr.*	2018-2019PM of the 08th November 2018	**Pagina** *Page*	12 di/*of* 20

N° Campione *Sample nr.*	**DESCRIZIONE** / *Sample designation*
2018-2019/6	Sample of bar Ø120mm made of steel ASTM A479 316/316L, heat 770222

(Descrizione e rappresentatività del saggio esaminato dichiarata dal committente./ *Description and representativeness of the sample examined declared by the customer)*

Numero *Number*	**ANALISI CHIMICA - % p.p.** / *chemical composition – % by weight*										
	C	Si	Mn	P	S	Cr	Ni	Mo	Cu	N	PREN
Requirements(ε)	*≤0,030*	*≤1,00*	*≤2,00*	*≤0,045*	*≤0,030*	*16,0÷18,0*	*10,0÷14,0*	*2,00÷3,00*	-	-	*≥24*
8-6987	0,03*	0,32	1,75*	0,030	0,025	16,71	10,02	2,12	0,46	0,078*	24,95*

Documento valido ad ogni effetto di legge, ex RD 1 marzo 1928 n° 842, legge 19 luglio 1957, n° 679 e D.M. 25 marzo 1986 Ministero di Grazia e Giustizia.
This document is legally effective to ex RD 1st march 1928 nr. 842, law 19th july 1957, nr. 679 and D.M. 25th march 1986 of Grant and Justice Ministry.

Metodi di prova/*Tests methods*
P-4LC/005 rev. 8 (2014); P-4LC/007 rev. 8 (2014); P-4LC/025 rev 1 (2004)*

Procedure interne o specifiche del committente/*Internal procedures or Customer technical specification*
P-4LC/003 rev 3 (2012)*,

TRAZIONE A TEMPERATURA AMBIENTE
Tensile test at room temperature

Numero *Number*	Posizione *Position*	Orientamento *Orientation*	Dimensioni *Dimensions*			YS offset$_{0,2}$	UTS	E after fracture	RA	YS/UTS	T
			∅	So	Lo						
			mm	mm²	mm	MPa	MPa	%	%	-	°C
Requirements(ε)	-	-	-	-	-	*≥170*	*≥485*	*≥30*	*≥40*	-	*+23*
8-6988	Ø/2	L	8,70	59,4	35	258	574	60,0	78,2	0,45	+23
8-6989	Ø/2	T	8,75	60,1	35	258	565	54,4	54,1	0,46	+23
8-6990	Ø/4	T	8,72	59,7	35	262	570	55,5	59,4	0,46	+23

Metodi di prova/*Tests methods:*
ASTM E8/E8M-16a ; ASTM A370-16*

Procedure interne o specifiche del committente/*Internal procedures or Customer technical specification*
N.d.

RESILIENZA
Impact test

Numero *Number*	Posizione *Position*	Orientamento *Orientation*	Dimensioni *Dimensions*	KV$_8$ 750 J		T	LATERAL EXPANSION	SHEAR FRACTURE
				Single	*Avg*			
-	-	-	mm			°C	mm	%
8-6991	Ø/2	L	10x10	232	234,7	-196	2,10	100
			10x10	212			1,93	100
			10x10	260			2,26	100

Metodi di prova/*Tests methods:*
ASTM A370-16; ASTM E23-16b

Procedure interne o specifiche del committente/*Internal procedures or Customer technical specification*
N.d.

VALPRES QC PASSED

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CENTRO SERVIZI TECNICI ALLE IMPRESE

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SUPPLEMENTO N° 2019-0025 AL RAPPORTO DI PROVA N°: *Supplement report nr. 2019-0025 to Test Report Nr.*	2018-2019PM of the 08th November 2018	**Pagina** *Page*	13 di/*of* 20

RESILIENZA
Impact test

Numero *Number*	Posizione *Position*	Orientamento *Orientation*	Dimensioni *Dimensions*	KV_8 750 J		T	LATERAL EXPANSION	SHEAR FRACTURE
-	-	-	mm	*Single*	*Avg*	°C	mm	%
8-6992	Ø/2	T	10x10	92	99,7	-196	1,15	100
			10x10	105			1,20	100
			10x10	102			1,17	100
8-6993	Ø/4	T	10x10	111	105,7	-196	1,14	100
			10x10	103			1,23	100
			10x10	103			1,15	100

Metodi di prova/*Tests methods:*
ASTM A370-16; ASTM E23-16b

Procedure interne o specifiche del committente/*Internal procedures or Customer technical specification*
N.d.

VALPRES QC PASSED

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Note /*Notes*:

PREN = (%Cr + 3,3*%Mo + 16*%N)

PREW = (%Cr + 3,3*(%Mo + 0,5*%W) + 16*%N

(*) Analisi e/o prove non coperte da accreditamento ACCREDIA /*analysis and/or tests not under ACCREDIA accreditation.*

(ε) requisiti informativi da norma ASTM A479/A479M-10a e specifica STFOR_SES20/010/003 / *Requirements for information only. The requirements are indicated in the standard ASTM A479/A479M-10a and STFOR_SES20/010/003*

Ogni commento o giudizio contenuto nel presente rapporto di prova non è oggetto di accreditamento ACCREDIA/ *Commentaries of test results are not under ACCREDIA accreditation.*

Valori di resilienza superiori all'80% del fondo scala del pendolo sono da ritenersi indicativi (vedi ISO 148, ASTM A370, ASTM E23) /*Absorbed energy values above 80% of the scale range are inaccurate and shall be considered as approximate (see ISO 148, ASTM A370, ASTM E23).*

Descrizione delle correzioni apportate/*Description of corrections made*:
-corrected the sampling position of specimens nr. 8-6954, 8-6961, 8-6968, 8-6975, 8-6982, 8-6989, 8-6996 and 8-7003 from Ø/4 to Ø/2

Registrazioni anomalie e incidenti di prova / *Tests anomalies and incidents recordings*: n.a.

Riferimento registri dati grezzi/ *Raw data register*: register nr. 257 pag. 28-58; nr. 219 pag 49; nr. 259 pag 72-75

Operatore
Operator

(Bongioni Laura) (Cassola p.i. Manuel)

Responsabile Commessa *Job order Responsible*	Resp. di Sezione *Head of Departement*	Direttore Laboratorio *Laboratory Manager*	Controllo Qualità AQM o Ispettore Ente Terzo *AQM quality control or third part inspection*
(Parzani p.i. Mattia)	(Pozzi p.i. Fabio)	(Ceselin p.i. Gabriele)	

VALPRES QC PASSED

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CERTIFICATO CONTROLLO QUALITA'

QUALITY CONTROL CERTIFICATE

EN 10204 3.1

VALPRES
AZIENDA CERTIFICATA
UNI EN ISO 9001: 2008
UNI EN ISO 14001 : 2004
OHSAS 18001 : 2007

DATI GENERALI / *GENERAL INFORMATION*

Certificato N° / *Data Rep N°*	**180002180-03/053**	Data / *Date*	**23/05/2018**
Ddt Cliente / *Customer delivery*	**NR.50402 DEL 17/05/18**		
Ddt DELTAR / DELTAR delivery			
Cliente / *Customer*	**VALPRES S.R.L.**		
Descrizione / *Description*	**SFERA DN1" **25u**		
Materiale base / *Base material*	**Inossidabile**	Tipo processo / *Process type*	**ENP-1012**
Specif. di riferim. / *Ref. specif.*	**DE-LS001-REV.7 STD**		

Q.tà / *Q.ty*	Imp n° / *Planet n°*	Bagno n° / *Bath n°*	Barra n° / *Rack n°*	M.T.O.
200,00	**B**	**69**	**53**	**4,45**

RIFERIMENTI DOCUMENTI / DOCUMENTARY REFERENCES

Ball 1" code 00306000088 - SS material
VS.ORD.NR.A-702298 POS.9 DEL 15/05/18

CONTROLLI EFFETTUATI / *PERFORMED TEST*

Controllo *Test*	Metodo *Method*	Su Particolare *On Parts*	Su Provino *On Coupon*	N° Provino *Coupon s.n.*	Specifica di rif. *Ref. Spec.*
ADHESION	IMPACT TEST	Conform			ASTM B571
ADHESION	IMPACT TEST	Conform			ASTM B571
ADHESION	BURNISCHING TEST	Conform			ASTM B571
ADHESION	BURNISCHING TEST	Conform			ASTM B571
THICKNESS	THICKNESS BY WEIGHT		µm 25,360	105052	ASTM B733
THICKNESS	THICKNESS BY WEIGHT		µm 25,360	105052	ASTM B733

Note / *Notes*

VALPRES QC PASSED

Emesso da / *Issue by*

DAVIDE DALLAVALLE

Approvato da / *Approved by*

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ENP and VACUUM - CODEPOSITION TECHNOLOGIES
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CERTIFICATO CONTROLLO QUALITA'

QUALITY CONTROL CERTIFICATE

EN 10204 3.1

VALPRES
AZIENDA CERTIFICATA
UNI EN ISO 9001: 2008
UNI EN ISO 14001 : 2004
OHSAS 18001 : 2007

DATI GENERALI / *GENERAL INFORMATION*

Certificato N° / *Data Rep N°*	**180002180-03/064**	Data / *Date*	**25/05/2018**
Ddt Cliente / *Customer delivery*	**NR.50402 DEL 17/05/18**		
Ddt DELTAR / DELTAR delivery			
Cliente / *Customer*	**VALPRES S.R.L.**		
Descrizione / *Description*	**SFERA DN1" **25u**		
Materiale base / *Base material*	**Inossidabile**	Tipo processo / *Process type*	**ENP-1012**
Specif. di riferim. / *Ref. specif.*	**DE-LS001-REV.7 STD**		

Q.tà / *Q.ty*	Imp n° / *Planet n°*	Bagno n° / *Bath n°*	Barra n° / *Rack n°*	M.T.O.
100,00	**B**	**69**	**64**	**3,45**

RIFERIMENTI DOCUMENTI / DOCUMENTARY REFERENCES

Ball 1" code 00306000088 - SS material
VS.ORD.NR.A-702298 POS.9 DEL 15/05/18

CONTROLLI EFFETTUATI / *PERFORMED TEST*

Controllo *Test*	Metodo *Method*	Su Particolare *On Parts*	Su Provino *On Coupon*	N° Provino *Coupon s.n.*	Specifica di rif. *Ref. Spec.*
ADHESION	IMPACT TEST	Conform			ASTM B571
ADHESION	IMPACT TEST	Conform			ASTM B571
ADHESION	BURNISCHING TEST	Conform			ASTM B571
ADHESION	BURNISCHING TEST	Conform			ASTM B571
THICKNESS	THICKNESS BY WEIGHT		µm 26,040	105063	ASTM B733
THICKNESS	THICKNESS BY WEIGHT		µm 26,040	105063	ASTM B733

VALPRES QC PASSED

Note / *Notes*

Emesso da / *Issue by*

DAVIDE DALLAVALLE

Approvato da / *Approved by*

ALLIED PRODUCTS OVERSEAS LTD.
P.O.BOX: 35-78, TAICHUNG, TAIWAN R.O.C.

Certificate EN 10204:2004 - 3.1

Kiant/customer: VALPRES S.R.L.

Certificate number:BT-37159-REV. "0318 REVISED"

ORDER NO: 37159-REV. | INVOICE NO:BT-0617/2019-2 | DATE: JUN. 17,2019

CODE NO.	Q'ty	Description	Dn	Rating	Conn.	Material
00405000059	598	STEM(16X43)	20-3	--	--	ASTM A564 17.4PH H1150D
00406000044	600	STEM(22X59)	20-4	--	--	ASTM A564 17.4PH H1150D
00410000042	400	STEM(30X76)	50-4	--	--	ASTM A564 17.4PH H1150D
00418000035	150	STEM(34X97)	80-1	--	--	ASTM A564 17.4PH H1150D

CODE NO.	Part	Charge Nr.	Q'ty	Hydrostatic test	Mechanishe eignenschappen/mechanical properties		
					Tensile strength (Mpa)	Yieldpoint (Mpa)	Elongation (%)
					RM	Rp0.2	A
					Min. 930	Min.725	Min.16
00405000059	STEM(16X43)	5P067215B	598	--	1126.0	1073.0	17.0
00406000044	STEM(22X59)	9SE3326-G10	600	--	980.0	904.1	21.0
00410000042	STEM(30X76)	9SH0374-GM01	400	--	1035.2	862.7	17.0
00418000035	STEM(34X97)	9SH0214-GE7	150	--	1000.7	793.7	17.0

CHEMISCHE ZUSAMMENSTELLUNG/CHEMICAL COMPOSITION

Charge Nr.	C %	Si %	Mn %	P %	S %	Cr %	Ni %	Cu %
	<=0.07	<=1.00	<=1.00	<=0.04	<=0.03	15.0-17.5	3.0-5.0	3.0-5.0
5P067215B	0.0190	0.4100	0.5500	0.0190	0.0009	15.4900	4.3000	3.6300
9SE3326-G10	0.0200	0.5100	0.6300	0.0270	0.0040	15.1000	4.3100	3.3600
9SH0374-GM01	0.0200	0.3300	0.6400	0.0200	0.0030	15.4200	4.7700	3.3500
9SH0214-GE7	0.0100	0.3500	0.5600	0.0170	0.0010	15.3300	4.6500	3.2400

We hereby clarify that 17-4 PH = ASTM A564 Tp 630 H1150 D.

We hereby certify that items mentioned above are according to NACE MR 01 75

ALLIED PRODUCTS OVERSEAS LTD.

ALLIED PRODUCTS OVERSEAS LTD

FORM NO.: 4-08-015

VALPRES QC PASSED

I-SS-00099 (era S-PSQ-08.2.4/12) – Certificato di collaudo / Insp. certificate

Via A. Gitti,11 - 25060 Marcheno (BS -ITALIA
Tel. +39 030 8969311 - Mail valpres@bonomi.it

Certificato di collaudo finale 3.1 EN 10204 / Final inspection certificate 3.1 EN 10204

Cliente / Customer	COES
Codice Cliente / Customer code	N/A
Ordine Cliente / Customer order	2296/24
Data ordine / Date of order	11/07/2024
VALPRES JOB NUMBER	24063
VALPRES SALES ORDER	2100139835
ITEM	7

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-007
TIPO VALVOLA / VALVE TYPE	68F02906
OGG. ISPEZIONATI / INSPECTED OBJECTS	9
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	1"
RATING	150

COLLAUDO / TESTING			
INFORMAZIONI GENERALI / GENERAL INFORMATION			
COLLAUDO PRESENZIATO / WITNESS TESTING	SI ☐		NO ■
TIPO DI COLLAUDO / INSPECTION TEST	IDROSTATICO / HYDRO ■	PNEUMATICO / PNEUMATIC ☐	GAS ☐
FLUIDO / MEDIA	Water with additive	Air	N/A

Test requirements – Hydro / Gas / Pneumatic test:

PRESSIONI E TEMPI DI PROVA / TEST PRESSURES AND TIMES										
SPECIFICA / SPECIFICATION	■ EN 12266									
ACCETTABILITÀ / ACCEPTABILITY	■ EN 12266 R.A									
PROCEDURA / PROCEDURE	CORPO/BODY				SEGGI/SEATS					
	STD HYDROTEST		GAS TEST		STD HYDROTEST		PNEUMATIC TEST		GAS TEST	
VALORI RICHIESTI / REQUIRED VALUES	PRESS. (bar)	DURATA (sec)	PRESS. (bar)	DURATA (sec)	PRESS. (bar)	DURATA (sec)	PRESS. (bar)	DURATA (min)	PRESS. (bar)	DURATA (min)
	29	**15**	**-**	**-**	**21**	**15**	**-**	**-**	**-**	**-**
TENUTA / SEAL	PERDITA / LEAKAGE (mm^3/min)		PERDITA / LEAKAGE (mm^3/min)		PERDITA / LEAKAGE (mm^3/min)		PERDITA / LEAKAGE (mm^3/min)		PERDITA / LEAKAGE (mm^3/min)	
MAX. ACCETTABLE	**0**		**-**		**0**		**-**		**-**	
STRUMENTI / INSTRUMENTS	Banco prova / Test bench: ITALCONTROL vertical 13-870 – Mod. MTS3-100A Gauges: MM0089/1-MM2124/1-MM2127/1–MM0090/1-MM2126/1-MM00127/1-MM0128/1-MM2125/1-MM0095/1									

Summary table of the tested valves:

OBJ.	SERIAL NUMBER	TAG
1	68F02906/01	n/a
2	68F02906/02	n/a
3	68F02906/03	n/a
4	68F02906/04	n/a
5	68F02906/05	n/a
6	68F02906/06	n/a
7	68F02906/07	n/a
8	68F02906/08	n/a
9	68F02906/09	n/a

I-SS-00099 (era S-PSQ-08.2.4/12) – Certificato di collaudo / Insp. certificate

Via A. Gitti,11 - 25060 Marcheno (BS -ITALIA
Tel. +39 030 8969311 - Mail valpres@bonomi.it

Certificato di collaudo finale 3.1 EN 10204 / Final inspection certificate 3.1 EN 10204

Cliente / Customer	COES
Codice Cliente / Customer code	N/A
Ordine Cliente / Customer order	2296/24
Data ordine / Date of order	11/07/2024
VALPRES JOB NUMBER	24063
VALPRES SALES ORDER	2100139835
ITEM	7

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-007
TIPO VALVOLA / VALVE TYPE	68F02906
OGG. ISPEZIONATI / INSPECTED OBJECTS	9
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	1"
RATING	150

Inspection test values – Hydro / Gas / Pneumatic test:

OBJ.	BODY			
	Std Hydrotest Detected pressure / Pressione rilevata (bar)	**Std Hydrotest** Detected leakage / Perdita rilevata (mm^3/min)	**Gas Test** Detected pressure / Pressione rilevata (bar)	**Gas Test** Detected leakage / Perdita rilevata (mm^3/min)
1	30	0	-	-
2	30	0	-	-
3	30	0	-	-
4	30	0	-	-
5	30	0	-	-
6	30	0	-	-
7	30	0	-	-
8	30	0	-	-
9	30	0	-	-

OBJ.	SEATS											
	Std Hydrotest Detected pressure / Pressione rilevata (bar)		**Std Hydrotest** Detected leakage / Perdita rilevata (mm^3/min)		**Pneumatic test** Detected pressure / Pressione rilevata (bar)		**Pneumatic test** Detected leakage / Perdita rilevata (mm^3/min)		**Gas Test** Detected pressure / Pressione rilevata (bar)		**Gas Test** Detected leakage / Perdita rilevata (mm^3/min)	
	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX	R / DX	L / SX
1	22	22	0	0	-	-	-	-	-	-	-	-
2	22	22	0	0	-	-	-	-	-	-	-	-
3	22	22	0	0	-	-	-	-	-	-	-	-
4	22	22	0	0	-	-	-	-	-	-	-	-
5	22	22	0	0	-	-	-	-	-	-	-	-
6	22	22	0	0	-	-	-	-	-	-	-	-
7	22	22	0	0	-	-	-	-	-	-	-	-
8	22	22	0	0	-	-	-	-	-	-	-	-
9	22	22	0	0	-	-	-	-	-	-	-	-

I-SS-00099 (era S-PSQ-08.2.4/12) – Certificato di collaudo / Insp. certificate

Via A. Gitti,11 - 25060 Marcheno (BS -ITALIA
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TIPO VALVOLA / VALVE TYPE	68F02906
OGG. ISPEZIONATI / INSPECTED OBJECTS	9
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	1"
RATING	150

TEST RESULT:	**SATISFACTORY**

ASSICURAZIONE QUALITA' / QUALITY ASSURANCE	ISPETTORE CLIENTE / CUSTOMER INSPECTOR	ISPETTORE PARTE TERZA / THIRD PART INSPECTOR
Firma / Sign VALPRES QC PASSED	Firma / Sign	Firma / Sign
Data / Date 09/09/2024	Data / Date	Data / Date

EN 10204 2.1 - DECLARATION OF COMPLIANCE WITH THE ORDER

Messrs COES

The Company: **VALPRES S.r.l.**

Address: **Via A. Gitti, 11 – 25060 Marcheno (Brescia) - Italy**

declares under its own responsibility that the products

code	size
68J01610	**2"**
68J01606	**1"**
8PV0050510	**2"**
8PV0050406	**1"**
8PV0050306	**1"**
8PV0050606	**1"**
68F02906	**1"**

comply with your

order/ orders n.	dated
2296/24	**11/07/2024**

The company works according to an integrated QUALITY, ENVIRONMENTAL, SAFETY and ENERGY management system which complies with the standards ISO_9001, ISO_14001, OHSAS_18001 and ISO_50001, recognised by SQS.

Marcheno, 04/04/2025

(place and date)

Carlo Bonomi *

Carlo Bonomi (General Manager)

* electronic signature: the original signature is available in our company

VALPRES S.r.l. - P.O. Box 40 - Via A. Gitti, 11 - 25060 Marcheno (BS) - Italy
Tel. +39 030 89 69 311 - Fax +39 030 89 60 239 - www.valpres.it - email: valpres@bonomi.it

SARVAL S.r.l.

INDUSTRIAL VALVES

Head Office: Via G. Mazzini, 6
24060 San Paolo D'Argon (BG)
Workshop, Production & Storege: Via F. Baracca, 30
24060 SAN PAOLO D'ARGON (BG)
TEL. +39.035.4255356

INSPECTION CERTIFICATE ACCORDING TO: UNI EN 10204 - 3.1

NR.: 240278

DATE: 06/08/2024

PAGE N° 1/1

Test procedures and specification standards:

- ☐ API 6D
- V API 598
- V ASME B 16.34
- ☐ EN 12266-1
- ☐ MSS SP.55
- ☐ MSS SP.61
- ☐
- ☐
- ☐

We declare that these products is in compliance with the directive 2014/68/EU and was subjected to the conformity assessment procedure H (for Category III). The monitoring is performed by Technická inšpekcia a.s. Notified Body 1354 (Certif. 1100/1/2021).

Comments: The above data are in accordance with the original certificate. Material is according to the Order requirements. Visual and dimensional check

Customer	Order	Date	DDT
COES S.R.L.	2078/24	21/06/2024	240480

TESTED MATERIAL				PRESSURE TEST ACC. API 598			NOTE – REMARKS SATISFACTORY																				
Item	Q.ty	Description	DN Size	Hydrostatic		Air Seat	Part Name	Material	Heat	C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Ti	Al	V	N	Ce	R N/mm2	S N/mm2	A%	C%	HB	IMPACT TEST
				Body	Seat																								
				Bar		Bar																							
10	6	**DUAL PLATE WAFER #150 FB RF**	**2"**	30	22	6	BODY	F316/316L	V3WB	0,03	0,41	1,42	0,036	0,022	16,625	10,35	2,0189	0,422	0,005					592	235	71	54	156	
							BODY	F316/316L	444610	0,009	0,38	1,67	0,028	0,022	16,72	10,13	2,08	0,28		0,003	0,03	0,062		599	243	53	74	178	

REMARKS:
VISUAL AND DIMENSIONAL CHECKED

THIRD AUTHORITY

DATE

CLIENT INSPECTION DEPT.

DATE

INSPECTION DEPT.

DATE **06/08/2024**

SARVAL S.r.l.
Quality Control Dept.

Emerson Automation Solutions
St. Emerson 4, Industrial Park Tetarom 2
Cluj Napoca, 400638 ROMANIA

Material Certificate of Conformance - consistent with "type 3.1" ISO 10474:2013 / EN 10204:2004

Customer Information	**Manufacturer Information**
Name: COES SRL **PO**: 2055/24	**Sales Order**: 39415178 **Line/Unit**: 1
Device Information	
Device Type: Coplanar Pressure Transmitter **Serial #**: 24CLPC0044336 **Model #**: 2051CG4A02A1KS5E1M5D4T1Q4Q8HR7	
Permanent Tag Information	**Wire-on Tag Information**
63-PIT-064	

Attached Models

0305RC22B11L4

Heat / Assembly #	Heat / Assembly # Description
377135	Manifold Body
7510671	Isolator
YVCV74B	Module Housing

This is to certify that materials as manufactured, assembled and shipped by Emerson for this order are in accordance with the material section as specified on the applicable Emerson drawings. Test reports from Emerson suppliers are attached.

Mihai Blaga
Measurement Solutions Quality Manager

Armaturenfabrik Franz Schneider GmbH + Co. KG · Bahnhofplatz 12 · D-74226 Nordheim
Tel. +49 7133 101-153 oder / or -253

Zeugnis-Nr. / Certificate no.: 224-0611

Deckblatt zum Abnahmeprüfzeugnis 3.1 EN 10204
Cover sheet to inspection certificate 3.1 EN 10204

Datum / Date: 02.07.2024/da
Blatt / Page: 1 / 1

Kunde / Customer: Emerson FZE DMMC Jebel Ali
Dubai 17034
Artikel / Part: 2-fach Ventilblock
2 Valve Manifold
Bestell-Nr. / Order no.: 4198040724

vom / of 26.06.2024

Auftrags-Nr. / O/A no.: 2M003898

Artikel-Nr. / Part no.: C30511-1124-0000
Ident-Nr. / Ident no.:
Teile-Nr. des Kunden / Part no. of customer:

Herstellerzeichen / Manufacturer's brand:

Anforderungen / Requirements:

- siehe Originalzeugnis -
- see original certificate -

für / for Gehäuse 2-fach Ventilblock 316 / Valve body 316

vom TÜV / of TÜV	**Vorlieferant /** Supplier	**mit Prüf-Nr. /** with inspection no.	**Material / Bauteil /** material / component	**Schmelzen-Nr. /** Heat no.	**Kurzzeichen /** Abbreviation of heat no.
	Einsal	WZ0324-00162	020445	377135	

Druckprobe nach EN 12266, P10 / P11 / P12: ohne Beanstandung / Pressure test acc. to EN 12266, P10 / P11 / P12: without objection

Sachgemäße Umstempelung erfolgt mit Zustimmung des TÜV Süd Industrie Service vom 29.06.2021, Prüf-Nr. 600130234.
Appropriate re-stamping is carried out with the permission of the TÜV Süd of 29.06.2021, Test no. 600130234.

Stempelung/Marking
Schmelzen-Nr./Heat no.: 377135

Das Zeugnis wurde elektronisch erstellt und ist gemäss EN 10204 ohne Unterschrift gültig.
This certificate is computer-generated - according to EN 10204 - and is valid without signature.

Daniela Andrei
.....
Abnahmebeauftragter / Inspector

Walzwerke Einsal GmbH

UST-IdNr.: DE123841325

Walzwerke Einsal GmbH - Postfach 20 - 58769 Nachrodt-Wiblingwerde

Armaturenfabrik Franz Schneider
GmbH & Co. KG
Bahnhofplatz 12
74226 Nordheim
Deutschland

Prüfbescheinigung Seite: 1
DIN EN 10204/3.1

Nr. WZ0324-00162 **vom** 06.03.2024

Bestell-Nr.
Lieferschein-Nr. KL24-00164 **Ref.-Nr.** 020445

Herstellerzeichen | **Abnahmebeauftragter** | **CE-Zeichen 0045**

WEE

0045

Auftrags-Nr.	**Pos.**	**Abmessung**	**Gewicht**
AB24-K2001	10	14404 Flach 63,50 x 31,75 mm 2 1/2" X 1 1/4"	20058 Kg

Werkstoff-Nr. 14404 **Werkstoff-Normbezeichnung** X2CrNiMo17-12-2 1.4401/ 1.4404/ AISI 316 / 316 L

Rohmaterial-Schmelze 377135 **Erschmelzungsart**

Chemische Analyse

C %	0,019	**Si %**	0,35	**Mn %**	1,69	**P %**	0,029	**S %**	0,023	**Cr %**	17,06	**Ni %**	10,38
Mo %	2,11	**Ti %**	0,002	**Co %**	0,18	**N %**	0,078	**Cu %**	0,32	**Nb %**	0,031		

Produktinformation
Blankstahl, 14404 X2CrNiMo17-12-2, abgeschreckt, gezogen, DIN EN 10278 Tol. wie folgt, mit Unterlängen s.u., ohne Stempelung, in Bunden

Zusatzdaten
Stablänge mm: 2900 - 3200, Unterlängen: ab 1000 mm bis max. 10 %,
Klebe-Etiketten: an Stirnseite je Stab: 1.4401/04/AISI316/316L/EW/CHNR/WEE, Verpackung max (kg): 500
Güte: 1.4401/ 1.4404/ AISI 316 / 316 L, Zusatzinfo: Oberflächenbeschaffenheit gem. DIN EN 10277 jedoch Reduzierung der erlaubten Oberflächenfehlertiefe um 50%

Anforderungen
Werkszeugnis: DIN EN 10204/3.1 Rev. 01/2005, WZ-Sprache: deutsch / englisch,
Mit: CE-Zeichen; BauPVO (305/2011/EU) gem. Leistungserklärung zum Download unter www.einsal.com Gemäß: DIN EN 10088 Teil 5 Rev. 07/2009, Maß-Formtoleranz: DIN EN 10278, Rev. 12/1999, Norm: DIN EN 10272 Rev. 10/2016 , ASTM A479/A479M Rev. 2023a , ASTM A262 Practice E Rev. 2015 , NACE Standard MR 0175 Rev. 1997 , DIN EN ISO 15156 Teil 3 Rev. 12/2015 , AD 2000 Merkblatt W 2 gemäß dem zertifizierten Geltungsbereich Rev. 06/2023 , ASTM A276/A276M Rev. 2024 , DIN EN 10088 Teil 3 Rev. 12/2014 , AD 2000 Merkblatt W 10 Rev. 05/2023 , DIN EN 10277 Teil 1 Rev. 06/2008 , NACE Standard MR 0103 Rev. 2015 DIN EN ISO 3651 Teil 2 Verfahren A Rev. 08/1998

Probe	**PRBO24-00766**				

Mechanische Eigenschaften

Rp 0,2% [MPa]	532
Rm [MPa]	635
Rp 1,0% [MPa]	578
A [%]	38,8
A50 [%]	38,8
Z [%]	69,5

Härte

HBW	212
HRC	<20

Korrosionsbeständigkeit

IK-Test (Lieferzustand)	ok
IK-Test [sensibilisiert]	ok

Es wird bestätigt, dass die Lieferung den Anforderungen der angeführten Lieferbedingungen entspricht. Das Zeugnis ist maschinell erstellt und ist gemäß EN 10204 ohne Unterschrift rechtsverbindlich.

Telefon 02352 / 332 0

Walzwerke Einsal GmbH bestätigt hiermit, dass die Reach-Verordnung (EG) Nr. 1907/2006 die RoHs-Richtlinie 2011/65/EU + (EU) 2015/863 und die Verordnung (EU) Nr. 833/2014 eingehalten werden. Das im Abnahmeprüfzeugnis deklarierte Material ist frei von Blei (<0,1%), Quecksilber (< 0,1%), Cadmium (< 0,01%), sechswertigem Chrom (< 0,1%) und Radioaktivität (<0,1Bq/g), Herstellungsland : Deutschland.

Walzwerke Einsal GmbH

Senderski / Seeger

Qualitätsstelle / Abnahmebeauftragte

Walzwerke Einsal GmbH

UST-IdNr.: DE123841325

Walzwerke Einsal GmbH - Postfach 20 - 58769 Nachrodt-Wiblingwerde

Armaturenfabrik Franz Schneider
GmbH & Co. KG
Bahnhofplatz 12
74226 Nordheim
Deutschland

Prüfbescheinigung Seite: 2
DIN EN 10204/3.1

Nr. WZ0324-00162 **vom** 06.03.2024

Bestell-Nr.
Lieferschein-Nr. KL24-00164 **Ref.-Nr.** 020445

Herstellerzeichen	Abnahmebeauftragter	CE-Zeichen 0045
E W	WEE	CE 0045

Auftrags-Nr.	Pos.	Abmessung	Gewicht
AB24-K2001	10	14404 Flach 63,50 x 31,75 mm 2 1/2" X 1 1/4"	20058 Kg

Werkstoff-Nr. 14404	**Werkstoff-Normbezeichnung** X2CrNiMo17-12-2 1.4401/ 1.4404/ AISI 316 / 316 L
Rohmaterial-Schmelze 377135	**Erschmelzungsart**

Bemerkung

Bemerkung: FA24-000553

Oberflächenbeschaffenheit:	nach DIN EN 10272 Tabelle 6/2H
Besichtigung:	Ohne Beanstandung
Maßkontrolle:	Ohne Beanstandung
Verwechselungsprüfung:	Ohne Beanstandung
Wärmebehandlung:	Lösungsgeglüht 1050°C/abgeschreckt

Es wird bestätigt, dass die Lieferung den Anforderungen der angeführten Lieferbedingungen entspricht. Das Zeugnis ist maschinell erstellt und ist gemäß EN 10204 ohne Unterschrift rechtsverbindlich.

Telefon 02352 / 332 0

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Walzwerke Einsal GmbH

Senderski / Seeger

Qualitätsstelle / Abnahmebeauftragte

Walzwerke Einsal GmbH

VAT Reg. No DE123841325

Walzwerke Einsal GmbH - Postfach 20 - 58769 Nachrodt-Wiblingwerde

Armaturenfabrik Franz Schneider
GmbH & Co. KG
Bahnhofplatz 12
74226 Nordheim
Deutschland

Inspection document Page: 1
DIN EN 10204/3.1

No. WZ0324-00162 **of** 06.03.2024

Your Order No.
Shipment No. KL24-00164 **Ref.-No.** 020445

Symbol of Manufacturers	Surveyor of inspection	CE-sign 0045
E W	WEE	CE 0045

our works No.	Item	Size	Weight
AB24-K2001	10	14404 Flat 63,50 x 31,75 mm 2 1/2" X 1 1/4"	20058 Kg

Material 14404 **Standard Grade of Material** X2CrNiMo17-12-2
1.4401/ 1.4404/ AISI 316 / 316 L

Heat Number 377135 **Method of melting**

Chemical analysis

C %	0,019	**Si %**	0,35	**Mn %**	1,69	**P %**	0,029	**S %**	0,023	**Cr %**	17,06	**Ni %**	10,38
Mo %	2,11	**Ti %**	0,002	**Co %**	0,18	**N %**	0,078	**Cu %**	0,32	**Nb %**	0,031		

Product Information
Bright steel bars, 14404 X2CrNiMo17-12-2, quenched, drawn, DIN EN 10278 tol. as follows, with short lengths see below, without stamping, in bundles

Additional Information
bar length mm: 2900 - 3200, short lengths: from 1000 mm to max. 10 %,
adhesive labels: an Stirnseite je Stab: 1.4401/04/AISI316/316L/EW/CHNR/WEE, packaging max (kg): 500
quality: 1.4401/ 1.4404/ AISI 316 / 316 L, additional information: Oberflächenbeschaffenheit gem. DIN EN 10277 jedoch Reduzierung der erlaubten Oberflächenfehlertiefe um 50%

Confirmed requirements
test certificate: DIN EN 10204/3.1 rev. 01/2005, language of test certificate: german / english,
with: CE-sign; BauPVO (305/2011/EU) acc. declaration of performance downloadable at www.einsal.com acc. to: DIN EN 10088 part 5 rev. 07/2009, tolerance of dimension/shape: DIN EN 10278 rev. 12/1999, standard: DIN EN 10272 rev. 10/2016 , ASTM A479/A479M rev. 2023a , ASTM A262 Practice E rev. 2015 , NACE Standard MR 0175 rev. 1997 , DIN EN ISO 15156 part 3 rev. 12/2015 , AD 2000 data sheet W 2 according to the certified scope rev. 06/2023 , ASTM A276/A276M rev. 2024 , DIN EN 10088 part 3 rev. 12/2014 , AD 2000 data sheet W 10 rev. 05/2023 , DIN EN 10277 part 1 rev. 06/2008 , NACE Standard MR 0103 rev. 2015 DIN EN ISO 3651 part 2 procedure A rev. 08/1998

Sample	PRBO24-00766				

Mechanical properties

Yield strength 0,2% [MPa]	532
Tensile strength [MPa]	635
Yield strength 1,0% [MPa]	578
Elongation 5D [%]	38,8
Elongation 50mm [%]	38,8
Reduction of area [%]	69,5

Hardness

HBW	212
HRC	<20

Corrosion resistance

IC-test (Delivery condition)	ok
IC-test (sensitized)	ok

The delivery corresponds to the requirements mentioned.
The certificate has been established by machine and acc. to EN 10204 it is legal without Signature.

Telephone 02352 / 332 0

Walzwerke Einsal GmbH herewith confirms, that the Reach-regulation (EG) No. 1907/2006, the RoHs-regulation 2011/65/EU + (EU) 2015/863 and the regulation (EU) 833/2014 is met. The material declared in the inspection certificate is free from lead (< 0,1%), mercury content (< 0,1%), cadmium (< 0,01%), hexavalent chromium (< 0,1%) and radioactivity (<0,1Bq/g), Country of Manufacture: Germany.

Walzwerke Einsal GmbH

Senderski / Seeger

QA-department / Surveyor of inspection

Walzwerke Einsal GmbH

VAT Reg. No DE123841325

Walzwerke Einsal GmbH - Postfach 20 - 58769 Nachrodt-Wiblingwerde

Armaturenfabrik Franz Schneider
GmbH & Co. KG
Bahnhofplatz 12
74226 Nordheim
Deutschland

Inspection document Page: 2
DIN EN 10204/3.1

No.	WZ0324-00162	**of**	06.03.2024

Your Order No.
Shipment No. KL24-00164 **Ref.-No.** 020445

Symbol of Manufacturers	**Surveyor of inspection**	**CE-sign 0045**
E W	WEE	CE 0045

our works No.	**Item**	**Size**	**Weight**
AB24-K2001	10	14404 Flat 63,50 x 31,75 mm 2 1/2" X 1 1/4"	20058 Kg

Material	14404	**Standard Grade of Material**	X2CrNiMo17-12-2 1.4401/ 1.4404/ AISI 316 / 316 L
Heat Number	377135	**Method of melting**	

Remark

Remark: FA24-000553

Surface condition:	acc. to DIN EN 10272 charts 6/2H
Visual inspection:	Without objection
Dimension inspection:	Without objection
Test of identity:	Without objection
Heat Treatment:	Solution annealed 1050°C/quenched

The delivery corresponds to the requirements mentioned.
The certificate has been established by machine
and acc. to EN 10204 it is legal
without Signature.

Telephone 02352 / 332 0

Walzwerke Einsal GmbH herewith confirms, that the Reach-regulation (EG) No. 1907/2006, the RoHs-regulation 2011/65/EU + (EU) 2015/863 and the regulation (EU) 833/2014 is met. The material declared in the inspection certificate is free from lead (< 0,1%), mercury content (< 0,1%), cadmium (< 0,01%), hexavalent chromium (< 0,1%) and radioactivity (<0,1Bq/g), Country of Manufacture: Germany.

Walzwerke Einsal GmbH

Senderski / Seeger

QA-department / Surveyor of inspection

HAMILTON PRECISION METALS

CERTIFICATE OF CHEMICAL ANALYSIS AND PHYSICAL TESTS

1780 Rohrerstown Road Lancaster, PA 17601-2334 Phone: (717) 569-7061 Web: www.hpmetals.com

DATE:	Wednesday, August 24, 2022	ORDER ID # :	67448
CUSTOMER:	KLESK METAL STAMPING	CUSTOMER P.O. NO.:	59720
SPECIFICATIONS:	ROSEMOUNT C09851 REV AV; P/N C09851-0009CPM		
MATERIAL:	SS 316L	SIZE:	.002" X 2.000" X COIL
WORK ORDER # :	2200962/1	QUANTITY SHIPPED:	24 COILS 291.79 LBS

PS# 16303
Lot# 16389 JDH 8-30-22

HAVAR and HPM Reg. U.S. Pat TM Off.Other trademarks are the property of their respective owners

CHEMICAL ANALYSIS

HEAT NO: 7510671

AG:		AL:	.0030	B:		BE:		C:	.021	CA:		CB:	.02
CO:	.21	CR:	16.40	CU:	.33	FE:	BAL	H:		MG:		MN:	1.40
MO:	2.11	N:	.026	NB:		NI:	10.08	O:		P:	.033	PB:	
S:	.002	SI:	.50	SN:		TA:		TI:		V:		W:	
Y:		ZN:		ZR:									

Composition In Wt % (*Denotes PPM) (< Denotes Less Than)

PHYSICAL TEST RESULTS

HEAT NO.: 7510671 COIL NO. : 16690A-3

TEMPER	HARDNESS	TENSILE (KSI)	YIELD (KSI)	% ELONGATION in 2"	DIRECTION
ANNEALED	78.8 RB	97.8	42.7	42.9	LONGITUDINAL

SURFACE TREATMENT

OTHER TESTS

GRAIN | SURFACE ROUGHNESS

GRAIN SIZE:

GRAIN COUNT:

PMI TESTED

COMMENTS: COUNTRY OF ORIGIN USA.

HPM'S QUALITY MANAGEMENT SYSTEM IS CERTIFIED TO THE REQUIREMENTS OF ISO 9001:2015.
CERTIFICATE OF TEST PREPARED IN ACCORDANCE WITH PARA 3.1 OF EN 10204.
TEST METHODS ARE PER APPLICABLE ASTM STANDARDS.
MATERIAL HAS NOT COME IN CONTACT WITH MERCURY OR MERCURY CONTAINING SUBSTANCES.
ALL PRODUCTS MANUFACTURED BY HPM ARE BOTH REACH AND RoHS COMPLIANT AND DO NOT CONTAIN ANY CONFLICT MATERIALS.

I HEREBY CERTIFY THAT THE CHEMICAL AND PHYSICAL OR MECHANICAL TESTS REPORTED ABOVE ARE CORRECT IN THE RECORDS OF THE COMPANY. THE MATERIAL DESCRIBED BY THIS CERTIFICATE IS IN FULL COMPLIANCE WITH THE SUBJECT PURCHASE ORDER AND DRAWINGS OR SPECIFICATIONS REFERENCED ON SAID PURCHASE ORDER EXCEPT AS MAY BE SPECIFICALLY NOTED ON THIS CERTIFICATE.

A. K. Miller

Authorized Quality Representative

INSPECTION CERTIFICATE 合格证

Xi'an HaoSen Precision Casting Co.,Ltd.
Tel:(029)-89080114
西安皓森精铸股份有限公司
No. 28, Lantian 1 Road,National Aviation Hi-TECH Industrial Base,Yanliang District Xi'an Shaanxi Province China
公司地址：陕西省西安市国家航空高技术产业基地蓝天一路28号

Cert NO．(0777)20240440 编号：QF-Z-367 版本REV：1

Order No. 订单号		Quantity 数量	
Manufacturer 制造商	Xi'an HaoSen 西安皓森	Customer 客户	G-Tek时硕科技（西安）有限公司
Part No. 零件号	03031-0777-0002(AM)	Description 名称	MODULE HOUSING, INVESTMENT CAST
Material 材料	CF-3M Per ASTM A743M(REV:2021)	Heat Treatment 热处理	Solution Annealed Per ASTM A743M(REV:2021)

Chemical Analysis 化学成分分析报告

Heat No 浇铸炉次号	Date 日期	标准要求(Standard) %C 0.03 max	%Si 1.50 max	%S 0.015～0.025	%P 0.04 max	%Mn 1.50 max	%Ni 9.00～13.00	%Cr 17.00～21.00	%Mo 2.00～3.00	Ratio ＞1.2	Result
YVCV74A	2024/4/15	0.023	0.591	0.019	0.034	1.057	9.485	18.764	2.245	1.374	OK
YVCV74B	2024/4/15	0.024	0.595	0.021	0.035	1.104	9.494	18.688	2.270	1.365	OK
YVCV74C	2024/4/15	0.023	0.539	0.020	0.038	1.060	9.739	18.804	2.212	1.341	OK
YVCV74D	2024/4/15	0.023	0.563	0.020	0.036	1.049	9.713	18.744	2.270	1.349	OK
YVCV74E	2024/4/15	0.022	0.583	0.022	0.037	1.094	9.820	18.895	2.231	1.348	OK
YVCV74F	2024/4/15	0.023	0.596	0.023	0.037	1.062	9.776	18.986	2.205	1.357	OK

Mechanical Properties 机械性能报告

Heat Treatment Code 热处理炉批号	Date 日期	Tensile Strength б b(≥485Mpa) 抗拉强度	Yield Strength б s(≥205Mpa) 屈服强度	Elongation б(≥30%) 延伸率	Hardness (HRB≤85) 硬度
YVCV74A-F	2024/4/22	524.0	272.0	47.5	81.0

Result: We certify that the above test report is in compliance with 3.1.b per ISO 10474 and 3.1 EN10204.
The products are qualified after radiation elements inspection.

Issued in agreement with TÜV SÜD Industrie Service GmbH (10.2021).

Marking:Manufacturer,Material grade,Material standard,Heat treatment code,Size.

我们谨证明以上材料测试报告为依据检验证书标准ISO 10474 3.1.b和EN10204 3.1所开具，本产品经过辐射元素检测合格。

Inspector (Name & Sig.)： Sun Dali Date： 2024-04-22

QC Supervisor (Name & Sig.): Zhang Xiangfeng Date： 2024-04-22



Country of Melt _China __ and Country of Pour__China __

Emerson Automation Solutions
St. Emerson 4, Industrial Park Tetarom 2
Cluj Napoca, 400638 ROMANIA

Material Certificate of Conformance - consistent with "type 3.1" ISO 10474:2013 / EN 10204:2004

Customer Information	**Manufacturer Information**
Name: COES SRL **PO**: 2055/24	**Sales Order**: 39415178 **Line/Unit**: 2
Device Information **Device Type**: Coplanar Pressure Transmitter **Serial #**: 24CLPC0044342 **Model #**: 2051CD3A02A1KS5E1M5D4T1Q4Q8HR7	
Permanent Tag Information 63-PDIT-051	**Wire-on Tag Information**

Attached Models

0305RC52B11L4

Heat / Assembly #	Heat / Assembly # Description
07K2A86-01-01	Isolator
377135	Manifold Body
YULV41A	Module Housing

This is to certify that materials as manufactured, assembled and shipped by Emerson for this order are in accordance with the material section as specified on the applicable Emerson drawings. Test reports from Emerson suppliers are attached.



Mihai Blaga
Measurement Solutions Quality Manager

MATERIAL CERTIFICATION

Ulbrich
We Deliver Precision™
USSM/UNE
1 Dudley Avenue
Wallingford, CT 06492 USA
Tel: 203-239-4481
or 800-243-1676
Fax: 203-239-7479
CORPORATE OFFICE
153 Washington Avenue
North Haven, CT 06473 USA

LOAD NUMBER	SHIP DATE		WORK ORDER	SALES ORDER	CUSTOMER PO
00240977	26-Sep-2023	ULBRICH SPECIALTY STRIP MILL	U64400	101-065098 - 1	60441

SOLD TO: Klesk Metal Stamping Company
1124 Stinson Blvd NE
Minneapolis, MN 55413-3001
USA

CUSTOMER NBR: 002012-000

PS#15904 LJP 10/10/23
Lot#16741

SHIP TO: Klesk Metal Stamping Company
1124 Stinson Blvd NE
Minneapolis, MN 55413-3001

PART DESCRIPTION	QTY SHIPPED	U/M
Material Type: 316 Low Carbon Nuclear Grade Stainless Steel	260.20	LBS

MATERIAL TESTS NOT COVERED WITHIN NADCAP OR ISO/IEC 17025 SCOPE OF ACCREDITATION.
THE RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THE CERTIFICATION MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL LAW.

ULBRICH PART NBR: S316LN-00100AN#2-002
CUST PART NBR: C09851-0024CPM

CUSTOMER SPECS / SPECIFICATIONS

CHEMISTRY OVECHECK PERFORMED AT .062" GAUGE BY DIRATS LABORATORIES 41 AIRPORT ROAD PO BOX 39
WESTFIELD, MA 01086-0039
REPORT NUMBER R741137

PRODUCT DESCRIPTION (AS SHIPPED)

Material Type: 316 Low Carbon Nuclear Grade Stainless Steel
Gauge: 0.00100" Gtol+: 0.00010" Gtol-: 0.00010"
Width: 1.5000" Wtol+: 0.00500" Wtol-: 0.00500"
Temper: AN Edge: 3S-#3 Slit Finish: #2
Camber Max: 0.250" per 8 feet

Customer Specifications

ASTM A240-24 W/EXC, EN 10204 3.1
C09851-0024 Rev AW w/exc
PS-58 Rev. 1 w/exc.
PS 25 REV 1 w/exc

Chemical Analysis (Wt. %) - HEAT NO. 07K2A86-01-01

Al	B	C	Cr	Co	Cu	Mn	Mo	Ni	N	P
.024	.0019	.014	16.30	.002	.02	1.53	2.10	10.21	.085	.007

Si	S
.460	.002

PMI TESTED
SJ 10.10.23

Mill Source

Country of Origin	Mill Source
USA	Allegheny

Mechanical Properties Room Temperature

TEST	UNITS	RESULTS	HIGH	LOW
Tensile, psi	PSI	90200		
Yield, psi	PSI	43100		
Elongation, %	Percent	25.8		
Hardness		86		
Hardness Scale		HRB		

DATE RECD 10/5/23 LJP
DATE CNTD 10/10/23 LJP

Received 20 Coils @ 258.69# = 594,728" LJP 10/10/23

This material is free from mercury contamination. All converted hardness values must be considered approximate based on ASTM E140 and may be inaccurate for specific application. This material Certification is only valid when signed by an authorized quality representative.
Material conforms to the above referenced specifications / requirements.
Tested to Ulbrich Quality Procedures
Certification Can Not Be Replicated Except In Full

NET WEIGHT SHIPPED 260.20 LBS

SIGNED:
TITLE: John Mel
Quality Manager
DATE: 05-Jun-2024
APPROVED BY: YR

Subject to Ulbrich Steel's terms and conditions: https://www.ulbrich.com/terms-conditions
Pricing and surcharge are subject to announced increases, changes, and governmental laws such as imposed duties and tariffs.
Subject to applicable surcharges at time of shipment: https://www.ulbrich.com/surcharges/

Walzwerke Einsal GmbH

UST-IdNr.: DE123841325

Walzwerke Einsal GmbH - Postfach 20 - 58769 Nachrodt-Wiblingwerde

Armaturenfabrik Franz Schneider
GmbH & Co. KG
Bahnhofplatz 12
74226 Nordheim
Deutschland

Prüfbescheinigung Seite: 1
DIN EN 10204/3.1

Nr. WZ0324-00162 **vom** 06.03.2024

Bestell-Nr.
Lieferschein-Nr. KL24-00164 **Ref.-Nr.** 020445

Herstellerzeichen | **Abnahmebeauftragter** | **CE-Zeichen 0045**

WEE

0045

Auftrags-Nr.	**Pos.**	**Abmessung**	**Gewicht**
AB24-K2001	10	14404 Flach 63,50 x 31,75 mm 2 1/2" X 1 1/4"	20058 Kg

Werkstoff-Nr. 14404 **Werkstoff-Normbezeichnung** X2CrNiMo17-12-2 1.4401/ 1.4404/ AISI 316 / 316 L

Rohmaterial-Schmelze 377135 **Erschmelzungsart**

Chemische Analyse

C %	0,019	**Si %**	0,35	**Mn %**	1,69	**P %**	0,029	**S %**	0,023	**Cr %**	17,06	**Ni %**	10,38
Mo %	2,11	**Ti %**	0,002	**Co %**	0,18	**N %**	0,078	**Cu %**	0,32	**Nb %**	0,031		

Produktinformation
Blankstahl, 14404 X2CrNiMo17-12-2, abgeschreckt, gezogen, DIN EN 10278 Tol. wie folgt, mit Unterlängen s.u., ohne Stempelung, in Bunden

Zusatzdaten
Stablänge mm: 2900 - 3200, Unterlängen: ab 1000 mm bis max. 10 %,
Klebe-Etiketten: an Stirnseite je Stab: 1.4401/04/AISI316/316L/EW/CHNR/WEE, Verpackung max (kg): 500
Güte: 1.4401/ 1.4404/ AISI 316 / 316 L, Zusatzinfo: Oberflächenbeschaffenheit gem. DIN EN 10277 jedoch Reduzierung der erlaubten Oberflächenfehlertiefe um 50%

Anforderungen
Werkszeugnis: DIN EN 10204/3.1 Rev. 01/2005, WZ-Sprache: deutsch / englisch,
Mit: CE-Zeichen; BauPVO (305/2011/EU) gem. Leistungserklärung zum Download unter www.einsal.com Gemäß: DIN EN 10088 Teil 5 Rev. 07/2009, Maß-Formtoleranz: DIN EN 10278, Rev. 12/1999, Norm: DIN EN 10272 Rev. 10/2016 , ASTM A479/A479M Rev. 2023a , ASTM A262 Practice E Rev. 2015 , NACE Standard MR 0175 Rev. 1997 , DIN EN ISO 15156 Teil 3 Rev. 12/2015 , AD 2000 Merkblatt W 2 gemäß dem zertifizierten Geltungsbereich Rev. 06/2023 , ASTM A276/A276M Rev. 2024 , DIN EN 10088 Teil 3 Rev. 12/2014 , AD 2000 Merkblatt W 10 Rev. 05/2023 , DIN EN 10277 Teil 1 Rev. 06/2008 , NACE Standard MR 0103 Rev. 2015 DIN EN ISO 3651 Teil 2 Verfahren A Rev. 08/1998

Probe	**PRBO24-00766**				

Mechanische Eigenschaften

Rp 0,2% [MPa]	532
Rm [MPa]	635
Rp 1,0% [MPa]	578
A [%]	38,8
A50 [%]	38,8
Z [%]	69,5

Härte

HBW	212
HRC	<20

Korrosionsbeständigkeit

IK-Test (Lieferzustand)	ok
IK-Test [sensibilisiert]	ok

Es wird bestätigt, dass die Lieferung den Anforderungen der angeführten Lieferbedingungen entspricht. Das Zeugnis ist maschinell erstellt und ist gemäß EN 10204 ohne Unterschrift rechtsverbindlich.

Telefon 02352 / 332 0

Walzwerke Einsal GmbH bestätigt hiermit, dass die Reach-Verordnung (EG) Nr. 1907/2006 die RoHs-Richtlinie 2011/65/EU + (EU) 2015/863 und die Verordnung (EU) Nr. 833/2014 eingehalten werden. Das im Abnahmeprüfzeugnis deklarierte Material ist frei von Blei (<0,1%), Quecksilber (< 0,1%), Cadmium (< 0,01%), sechswertigem Chrom (< 0,1%) und Radioaktivität (<0,1Bq/g), Herstellungsland : Deutschland.

Walzwerke Einsal GmbH

Senderski / Seeger

Qualitätsstelle / Abnahmebeauftragte

Walzwerke Einsal GmbH

UST-IdNr.: DE123841325

Walzwerke Einsal GmbH - Postfach 20 - 58769 Nachrodt-Wiblingwerde

Armaturenfabrik Franz Schneider
GmbH & Co. KG
Bahnhofplatz 12
74226 Nordheim
Deutschland

Prüfbescheinigung Seite: 2
DIN EN 10204/3.1

Nr. WZ0324-00162 **vom** 06.03.2024

Bestell-Nr.
Lieferschein-Nr. KL24-00164 **Ref.-Nr.** 020445

Herstellerzeichen	Abnahmebeauftragter	CE-Zeichen 0045
E W	WEE	CE 0045

Auftrags-Nr.	Pos.	Abmessung	Gewicht
AB24-K2001	10	14404 Flach 63,50 x 31,75 mm 2 1/2" X 1 1/4"	20058 Kg

Werkstoff-Nr. 14404	**Werkstoff-Normbezeichnung** X2CrNiMo17-12-2 1.4401/ 1.4404/ AISI 316 / 316 L
Rohmaterial-Schmelze 377135	**Erschmelzungsart**

Bemerkung

Bemerkung: FA24-000553

Oberflächenbeschaffenheit:	nach DIN EN 10272 Tabelle 6/2H
Besichtigung:	Ohne Beanstandung
Maßkontrolle:	Ohne Beanstandung
Verwechselungsprüfung:	Ohne Beanstandung
Wärmebehandlung:	Lösungsgeglüht 1050°C/abgeschreckt

Es wird bestätigt, dass die Lieferung den Anforderungen der angeführten Lieferbedingungen entspricht. Das Zeugnis ist maschinell erstellt und ist gemäß EN 10204 ohne Unterschrift rechtsverbindlich.

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Walzwerke Einsal GmbH

Senderski / Seeger

Qualitätsstelle / Abnahmebeauftragte

Walzwerke Einsal GmbH

VAT Reg. No DE123841325

Walzwerke Einsal GmbH - Postfach 20 - 58769 Nachrodt-Wiblingwerde

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74226 Nordheim
Deutschland

Inspection document Page: 1
DIN EN 10204/3.1

No. WZ0324-00162 **of** 06.03.2024

Your Order No.
Shipment No. KL24-00164 **Ref.-No.** 020445

Symbol of Manufacturers	Surveyor of inspection	CE-sign 0045
E W	WEE	CE 0045

our works No.	Item	Size	Weight
AB24-K2001	10	14404 Flat 63,50 x 31,75 mm 2 1/2" X 1 1/4"	20058 Kg

Material 14404 **Standard Grade of Material** X2CrNiMo17-12-2
1.4401/ 1.4404/ AISI 316 / 316 L

Heat Number 377135 **Method of melting**

Chemical analysis

C %	0,019	**Si %**	0,35	**Mn %**	1,69	**P %**	0,029	**S %**	0,023	**Cr %**	17,06	**Ni %**	10,38
Mo %	2,11	**Ti %**	0,002	**Co %**	0,18	**N %**	0,078	**Cu %**	0,32	**Nb %**	0,031		

Product Information
Bright steel bars, 14404 X2CrNiMo17-12-2, quenched, drawn, DIN EN 10278 tol. as follows, with short lengths see below, without stamping, in bundles

Additional Information
bar length mm: 2900 - 3200, short lengths: from 1000 mm to max. 10 %,
adhesive labels: an Stirnseite je Stab: 1.4401/04/AISI316/316L/EW/CHNR/WEE, packaging max (kg): 500
quality: 1.4401/ 1.4404/ AISI 316 / 316 L, additional information: Oberflächenbeschaffenheit gem. DIN EN 10277 jedoch Reduzierung der erlaubten Oberflächenfehlertiefe um 50%

Confirmed requirements
test certificate: DIN EN 10204/3.1 rev. 01/2005, language of test certificate: german / english,
with: CE-sign; BauPVO (305/2011/EU) acc. declaration of performance downloadable at www.einsal.com acc. to: DIN EN 10088 part 5 rev. 07/2009, tolerance of dimension/shape: DIN EN 10278 rev. 12/1999, standard: DIN EN 10272 rev. 10/2016 , ASTM A479/A479M rev. 2023a , ASTM A262 Practice E rev. 2015 , NACE Standard MR 0175 rev. 1997 , DIN EN ISO 15156 part 3 rev. 12/2015 , AD 2000 data sheet W 2 according to the certified scope rev. 06/2023 , ASTM A276/A276M rev. 2024 , DIN EN 10088 part 3 rev. 12/2014 , AD 2000 data sheet W 10 rev. 05/2023 , DIN EN 10277 part 1 rev. 06/2008 , NACE Standard MR 0103 rev. 2015 DIN EN ISO 3651 part 2 procedure A rev. 08/1998

Sample	PRBO24-00766				

Mechanical properties

Yield strength 0,2% [MPa]	532
Tensile strength [MPa]	635
Yield strength 1,0% [MPa]	578
Elongation 5D [%]	38,8
Elongation 50mm [%]	38,8
Reduction of area [%]	69,5

Hardness

HBW	212
HRC	<20

Corrosion resistance

IC-test (Delivery condition)	ok
IC-test (sensitized)	ok

The delivery corresponds to the requirements mentioned.
The certificate has been established by machine and acc. to EN 10204 it is legal without Signature.

Telephone 02352 / 332 0

Walzwerke Einsal GmbH herewith confirms, that the Reach-regulation (EG) No. 1907/2006, the RoHs-regulation 2011/65/EU + (EU) 2015/863 and the regulation (EU) 833/2014 is met. The material declared in the inspection certificate is free from lead (< 0,1%), mercury content (< 0,1%), cadmium (< 0,01%), hexavalent chromium (< 0,1%) and radioactivity (<0,1Bq/g), Country of Manufacture: Germany.

Walzwerke Einsal GmbH

Senderski / Seeger

QA-department / Surveyor of inspection

Walzwerke Einsal GmbH

VAT Reg. No DE123841325

Walzwerke Einsal GmbH - Postfach 20 - 58769 Nachrodt-Wiblingwerde

Armaturenfabrik Franz Schneider
GmbH & Co. KG
Bahnhofplatz 12
74226 Nordheim
Deutschland

Inspection document Page: 2
DIN EN 10204/3.1

No.	WZ0324-00162	**of**	06.03.2024

Your Order No.
Shipment No. KL24-00164 **Ref.-No.** 020445

Symbol of Manufacturers	**Surveyor of inspection**	**CE-sign 0045**
E W	WEE	CE 0045

our works No.	**Item**	**Size**	**Weight**
AB24-K2001	10	14404 Flat 63,50 x 31,75 mm 2 1/2" X 1 1/4"	20058 Kg

Material	14404	**Standard Grade of Material**	X2CrNiMo17-12-2 1.4401/ 1.4404/ AISI 316 / 316 L
Heat Number	377135	**Method of melting**	

Remark

Remark: FA24-000553

Surface condition:	acc. to DIN EN 10272 charts 6/2H
Visual inspection:	Without objection
Dimension inspection:	Without objection
Test of identity:	Without objection
Heat Treatment:	Solution annealed 1050°C/quenched

The delivery corresponds to the requirements mentioned.
The certificate has been established by machine
and acc. to EN 10204 it is legal
without Signature.

Telephone 02352 / 332 0

Walzwerke Einsal GmbH herewith confirms, that the Reach-regulation (EG) No. 1907/2006, the RoHs-regulation 2011/65/EU + (EU) 2015/863 and the regulation (EU) 833/2014 is met. The material declared in the inspection certificate is free from lead (< 0,1%), mercury content (< 0,1%), cadmium (< 0,01%), hexavalent chromium (< 0,1%) and radioactivity (<0,1Bq/g), Country of Manufacture: Germany.

Walzwerke Einsal GmbH

Senderski / Seeger

QA-department / Surveyor of inspection

INSPECTION CERTIFICATE 合格证

Xi'an HaoSen Precision Casting Co.,Ltd.
Tel:(029)-89080114
西安皓森精铸股份有限公司
No. 28, Lantian 1 Road,National Aviation Hi-TECH Industrial Base,Yanliang District Xi'an Shaanxi Province China
公司地址：陕西省西安市国家航空高技术产业基地蓝天一路28号

Cert NO．(0777)20231220 编号：QF-Z-367 版本REV：1

Order No. 订单号		Quantity 数量	
Manufacturer 制造商	Xi'an HaoSen 西安皓森	Customer 客户	G-Tek时硕科技（西安）有限公司
Part No. 零件号	03031-0777-0002(AM)	Description 名称	MODULE HOUSING, INVESTMENT CAST
Material 材料	CF-3M Per ASTM A743M	Heat Treatment 热处理	Solution Annealed Per ASTM A743M

Chemical Analysis 化学成分分析报告

Heat No 浇铸炉次号	Date 日期	标准要求(Standard) %C 0.03 max	%Si 1.50 max	%S 0.015～0.025	%P 0.04 max	%Mn 1.50 max	%Ni 9.00～13.00	%Cr 17.00～21.00	%Mo 2.00～3.00	Ratio ＞1.2	Result
YULV41A	2023/12/11	0.025	0.565	0.018	0.037	1.165	9.946	18.961	2.195	1.323	OK
YULV41B	2023/12/11	0.024	0.580	0.021	0.039	1.141	9.900	18.898	2.193	1.328	OK
YULV41C	2023/12/11	0.023	0.586	0.023	0.039	1.196	9.828	18.840	2.208	1.333	OK
YULV41D	2023/12/11	0.023	0.603	0.021	0.039	1.176	9.816	18.900	2.141	1.335	OK
YULV41E	2023/12/11	0.022	0.643	0.018	0.037	1.177	9.798	18.791	2.157	1.338	OK
YULV41F	2023/12/11	0.024	0.600	0.018	0.038	1.161	9.985	18.904	2.159	1.318	OK

Mechanical Properties 机械性能报告

Heat Treatment Code 热处理炉批号	Date 日期	Tensile Strength бb(≥485Mpa) 抗拉强度	Yield Strength бs(≥205Mpa) 屈服强度	Elongation б(≥30%) 延伸率	Hardness (HRB≤85) 硬度
YULV41A-F	2023/12/13	564.0	275.0	50.5	80.0

Result: We certify that the above test report is in compliance with 3.1.b per ISO 10474 and 3.1 EN10204.
The products are qualified after radiation elements inspection.

Issued in agreement with TÜV SÜD Industrie Service GmbH (10.2021).

Marking:Manufacturer,Material grade,Material standard,Heat treatment code,Size.

我们谨证明以上材料测试报告为依据检验证书标准ISO 10474 3.1.b和EN10204 3.1所开具，本产品经过辐射元素检测合格。

Inspector (Name & Sig.)： Sun Dali Date： 2023-12-13

QC Supervisor (Name & Sig.): Zhang Xiangfeng Date： 2023-12-13

皓森精铸股份有限公司 检验专用章

Country of Melt _China __ and **Country of Pour__China __**

Emerson Automation Solutions
St. Emerson 4, Industrial Park Tetarom 2
Cluj Napoca, 400638 ROMANIA

Material Certificate of Conformance - consistent with "type 3.1" ISO 10474:2013 / EN 10204:2004

Customer Information	**Manufacturer Information**
Name: COES SRL **PO**: 2055/24	**Sales Order**: 39415178 **Line/Unit**: 2
Device Information **Device Type**: Coplanar Pressure Transmitter **Serial #**: 24CLPC0044343 **Model #**: 2051CD3A02A1KS5E1M5D4T1Q4Q8HR7	
Permanent Tag Information 63-PDIT-062	**Wire-on Tag Information**

Attached Models

0305RC52B11L4

Heat / Assembly #	Heat / Assembly # Description
07K2A86-01-01	Isolator
902856	Manifold Body
YVEV01E	Module Housing

This is to certify that materials as manufactured, assembled and shipped by Emerson for this order are in accordance with the material section as specified on the applicable Emerson drawings. Test reports from Emerson suppliers are attached.

Mihai Blaga
Measurement Solutions Quality Manager

MATERIAL CERTIFICATION

Ulbrich
We Deliver Precision™
USSM/UNE
1 Dudley Avenue
Wallingford, CT 06492 USA
Tel: 203-239-4481
or 800-243-1676
Fax: 203-239-7479
CORPORATE OFFICE
153 Washington Avenue
North Haven, CT 06473 USA

LOAD NUMBER	SHIP DATE		WORK ORDER	SALES ORDER	CUSTOMER PO
00240977	26-Sep-2023	ULBRICH SPECIALTY STRIP MILL	U64400	101-065098 - 1	60441

SOLD TO: Klesk Metal Stamping Company
1124 Stinson Blvd NE
Minneapolis, MN 55413-3001
USA

CUSTOMER NBR: 002012-000

PS#15904 LJP 10/10/23
Lot#16741

SHIP TO: Klesk Metal Stamping Company
1124 Stinson Blvd NE
Minneapolis, MN 55413-3001

PART DESCRIPTION	QTY SHIPPED	U/M
Material Type: 316 Low Carbon Nuclear Grade Stainless Steel	260.20	LBS

MATERIAL TESTS NOT COVERED WITHIN NADCAP OR ISO/IEC 17025 SCOPE OF ACCREDITATION.
THE RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THE CERTIFICATION MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL LAW.

ULBRICH PART NBR: S316LN-00100AN#2-002
CUST PART NBR: C09851-0024CPM

CUSTOMER SPECS / SPECIFICATIONS

CHEMISTRY OVECHECK PERFORMED AT .062" GAUGE BY DIRATS LABORATORIES 41 AIRPORT ROAD PO BOX 39
WESTFIELD, MA 01086-0039
REPORT NUMBER R741137

PRODUCT DESCRIPTION (AS SHIPPED)

Material Type: 316 Low Carbon Nuclear Grade Stainless Steel
Gauge: 0.00100" Gtol+: 0.00010" Gtol-: 0.00010"
Width: 1.5000" Wtol+: 0.00500" Wtol-: 0.00500"
Temper: AN Edge: 3S-#3 Slit Finish: #2
Camber Max: 0.250" per 8 feet

Customer Specifications

ASTM A240-24 W/EXC, EN 10204 3.1
C09851-0024 Rev AW w/exc
PS-58 Rev. 1 w/exc.
PS 25 REV 1 w/exc

Chemical Analysis (Wt. %) - HEAT NO. 07K2A86-01-01

Al	B	C	Cr	Co	Cu	Mn	Mo	Ni	N	P
.024	.0019	.014	16.30	.002	.02	1.53	2.10	10.21	.085	.007

Si	S
.460	.002

PMI TESTED
SJ 10.10.23

Mill Source

Country of Origin	Mill Source
USA	Allegheny

Mechanical Properties Room Temperature

TEST	UNITS	RESULTS	HIGH	LOW
Tensile, psi	PSI	90200		
Yield, psi	PSI	43100		
Elongation, %	Percent	25.8		
Hardness		86		
Hardness Scale		HRB		

DATE RECD 10/5/23 LJP
DATE CNTD 10/10/23 LJP

Received 20 Coils @ 258.69# = 594,728" LJP 10/10/23

This material is free from mercury contamination. All converted hardness values must be considered approximate based on ASTM E140 and may be inaccurate for specific application. This material Certification is only valid when signed by an authorized quality representative.
Material conforms to the above referenced specifications / requirements.
Tested to Ulbrich Quality Procedures
Certification Can Not Be Replicated Except In Full

NET WEIGHT SHIPPED 260.20 LBS

SIGNED:
TITLE: John Mel
Quality Manager
DATE: 05-Jun-2024
APPROVED BY: YR

Subject to Ulbrich Steel's terms and conditions: https://www.ulbrich.com/terms-conditions
Pricing and surcharge are subject to announced increases, changes, and governmental laws such as imposed duties and tariffs.
Subject to applicable surcharges at time of shipment: https://www.ulbrich.com/surcharges/

Abnahmeprufzeugnis

INSPECTION CERTIFICATE

Art des Zeugnisses :
Certificate Type : EN 10204/3.1

Unsere Auftragsnummer Our Sales OrderNo	111269	Rechnungsnummer Invoice No.	4240854	Nummer des Zertifikates Certificate No.	2017-61277
Ihre Auftragsnummer Customer Order No.	182896	Rechnugsdatum Invoice Date	15-12-2023	Datum Date	16-12-2023

Kunde
Customer

Armaturenfabrik Franz Schneider Gmbh + Co. KG
Bahnhofplatz 12 74226 Nordheim
DEU

Markenname
Trade Mark **AIL**

Inspektionszeichen
Inspector,s Mark : **AIL1**

Materialeigenschaften Material Details	**Stainless Steel Flat CD Cold Drawn Sol. Ann**				
Werkstoff Steel Grade	316 / 316L / 1.4401 / 1.4404	Form Shape	Flat CD	Abmessung Size	2-1/2"X1-1/4" inch
Charge Heat No.	902856	Toleranz Tolerance	-0/+0.20 mm	Stablange Length Of Bars	3.000-3.200 meter
Nettogewicht Net Weight	13.601 MT	Anzahl der Stable Number Of Bars	269	Schmelzverfahren Melting Process	EF/AOD/MEMS.
Bundnummer Bundle Nos	3013013,3013015,3013016,3013017,3013018,3013019,3013020,3013021,3013022,3013023,3013024,3013026,3013027,3013028,3013029,3013033,3013030,3013034,3013035,3013036,3013037,3013038,3013039,3013040,3013041,3013042,3013045				
Anforderugen Requirements	AD 2000 MARKBLATT W10 DIN EN 10272:2016	AD 2000 MARKBLATT W2 NACE MR 0103:2015	ASME SA 479:2021 NACE MR 0175 / ISO 15156:2020	ASTM A 479:2023	

Chemische Analyse / Chemical Analysis %

Element	C	Si	Mn	P	S	N2	Cr	Ni	Mo								
Min							16.5000	10.0000	2.0000								
Max	0.0300	1.0000	2.0000	0.0450	0.0300	0.1000	18.0000	13.0000	2.5000								
Obs	**0.0200**	**0.3800**	**1.6600**	**0.0430**	**0.0260**	**0.0860**	**16.6700**	**10.0600**	**2.0600**								

Mechanische Werte / Mechanical Properties

	YS/(Rp 0.2%) (N/mm2) ISO 6892-1:2019	UTS (N/mm2) ISO 6892-1:2019	% Bruchdehnung % Elongation ISO 6892-1:2019	% Brucheinschnur % Reduction Area ISO 6892-1:2019	Harte Hardness (HRC) ISO 6506-1:2014	Kerbschagbiegevesuch nach charpy V notch (Langs) Charpy Impact V Notch (Longitudnal) (Joules) EN 1SO 148-1:2016				
Min.	205.00	515.00	40.00	40.00		Temp. Gradi Temp.Deg	Resultate Result			
Max.		700.00			22.00	C	1	2	3	Avg.
Resultate Result	**394.62**	**680.66**	**48.00**	**68.00**	**20.00**					

Warmebehandlung / Heat Treatment :
Solution Annealed @ 1050°C. Soaking for 1hr-20mins & Water Quenching.

Bemerkungen / Remarks

- Ursprungsland Indien / Country of origin India
- Name des Herstellers und Schmelznummer des eingesetzten Stranggussknüppels - Avtar A-7720 / Name of the manufacturer and melting number of the continuous casting billet used - Avtar A-7720
- Herstellungsland der Schmelze: Indien / Melt manufacturing country: India
- Zolltarif - Unterposition des durchgehenden Knüppels: 721899 / Customs tariff - subheading of continuous billet: 721899
- Warmgewalzt und kaltbearbeitet : Aamor Inox Ltd (Indien) / Hot rolled and cold worked: Aamor Inox Ltd (India)
- Frei Von Radioaktivitat-Verifiziert durch ein Gammastrahlenspektrometer / Free from radioactivity - verified by a gamma ray spectrometer
- Frei Von Quecksilber / Mercury free
- Gefugeuntersuchung(Mikro & Makro Test) mangelfrei / Structural examination (micro & macro test) free of defects
- Es wurden keine SchweiBarbeiten am Material durchgefuhrt / No welding work was carried out on the material
- Visuelle Begutachutung und Mabkontrolle - OK / Visual inspection and size control - OK
- IGC Test:ASTM A 262:2015 PRACTICE E :ok / IGC Test:ASTM A 262:2015 PRACTICE E:ok
- Identitatsprufung durch portable Spektrometer, basierend auf Rontgenstrahl / Identity verification using portable spectrometers based on X-rays

Das Material enthält keine Stahlprodukte mit Ursprung in Russland, das in Anhang XVII der Verordnung (EU) Nr. 833/2014 aufgeführt ist und weitere Änderungen aufgeführt sind

The material does not contain steel products originating in Russia, which is listed in Annex XVII to Regulation (EU) No. 833/2014 and other amendments are listed

Wir bestatigen die Ubereinstimmung mit den Vorgaben der Bestellung
We confirm that the material is manufactured & supplied in accordance to the Purchase Order

QA Head/NDT Inspector
AAMOR INOX LIMITED

Aamor Inox Limited

A-30, Site IV, UPSIDC Industrial Area, Sahibabad, Ghaziabad 201010, Uttar Pradesh, India, Tel: +91 120 4564585 / 86
Email:- info@aamorinox.com, Website:- www.aamorinox.com

Abnahmeprufzeugnis

INSPECTION CERTIFICATE

Art des Zeugnisses :
Certificate Type : EN 10204/3.1

Unsere Auftragsnummer Our Sales OrderNo	111269	Rechnungsnummer Invoice No.	4240854	Nummer des Zertifikates Certificate No.	2017-61278
Ihre Auftragsnummer Customer Order No.	182896	Rechnungsdatum Invoice Date	15-12-2023	Datum Date	16-12-2023

Kunde
Customer

Armaturenfabrik Franz Schneider Gmbh + Co. KG
Bahnhofplatz 12 74226 Nordheim
DEU

Markenname
Trade Mark **AIL**

Inspektionszeichen
Inspector,s Mark : **AIL1**

Materialeigenschaften Material Details	Stainless Steel Flat CD Cold Drawn Sol. Ann				
Werkstoff Steel Grade	316 / 316L / 1.4401 / 1.4404	Form Shape	Flat CD	Abmessung Size	2-1/2"X1-1/4" inch
Charge Heat No.	902856	Toleranz Tolerance	-0/+0.20 mm	Stablange Length Of Bars	3.000-3.200 meter
Nettogewicht Net Weight	3.639 MT	Anzahl der Stable Number Of Bars	72	Schmelzverfahren Melting Process	EF/AOD/MEMS.
Bundnummer Bundle Nos	3013046,3013047,3013048,3013049,3013051,3013052,3013066,3013067				
Anforderugen Requirements	AD 2000 MARKBLATT W10 DIN EN 10272:2016	AD 2000 MARKBLATT W2 NACE MR 0103:2015	ASME SA 479:2021 NACE MR 0175 / ISO 15156:2020	ASTM A 479:2023	

Chemische Analyse / Chemical Analysis %

Element	C	Si	Mn	P	S	N2	Cr	Ni	Mo								
Min							16.5000	10.0000	2.0000								
Max	0.0300	1.0000	2.0000	0.0450	0.0300	0.1000	18.0000	13.0000	2.5000								
Obs	0.0200	0.3800	1.6600	0.0430	0.0260	0.0860	16.6700	10.0600	2.0600								

Mechanische Werte / Mechanical Properties

	YS/(Rp 0.2%) (N/mm2) ISO 6892-1:2019	UTS (N/mm2) ISO 6892-1:2019	% Bruchdehnung % Elongation ISO 6892-1:2019	% Brucheinschnur % Reduction Area ISO 6892-1:2019	Harte Hardness (HRC) ISO 6506-1:2014	Kerbschagbiegevesuch nach charpy V notch (Langs) Charpy Impact V Notch (Longitudnal) (Joules) EN ISO 148-1:2016				
Min.	205.00	515.00	40.00	40.00		Temp. Gradi Temp.Deg	Resultate Result			
Max.		700.00			22.00	C	1	2	3	Avg.
Resultate Result	394.62	680.66	48.00	68.00	20.00					

Warmebehandlung / Heat Treatment :

Solution Annealed @ 1050°C. Soaking for 1hr-20mins & Water Quenching.

Bemerkungen / Remarks

- Ursprungsland Indien / Country of origin India
- Name des Herstellers und Schmelznummer des eingesetzten Stranggussknüppels - Avtar A-7720 / Name of the manufacturer and melting number of the continuous casting billet used - Avtar A-7720
- Herstellungsland der Schmelze: Indien / Melt manufacturing country: India
- Zolltarif - Unterposition des durchgehenden Knüppels: 721899 / Customs tariff - subheading of continuous billet: 721899
- Warmgewalzt und kaltbearbeitet : Aamor Inox Ltd (Indien) / Hot rolled and cold worked: Aamor Inox Ltd (India)
- Frei Von Radioaktivitat-Verifiziert durch ein Gammastrahlenspektrometer / Free from radioactivity - verified by a gamma ray spectrometer
- Frei Von Quecksilber / Mercury free
- Gefugeuntersuchung(Mikro & Makro Test) mangelfrei / Structural examination (micro & macro test) free of defects
- Es wurden keine SchweiBarbeiten am Material durchgefuhrt / No welding work was carried out on the material
- Visuelle Begutachutung und Mabkontrolle - OK / Visual inspection and size control - OK
- Identitatsprufung durch portable Spektrometer, basierend auf Rontgenstrahl / Identity verification using portable spectrometers based on X-rays
- IGC Test:ASTM A 262:2015 PRACTICE E :ok / IGC Test:ASTM A 262:2015 PRACTICE E:ok

Das Material enthält keine Stahlprodukte mit Ursprung in Russland, das in Anhang XVII der Verordnung (EU) Nr. 833/2014 aufgeführt ist und weitere Änderungen aufgeführt sind

The material does not contain steel products originating in Russia, which is listed in Annex XVII to Regulation (EU) No. 833/2014 and other amendments are listed

Wir bestatigen die Ubereinstimmung mit den Vorgaben der Bestellung

We confirm that the material is manufactured & supplied in accordance to the Purchase Order

QA Head/NDT Inspector
AAMOR INOX LIMITED

Aamor Inox Limited

A-30, Site IV, UPSIDC Industrial Area, Sahibabad, Ghaziabad 201010, Uttar Pradesh, India, Tel: +91 120 4564585 / 86
Email:- info@aamorinox.com, Website:- www.aamorinox.com

INSPECTION CERTIFICATE 合格证

Xi'an HaoSen Precision Casting Co.,Ltd.
Tel:(029)-89080114
西安皓森精铸股份有限公司
No. 28, Lantian 1 Road,National Aviation Hi-TECH Industrial Base,Yanliang District Xi'an Shaanxi Province China
公司地址：陕西省西安市国家航空高技术产业基地蓝天一路28号

Cert NO．(0777)20240536 编号：QF-Z-367 版本REV：1

Order No. 订单号		Quantity 数量	
Manufacturer 制造商	Xi'an HaoSen 西安皓森	Customer 客户	G-Tek时硕科技（西安）有限公司
Part No. 零件号	03031-0777-0002(AM)	Description 名称	MODULE HOUSING, INVESTMENT CAST
Material 材料	CF-3M Per ASTM A743M(REV:2021)	Heat Treatment 热处理	Solution Annealed Per ASTM A743M(REV:2021)

Chemical Analysis 化学成分分析报告

Heat No 浇铸炉次号	Date 日期	标准要求(Standard) %C 0.03 max	%Si 1.50 max	%S 0.015～0.025	%P 0.04 max	%Mn 1.50 max	%Ni 9.00～13.00	%Cr 17.00～21.00	%Mo 2.00～3.00	Ratio ＞1.2	Result
YVEV01A	2024/5/22	0.022	0.597	0.017	0.035	1.048	9.644	18.605	2.300	1.356	OK
YVEV01B	2024/5/22	0.021	0.582	0.017	0.038	1.109	9.822	18.798	2.198	1.340	OK
YVEV01C	2024/5/22	0.019	0.647	0.016	0.037	1.104	9.735	18.861	2.253	1.373	OK
YVEV01D	2024/5/22	0.022	0.719	0.019	0.038	1.152	9.571	18.981	2.240	1.394	OK
YVEV01E	2024/5/22	0.023	0.695	0.017	0.035	1.091	9.623	18.897	2.226	1.378	OK
YVEV01F	2024/5/22	0.022	0.729	0.019	0.037	1.137	9.538	18.784	2.270	1.388	OK

Mechanical Properties 机械性能报告

Heat Treatment Code 热处理炉批号	Date 日期	Tensile Strength бb(≥485Mpa) 抗拉强度	Yield Strength бs(≥205Mpa) 屈服强度	Elongation б(≥30%) 延伸率	Hardness (HRB≤85) 硬度
YVEV01A-F	2024/5/28	577.0	282.0	49.0	82.5

Result: We certify that the above test report is in compliance with 3.1.b per ISO 10474 and 3.1 EN10204.
The products are qualified after radiation elements inspection.

Issued in agreement with TÜV SÜD Industrie Service GmbH (10.2021).

Marking:Manufacturer,Material grade,Material standard,Heat treatment code,Size.

我们谨证明以上材料测试报告为依据检验证书标准ISO 10474 3.1.b和EN10204 3.1所开具，本产品经过辐射元素检测合格。

Inspector (Name & Sig.)： Sun Dali Date： 2024-05-28

QC Supervisor (Name & Sig.): Zhang Xiangfeng Date： 2024-05-28

皓森精铸股份有限公司 检验专用章

Country of Melt _China __ and **Country of Pour__China __**

Emerson Automation Solutions
St. Emerson 4, Industrial Park Tetarom 2
Cluj Napoca, 400638 ROMANIA

Material Certificate of Conformance - consistent with "type 3.1" ISO 10474:2013 / EN 10204:2004

Customer Information	**Manufacturer Information**
Name: COES SRL **PO**: 2055/24	**Sales Order**: 39415178 **Line/Unit**: 3
Device Information **Device Type**: Thermowell **Serial #**: 24CLTN0021258 **Model #**: 114CM0100FAB2SC070AQ8XW **Manufacturing #**: R4262019666-06-001	
Permanent Tag Information 63-TW-051	**Wire-on Tag Information**

Attached Models

214CRTSMA1S3M0170SLNDSR2C2B1UAE100V20Q4G1XAXW
644HANDM5Q4HR7XA

Heat / Assembly #	Heat / Assembly # Description
3LTV	Stem Heat Code 1
E230179	Weld Heat Code 1
E231407	Weld Heat Code 2
K2223785	Flange Heat Code

This is to certify that materials as manufactured, assembled and shipped by Emerson for this order are in accordance with the material section as specified on the applicable Emerson drawings. Test reports from Emerson suppliers are attached.



Mihai Blaga
Measurement Solutions Quality Manager

KAMLESH METAL INDIA

OUR MOTTO: "QUALITY PRODUCT & CUSTOMER SATISFACTION"

MANUFACTURERS OF: NICKLE ALLOY, STAINLESS STEEL, CARBON / ALLOY STEEL, PIPE FITTINGS & FLANGES

MATERIAL TEST CERTIFICATE
EN 10204 3.1

Customer: M/s.: THE BRITISH ROTOTHERM COMPANY LTD. KENFIG INDUSTRIAL ESTATE, MARGAM, PORT TALBOT, WEST GLAMORGAN SA 13 2PW **PURCHASE ORDER NO:** PO00047651 **PURCHASE ORDER DT:** 05-12-2022 **JOB NO:** NA		**TC Number**	: **KLAB/22-23/2637**
		TC Date	: **24-01-2023**
		PART NAME	: **BLIND DISC**
		PRODUCT SPEC	: **ASTM A182 F316/316L**
		UNS STANDARD	: **UNS S31600 / S31603**
		NACE STANDARD	: **NACE MR0175**
		PRODUCT TYPE	: **FORGED**
		HEAT No	: **K2223785 & K2223788**

MATERIAL DESCRIPTION					TEST RESULTS
Sr.	**Po Sr.**	**Po Item No**	**PRODUCT DETAIL**	**Qty**	**Heat Treatment: SOLUTION ANNEALED**
HEAT NO# K2223785					**Dimension Check: Satisfactory**
1	8	E/DSC/111/20/316L	111MM DIA x 20MM THK	45	**Visual Check: Satisfactory**
2	10	E/DSC/118/21/316L	118MM DIA x 21MM THK	30	
3	12	E/DSC/130/23/316L	130MM DIA x 23MM THK	90	**PMI Check: Satisfactory**
4	13	E/DSC/155/25/316L	155MM DIA x 25MM THK	72	
HEAT NO# K2223788					**Remarks: Satisfactory**
5	15	E/DSC/160/35/316L	160MM DIA x 35MM THK	12	**Material Identification: {Size} x {Mat. Grade} x {Heat No}**
6	14	E/DSC/168/28/316L	168MM DIA x 28MM THK	102	

CHEMICAL ANALYSIS: (%)

Elements	Uom	Min	Max	Heat No: K2223785	Heat No: K2223788
C	%	---	0.030	0.022	0.025
Mn	%	---	2.000	1.289	1.432
Si	%	---	1.000	0.655	0.590
S	%	---	0.030	0.008	0.007
Cr	%	16.00	18.00	16.32	16.28
Ni	%	10.00	14.00	10.27	10.19
Cu	%	---	1.000	0.250	0.315
P	%	---	0.045	0.029	0.028
Mo	%	2.000	3.000	2.070	2.080
Ti	%	---	---	----	----
Nb	%	---	---	----	----
Fe	%	---	Balance	----	----

MECHANICAL PROPERTIES:

	Min	Max	Heat No: K2223785	Heat No: K2223788
Yield Stress Mpa	205	---	292.50	296.10
UTS Mpa	515	---	605.40	611.35
Elongation %	30	---	41.40	42.15
Hardness (HB)	---	215	175, 178	178, 180

Declaration: We hereby certify that the particulars herein are correct & the materials have been manufactured at our works in accordance to the technical delivery condition agreed by us.

		For, Kamlesh Metal India
Inspector / Surveyor - TPIA	Inspector / Surveyor - TPIA	QA / QC Engineer

REGD OFF: NO. 2, 42/46 GURU RAJENDRA HOUSE, 5th KUMBHARWADA, MUMBAI - 400004, MAHARASHTRA, INDIA.

Tel.No:- +91-22-67437381, 66595882, Fax No.:- +91-22-23858213. Email: info@kamleshmetal.com Web: www.kamleshmetal.com

7419482

INSPECTION CERTIFICATE (3.1) - Chemical analysis
TEST REPORT (2.2) - Mechanical properties

Issued Date: 2024-05-21

Certificate number: EC27528787 rev. 0

Our order:
Our reference: Louise Cox
Customer number: GBB00496
Customer order date:

Your order:
Your reference: Andrew
Your fax number:
Your e-mail: andrew@geartrodes.com

Invoice address
GEAR-TRODE SOUTH WALES LTD ptalbot

Receiver of certificate

Delivery address

DELIVERY Lot number: PVY0711454 Quantity:

PRODUCT

Brand: ESAB
Description: OK Tigrod 316L 2.4x1000mm 5kg
Item number: 163024R150
Heat number: E231407

CHEMICAL ANALYSIS

Actual results: acc to EN 10204 - 3.1

Wire/strip	
C	0.01%
Si	0.5%
Mn	1.6%
P	0.02%
S	0.02%
Cr	18%
Ni	12%
Mo	2.6%
Nb	0.01%
Cu	0.1%
N	0.04%
FN WRC-92	7

CLASSIFICATIONS

EN ISO 14343-A: W 19 12 3 L
SFA/AWS A5.9: ER316L
Werkstoffnummer: ~1.4430

MECHANICAL PROPERTIES

Typical data: acc to EN 10204 – 2.2

Tensile

Standard	Shielding Gas	Condition	Rp0.2 [MPa/ksi]	Rm [MPa/ksi]	A4 [%]
AWS	I1	As Welded	470/68	600/87	32

Impact

Standard	Shielding Gas	Condition	Temp [°C/°F]	KV[J/ft-lb]
AWS	I1	As Welded	+20/68	175/129
AWS	I1	As Welded	-60/-76	130/96
AWS	I1	As Welded	-110/-166	120/89
AWS	I1	As Welded	-196/-321	75/55

A4, A5 = Elongation
ReH = Upper Yield Point
ReL = Lower Yield Point
Rm = Ultimate Tensile Strength
Rp0.2 = Yield Strength 0.2 offset
Rp1.0 = Yield Strength 1.0 offset

COMMENTS

Product supplied under a QA Programme fulfilling the EN ISO 9001 standard.
This certificate is produced electronically.
Please refer any queries to:
ESAB Group (UK) Ltd, Warlies Park House Horseshoe Hill, Upshire, Essex, EN9 3SL +44 1992-768515

Validation

Josef Moravek — Quality Manager

Per Ake Bjornstedt — Product Manager

INSPECTION CERTIFICATE (3.1) - Chemical analysis
TEST REPORT (2.2) - Mechanical properties

Issued Date: 2023-08-04

Certificate number: EC27236781 rev. 0

Our order:
Our reference: Louise Cox
Customer number: GBB00496
Customer order date:

Your order:
Your reference: Andrew
Your fax number:
Your e-mail: andrew@geartrodes.com

Invoice address
GEAR-TRODE SOUTH WALES LTD ptalbot

Receiver of certificate

Delivery address

DELIVERY Lot number: PVX1611396 Quantity:

PRODUCT

Brand: ESAB
Description: OK Tigrod 316L 2.4x1000mm 5kg
Item number: 163024R150
Heat number: E230179

CLASSIFICATIONS

EN ISO 14343-A: W 19 12 3 L
SFA/AWS A5.9: ER316L
Werkstoffnummer: ~1.4430

CHEMICAL ANALYSIS

Actual results: acc to EN 10204 - 3.1

Wire/strip	
C	0.01%
Si	0.39%
Mn	1.5%
P	0.021%
S	0.008%
Cr	18.5%
Ni	11.9%
Mo	2.6%
Nb	0.01%
Cu	0.06%
N	0.04%
FN WRC-92	9%

MECHANICAL PROPERTIES

Typical data: acc to EN 10204 – 2.2

Tensile

Rp0.2 [MPa/ksi]	Rm [MPa/ksi]	A5 [%]
470/68	600/87	32

Impact

Temp [°C/°F]	KV[J/ft-lb]
-60/-76	130/96
-196/-321	75/55

A4, A5 = Elongation
ReH = Upper Yield Point
ReL = Lower Yield Point
Rm = Ultimate Tensile Strength (UTS)
Rp0.2 = Yield Strength 0.2 offset
Rp1.0 = Yield Strength 1.0 offset

COMMENTS

Product supplied under a QA Programme fulfilling the EN ISO 9001 standard.
This certificate is produced electronically.
Please refer any queries to:
ESAB Group (UK) Ltd, Warlies Park House Horseshoe Hill, Upshire, Essex, EN9 3SL +44 1992-768515

Validation

Josef Moravek Quality Manager

Per Ake Bjornstedt Product Manager

MC - 423857 - 01

ROLDAN, S.A. - Stainless Steels

FACTORY

Santo Tomás de las Ollas, S/N
Apdo. de Correos 11
PONFERRADA (LEÓN)
TEL.: +34 987 44 61 00
FAX: +34 987 44 61 01
E-MAIL: rdn_fabrica@acerinox.com

HEAD OFFICE

Santiago de Compostela, 100-3°
28035 MADRID (ESPAÑA)
TEL.: +34 913 98 52 57
FAX: +34 913 98 51 93
E-MAIL: roldan@acerinox.com

INSPECTION CERTIFICATE
EN 10204 3.1

Z01 Declaration: the Product is in compliance with the order

MADE IN SPAIN - EUROPEAN UNION

TÜVRheinland CERTIFICADO

Sistema de Gestión
ISO 9001:2015
ISO 14001:2015
ISO 50001:2018

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ID 0091003143

CE
0432
11
0432-CPR-00190-01

EN 10.088:5

CERTIFICATE N° 2024/005201	DATE 30/04/2024	SHEET 1	DELIVERY NOTE N° 2024/000921

GRADE ROLDAMAX-339 EN10088:3 (1.4401/1.4404.)

CUSTOMER THE METAL CENTRE

DIMENSIONS 35,00 mm. | Surface finish according EN10088-3 Table 7:2H

LENGTH 3.100 mm. TOLERANCE ISO h10

PRODUCT [231] Round bar, annealed, smooth turned, polished, one side chamfered 45°

REQUIREMENTS EN10088:3 CUSTOMER ORDER P00019346MC/May

TENSILE TEST EN ISO 6892-1

ACCORDING TO EN 10272 EDITION AD2000 W0, W2 & W10

INTERGRANULAR CORROSION EN ISO 3651-2 method A: SATISFACTORY WITHOUT OBJETIONS

SURFACE AND DIMENSIONS CONTROL WITHOUT OBJECTIONS Spektrometrical Identity Test: O.K.

IMPACT TEST, SAMPLE DIMENSIONS EN ISO 148-1 MATERIAL FREE FROM RADIOACTIVITY

ORDER N°	WORKS N°	MARKS / BOX	HEAT NUMBER	SAMPLE	WEIGHT
MA10356 11	T312404 19 3	56008 / RK55872	3LTV	3LTV	544

PRODUCTION PROCESS

EAF + AOD +CC

TRADE MARK

RDN

MARKING

HEAT NUMBER

GRADE (ACX-339)

INSPECTOR STAMP

R3

QUALITY INSPECTOR

JUAN JOSE ALVAREZ RODRIGUEZ

QUALITY CONTROL REPRESENTATIVE

MECHANICAL PROPERTIES

CAST	SAMPLE	SAMPLE DIMENSIONS mm.	Observ. T°.	Rm MPa	Rp 0,2% MPa	Rp 1% MPa	Z %	A % L=5D	A % L=4D	Agt %	IMPACT STRENGHT ISO-V (J) 20°C	IMPACT STRENGHT ISO-V (J) -196°C		HARDNESS HB	FATIGUE TEST	BEND TEST	CROSS SECTIONAL AREA mm²	Kg / m
3LTV	3LTV	20,00	20°C	629	323	381	68	48	49					160				
REQUIREMENTS		EN ISO 377		500 900	200	235		20			100			315				

CHEMICAL COMPOSITION %

CAST	C	P	S	Si	Mn	Cr	Ni	Mo	Ti	N	Cu	Co			
3LTV	0,0220	0,0330	0,0240	0,3650	1,4970	16,7300	10,3500	2,0300	0,0050	0,0300	0,4400	0,2070			
REQUIREMENTS	0,0300	0,0450	0,0300	1,0000	2,0000	16,5000 18,5000	10,0000 13,0000	2,0000 2,5000		0,1000					

OBSERVATIONS

AISI 316/316L. UNS S31600/S31603. ASTM/ASME A/SA-182 grade F316/F316L, A/SA-193 class 1 grade B8M, A/SA-276 condition A, A/SA-320 class 1 grade B8M, A/SA-479 condition A. AMS 5648. AMS 5653. AMS QQ-S-763 condition A. NACE MR0175 & MR0103. ASME BPVC section II partA. ASTM A-262 practice E: OK.
Material tested with crack detection, operating on the basisof the eddy current method.
No weld or weld repair on the material.

CER_IN4

OTHER TEST RESULTS | REQUIREMENTS AD2000 W0,W2,W10|2014/68/EU(PED)|UKCA PER 2016/1105

HEAT TREATMENT 1.050 °C AND WATERCOOLED | Crack tested acc. to EN10277 table 3 class 3 (Eddy current)

Emerson Automation Solutions
St. Emerson 4, Industrial Park Tetarom 2
Cluj Napoca, 400638 ROMANIA

Material Certificate of Conformance - consistent with "type 3.1" ISO 10474:2013 / EN 10204:2004

Customer Information	**Manufacturer Information**
Name: COES SRL **PO**: 2055/24	**Sales Order**: 39415178 **Line/Unit**: 3
Device Information **Device Type**: Thermowell **Serial #**: 24CLTN0021259 **Model #**: 114CM0100FAB2SC070AQ8XW **Manufacturing #**: R4262019666-06-002	
Permanent Tag Information 63-TW-052	**Wire-on Tag Information**

Attached Models

214CRTSMA1S3M0170SLNDSR2C2B1UAE100V20Q4G1XAXW
644HANDM5Q4HR7XA

Heat / Assembly #	Heat / Assembly # Description
3LTV	Stem Heat Code 1
E230179	Weld Heat Code 1
E231407	Weld Heat Code 2
K2223785	Flange Heat Code

This is to certify that materials as manufactured, assembled and shipped by Emerson for this order are in accordance with the material section as specified on the applicable Emerson drawings. Test reports from Emerson suppliers are attached.



Mihai Blaga
Measurement Solutions Quality Manager

KAMLESH METAL INDIA

OUR MOTTO: "QUALITY PRODUCT & CUSTOMER SATISFACTION"

MANUFACTURERS OF: NICKLE ALLOY, STAINLESS STEEL, CARBON / ALLOY STEEL, PIPE FITTINGS & FLANGES

MATERIAL TEST CERTIFICATE
EN 10204 3.1

Customer: M/s.: THE BRITISH ROTOTHERM COMPANY LTD. KENFIG INDUSTRIAL ESTATE, MARGAM, PORT TALBOT, WEST GLAMORGAN SA 13 2PW **PURCHASE ORDER NO:** PO00047651 **PURCHASE ORDER DT:** 05-12-2022 **JOB NO:** NA		**TC Number**	: **KLAB/22-23/2637**
		TC Date	: **24-01-2023**
		PART NAME	: **BLIND DISC**
		PRODUCT SPEC	: **ASTM A182 F316/316L**
		UNS STANDARD	: **UNS S31600 / S31603**
		NACE STANDARD	: **NACE MR0175**
		PRODUCT TYPE	: **FORGED**
		HEAT No	: **K2223785 & K2223788**

MATERIAL DESCRIPTION					TEST RESULTS
Sr.	**Po Sr.**	**Po Item No**	**PRODUCT DETAIL**	**Qty**	**Heat Treatment: SOLUTION ANNEALED**
HEAT NO# K2223785					**Dimension Check: Satisfactory**
1	8	E/DSC/111/20/316L	111MM DIA x 20MM THK	45	**Visual Check: Satisfactory**
2	10	E/DSC/118/21/316L	118MM DIA x 21MM THK	30	
3	12	E/DSC/130/23/316L	130MM DIA x 23MM THK	90	**PMI Check: Satisfactory**
4	13	E/DSC/155/25/316L	155MM DIA x 25MM THK	72	
HEAT NO# K2223788					**Remarks: Satisfactory**
5	15	E/DSC/160/35/316L	160MM DIA x 35MM THK	12	**Material Identification: {Size} x {Mat. Grade} x {Heat No}**
6	14	E/DSC/168/28/316L	168MM DIA x 28MM THK	102	

CHEMICAL ANALYSIS: (%)

Elements	Uom	Min	Max	Heat No: K2223785	Heat No: K2223788
C	%	---	0.030	0.022	0.025
Mn	%	---	2.000	1.289	1.432
Si	%	---	1.000	0.655	0.590
S	%	---	0.030	0.008	0.007
Cr	%	16.00	18.00	16.32	16.28
Ni	%	10.00	14.00	10.27	10.19
Cu	%	---	1.000	0.250	0.315
P	%	---	0.045	0.029	0.028
Mo	%	2.000	3.000	2.070	2.080
Ti	%	---	---	----	----
Nb	%	---	---	----	----
Fe	%	---	Balance	----	----

MECHANICAL PROPERTIES:

	Min	Max	Heat No: K2223785	Heat No: K2223788
Yield Stress Mpa	205	---	292.50	296.10
UTS Mpa	515	---	605.40	611.35
Elongation %	30	---	41.40	42.15
Hardness (HB)	---	215	175, 178	178, 180

Declaration: We hereby certify that the particulars herein are correct & the materials have been manufactured at our works in accordance to the technical delivery condition agreed by us.

		For, Kamlesh Metal India
Inspector / Surveyor - TPIA	Inspector / Surveyor - TPIA	QA / QC Engineer

REGD OFF: NO. 2, 42/46 GURU RAJENDRA HOUSE, 5th KUMBHARWADA, MUMBAI - 400004, MAHARASHTRA, INDIA.

Tel.No:- +91-22-67437381, 66595882, Fax No.:- +91-22-23858213. Email: info@kamleshmetal.com Web: www.kamleshmetal.com

7419482

INSPECTION CERTIFICATE (3.1) - Chemical analysis
TEST REPORT (2.2) - Mechanical properties

Issued Date: 2024-05-21

Certificate number: EC27528787 rev. 0

Our order:
Our reference: Louise Cox
Customer number: GBB00496
Customer order date:

Your order:
Your reference: Andrew
Your fax number:
Your e-mail: andrew@geartrodes.com

Invoice address
GEAR-TRODE SOUTH WALES LTD ptalbot

Receiver of certificate

Delivery address

DELIVERY Lot number: PVY0711454 Quantity:

PRODUCT

Brand: ESAB
Description: OK Tigrod 316L 2.4x1000mm 5kg
Item number: 163024R150
Heat number: E231407

CHEMICAL ANALYSIS

Actual results: acc to EN 10204 - 3.1

Wire/strip	
C	0.01%
Si	0.5%
Mn	1.6%
P	0.02%
S	0.02%
Cr	18%
Ni	12%
Mo	2.6%
Nb	0.01%
Cu	0.1%
N	0.04%
FN WRC-92	7

CLASSIFICATIONS

EN ISO 14343-A: W 19 12 3 L
SFA/AWS A5.9: ER316L
Werkstoffnummer: ~1.4430

MECHANICAL PROPERTIES

Typical data: acc to EN 10204 – 2.2

Tensile

Standard	Shielding Gas	Condition	Rp0.2 [MPa/ksi]	Rm [MPa/ksi]	A4 [%]
AWS	I1	As Welded	470/68	600/87	32

Impact

Standard	Shielding Gas	Condition	Temp [°C/°F]	KV[J/ft-lb]
AWS	I1	As Welded	+20/68	175/129
AWS	I1	As Welded	-60/-76	130/96
AWS	I1	As Welded	-110/-166	120/89
AWS	I1	As Welded	-196/-321	75/55

A4, A5 = Elongation
ReH = Upper Yield Point
ReL = Lower Yield Point
Rm = Ultimate Tensile Strength
Rp0.2 = Yield Strength 0.2 offset
Rp1.0 = Yield Strength 1.0 offset

COMMENTS

Product supplied under a QA Programme fulfilling the EN ISO 9001 standard.
This certificate is produced electronically.
Please refer any queries to:
ESAB Group (UK) Ltd, Warlies Park House Horseshoe Hill, Upshire, Essex, EN9 3SL +44 1992-768515

Validation

Josef Moravek — Quality Manager

Per Ake Bjornstedt — Product Manager

INSPECTION CERTIFICATE (3.1) - Chemical analysis
TEST REPORT (2.2) - Mechanical properties

Issued Date: 2023-08-04

Certificate number: EC27236781 rev. 0

Our order:
Our reference: Louise Cox
Customer number: GBB00496
Customer order date:

Your order:
Your reference: Andrew
Your fax number:
Your e-mail: andrew@geartrodes.com

Invoice address
GEAR-TRODE SOUTH WALES LTD ptalbot

Receiver of certificate

Delivery address

DELIVERY Lot number: PVX1611396 Quantity:

PRODUCT

Brand: ESAB
Description: OK Tigrod 316L 2.4x1000mm 5kg
Item number: 163024R150
Heat number: E230179

CLASSIFICATIONS

EN ISO 14343-A: W 19 12 3 L
SFA/AWS A5.9: ER316L
Werkstoffnummer: ~1.4430

CHEMICAL ANALYSIS

Actual results: acc to EN 10204 - 3.1

Wire/strip	
C	0.01%
Si	0.39%
Mn	1.5%
P	0.021%
S	0.008%
Cr	18.5%
Ni	11.9%
Mo	2.6%
Nb	0.01%
Cu	0.06%
N	0.04%
FN WRC-92	9%

MECHANICAL PROPERTIES

Typical data: acc to EN 10204 – 2.2

Tensile

Rp0.2 [MPa/ksi]	Rm [MPa/ksi]	A5 [%]
470/68	600/87	32

Impact

Temp [°C/°F]	KV[J/ft-lb]
-60/-76	130/96
-196/-321	75/55

A4, A5 = Elongation
ReH = Upper Yield Point
ReL = Lower Yield Point
Rm = Ultimate Tensile Strength (UTS)
Rp0.2 = Yield Strength 0.2 offset
Rp1.0 = Yield Strength 1.0 offset

COMMENTS

Product supplied under a QA Programme fulfilling the EN ISO 9001 standard.
This certificate is produced electronically.
Please refer any queries to:
ESAB Group (UK) Ltd, Warlies Park House Horseshoe Hill, Upshire, Essex, EN9 3SL +44 1992-768515

Validation

Josef Moravek Quality Manager

Per Ake Bjornstedt Product Manager

MC - 423857 - 01

ROLDAN, S.A. - Stainless Steels

FACTORY

Santo Tomás de las Ollas, S/N
Apdo. de Correos 11
PONFERRADA (LEÓN)
TEL.: +34 987 44 61 00
FAX: +34 987 44 61 01
E-MAIL: rdn_fabrica@acerinox.com

HEAD OFFICE

Santiago de Compostela, 100-3°
28035 MADRID (ESPAÑA)
TEL.: +34 913 98 52 57
FAX: +34 913 98 51 93
E-MAIL: roldan@acerinox.com

INSPECTION CERTIFICATE
EN 10204 3.1

Z01 Declaration: the Product is in compliance with the order

MADE IN SPAIN - EUROPEAN UNION

TÜVRheinland CERTIFICADO

Sistema de Gestión
ISO 9001:2015
ISO 14001:2015
ISO 50001:2018

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ID 0091003143

CE
0432
11
0432-CPR-00190-01

EN 10.088:5

CERTIFICATE N° 2024/005201	DATE 30/04/2024	SHEET 1	DELIVERY NOTE N° 2024/000921

GRADE ROLDAMAX-339 EN10088:3 (1.4401/1.4404.)

CUSTOMER THE METAL CENTRE

DIMENSIONS 35,00 mm. | Surface finish according EN10088-3 Table 7:2H

LENGTH 3.100 mm. TOLERANCE ISO h10

PRODUCT [231] Round bar, annealed, smooth turned, polished, one side chamfered 45°

REQUIREMENTS EN10088:3 CUSTOMER ORDER P00019346MC/May

TENSILE TEST EN ISO 6892-1

ACCORDING TO EN 10272 EDITION AD2000 W0, W2 & W10

INTERGRANULAR CORROSION EN ISO 3651-2 method A: SATISFACTORY WITHOUT OBJETIONS

SURFACE AND DIMENSIONS CONTROL WITHOUT OBJECTIONS Spektrometrical Identity Test: O.K.

IMPACT TEST, SAMPLE DIMENSIONS EN ISO 148-1 MATERIAL FREE FROM RADIOACTIVITY

ORDER N°	WORKS N°	MARKS / BOX	HEAT NUMBER	SAMPLE	WEIGHT
MA10356 11	T312404 19 3	56008 / RK55872	3LTV	3LTV	544

PRODUCTION PROCESS

EAF + AOD +CC

TRADE MARK

RDN

MARKING

HEAT NUMBER

GRADE (ACX-339)

INSPECTOR STAMP

R3

QUALITY INSPECTOR

JUAN JOSE ALVAREZ RODRIGUEZ

QUALITY CONTROL REPRESENTATIVE

MECHANICAL PROPERTIES

CAST	SAMPLE	SAMPLE DIMENSIONS mm.	Observ. T°.	Rm MPa	Rp 0,2% MPa	Rp 1% MPa	Z %	A % L=5D	A % L=4D	Agt %	IMPACT STRENGHT ISO-V (J) 20°C	IMPACT STRENGHT ISO-V (J) -196°C		HARDNESS HB	FATIGUE TEST	BEND TEST	CROSS SECTIONAL AREA mm²	Kg / m
3LTV	3LTV	20,00	20°C	629	323	381	68	48	49					160				
REQUIREMENTS		EN ISO 377		500 900	200	235		20			100			315				

CHEMICAL COMPOSITION %

CAST	C	P	S	Si	Mn	Cr	Ni	Mo	Ti	N	Cu	Co			
3LTV	0,0220	0,0330	0,0240	0,3650	1,4970	16,7300	10,3500	2,0300	0,0050	0,0300	0,4400	0,2070			
REQUIREMENTS	0,0300	0,0450	0,0300	1,0000	2,0000	16,5000 18,5000	10,0000 13,0000	2,0000 2,5000		0,1000					

OBSERVATIONS

AISI 316/316L. UNS S31600/S31603. ASTM/ASME A/SA-182 grade F316/F316L, A/SA-193 class 1 grade B8M, A/SA-276 condition A, A/SA-320 class 1 grade B8M, A/SA-479 condition A. AMS 5648. AMS 5653. AMS QQ-S-763 condition A. NACE MR0175 & MR0103. ASME BPVC section II partA. ASTM A-262 practice E: OK.
Material tested with crack detection, operating on the basisof the eddy current method.
No weld or weld repair on the material.

CER_IN4

OTHER TEST RESULTS | REQUIREMENTS AD2000 W0,W2,W10|2014/68/EU(PED)|UKCA PER 2016/1105

HEAT TREATMENT 1.050 °C AND WATERCOOLED | Crack tested acc. to EN10277 table 3 class 3 (Eddy current)

Emerson Automation Solutions
St. Emerson 4, Industrial Park Tetarom 2
Cluj Napoca, 400638 ROMANIA

Material Certificate of Conformance - consistent with "type 3.1" ISO 10474:2013 / EN 10204:2004

Customer Information	**Manufacturer Information**
Name: COES SRL **PO**: 2055/24	**Sales Order**: 39415178 **Line/Unit**: 4
Device Information **Device Type**: Coplanar Pressure Transmitter **Serial #**: 24CLPC0044345 **Model #**: 2051CD2A02A1KS5E1M5D4T1Q4Q8HR7	
Permanent Tag Information 63-FIT-051	**Wire-on Tag Information**

Attached Models

0305RC52B11

Heat / Assembly #	Heat / Assembly # Description
07K2A86-01-01	Isolator
902856	Manifold Body
YVEV23A	Module Housing

This is to certify that materials as manufactured, assembled and shipped by Emerson for this order are in accordance with the material section as specified on the applicable Emerson drawings. Test reports from Emerson suppliers are attached.

Mihai Blaga
Measurement Solutions Quality Manager

MATERIAL CERTIFICATION

Ulbrich
We Deliver Precision™
USSM/UNE
1 Dudley Avenue
Wallingford, CT 06492 USA
Tel: 203-239-4481
or 800-243-1676
Fax: 203-239-7479
CORPORATE OFFICE
153 Washington Avenue
North Haven, CT 06473 USA

LOAD NUMBER	SHIP DATE		WORK ORDER	SALES ORDER	CUSTOMER PO
00240977	26-Sep-2023	ULBRICH SPECIALTY STRIP MILL	U64400	101-065098 - 1	60441

SOLD TO: Klesk Metal Stamping Company
1124 Stinson Blvd NE
Minneapolis, MN 55413-3001
USA

CUSTOMER NBR: 002012-000

PS#15904 LJP 10/10/23
Lot#16741

SHIP TO: Klesk Metal Stamping Company
1124 Stinson Blvd NE
Minneapolis, MN 55413-3001

PART DESCRIPTION	QTY SHIPPED	U/M
Material Type: 316 Low Carbon Nuclear Grade Stainless Steel	260.20	LBS

MATERIAL TESTS NOT COVERED WITHIN NADCAP OR ISO/IEC 17025 SCOPE OF ACCREDITATION.
THE RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THE CERTIFICATION MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL LAW.

ULBRICH PART NBR: S316LN-00100AN#2-002
CUST PART NBR: C09851-0024CPM

CUSTOMER SPECS / SPECIFICATIONS

CHEMISTRY OVECHECK PERFORMED AT .062" GAUGE BY DIRATS LABORATORIES 41 AIRPORT ROAD PO BOX 39
WESTFIELD, MA 01086-0039
REPORT NUMBER R741137

PRODUCT DESCRIPTION (AS SHIPPED)

Material Type: 316 Low Carbon Nuclear Grade Stainless Steel
Gauge: 0.00100" Gtol+: 0.00010" Gtol-: 0.00010"
Width: 1.5000" Wtol+: 0.00500" Wtol-: 0.00500"
Temper: AN Edge: 3S-#3 Slit Finish: #2
Camber Max: 0.250" per 8 feet

Customer Specifications

ASTM A240-24 W/EXC, EN 10204 3.1
C09851-0024 Rev AW w/exc
PS-58 Rev. 1 w/exc.
PS 25 REV 1 w/exc

Chemical Analysis (Wt. %) - HEAT NO. 07K2A86-01-01

Al	B	C	Cr	Co	Cu	Mn	Mo	Ni	N	P
.024	.0019	.014	16.30	.002	.02	1.53	2.10	10.21	.085	.007

Si	S
.460	.002

PMI TESTED
SJ 10.10.23

Mill Source

Country of Origin	Mill Source
USA	Allegheny

Mechanical Properties Room Temperature

TEST	UNITS	RESULTS	HIGH	LOW
Tensile, psi	PSI	90200		
Yield, psi	PSI	43100		
Elongation, %	Percent	25.8		
Hardness		86		
Hardness Scale		HRB		

DATE RECD 10/5/23 LJP
DATE CNTD 10/10/23 LJP

Received 20 Coils @ 258.69# = 594,728" LJP 10/10/23

This material is free from mercury contamination. All converted hardness values must be considered approximate based on ASTM E140 and may be inaccurate for specific application. This material Certification is only valid when signed by an authorized quality representative.
Material conforms to the above referenced specifications / requirements.
Tested to Ulbrich Quality Procedures
Certification Can Not Be Replicated Except In Full

NET WEIGHT SHIPPED 260.20 LBS

SIGNED:
TITLE: John Mel
Quality Manager
DATE: 05-Jun-2024
APPROVED BY: YR

Subject to Ulbrich Steel's terms and conditions: https://www.ulbrich.com/terms-conditions
Pricing and surcharge are subject to announced increases, changes, and governmental laws such as imposed duties and tariffs.
Subject to applicable surcharges at time of shipment: https://www.ulbrich.com/surcharges/

Abnahmeprufzeugnis

INSPECTION CERTIFICATE

Art des Zeugnisses :
Certificate Type : EN 10204/3.1

Unsere Auftragsnummer Our Sales OrderNo	111269	Rechnungsnummer Invoice No.	4240854	Nummer des Zertifikates Certificate No.	2017-61277
Ihre Auftragsnummer Customer Order No.	182896	Rechnugsdatum Invoice Date	15-12-2023	Datum Date	16-12-2023

Kunde
Customer

Armaturenfabrik Franz Schneider Gmbh + Co. KG
Bahnhofplatz 12 74226 Nordheim
DEU

Markenname
Trade Mark **AIL**

Inspektionszeichen
Inspector,s Mark : **AIL1**

Materialeigenschaften Material Details	**Stainless Steel Flat CD Cold Drawn Sol. Ann**				
Werkstoff Steel Grade	316 / 316L / 1.4401 / 1.4404	Form Shape	Flat CD	Abmessung Size	2-1/2"X1-1/4" inch
Charge Heat No.	902856	Toleranz Tolerance	-0/+0.20 mm	Stablange Length Of Bars	3.000-3.200 meter
Nettogewicht Net Weight	13.601 MT	Anzahl der Stable Number Of Bars	269	Schmelzverfahren Melting Process	EF/AOD/MEMS.
Bundnummer Bundle Nos	3013013,3013015,3013016,3013017,3013018,3013019,3013020,3013021,3013022,3013023,3013024,3013026,3013027,3013028,3013029,3013033,3013030,3013034,3013035,3013036,3013037,3013038,3013039,3013040,3013041,3013042,3013045				
Anforderugen Requirements	AD 2000 MARKBLATT W10 DIN EN 10272:2016	AD 2000 MARKBLATT W2 NACE MR 0103:2015	ASME SA 479:2021 NACE MR 0175 / ISO 15156:2020	ASTM A 479:2023	

Chemische Analyse / Chemical Analysis %

Element	C	Si	Mn	P	S	N2	Cr	Ni	Mo								
Min							16.5000	10.0000	2.0000								
Max	0.0300	1.0000	2.0000	0.0450	0.0300	0.1000	18.0000	13.0000	2.5000								
Obs	**0.0200**	**0.3800**	**1.6600**	**0.0430**	**0.0260**	**0.0860**	**16.6700**	**10.0600**	**2.0600**								

Mechanische Werte / Mechanical Properties

	YS/(Rp 0.2%) (N/mm2) ISO 6892-1:2019	UTS (N/mm2) ISO 6892-1:2019	% Bruchdehnung % Elongation ISO 6892-1:2019	% Brucheinschnur % Reduction Area ISO 6892-1:2019	Harte Hardness (HRC) ISO 6506-1:2014	Kerbschagbiegevesuch nach charpy V notch (Langs) Charpy Impact V Notch (Longitudnal) (Joules) EN 1SO 148-1:2016				
Min.	205.00	515.00	40.00	40.00		Temp. Gradi Temp.Deg	Resultate Result			
Max.		700.00			22.00	C	1	2	3	Avg.
Resultate Result	**394.62**	**680.66**	**48.00**	**68.00**	**20.00**					

Warmebehandlung / Heat Treatment :
Solution Annealed @ 1050°C. Soaking for 1hr-20mins & Water Quenching.

Bemerkungen / Remarks

- Ursprungsland Indien / Country of origin India
- Name des Herstellers und Schmelznummer des eingesetzten Stranggussknüppels - Avtar A-7720 / Name of the manufacturer and melting number of the continuous casting billet used - Avtar A-7720
- Herstellungsland der Schmelze: Indien / Melt manufacturing country: India
- Zolltarif - Unterposition des durchgehenden Knüppels: 721899 / Customs tariff - subheading of continuous billet: 721899
- Warmgewalzt und kaltbearbeitet : Aamor Inox Ltd (Indien) / Hot rolled and cold worked: Aamor Inox Ltd (India)
- Frei Von Radioaktivitat-Verifiziert durch ein Gammastrahlenspektrometer / Free from radioactivity - verified by a gamma ray spectrometer
- Frei Von Quecksilber / Mercury free
- Gefugeuntersuchung(Mikro & Makro Test) mangelfrei / Structural examination (micro & macro test) free of defects
- Es wurden keine SchweiBarbeiten am Material durchgefuhrt / No welding work was carried out on the material
- Visuelle Begutachutung und Mabkontrolle - OK / Visual inspection and size control - OK
- IGC Test:ASTM A 262:2015 PRACTICE E :ok / IGC Test:ASTM A 262:2015 PRACTICE E:ok
- Identitatsprufung durch portable Spektrometer, basierend auf Rontgenstrahl / Identity verification using portable spectrometers based on X-rays

Das Material enthält keine Stahlprodukte mit Ursprung in Russland, das in Anhang XVII der Verordnung (EU) Nr. 833/2014 aufgeführt ist und weitere Änderungen aufgeführt sind

The material does not contain steel products originating in Russia, which is listed in Annex XVII to Regulation (EU) No. 833/2014 and other amendments are listed

Wir bestatigen die Ubereinstimmung mit den Vorgaben der Bestellung
We confirm that the material is manufactured & supplied in accordance to the Purchase Order

QA Head/NDT Inspector
AAMOR INOX LIMITED

Aamor Inox Limited

A-30, Site IV, UPSIDC Industrial Area, Sahibabad, Ghaziabad 201010, Uttar Pradesh, India, Tel: +91 120 4564585 / 86
Email:- info@aamorinox.com, Website:- www.aamorinox.com

Abnahmeprufzeugnis

INSPECTION CERTIFICATE

Art des Zeugnisses :
Certificate Type : EN 10204/3.1

Unsere Auftragsnummer Our Sales OrderNo	111269	Rechnungsnummer Invoice No.	4240854	Nummer des Zertifikates Certificate No.	2017-61278
Ihre Auftragsnummer Customer Order No.	182896	Rechnungsdatum Invoice Date	15-12-2023	Datum Date	16-12-2023

Kunde
Customer

Armaturenfabrik Franz Schneider Gmbh + Co. KG
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DEU

Markenname
Trade Mark **AIL**

Inspektionszeichen
Inspector,s Mark : **AIL1**

Materialeigenschaften Material Details	Stainless Steel Flat CD Cold Drawn Sol. Ann				
Werkstoff Steel Grade	316 / 316L / 1.4401 / 1.4404	Form Shape	Flat CD	Abmessung Size	2-1/2"X1-1/4" inch
Charge Heat No.	902856	Toleranz Tolerance	-0/+0.20 mm	Stablange Length Of Bars	3.000-3.200 meter
Nettogewicht Net Weight	3.639 MT	Anzahl der Stable Number Of Bars	72	Schmelzverfahren Melting Process	EF/AOD/MEMS.
Bundnummer Bundle Nos	3013046,3013047,3013048,3013049,3013051,3013052,3013066,3013067				
Anforderugen Requirements	AD 2000 MARKBLATT W10 DIN EN 10272:2016	AD 2000 MARKBLATT W2 NACE MR 0103:2015	ASME SA 479:2021 NACE MR 0175 / ISO 15156:2020	ASTM A 479:2023	

Chemische Analyse / Chemical Analysis %

Element	C	Si	Mn	P	S	N2	Cr	Ni	Mo								
Min							16.5000	10.0000	2.0000								
Max	0.0300	1.0000	2.0000	0.0450	0.0300	0.1000	18.0000	13.0000	2.5000								
Obs	0.0200	0.3800	1.6600	0.0430	0.0260	0.0860	16.6700	10.0600	2.0600								

Mechanische Werte / Mechanical Properties

	YS/(Rp 0.2%) (N/mm2) ISO 6892-1:2019	UTS (N/mm2) ISO 6892-1:2019	% Bruchdehnung % Elongation ISO 6892-1:2019	% Brucheinschnur % Reduction Area ISO 6892-1:2019	Harte Hardness (HRC) ISO 6506-1:2014	Kerbschagbiegevesuch nach charpy V notch (Langs) Charpy Impact V Notch (Longitudnal) (Joules) EN ISO 148-1:2016				
Min.	205.00	515.00	40.00	40.00		Temp. Gradi Temp.Deg	Resultate Result			
Max.		700.00			22.00	C	1	2	3	Avg.
Resultate Result	394.62	680.66	48.00	68.00	20.00					

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Solution Annealed @ 1050°C. Soaking for 1hr-20mins & Water Quenching.

Bemerkungen / Remarks

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- Herstellungsland der Schmelze: Indien / Melt manufacturing country: India
- Zolltarif - Unterposition des durchgehenden Knüppels: 721899 / Customs tariff - subheading of continuous billet: 721899
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- Frei Von Quecksilber / Mercury free
- Gefugeuntersuchung(Mikro & Makro Test) mangelfrei / Structural examination (micro & macro test) free of defects
- Es wurden keine SchweiBarbeiten am Material durchgefuhrt / No welding work was carried out on the material
- Visuelle Begutachutung und Mabkontrolle - OK / Visual inspection and size control - OK
- Identitatsprufung durch portable Spektrometer, basierend auf Rontgenstrahl / Identity verification using portable spectrometers based on X-rays
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Wir bestatigen die Ubereinstimmung mit den Vorgaben der Bestellung

We confirm that the material is manufactured & supplied in accordance to the Purchase Order

QA Head/NDT Inspector
AAMOR INOX LIMITED

Aamor Inox Limited

A-30, Site IV, UPSIDC Industrial Area, Sahibabad, Ghaziabad 201010, Uttar Pradesh, India, Tel: +91 120 4564585 / 86
Email:- info@aamorinox.com, Website:- www.aamorinox.com

INSPECTION CERTIFICATE 合格证

Xi'an HaoSen Precision Casting Co.,Ltd.
Tel:(029)-89080114
西安皓森精铸股份有限公司
No. 28, Lantian 1 Road,National Aviation Hi-TECH Industrial Base,Yanliang District Xi'an Shaanxi Province China
公司地址：陕西省西安市国家航空高技术产业基地蓝天一路28号

Cert NO．(0777)20240612 编号：QF-Z-367 版本REV：1

Order No. 订单号		Quantity 数量	
Manufacturer 制造商	Xi'an HaoSen 西安皓森	Customer 客户	G-Tek时硕科技（西安）有限公司
Part No. 零件号	03031-0777-0002(AM)	Description 名称	MODULE HOUSING, INVESTMENT CAST
Material 材料	CF-3M Per ASTM A743M(REV:2021)	Heat Treatment 热处理	Solution Annealed Per ASTM A743M(REV:2021)

Chemical Analysis 化学成分分析报告

Heat No 浇铸炉次号	Date 日期	标准要求(Standard) %C 0.03 max	%Si 1.50 max	%S 0.015～0.025	%P 0.04 max	%Mn 1.50 max	%Ni 9.00～13.00	%Cr 17.00～21.00	%Mo 2.00～3.00	Ratio ＞1.2	Result
YVEV23A	2024/6/1	0.026	0.571	0.019	0.039	1.080	10.052	19.049	2.155	1.316	OK
YVEV23B	2024/6/1	0.023	0.597	0.018	0.039	1.076	9.920	18.632	2.221	1.317	OK
YVEV23C	2024/6/1	0.026	0.572	0.019	0.039	1.113	10.025	18.890	2.228	1.313	OK
YVEV23D	2024/6/1	0.023	0.564	0.018	0.038	1.022	10.139	19.025	2.152	1.317	OK
YVEV23E	2024/6/1	0.023	0.566	0.017	0.038	1.023	10.086	18.932	2.191	1.319	OK
YVEV23F	2024/6/1	0.024	0.589	0.019	0.038	1.119	10.023	18.894	2.193	1.318	OK

Mechanical Properties 机械性能报告

Heat Treatment Code 热处理炉批号	Date 日期	Tensile Strength бb(≥485Mpa) 抗拉强度	Yield Strength бs(≥205Mpa) 屈服强度	Elongation б(≥30%) 延伸率	Hardness (HRB≤85) 硬度
YVEV23A-F	2024/6/11	524.0	273.0	49.0	80.5

Result: We certify that the above test report is in compliance with 3.1.b per ISO 10474 and 3.1 EN10204.
The products are qualified after radiation elements inspection.

Issued in agreement with TÜV SÜD Industrie Service GmbH (10.2021).

Marking:Manufacturer,Material grade,Material standard,Heat treatment code,Size.

我们谨证明以上材料测试报告为依据检验证书标准ISO 10474 3.1.b和EN10204 3.1所开具，本产品经过辐射元素检测合格。

Inspector (Name & Sig.)： Sun Dali Date： 2024-06-11

QC Supervisor (Name & Sig.): Zhang Xiangfeng Date： 2024-06-11



Country of Melt _China __ and **Country of Pour__China __**

Inspection certificate according to EN 10204 - 3.1
Abnahmeprüfzeugnis nach EN 10204 - 3.1

Customer: *Kunde:*	**COES SRL VIA PONTIDA 265 IT 24040 STEZZANO**	Certificate No. *Zeugnis-Nr.*	**01353933**
		Date *Datum*	**31.07.2024**

Customer order number *Kundenbestellnummer*	**2153/24**	Customer Part. No. *Kunden Artikel-Nr.*		order date *Bestelldatum*	**28.06.2024**

Order No. / Item *Auftrags-Nr. / Pos.*	**S000346021/1**	Part No. *Artikel-Nr.*	**57497031**	Quantity *Menge*	**8,00**
Model *Typ*	**233.30**			Scale range *Anzeigebereich*	**0...16 bar**
Serial number *Seriennummer*	**[1*]**			Class *Klasse*	**1.0**
Tag No. *Messstellen-Nr.*	**[2*]**				

RESTAMPING CERTIFICATE

Restamping is done with prior approval by a notified body, in accordance with the existing valid agreement and in conjunction with the periodic inspection certificate for proper restamping.

For wetted, metallic components, we have only used materials with a certificate of inspection in accordance with EN 10204 para. 3.1. The corresponding certificates of inspection of our suppliers or a notified body are applicable. These are as follows:

UMSTEMPEL-BESCHEINIGUNG

Das Umstempeln erfolgt mit der Zustimmung einer benannten Stelle gemäß vorliegender gültiger Vereinbarung in Verbindung mit der Bescheinigung über die wiederkehrende Prüfung der ordnungsgemäßen Umstempelung.

Für medienberührte, metallische Bauteile wurden ausschließlich Werkstoffe eingesetzt, die ein Abnahmeprüfzeugnis nach EN 10204 Ziffer 3.1 besitzen. Hierfür gelten die entsprechenden Abnahmeprüfzeugnisse unserer Vorlieferanten bzw. einer benannten Stelle. Es sind dies:

End piece / ENDSTUECK

vendor / Lieferant	**KMW Parth GmbH DE 74722 Buchen**
Material / Material	**1.4404/316L**
charge / Charge	**3KNP**
Code / Code	**897EN - 72**
Marking / Kennzeichnung	**PO00308526**

WIKA Polska sp. z o. o. SGF sp. k.
ul. Kawka 6
87-800 Włocławek
Poland

Phone :+48 54 42 21 300

E-Mail: info@wika.de
Internet: www.wika.com

Inspection certificate according to EN 10204 - 3.1
Abnahmeprüfzeugnis nach EN 10204 - 3.1

Customer: / *Kunde:*
COES SRL
VIA PONTIDA 265
IT 24040 STEZZANO

Certificate No. / *Zeugnis-Nr.* **01353933**

Date / *Datum* **31.07.2024**

Measuring element / MESSGLIED

vendor / Lieferant	**Zwahlen & Mayr SA** **CH 1860 Aigle**
Material / Material	**1.4404/316L**
charge / Charge	**Y211108C31**
Code / Code	**897RPB - 93**
Marking / Kennzeichnung	**PO00282100**

Socket / FEDERTRAEGER

vendor / Lieferant	**Aceros Inoxidables Olarra, S.A.** **ES 48180 LOIU**
Material / Material	**1.4404/316L**
charge / Charge	**539395**
Code / Code	**897VO - 236**

[1*]
8975QOD3 # 8975QOD4 # 8975QOD5 # 8975QOD6 # 8975QOD7 # 8975QOD8 # 8975QOD9 # 8975QODA

[2*]
63-PI-053 # 63-PI-055 # 63-PI-057 # 63-PI-059 # 63-PI-063 # 64-PI-054 # 64-PI-055 # 64-PI-058

Inspection Representative / *Abnahmebeauftragter* **(GA)** **Paweł Golasiński**

The inspection certificate was created electronically and is hereby validated by named inspection representative. This document is valid without signature.
Dieses Abnahmeprüfzeugnis wurde elektronisch erstellt und wird hiermit vom genannten Abnahmebeauftragten bestätigt. Das Dokument gilt ohne Unterschrift.

WIKA Polska sp. z o. o. SGF sp. k.
ul. Kawka 6
87-800 Włocławek
Poland

Phone :+48 54 42 21 300

E-Mail: info@wika.de
Internet: www.wika.com

WIKA-Code: 897EN72
durch: RypinsB, 16.04.2024

VOGEL-BAUER
EDELSTAHL MIT SERVICE

VOGEL-BAUER EDELSTAHL GmbH & Co. KG · Focher Straße 181 · 42719 Solingen

KMW Parth GmbH

Siemensstraße 21

74722 Buchen

Bestellnummer *Your order number / N° de commande client*	:	BS240289
Bestelldatum *Order date / Date de commande*	:	13.03.2024
Kundenartikelnr. *Customer article number / N° d´article client*	:	4110008
Ihre Kundennr. *Your customer number / Votre numéro de client*	:	15296
Unsere Lf.Nr. *Our number of delivery note / Notre N° d´avis de livraison*	:	
Auftragsnummer *Order number / N° de commande*	:	2413346/1
LieferscheinNr. *Number of delivery note / N° d´avis de livraison*	:	518732
Datum *Date / Date*	:	21.03.2024

Auszug aus dem Abnahmeprüfzeugnis nach DIN EN 10204-3.1 gemäß folgender Coil-/Chargenr.

Abstract of mill certificate EN 10204-3.1 / Extrait du certificat de reception EN 10204-3.1
According to the following Coil n. and Heat n. / Conformément aux dispo. suivantes N° de bobine et N° de coulée

Dicke mm: *Thickness / Epaisseur*	1,00 *+0,070/-0,070*	Qualität: *Quality / Qualité*	1.4404 / 2B	Coilnummer: *Coil n. / No de bobine*	033KNP
Breite mm: *Width / Largeur*	22,00 *+0,30/-0,00*	Gewicht kg: *Weight / Poids*	1.148,00	Chargenr.: *Heat n. / No de coulée*	3KNP
Länge mm: *Length / Longueur*	0,00	Stückzahl: *Number of pieces / Nombre de pièces*	14	Mat.-Nr.*: *Material number / N° d'article*	6157967

Anforderung Mechanische Werte / Required mechanical Properties / Exigé Proprietes Mecaniques		
Streckgr.(ReH): *Yield strength / Limite d`élasticité*	Zugfest.(Rm): 530 - 680 N/mm² *Tensile strength / Résistance à la traction*	Bruchdehnung A 80 >= 35,0 % *Elongation after fracture / Allongement après rupture*
Rp 0,2 %: 240 - 0 N/mm²	Rp 1,0 %: >= 270 N/mm²	

Ergebnisse Mechanische Werte / Results mechanical properties / Résultats propriétes mecaniques		
Streckgr.(ReH): *Yield strength / Limite d`élasticité*	Zugfest.(Rm): 608 / N/mm² *Tensile strength / Résistance à la traction*	Bruchdehnung A 80 : 57,3 / % *Elongation after fracture / Allongement après rupture*
Rp 0,2 %: 310 / N/mm²	Rp 1,0 %: 342 / N/mm²	Korn (ASTM): 8,8 / *Granulation / Grain size*
Härte (): *Hardness / Dureté*	Rauhigkeit (Ra): *Roughness / Rugosité*	

Chemische Analyse in % / Chemical analysis expressed as a percentage / Analyse chimique en pour cent
Vorgabewert in () / Default value () / Vaut handicap ()

C : 0,024 (0,000-0,030)	Si : 0,288 (0,000-1,000)	Mn: 1,313 (0,000-2,000)	P : 0,031 (0,000-0,045)
S : 0,001 (0,000-0,015)	Al :	Cr : 16,825 (16,500-18,500)	V :
Nb:	Ti :	N : 0,037 (0,000-0,100)	Cu:
Ni : 10,185 (10,000-13,000)	Mo: 2,087 (2,000-2,500)	Co:	

- Wir bestätigen, daß die obigen Angaben dem Abnahmeprüfzeugnis/Werkzeugnis des Herstellers entnommen wurden. Diese Materialbescheinigung wurde per EDV erstellt und ist gemäß EN 10204 ohne Unterschrift gültig.
- *We confirm that the above information from the mill certificate from manufacturer were taken. This material certificate was created by computer and is valid according to EN 10 204 without a signature.*
- *Nous confirmons que les informations ci-dessus de certificat de réception du constructeur ont été prises. Ce certificat matériel a été créé par ordinateur et est valable selon la norme EN 10 204 sans signature.*

V O G E L - B A U E R
Dipl.Ing. Gerald Vogel
(Abnahmebeauftragter / inspectionrepresentative / responsable d`inspection de contrôle)

* Mat-Nr: 6.157.968

ACERINOX EUROPA
FABRICA DEL CAMPO DE GIBRALTAR
PALMONES (LOS BARRIOS)
TFNO. (34) - 956 62 93 00
FAX (34) - 956 62 93 11
P.O. BOX 83
11370 LOS BARRIOS (CADIZ)
ESPAÑA

by Accredited Body

INSPECTION CERTIFICATE
ABNAHMEPRÜFZEUGNIS 3.1

ACCORDING TO GEMÄSS: EN 10204

CERTIFICATE Nº ZEUGNIS NR.: F0 2024 3711 10002*

CUSTOMER KUNDE	OUR ORDER Nº UNSERE AUFT	YOUR ORDER Nº IHRE BESTELL	TRADE MARK STEMPEL DES HERSTELL	INSPECTOR'S STAMP STEMPEL DES WERKSSACHVERSTÄNDIGEN	STEELMAKING PROCESS HERSTELLUNGSPROZESS
VOGEL BAUER KG Facher Str. 181 SOLINGEN 42719 ALEMANIA	MA 31716	733.294 / Feb.24 u.V.	ACERINOX	4511	A.O.D.

REQUIREMENTS ANFORDERUNGEN	INTERGRANULAR CORROSION INTERKRISTALLINE KORROSION	GRADE WERKSTOFF		FINISH AUSFÜHRUNG
EN 10028-7/TRD 100/AD-2000-MERKBLATT W0/W2/W10 PED2014/68/EU	EN ISO 3651-2	Acx 240	1.4404/1.4401	2B
EN 10088-2:2014	EN ISO 3651-2	Acx 240	1.4401	2B
ASTM A240Ed23/A480Ed23-ASME SecIIA SA240/SA480Ed23	ASTM-A-262 PRACTICA E	Acx 240	316	2B
EN 10088-2:2014	EN ISO 3651-2	Acx 240	1.4404	2B
ASTM A240Ed23/A480Ed23-ASME SecIIA SA240/SA480Ed23	ASTM-A-262 PRACTICA E	Acx 240	316L	2B

COIL / BOX COIL/KISTE	CONTENT INHALT	DIMENSIONS (mm) ABMESSUNGEN THICKNESS DICKE	WIDTH BREITE	LENGTH LÄNGE	MARKS POS.	QUANTITY STÜCKZAHL	TEST Nº PROBE NR.
033KNP 1	033KNP 1	1,000	625,00		1	1	033KNP C
033KNP 2	033KNP 2	1,000	625,00		2	1	033KNP C

CHEMICAL ANALYSIS / CHEMISCH ZUSAMMENSETZUN

HEAT Nº SCHMELZE NR	C	CR	MN	MO	N	NI	P	S	SI
3KNP	0,024	16,825	1,313	2,087	0,037	10,185	0,031	0,001	0,288

MECHANICAL PROPERTIES / MECHANISCHE EIGENSCHAFTEN

TEST Nº PROBE N.	PROBE SIT	PROBE TYPE	Rm N/mm2	Rp 0.2 N/mm2	Rp 1.0 N/mm2	A50 %	A80 %	G.S.	HB
033KNP	C	T	608,32	310,29	342,06	54,25	57,25	8,80	148,00
033KNP	F	T							150,00

REMARKS / BEOBACHTUNGEN

Spectrochemical identity test O.K.
Heat treatment: 1050-1100ºC.
Cooling with air.
Issued in agreement with TÜV SÜD Industrie Service GmbH (02/1983).
The delivery is in accordance with the order
Temperatura de hipertemple entre 1050 y 1100 ° C.
NACE-MR0175/ISO 15156-3:2015;NACE MR0103:2012/ISO 17945:2015 (Chem & Mech only).
Melted and transformed in Spain

SURFACE AND DIMENSIONAL CONTROL
OBERFLÄCHEN- UND ABMESSUNGSKONTROLLE

SATISFACTORY
OHNE BEANSTANDUNG

WORK INSPECTOR
WERKSSACHVERSTÄNDIGER

p.o. A. Heredia

A. Her

Palmones, 31

WIKA-Code: 897EN72
durch: RypinsB, 16.04.2024

FDT0009

Analyse: 31196 MatNr.: 301923

Analyse: 31196 MatNr.: 301923

9

ACERINOX EUROPA
FABRICA DEL CAMPO DE GIBRALTAR
PALMONES (LOS BARRIOS)
TFNO. (34) - 956 62 93 00
FAX (34) - 956 62 93 11
P.O. BOX 83
11370 LOS BARRIOS (CADIZ)
ESPAÑA

ISO 9001 · ISO 14001 · OHSAS 18001 · ISO 50001 MANAGEMENT SYSTEMS CERTIFIED
ACERINOX
by Accredited Body

INSPECTION CERTIFICATE
ABNAHMEPRÜFZEUGNIS 3.1

ACCORDING TO / GEMÄSS: EN 10204

CERTIFICATE Nº / ZEUGNIS NR.: F0 2024 3711 30001 7

CUSTOMER / KUNDE
VOGEL BAUER KG
Focher Str. 181
SOLINGEN 42719
ALEMANIA

OUR ORDER Nº / UNSERE AUFT: MA 31716

YOUR ORDER Nº / IHRE BESTELL: 733.294 / Feb.24 u.V.

TRADE MARK / STEMPEL DES HERSTELL: ACERINOX

INSPECTOR'S STAMP / STEMPEL DES WERKSSACHVERSTÄNDIGEN

STEELMAKING PROCESS / HERSTELLUNGSPROZESS: A.O.D.

REQUIREMENTS / ANFORDERUNGEN	INTERGRANULAR CORROSION / INTERKRISTALLINE KORROSION	GRADE / WERKSTOFF		FINISH / AUSFÜHRUNG
ASTM A240Ed23/A480Ed23-ASME SecIIA SA240/SA480Ed23	ASTM-A-262 PRACTICA E	Acx 240	316L	2B

COIL / BOX / COIL/KISTE	CONTENT / INHALT	DIMENSIONS (mm) / ABMESSUNGEN: THICKNESS / DICKE	WIDTH / BREITE	LENGTH / LÄNGE	MARKS / POS.	QUANTITY / STÜCKZAHL	TEST Nº / PROBE NR.
033KNP 1	033KNP 1	1,000	625,00		1	1	033KNP C
033KNP 2	033KNP 2	1,000	625,00		2	1	033KNP C

CHEMICAL ANALYSIS / CHEMISCH ZUSAMMENSETZUN

HEAT Nº / SCHMELZE NR	C	CR	MN	MO	N	NI	P	S	SI
REQUIREMENTS / ANFORDERUNGEN	0,030	16,000 18,000	2,000	2,000 3,000	0,100	10,000 14,000	0,045	0,030	0,750
3KNP	0,024	16,825	1,313	2,087	0,037	10,185	0,031	0,001	0,288

MECHANICAL PROPERTIES / MECHANISCHE EIGENSCHAFTEN

TEST Nº / PROBE N.	PROBE STT	PROBE TYPE	Rm N/mm2	Rp 0.2 N/mm2	A50 %	HB
REQUIREMENTS / ANFORDERUNGEN			485,00	170,00	40,00	217,00
033KNP	C	T	608,32	310,29	54,25	148,00
033KNP	F	T				150,00

REMARKS / BEOBACHTUNGEN

Temperatura de hipertemple entre 1050 y 1100 º C.
The delivery is in accordance with the order
NACE-MR0175/ISO 15156-3:2015;NACE MR0103:2012/ISO 17945:2015
(Chem & Mech only).
material complies ASTM A666
Melted and transformed in Spain

SURFACE AND DIMENSIONAL CONTROL / OBERFLÄCHEN- UND ABMESSUNGSKONTROLLE

SATISFACTORY
OHNE BEANSTANDUNG

WORK INSPECTOR / WERKSSACHVERSTÄNDIGER

p/p A. Heredia

A. Heredia

Palmones, 31 Enero 2024

WIKA-Code: 897EN72
durch: RypinsB, 16.04.2024

FDT0009

ZWAHLEN & MAYR
ZM TUBES

Z.I. 2, CH-1860 **AIGLE**
Tel. ++41-(0)24-468 46 46
Fax ++41-(0)24-468 46 01

* DER TÜV SUDWEST HAT MIT SCHREIBEN VOM 3 NOVEMBER 1992 AUF DIE GEGENZEICHNUNG VERZICHTET

INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION
ABNAHMEPRÜFZEUGNIS

EN 10204 - 3.1
N° **230299 A**

SHEET / PAGE / SEITE 1 OF / DE / VON 1

Certified ISO 9001
LRQA n° 943175
Quality System Management

CONFIRMATION N°: / AUFTRAGS N° **13230**

CUSTOMER: / CLIENT/ KUNDE **WIKA / PL**

CUSTOMER ORDER N° COMMANDE CLIENT / KUNDENBESTELLUNG	SPECIFICATIONS: ANFORDERUNGEN	HEAT N. COULEE N. SCHMELZE N.	QUANTITY QUANTITE STÜCKE	DIMENSIONS mm ABMESSUNGEN	LENGTH LONGUEUR LÄNGE mm	STEEL GRADE NUANCE D'ACIER MARKENBEZEICHNUNG
PO00282100	**2379959.05 EN 10217-7 TC2/A312M**	**Y211108C31**	**1749 m**	**10.70 x 0.40**	**4500**	**Wst. 1.4404 / 316L**

PRODUCT / PRODUIT / PRÜFGEGENSTAND: **REDRAWN TUBES - TUBES ETIRES - NACHGEZOGENE ROHRE**

HEAT ANALYSIS — ANALYSE DE COULEE / SCHMELZANALYSE

HEAT N. COULEE N. SCHMELZE N.	% C	% Si	% Mn	% P	% S	% Cr	% Ni	% Mo	% N	% Ti	% Cu	% Fe	% Al	% Co	% B	% Zr	%	%
Y211108C31	0.025	0.430	1.330	0.031	0.002	16.730	10.040	2.036	0.040									

PRODUCT ANALYSIS — ANALYSE PRODUIT / STÜCKANALYSE

HEAT N. COULEE N. SCHMELZE N.	% C	% Si	% Mn	% P	% S	% Cr	% Ni	% Mo	% N	% Ti	% Cu	% Fe	% Al	% Co	% B	% Zr	%	%
PIECE	0.176	0.482	1.390	0.020	0.0005	16.700	10.100	2.070	0.025									

HEAT TRAITMENT : TREATEMENT THERMIQUE WÄRMEBEHANDLUNG
ANNEALED AT : HYPERTREMPE A LÖSUNGSGEGLÜHT BEI **1'050 ±30°C** AND RAPIDLY COOLING ET REFROIDI RAPIDEMENT UND ABGESCHRECKT

100 % OF THE MATERIAL HAVE BEEN PASSED WITH SATISFACTORY RESULT THE : DU MATERIEL SATISFAIT AU(X) CONTROLE(S) DES MATERIALS HAT DIE PRÜFUNG BESTANDEN

Eddy Current

TEST ACCORDING TO : SUIVANT ENTSPRECHEND **EN 10246-3 / 10246-2**

MARKING : MARQUAGE KENNZEICHNUNG **S-Nr.2379959.05 - Ø10.7 x 0.40 - 316/316L/1.4404- PO00282100 - ZM**

REMARKS : REMARQUE ANMERKUNG **Material acc. to AD2000-W2 IGC resistant acc.DIN EN ISO 3651-2 Practice A and ASTM A 262 Practice E**

WIKA-Code: 897RPB93
durch: ZaboroD, 18.01.2024

(10 BAR = 1M Pa)

FLATTENING APLATISSEMENT RINGFALTVERSUCH	HYDROSTATIC TEST ESSAI HYDRAULIQ BAR WASSERDRUCKVERSUCH	FLARING EVASEMENT AUFWEITUNG
NE	**NE**	**S 100 %**
FLANGING COLLET BÖRDELVERSUCH	REVERSE BENDING RETOURNEMENT INVERSE WURZELSEITIGER RINGFA	GRAIN SIZE ASTM GROSSEUR DE GRAIN KORNGRÖSSE
NE	**NE**	**S ASTM E112 6.0**
CORROSION TEST TEST CORROSION IK TEST	P.M.I. TEST DE NON MELANGE VERWECHSELLUNGSPR.	VISUAL CONTROL CONTROLE VISUEL BESICHTIGUNGSKONTR.
S EN ISO 3651-2	**S**	**S**
SPECIFICATION SPEZIFIKATION	SPECIFICATION SPEZIFIKATION	SPECIFICATION SPEZIFIKATION
Surface condition S		

S = Satisfactory - Satisfaisant - Zufriedenstellend
NE = Not executed - Pas effectué - Nicht durchgeführt

TEST RESULTS — RESULTATS DES ESSAIS / ERGEBNIS DER PRÜFUNGEN (1 N/mm2 = 1M Pa)

SAMPLE ECHANTILLON PROBE	OUT Ø EXT AUSS.	INT. Ø INN.	WALL THIC. EPAISSEU WANDSTÄR	LENGTH LONGUEUR LÄNGE	ROUGHNESS RUGOSITE RAUHIGKEIT	ROUGHNESS RUGOSITE RAUHIGKEIT	ROUGHNESS RUGOSITE RAUHIGKEIT	TENSILE TRACTION / ZUGVERSUCH Rp 0.2% N/mm²	Rp 1% N/mm²	Rm N/mm²	A % Lo=5,65√ So	HARDNESS DURETE. HÄRTE	Ag
TOLERANCES / TOLERANZEN	**10.70** ±0.08	**9.90**	**0.40** ±0.02	**4500** 0/-500	µm	µm	µm	≥ 400		≥ 600	≥ 30%		%
1	**10.76**	**9,96**	**0,40**	**4000**				441		644	46		33
2	**10.76**	**9,94**	**0,41**					414		641	46		33
3	**10.76**	**9,94**	**0,41**	**4490**				408		644	46		33
4	**10.76**	**9,97**	**0,40**					411		641	46		33
5	**10.76**	**9,94**	**0,41**	**4490**				442		644	46		33

Emis et vérifié par : Issued and checked by :

Z.M. QC Manager R. MARTENA

First issue : 14-déc-23 Modified :

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

ACEROS INOXIDABLES
OLARRA

Trade Mark - Zeichen des Lieferwerkes
Anagrama del suministrador

Works Inspector Stamp - Werkssachverständiger
Sello del Inspector 3

WIKA POLSKA SP. Z O.O. SGF SP.K
UL. KAWKA 6
87-800 WLOCLAWEK - POLONIA

Certificate type - APZ Nach / Certificado tipo	Certificate nº - Prüf-Nr / Certificado nº	Date - Datum - Fecha
EN 10204/3.1	499048	14 - 07 - 2022

Our order Nº / Werks - Nr / Nº de Referencia	Heat / Schmelze / Colada	Your order Nº / Bestell - Nr / Pedido Nº
772484	539395	PO00224900/MNPI1

Steel Grade / Werkstoff / Calidad	According to / Entsprechend / Corresponde
X-2-CRNIMO-17-12-2 / 1.4404	EN 10272-2016.

Shape and Size - Gegenstad / Perfil y dimensión	Tolerance - Toleranz / Tolerancia	Bundles / Bunde / Bultos	Bars / Stäbe / Barras	Weight / Gewitcht / Peso
SQUARE 22 mm	h 11 /DIN 178 /EN 10278	42	1512	18480 Kg

Requirements - Anforderungen - Exigencias

ASTM A 276/A 276M-17.
AD-2000-W2 2022/W10 2020.
S-NR. 0693227.11.
NACE MR-0175/ISO 15156-3 2015.
W N 04.026-2.
Type 316L-Type 316.
PED 2014/68/EU, Annex I, Parag.4.3/DGR 2014/68/EU
Anhang I Absatz 4.3 Certificate/Zertifikat Nr. 348/2008/MUC

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-

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				100
	Max.			900				315	
Temperature ºC 20	Spec. Nº. 1	442	523	625	43		76	192	205/204/200
	Probe Nr. Pro Nº. 2	444	525	627	42		75	192	203/202/198

	C	Si	Mn	P	S	Cr	Mo	Ni	N	Co	
Min.					0,010	16,50	2,00	10,00			
Max.	0,030	0,75	2,00	0,045	0,020	18,50	2,50	13,00	0,1000		
	0,023	0,49	1,60	0,035	0,014	16,67	2,02	10,05	0,0260	0,20	

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

Remarks - Bemerkungen - Observaciones

IC test acc./IK prüfung nach EN ISO 3651-2/98 Met.A. OK
Scharfkanting,kantenrundung. 0,4 mm.
SURFACE FINISH:2H

WIKA-Code: 897VO236
durch: ZaboroD, 01.09.2022

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.

UGITECH
Groupe Arcelor

Usine productrice
Hersteller
Manufacturer
E-mail

Ugine
F-73403 UGINE

N. Nr N° 4: 80107115

N° de commande usine - Werksbestellnummer - Works order number 11:

CERTIFICATO COLLAUDO DI ACCETTAZIONE 3.1
CERTIFICAT DE RECEPTION 3.1
INSPECTION CERTIFICATE 3.1

EN 10204 / 3.1

Page

Numéro de prélèvement / Probenummer / Test Number	Demandé-Vorschrift-Required	Traction-Zugversuch-Tensile test: Sens / Richtung / Direction (3)	Température d'essai / Prüftemperatur / Test Temperature	Limite d'élasticité / Streckgrenze / Yield Strength 0,2%	Limite d'élasticité / Streckgrenze / Yield Strength 1%	Résistance à la traction / Zugfestigkeit / Tensile	Allongement / Bruchdehnung / Elongation	Striction / Einschnürung / Red of Area	Dureté / Haerte / Hardness	Dureté / Haerte / Hardness	Résilience-Kerbschlagzaehigkeit-Notch Toughness: Type / Form / Type	Sens / Richtung / Direction (3)	Température d'essai / Prüftemperatur / Test Temperature	Valeurs individuelles / Einzelwerte / Individual Values	Moyenne / Mittelwerte / Average
39B		24	25	26A	26B	27	28	29	30	37	31	32	33	35	36
			°C	MPa	MPa	MPa	%	%	HB	HRC			°C	J	J
		L	20								ISOV	L	20		
		Min													
		Max													
	(5)														
	(4)														

Numéro de prélèvement / Probenummer / Test Number	Demandé / Vorschrift / Required		42 % C	43 % Si	44 % Mn	45 % Ni	46 % Cr	47 % Mo	48 % N	49 % S	50 % P
39A	40	Min				10,0000	16,5000	2,0000			
		Max	0,0300	1,0000	2,0000	13,0000	18,5000	2,5000	0,1100	0,0300	0,0450
Numéro de coulée / Schmelz Nr / Heat N. 526016			0,0170	0,5100	1,2600	11,0800	16,5500	2,0200	0,0220	0,0230	0,0290

Mode d'élaboration / Erchmel zungsart / Melting process	Demandé / Vorschrift / Required		51	52	53	54	55	70	71	72	73	74
38		Min										
Electrique / Elektrisch / Electriq		Max										

PROVA ANTIMESCOLAMENTO EFFETTUATA

ULTRA-SOUND TESTED **ANTIMIXING TESTED**

COPIA CONFORME ALL'ORIGINALE
Copy conform to original
CLIENTE/Customer COES
ORDINE/Order n° 1807124 Pos. 10
Componente/Element
COPPA
TE.MA s.r.l.
Quality Dept. Check data/date 10/09/24

CONFORME

56

(3) L = Long / Laengs - Long / Long; T = Travers / Quer - Transverse — 58

(1) TE = Trempé à l'eau-Wasserhaerten-Waterquench; TH = Trempé à l'huile-Olharten-Oil Quench; A = Hypertrempé-Loesungsgeglueht-Solution annealed; RO = Rond-Rund-Round; QR = Carré-Viereckig-Square; R = Revenu-Anlassen-Tempered; RT = Recuit-Geglueht-Annealed; TRM = Recuit maxi-Weichgeglueht-Maxi annealed; HX = Hexagonal-Sechskant-Hexagonal — 7

(4) A l'état de référence / Zum Bezug Zustand / At reference condition — 59A

(5) A l'état de livraison / In Lieferzustand / In state of delivery — 59B

Contrôles de marquage, d'aspect et de dimensions : satisfaisants
Bezeichnung, Besichtigung und Ausmessung : ohne Beanstandung
Marking, inspection and measurement : without objection — 62

Nous certifions que les produits énumérés ci-dessus sont conformes aux prescriptions de la commande
Wir bestätigen hiermit dass die obengenannten Erzeugnisse den Bestellungvorschriften entsprechen
We certify hereby that the above mentioned products are consistent with the order prescritions — 66

Ugine, le

L'agent Réceptionnaire de l'usine
Der Werkssachverständige
The work inspector

C. BIOTEAU — 63

Precision Metals EU
PART OF THE KNIGHT GROUP

CERTIFICATE OF CONFORMITY

EN 10204/3.1

Issued By	Ordered By	Delivery Address	Document Information
Precision Metals EU Wayenborgstraat 25 B-2800 Mechelen Belgium			**Our Reference:** 3007082 **Cust Ref:** 20334 **Despatch No:** PM-6009302 **Job Reference:** RCT-105163 **Cert Date:** 6th February 2023

Despatch Item	Description	Weight/Quantity
1	Bright Annealed AISI 316L Stainless Steel Strip in Coil with Sheared Edges 1.4404 (EN 10088-2) Test Certificate: BS EN 10204:3.1 0.1000mm +/-0.01 x 610.0000mm +/-10	104.000 KGS

Stock Item No.	Parent Batch.	Original Batch.	Cast/Heat No.	Incoming Certificate No.
912449			GK4393	0762775/1

Chemical Analysis

C %	Cr %	Mn %	Mo %	N %	Ni %	P %	S %	Si %			
0.0220	16.6800	1.3000	2.0300	0.0340	10.0100	0.0300	0.0020	0.5400			

Mechanical Analysis

Test	Test Values
Elongation %	50
Grain Size	8.5
0.2% Proof Stress N/mm2	315
Surface Roughness Ra	0.13
Ultimate Tensile N/mm2	640
Hardness VPN	174
BS EN 10204:3.1	

COPIA CONFORME ALL'ORIGINALE
Copy conform to original
CLIENTE/Customer COES SRL
ORDINE/Order n° 1807 Pcs. 10
Componente/Element
memb AISI 316
TE.MA s.r.l.
Quality Dept. Check data/date
10/09/24

We hereby certify that the supplies detailed have been manufactured/inspected/tested and unless otherwise stated conform to your purchase order requirements and are covered by the suppliers Certificate of Conformity referenced hereon and have been subjected to our scope of approval.

Transcription of all data from original Mill certificate.
This computer generated certificate is valid without signature.

ROSETTI MARINO	**INSPECTION REPORT**	**Report No**. IR01-123A90A-29Oct2024_COES	SHEET 1 di 5
		Data *Date 28-29/10/2024*	Rev. *Rev. 0*
PROGETTO *Project* **Base Load Power Hub (BLPH)**	**CLIENTE** *Client* CROSSWIND	**COMMESSA /** *Job* ***123 A90***	**COMMESSA FORNITORE /** *Job Vendor* 166-167/24
FORNITORE *Supplier: COES*	**No. Ordine** *P.O. No. 1724000428 - 1724000437*	**OGGETTO** *Object Instrument Air Package / Nitrogen Generator Package*	

DESCRIZIONE DEL MATERIALE / *Material Description*

POS. *Item*	**QUANTITA'** *Quantity*	**DESCRIZIONE** *Description*	**Nr. TAG** *TAG No.*	**TIPO DI ISPEZIONE** / *Kind of Inspection*	**ESITO** / *Result*
10	1	Instrument Air Package	A-63000	Performance Test	**Satisfactory with PL**
10	1	Nitrogen Generator Package	A-64000	Performance Test	**Not Satisfactory with PL**

DOCUMENTI APPLICABILI / *Applicable Documents*

TITOLO DOCUMENTO / *Document Title*	**NUMERO DOCUMENTO** / *Document Number*	**REVISIONE** / *Revision*	**STATO DOCUMENTO** / *Document Status*
PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS- NITROGEN GENERATION PACKAGE	1724000437-MAC-DA-00005	03	AFC – Accepted for construction
PACKAGE GENERAL ARRANGEMENT - INSTRUMENT AIR PACKAGE	1724000428-MAC-DA-00005	03	AFC – Accepted for construction
FAT (FACTORY ACCEPTANCE TEST) PROCEDURE - INSTRUMENT AIR PACKAGE	1724000428-QC-PRO-00024	03	AFC – Accepted for construction
FAT (FACTORY ACCEPTANCE TEST) PROCEDURE - NITROGEN GENERATION PACKAGE	1724000437-QC-PRO-00023	02	IFR – Issued for review
PACKAGE WIRING DIAGRAM INCLUDING LAYOUT OF PACKAGE CONTROL PANEL 63-LP-001 - INSTRUMENT AIR PACKAGE A-63000	1724000428-MAC-DG-00009	02	AFC – Accepted for construction
PACKAGE WIRING DIAGRAM INCLUDING LAYOUT OF PACKAGE CONTROL PANEL - NITROGEN GENERATION PACKAGE	1724000437-MAC-DG-00009	02	AFC – Accepted for construction

DISTRIBUZIONE A: / *Distribution to:*

☒**GESTIONE FORNITURE** / *Supply Management Department*	☒**CAPO COMMESSA** / *Project Manager*
☒**PRODUZIONE** / *Production*	☒**FORNITORE** / *Supplier*
☒**PPLM** / *Project Procurement & Logistic Manager*	☒**P.Q.M.**
☒**MAGAZZINO** / *Warehouse*	☒**P.E.M.**

ATTIVITA' ESEGUITE / *Activities Carried Out*

A - INTRODUZIONE / *Preliminary Introduction*

On date 28th and 29th of October 2024 the performance test of both the instrument air package and nitrogen generation packages have been carried out according to the shop test notification submitted STN-166-24-003 Rev.2 and STN-167-24-003 Rev.2.
The inspection included the visual and dimensional check as well as the final painting check.

L' INCARICATO / *The person in charge*	**IL RAPP. DEL CLIENTE** / *Client's Representative*	**IL FORNITORE** / *Supplier*
ROSETTI MARINO *Supply Management dept.*		

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO /
This document does not relieve the Supplier of the responsibility of any possible defects and/or misfunctioning arising during the utilisation.

For what concerns the instrument air package, PO no. 1724000428, the test returned positive results as the operative conditions have been reached by the package, however a punch list has been raised and COES agreed to close the same at RM fabrication yard in Ravenna (PL attached).

For what concerns the nitrogen generation package, PO no. 1724000437, the test could not be considered satisfactory since the defective solenoid valves didn't allow the proper closure of the process cycle.

Participants to the test:

- Anthony Iveson (Comm. Manager RM)
- Giandonato Delmisser (Comm. E/I RM)
- Nicola Salvemini (Quality Control RM)
- Davide Lo Sterzo (Project Engineering Manager RM)
- Pasquale Anacleto (Crosswind)
- Luigi Testa (COES)

B –SCOPO DELL'ISPEZIONE / *Scope of Inspection*

DESCRIZIONE DEI TEST PRESENZIATI / *Description of witnessed tests*	**ESITO /** *Result*
Performance Test for Instrument Air Package (Including visual and dimensional check and painting check)	**Satisfactory with PL**
Performance Test for Nitrogen Generation Package (Including visual and dimensional check and painting check)	**Not Satisfactory with PL**

C –DETTAGLIO DEGLI STRUMENTI UTILIZZATI PER TEST E ISPEZIONE / *Details of Inspection and Test Instruments used*

NOME DELLO STRUMENTO *Equipment name*	**PRODUTTORE** *Manufacturer*	**MODELLO** *Model*	**PROSSIMA TARATURA** *Next calibration*
Temperature and Humidity gauge	Elcometer	319 TOP	SN – ZF29428
Wet film thickness gauge	Elcometer	3236	SN – XB04087
Dry film thickness gauge	Elcometer	456 TOP	SN – SG00559

D –ALLEGATI / *Attachments (***CERTIFICATI E TEST REPORT** */ Certificates and Test Reports)*

NUMERO DOCUMENTO / *Document Number*	**DESCRIZIONE** / *Description*	**TIPO** / *Type*	**NR. PAGINE** / *No. Pages*
\\	Instrument air package FAT Certificate	Report	2
\\	Nitrogen Generation Package FAT Certificate	Report	2
\\	Instrument air package Punch List	Report	2
\\	Nitrogen Generation Package Punch List	Report	2

L' INCARICATO / *The person in charge*	**IL RAPP. DEL CLIENTE** / *Client's Representative*	**IL FORNITORE** / *Supplier*
ROSETTI MARINO *Supply Management dept.*		

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO /
This document does not relieve the Supplier of the responsibility of any possible defects and/or misfunctioning arising during the utilisation.

ROSETTI MARINO	**INSPECTION REPORT**	**Report No**. IR01-123A90A-29Oct2024_COES	SHEET 3 di 5
		Data *Date 28-29/10/2024*	Rev. *Rev. 0*
PROGETTO *Project* **Base Load Power Hub (BLPH)**	**CLIENTE** *Client* CROSSWIND	**COMMESSA /** *Job* ***123 A90***	**COMMESSA FORNITORE /** *Job Vendor* 166-167/24
FORNITORE *Supplier: COES*	**No. Ordine** *P.O. No. 1724000428 - 1724000437*	**OGGETTO** *Object Instrument Air Package / Nitrogen Generator Package*	

E – DETTAGLI ED ESITO DELL'ISPEZIONE / *Details and Results of Inspection*

POS. *Item*	**BREVE DESCRIZIONE MATERIALE** *Material brief description*	**Q.TA' ODA** *Order Q.ty*	**Q.TA' TESTATA** *Tested Q.ty*	**ACCETTATO** *Accepted*	**DATA ACCETTAZIONE** *Acceptance date*
10	Instrument air package	1	1	Yes (Punch List Raised)	**29/10/2024**
10	Nitrogen Generation Package	1	1	No (Punch List Raised)	**/**

F – CONCLUSIONI / *Conclusions*

COES and RM agreed on opening a punch list for the outstanding points found during the final tests. The packages will be shipped to RM yard, however, COES will organize a team to first close the punch list points and secondly to re-perform the Performance test on the nitrogen generation package which is currently not accepted. The same will have to be organized along with RM personnel.

G – PUNTI IRRISOLTI / *Outstanding points*

The outstanding points have been duly listed in a punch list agreed with the supplier (attached). The resolution of the same has been agreed to be done at RM yard in Ravenna.

H – STATO PACKING LIST / *Packing List Status*	☐ **EMESSO** / *Issued*	☒ **NON EMESSO** / *Not Issued*	DD/MM/YYYY **ULTIMA DATA UTILE** / *Last Date*

PUNCH LIST REPORT: VEDI ALLEGATO N° / *Refer to Attachment n° 01*

REPORT FOTOGRAFICO (SE PRESENTE) / *Digital Pictures (if any)*



Instrument Air Package



Instrument Air Package

L' INCARICATO / *The person in charge*	**IL RAPP. DEL CLIENTE** / *Client's Representative*	**IL FORNITORE** / *Supplier*
ROSETTI MARINO *Supply Management dept.*		

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO /
This document does not relieve the Supplier of the responsibility of any possible defects and/or misfunctioning arising during the utilisation.



Instrument Air Package



Instrument Air Package



Instrument Air Package



Instrument Air Package

L' INCARICATO / *The person in charge*	**IL RAPP. DEL CLIENTE** / *Client's Representative*	**IL FORNITORE** / *Supplier*
ROSETTI MARINO *Supply Management dept.*		

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO /
This document does not relieve the Supplier of the responsibility of any possible defects and/or misfunctioning arising during the utilisation.

ROSETTI MARINO	**INSPECTION REPORT**	**Report No**. IR01-123A90A-29Oct2024_COES	SHEET 5 di 5
		Data *Date 28-29/10/2024*	Rev. *Rev. 0*
PROGETTO *Project* **Base Load Power Hub (BLPH)**	**CLIENTE** *Client* CROSSWIND	**COMMESSA /** *Job* ***123 A90***	**COMMESSA FORNITORE /** *Job Vendor* 166-167/24
FORNITORE *Supplier: COES*	**No. Ordine** *P.O. No. 1724000428 - 1724000437*	**OGGETTO** *Object Instrument Air Package / Nitrogen Generator Package*	



Nitrogen Tank



Air Tank



Nitrogen Generation Package



Nitrogen Generation Package

NON VALIDO PER IL RILASCIO DELLA FORNITURA / *It is not valid for the supply's release*

L' INCARICATO / *The person in charge*	**IL RAPP. DEL CLIENTE** / *Client's Representative*	**IL FORNITORE** / *Supplier*
ROSETTI MARINO *Supply Management dept.*		

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO /
This document does not relieve the Supplier of the responsibility of any possible defects and/or misfunctioning arising during the utilisation.

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FACTORY ACCEPTANCE TEST CERTIFICATE

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000428
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
SCOPE OF SUPPLY:	INSTRUMENT AIR PACKAGE
ITEM:	A-63000
INSPECTION AND TEST PLAN:	1724000428-QC-ITP-00002
FAT PROCEDURE:	1724000428-QC-PRO-00024
COES JOB:	166/24

ACTIVITY	RESULT
VISUAL AND DIMENSIONAL CHECK	**CONFORM**
LOCAL PANEL WIRING CHECK	**CONFORM (SEE NOTE 1)**
MARKING AND NAMEPLATES CHECK	**CONFORM (SEE NOTE 1)**
PNEUMATIC LEAKAGE CHECK	**NOT WITNESSED**
FAT PERFORMANCE TEST	**CONFORM (SEE NOTE 1 & 2)**
PAINTING CHECK	**CONFORM**

Notes:
1. See attached punch list
2. Operating conditions have been reached.

Client agrees with Coes to dismount all solenoid valves before shipment preparation and re-install them on RM site (Ravenna Yard) after further investigation to identify and resolve the cause of malfunctioning of solenoid valve installed on Nitrogen Generation package, since all the solenoid valves are the same model.

COES SRL Via Pontida, 265 24040 STEZZANO (BG) P.I.C.F. 02529570166 Tel. 035 2050511 29/10/24	ROSETTI MARINO SpA Stefano Linari Quality Control Dept. 29/10/24 Comm. mgr.

DOC. N°: CDC54946

CDC54946 - FAT REPORT – Attachment

INSTRUMENT AIR PACKAGE

- Start the Compressor K-63001A in LOCAL MODE, immediately it goes into LOAD since the pressure 63-PT-064 is below 8 barg. (The compressor working max 10 barg with set point 9 barg).
- Valves in the AIR DRYER fully open. When the pressure 63-PT-064 reaches 8 barg the logic selects the PRE-FILTER /DRYER / AFTER-FILTER.
- Dryer Cycle:
    1. ADSORPTION TOWER A – REGENERATION TOWER B **240 seconds**
    2. ADSORPTION TOWER A – PRESSURIZED TOWER B **60 seconds**
    3. REGENERATION TOWER A – ADSORPTION TOWER B **240 seconds**
    4. PRESSURIZATION TOWER A – ADSORPTION TOWER B **60 seconds**
- The 63-PDT-051 on H alarm we change (with a delay time of 30 seconds) the PRE-FILTER A with PRE-FILTER B and vice versa. (test simulated by putting the negative chamber in atmosphere).
- The 63-PDT-052 on H alarm we change (with a delay time of 30 seconds) the AFTER-FILTER A with AFTER-FILTER B and vice versa. (test simulated by putting the negative chamber in atmosphere).
- The DEW POINT 63-AIT-051 value (-40.58°C).
- The Pressure switches 63-PS-054 / 63-PS-056 / 63-PS-058 / 63-PS-060 DRYER UNIT 1 & 2 we forced to verify the exchange between the DRYER D-63001A/B al DRYER D-63002A/B and vice versa.
- Stop the Compressor K-63001A.
- Start the Compressor K-63001B in LOCAL MODE (verify the changeover with PUSH BUTTON). Compressor K-63001B in STOP, Compressor K-63001A in SERVICE.

ROSETTI MARINO SpA
Stefano Linari
Quality Control Dept.
29/10/24

COES SRL
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24040 STEZZANO (BG)
P.I./C.F. 02529570168
Tel. 035/2050511
29/10/24

For acceptance

ROSETTI MARINO

Base Load Power Hub (BLPH)

Punch List Entry Form

CROSSWIND

Sub-system code:

Sub-system description:
INSTRUMENT AIR PACKAGE A-63000

Date:
29/10/2024

Category "A" → Items to be cleared before the issuance of the RFCC (Ready for Commissioning Certificate).

Category "B" → Items to be cleared before the issuance of the RFOC (Ready For Operations Certificate).

Category "C" → Items to be cleared before Sail Away.

Item N.	Check sheet ref.	Disc.	Tag Number	Raised By	Defect Description / Corrective Action	Attachments	Cat.	Action By	Duty Phase	Deadline date
1.	-		A-63000	RM Comm.	CHECK IF THE SET POINT SHOULD BE SET TO 9.5 SINCE ON THE AIR RECEIVER (63-PT-04) WE HAVE A PRESSURE OF 8.8 barg		B	COES		02/12/24
2.	-		A-63000	RM Comm.	PACKAGE to be test with PLC set to REMOTE MODE		B	COES/RM		02/12/24
3.	-		A-63000	RM Comm.	necessary to set the operating logic to ensure that with a DEW POINT measured > -40°C, the DRYER in operation is exchanged with the DRYER in pause		B	COES/RM		02/12/24
4.	-		A-63000	RM Comm.	TO BE IMPLEMENT: THE PRESSURE SWITCHES IN BAD QUALITY MUST BLOCK AIR DRYER (to be verify at yard)		B	COES/RM		02/12/24
5.	-		A-63000	RM Comm.	TO BE IMPLEMENT: THE INTERVENTION TIME OF THE LIMIT SWITCHES (to be verify at yard)		B	COES		02/12/24
6.			A-63000	RM Comm.	TO BE IMPLEMENTED: VALVE POSITION DISCREPANCY (to be verify at yard)		B	COES		02/12/24
7.			A-63000	RM Comm.	VERIFY AND SET THE EXCHANGE OF THE COMPRESSORS WITH THE DUTY/STAND-BY CYCLE TIME. To be verify and to be tested		B	COES/RM		02/12/24
8.			A-63000	RM Comm.	TO BE VERIFY AND TEST THE CHANGE OVER COMPRESSOR K-63001A TO K-63001B		B	COES		02/12/24
9.			A-63000	RM Comm.	ALL SOLENOIDS HAVE BEEN DISMANTLED FROM THE PACKAGE. SEND TO THE SUB-VENDOR TO BE CHECK. ALL SOLENOID WILL BE RE INSTALLED		A	COES		02/12/24
10.			A-63000	RM Comm.	THE RESET COMMAND TO PACKAGE MUST BE MANAGED BY ESD (CURRENTLY IT'S ON LOCAL PANEL). To be verify with engineering		B	RM		02/12/24
11.			A-63000	RM Comm.	MAX PRESSURE ON VALVE ACTUATORS = 8 BAR IS NOT CONGRUENT WITH OPERATING PRESSURE = 9 BAR		B	COES		02/12/24

12.			A-63000	RM Comm.	DUE TO THE RUSH TO CONCLUDE ALL TESTS WITHIN ONE DAY, AN EXTENSIVE AND COMPREHENSIVE ON-SITE TEST WILL BE MANDATORY BEFORE PERFORMING THE FUNCTIONAL AND PERFORMANCE TESTS OF THE PACKAGE. ALL PERFORMANCE MUST BE TESTED AND ACCEPTED AT THE CONSTRUCTION SITE		B	COES		02/12/24
13.			A-63000	RM Comm.	ALL HARDWIRED AND PROFINET SIGNALS STILL TO BE TESTED		A	COES		02/12/24
14.			A-63000	S.Linari	TO BE UPDATED DWG N. 1724000428-MAG-DG-00009 – CORRECT RAL 9002		B	COES		02/12/24
15.			A-63000	S.Linari	CABLING INSIDE CONTROL PANEL NOT REFLECT THE SPECIFICATIONS AND DWG IN TERM OF COLOUR CODING. SEE NCR **2024-Q-123A90-0009**		A	COES		02/12/24
16.			A-63000	S.Linari	MISSING LEAKAGE TEST REPORTS. To be repeated on site up to rated package pressure		B	COES		02/12/24
17.			A-63000	S.Linari	CONTINUITY AND MEGGER TEST REPORTS ARE MISSING. TO BE PROVIDE		B	COES		02/12/24

Raised by
Contractor / Subcontractor: _____

Checked by
Contractor QA/QC: _____

ROSETTI MARINO SpA
Stefano Linari
Quality Control Dept.
29/10/24

Accepted by
COMPANY: _____

COES SRL
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For acceptance

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FACTORY ACCEPTANCE TEST CERTIFICATE

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000437
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
SCOPE OF SUPPLY:	NITROGEN GENERATION PACKAGE
ITEM:	U-64000
INSPECTION AND TEST PLAN:	1724000437-QC-ITP-00002
FAT PROCEDURE:	1724000437-QC-PRO-00023
COES JOB:	167/24

ACTIVITY	RESULT
VISUAL AND DIMENSIONAL CHECK	**CONFORM**
LOCAL PANEL WIRING CHECK	**CONFORM (SEE NOTE 1)**
MARKING AND NAMEPLATES CHECK	**CONFORM (SEE NOTE 1)**
PNEUMATIC LEAKAGE CHECK	**NOT WITNESSED**
FAT PERFORMANCE TEST	**NOT CONFORM (SEE NOTE 1 & 2)**
PAINTING CHECK	**CONFORM**

Notes:
1. See attached punch list
2. Due to continued Solenoid valves failure, the package cycle phases could not properly be recorded. Coes dismounted all solenoid valves before shipment preparation and re-install them on site (Ravenna Yard) after further investigation to identify and resolve the cause of malfunctioning.
Performance test to be repeated on RM site (Ravenna Yard).

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29/10/24

ROSETTI MARINO SpA
Stefano Linari
Quality Control Dept.
29/10/24
Comm. MGR.

CDC54947 - FAT REPORT - Attachment

NITROGEN GENERATOR PACKAGE

- Start sequence in LOCAL MODE.
- Inlet pressure PACKAGE 64-PT051 8.8 barg.
- Start Phase sequence PSA TOWER C-64001A / C-64001B.
    1. TOWER C-64001A GENERATION - TOWER C-64001B DEPRESSURIZATION **50 sec.**
    2. TOWER C-64001A EQUALIZATION - TOWER C-64001B EQUALIZATION **10 sec.**
    3. TOWER C-64001A DEPRESSURIZATION - TOWER C-64001B GENERATION **50 sec.**
    4. TOWER C-64001A EQUALIZATION - TOWER C-64001B EQUALIZATION **10 sec.**

About an hour after the start of the INSTRUMENT AIR PACKAGE and NITROGEN GENERATION PACKAGE we have the following values:

INSTRUMENT AIR PACKAGE

• AIR RECEIVER PRESSURE	63-PT-064	**8.8 barg**
• TEMPERATURE GAUGE AIR RECEIVER	63-TI-053	**20°C**
• DEW POINT ANALYZER	63-AIT-051	**-47.15**
• FLOW TRANSMITTER	63-FT-051	**320 m3/h**

NITROGEN GENERATION PACKAGE

• PSA INLET PRESSURE	64-PT-051	**8.8 barg**
• OXYGEN ANALYZER	64-AT-051	**2.9% / 3.2%**

ROSETTI MARINO SpA
Stefano Binari
Quality Control Dept
29/10/24

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29/10/24

For acceptance

ROSETTI MARINO

Base Load Power Hub (BLPH)

Punch List Entry Form

CROSSWIND

Sub-system code:	Sub-system description: NITROGEN PACKAGE A-64000	Date: 29/10/2024

Category "A" → Items to be cleared before the issuance of the RFCC (Ready for Commissioning Certificate).

Category "B" → Items to be cleared before the issuance of the RFOC (Ready For Operations Certificate).

Category "C" → Items to be cleared before Sail Away.

Item N.	Check sheet ref.	Disc.	Tag Number	Raised By	Defect Description / Corrective Action	Attachments	Cat.	Action By	Duty Phase	Deadline date
1.	-		A-64000	RM Comm.	PACKAGE to be tested with PLC set to REMOTE MODE		B	COES/RM		02/12/2024
2.	-		A-64000	RM Comm.	THE SOLENOID 64-XV-054 DOES NOT WORK. TO BE INVESTIGATE		A	COES		02/12/2024
3.	-		A-64000	RM Comm.	ALL SOLENOIDS HAVE BEEN DISMANTLED FROM THE PACKAGE. SEND TO THE SUB-VENDOR TO BE CHECK. ALL SOLENOID WILL BE RE INSTALLED		A	COES		02/12/2024
4.	-		A-64000	RM Comm.	**During on-site testing phase, it will be necessary to validate that the PACKAGE does not suffer malfunctions due to the low pressure**		B	COES		02/12/2024
5.	-		A-64000	RM Comm.	HARDWIRED & PROFINET SIGNALS STILL TO BE TESTED		B	COES		02/12/2024
6.			A-64000	RM Comm.	MAX PRESSURE ON VALVE ACTUATORS = 8 BAR - IS NOT CONGRUENT WITH OPERATING PRESSURE = 9 BAR		B	COES		02/12/2024
7.			A-64000	RM Comm.	THE OXYGEN VALUE DURING PRESSURIZATION IS NOT STABLE. IN THIS PHASE IT IS POSSIBLE TO CHECK THE CLOSURE OF VALVE 64-XV-058 AND THE OPENING OF THE VALVE OF VENT 64-XV-059		B	COES		02/12/2024
8.			A-64000	RM Comm.	THE RESET COMMAND TO PACKAGE MUST BE MANAGED BY ESD (CURRENTLY IT'S ON LOCAL PANEL). To be verify with engineering		B	RM		02/12/2024
9.			A-64000	RM Comm.	DUE TO THE RUSH TO CONCLUDE ALL TESTS WITHIN ONE DAY, AN EXTENSIVE AND COMPREHENSIVE ON-SITE TEST WILL BE MANDATORY BEFORE PERFORMING THE FUNCTIONAL AND PERFORMANCE TESTS OF THE PACKAGE. ALL PERFORMANCE MUST BE TESTED AND ACCEPTED AT THE CONSTRUCTION SITE		A	COES		02/12/2024

10.			A-64000	RM Comm.	BALL FLOW METER UPSTREAM OF THE 64-AT-051 OXYGEN TO THE NITROGEN GENERATION TO BE ADDED IN PKG PID		B	COES		02/12/2024
12.			A-64000	RM Comm.	ALL THE ALARMS AND SET POINT OF NITROGEN GENERATION PACKAGE TO BE TESTED			COES/RM		02/12/2024
13.			A-64000	S.Linari	TO BE UPDATED DWG N. 1724000437-MAG-DG-00009 – CORRECT RAL 9002		B	COES		02/12/2024
14.			A-64000	S.Linari	CABLING INSIDE CONTROL PANEL NOT REFLECT THE SPECIFICATIONS AND DWG IN TERM OF COLOUR CODING. SEE NCR **2024-Q-123A90-0009**		A	COES		02/12/2024
15.			A-64000	S.Linari	CONTINUITY AND MEGGER TEST REPORTS ARE MISSING. TO BE PROVIDE		B	COES		02/12/2024
16.			A-64000	S.Linari	MISSING LEAKAGE TEST REPORTS. To be repeated on site up to rated package pressure		B	COES		02/12/2024
17.			A-64000	S.Linari	MISSING TAG PLATE ON PSV 64-053 / PSV -64-054			COES		02/12/2024

Raised by
Contractor / Subcontractor: _____

Checked by
Contractor QA/QC: _____

Accepted by
COMPANY: _____

ROSETTI MARINO SpA
Stefano Linari
Quality Control Dept.
29/10/24

COES SRL
Via Portalta, 265
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P.I.C.F. 02520570166
Tel. 035/2050511
29/10/24

For acceptance

ROSETTI MARINO

Base Load Power Hub (BLPH)

Punch List Entry Form

CROSSWIND

Sub-system code:

Sub-system description:
INSTRUMENT AIR PACKAGE A-63000

Date:
29/10/2024

Category "A" → Items to be cleared before the issuance of the RFCC (Ready for Commissioning Certificate).

Category "B" → Items to be cleared before the issuance of the RFOC (Ready For Operations Certificate).

Category "C" → Items to be cleared before Sail Away.

Item N.	Check sheet ref.	Disc.	Tag Number	Raised By	Defect Description / Corrective Action	Attachments *	Cat.	Action By	Duty Phase	Deadline date
1.	-		A-63000	RM Comm.	CHECK IF THE SET POINT SHOULD BE SET TO 9.5 SINCE ON THE AIR RECEIVER (63-PT-04) WE HAVE A PRESSURE OF 8.8 barg	PL C30000482	B	COES		02/12/24
2.	-		A-63000	RM Comm.	PACKAGE to be test with PLC set to REMOTE MODE	PL C30000483	B	COES/RM		02/12/24
3.	-		A-63000	RM Comm.	necessary to set the operating logic to ensure that with a DEW POINT measured > -40°C, the DRYER in operation is exchanged with the DRYER in pause	PL C30000484	B	COES/RM		02/12/24
4.	-		A-63000	RM Comm.	TO BE IMPLEMENT: THE PRESSURE SWITCHES IN BAD QUALITY MUST BLOCK AIR DRYER (to be verify at yard)	PL C30000485	B	COES/RM		02/12/24
5.	-		A-63000	RM Comm.	TO BE IMPLEMENT: THE INTERVENTION TIME OF THE LIMIT SWITCHES (to be verify at yard)	PL C30000486	B	COES		02/12/24
6.			A-63000	RM Comm.	TO BE IMPLEMENTED: VALVE POSITION DISCREPANCY (to be verify at yard)	PL C30000487	B	COES		02/12/24
7.			A-63000	RM Comm.	VERIFY AND SET THE EXCHANGE OF THE COMPRESSORS WITH THE DUTY/STAND-BY CYCLE TIME. To be verify and to be tested	PL C30000488	B	COES/RM		02/12/24
8.			A-63000	RM Comm.	TO BE VERIFY AND TEST THE CHANGE OVER COMPRESSOR K-63001A TO K-63001B	PL C30000489	B	COES		02/12/24
9.			A-63000	RM Comm.	ALL SOLENOIDS HAVE BEEN DISMANTLED FROM THE PACKAGE. SEND TO THE SUB-VENDOR TO BE CHECK. ALL SOLENOID WILL BE RE INSTALLED	PL C30000490	A	COES		02/12/24
10.			A-63000	RM Comm.	THE RESET COMMAND TO PACKAGE MUST BE MANAGED BY ESD (CURRENTLY IT'S ON LOCAL PANEL). To be verify with engineering	PL C30000491	B	RM		02/12/24
11.			A-63000	RM Comm.	MAX PRESSURE ON VALVE ACTUATORS = 8 BAR IS NOT CONGRUENT WITH OPERATING PRESSURE = 9 BAR	PL C30000492	B	COES		02/12/24

12.			A-63000	RM Comm.	DUE TO THE RUSH TO CONCLUDE ALL TESTS WITHIN ONE DAY, AN EXTENSIVE AND COMPREHENSIVE ON-SITE TEST WILL BE MANDATORY BEFORE PERFORMING THE FUNCTIONAL AND PERFORMANCE TESTS OF THE PACKAGE. ALL PERFORMANCE MUST BE TESTED AND ACCEPTED AT THE CONSTRUCTION SITE	* PL C30000493	B	COES		02/12/24
13.			A-63000	RM Comm.	ALL HARDWIRED AND PROFINET SIGNALS STILL TO BE TESTED	PL C30000495	A	COES		02/12/24
14.			A-63000	S.Linari	TO BE UPDATED DWG N. 1724000428-MAG-DG-00009 – CORRECT RAL 9002	PL C30000494	B	COES		02/12/24
15.			A-63000	S.Linari	CABLING INSIDE CONTROL PANEL NOT REFLECT THE SPECIFICATIONS AND DWG IN TERM OF COLOUR CODING. SEE NCR **2024-Q-123A90-0009**	PL C30000496	A	COES		02/12/24
16.			A-63000	S.Linari	MISSING LEAKAGE TEST REPORTS. To be repeated on site up to rated package pressure	PL C30000497	B	COES		02/12/24
17.			A-63000	S.Linari	CONTINUITY AND MEGGER TEST REPORTS ARE MISSING. TO BE PROVIDE	PL C30000498	B	COES		02/12/24

Raised by
Contractor / Subcontractor: _____

Checked by
Contractor QA/QC: _____

ROSETTI MARINO SpA
Stefano Linari
Quality Control Dept.
29/10/24

Accepted by
COMPANY: _____

COES SRL
Via Pontida, 265
24040 STEZZANO (BG)
P.I./C.F. 02128570166
Tel. 0352050511
For acceptance

* See Attached all Punch list Closed

ROSETTI MARINO SpA
Stefano Linari
Quality Control Dept.

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000498

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task		1.4 Discipline	Mechanical
1.2 Item	A-63000		Instrument Air Package
1.3 Subsystem	63-00		Instrument Air Package (A-63000)

2 - OBSERVATION

CONTINUITY AND MEGGER TEST REPORTS ARE MISSING.
TO BE PROVIDE

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority B

3.4 Activity code FAT

3.5 Action by

Name Stefano Linari

Date 2024-10-29

Signature --- Proverlis ---
Duplicata issued from database information
Signature is on original form

4 - PERFORMED ACTION

done

Name VENDOR COES

Date 2025-01-30

Signature

5 - CLEARANCE CHECK

done

Name Stefano Linari

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6- CLEARANCE APPROVAL

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CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000498

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6- CLEARANCE APPROVAL

Name

Date

Signature

Linari Stefano (Rosetti)

Da: Sirigu Fabio (ERM)
Inviato: mercoledì 5 febbraio 2025 14:21
A: Calabrese Loredana (Rosetti); Casagrande Davide (ERM); Lo Sterzo Davide (Rosetti); Linari Stefano (Rosetti)
Cc: Iveson Anthony (ERM); Giunchi Claudia (Rosetti); Mura Fabrizio (Rosetti); Cavallo Giuseppe (ERM)
Oggetto: I: 123A90 CW // IO list IA & N2

Ciao,
COES conferma che il package fa trip per:

- pressione pulsante a fronte quadro
- shutdown da SIS

Direi quindi che il reset non è necessario e possiamo rimuovere la relativa punch.
Cordialità

Fabio SIRIGU
Commissioning Lead Automation
CROSSWIND BLPH PROJECT

Da: Luigi Testa <testa@coessrl.com>
Inviato: mercoledì 5 febbraio 2025 12:45
A: Sirigu Fabio (ERM) <Fabio.Sirigu@rosetti.it>
Oggetto: R: 123A90 CW // IO list IA & N2

Buongiorno Sig. Sirigu,

Ho ricevuto conferma che non è stata fatta alcune modifica rispetto a quanto sotto.

Cordiali saluti,
Luigi Testa

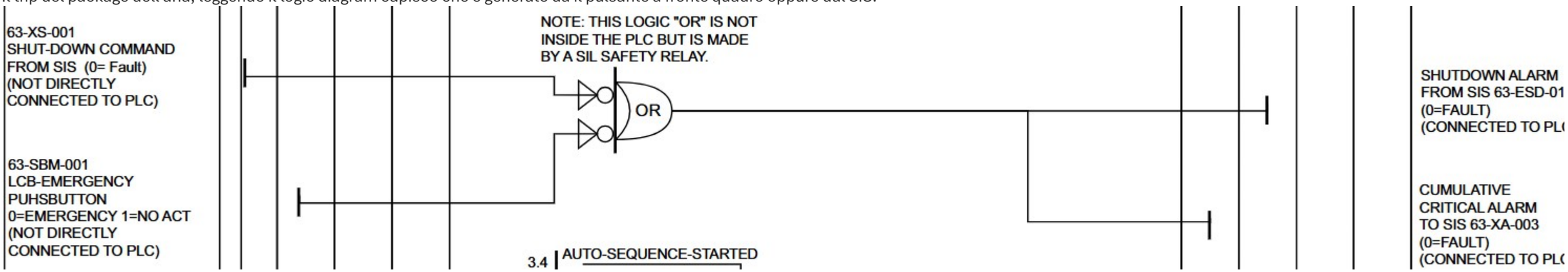
Coes Srl
Via Pontida, 265 - 24040 Stezzano, Italy

Office +39 035 2050511
Mobile +39 346 9690537
Fax +39 035 2050532
testa@coessrl.com
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Please consider the environment before printing this email

Da: Sirigu Fabio (ERM) <Fabio.Sirigu@rosetti.it>
Inviato: martedì 4 febbraio 2025 17:47
A: Luigi Testa <testa@coessrl.com>
Oggetto: R: 123A90 CW // IO list IA & N2

Buongiorno Sig. Testa,
avrei necessità di una conferma.
Il trip del package dell'aria, leggendo il logic diagram capisco che è generato da il pulsante a fronte quadro oppure dal SIS:



ed è confermato anche dalla vostra narrativa:

3.2.4 SHUTDOWN

The system shutdown can be activated locally by pressing the mushroom button on the LCP (63-LP-001) or by command from SIS.

In case of shutdown, the compressors are stopped and the valves are brought to "fail position" by deactivating the command to the solenoid valves.

To reset the shutdown, you must act on the LCP (63-LP-001) by pressing the "SAFETY RELAY RESET" button (63-HS-003).

Non trovo altre cause di trip interne al package.
Me lo conferma?
Cordialità

Fabio SIRIGU
Commissioning Lead Automation
CROSSWIND BLPH PROJECT

Da: Luigi Testa <testa@coessrl.com>
Inviato: venerdì 31 gennaio 2025 11:24
A: Sirigu Fabio (ERM) <Fabio.Sirigu@rosetti.it>
Cc: Delmissier Giandonato (ERM) <Giandonato.Delmissier@rosetti.it>; Casagrande Davide (ERM) <Davide.Casagrande@rosetti.it>; Giunchi Claudia (Rosetti) <Claudia.Giunchi@rosetti.it>; Basile Martino (ERM) <Martino.Basile@rosetti.it>
Oggetto: R: 123A90 CW // IO list IA & N2

Buongiorno Sig. Sirigu,

I due segnali sono mantenuti.

Cordiali saluti,
Luigi Testa

Coes Srl
Via Pontida, 265 - 24040 Stezzano, Italy

Office +39 035 2050511
Mobile +39 346 9690537
Fax +39 035 2050532
testa@coessrl.com
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Da: Sirigu Fabio (ERM) <Fabio.Sirigu@rosetti.it>
Inviato: mercoledì 29 gennaio 2025 16:12
A: Luigi Testa <testa@coessrl.com>
Cc: Delmissier Giandonato (ERM) <Giandonato.Delmissier@rosetti.it>; Casagrande Davide (ERM) <Davide.Casagrande@rosetti.it>; Giunchi Claudia (Rosetti) <Claudia.Giunchi@rosetti.it>; Basile Martino (ERM) <Martino.Basile@rosetti.it>
Oggetto: R: 123A90 CW // IO list IA & N2

Buon pomeriggio,
un chiarimento riguardo i seguenti segnali:

- 63-CMPR-START-001 COMPRESSOR 1 REMOTE START/STOP
- 63-CMPR-START-002 COMPRESSOR 2 REMOTE START/STOP

sono mantenuti o impulsivi?
Grazie

Fabio SIRIGU
Commissioning Lead Automation
CROSSWIND BLPH PROJECT

Da: Luigi Testa <testa@coessrl.com>
Inviato: venerdì 24 gennaio 2025 11:45
A: Sirigu Fabio (ERM) <Fabio.Sirigu@rosetti.it>
Cc: Delmissier Giandonato (ERM) <Giandonato.Delmissier@rosetti.it>; Casagrande Davide (ERM) <Davide.Casagrande@rosetti.it>; Giunchi Claudia (Rosetti) <Claudia.Giunchi@rosetti.it>; Basile Martino (ERM) <Martino.Basile@rosetti.it>
Oggetto: 123A90 CW // IO list IA & N2

Buongiorno Sig. Sirigu,

Invio in allegato le IO list in ultima versione.

Carico anche a sistema i due documenti.

Cordiali saluti,
Luigi Testa

Coes Srl
Via Pontida, 265 - 24040 Stezzano, Italy

Office +39 035 2050511

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Fax +39 035 2050532
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ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000498

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1.1 Task		1.4 Discipline	Mechanical
1.2 Item	A-63000		Instrument Air Package
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CONTINUITY AND MEGGER TEST REPORTS ARE MISSING.
TO BE PROVIDE

Name

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COES Srl
24040 STEZZANO - ITALY - Via Pontida, 265
tel +39 035 2050 511
e.mail: coes@coessrl.com

Sedi operative
24040 STEZZANO – Via Pontida, 265
24040 COMUN NUOVO – Via Europa, 9

LEAKAGE TEST CERTIFICATE

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000428
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
SCOPE OF SUPPLY:	INSTRUMENT AIR PACKAGE
ITEM:	A-63000
INSPECTION AND TEST PLAN:	1724000428-QC-ITP-00002
FAT PROCEDURE:	1724000428-QC-PRO-00024
COES JOB:	166/24

ACTIVITY	RESULT
PNEUMATIC LEAKAGE CHECK @ 7 barg	**CONFORM**

Notes:
Test performed at RM Piomboni Yard

COES SRL

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000498

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task		1.4 Discipline	Mechanical
1.2 Item	A-63000		Instrument Air Package
1.3 Subsystem	63-00		Instrument Air Package (A-63000)

2 - OBSERVATION

CONTINUITY AND MEGGER TEST REPORTS ARE MISSING.
TO BE PROVIDE

Name

Date

Signature

3 - DEFECT ASSESSMENT

3.1 Corrective action proposal

3.2 Material required

3.3 Priority	B PL B	Name	Stefano Linari
3.4 Activity code	FAT factory acceptance test	Date	2024-10-29
3.5 Action by		Signature	--- Proverlis --- Duplicata issued from database information Signature is on original form

4 - PERFORMED ACTION

done

Name VENDOR COES

Date 2025-01-30

Signature

5 - CLEARANCE CHECK

done

Name Stefano Linari

Date 2025-01-30

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

COES Srl
24040 STEZZANO - ITALY - Via Pontida, 265
tel +39 035 2050 511
e.mail: coes@coessrl.com

Sedi operative
24040 STEZZANO – Via Pontida, 265
24040 COMUN NUOVO – Via Europa, 9

CONTINUITY AND INSULATION RESISTANCE TEST CERTIFICATE

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000428
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
SCOPE OF SUPPLY:	INSTRUMENT AIR PACKAGE
ITEM:	A-63000
INSPECTION AND TEST PLAN:	1724000428-QC-ITP-00002
FAT PROCEDURE:	1724000428-QC-PRO-00024
COES JOB:	166/24

ACTIVITY	**RESULT**
CHECK THE CONTINUITY OF THE PROTECTIVE BONDING CIRCUIT	**CONFORM**

Test parameters:

Open circuit voltage: 24Vac/dc
Test current: 10A
Test time: 5 s
Localization of the PE terminal: Earth bar

ACTIVITY	**RESULT**
INSULATION RESISTANCE TEST	**CONFORM**

Test parameters:

Test voltage: 500V
Localization of the PE terminal: Earth bar

(When performing the strength tests of insulation, the insulation resistance measured at 500V DC between conductors of the power circuit and the protective bonding circuit shall not be less than 1MΩ.)



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Via Pontida, 265 - 24040 STEZZANO (BG) ITALY | Via Europa, 9 - 24040 COMUN NUOVO (BG) ITALY

TÜVNORD
TÜV NORD CERT GmbH
ISO 9001
ISO 14001
ISO 45001
tuev-nord.de

DICHIARAZIONE DI CONFORMITÀ UE
Allegato IV D.E. 2014/68/UE
Doc. CDC-CPN52824

PROGETTO, COSTRUZIONE E COLLAUDO CONFORME ALLA DIRETTIVA 2014/68/UE

CATEGORIA II Modulo G

CLIENTE:	ROSETTI MARINO
COMMESSA COES:	166/24
ATTREZZATURA A PRESSIONE:	INSTRUMENT AIR PACKAGE
MATRICOLA N°:	I240007
DISEGNO DI INSIEME	CGA52810
ANNO DI COSTRUZIONE:	2024

DATI DI PROGETTO					
Fluido	Air		Pressione di progetto	PS	0/12 barg
Temperatura minima di esercizio	Tmin	-20°C	Temperatura massima di esercizio	Tmax	90 °C

COMPONENTI INCLUSI NELL'INSIEME				
COMPONENTE	MATRICOLA / IDENTIFICATIVO	PRESSIONE DI PROGETTO	TEMPERATURA DI PROGETTO	CONFORMITA'
Pre-filtro	S240121	0/12 barg	-29/90 °C	2014/68/UE Cat. I
Pre-filtro	S240122	0/12 barg	-29/90 °C	2014/68/UE Cat. I
Post-filtro	S240127	0/12 barg	-29/90 °C	2014/68/UE Cat. I
Post-filtro	S240128	0/12 barg	-29/90 °C	2014/68/UE Cat. I
Serbatoio	S240123	0/12 barg	-29/90 °C	2014/68/UE Cat. II
Serbatoio	S240124	0/12 barg	-29/90 °C	2014/68/UE Cat. II
Serbatoio	S240125	0/12 barg	-29/90 °C	2014/68/UE Cat. II
Serbatoio	S240126	0/12 barg	-29/90 °C	2014/68/UE Cat. II

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ACCESSORI DI SICUREZZA			
ACCESSORIO	MATRICOLA	PRESSIONE DI TARATURA	CONFORMITA'
PSV	224481815	12 barg	2014/68/UE Cat. IV Modulo H1
PSV	224481816	12 barg	2014/68/UE Cat. IV Modulo H1
PSV	224481817	12 barg	2014/68/UE Cat. IV Modulo H1
PSV	224481818	12 barg	2014/68/UE Cat. IV Modulo H1

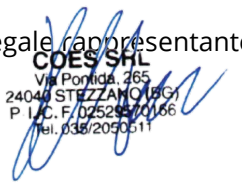
ORGANISMO NOTIFICATO	
PROCEDURA DI CONFORMITÀ UTILIZZATA	G
NUMERO DI CERTIFICATO DI CONFORMITÀ	0425 PED 007450-00
ORGANISMO NOTIFICATO	ICIM SpA - Piazza Don Enrico Mapelli 75, 20099 Sesto San Giovanni (MI)
NUMERO DI IDENTIFICAZIONE	0425

ALTRE DIRETTIVE COMUNITARIE APPLICATE	
2006/42/UE	Direttiva Macchine
2014/35/UE	Direttiva bassa tensione
2014/30/UE	Direttiva compatibilità elettromagnetica

Il sottoscritto, sotto la propria responsabilità, dichiara che il progetto, la costruzione ed il collaudo del suddetto insieme sono conformi ai requisiti della direttiva 2014/68/UE.

Stezzano
17/09/2025

Il legale rappresentante



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Sedi operative
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CERTIFICATE OF CONFORMITY WITH THE ORDER

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000428
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
SERIAL NUMBER:	I240007
SUPPLY:	INSTRUMENT AIR PACKAGE
TAG:	A-63000
COES JOB:	166/24

We declare that our supply mentioned above result in conformity to the required characteristics indicated in your order.

COES SRL Via Pontida, 265 24040 STEZZANO (BG) P.I./C.F. 02529570166 Tel. 035/2050511			

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000
SYSTEM/PACKAGE FUNCTIONAL DESCRIPTION

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
Giuseppe Cavallo	06/05/25

1724000428-MAC-SP-00003

ument Class: 3

		tion (IFI)	GT	SG	TM
01	02/01/2025	Issue for Information (IFI)	GT	SG	TM
00	22/10/2024	Issue for Information (IFI)	GT	SG	TM
Rev.	Date	Description	Prepared	Reviewed	Approved

COES

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Revision / Change Log

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

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None

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

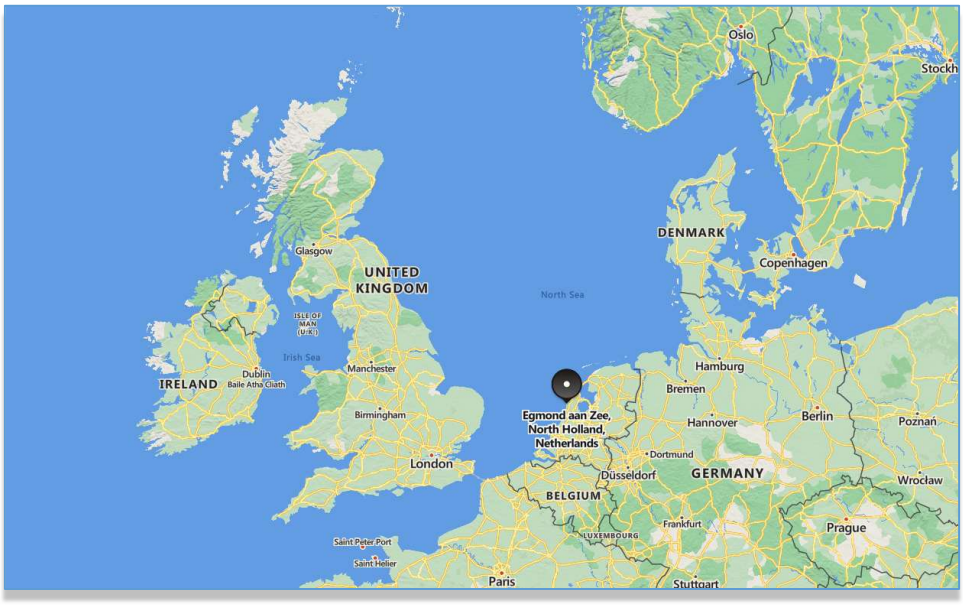


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

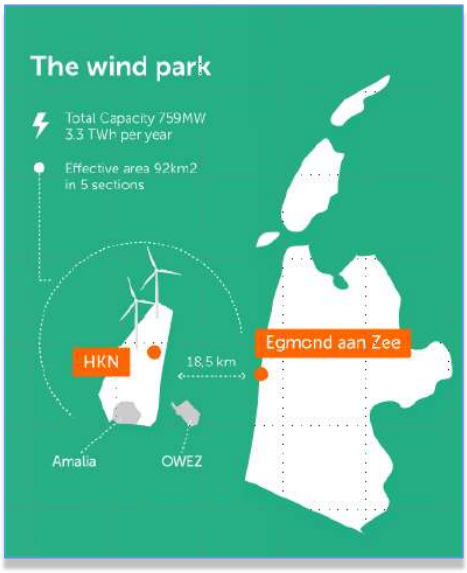


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

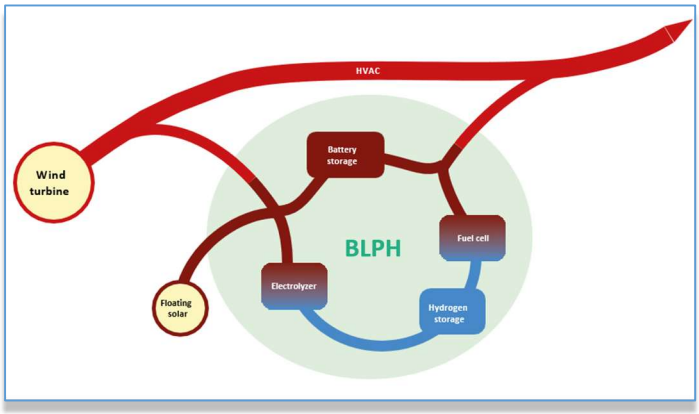


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies the functioning of the instrument air package.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DS-00011	EQUIPMENT DATA SHEETS INCLUDING MOTORS, AIR COMPRESSOR, DRYERS, ETC.
1724000428-MAC-MAN-00030	INSTALLATION, OPERATING AND MAINTENANCE MANUAL (INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)
1724000428-IN-LIS-00017	INSTRUMENT LIST WITH SET POINTS / CONTROL / ALARM / SHUTDOWN

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
DCS	Distributed Control System
LCP	Local Control Panel
NA	Not Applicable
SIS	Safety Interlock System

Table 2 - Definitions and Abbreviations

3 FUNCTIONAL DESCRIPTION

3.1 INSTRUMENT AIR PACKAGE BRIEF DESCRIPTION

The purpose of the instrumen air package is to generate instrument air.

The main items installed in the package are:

- No.2 air compressors
- No.2 pre-filters (one operating and one in stand-by)
- No.2 heatless air dryer units (one unit operating and one unit in stand-by)
- No.2 post filters (one operating and one in stand-by)

The outled net flow data are:

- Flowrate: 350 Sm^3/h
- Pressure: 9.0 barg
- Temperature: 35°C
- Dew point: -40°C @ 9.0 barg

3.2 INSTRUMENT AIR PACKAGE LOGICS

NOTES

From DCS (via Profinet) it will be possible to select the master/slave priority of the skid components, independently (Compressor K-63001A/K-63001B, Prefilter S-63001A/S-63001B, Dryer D-63001A/B / D-63002A/B, Postfilter S-63002A/S-63002B).

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3.2.1 Local / Remote switch

In LOCAL, the sequence is activated from LCP by pressing the START button (63-HS-001) and for the first start-up, if there is no REMOTE preset, the following are activated by default:

Compressor K-63001A, Pre-filter S-63001A, Dryer D-63001A/B and Post-filter S-63002A.

In case of REMOTE presetting of another activation sequence (e.g. Compressor K-63001B, Pre-filter S-63001A, Dryer D-63001A/B, Post-filter S-63002B etc.) this selection is also maintained in LOCAL.

In REMOTE, the sequence is activated by DCS by the START command via Profinet.

The master compressor is activated and the skid waits for the threshold pressure of 63-PIT-064 to be reached (set: 8 barg).

All automatic valves are in the open position.

When the 63-PIT-064 threshold is reached, the automatic interception valves of the filters and the non-line dryer (slave) are closed and the dryer sequence is activated.

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Example with default configuration Compressor K-63001A, Pre-filter S-63001A, Dryer D-63001A/B and Post-filter S-63002A:

63-XY-055	OFF	63-XV-055	OPEN
63-XY-056	ON	63-XV-056	CLOSED
63-XY-057	OFF	63-XV-057	OPEN
63-XY-058	ON	63-XV-058	CLOSED
63-XY-059	OFF	63-XV-059	OPEN
63-XY-060	ON	63-XV-060	CLOSED

To stop the system locally press the STOP button (63-HS-003) or REMOTELY via the STOP command via Profinet.

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3.2.2 Air Dryer logic

Cycle steps of the Air Dryer in operating conditions (D-63001A/B)

	TOWER D-63001A	TOWER D-63001B	TIME DURATION
PHASE 0	READY TO START	READY TO START	NA
PHASE 1	ADSORPTION	REGENERATION	240s
PHASE 2	ADSORPTION	PRESSURIZATION	60s
PHASE 3	REGENERATION	ADSORPTION	240s
PHASE 4	PRESSURIZATION	ADSORPTION	60s
PHASE 5	FAULT	FAULT	NA

Solenoid valves operating condition for dryer in operating condition:

	SOV 63-XY-051	SOV 63-XY-052	DELAY TIME
PHASE 0	OFF	OFF	NA
PHASE 1	OFF	ON*	* 3s
PHASE 2	OFF	OFF	
PHASE 3	ON	ON*	* 3s
PHASE 4	ON	OFF	
PHASE 5	NA	NA	NA

CHANGE OVER ALARM (set: 5barg [ON= >5 barg])

	63-PS-054	63-PS-056	DELAY TIME
PHASE 0	ON	ON	NA
PHASE 1	ON	OFF**	**20s
PHASE 2	ON	ON***	***30s
PHASE 3	OFF**	ON	**20s
PHASE 4	ON***	ON	***30s

Cycle steps of the Air Dryer in stand-by conditions (D-63002A/B)

	TOWER D-63002A	TOWER D-63002B	TIME DURATION
PHASE 0	READY TO START	READY TO START	NA

Solenoid valves operating condition for dryer in stand-by conditions

	SOV 63-XY-053	SOV 63-XY-054	DELAY TIME
PHASE 0	OFF	OFF	NA

3.2.3 Fault

In case of Fault of one of the master components (Compressor, Pre-filters, Dryer or Post-filters) the slave component starts automatically and upon feedback of the slave commissioning the master is excluded.

A dedicated alarm (with retention) is generated and sent to DCS via profinet and the "general alarm" lamp on the local LCP lights up.

The lamp switches off when the cause of the alarm disappears while the dedicated alarm must be reset by DCS.

3.2.4 SHUTDOWN

The system shutdown can be activated locally by pressing the mushroom button on the LCP (63-LP-001) or by command from SIS.

In case of shutdown, the compressors are stopped and the valves are brought to "fail position" by deactivating the command to the solenoid valves.

To reset the shutdown, you must act on the LCP (63-LP-001) by pressing the "SAFETY RELAY RESET" button (63-HS-003).

3.3 ALARM DESCRIPTION:

3.3.1 AIR COMPRESSOR ALARM

Compressor general alarm [FAULT]

- Generates a dedicated alarm via Profinet (retention alarm)
- Switch on the "General alarm" lamp on LCP
- Activates the switch of the two compressors (slave compressor in line and subsequent exclusion of the master compressor).

3.3.2 AIR DRYER ALARM

Change over alarm [FAULT]

- Generates a dedicated alarm via Profinet (retention alarm)
- Switch on the "General alarm" lamp on LCP
- Activates the switch of the two dryers (dryer slave in line and subsequent exclusion of the dryer master)

3.3.3 PRE-FILTER ALARM

Hig differential pressure drop alarm (set: 0.5 bar) [FAULT]

- Generates a dedicated alarm via Profinet (retentive alarm).
- Switch on the "General alarm" lamp on LCP.
- Activates the switch of the two filters (slave in line and subsequent exclusion of the master filter).

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3.3.4 POST-FILTER ALARM

High differential pressure drop alarm (set: 0.5 bar)[FAULT]

- Generates a dedicated alarm via Profinet (retentive alarm).
- Switch on the "General alarm" lamp on LCP.
- Activates the switch of the two filters (slave in line and subsequent exclusion of the master filter).

3.3.5 HIGH AIR TEMPERATURE ALARM [WARNING]

Temperature transmitter 63-TIT-051/052 (set: >40°C)

- Switch on the "General alarm" lamp on LCP.

3.3.6 HIGH DEW-POINT ALARM [WARNING]

Dew point analyzer 63-AIT-051 (set: >-40°C)

- Switch on the "General alarm" lamp on LCP.

3.4 MONITORING:

FLOW [MONITORING]

Flow transmitter 63-FIT-051 (RANGE: 0 to 500Sm^3/h) (Design value 350 Sm^3/h)

Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000

SPARE PARTS LIST (2 YEARS AND COMMISSIONING & START-UP)

ROSETTI MARINO

1724000428-COM-LIS-00029

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

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Sign	Date
Giuseppe Cavallo	21/05/2025

ument Class: 2

		uction (AFC)	GT	MC	TM
		v (IFR)	GT	MC	TM
00	17/12/2024	Issue for Review (IFR)	GT	MC	TM
Rev.	Date	Description	Prepared	Reviewed	Approved

COES

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Revision / Change Log

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

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1 INTRODUCTION

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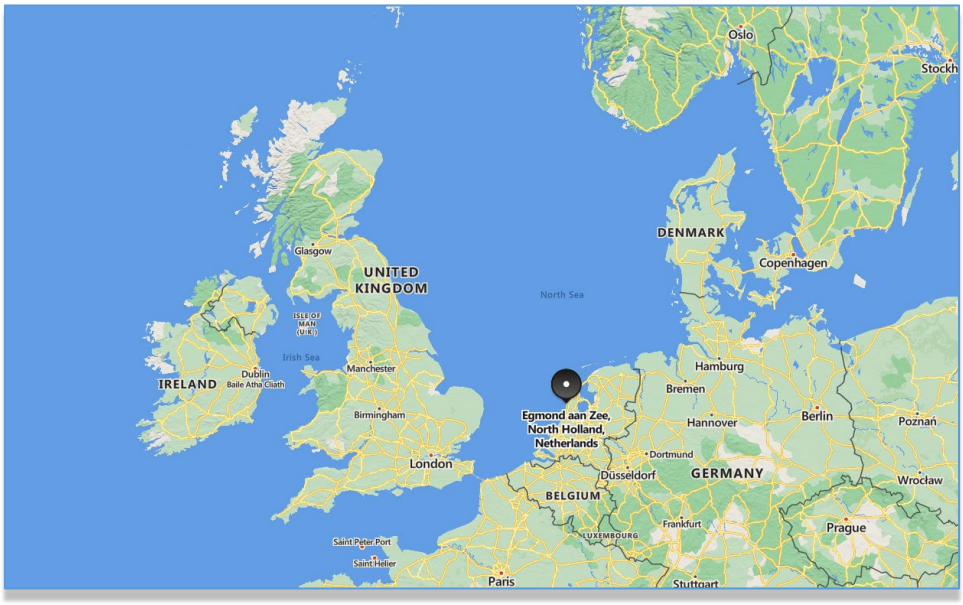


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

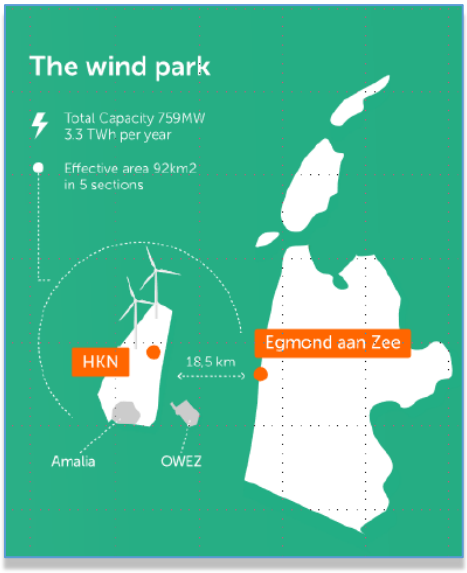


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

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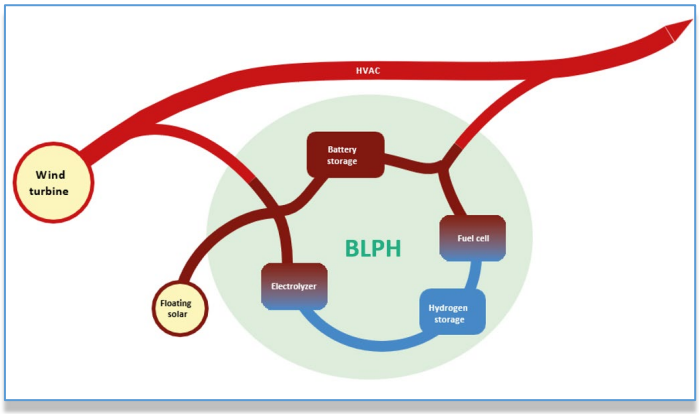


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
1724000428-MAC-DS-00011	EQUIPMENT DATA SHEETS INCLUDING MOTORS, AIR COMPRESSOR, DRYERS, ETC.

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

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3 COMMISSIONING & START-UP SPARE PARTS

Description	Valid for	Equipment TAG	Reference drawing	Material	Dimensions	Supplied quantity	Coes code
Set of piping gaskets	Complete package	A-63000	1724000428-MAC-DD-00008	AISI 316 + GRAPHITE	1" ANSI 150	1 PC	C3052
				AISI 316 + GRAPHITE	1.1/2" ANSI 150	1 PC	C3127
				AISI 316 + GRAPHITE	2" ANSI 150	5 PCS	C2416
				AISI 316 + GRAPHITE	2" ANSI 300	1 PC	D2662
				AISI 316 + GRAPHITE	DN50 PN16	1 PC	E3404
Set of gaskets for valves	Complete package	63-XV-055, 056, 057, 058, 059, 060	1724000428-PR-PID-00019	PTFE	2" ANSI 150	6 PCS	L7086

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4 2-YEARS SPARE PARTS

Description	Valid for	Equipment TAG	Reference drawing	Material	Dimensions	Supplied quantity	Coes code
Set of gaskets for valves	Complete package	63-XV-055, 056, 057, 058, 059, 060	1724000428-PR-PID-00019	PTFE	2" ANSI 150	12 PCS	L7086
Set of filter elements & gaskets	Prefilters	S-63001A S-63001B	1724000428-PR-PID-00019	MICROFIBER	Ø55 x 250mm	4 PCS	2842
				AISI 316 + GRAPHITE	6" ANSI 150	4 PCS	D2659
Set of filter elements & gaskets	Afterfilters	S-63002A S-63002B	1724000428-PR-PID-00019	MICROFIBER	Ø55 x 250mm	4 PCS	2842
				AISI 316 + GRAPHITE	6" ANSI 150	4 PCS	D2659
Set of gaskets	Air receiver	V-63001	1724000428-MAC-DD-00006	AISI 316 + GRAPHITE	24" ANSI 150	2 PCS	C3128
				AISI 316 + GRAPHITE	3" ANSI 150	4 PCS	C3125
				AISI 316 + GRAPHITE	1" ANSI 150	8 PCS	C3052
				AISI 316 + GRAPHITE	2" ANSI 150	2 PCS	C2416
				AISI 316 + GRAPHITE	1.1/2" ANSI 150	4 PCS	C3127
Maintenance kit	Air compressor	K-63001A K-63001B	1724000428-PR-PID-00019	MICROFIBER	N.A.	2 PCS	L7216

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Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000
INSTALLATION, OPERATING AND MAINTENANCE MANUAL
(INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)

r: 1724000428-MAC-MAN-00030

ocument 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
Giuseppe Cavallo	21/05/2025

		rmation (IFI)	GT	MC	TM
00	16/10/2024	Issue for Information (IFI)	GT	MC	TM
Rev.	Date	Description	Prepared	Reviewed	Approved

COES

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Revision / Change Log

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

HOLDS LIST

No.	Description
1	
2	
3	
4	

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None

1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

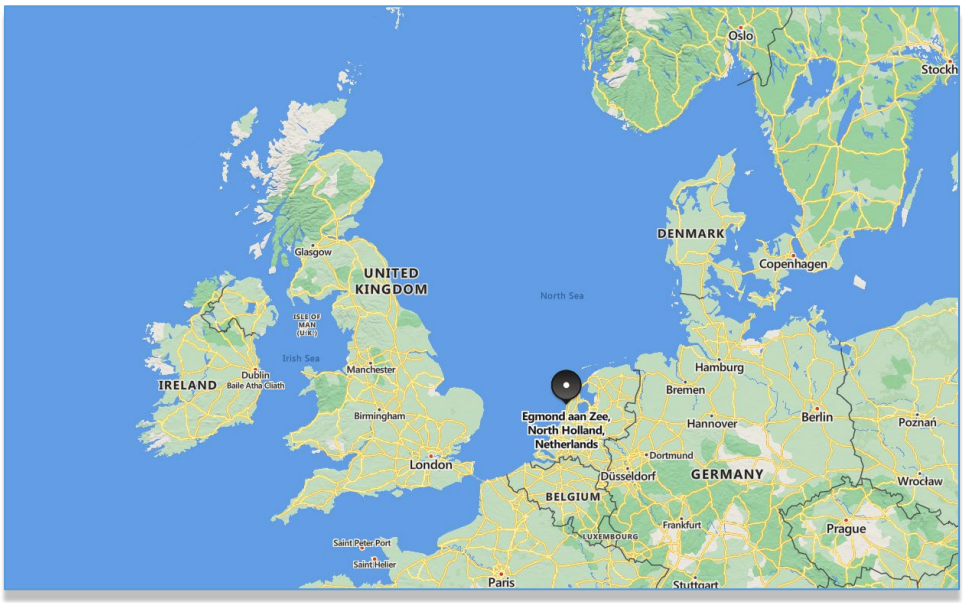


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

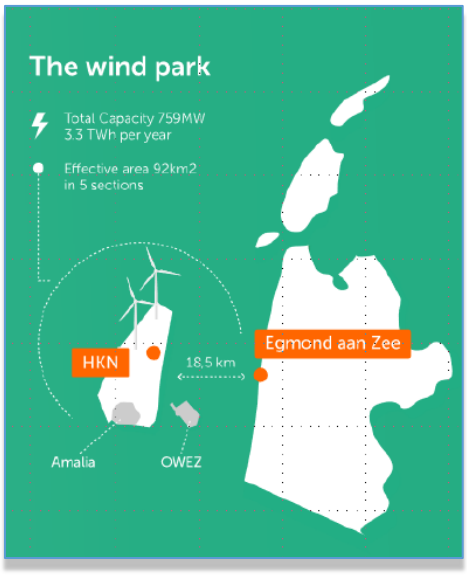


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

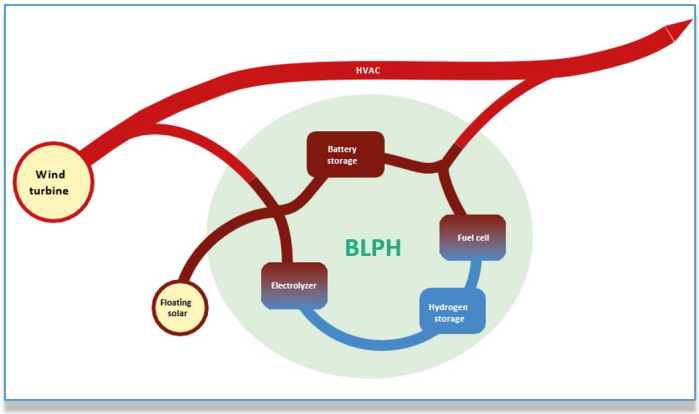


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document includes instructions for the installation, operating and maintenance of the instrument air package.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
1724000428-ST-RE-00010	PACKAGE WIRING DIAGRAM INCLUDING LAYOUT OF PACKAGE CONTROL PANEL

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

3 SAFETY PRESCRIPTIONS

- The operators must employ safe working practices and observe all related work safety requirements and regulations.
- If any of the following statements does not comply with the applicable legislation, the stricter of the two shall apply.
- Installation, operation, maintenance and repair work must only be performed by authorized, trained, specialized personnel.
- The owner is responsible for maintaining the unit in safe operating condition. Parts and accessories shall be replaced if unsuitable for safe operation.
- All responsibility for any damage or injury resulting from neglecting these precautions, or non observance of the normal caution and care required for transportation, installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.
- Before any maintenance, repair work, adjustment or any other non-routine checks, stop the unit, switch off the voltage and depressurize the dryer, the filters and the interconnecting piping. In addition, the power isolating switch must be opened and locked.
- Never remove or tamper with the safety devices, guards or insulation fitted on the machine
- The equipment must only be lifted using suitable equipment in accordance with the applicable safety regulations. Loose or pivoting parts must be securely fastened before lifting. It is strictly forbidden to dwell or stay in the risk zone under a lifted load. Lifting acceleration and deceleration must be kept within safe limits. Wear a safety helmet when working in the area of overhead or lifting equipment
- Any blanking flanges must be removed before connecting the pipes
- The electrical connections must correspond to the applicable codes. The package must be earthed and protected against short circuits. A lockable power isolating switch must be installed
- Make sure that no tools, loose parts or rags are left in or on the machine.
- Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine.
- Never operate the package below or in excess of its limit ratings.

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4 PROCEDURE FOR ERECTION AND INSTALLATION OF THE EQUIPMENT

4.1 Remove the packing.

4.2 The instrument air package is shipped fully assembled: no loose supplied components are foreseen.

4.3 Lift the skid baseplate, using an adequate lifting device. Skid baseplate shall be lift by means of lifting lugs weldde on the skid baseframe, and placed in its final position, on a properly sized structure, taking care to avoid damages to any installed equipment.
Air dryer package is supplied with all the components already assembled.

WARNING
IT IS NECESSARY TO PROPERLY LEVEL THE BASEPLATES AND TO ASSURE THE CORRECT ALIGNMENT OF MATCHING FLANGES, TO AVOID UNEXPECTED LOADS ON INTERCONNECTING PIPING

4.4 Fix the skid baseplate to the structure by means of the anchor bolts, as shown in the reference drawings.

4.5 Lift the air instrument air receiver, using an adequate lifting device, by means of the lifting points welded on the vessel. Then place it in its final position, on a properly sized structure.

WARNING
IT IS NECESSARY TO PROPERLY LEVEL THE VESSEL AND TO ASSURE THE CORRECT ALIGNMENT OF MATCHING FLANGES, TO AVOID UNEXPECTED LOADS ON INTERCONNECTING PIPING

4.6 Fix the receiver to the structure by means of the anchor bolts, as shown in the reference drawings.

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4.7 All the components inside the package are cabled as per Wiring Diagram, document no. 1724000428-ST-RE-00010. Power and signal cables should be connected by others to the Local Control Panel following the previous mentioned wiring diagram.

WARNINGS

TURN OFF MAIN POWER SUPPLY BEFORE ATTEMPTING TO WIRE THE UNIT

IT IS MANDATORY TO WIRE THE UNIT IN COMPLIANCE WITH THE APPLICABLE ELECTRICAL CODES AND LAWS IN FORCE IN THE COUNTRY OF INSTALLATION

ELECTRICAL CHECKS MAY INVOLVE LIVE CONNECTIONS AND SHOULD BE PERFORMED ONLY BY QUALIFIED PERSONNEL

MAKE SURE THAT CABLES ARE PROPERLY SIZED TO HANDLE THE INSTALLED VOLTAGES.

THE UNIT MUST BE EARTHED AND PROTECTED AGAINST SHORT CIRCUITS. A LOCKABLE POWER ISOLATING SWITCH MUST BE INSTALLED

4.7 Recommendation for storage are included in document 1724000428-QC-PRO-00031

4.8 Instrument air package terminal points shall be connected as shown in P&ID, document no. 1724000428-PR-PID-00019.

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5 AIR DRYER, FILTERS MANUAL

5.1 AIR DRYER THEORY OF OPERATION

5.1.1 Heatless regeneration drying systems

Heatless regenerated dryers use the chemical-physical property of the adsorbent material (activated alumina) for adsorption of gas humidity and for its transfer during the subsequent regeneration cycle.

A small dry gas stream, drawn from the outlet, is used for regeneration. It drives off the moisture, retained in the desiccant bed, and it is vented to the atmosphere.

While the desiccant bed in one tower dries the wet gas stream, the other tower is being regenerated by a purge of dry gas expanded to atmospheric pressure.

5.1.2 Main features

This dryer consists in two twin towers, mounted on a common base-plate which includes all pneumatic components.

The special design of the dryer makes possible to easily remove the different elements for their possible inspection.

This dryer is designed for continuous operation and no control on its operation is needed

5.2 INSTALLATION

5.2.1 General location

Install the skid, on a level surface, with adequate load bearing capacity. To insure rated dew point, locate the dryer where ambient temperatures are between -8°C and +40°C. In any case they will not exceed the design temperature.

Higher or lower ambient temperatures may affect the thermal balance of the two towers and the rated dew point may not be achieved.

5.2.2 Electrical connection

CAUTION

BEFORE ATTEMPTING TO WIRE THE UNIT TURN OFF LINE POWER

Connect the line to the power terminals. Make sure power supplied corresponds to power shown on the wiring diagram.

CAUTION

MAKE SURE WIRINGS ARE PROPER SIZED TO HANDLE AMPERAGESù

SPECIFIED IN THE REFERENCE DOCUMENTS.

CHECK THAT THE UNIT IS WIRED IN ACCORDANCE WITH THE APPLICABLE ELECTRICAL CODES.

5.2.3 Pre-filters S-63001A/B

To avoid large amounts of condensed water may enter the system, an automatic drain trap with manual by-pass is installed ahead of each pre-filter, to prevent flooding of the coalescing elements and possible performance problems of the filter.

REMARKS

Pre-Filters group is equipped with a differential pressure transmitter 63-PDIT-051 in order to obtain the best performances of the filtration elements.

5.2.4 After-filters S-63002A/B

Desiccant particles are produced during the normal operation of the drying unit and they may be carried downstream.
To remove particles two after-filters are installed, one working and the other one in stand-by condition.

REMARKS

After-Filters group is equipped with a differential pressure transmitter 63-PDIT-062 in order to obtain the best performances of the filtration elements.

5.3 INSTRUMENT AIR PACKAGE OPERATION

5.3.1 Start-up

1 Cut power supply to the Local Control Panel : POWER ON light (pos. 63-XL-001 and 63-XL-002) are off.

2 Open manual valves BLPH-MV-700, BLPH-MV-701, BLPH-MV-702 and BLPH-MV-703 to pressurize the pre-filter group.

3 Slowly open manual valves BLPH-MV-704, BLPH-MV-705, BLPH-MV-712 and BLPH-MV-720 to pressurize the dryer.

4 Keep outlet manual valves BLPH-MV-719 and BLPH-MV-727 closed.

5 Press Start push button 63-HS-001: Running light 63-XL-003 is on.

6 After a few minutes check the pressure shown by one or both pressure gauges.

One pressure gauge (pos 63-PI-053 or 63-PI-055 and 63-PI-057 or 63-PI-059) will show the operating pressure, while the other the atmospheric pressure.

If the dryer is repressurizing, both pressure gauges will show pressure inside the tower.

7 Make sure the cycle is carried out properly. If not, go back to the start-up procedure and to the "Troubleshooting" section.

8 Now the dryer is ready for its operation, but we suggest to let it work for a few cycles with outlet flow off. This procedure will be followed specially when the dryer has been off stream for a long time.

9 Slowly open outlet valves BLPH-MV-719 and BLPH-MV-727, so that to pressurise the service up to the after-filter group. Never go beyond the maximum design flow.

10 Slowly open manual valves BLPH-MV-728 and BLPH-MV-729 to pressurize the after-filter group.

11 Slowly open manual valves BLPH-MV-730 and BLPH-MV-731 to pressurize the service up to the line.

General note: valves provided with locking device shall be kept open or closed as shown in the P&ID.

5.3.2 Description of the cycle

Tower (pos. D-63001A or D-63002A) is in the adsorption phase, while tower (pos. D-63001B or D-63002B) is regenerating.

ADSORPTION PHASE

Solenoid valve (pos. 63-XY-052 or 63-XY-054) is de-energized. Therefore valve (pos. 63-XV-052 or 63-XV-054) is in the position shown on the P&ID.

The gas to be dried enters tower (pos. D-63001A or D-63002A), flows on the desiccant bed in an upward direction and comes out from outlet valve, dried and ready for utilization.

REGENERATION PHASE

Solenoid valve (pos. 63-XY-052 or 63-XY-054) is energized. Therefore valve (pos. 63-XV-052 or 63-XV-054) is open.

A small percentage of the dry gas is drawn by calibrated orifice (pos. 63-FO-001 or 63-FO-002) from tower (pos. D-63001A or D-63002A) and will be expanded inside tower (pos. D-63001B or D-63002B).

The gas runs through the tower in a counter-current direction and regenerates it.

Afterwards it is vented to the atmosphere through valve (pos. 63-XV-052 or 63-XV-054).

PRESSURIZATION

Solenoid valve (pos. 63-XY-052 or 63-XY-054) is de-energized and it controls the closing of valve (pos. 63-XV-052 or 63-XV-054).

Therefore regeneration gas, coming from calibrated orifice (pos. 63-FO-001 or 63-FO-002) will pressurize tower (pos. D-63001B or D-63002B), since it is not vented to the atmosphere.

CHANGE-OVER

Solenoid valves (pos. 63-XY-051 or 63-XY-053 and 63-XY-052 or 63-XY-054) are energized

Therefore valve (pos. 63-XV-051 or 63-XV-053) shifts and the gas to be dried enters tower (pos. D-63001B or D-63002B).

Valve (pos. 63-XV-052 or 63-XV-054) opens causing the decompression of tower (pos. D-63001A or D-63002A) which starts its regeneration.

5.3.3 STOP

1 Close outlet and inlet manual valves (pos. BLPH-MV-712, BLPH-MV-719, BLPH-MV-720 and BLPH-MV-727), to isolate the dryer.

2 Press button 63-HS-002: DRYER ON light (Pos. H2) is off.

3 Cut the power supply to the Local Control Panel; POWER ON lights (Pos. 63-XL-001 and 63-XL-002) are off.

5.4 MAINTENANCE

WARNING

DEPRESSURIZE THE DRYER COMPLETELY AND DISCONNECT MAIN POWER BEFORE SERVICING ANY VALVE, FITTING OR COMPONENT UNDER PRESSURE.
ELECTRICAL CHECKS MAY INVOLVE LIVE CONNECTIONS AND SHOULD BE PERFORMED ONLY BY QUALIFIED PERSONNEL.

REMARKS

THIS DRYER USES NON-LUBRICATED VALVES. THEREFORE NO LUBRICATION IS NEEDED.

5.4.1 Six-monthly

1 Replace the cartridges of filters S-63001A/B and S-63002A/B.

2 Replace instrument air filter

5.4.2 Yearly

1 Check the conditions of the desiccant material, which should be clear.

If necessary replace it.

2 Proceed to the full servicing of process valves. Replace their gaskets, if needed.

5.5 TROUBLESHOOTING

WARNING

DEPRESSURIZE THE DRYER COMPLETELY AND DISCONNECT MAIN POWER BEFORE SERVICING ANY VALVE, FITTING OR COMPONENT UNDER PRESSURE.
ELECTRICAL CHECKS MAY INVOLVE LIVE CONNECTIONS AND SHOULD BE PERFORMED ONLY BY QUALIFIED PERSONNEL.

	PROBLEM	POSSIBLE CAUSE	SOLUTION
1	Poor dew point	Low inlet pressure	Make sure inlet pressure does not fall below design conditions
		Excessive flow	Check design conditions
		High inlet temperature	Make sure inlet temperature corresponds to or is lower than the design value
		Desiccant material saturated with moisture	Call the supplier. Desiccant must be regenerated or replaced. It may be caused by: - low purge gas flow - malfunctioning of the pre-filter S-63001A/B - dryer overloading Determine and remedy the cause before putting the unit back on stream.
		Towers not changing over	Watch operation. If towers do not operate see pos. 2 below.
2	Switching failure	Power failure	Check power on line, fuses and/or main switch
		Failure to repressurize	Check the operation of valves (pos. 63-XV-052 and 63-XV-054)
		Faulty programmer	Replace programmer
3	Regeneration does not occur	Drain valve does not open	Check the operation of pilot valve (pos. 63-XY-052 and 63-XY-054) and of repressurization valve (pos. 63-XV-052 and 63-XV-054)
4	Pressure inside the tower which is regenerating	Decompression valve not fully open	Check the operation of pilot valve (pos. 63-XY-052 and 63-XY-054) and of repressurization valve (pos. 63-XV-052 and 63-XV-054)
5	Pressure drops across the dryer	Excessive flow	Check rated flow versus operating conditions
		Low inlet pressure	Check rated pressure versus dryer features
		Clogged desiccant retainer and/or clogged internal filters	Disassemble and service (Call supplier if needed).
		Desiccant deterioration	Replace desiccant

REMARKS

When asking for spare parts the following information should be given:

- order no. referred to dryer supplied and for which spare parts are required

and/or

- our job ref. for the dryer mentioned here over
- description of parts required
- dwg no. of the parts required
- position of the parts required

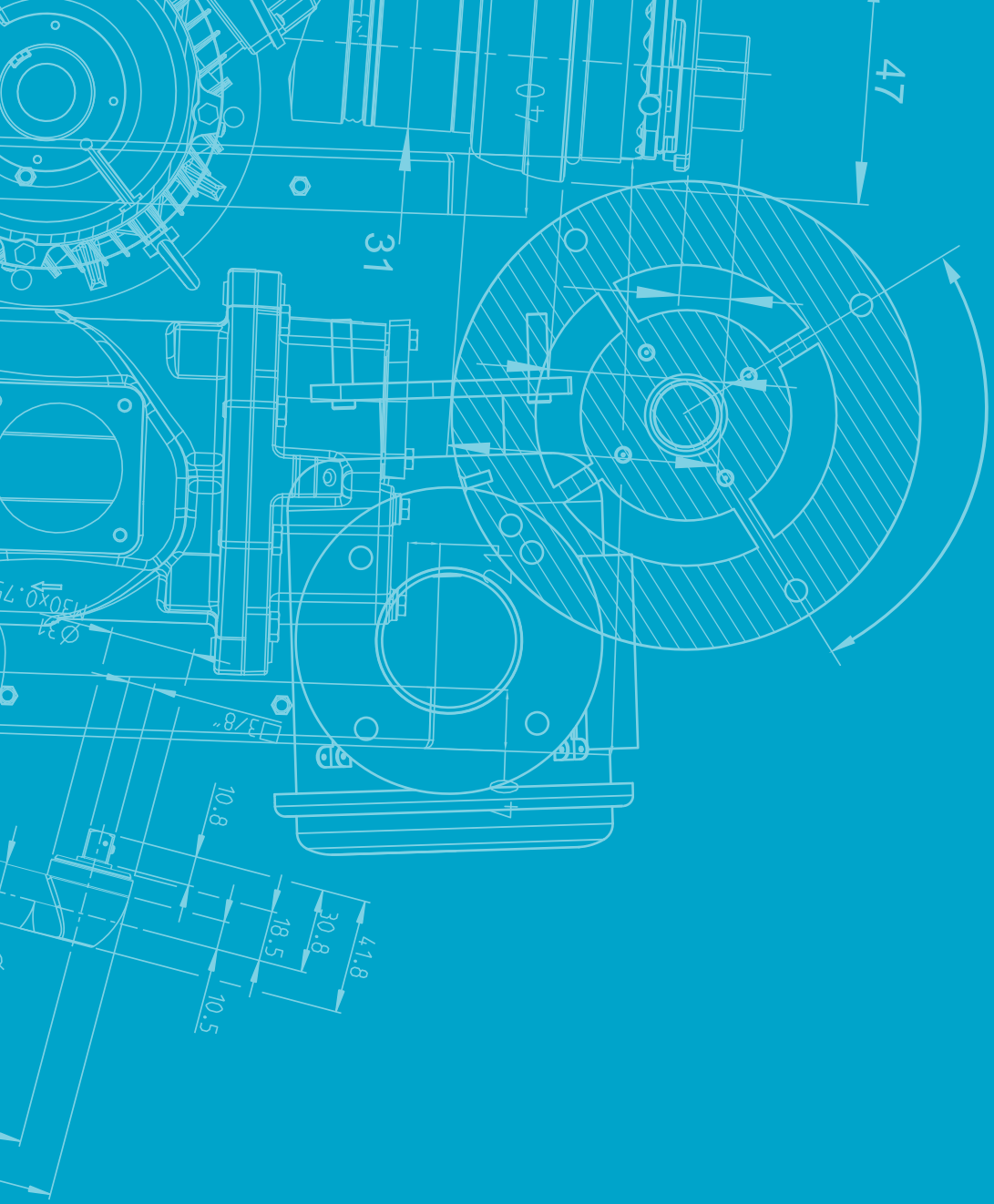
REMARKS

TO AVOID POSSIBLE DAMAGES AND INCORRECT OPERATION OF THE DRYING UNIT, WE SUGGEST TO USE ONLY ORIGINAL "COES" SPARE PARTS.

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6 AIR COMPRESSOR MANUAL

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Instruction book

Oil-free screw compressors

APF282471
ZT 55

Atlas Copco

Oil-free screw compressors

ZT 55

APF282471

Instruction book

Original instructions

WARNING



Read all safety warnings, instructions, illustrations and specifications provided with this product. Failure to follow all instructions listed in this instruction book may result in personal injury, death and/or property damage.

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This applies in particular to trademarks, model denominations, part numbers and drawings.

This instruction book is valid for CE as well as non-CE labelled machines. It meets the requirements for instructions specified by the applicable European directives as identified in the Declaration of Conformity.

April 2024

No. APF282471

www.atlascopco.com

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1 Additional safety precautions

1.1 Safety icons

Explanation

	Danger to life
	Warning
	Important note

1.2 General safety precautions

1. The operator must employ safe working practices and observe all related work safety requirements and regulations.
2. If any of the following statements does not comply with the applicable legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorized, trained, specialized personnel. The personnel should apply safe working practices by use of personal protection equipment, appropriate tools and defined procedures.
4. The compressor is not considered capable of producing air of breathing quality. For air of breathing quality, the compressed air must be adequately purified according to the applicable legislation and standards.
5. Before any maintenance, repair work, adjustment or any other non-routine checks:
    - Stop the machine
    - Press the emergency stop button
    - Switch off the voltage
    - Depressurize the machine
    - Lock Out - Tag Out (LOTO):
        - Open the power isolating switch and lock it with a personal lock
        - Tag the power isolating switch with the name of the service technician.
    - On units powered by a frequency converter, wait 10 minutes before starting any electrical repair.
    - Never rely on indicator lamps or electrical door locks before maintenance work, always disconnect and check with measuring device.

	If the machine is equipped with an automatic restart after voltage failure function and if this function is active, be aware that the machine will restart automatically when the power is restored if it was running when the power was interrupted!

6. Never play with compressed air. Do not apply the air to your skin or direct an air stream at people. Never use the air to clean dirt from your clothes. When using the air to clean equipment, do so with extreme caution and wear eye protection.
7. The owner is responsible for maintaining the unit in safe operating condition. Parts and accessories shall be replaced if unsuitable for safe operation.
8. It is prohibited to walk or stand on the unit or on its components.
9. If compressed air is used in the food industry and more specifically for direct food contact, it is recommended, for optimal safety, to use certified Class 0 compressors in combination with appropriate filtration depending on the application. Please contact your customer center for advice on specific filtration.
10. The service switch should only be operated by a trained service specialist from the manufacturer.

1.3 Safety precautions during installation

	All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

Precautions during installation

1. The machine must only be lifted using suitable equipment in accordance with the applicable safety regulations. Loose or pivoting parts must be securely fastened before lifting. It is strictly forbidden to dwell or stay in the risk zone under a lifted load. Lifting acceleration and deceleration must be kept within safe limits. Wear a safety helmet when working in the area of overhead or lifting equipment.
2. The unit is designed for indoor use. If the unit is installed outdoors, special precautions must be taken. Consult your supplier.
3. In case the device is a compressor, place the machine where the ambient air is as cool and clean as possible. If necessary, install a suction duct. Never obstruct the air inlet. Care must be taken to minimize the entry of moisture at the inlet air.
4. Any blanking flanges, plugs, caps and desiccant bags must be removed before connecting the pipes.
5. Air hoses must be of correct size and suitable for the working pressure. Never use frayed, damaged or worn hoses. Distribution pipes and connections must be of the correct size and suitable for the working pressure.
6. In case the device is a compressor, the aspirated air must be free of flammable fumes, vapors and particles, e.g. paint solvents, that can lead to internal fire or explosion.
7. In case the device is a compressor, arrange the air intake so that loose clothing worn by people cannot be drawn in.
8. Ensure that the discharge pipe from the compressor to the aftercooler or air net is free to expand under heat and that it is not in contact with or close to flammable materials.
9. No external force may be exerted on the air outlet valve; the connected pipe must be free of strain.
10. If remote control is installed, the machine must bear a clear sign stating: DANGER: This machine is remotely controlled and may start without warning.

The operator has to make sure that the machine is stopped and depressurized and that the electrical isolating switch is open, locked and labelled with a temporary warning before any maintenance or repair. As a further safeguard, persons switching on or off remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the start equipment.

11. Air-cooled machines must be installed in such a way that an adequate flow of cooling air is available and that the exhausted air does not recirculate to the compressor air inlet or cooling air inlet.
12. The electrical connections must correspond to the applicable codes. The machines must be earthed and protected against short circuits by fuses in all phases. A lockable power isolating switch must be installed near the compressor.
13. On machines with automatic start/stop system or if the automatic restart function after voltage failure is activated, a sign stating "This machine may start without warning" must be affixed near the instrument panel.
14. In multiple compressor systems, manual valves must be installed to isolate each compressor. Non-return valves (check valves) must not be relied upon for isolating pressure systems.
15. Never remove or tamper with the safety devices, guards or insulation fitted on the machine. Every pressure vessel or auxiliary installed outside the machine to contain air above atmospheric pressure must be protected by a pressure relieving device or devices as required.
16. Piping or other parts with a temperature in excess of 70˚C (158˚F) and which may be accidentally touched by personnel in normal operation must be guarded or insulated. Other high temperature piping must be clearly marked.
17. For water-cooled machines, the cooling water system installed outside the machine has to be protected by a safety device with set pressure according to the maximum cooling water inlet pressure.
18. If the ground is not level or can be subject to variable inclination, consult the manufacturer.
19. If the device is a dryer and no free extinguishing system is present in the air net close to the dryer, safety valves must be installed in the vessels of the dryer.

	Also consult the following safety precautions: Safety precautions during operation and Safety precautions during maintenance. These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein. Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

1.4 Safety precautions during operation

	All responsibility for any damage or injury resulting from neglecting these precautions, or non observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

Precautions during operation

1. Never touch any piping or components of the machine during operation.

2. Use only the correct type and size of hose end fittings and connections. When blowing through a hose or air line, ensure that the open end is held securely. A free end will whip and may cause injury. Make sure that a hose is fully depressurized before disconnecting it.
3. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
4. Never operate the machine when there is a possibility of taking in flammable or toxic fumes, vapors or particles.
5. Never operate the machine below or in excess of its limit ratings.
6. Keep all bodywork doors shut during operation. The doors may be opened for short periods only, e.g. to carry out routine checks. Wear ear protectors when opening a door.

   On machines without bodywork, wear ear protection in the vicinity of the machine.
7. People staying in environments or rooms where the sound pressure level reaches or exceeds 80 dB(A) shall wear ear protectors.
8. Periodically check that:
   - All guards are in place and securely fastened
   - All hoses and/or pipes inside the machine are in good condition, secure and not rubbing
   - No leaks occur
   - All fasteners are tight
   - All electrical leads are secure and in good order
   - Safety valves and other pressure relief devices are not obstructed by dirt or paint
   - Air outlet valve and air net, i.e. pipes, couplings, manifolds, valves, hoses, etc. are in good repair, free of wear or abuse
   - Air cooling filters of the electrical cabinet are not clogged
9. If warm cooling air from compressors is used in air heating systems, e.g. to warm up a workroom, take precautions against air pollution and possible contamination of the breathing air.
10. On water-cooled compressors using open circuit cooling towers, protective measures must be taken to avoid the growth of harmful bacteria such as Legionella pneumophila bacteria.
11. Do not remove any of, or tamper with, the sound-damping material.
12. Never remove or tamper with the safety devices, guards or insulations fitted on the machine. Every pressure vessel or auxiliary installed outside the machine to contain air above atmospheric pressure shall be protected by a pressure relieving device or devices as required.
13. Yearly inspect the air receiver. Minimum wall thickness as specified in the instruction book must be respected. Local regulations remain applicable if they are more strict.
14. It is not allowed to directly use the hot water from the compressor cooling water circuit as process water in pollution-sensitive applications such as the food and pharmaceutical industry.

	Also consult following safety precautions: Safety precautions during installation and Safety precautions during maintenance. These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein. Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

1.5 Safety precautions during maintenance or repair

	All responsibility for any damage or injury resulting from neglecting these precautions, or non observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

Precautions during maintenance or repair

1. Always use the correct safety equipment (such as safety glasses, gloves, safety shoes, etc.).
2. Use only the correct tools for maintenance and repair work.
3. Use only genuine spare parts for maintenance or repair. The manufacturer will disclaim all damage or injuries caused by the use of non-genuine spare parts.
4. All maintenance work shall only be undertaken when the machine has cooled down.
5. A warning sign bearing a legend such as "Work in progress; do not start" shall be attached to the starting equipment.
6. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
7. Close the compressor air outlet valve and depressurize the compressor before connecting or disconnecting a pipe.
8. Before removing any pressurized component, effectively isolate the machine from all sources of pressure and relieve the entire system of pressure.
9. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapors of cleaning liquids.
10. Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape.
11. Never weld or perform any operation involving heat near the oil system. Oil tanks must be completely purged, e.g. by steam cleaning, before carrying out such operations. Never weld on, or in any way modify, pressure vessels.
12. Whenever there is an indication or any suspicion that an internal part of a machine is overheated, the machine shall be stopped but no inspection covers shall be opened before sufficient cooling time has elapsed; this to avoid the risk of spontaneous ignition of the oil vapor when air is admitted.
13. Never use a light source with open flame for inspecting the interior of a machine, pressure vessel, etc.
14. Make sure that no tools, loose parts or rags are left in or on the machine.
15. All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action.
16. Before clearing the machine for use after maintenance or overhaul, check that operating pressures, temperatures and time settings are correct. Check that all control and shut-down devices are fitted and that they function correctly. If removed, check that the coupling guard of the compressor drive shaft has been reinstalled.
17. Every time the separator element is renewed, examine the discharge pipe and the inside of the oil separator vessel for carbon deposits; if excessive, the deposits should be removed.
18. Protect the motor, air filter, electrical and regulating components, etc. to prevent moisture from entering them, e.g. when steam cleaning.

19. Make sure that all sound-damping material and vibration dampers, e.g. damping material on the bodywork and in the air inlet and outlet systems of the compressor, is in good condition. If damaged, replace it by genuine material from the manufacturer to prevent the sound pressure level from increasing.
20. Never use caustic solvents which can damage materials of the air net, e.g. polycarbonate bowls.
21. **Only if applicable, the following safety precautions are stressed when handling refrigerant:**
    - Never inhale refrigerant vapors. Check that the working area is adequately ventilated; if required, use breathing protection.
    - Always wear special gloves. In case of refrigerant contact with the skin, rinse the skin with water. If liquid refrigerant contacts the skin through clothing, never tear off or remove the latter; flush abundantly with fresh water over the clothing until all refrigerant is flushed away; then seek medical first aid.

	Also consult following safety precautions: Safety precautions during installation and Safety precautions during operation. These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein. Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

1.6 Dismantling and disposal

Dismantling

Once the end of life of the machine is reached, please follow next steps:

1. Stop the machine.
2. Check all safety precautions mentioned in the previous chapters to secure safe handling (e.g. LOTO, cool-down, depressurize, discharge, ...).
3. Separate the harmful from the safe components (e.g. drain oil from oil containing parts).
4. Refer to the disposal topic mentioned below.

Disposal of electrical and electronic appliances (WEEE)

This equipment falls under the provisions of the European Directive 2012/19/EU on waste electrical and electronic appliances (WEEE) and may not be disposed as unsorted waste.



The equipment is labelled in accordance with the European Directive 2012/19/EU with the crossed-out wheelie bin symbol.

At the end of life-time of the electric and electronic equipment (EEE) it must be taken to separate collection.

For more information check with your local waste authority, customer center or distributor.

Disposal of other used material

Used filters or any other used material (e.g. filter bags, filter media, desiccant, lubricants, cleaning rags, machine parts, etc.) must be disposed of in an environmentally friendly and safe manner, and in line with the local recommendations and environmental legislation.

2 General description

2.1 Introduction

General views



Figure 1: General view Pack compressor

Ref.	Name
MK5	Elektronikon Mk5–Touch regulator
S2	Emergency stop button

This unit is a two-stage, electric motor driven screw compressor which delivers oil-free, pulsation-free air.

ZT compressors are air-cooled.

The compressor is enclosed in a sound-insulated bodywork and includes mainly:

- Air filter
- Low-pressure compressor element
- Intercooler
- High-pressure compressor element
- Aftercooler
- Water separators
- Electronic water drain
- Electric motor
- Drive coupling
- Gear casing
- Elektronikon^{TM} control system
- Safety valves

Elektronikon^{TM} control system

The compressor is controlled by an electronic regulator which:

- Controls the operation of the compressor
- Reduces the power consumption
- Warns the operator in case of an abnormal operating condition
- Protects the compressor
- Monitors components subject to service
- If activated, the regulator can automatically restart the compressor after voltage failure
- Has an internal connectivity device

Anchor pads

Steel plates on the side of the frame can be turned over to be used as anchor pads. Anchor bolts are shipped loose with the compressor. With these plates and bolts the compressor frame can be fixed to the floor.

Connections

DIN flanges

2.2 Air system

Flow diagram

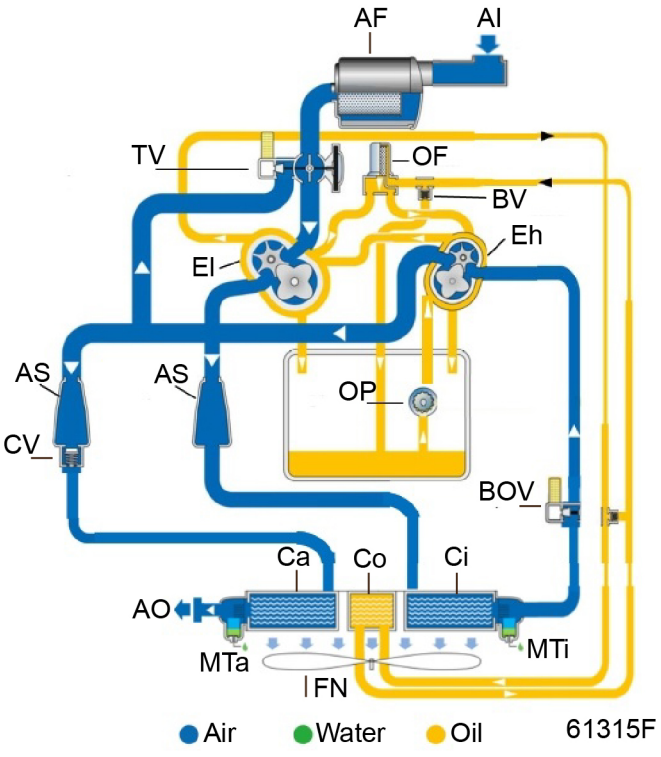


Figure 2: Flow diagram Pack compressor

Reference	Name
AF	Air filter
AO	Air outlet

Reference	Name
AS	Silencer
BV	By-pass valve
Ca	Aftercooler
Ci	Intercooler
Co	Oil cooler
CV	Check valve
Eh	High-pressure compressor element
El	Low-pressure compressor element
MTa	Moisture trap, aftercooler
MTi	Moisture trap, intercooler
OF	Oil filter
OP	Oil pump

Description

Air drawn through the filter (AF) is compressed in the low-pressure compressor element (El).

The cooled air is further compressed in the high-pressure compressor element (Eh) and discharged through the silencer (AS) and aftercooler (Ca).

The compressed air leaves the compressor via the air outlet (AO).

2.3 Cooling system

Cooling system for ZT compressors

The compressors are fitted with an oil cooler (Co), intercooler (Ci) and aftercooler (Ca). The coolers are air-cooled, the cooling air is generated by fan (FN).

2.4 Oil system

Description

Oil is circulated by pump (OP) from the sump of the gear casing through the cooling jackets of the compressor elements and then through the oil cooler (Co).

The oil passes through oil filter (OF) towards the bearings and timing gears.

By-pass valve (BV) opens if the oil pressure should rise above a given value.

2.5 Condensate drain system

Description

Two condensate traps are installed:

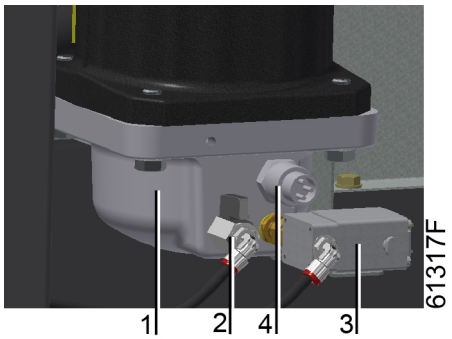
- one downstream of the intercooler, to prevent condensate from entering the compressor element
- one downstream of the aftercooler, to prevent condensate from entering the air outlet pipe

The condensate traps are connected to an ERD. Refer to *Elektronikon regulated drain (ERD)*

2.6 Elektronikon regulated drain (ERD)

Description

The drain consists of a capacitive sensor which is incorporated in the drain collector and of a pilot valve which is placed outside the drain collector. A drain opening delay timer is started when the collector is filled up to the level of the capacitive sensor. As long as the delay timer is running, extra condensate will be collected and the level will rise even higher than the position of the sensor. As soon as the delay timer has expired, the pilot valve (normally open) is deactivated and the diaphragm opens the outlet, discharging the condensate. From the moment that the sensor is not detecting any condensate anymore, a drain closing delay timer is started. The pilot valve will still drain the condensate during the run of this timer to make sure that the remaining amount of condensate is drained. The pilot valve is activated when the timer has expired, the outlet closes quickly without wasting compressed air.



Reference	Description
1	Drain receiver
2	Manual valve
3	Solenoid valve
4	Sensor

If the controller detects water in the intercooler or aftercooler drain receiver for too long a period, a shutdown is generated. If water is detected on the integrated dryer drain receiver for too long a period, a warning is generated.

The level switch is a capacitive sensor which generates a high signal when no water is present. The solenoid valves of the intercooler and aftercooler/integrated dryer drains are different. The solenoid valve of the intercooler drain has a high flow but cannot handle high pressures. The solenoid valve on the aftercooler/integrated dryer drains has less flow but can handle higher pressures. It is not allowed to open the valves as they can loose their set point. Special attention must be paid to the correct wiring of the different level switches and solenoid valves.

The output of the level switch can be called up on the screen of the Elektronikon regulator. The reading does not indicate whether the solenoid valve is open or closed, but indicates whether the level switch is detecting water in the collector. Since there is a drain opening delay timer, the display on the Elektronikon can show "Condensate Drain IC Open", while the solenoid valve is still closed. Changes to the Elektronikon settings are not allowed. The "Always pressurized" bit must be activated on aftercooler and integrated dryer drains. On the intercooler it is not allowed to activate this bit.

A functionality test is possible through the Elektronikon regulator. By performing this test, all solenoid valves will be opened for a short time (e.g. 15 seconds). Refer to the Elektronikon chapter for more details.

2.7 Electrical system

Main components



Figure 3: General view Pack compressor

Ref.	Name
1	Elektronikon™ regulator
2	Emergency button
3	Electric/converter cabinet

Electric cabinet

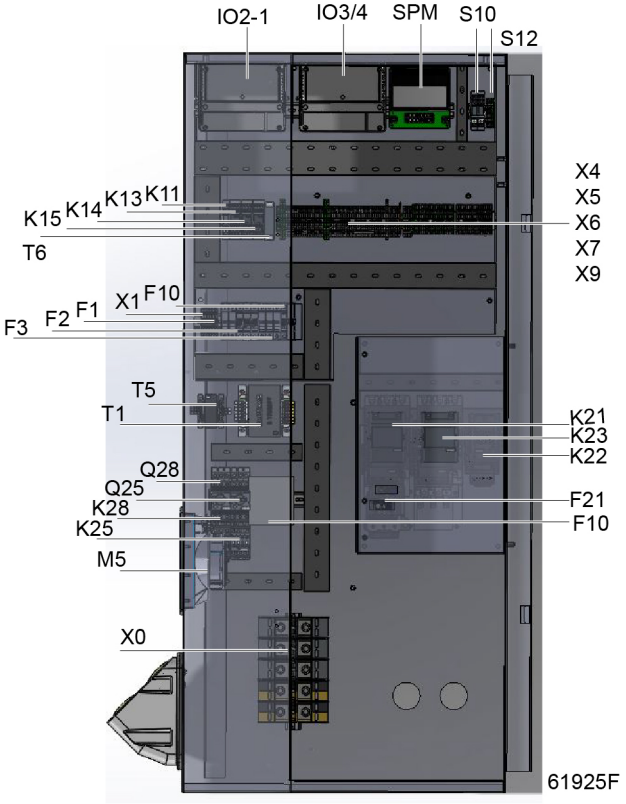


Figure 4: Electric cabinet

Reference	Description
IO2–1	Expansion module
IO3/4	Expansion module (optional)
SPM	Expansion module, for SPM (optional)
M5	Cubicle fan
F21	Overload relay
F10	Fuses, auxiliary circuit
K11-K13-K14-K15	Auxiliary relay, load indication
K28	Line contactor, heater (optional)
K21	Line contactor
K22	Wye contactor
K23	Delta contactor
K25	Line contactor, fan
T1	Main transformer
T5	Transformer, energy recovery (optional)
T6	Power supply, energy recovery (optional)
Q25	Circuit breaker, fan
Q28	Circuit breaker, heater
F1-F2-F3	Fuses, control circuit
F40/41	Circuit breakers, control circuit (optional)
F51	Circuit breakers, control circuit
X0	Terminals, power supply
X1-X4-X5-X6-X7-X9	Terminal strip

2.8 External compressor status indication

Warning

	Stop the compressor and switch off the voltage before connecting external equipment. Consult the Safety precautions.

Connections for external compressor status indication

Terminal strip (1X7) is fitted with auxiliary contacts for external indication of:

Indication	Relay	Terminals on strip 1X7	Maximum load
Automatic operation	K05–1	1-2	10 A / 230 V AC
Warning	K06–1	3-4	10 A / 24 V AC
Shut-down	K07–1	5-6	10 A / 24 V AC
Compressor loaded	K11	9-10	8 A / 250 V AC
Compressor running	K13	7-8	6 A / 250 V AC
Warning ring type terminals	K55		8 A / 250 V AC
Shut-down ring type terminals	K56		8 A / 250 V AC

2.9 Connectivity and SMARTLINK

General

The machine comes with an Elektronikon Touch controller which has an internal connectivity device. The Touch controller allows read-out of a number of parameters of the machine on a user login-protected web site called **SMART**LINK. The Touch controller has an integrated antenna.

Safety precautions

It is important to follow all regulations regarding the use of radio equipment, in particular regarding the possibility of radio frequency (RF) interference. Please follow the safety advice given below carefully.

- Respect restrictions on the use of radio equipment in fuel depots, chemical plants or other explosive environments.
- Avoid operation close to inadequately protected personal medical devices such as hearing aids and pacemakers. Consult the manufacturers of the medical device to determine if it is adequately protected.
- Avoid operation close to other electronic equipment which may also cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturer recommendations.
- Respect a distance from the human body of at least 20 cm (8 inch) during operation.
- Do not operate the device in areas where cellular modems are not advised without proper device certifications. These areas include environments where cellular radio can interfere, such as explosive atmospheres, medical equipment, or any other equipment which may be susceptible to any form of radio interference. The modem can transmit signals that could interfere with this equipment.

SMARTLINK

The machine is **SMART**LINK-ready.

SMARTLINK is Atlas Copco's web-based platform to monitor compressed air installations. It is available in 3 product levels:

- **SMART**LINK Service

  SMARTLINK Service rules out all uncertainties. Scheduling maintenance visits becomes as simple and easy as it should be; the service log book is always just one click away and the online link with Atlas Copco allows to request and quickly receive quotes for spare parts or additional services.

  This product level is free of charge and available for 3 years following the machine purchase.
- **SMART**LINK Uptime

  SMARTLINK Uptime keeps your compressors up and running. By e-mail and/or text, you receive all relevant machine indications (warnings and shutdowns) in advance. Based on this information, you can then take all necessary actions and measures to avoid the risk of a breakdown.

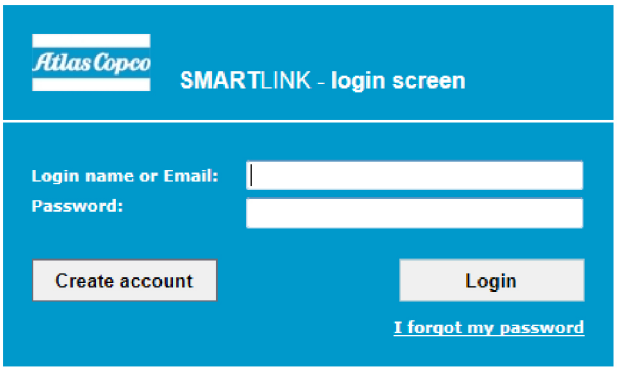
  This product level is available as a free of charge 3-month trial.
- **SMART**LINK Energy

  SMARTLINK Energy safeguards the performance of your equipment. It enables you to continuously monitor and analyze the energy efficiency of the compressor room. You decide which performance indicators, benchmarks and reports are created. You can make accurate and immediate improvements when needed. The results can be used for energy monitoring according to ISO50001.

  This product level is available as a free of charge 3-month trial.

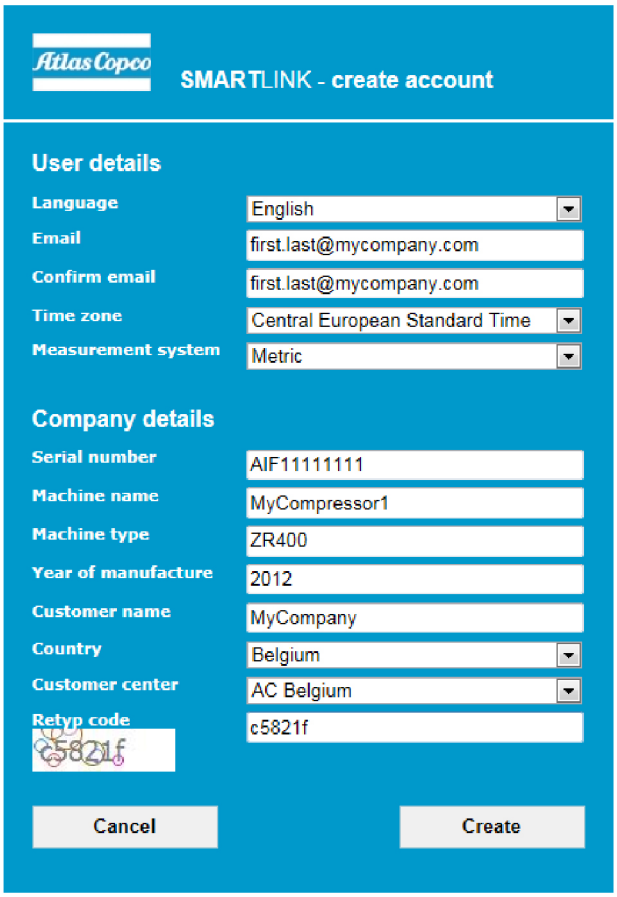
Once a **SMART**LINK level is chosen, gaining access is the next step. To gain access at least one machine **SMART**LINK-ready component (compressor, dryer, ...) is required. Follow the next steps:

- Gather the information about the **SMART**LINK-ready machine(s) (e.g. picture of the data plate; invoice,…)
- Go to the **SMART**LINK web site http://www.atlascopco.com/smartlink
- Click on the left button in the screen below.



59851F

- Use the data of the **SMART**LINK–ready machine to register as a user.



59852F

- You will receive an e-mail with login credentials.
- Go to the **SMART**LINK web site http://www.atlascopco.com/smartlink, log in with the user credentials.
- Enjoy **SMART**LINK!
- In case more **SMART**LINK-ready machines are available, you can add these via *My Profile*.

3 Elektronikon™ Touch controller

3.1 Controller



Figure 5: The Elektronikon™ Touch controller

Introduction

The controller has the following functions:

- Controlling the unit
- Protecting the unit
- Monitoring components subject to service
- Automatic Restart After Voltage Failure (ARAVF)

Automatic control of the unit

The controller maintains the net pressure between programmable limits by automatically loading and unloading the unit (fixed speed units) or by adapting the motor speed (units with frequency converter).

A number of programmable settings, e.g. the unloading and loading pressures (for fixed speed units), the setpoint (for units with frequency converter), the minimum stop time, the maximum number of motor starts and several other parameters are taken into account.

The controller stops the unit whenever possible to reduce the power consumption and restarts it automatically when the net pressure decreases. If the expected unloading period is too short, the unit is kept running to prevent too short standstill periods.

	It is possible to program a number of time-based commands for automatic start/stop. Take into account that a start command will be executed (if programmed and activated), even after manually stopping the unit.

Protecting the unit

Shutdown

Several sensors are provided on the unit. If one of the measured signals exceeds the programmed shutdown level, the unit will be stopped.

Example: If the element outlet temperature exceeds the programmed shutdown level, the unit will be stopped. This will be indicated on the display of the controller.

The unit will also be stopped in case of overload of the drive motor or fan motor.

	Before remedying, consult the *Safety precautions*. Before resetting a warning or shutdown message, always solve the problem. Frequently resetting these messages without remedying may damage the unit.

Shutdown warning

A shutdown warning level is a programmable level below the shutdown level.

If one of the measurements exceeds the programmed shutdown warning level, a message will appear on the display and the general alarm LED will light up to warn the operator before the shutdown level is reached.

The message disappears as soon as the warning condition disappears.

When the shutdown warning is shown, press stop button to stop the unit and wait until the unit has stopped. Switch off the voltage, inspect the unit and remedy if necessary. The warning message will disappear as soon as the warning condition disappears.

Service warning

A number of service operations are grouped as a Service Plan. Each Service Plan has a programmed time interval. If the service timer exceeds a programmed value, this will be indicated on the display to warn the operator to carry out the service actions belonging to that Service Plan.

When the service warning is shown, stop the unit, switch off the voltage and contact your supplier to schedule the necessary maintenance actions. See section **Preventive maintenance schedule**.

Automatic Restart After Voltage Failure (ARAVF)

The controller has a built-in function to automatically restart the unit when the voltage is restored after voltage failure.

For units leaving the factory, this function is made inactive. If desired, the function can be activated. Consult your supplier.

	If the function is activated and provided the regulator was in the automatic operation mode, the unit will automatically restart if the supply voltage to the module is restored. The ARAVF label shall be glued next to the controller.

3.2 Control panel

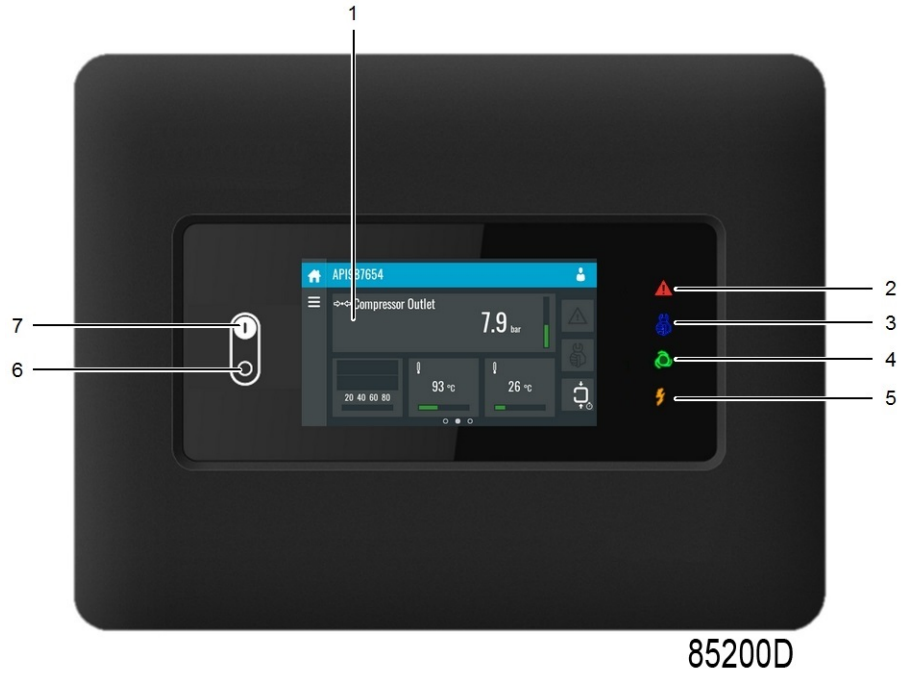


Figure 6: Control panel

Parts and functions

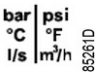
Reference	Designation	Function
1	Touch screen	Shows the unit operating condition and several icons to navigate through the menu. The screen can be operated by touch.
2	Warning sign	Flashes in case of a shut-down and is lit in case of a warning condition.
3	Service sign	Lit when service is needed.
4	Operation sign	Lit when the unit is running in automatic operation.
5	Voltage sign	Indicates that power is switched on.
6	Stop button	Stops the unit.
7	Start button	Starts the unit. The operation sign (4) lights up. The controller is operative.

3.3 Icons used

Menu icons

Menu	Icon	Menu	Icon	Menu	Icon
Data	 85233D	Status	 85239D		
		Inputs	 85240D		

Menu	Icon	Menu	Icon	Menu	Icon
		Outputs	85241D		
		Counters	85242D		
		Aux. Equipment Parameters	85243D	Converters	85251D
Service	85234D	Service		Overview	85252D
				Service Plan	85253D
				Service History	85254D
		Service functions	85244D		
		Clean Screen	85302D		
Week Timer	85235D			Week	85303D
				Remaining Running Time	85304D
Event History	85236D	Saved Data	85245D		
Machine Settings	85237D	Alarms	85239D		
		Regulation	85346D		
		Control Parameters	85347D		
		Aux. Equipment Parameters	85243D	Converter(s)	85251D
				Fan	85255D
				Internal SmartBox	85256D
		Auto Restart	85274D		
Controller Settings	85238D	Network Settings	85246D	Ethernet Settings	85257D
				CAN Settings	85258D

Menu	Icon	Menu	Icon	Menu	Icon
		Localisation	 85247D	Language	 85259D
				Date/Time	 85260D
				Units	 85261D
		User Password	 85248D		
		Help	 85249D		
		Information	 85250D		

Status icons

Icon	Description
 85262D	Motor Stopped
 85263D	Motor Stopped Wait
 85264D	Running Unloaded
 85265D	Manual Unload
 85266D	Running Unloaded Wait
 85267D	Running Loaded
 85268D	Failed to Load
 85269D	Running Loaded Wait
 85270D	Manual Stop
 85271D	Machine Control Mode, Local
 85272D	Machine Control Mode, Remote
 85273D	Machine Control Mode, LAN

 85274D	Automatic Restart After Voltage Failure
 85275D	Week Timer Active

System icons

Icon	Description
 85276D	Basic User
 85277D	Advanced User
 85278D	Service User
 85279D	Antenna 25%
 85280D	Antenna 50%
 85281D	Antenna 75%
 85282D	Antenna 100%
85283D	Change between screens (indication)
 85284D	Energy recovery
 85285D	Dryer
 85286D	Element
 85287D	Drain(s)
 85288D	Analogue Output
 85289D	Menu
 85290D	Reset
 85291D	Auto Restart

 85292D	Filter(s)
 85293D	Cooler
 85294D	Valve(s)
 85295D	Power Meter

Input icons

Icon	Description
 85296D	Pressure
 85297D	Temperature
 85298D	Special Protection
 85299D	Open
85300D	Closed

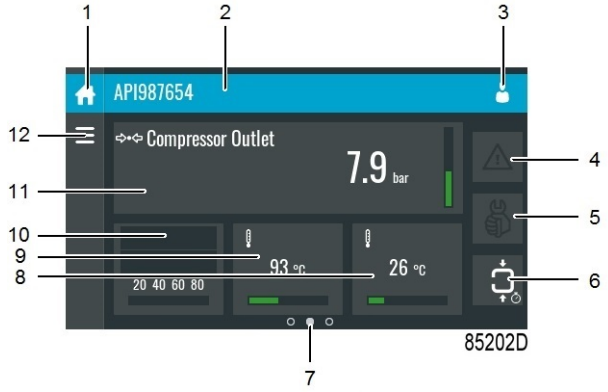
	This chapter gives a general survey of available icons. Not all icons mentioned in this chapter are applicable to every machine.

3.4 Main screen

Function

The Main screen is the screen that is shown automatically when the voltage is switched on. It is switched off automatically after a few minutes when there is no touch input.

Description



Reference	Designation	Function
1	Home button	The home button is always shown and can be tapped to return to the main screen.
2	Screen information	On the main screen, the screen information bar shows the serial number of the machine. When scrolling through menus, the name of the current menu is shown.
3	Access level button	The access level button is always shown and can be tapped to change the current user access level.
4	Alarm button	The alarm button can be tapped to show the current alarms. If an alarm occurs, the icon on the button will be red.
5	Service button	The service button can be tapped to show the service information.
6	Status	This icon shows the current status of the unit.
7	Page indicator	Indicates which page you currently see. The middle indication is the main screen, left is the menu screen and at the right the quick access screen. Swipe left or right to go to another screen.
8, 9, 10, 11	These fields can contain a history chart, an input or a counter value, depending on the type of the machine.	Tap the field to view the type of measurement. This will be shown in the screen information bar. Examples of inputs: • Ambient temp • Outlet • Dryer dewpoint Examples of counters: • Running hours • Load relay • Loaded hours
12	Menu button	The menu button is always shown and can be tapped to go to the menu.

3.5 Quick access screen

Function

The screen is used to directly access some frequently used functions.

Procedure

The Quick access screen can be viewed by swiping left, starting from the main screen.

Description



Through this screen, several important settings can be viewed and modified.

Function	Description
Setpoints	Several setpoints can be modified by tapping this icon.
Control mode	The control mode can be changed by tapping this icon. • Local control via start/stop buttons • Remote control via digital input(s) • LAN control via the network. When in Remote or LAN control, the start/stop buttons on the controller will not work.
Display language	The display language of the controller can be changed by tapping this icon.
Manual unload (only on fixed speed units)	When tapped, the machine will go in Manual unload mode until the icon is tapped again.
Week timer	Week timers can be set by tapping this icon.
Remaining running time	The Remaining running time can be set and modified by tapping this icon.
Internal SmartBox	The reception quality of the internal antenna can be monitored.  85256D Each bar represents 25% reception strength. If the four bars are filled, the reception strength is 100%. If only one bar is filled, the reception strength is just 25%.
Auto restart	Auto restart can be activated by tapping this icon.

3.6 Menu screen

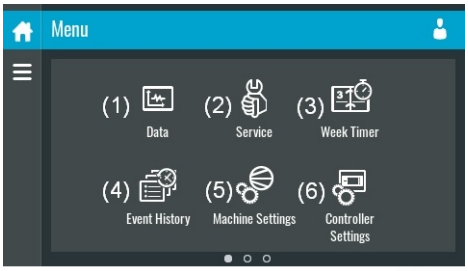
Function

This screen is used to display the different menus where settings can be viewed or changed.

Procedure

The Menu screen can be viewed by tapping the Menu button or by swiping right, starting from the main screen.

Description



Reference	Designation	Function
(1)	Data	The data menu contains the status of the unit, information about the Inputs, Outputs and Counters. The Auxiliary equipment can also be viewed through this menu.
(2)	Service	The service menu contains the Service information. The ‘Clean screen’ function can be used to clean the touchscreen.
(3)	Week timer	Multiple Week timers and a Remaining running time can be set through this menu.
(4)	Event history	In case of an alarm, the Status information of the unit is saved and can be viewed through this menu.
(5)	Machine settings	Alarms settings, Regulation settings and Control parameters can be changed through this menu. Auxiliary equipment parameters can also be changed. The Auto restart function can be set through this menu. This function is password protected.
(6)	Controller settings	Network settings, Localisation settings and a User password can be set through this menu. There is also a Help page available and the Controller information can be shown.

Menu structure

Operating the controller can be done by swiping through screens and tapping icons or menu items.



This is the main menu structure. The structure can be different depending on the configuration of the unit.

3.7 Data menu

Function

This screen is used to display the following submenus:

- Status
- Inputs
- Outputs
- Counters
- Aux. Equipment

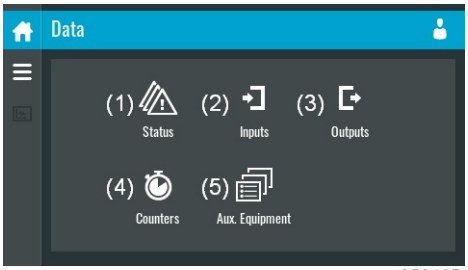
These submenus can be entered by tapping the icons.

Procedure

To enter the Data menu screen:

1. Tap the Menu button
2. Tap the Data icon

Description

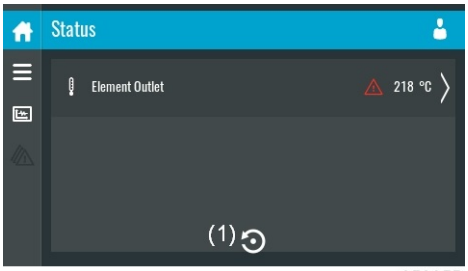


85210D

Reference	Designation
(1)	Status menu
(2)	Inputs menu
(3)	Outputs menu
(4)	Counters menu
(5)	Auxiliary equipment menu

Status menu

Tap the Status icon to enter the Status menu.



85205D

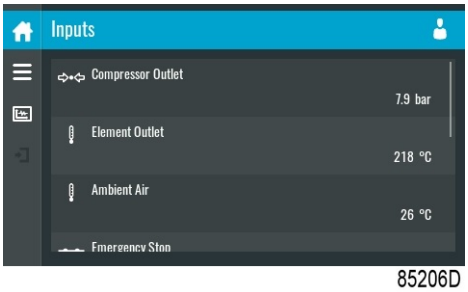
This menu shows the current status of the unit.

If an alarm is active, it can be viewed by tapping the alarm message. To reset an alarm, tap the reset button (1).

	Before remedying, consult the *Safety precautions*. Before resetting a warning or shutdown message, always solve the problem. Frequently resetting these messages without remedying may damage the unit.

Inputs menu

Tap the Inputs icon to enter the Inputs menu.



85206D

This menu shows information about all the inputs.

Outputs menu

Tap the Outputs icon to enter the Outputs menu.



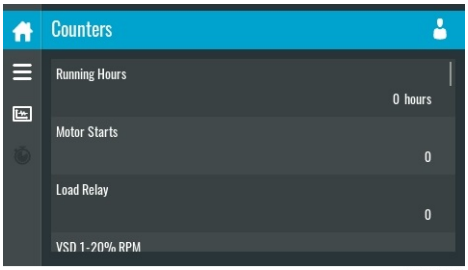
85207D

This menu shows information about all the outputs.

	Voltage-free outputs may only be used to control or monitor functional systems. They should NOT be used to control, switch or interrupt safety related circuits. Check the maximum allowed load on the label.
	Stop the unit and switch off the supply before connecting external equipment. Check the *Safety precautions*.

Counters menu

Tap the Counters icon to enter the Counters menu.

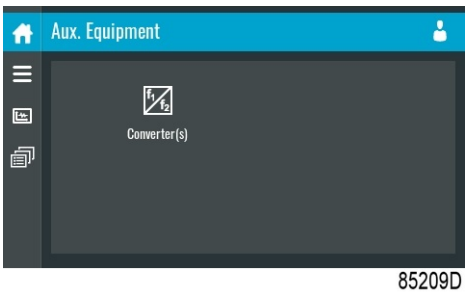


85208D

This menu shows an overview of all actual hours and counters of the unit and controller.

Auxiliary equipment menu

Tap the Aux. Equipment icon to enter the Aux. equipment menu.



85209D

This menu shows an overview of all auxiliary equipment fitted.

3.8 Service menu

Function

This screen is used to display the following submenus:

- Service
- Service functions (Only visible as advanced user)
- Clean screen

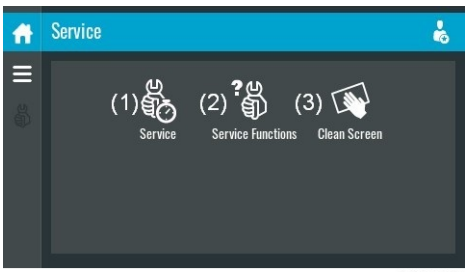
These submenus can be entered by tapping the icons.

Procedure

To enter the Service menu screen:

1. Tap the Menu button
2. Tap the Service icon

Description

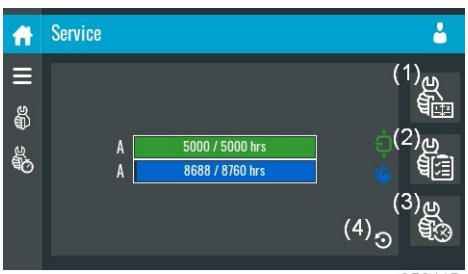


85213D

Reference	Designation
(1)	Service
(2)	Service functions (Only visible as advanced user)
(3)	Clean screen

Service menu

Tap the Service icon to enter the Service menu.



85211D

This menu shows the remaining Running Hours and the remaining Real Time Hours until the next service. The first row (A) shows the Running Hours when the first service is needed (green), the second row shows the Real Time Hours (blue)

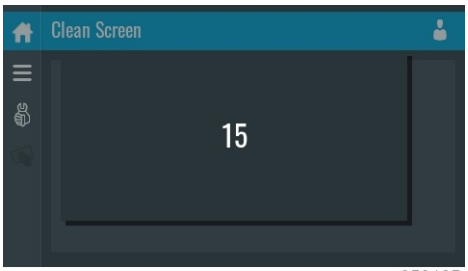
A service overview can be viewed by tapping icon (1).

The service history can be viewed by tapping icon (3).

When a service plan interval is reached, a message will appear on the screen.

Clean screen

Tap the Clean Screen icon to start the 15 seconds countdown to perform cleaning of the touchscreen.



85212D

The touchscreen and the start and stop button become inactive for 15 seconds.

3.9 Week timer menu

Function

This screen is used to set up to 4 different week timers with each up to 8 settings per day.

The week timers can be activated through this screen.

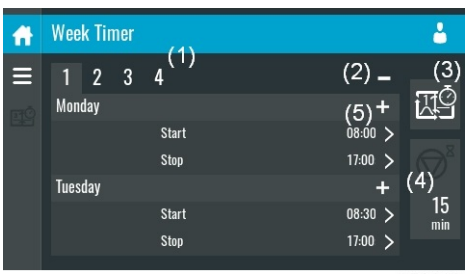
A Remaining Running Time can be set from 5 up to 240 minutes.

Procedure

To enter the Week Timer menu screen:

1. Tap the Menu button
2. Tap the Week Timer icon

Description



85214D

Reference	Designation	Function
(1)	Add or select week	If less than 4 weeks are programmed, tap the '+' button to add a week.
(2)	Remove week	Tap to remove a programmed week timer.

Reference	Designation	Function
(3)	Activate week timer	A selection screen pops up. The user can choose the correct week by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.
(4)	Remaining running time	A selection screen pops up. The user can change the remaining time by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.
(5)	Add setting	A selection screen pops up. The user can change the setting by swiping up or down and confirm by tapping 'V' or decline by tapping 'X'.

3.10 Event history menu

Function

This screen is used to display the saved data in case of an alarm.

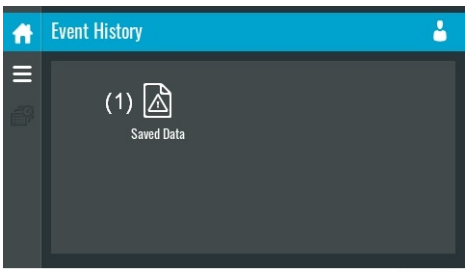
These submenus can be entered by tapping the icons.

Procedure

To enter the Event history menu screen:

1. Tap the Menu button
2. Tap the Event History icon

Description



85216D

Reference	Designation
(1)	Saved Data

Saved data

Tap the Saved Data icon to enter the Saved Data menu.



85215D

Scroll through the items swiping up and down in this list. The event date and time is shown at the right side of the screen.

Press on one of the items in the list for more information reflecting the status of the unit when the shutdown occurred.

3.11 Machine settings menu

Function

This screen is used to display the following submenus:

- Alarms
- Regulation
- Control Parameters

  Only visible if the machine has adaptable parameters.
- Aux. Equipment parameters
- Auto Restart

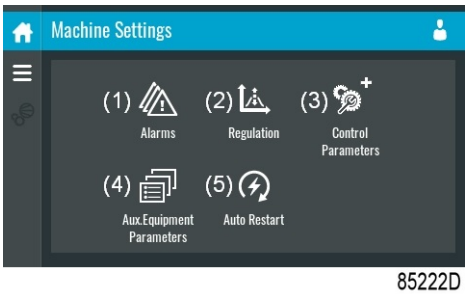
These submenus can be entered by tapping the icons.

Procedure

To enter the Machine settings menu screen:

1. Tap the Menu button
2. Tap the Machine Settings icon

Description

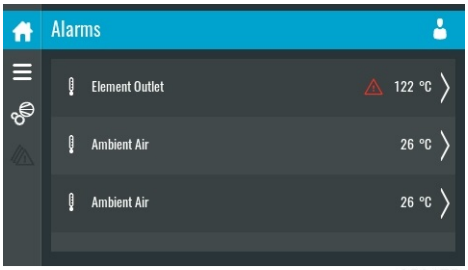


85222D

Reference	Designation
(1)	Alarms menu
(2)	Regulation menu
(3)	Control Parameters menu
(4)	Aux. Equipment Parameters menu
(5)	Auto Restart menu

Alarms menu

Tap the Alarms icon to enter the Alarms menu.



85217D

A list of all alarms is shown.

When pressing on one of the items in this list, the warning and/or shutdown levels are shown for this alarm.

Regulation menu

Tap the Regulation icon to enter the Regulation menu.



85218D

Setpoints or pressure bands can be modified through this menu.

Modify a setting

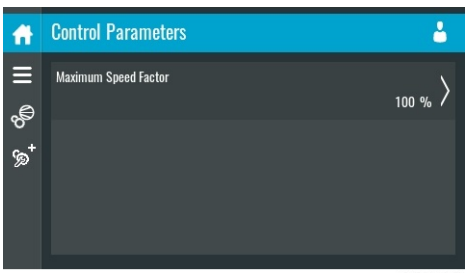
When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

Change a selection

When tapping a list item, a selection screen pops up. The user can change the selection by swiping up or down and confirm by tapping 'V' or decline by tapping 'X'.

Control parameters menu

Tap the Control Parameters icon to enter the Control Parameters menu.



85219D

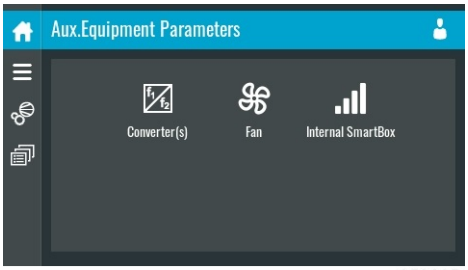
This menu shows information about the Control Parameters.

Modify a setting

When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

Auxiliary equipment parameters menu

Tap the Aux. Equipment Parameters icon to enter the auxiliary equipment parameters menu.



85220D

This menu shows an overview of all the auxiliary equipment fitted.

Through this menu, the parameters of the auxiliary equipment can be changed.

Modify a setting

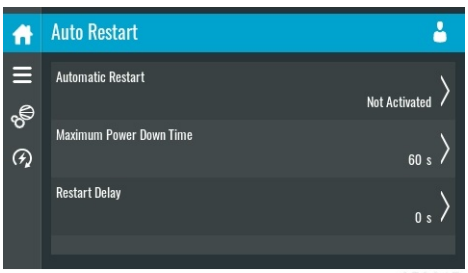
When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

Auto restart menu

	If the function is activated and provided the regulator was in the automatic operation mode, the unit will automatically restart if the supply voltage to the module is restored. The ARAVF label shall be glued next to the controller.

Tap the Auto restart icon to enter the Auto Restart menu.

The controller has a built-in function to automatically restart the unit when the voltage is restored after voltage failure. For units leaving the factory, this function is made inactive. If desired, the function can be activated. Consult your supplier.



85221D

Through this menu, the automatic restart can be activated. The activation is password protected.

The automatic restart settings can also be changed.

Enter a password

When tapping a password protected item, a selection screen pops up. The user can enter the password by swiping up or down to select the desired number. Once the 4 digits are entered, the user can confirm by tapping 'V' or decline by tapping 'X'.

Modify a setting

When clicking a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

3.12 Controller settings menu

Function

This screen is used to display the following submenus:

- Network Settings
- Localisation
- User Password
- Help
- Information

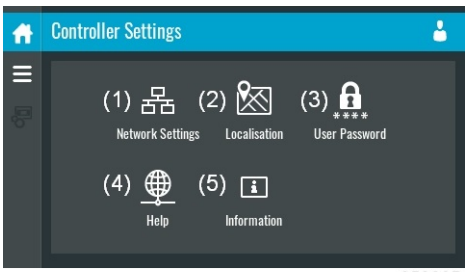
These submenus can be entered by tapping the icons.

Procedure

To enter the Controller Settings menu screen:

1. Tap the Menu button
2. Tap the Controller Settings icon

Description

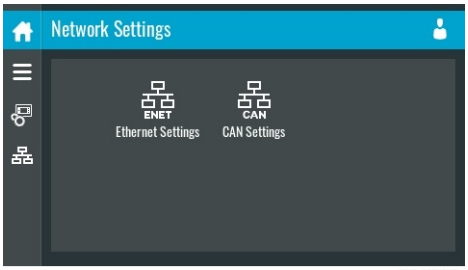


85228D

Reference	Designation
(1)	Network Settings menu
(2)	Localisation menu
(3)	User Password menu
(4)	Help menu
(5)	Information menu

Network settings menu

Tap the Network Settings icon to enter the Network Settings menu.



85223D

Ethernet Settings

The list of Ethernet Settings is shown. When ethernet is turned off, the settings can be modified.

CAN Settings

The list of CAN Settings is shown. When CAN is turned off, the settings can be modified.

Modify a setting

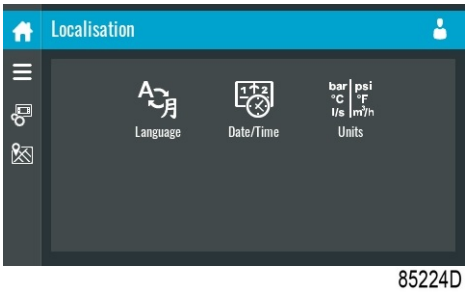
When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

Change a selection

When tapping a list item, a selection screen pops up. The user can change the selection by swiping up or down and confirm by tapping 'V' or decline by tapping 'X'.

Localisation menu

Tap the Localisation icon to enter the Localisation menu.



85224D

Language

The language setting of the controller can be modified through this menu.

Date/Time

The date and time settings of the controller can be modified through this menu.

Units

The units displayed can be modified through this menu.

Modify a setting

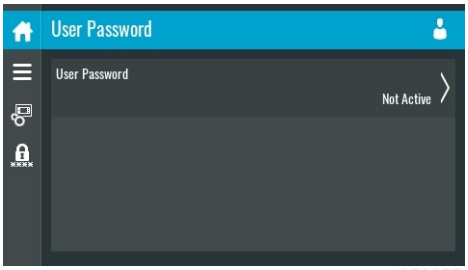
When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

Change a selection

When tapping a list item, a selection screen pops up. The user can change the selection by swiping up or down and confirm by tapping 'V' or decline by tapping 'X'.

User password menu

Tap the User Password icon to enter the User Password menu.



85225D

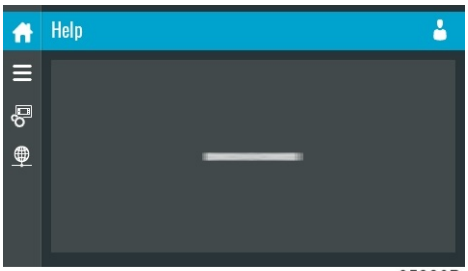
The user password can be activated or deactivated through this menu. Enter and confirm a user password to activate, repeat to deactivate.

Enter a password

When tapping a password protected item, a selection screen pops up. The user can enter the password by swiping up or down to select the desired number. Once the 4 digits are entered, the user can confirm by tapping ‘V’ or decline by tapping ‘X’.

Help menu

Tap the Help icon to enter the Help menu.

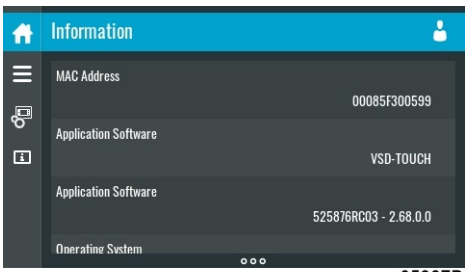


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This menu can show a link to the web page of your supplier, a helpdesk phone number or other helpful information.

Information menu

Tap the Information icon to enter the Information menu.



85227D

This menu shows information about the controller.

3.13 Access level

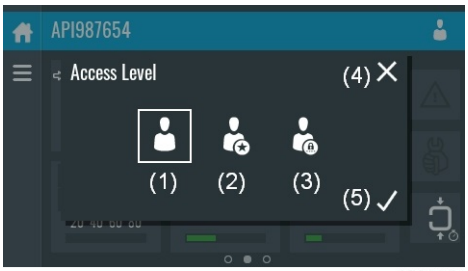
Function

Through this pop-up screen the access level settings can be viewed or changed.

Procedure

The Access Level screen can be viewed or changed by tapping the Access Level button at the upper right corner of the screen.

Description



85229D

Reference	Designation	Function
(1)	User	A basic set of parameters is visualized, no password required.
(2)	Service	This access level is only to be used by certified technicians.
(3)	Full	This access level is only to be used by certified technicians.
(4)	Decline	Tap to decline the selected user level.
(5)	Confirm	Tap to confirm the selected user level.

4 Installation

4.1 Installation warnings

	• The compressor is intended for indoor use only.
	• Working with machinery controlled by a frequency converter requires special safety precautions which depend on the type of network (TN, TT or IT). Consult Atlas Copco.
	• Consult the “Safety precautions during installation” before starting the installation.
	• Cooling air for starter cabinet:
	  • Contamination levels (ambient) according to IEC 60 721-3-3.
	  • Chemical gases: Class 3C2
	  • Solid particles: Class 3S2
	  • No conductive dust allowed
	  • No condensation allowed
	  • Maximum allowed relative humidity is 60 % in the presence of corrosive gases.
	• When good EMC practices for installation are followed, the compressor qualifies for installation in EMC category C3, according to EN61800-3, for use in a second environment (a second environment includes all establishments other than those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes).

	The compressor is not intended to be used on a low-voltage public network which supplies domestic premises. Radio frequency interference can be expected if used on such a network.

	The safety of the control system according ISO 13849 is based on 60000 motor starts per year.

4.2 Dimension drawing

Dimensions

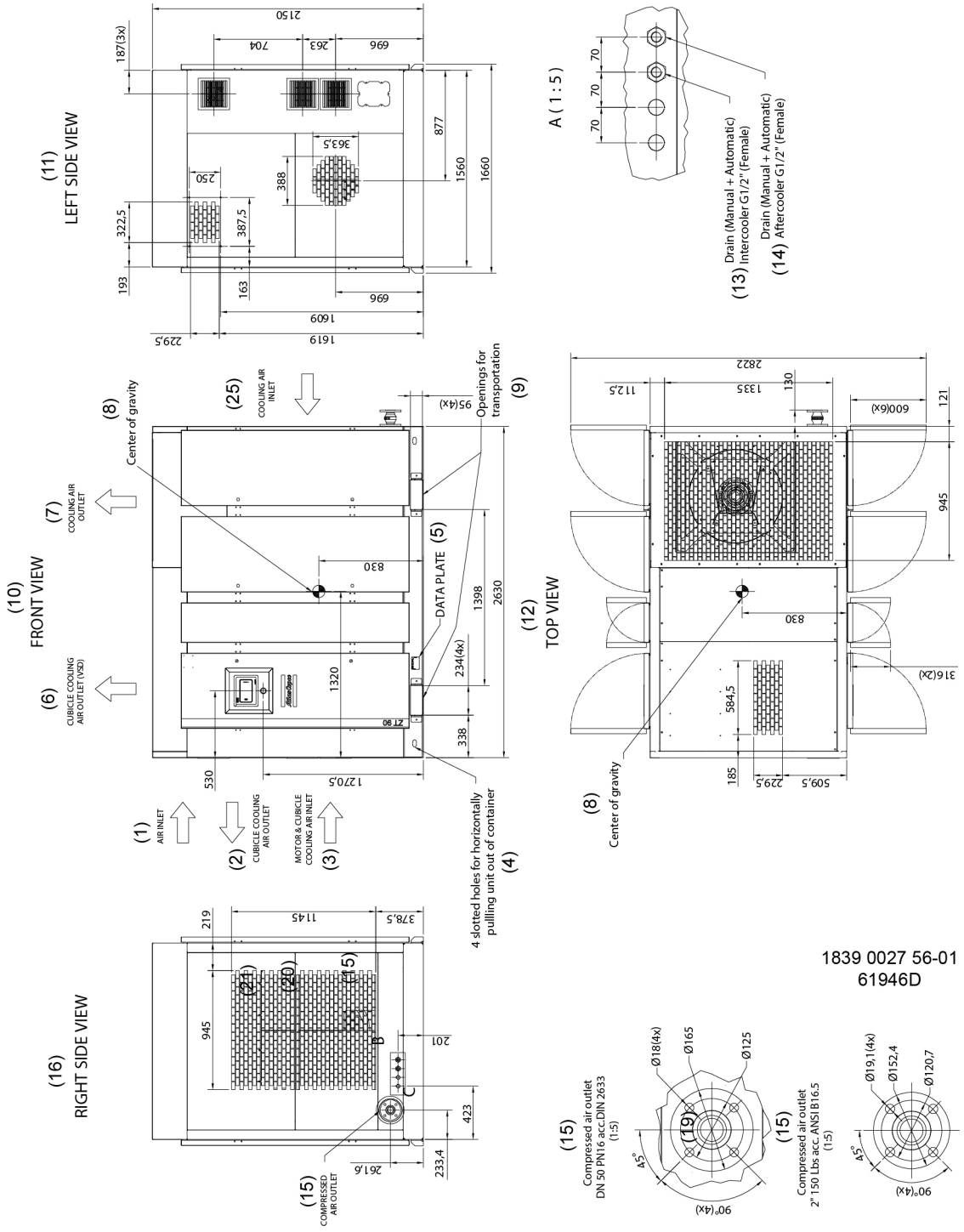


Figure 7: Dimension drawing, Pack compressor, metric units

Reference	Description
1	Air inlet

Reference	Description
2	Cubicle cooling air outlet
3	Motor and cubicle cooling air inlet
4	4 slotted holes
5	Data plate
6	Cubicle cooling air outlet (VSD)
7	Cooling air outlet
8	Center of gravity
9	Openings for transportation
10	Front view
11	Left side view
12	Top view
13	Drain (manual + automatic), intercooler
14	Drain (manual + automatic), aftercooler
15	Compressed air outlet
16	Right side view
25	Cooling air inlet

4.3 Installation proposal

Compressor room example

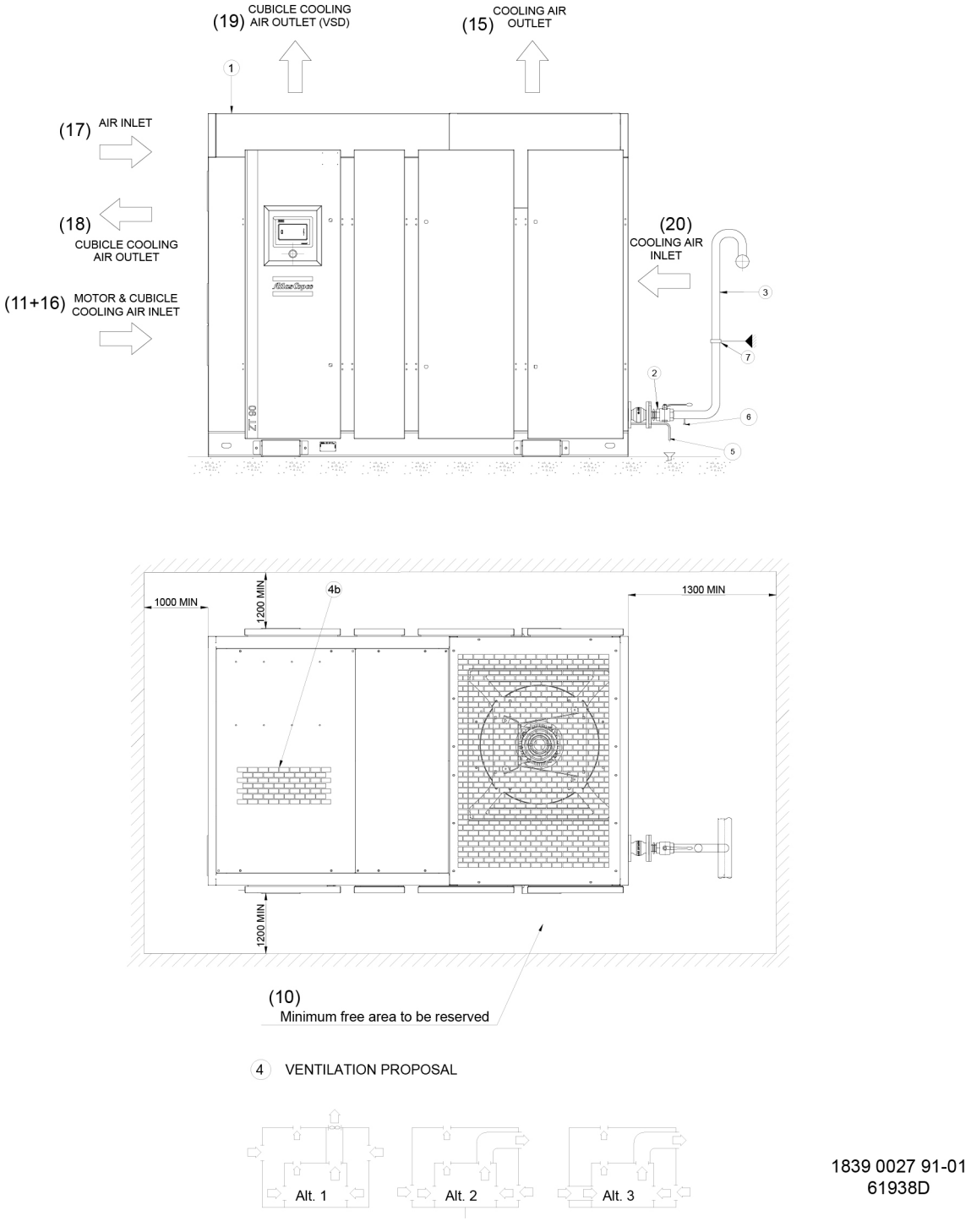


Figure 8: Installation proposal, Pack compressor in metric units

Description

1. Install the compressor on a level floor suitable for taking its weight. The recommended minimum distance between the top of the body and the ceiling is 1200 mm (47 in).
2. Compressed air outlet valve with lockout / TAG OUT system.
3. The maximum total length of the air delivery pipe can be calculated as follows:

   For SI Units:

   $L_{max} = (dp \times d^5 \times p) / (450 \times Qc^{1.85})$

Symbol	Explanation
d	Inner diameter of the outlet pipe in mm
dp	Pressure drop (recommended maximum = 0.1 bar)
L	Length of outlet pipe in m
p	Absolute pressure at the compressor outlet in bar(a)
Qc	Free air delivery of the compressor in l/s

   It is strongly recommended to make the connection of the compressor air outlet pipe on top of the main air net pipe in order to minimize carry-over of possible condensate residue.
4. The inlet grids and ventilation fan should be installed in such a way that any recirculation of cooling air to the compressor is avoided. The maximum air velocity through the grids is 5 m/s (16.5 ft/s).

   The required ventilation capacity (per compressor installed) to limit the compressor room temperature can be calculated as follows:

   - **For SI Units:** Qv = 0.92 N/dT

Symbol	Explanation
dT	Temperature increase in compressor room • **For SI Units:** in °C
N	Shaft input of compressor • **For SI Units:** in kW
Qv	Required ventilation capacity • **For SI Units:** in m^3/s

   If cooling air ducts are installed, the maximum allowable pressure drop over the ducts is 100 Pa (0.40 in wc). Common ducting for several compressors is not allowed.
5. Lay out the drain piping from the condensate outlets towards the condensate collector. The drain pipes must not dip into the water in the collector. It is recommended to provide a funnel to allow visual inspection of the condensate flow.
6. Elektronikon control system with control panel.
7. Power supply cable entry.
8. Drain valve.
9. -
10. Minimum free area to be reserved.
11. Cubicle cooling air inlet.
12. Cooling air outlet.
13. Motor cooling air inlet.
14. Air inlet.

15. Cubicle cooling air outlet.
16. Cubicle cooling air outlet (VSD).
17. Cooling air inlet.

4.4 Installation requirements for rubber compensators

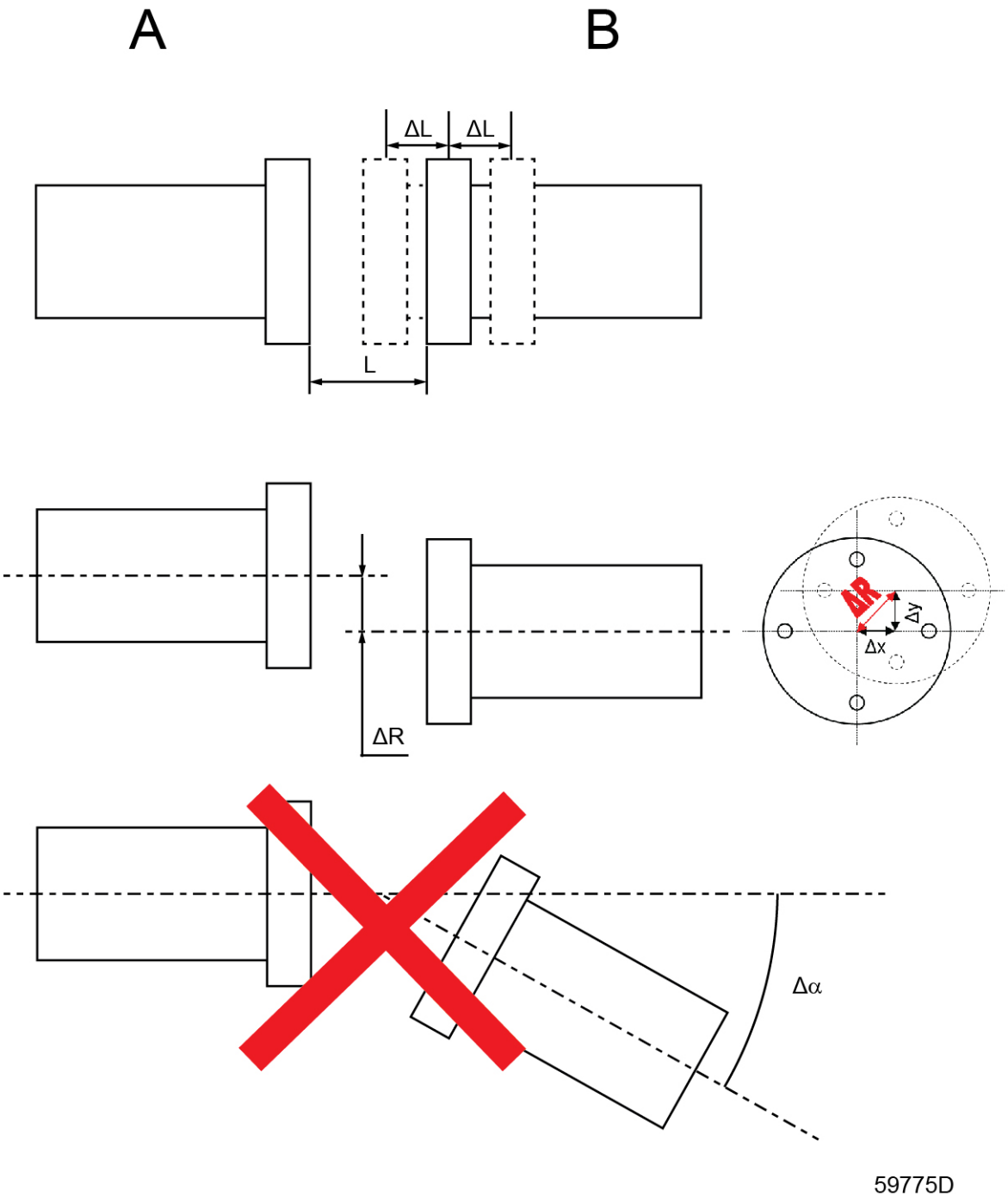
Types and sizes

Atlas Copco oil-free air products with aftercooler are equipped with rubber compensators on the air outlet and water connections.

Types of misalignments

The supplied compensators can cope with 2 types of minor misalignments when the customer pipe end is mounted:

- Axial ΔL
- Lateral ΔR



Drawing reference	Description
A	Atlas Copco compressor pipe end
B	Customer installation pipe end

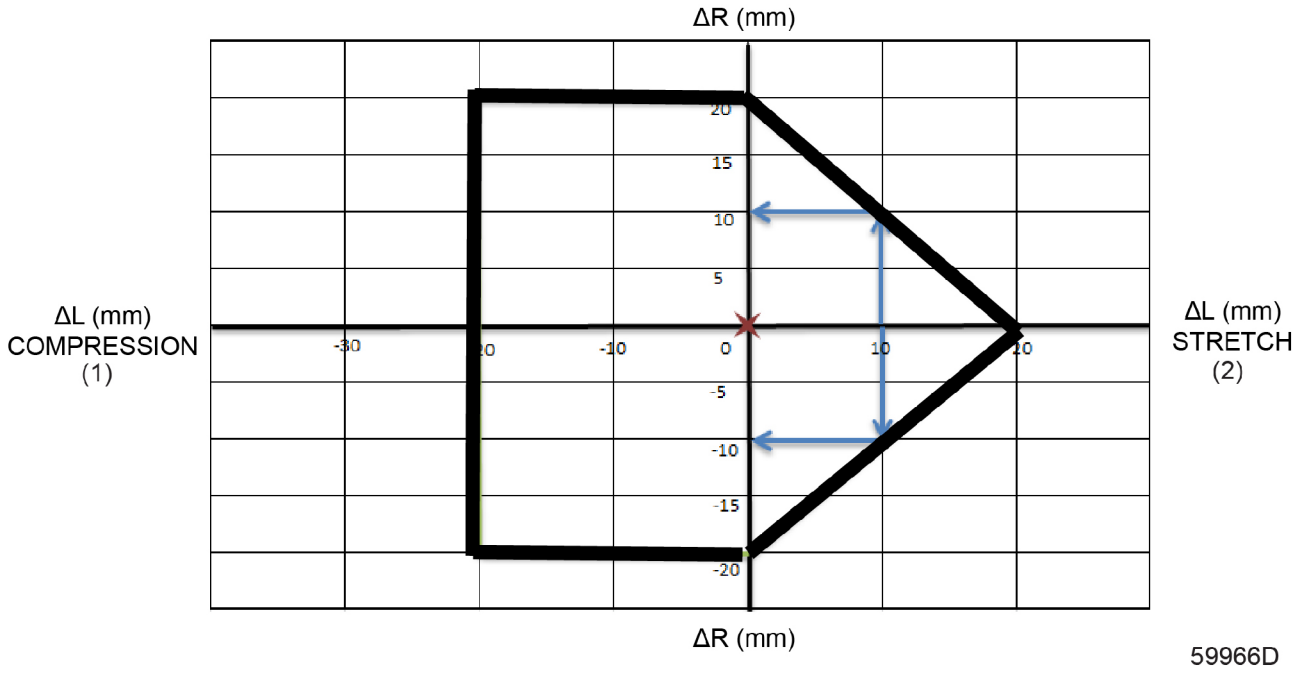
	Angular misalignments Δα are NOT allowed!

Misalignment tolerances

- Single direction misalignments

Axial $_1$: ΔL	mm	20
Lateral: ΔR	mm	20
$\Delta\alpha_2$	°	0
$_1$ = stretch or compression $_2$ = NO angular misalignment is tolerated!		

- Combined direction misalignments



Drawing reference	Description
(1)	Compression
(2)	Stretch

	Do NOT operate outside of the **black** polygon.

	Do NOT exceed the misalignment tolerances to avoid compensator damage! The piping system of the customer should be designed to fit the misalignment tolerances both during standstill and operation.

Temperature correction factors

Medium temperature (°C)	Correction factor for maximum working pressure of the compensator
0	1
50	1
80	1
85	0.92
90	0.83
95	0.75
100	0.67

Medium temperature (°C)	Correction factor for maximum working pressure of the compensator
105	0.6
110	0.54

Torque values

Compensator bolts should be torqued in 3 successive steps

- Step 1: Hand-tighten each bolt.
- Step 2: Torque the bolts crosswise up to the value mentioned in the table below and allow a stabilization period of 30 minutes before moving to step 3.
- Step 3: Torque the bolts crosswise up to the value mentioned in the table below.

	• Mind the parallelism of the sealing. • Excessive torque will damage the sealing.

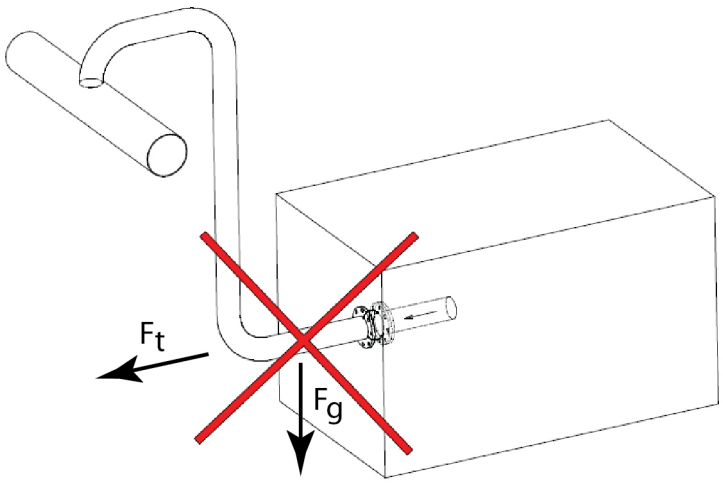
DN (mm)	Step 1	Step 2 (Nm)	Step 3 (Nm)
20 – 80	hand tight	50	80
100 – 300	hand tight	50	100
350 – 500	hand tight	50	130

Do's and don'ts

The supplied compensators are NOT designed:

- to carry the weight of the mounted customer pipe end.
- to work as a damper for unanchored pipe ends.
- to carry the thrust forces of the compressed air.

Therefore, adequate supporting and anchoring of the customer pipe end should be foreseen to avoid compensator damage.



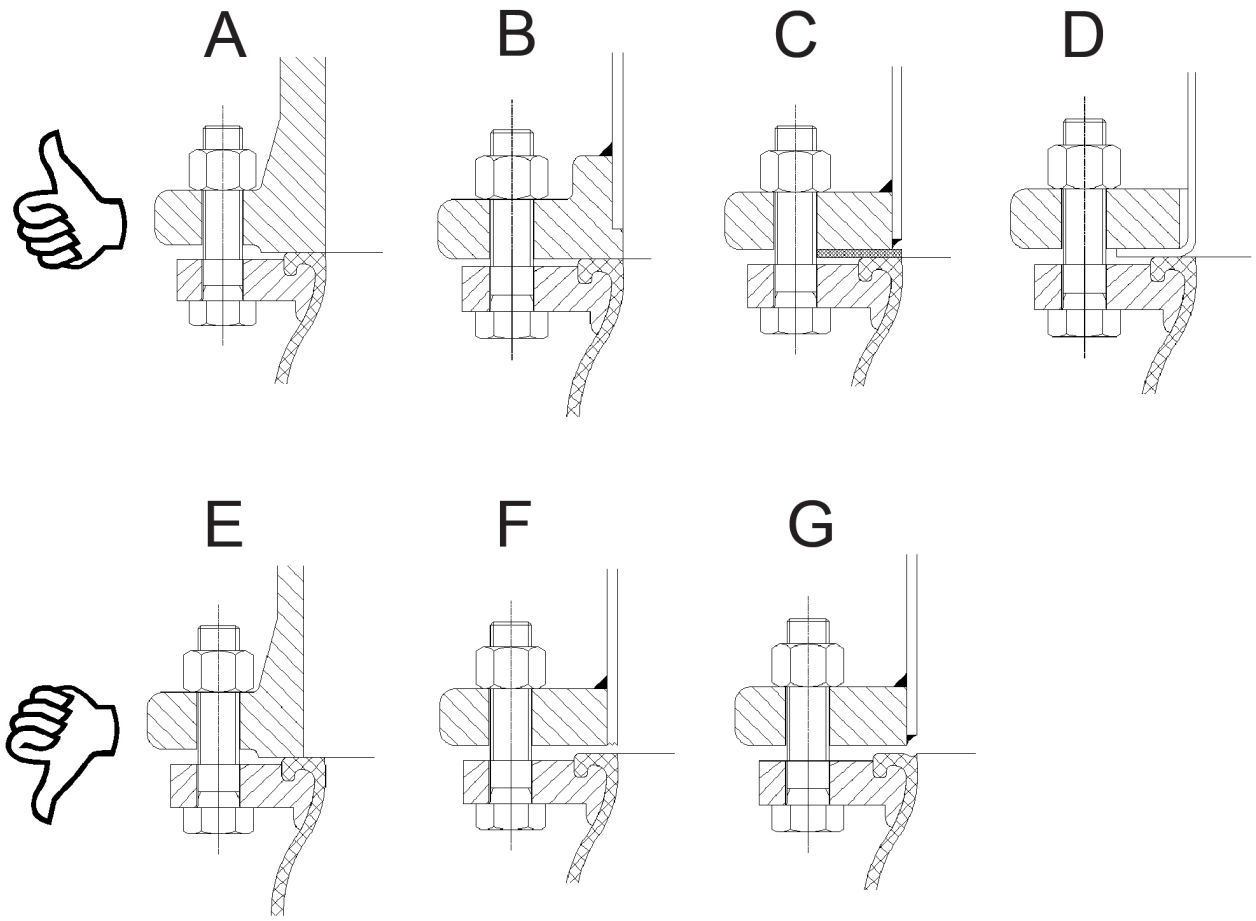
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	The compensator loads (F_g and F_t) that are mentioned on the drawing are strictly forbidden: • Weight loads F_g • Thrust forces F_t

For the design of piping and supporting structures, use an approved standard code (e.g. EN 13480 or ASME 16.5/B31.3).

	Mind that the connected pipe at customer side does not create any flow restriction caused by e.g. section reduction.

While installing the compensator, please mind the following check points to avoid sealing damage.

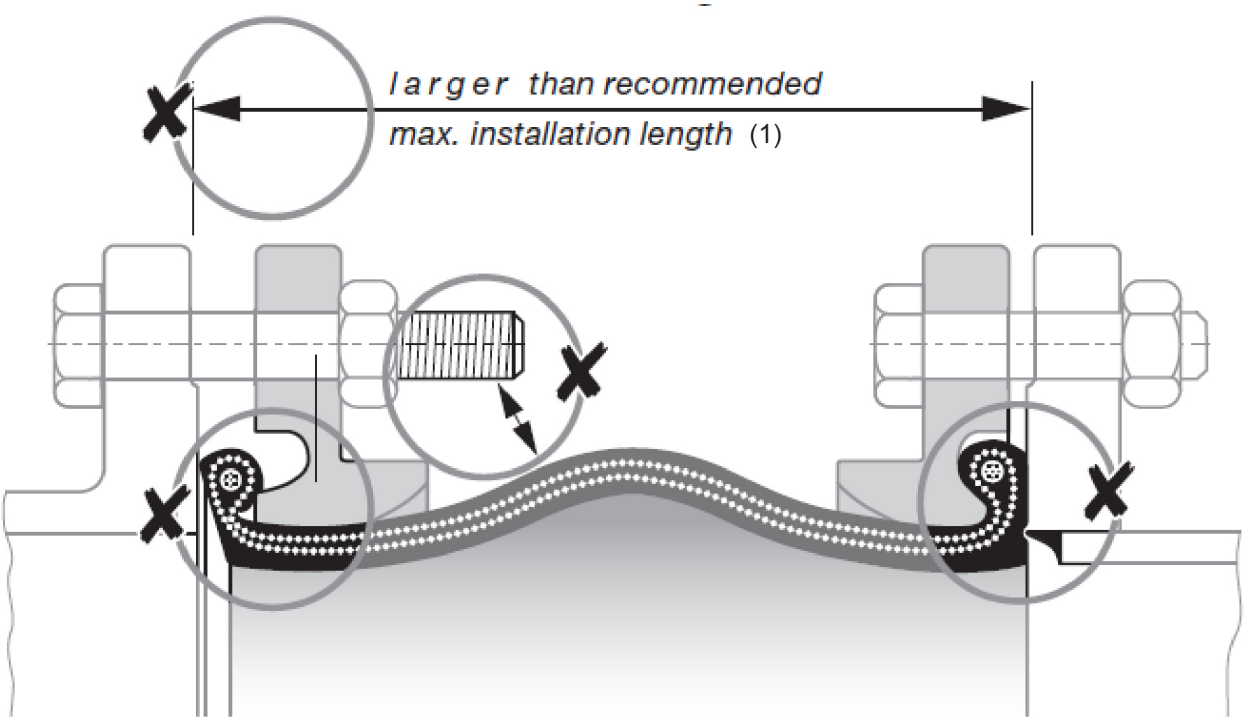


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Situation	Description
A	Flat DIN flanges prevent damage of the rubber sealings.
B	Collared flanges prevent premature wear.
C	Add a flat sealing or if necessary a metal disc with flat seal in case of damage risk.
D	Avoid excessive torque to prevent damage to the bended pipes or the sealings.
E	Rubber sealings will get damaged when the inner pipe diameter exceeds the inner sealing diameter.
F	Rough pipe ends will damage the rubber sealing.
G	Avoid contact between the pipe end and the rubber sealing.

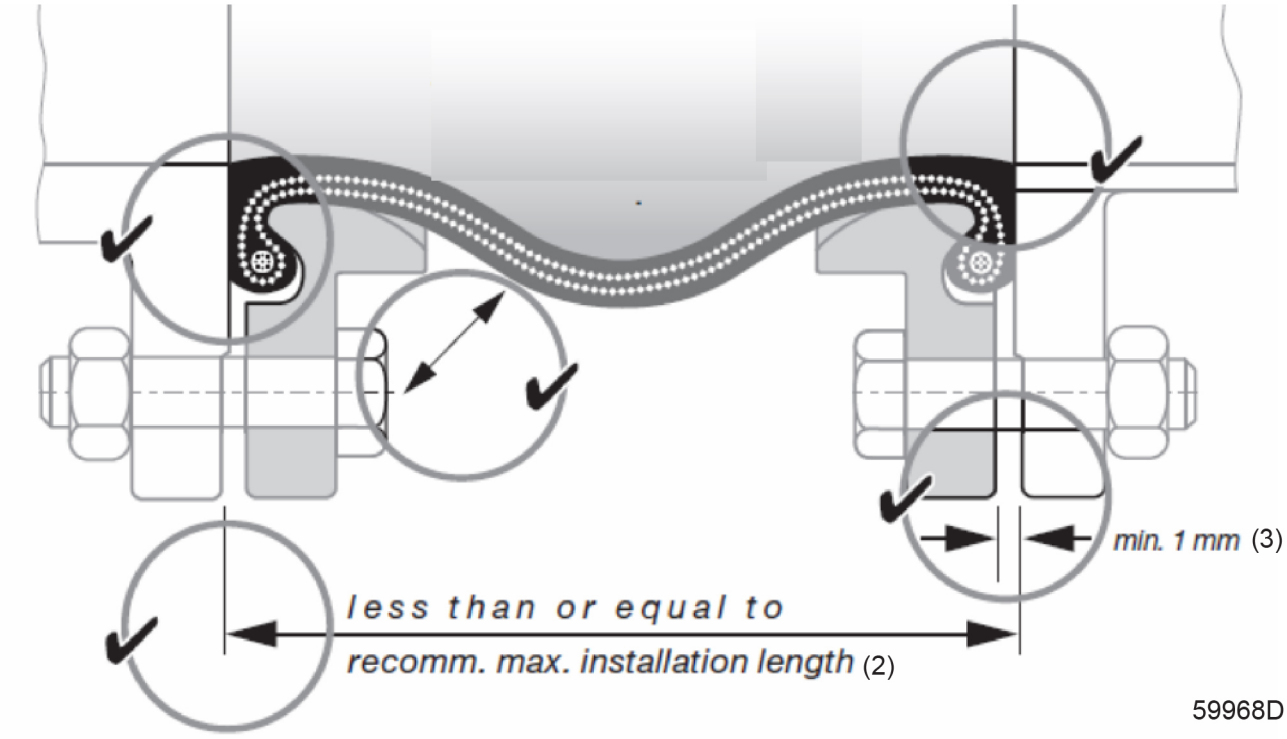
Refer to the pictures below for a visual overview of 5 do's and don't's when installing rubber compensators:

- **WRONG installation!**



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- **CORRECT installation!**



Drawing reference	Description
(1)	Larger than maximum allowed installation length.
(2)	Less than or equal to maximum allowed installation length
(3)	Minimum 1 mm of free space

	Do NOT:
	• Paint the rubber bellows of the expansion joint since:
	  • Solvents can damage the rubber cover.
	  • The colored coating avoids decent visual inspection of the rubber condition.
	• Weld, cut or grind without protecting the rubber bellows
	• Expose the compensator to permanent radiation heat above 90 °C (194 °F)

4.5 Electric connections

Diagram

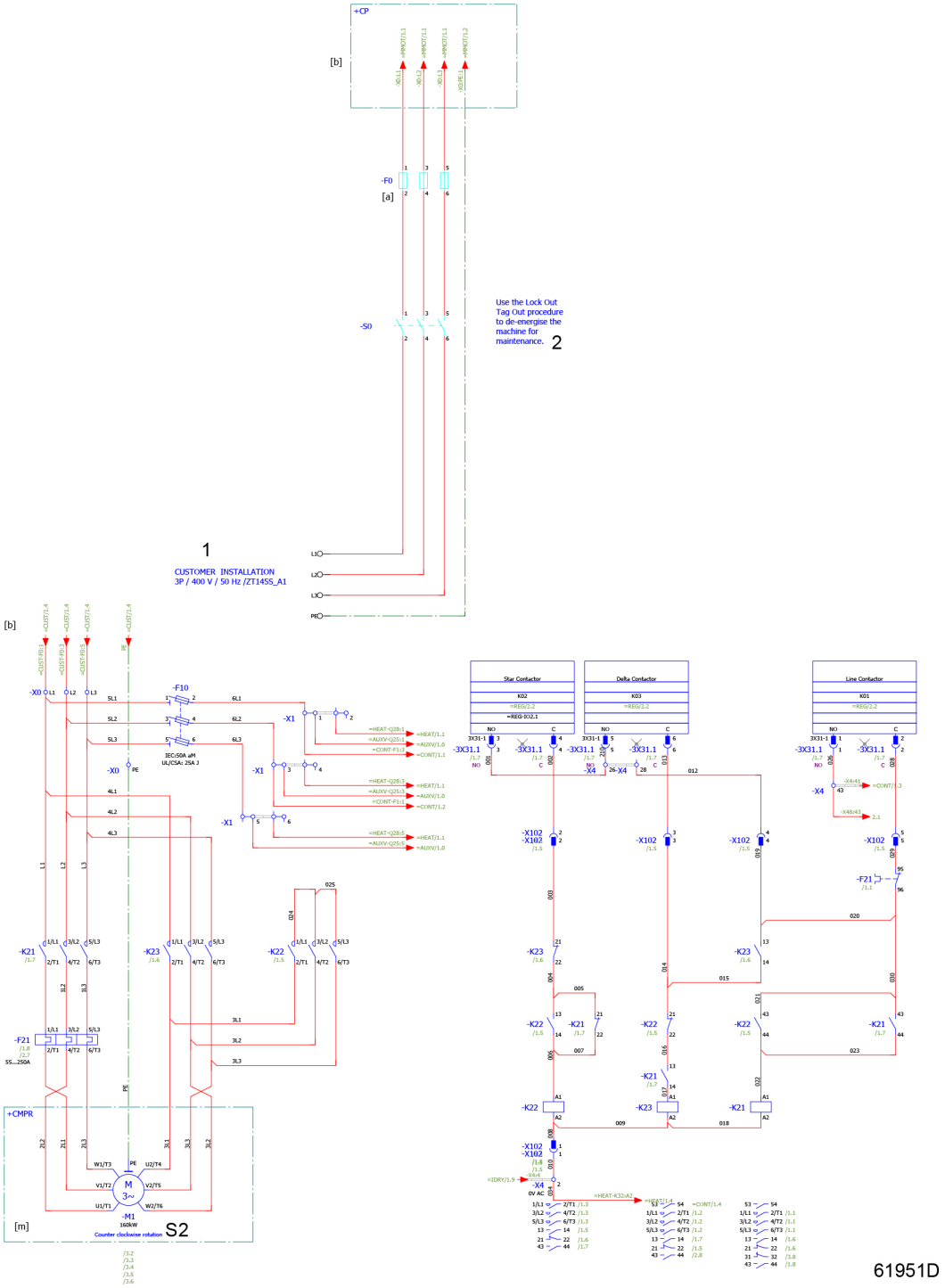


Figure 9: Electrical diagram

Ref.	Name
(1)	Customer’s installation

Ref.	Name
(2)	Use the Lock Out Tag Out procedure to de-energize the machine for maintenance

4.6 Electric cables

Electrical connections

	To preserve the protection degree of the electric cubicle and to protect its components from dust from the environment, it is mandatory to use a proper cable gland when connecting the supply cable to the compressor.

	• Obey local regulations if they are stricter than the regulations mentioned in this document.
	• Obey the applicable electrical directives when installing and connecting the compressor to the power circuit :
	  • IEC 60204-1
	  • IEC 60364-5-52
	• An isolating switch and the required fuses must be installed before the compressor. This is indicated on the connection diagram as “customer’s installation” (customer’s installation).
	The fuses protect the supply cables against overload and short circuit. To select the required type and size of the isolator switch, the fuses and the package current (found in the technical data sheet) must be taken into account.
	• The voltage on the compressor terminals must not deviate more than 10 % of the nominal voltage. It is however highly recommended to keep the voltage drop over the supply cables at nominal current below 5 % of the nominal voltage (IEC 60204-1).
	• Use the original cable entry. (See section Dimension drawings).
	• Full load (compressor) package currents are calculated and available on the Technical data sheet. For cable section selection purposes, we suggest to add 10 % to compensate for any under-voltages that might occur in the installation.
	• Use copper wires only.
	• Fuses are maximum allowed values to protect installed compressor electrical panel, see chapter Circuit breakers and fuses.
	• Caution!
	  • Always double-check the fuse size versus the calculated cable size. If required, reduce the fuse size or enlarge the cable size.
	  • Cable length should not exceed the maximum length according to IEC 60204 (table.10).
	• Display the fuse type information next to the fuse holder of the mains branch.
	• Connect the power cable with the correct cable lugs on the terminals in the electrical cabinet.
	• Do not connect more than one (1) cable lug at one side of a contactor terminal or copper bar, unless specified otherwise.
	• Mount all cables on a horizontally ventilated cable tray.
	• Do not stack or group cables as this avoids heat dissipation.
	• Use only the prescribed cable types:
	  • IEC: XLPE 90 °C (194 °F)
	• Respect a minimum of 10 mm IEC between stripped cable ends for low voltage installations

Maximum fuse size

- The pre-described fuses mentioned in the Technical Data Sheet (TDS) or on the service diagram are the maximum main fuses to protect the installed compressor electrical panel.
- The pre-described fuse types are to be used.
- Final cable and fuse selection will depend on the customer’s installation and local legislation.
- Installing smaller fuses of the same type/class might lead to smaller main feeder cables.
- Always double-check the fuse size versus the calculated cable size. If required, reduce the fuse size or enlarge the cable size.
- Cable length should not exceed the maximum length according to IEC 60204 (table 10).

- Obey local regulations if they are stricter than the examples mentioned in this document.

Package current

The Package Current mentioned on the Technical Data Sheet is defined as follows:

Package current is the current the compressor uses:

- At reference conditions
- At 100% load
- At maximum pressure
- At nominal voltage
- Before service interval (so including fouled filters, etc)

The pre-described fuses on the Technical Data Sheet are the maximum main fuses to protect the installed compressor electrical panel.

- Supply cables: 1x(3+PE).
- Number of cables:
  - Feeder cables: maximum 3x(240 mm^2 or 500 kcmil).
  - Earth cable: maximum 240 mm^2 (500 kcmil).
- Torque:
  - Feeder cables: 14 Nm - 30 Nm (124 lbin - 265 lbin).
- Connection:
  - Feeder cables: M12 lugs required.

Cable configuration

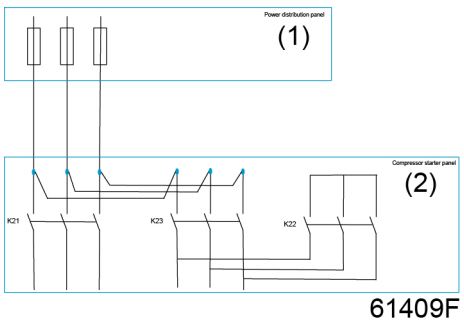


Figure 10: Single supply cables

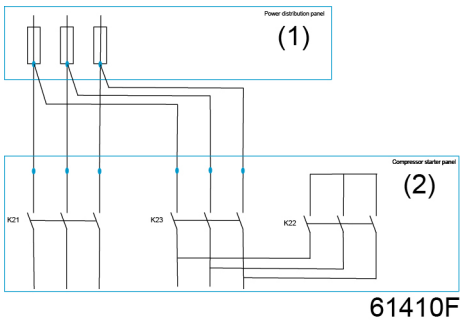


Figure 11: Parallel supply cables

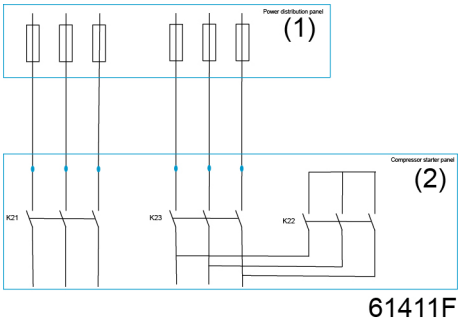


Figure 12: Phase supply cables (Only valid for Y-D versions)

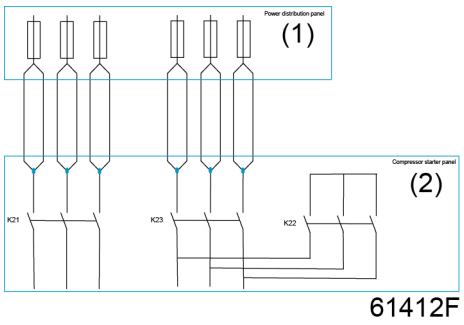


Figure 13: Parallel phase supply cables (Only valid for Y-D versions)

(1): Power distribution panel

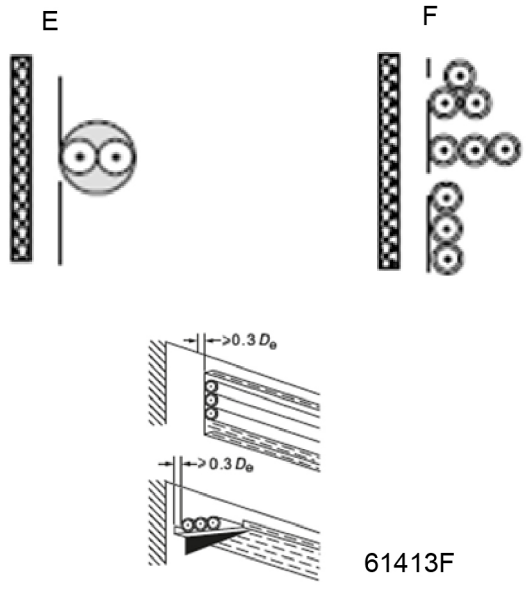
(2): Compressor starter panel

Fuse calculations for IEC are done according to IEC 60364–4–43 (Low voltage electrical installations — Part 4–43: protection against overcurrent).

Cable sizing according IEC

The tables below indicate the current carrying capacities of cables for commonly used installation methods, calculated according to standard IEC 60364-5-52 (Electrical installations of buildings part 5 - selection and erection equipment and section 52 - current carrying capacities in wiring systems).

The allowed currents are valid for XLPE (Cross-linked polyethylene) insulated cables with three loaded copper conductors and for maximum conductor temperature 90 °C, reference temperature 30 °C.



Installation method E or F, according to table B.52.1;

Single-core or multi-core cables, touching in free air;

Clearance to wall not less than 0,3 times cable diameter for method E or one cable diameter for method F.

Cable section	30 °C	40 °C	45 °C	50 °C	55 °C
25 mm²	< 127 A	< 116 A	< 110 A	< 104 A	< 97 A
35 mm²	< 158 A	< 144 A	< 137 A	< 130 A	< 120 A
50 mm²	< 192 A	< 175 A	< 167 A	< 157 A	< 146 A
70 mm²	< 246 A	< 224 A	< 214 A	< 202 A	< 187 A
95 mm²	< 298 A	< 271 A	< 259 A	< 244 A	< 226 A
120 mm²	< 346 A	< 315 A	< 301 A	< 284 A	< 263 A
150 mm²	< 399 A	< 363 A	< 347 A	< 327 A	< 303 A
185 mm²	< 456 A	< 415 A	< 397 A	< 374 A	< 347 A
240 mm²	< 538 A	< 490 A	< 468 A	< 441 A	< 409 A
300 mm²	< 621 A	< 565 A	< 540 A	< 509 A	< 472 A

Table 1: Maximum allowable current in function of the ambient temperature for installation method E (Multi-core cables with 3 loaded conductors and maximum conductor temperature 90 °C)

Cable section	30 °C	40 °C	45 °C	50 °C	55 °C
25 mm²	< 135 A	< 123 A	< 117 A	< 110 A	< 103 A
35 mm²	< 169 A	< 154 A	< 147 A	< 139 A	< 128 A
50 mm²	< 207 A	< 188 A	< 180 A	< 170 A	< 157 A
70 mm²	< 268 A	< 244 A	< 233 A	< 220 A	< 204 A
95 mm²	< 328 A	< 298 A	< 285 A	< 269 A	< 249 A
120 mm²	< 383 A	< 349 A	< 333 A	< 314 A	< 291 A
150 mm²	< 444 A	< 404 A	< 386 A	< 364 A	< 337 A
185 mm²	< 510 A	< 464 A	< 443 A	< 418 A	< 388 A
240 mm²	< 607 A	< 552 A	< 528 A	< 498 A	< 461 A
300 mm²	< 703 A	< 639 A	< 611 A	< 576 A	< 534 A
400 mm²	< 823 A	< 749 A	< 716 A	< 674 A	< 625 A

Table 2: Maximum allowable current in function of the ambient temperature for installation method F (Single-core cables with 3 loaded conductors and maximum conductor temperature 90 °C)

Cable calculation method for IEC

- Single supply cables (3 phases + PE):
  - Add 10 % to the total package current (Package current from the technical data sheets).
  - Install fuses on each supply cable which are smaller than or equal to the Max. fuse values from the technical data sheets or the instruction manual.
  - Connection between contactors must be made by means of copper bars.
- Parallel supply cables and phase supply cables (2 x (3 phases + PE)):
  - Add 10 % to the total package current (Package current from the technical data sheets) and divide by √3.
  - Multiply the ampacity of the cables with the reduction factor as per table B.52.17 of IEC 60364-5-52 (Method E or F), *(typically 0.8).*
  - Install fuses on each supply cable which are smaller than or equal to the Max. fuse values from the technical data sheets or the instruction manual.
- Parallel phase supply cables (4 x (3 phases + PE)):
  - Add 10 % to the total package current (Package current from the technical data sheets) and divide by √3 and then by 2.
  - Multiply the ampacity of the cables with the reduction factor as per table B.52.17 of IEC 60364-5-52 (Method E or F), *(typically 0.8).*
  - Install fuses which are smaller than or equal to the Max. fuse values of the technical data sheets or the instruction manual.
- Size of the PE cable:
  - For supply cables up to 16 mm²: same size as supply cables.
  - For supply cables between 16 mm² and 35 mm²: 16 mm².
  - For supply cables larger than 35 mm²: half the size of the supply wires.

Always check the voltage drop over the cable (less than 5 % of the nominal voltage is recommended).

Example of supply cable calculation

Itot = 407 A, maximum ambient temperature is 45 °C, recommended fuse = 500 A.

- **Single supply cables** (3 phases + PE):
  - I = 407 A + 10 % = 407 x 1.1 = 447.7 A

  The table for method E (multi-core cable), 90 °C cable temperature and ambient temperature of 45 °C allows a maximum current of 468 A for a 240 mm² cable. So use a multi-core cable of 3 x 240 mm² + 120 mm².
- **Parallel supply cable and phase supply cable** 2 x (3 phases + PE):
  - I = (407 A + 10 %)/√3 = (407 x 1.1)/√3 = 259 A

  For a single-core cable of 120 mm², method F, 90 °C cable temperature and ambient temperature of 45°C, the maximum current is 333 A x 0.8 = 266 A. So two (2) parallel (single-core) cables of 3 x 120 mm² + 70 mm² are sufficient.

For a multi-core cable of 120 mm², method E, 90 °C cable temperature and ambient temperature of 45°C, the maximum current is 301 A x 0.8 = 240 A. This 120 mm² cable would be too small, so you need to install a cable with a bigger section.

Looking at a multi-core cable of 150 mm², method E, 90 °C cable temperature and ambient temperature of 45°C, the maximum current is 347 A x 0.8 = 277 A. The right selection in this case would then be two (2) parallel cables of 3 x 150 mm² + 95 mm².

- **Parallel phase supply cable** 4 x (3 phases + PE):
  - I = (407 A + 10 %)/(√3 x 2) = (407 x 1.1)/(√3 x 2) = 130 A

For a single-core cable of 50 mm², method F, 90 °C cable temperature and ambient temperature of 45°C, the maximum current is 180 A x 0.8 = 144 A. So two (2) parallel (single-core) cables of 3 x 50 mm² + 25 mm² are sufficient.

For a multi-core cable of 50 mm², method E, 90 °C cable temperature and ambient temperature of 45°C, the maximum current is 167 A x 0.8 = 133 A. So two (2) parallel (multi-core) cables of 3 x 50 mm² + 25 mm² are sufficient.

4.7 Quality of safety components

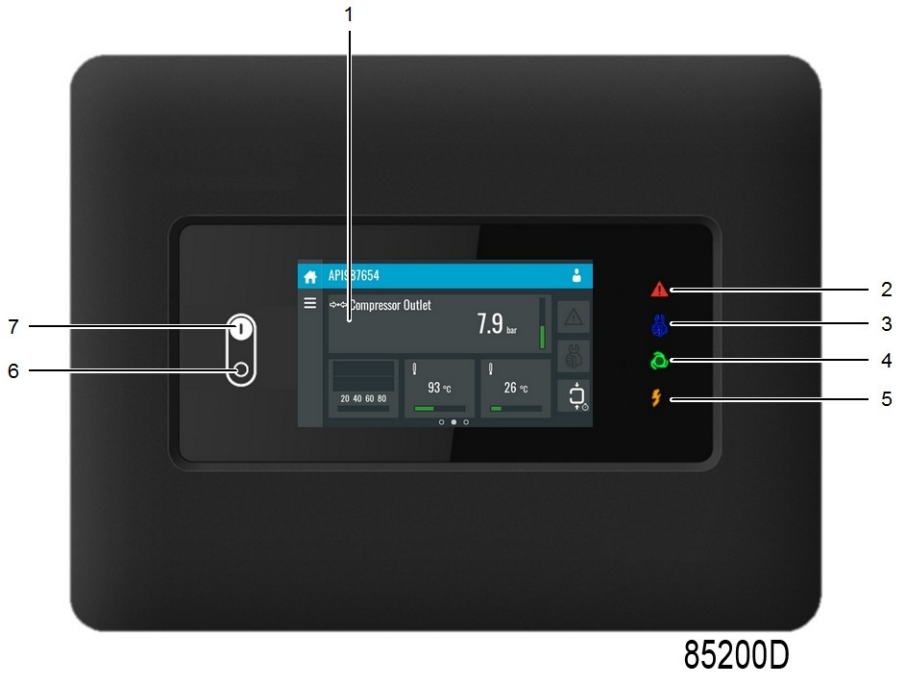
When installing a remote emergency stop button, the following B10d value is advised:

- Emergency stop button: **500 000**

Every three (3) years the emergency circuit shall be tested by pushing the emergency stop button of the unit and the remote emergency stop button.

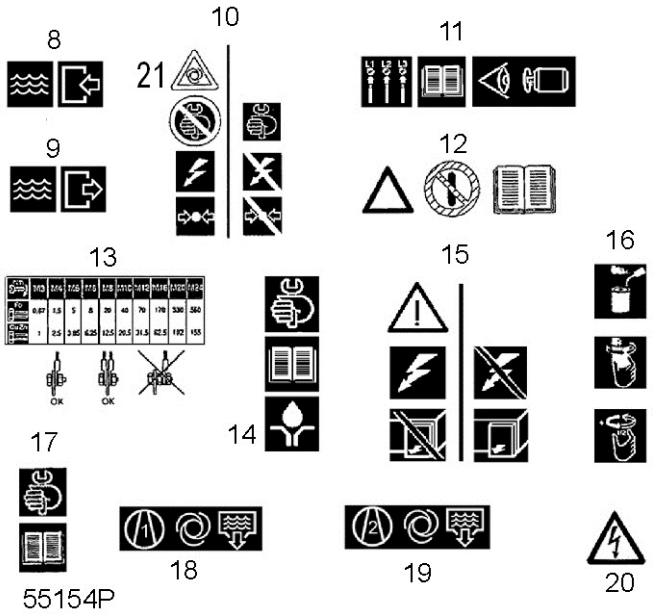
4.8 Pictographs

Pictographs on control panel



Reference	Designation	Function
1	Touchscreen	Shows the unit operating condition and a number of icons to navigate through the menu. The screen can be operated by touch.
2	Warning sign	Flashes in case of a shut-down, is lit in case of a warning condition.
3	Service sign	Is lit when service is needed.
4	Operation sign	Is lit when the unit is running in automatic operation.
5	Voltage sign	Indicates that the voltage is switched on.
6	Stop button	This button stops the unit.
7	Start button	This button starts the unit. The operation sign (4) lights up. The controller is operative.

Pictographs at other locations



Ref.	Name
8	Cooling water inlet
9	Cooling water outlet
10	Switch off the voltage and depressurize the compressor before maintenance or repair
11	Before connecting the compressor electrically, consult the Instruction book for the motor rotation direction
12	Read Instruction book before starting the compressor
13	Torques for steel (Fe) or brass (CuZn) bolts
14	Consult the Instruction book before greasing
15	Switch off the voltage before removing the protecting cover inside the electric cabinet
16	Oil the gaskets, screw on the filters and tighten by hand (approx. one half turn)
17	Consult the Instruction book before maintenance or repair
18	Automatic condensate outlet, intercooler
19	Automatic condensate outlet, aftercooler
20	Warning: under tension
21	Unit is remotely controlled and can start without warning (ARAVF)

5 Operating instructions

5.1 Operation introduction

Warning

	The operator must apply all relevant “Safety precautions”.

Ambient conditions

Refer to *Limitations* for the limits of ambient conditions and altitude operation. If the compressor is operated beyond these limits, precautions must be taken. If this is the case, consult your Atlas Copco Customer Center.

Moving/lifting

In order not to damage the frame, the compressor must be moved either by a lift truck or by using lifting equipment as described below.

When moving the compressor with a lift truck, use the slots in the frame. Make sure that the forks protrude from the other side of the frame. When moving the compressor with a lifting device, insert beams in the slots. Make sure that the beams cannot slide and that they protrude from the frame equally. The chains must be held parallel to the bodywork by chain spreaders in order not to damage the compressor. The lifting equipment must be placed in such a way that the compressor is lifted perpendicularly. Lift gently and avoid twisting.

5.2 Initial start-up

Attention

	The operator must apply all relevant safety precautions.

General preparations

Make sure the compressor is installed correctly.

See “Electric cables”, “Installation proposal” and “Dimension drawing”.

A sticker summarizing the operating instructions is delivered with the literature set. Affix the sticker next to the control panel.

A number of VCI (Volatile Corrosion Inhibitor) plates are available inside the bodywork to protect the compressor against corrosion during transport. Remove these plates.

Protection during transport

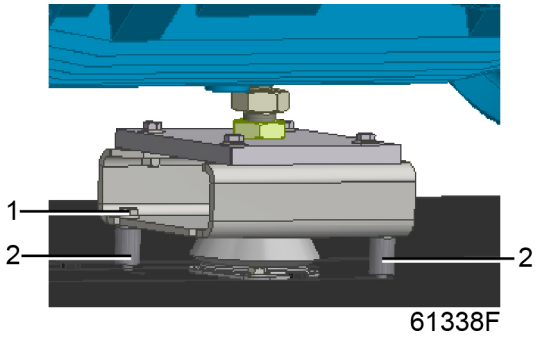


Figure 14: Motor transport spacers

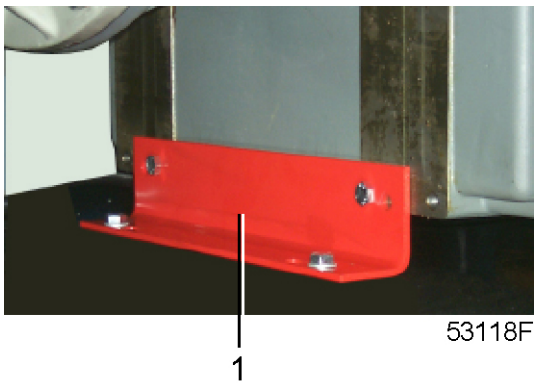


Figure 15: Gear casing transport support

The compressor and motor are secured to the frame immobilizing the vibration dampers during transport. The transport protection devices are painted red and must be removed:

Step	Action
1	On the motor side, remove bolts (1) and spacers (2).
2	Remove support (1) on the gear casing side.

Silica gel bags

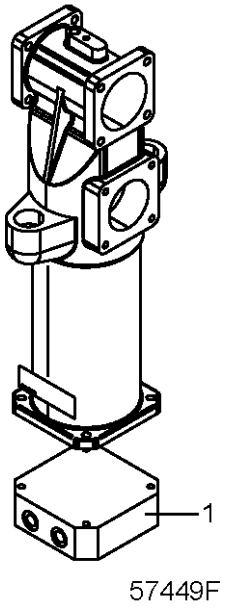


Figure 16: Side view

Remove flange (1) and take out the silica gel bags. Refit the flange.

Electrical system

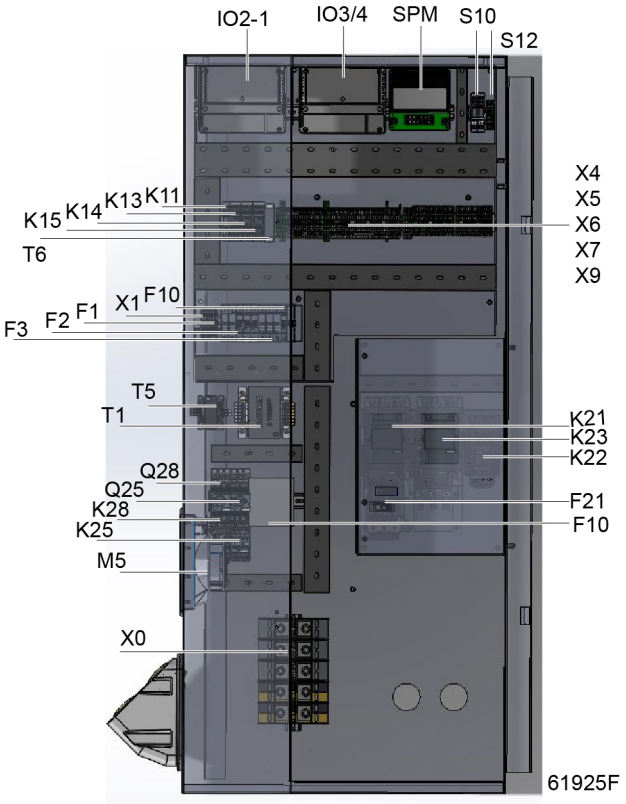


Figure 17: Electric cabinet

Step	Action
1	Check that the electrical connections correspond to the local codes. The installation must be earthed and protected by fuses in all phases. An isolating switch must be fitted.
2	Check the connections on the primary sides of transformers (T1).

Oil circuit

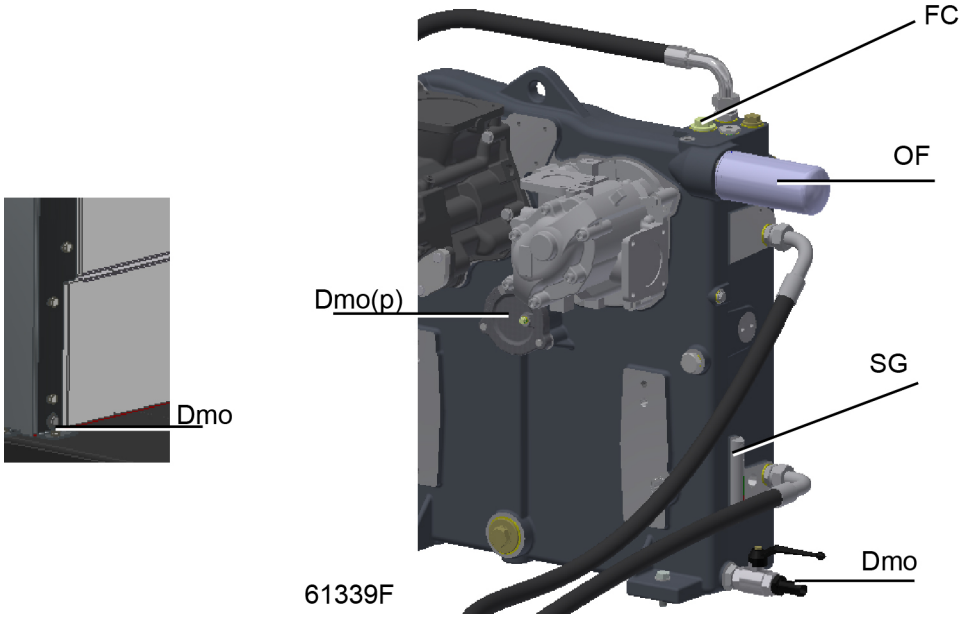


Figure 18: Position of the oil level sight-glass

Check that oil is visible in sight-glass (SG).

Start-up

Step	Action
1	Check that the gear casing is filled with oil.
2	Switch on the voltage.
3	Start the compressor and stop it immediately. Check for correct direction of rotation while the motor is coasting to a stop. The correct rotation direction is indicated by an arrow on the gear casing. Consult Atlas Copco if the rotation direction is wrong.
4	Run the compressor for a few minutes and check that it operates normally. Fill in the commissioning report.
5	Stop the compressor. The oil level after stopping must be in the middle of the sight-glass (SG) (in the case of longer standstill, the oil level in the sight-glass may increase).
6	Fill in the commissioning report.

5.3 Before starting

Attention

	• The operator must apply all relevant safety precautions. • It is mandatory to renew the preservative oil film before starting if the unit was stopped for more than 6 months or if the unit was produced more than 6 months before initial startup. To renew the preservative oil film please contact Atlas Copco for further instructions.

Procedure

Step	Action
1	Check the oil level. After stopping, the level must be in the middle of sight-glass (SG) or in the upper field of the green range. At longer standstill, the oil level may increase. Top up, if necessary, with the correct type of oil.

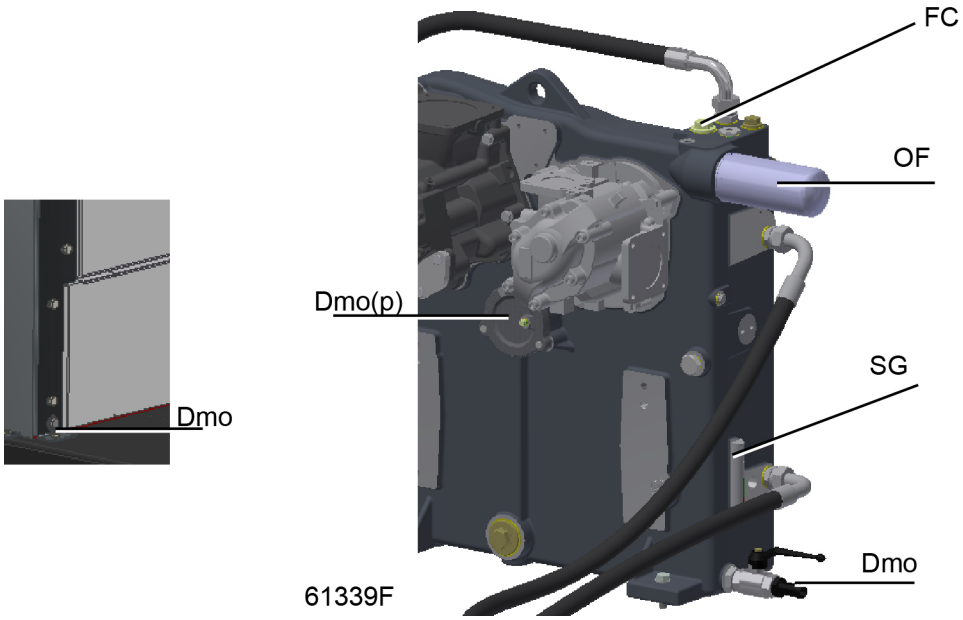


Figure 19: Position of oil level sight-glass

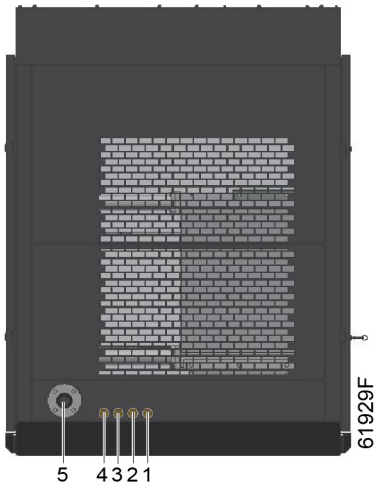


Figure 20: Drain connections

Reference	Description
1	Manual + automatic drain, aftercooler
2	Manual + automatic drain, intercooler
3	Manual + automatic drain, regeneration cooler (Full-Feature version)
4	Manual + automatic drain, dryer drum(Full-Feature version)
5	Compressed air outlet

5.4 Routine starting

Procedure

⚠	• The operator must apply all relevant safety precautions. • When the compressor is stopped and automatic operation sign (4) is alight, the compressor may start automatically. • If the start/stop timer is active, the compressor may start automatically, even if it was stopped manually.



Figure 21: Control panel

Step	Action
1	Open the air outlet valve (customer's installation).
2	Switch on the voltage and check that voltage on sign (5) lights up.
3	Press start button (7). The compressor starts running and automatic operation sign (4) lights up.

5.5 Starting after emergency stop or shutdown

Control panel

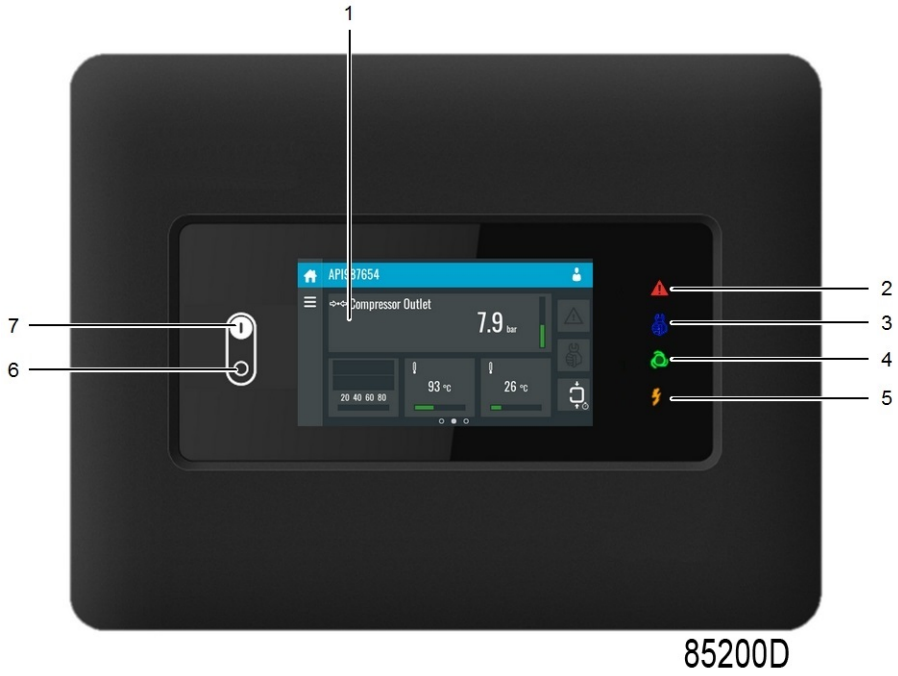


Figure 22: Control panel of controller

Procedure

Step	Action
1	Press the emergency stop button (if not yet done).
2	Switch off the voltage and then depressurize the compressor.
3	Remedy the fault.
4	Unlock the emergency stop button by pulling it back.
5	Reset the protection warning in the Elektronikon controller.
6	Restart the compressor. Check the section Routine starting.

	If the automatic restart function after voltage failure is activated and the duration of repair is shorter than the programmed power recovery time, reset the display after remedying the fault.

Minimum stop time

The compressor will not be allowed to restart within a programmed time after a stop for any reason at all. A start command given during the minimum stop time will be memorized; operation sign (4) lights up. The compressor will start when the minimum stop time has run out.

Manual restart

In automatic operation, the regulator limits the number of motor starts.

On compressors with a low-voltage motor, observe a minimum interval of 20 minutes between two manual starts.

5.6 During operation

Control panel

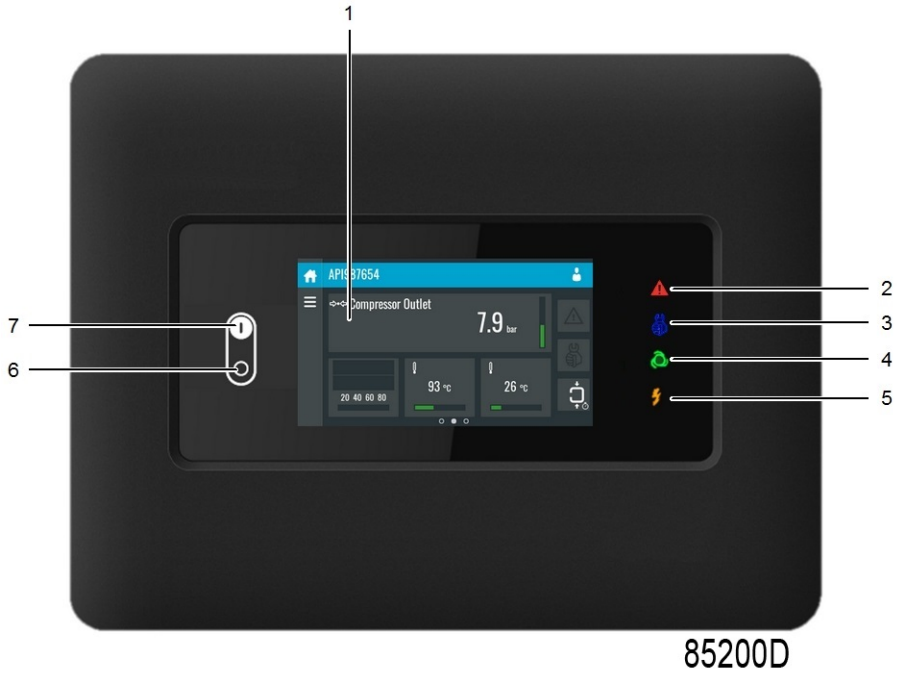


Figure 23: Control panel of Elektronikon controller

Procedure

	When operation sign (4) is alight, starting and stopping of the motor is automatically controlled: when the motor is stopped, it may restart automatically.

Step	Action
1	Check the readings on the touchscreen (1).
2	When reaching the preset unloading pressure, shown on the touchscreen (1), the compressor will start running unloaded. From now on, the electronic control module will calculate the optimum moment to stop and restart the compressor motor automatically, depending on the maximum permissible number of motor starts and on the air consumption.
3	To unload the compressor manually, select Unload on the touchscreen. To put the compressor back into automatic operation, select Load on the touchscreen.

5.7 Checking the display

Control panel

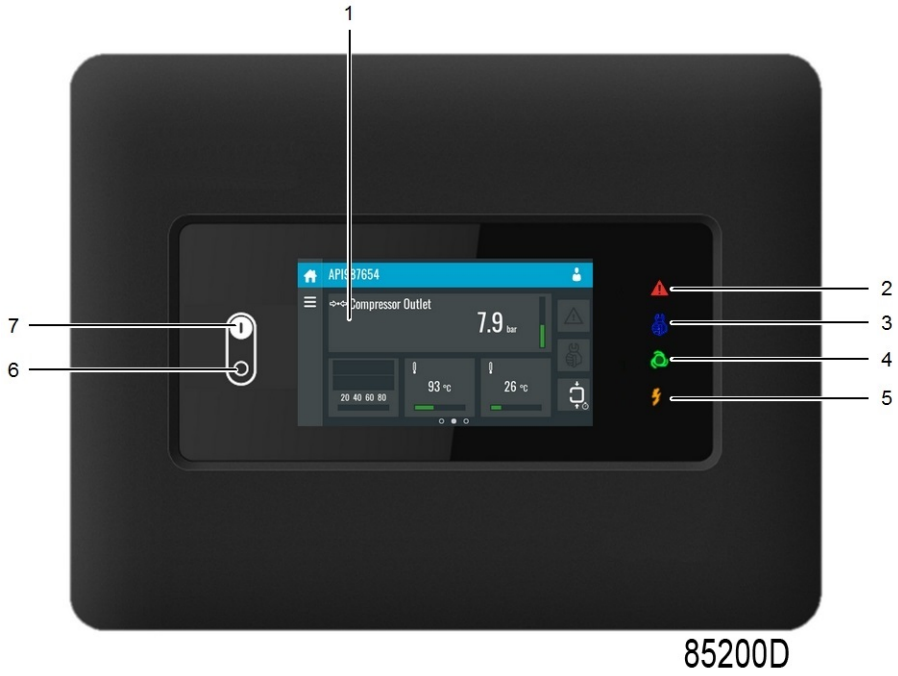


Figure 24: Control panel of controller

Procedure

1. Regularly check the display for readings and messages. Normally, the main display is shown.
2. Always check the display and remedy the trouble if warning sign (2) is alight or blinks.

   The display will show a service message if a service plan interval has been exceeded or if a service level for a monitored component has been exceeded. Carry out the service actions of the indicated plans or replace the component and reset the relevant timer.

   Regularly check the Inputs and Outputs menus for a quick look at the compressor status.

5.8 Manual loading/unloading

Control panel

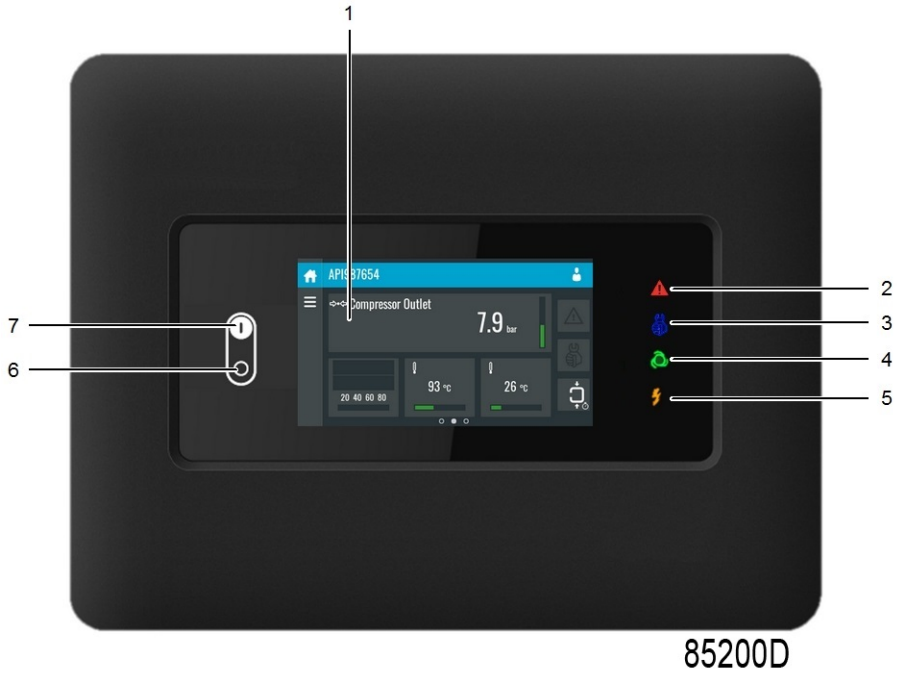


Figure 25: Control panel of controller

General

Normally, the compressor runs in automatic operation, i.e. the electronic regulator loads, unloads, stops and restarts the compressor automatically. Sign (4) is then alight.

If required, the compressor can be unloaded manually. In this case, the compressor is switched out of automatic operation i.e. the compressor remains running unloaded unless it is loaded again manually.

Manual unloading

Starting from the main screen, select Unload. The compressor starts running unloaded and sign (4) fades. The message *Manual Unload* appears on the display.

Manual loading

Starting from the main screen, select Load. Sign (4) lights up and the compressor starts running loaded in case the air net pressure drops below the programmed level. The message *Load* appears on the display.

5.9 Stopping

Procedure

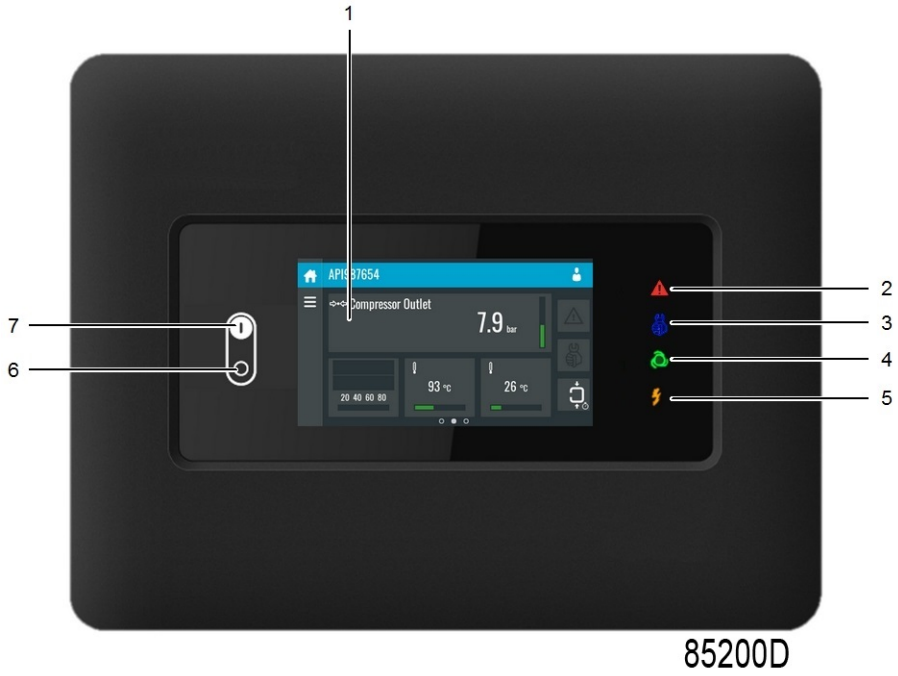


Figure 26: Control panel

	The operator must apply all relevant Safety precautions. Frequently stopping the compressor using the emergency stop button may damage the compressor. Only use the emergency stop button in case of emergency.

Step	Action
1	Press stop button (6). The compressor will stop and warning sign (2) will fade.
2	Close the air outlet valve.
3	To stop the compressor immediately in case of emergency, press the emergency stop button. When the problem is solved, unlock the emergency stop button, by pulling it back.
4	Close the cooling water inlet valve.

Attention

	If the compressor is installed in a room where freezing temperatures are expected, drain the cooling system completely: • By opening the main drain valves in the water inlet and outlet pipes (customer's installation). • By removing drain plugs.

5.10 Taking out of operation

Procedure

Step	Action
1	Close the air outlet valve and stop the compressor.
2	Switch off the voltage. Disconnect the compressor from the mains.
3	Shut off and depressurize the part of the air net which is connected to the outlet valve. Disconnect the compressor air outlet pipe from the air net.
4	Drain oil and condensate circuits.
5	Disconnect the compressor condensate piping from the condensate drain net.

6 Maintenance

6.1 Preventive maintenance schedule

Safety precautions

	• The operator must employ safe working practices and observe all related local work safety requirements and regulations. • Maintenance must only be performed by authorized, trained and specialized personnel. • Before maintenance, repair work, adjustment or any other non-routine checks, stop the compressor, press the emergency stop button, close the air outlet valve and depressurize the air system. • Open the isolating switch (customer's installation) to switch off the voltage to the compressor, and lock it (Lock Out - Tag Out procedure, LOTO). • Repairs inside the speed regulation cabinet must only be carried out by Atlas Copco. • Wait at least 6 minutes before starting any electrical repairs as hazardous high voltage remains on the condensers of the variable speed drive for 6 minutes after switching off the voltage. • Use only the correct tools for maintenance and repair work. • All maintenance work shall only be undertaken when the machine has cooled down. • A warning sign bearing a legend such as ‘Work in progress; do not start’ shall be attached to the starting equipment. • Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment. • Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape. • Make sure that no tools, loose parts or rags are left in or on the machine. • All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action. • Always wear the following personal protective equipment: Work clothing, safety shoes, safety goggles, ear protection and safety gloves when there is a cutting risk or a risk for a heat injury.

Service agreements

Atlas Copco Customer Centers have a range of service agreements to suit your needs:

- An Inspection plan
- A Preventive maintenance plan
- A Total responsibility plan

Contact your Customer Center to agree on a tailor-made service agreement. It will ensure optimum operational efficiency, minimize downtime and reduce the total life cycle costs and ensure that all warranties are validated.

Warranty-Product Liability

Use only authorized parts at the correct intervals (check with your local Atlas Copco Service center). Any damage or malfunction caused by the use of unauthorized parts or unqualified personnel is not covered by Warranty or Product Liability. In the event of any extended warranty, the end user must ensure that all required maintenance actions are performed when indicated on the Elektronikon display (see table below) or, alternatively, use an Atlas Copco Service agreement.

Service kits

Atlas Copco Customer Centers will be glad to provide you with a wide range of service kits. Service kits comprise all parts needed for servicing components and offer the benefits of genuine Atlas Copco parts while keeping the maintenance budget low.

Regular checks

The following checks should be carried out regularly to ensure safe operation and long service life. Depending on the environmental and working conditions of the compressor, the local Atlas Copco Service center may overrule the standard maintenance schedule; always check if in doubt.

Please keep following checks in mind:

- Regularly test the water drains

Period	Running hours	Operation
--	At initial start	Check the dryer adjustment as specified in *Initial start-up*.
Daily	8	Check the Elektronikon display for warnings.
Daily	8	Check that condensate is discharged from the drain receivers during loading.
Daily	--	Before stopping: • Drain the aftercooler drain receiver • Drain the intercooler drain receiver
Weekly	--	Check the oil level. Refer to *Before starting*.
Weekly	--	Drain condensate from the air receiver, if installed.
Weekly	--	Check for leaks. Tighten leaking connections and replace damaged/leaking parts.
3-monthly	--	Clean compressor.
3-monthly	500	Check coolers, clean if necessary.
When displayed	--	Carry out service actions according to the displayed service warnings or service plans as shown below.

	• When operating in a dusty atmosphere, inspect the air filters more frequently. Always use Atlas Copco filters to guarantee the performance of your compressor. • Grease the motor bearings at the correct interval and with the correct grease type and quantity as mentioned on the motor data plate. If in doubt, consult your Atlas Copco Service center.

Service plan

A number of service operations are grouped (called level A, level B, level C, ...). Each level stands for a number of service actions to be carried out at the time intervals programmed in the Elektronikon regulator.

When a level is reached, a message will appear on the screen. After carrying out all service actions, reset the interval timers using the "Reset" key in the "Service" menu.

Activities	Visit I 4000 hrs	Visit A 8000 hrs	Visit B 16000 hrs	Visit C 24000 hrs	Visit D 40000 hrs	Visit E 64000 hrs
Check air filter element(s)	x	x	x	x	x	
Check filter element of gear case breather	x	x	x	x	x	
Take service readings (temperature and pressure of air, oil and water)	x	x	x	x	x	
Check cooler functions (approach temperature)/ clean if necessary	x	x	x	x	x	
Check for air, water and oil leakage	x	x	x	x	x	
Check sensitive bolt/ coupling connections	x	x	x	x	x	
Check/adjust safety valve + switches	x	x	x	x	x	
Check for presence of water in lube oil	x	x	x	x	x	
Check condition of air intake chamber	x	x	x	x	x	
Check cycle of air intake throttle valve	x	x	x	x	x	
Check functioning of check valve	x	x	x	x	x	
Check/clean condensate drain(s)	x	x	x	x	x	
Take full set of S.P.M. readings	x	x	x	x	x	
Check oil quality and level	x	x	x	x	x	
Check for loose wiring and connections in the cubicle	x	x	x	x	x	
Check for loose wiring and connections in the motor box	x	x	x	x	x	
Check intercooler blow-off valve	x	x	x	x	x	
Change intercooler condensate check valve	x	x	x	x	x	
Inspect/change air filter element(s)	x	x	x	x	x	
Replace filter element of gear case breather	x	x	x	x	x	
Clean injector nozzle breather cover (with needle diameter <0.7 mm (0.02756 in))	x	x	x	x	x	
Clean fan cowl of electric motor	x	x	x	x	x	
Check rubber inserts of drive coupling (arr. E)	x	x	x	x	x	
Check blow-off valve	x	x	x	x	x	
Blast clean cubicle, dry air maximum 10 bar (145 psi)	x	x	x	x	x	
Clean air coolers and fan	x	x	x	x	x	
Clean ERD drains	x	x	x	x	x	
Grease main drive motor bearings (according to motor data plate)		x	x	x	x	
Replace cubicle filter		x	x	x	x	
Replace diaphragm of air throttle valve		x	x	x	x	
Overhaul oil filter		x	x	x	x	
Overhaul drains: solenoids, blue sponge		x	x	x	x	
Check condition of drive gear teeth		x	x	x	x	
Overhaul air intake valve			x		x	
Replace blow-off silencer of throttle valve			x		x	
Overhaul check valve (CV)			x		x	
Replace rubber inserts of drive coupling (arr. E)			x		x	
Change compressor oil (16000 hrs or 4-yearly)			x		x	
Change gear casing strainer			x		x	
Replace blow-off valve and silencer			x		x	
Replace flexibles (hose assemblies)					5 years	

Activities	Visit I 4000 hrs	Visit A 8000 hrs	Visit B 16000 hrs	Visit C 24000 hrs	Visit D 40000 hrs	Visit E 64000 hrs
Replace compensators					5 years	
Replace rubber buffers					5 years	
Replace converter cooling fan (Neos VSD)				x		
Replace cubicle fan				x		
Overhaul main drive motor: bearings, seal, grease						x
Replace main shaft bearings						x
Overhaul silencers						x
Overhaul oil pump						x
Overhaul oil-bypass						x

- *: ERD solenoids need to be replaced annually regardless running hours
- **: The temperature difference between the incoming water and the outgoing air of the cooler during the loading periods of the compressor should never exceed 10 °C (50 °F). A contact thermometer should be used to measure the temperature of the pipes. Have the cooler cleaned if the cooling efficiency is insufficient.
- ***: Dewpoint sensor needs to be replaced yearly for certification

Remarks:

- B-Visit: 8000 running hours or one year (whichever comes first)
- C-Visit: 16000 running hours or 2 years (whichever comes first)

6.2 Motor greasing

Warning

	Stop the compressor and switch off the voltage while following the LOTO procedure (Lock Out - Tag Out) before greasing. The operator must apply all relevant “Safety precautions”.
	Never mix greases of different brands or types.

Motor greasing

6.3 Storage after installation

Run the compressor at least once every 3 to 5 days, depending on environmental conditions (more often in hot and humid environment). The compressor must run for at least 20 minutes.

- If the compressor will not be started again for a period of several hours to several days:
  - Open or purge manual drains of intercooler and aftercooler, drain receivers or EWDs, during load just before stopping.
  - Check if drain pipes are free of water. Close the valves after the condensate is drained.
  - If frost can be expected, drain the cooling system carefully.
  - Inspect the compressor once a week. Turn the main coupling a few turns by hand, change the position of balls and rollers in the bearings and redistribute the oil film.

- If the compressor will not be started again for a period of several months to 6 months:
  - Consult Atlas Copco.
- If the compressor will not be started again for a period of more than 6 months:
  - Consult Atlas Copco.

6.4 Oil specifications

Roto-Z lubricating oil

Use Atlas Copco Roto-Z oil which is specially developed for oil-free rotary compressors. This oil has a long service life and ensures optimum lubrication.

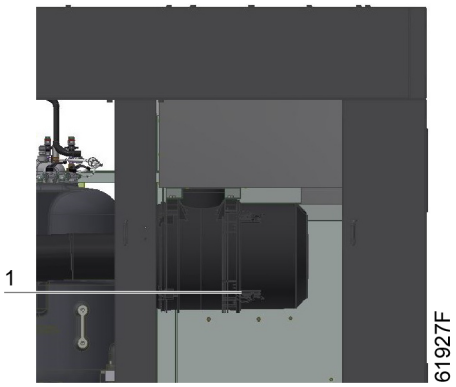
Atlas Copco Roto-Z oil can be ordered in following quantities:

Quantity (l)	Ordering number
5 l can	2908 8503 00
20 l can	2908 8501 01
209 l drum	2908 8500 00

7 Adjustments and servicing procedures

7.1 Air filters

Location of the air filters



Procedure

	The filters must be serviced regularly; consult section Preventive maintenance schedule. Never install damaged or clogged filters.

Step	Action
1	Stop the compressor and press the emergency stop button.
2	Switch off the voltage and follow the LOTO procedure. (Refer to the *Safety Precautions* before acting.)
3	Loosen clamps (1).
4	Take off the end cap of the air filter.
5	Replace the dirty filter element with a new one.
6	Re-install the end cap of the air filter.
7	Tighten clamps (1).
8	Switch on the voltage.
9	Unlock the emergency stop button and reset the air filter service warning.

Table 3: Procedure

7.2 Oil and oil filter change

Oil system

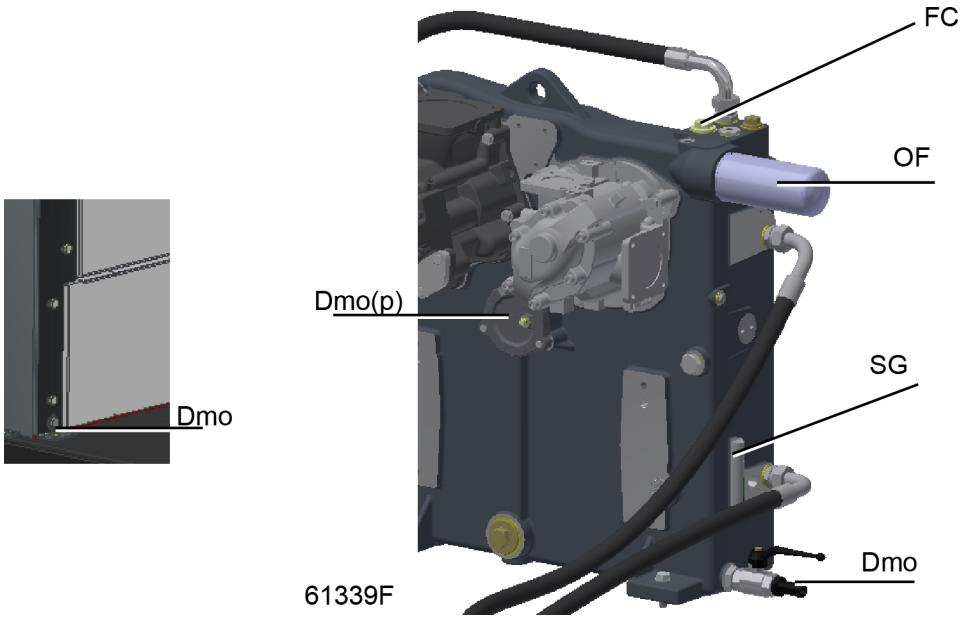


Figure 27: Oil system components

Procedure

Step	Action
1	Run the compressor until warm.
2	Stop the compressor. Press the emergency stop button.
3	Switch off the voltage and follow the LOTO procedure (Lock Out - Tag Out). Refer to the safety precautions before acting.
4	The filler plug and drain points are painted yellow. Remove filler plug (FC). Drain the compressor sump by opening drain valve (Dmo) and opening oil cooler bypass. Drain the oil cooler by opening drain valve (Dmc). Drain the element jackets by removing plug Dmo(p) on the pump cover. Close the drain valves. Fit plug Dmo(p) on the pump cover.
5	Push and turn the oil filters a quarter turn to remove the oil filters. Clean the filter seats, oil the gaskets on the new filters. Push and turn the new filter a quarter turn to mount the new filter.
6	Fill the compressor sump to the maximum mark of the oil level sight-glass. See Oil specifications for the correct type of oil. See Compressor data for the correct oil quantity.
7	Reinstall the filler plug.
8	Switch on the voltage. Unlock the emergency stop button and reset the oil and oil filter service warnings.
9	Run the compressor for a few minutes.
10	Stop the compressor.

Step	Action
11	Check the oil level. After stopping, the level must be in the middle of sight-glass (SG). After a longer standstill, the level may rise. Top up, if necessary.

7.3 Safety valves

Testing

The safety valves can be tested on a separate compressed air line. If the valves do not open at the pressure specified in Settings of safety valves, consult Atlas Copco.

	• Never run the compressor without safety valves. • No adjustments are allowed.

7.4 Coolers

Testing

	The coolers must be serviced regularly; refer to *Preventive maintenance schedule* . Never install damaged or clogged coolers.

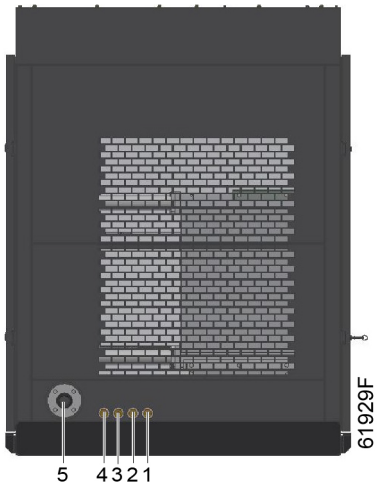


Figure 28: Cooler block (CB)

Keep the coolers clean to ensure cooling efficiency.

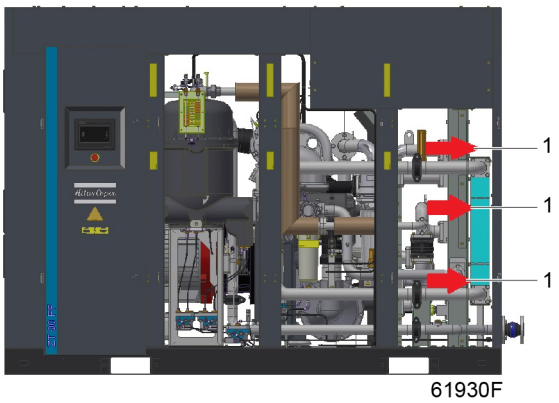


Figure 29: Air jet direction (1)

Step	Action
1	Stop the compressor.
2	Depressurize the air system as follows: • Close the air outlet valve. • Press the emergency stop button. • Open the isolating switch (customer's installation) to switch off the voltage to the compressor, and lock it (Lock Out - Tag Out procedure, LOTO).
3	-
4	Remove any dirt form the coolers with a fibre brush in the direction of the fins.
5	Remove dirt from the fans.
6	Clean the coolers with an air jet in the reverse direction to normal flow (i.e. from the outside to the inside of the compressor). Use low pressure air. If required, the pressure may be increased up to 6 bar(e) (87 psig).
7	If it is required to clean the coolers with a cleaning agent, consult your Atlas Copco Customer Center.

8 Problem solving

8.1 Problem solving

	• The operator must employ safe working practices and observe all related local work safety requirements and regulations. • Maintenance must only be performed by authorized, trained and specialized personnel. • Before maintenance, repair work, adjustment or any other non-routine checks, stop the compressor, press the emergency stop button, close the air outlet valve and depressurize the air system. • Open the isolating switch (customer's installation) to switch off the voltage to the compressor, and lock it (Lock Out - Tag Out procedure, LOTO). • Repairs inside the speed regulation cabinet must only be carried out by Atlas Copco. • Wait at least 6 minutes before starting any electrical repairs as hazardous high voltage remains on the condensers of the variable speed drive for 6 minutes after switching off the voltage. • Use only the correct tools for maintenance and repair work. • All maintenance work shall only be undertaken when the machine has cooled down. • A warning sign bearing a legend such as ‘Work in progress; do not start’ shall be attached to the starting equipment. • Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment. • Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape. • Make sure that no tools, loose parts or rags are left in or on the machine. • All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action. • Always wear the following personal protective equipment: Work clothing, safety shoes, safety goggles, ear protection and safety gloves when there is a cutting risk or a risk for a heat injury.

Control panel

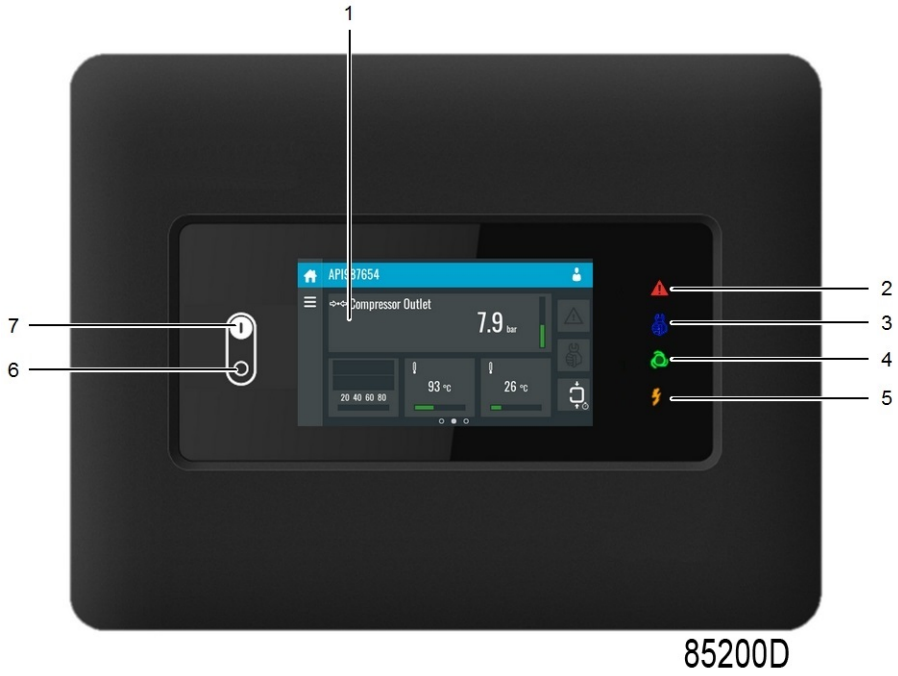


Figure 30: Control panel of controller

Faults and remedies

Condition	Fault	Remedy
Compressor starts running, but does not load after a delay time	Pressure in air net is above pre-set loading pressure	Compressor will load when pressure in air net drops to pre-set loading pressure
	Loading solenoid valve inoperative	Check and replace the valve as necessary
	Full-load/no-load valve malfunctioning	Have the valve inspected
Compressor capacity or working pressure lower than normal	Air consumption exceeds capacity of compressor	Check pneumatic plant
	Leaking connections and damaged/leaking parts	Check for leaks. Tighten leaking connections and replace damaged/leaking parts.
Oil pressure too low	Oil level too low	Top up level as described in section Before starting.
	Oil filters clogged	Replace filters
Air temperature above normal	Inlet temperature too high due to bad room ventilation or recirculation of cooling air	Improve ventilation in compressor room and prevent recirculation of cooling air
	Unloading pressure incorrectly set	Check the controller setting.
	Insufficient cooling air or cooling air temperature too high	Check and correct.

Condition	Fault	Remedy
Condensate is not discharged from condensate traps during operation	Drain/pipe clogged	Check and correct
	Frozen drain piping	Check and correct
	Venting lines not/badly assembled	Check and correct
	Only on IC drain : intercooler condensate check valve defect/dirty/wrongly assembled	Check and correct
	Solenoid valve defect/dirty	Check and correct
	Manually operated solenoid valve	Set valve to automatic operation
	Level sensor defect/dirty	Clean sensor or replace as necessary
Drain continuously discharges air	Damaged/poor assembled condensate drain (housing/ seals/valve/…)	Check and correct
	Solenoid valve defect/dirty	Check and correct
	Level sensor defect/dirty	Clean sensor or replace as necessary

9 Technical data

9.1 Readings on display

Important

	The readings below are indicative values when operating at reference conditions. Check the section Reference conditions. These values are no rejection limits. In case of doubt, consult your Atlas Copco Customer Center.

Common readings

	Unit	
Dp of air filter, approx.	bar	0.015

9.2 Settings of safety valves

	Unit
Low-pressure safety valve	3.7 bar(e)

9.3 Circuit breakers and fuses

Fuse	Size
F1	4 A
F3	S201M-C2
F4	S202M-C6
F10	25 A
F11	S201M-C2
F51	S201M-C2

Main voltage (V)	Frequency (Hz)	Setting (A)
400	50	10.8

Table 4: Circuit breakers Q25

Main voltage (V)	Frequency (Hz)	Setting (A)
400	50	8.7

Table 5: Circuit breakers Q28

Obey the applicable electrical directives when installing and connecting the compressor to the power circuit: IEC60364–5–52

For the selection of the customer fuses and /or circuit breaker (size/ type) and supply cables, the package current, specified in the technical data sheet, must be taken into account. For cable

section selection purposes we suggest to add 10% to the package current to compensate for any under-voltages that might occur in the installation. Always double-check the fuse size versus the calculated cable size. If required, reduce the fuse size or enlarge the cable size. Cable length should not exceed the maximum length according to IEC 60204 (table 10).

9.4 Reference conditions

Absolute inlet pressure	1 bar(a)
Ambient temperature	20 °C
Air inlet temperature	20 °C
Effective working pressure	9 bar(g) for 10 bar compressors
Motor shaft speed	2980 rpm for 50 Hz machines with 2–pole motors 1489 rpm for 50 Hz machines with 4–pole motors

9.5 Limitations

Minimum - maximum ambient temperature	0 - 40 °C
Minimum - maximum temperature of air inlet	0 - 40 °C
Maximum temperature at compressed air outlet	55 °C
Maximum temperature at outlet of compressor stage 1	235 °C
Minimum - maximum working pressure of compressor stage 1	1.0 – 2.8 bar(g)
Maximum temperature at outlet of compressor stage 2	235 °C
Minimum - maximum working pressure of compressor stage 2	3.5 – 10.4 bar(g)
Maximum altitude	1000 m
Minimum - maximum absolute inlet pressure	0.9–1.1 bar(a)
Maximum pressure over air filter	0.05 bar(a)
Minimum - maximum oil pressure	see graph–4.0 bar(g)
Minimum - maximum oil injection temperature	0-70 °C
Minimum - maximum motor shaft speed *	1000–3600 rpm

* : can be derated for Full-Feature compressors, High Ambient Temperature compressors.

	Pack	Pack
Working pressure (bar(g))	**Minimum**	**Maximum**
10.0 bar variant	6.0	10.0

9.6 Compressor data

l
45

Table 6: Oil quantity in the lubrication system of the compressor

Sound pressure level: see technical data sheet.

10 Pressure equipment directives

ZT 55 Pack up to ZT 90 Pack compressors are pressure assemblies of cat. I according to 2014/68/EU.

Parts of article 4.3 of 2014/68/EU are subject to Sound Engineering Practice (SEP).

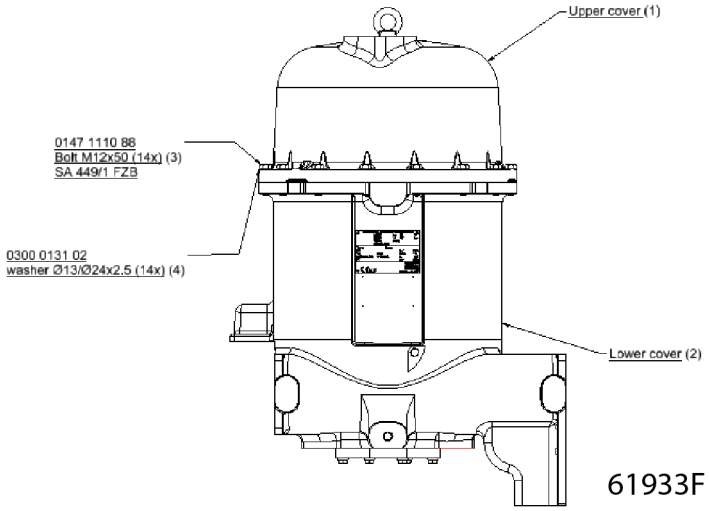
Parts subject to the Simple Pressure Vessel Directive 2014/29/EU are excluded from 2014/68/EU according to article I, section 4.3.

Parts of category I according to 2014/68/EU are integrated into the machine and fall under the exclusion of article 1.2 (f)(i).

The following pressure bearing parts are of category higher than I :

Compressor type	Pressure bearing part
ZT 55 up to ZT 90	**Safety valve: Category IV** • Design code: AD-Merkblätter, A2

Instructions for use (vessel)



Reference	Name
1	Upper cover
2	Lower cover
3	Bolt
4	Washer

- This vessel can contain pressurized air; please be aware of its potential danger in case of misuse.
- This vessel shall only be used as an air dryer to a compressor and operated within the specified limits as given on the data plate.
- Original bolts have to be used after opening for inspection. Specified torque has to be taken into consideration.
- This vessel has been designed and built to guarantee an operational lifetime in excess of 20 years. Therefore there is no intrinsic need for in-service inspection of the vessel when used

within its design limits and in its intended application. National legislation however may require in-service inspection.

Part number	**V in liter** (US gal/Imp gal/ cu.ft)	**MWT in mm**	**H in mm**	**D in mm**	**CF**
1617 5558 79 1617 5558 70	85.1 (52.57/443.77/7.03)	Upper cover: 8 Lower cover: 8	868	496	0.8

Used abbreviations

V: Internal volume (liter)

MWT: Minimum wall thickness as manufactured (mm)

H: Height of the vessel (mm)

D: Diameter of the vessel (mm)

CF: Casting factor (according ASME BPVC section VIII div 1)

11 Documentation

Declaration of conformity

Typical example of a Declaration of Conformity document

EU DECLARATION OF CONFORMITY

We, ……(1)……., declare under our sole responsibility, that the product
Machine name ……..
Machine type ……..
Serial number ……..

Which falls under the provisions of article 12.2 of the EC Directive 2006/42/EC on the approximation of the laws of the Member States relating to machinery, is in conformity with the relevant Essential Health and Safety Requirements of this directive.

The machinery complies also with the requirements of the following directives and their amendments as indicated.

Directive on the approximation of laws of the Member States relating to		Harmonized and/or Technical Standards used		Att' mnt
……(2)……		……(3)……		

The harmonized and the technical standards used are identified in the attachments hereafter

……(4)…… is authorized to compile the technical file.

	Conformity of the specification to the directives	Conformity of the product to the specification and by implication to the directives
Issued by	Engineering	Manufacturing
Name	……	……
Signature	……	……
Date	……	……
Place	……	……

Form 5009 xxxx xx
ed. xx, xxxx-xx-xx

….(5)….

58397_3D

Figure 31:

(1): Manufacturer

(2): Applicable directives

(3): Standards used

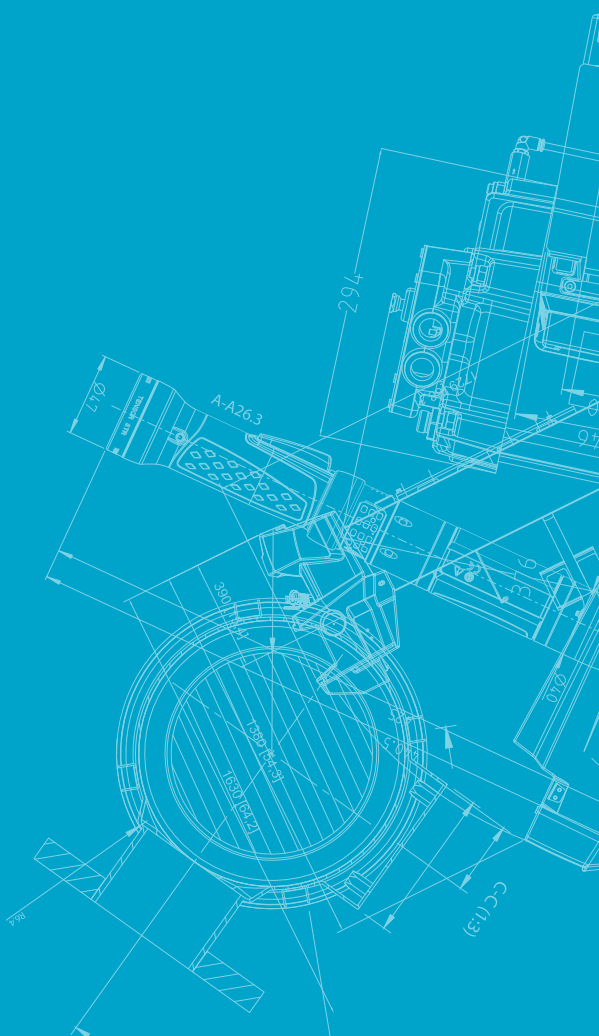
(4): Technical file holder

(5): Contact address of the manufacturer

On the Declaration of Conformity, the harmonized and/or other standards that have been used for the design are shown and/or referred to.

The Declaration of Conformity is part of the documentation that is supplied with this device.

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