Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE A-64000
MANUFACTURERS RECORD BOOK (FINAL DOSSIER)

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Rev.	Date	Description	Prepared	Reviewed	Approved

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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.

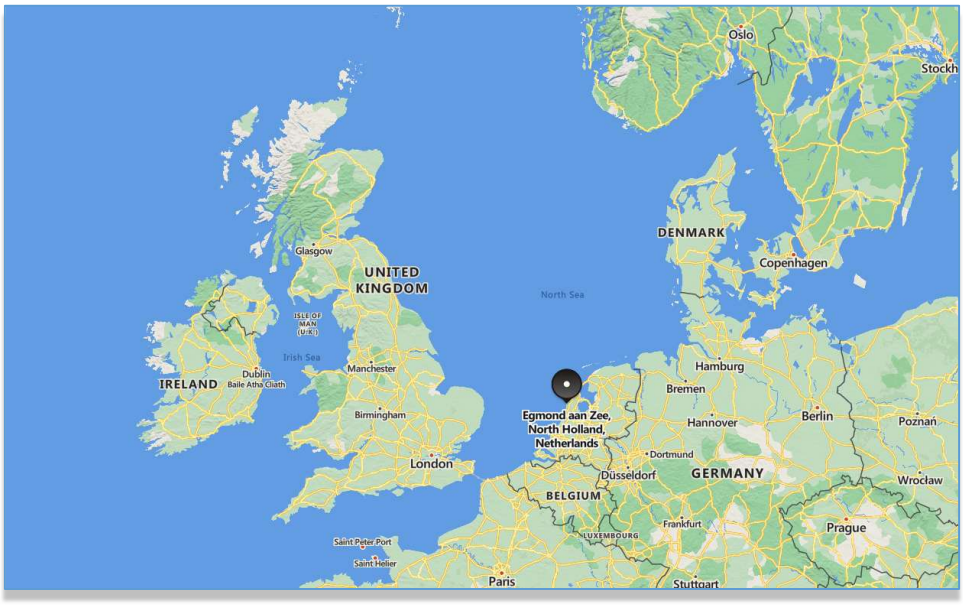


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

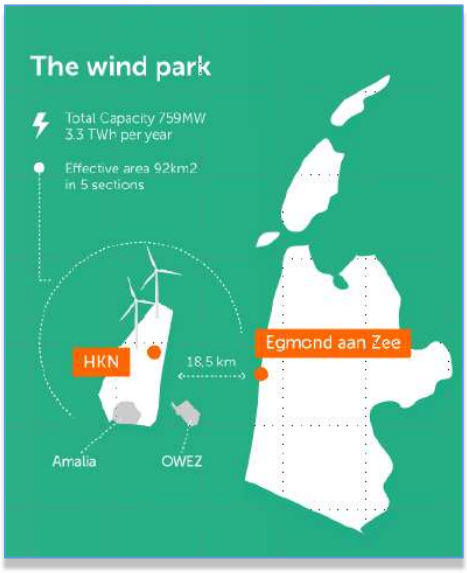


Figure 2 - Wind Park Details

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.

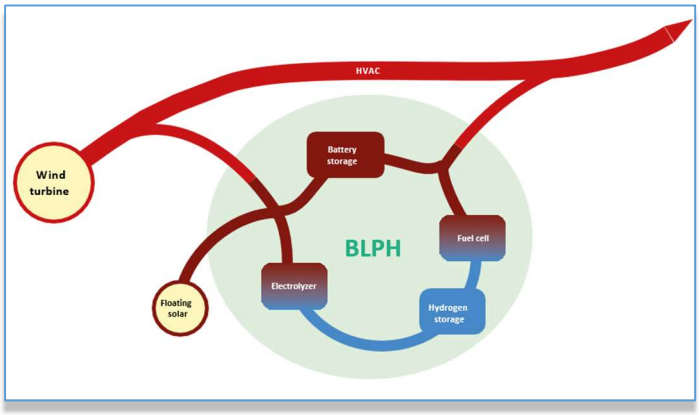


Figure 3 – BLPH Concept

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
1724000437-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

- 1724000437-MD-LIS-00001: SMIR - SUPPLIER MASTER INFORMATION REGISTER
- 1724000437-EL-LIS-00014: ELECTRICAL LOAD LIST
- 1724000437-IN-LIS-00015: I/O LIST
- 1724000437-IN-LIS-00016: INSTRUMENT LIST WITH SET POINTS/CONTROL/ALARM/SHUTDOWN
- 1724000437-EL-LIS-00017: CABLES LIST
- 1724000437-MAC-LIS-00026: ATEX REGISTER
- 1724000437-MAC-LIS-00027: ATEX DOCUMENTATION

3.1.2 Diagrams

- 1724000437-PR-PID-00018: PACKAGE P&ID

3.1.3 Drawings

- 1724000437-MAC-DA-00005: CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
- 1724000437-MAC-DD-00006: EQUIPMENT SECTIONAL DRAWING WITH BILL OF MATERIAL
- 1724000437-MAC-DD-00008: PACKAGE PIPING SCHEMATICS AND BILL OF MATERIALS
- 1724000437-MAC-DG-00009: PACKAGE WIRING DIAGRAM INCLUDING LAYOUT OF PACKAGE CONTROL PANEL
- 1724000437-MAC-CE-00004: PACKAGE CAUSE EFFECT MATRIX /LOGIC DIAGRAMS

3.1.4 Calculation notes

- 1724000437-ST-RE-00010: PACKAGE STRUCTURAL CALCULATION REPORT INCLUDING FIXING POINTS and LIFTING POINTS
- 1724000437-MAC-CA-00031: NITROGEN RECEIVER CALCULATION

3.1.5 Data sheets

- 1724000437-MAC-DS-00011: EQUIPMENT DATA SHEETS INCLUDING PSA, ETC.
- 1724000437-MAC-DS-00012: PACKAGE EQUIPMENT NOISE DATA SHEETS INCLUDING PSA, ETC.
- 1724000437-MAC-DS-00013: INSTRUMENT DATA SHEETS

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3.2 CERTIFICATION DOSSIER

3.2.1 Manufacturing procedures

- 1724000437-QC-ITP-00002: INSPECTION TEST PLAN (ITP)
- 1724000437-WEL-LIS-00020: WELDING BOOK (WPS, PQR, WELDERS QUALIFICATIONS, WELDING MAPS, ETC.)
- 1724000437-NDT-PRO-00019: NDT PROCEDURES INCLUDING PERSONNEL QUALIFICATIONS
- 1724000437-MAT-PRO-00021: PAINTING PROCEDURE
- 1724000437-QC-PRO-00022: HYDROSTATIC AND OR PNEUMATIC TEST PROCEDURE
- 1724000437-QC-PRO-00023: FAT (FACTORY ACCEPTANCE TEST) PROCEDURE
- 1724000437-QC-PRO-00030: 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
- SPARE PARTS CHECK (TYPE, QUANTITY & LABELLING)

3.2.3 Package certification

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

3.3 FIELD OPERATIONS & MAINTENANCE

3.3.1 General documents

- 1724000437-MAC-SP-00003: SYSTEM/PACKAGE FUNCTIONAL DESCRIPTION
- 1724000437-COM-LIS-00028: SPARE PARTS LIST (2 YEARS AND COMMISSIONING & START-UP)
- 1724000437-MAC-MAN-00029: INSTALLATION, OPERATING AND MAINTENANCE MANUAL (INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)

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Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE

SUPPLIER MASTER INFORMATION REGISTER

Document Number: 1724000437-MD-LIS-00001

Document Class: 3

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Cristian Parisi	29/03/2024

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1	1724000437-MD-LIS-00001	00	1724000437-MD-LIS-00001	00	CED52837	00	SMIR - SUPPLIER MASTER INFORMATION REGISTER	Eng-Mechanical			20/03/2024				A
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2	1724000437-QC-ITP-00002	00	1724000437-QC-ITP-00002	00	CPC52838	00	INSPECTION TEST PLAN (ITP)	QUA			22/03/2024				A
							ENGINEERING DOCUMENTS								
3	1724000437-MAC-SP-00003	00	1724000437-MAC-SP-00003	00	CVV52839	00	SYSTEM/PACKAGE FUNCTIONAL DESCRIPTION	Eng-Mechanical			30/04/2024				I
4	1724000437-MAC-CE-00004	00	1724000437-MAC-CE-00004	00	CVV52840	00	PACKAGE CAUSE EFFECT MATRIX /LOGIC DIAGRAMS	Eng-Mechanical			19/04/2024				I
5	1724000437-MAC-DA-00005	00	1724000437-MAC-DA-00005	00	CGA52841	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	1724000437-MAC-DD-00006	00	1724000437-MAC-DD-00006	00	CCO52842	00	EQUIPMENT SECTIONAL DRAWING WITH BILL OF MATERIAL	Eng-Mechanical			10/05/2024				I
7	1724000437-MAC-DD-00007	00	1724000437-MAC-DD-00007	00	C3D52843	00	PACKAGE 3D MODEL DRAWING AND ELECTRONIC FILE	Eng-Mechanical			12/04/2024				A
8	1724000437-MAC-DD-00008	00	1724000437-MAC-DD-00008	00	CCO52844	00	PACKAGE PIPING SCHEMATICS AND BILL OF MATERIALS	Eng-Mechanical			10/05/2024		X		A
9	1724000437-MAC-DG-00009	00	1724000437-MAC-DG-00009	00	CEL52845	00	PACKAGE WIRING DIAGRAM INCLUDING LAYOUT OF PACKAGE CONTROL PANEL	Eng-Mechanical			05/04/2024		X	X	A
10	1724000437-ST-RE-00010	00	1724000437-ST-RE-00010	00	CVV52846	00	PACKAGE STRUCTURAL CALCULATION REPORT INCLUDING FIXING POINTS and LIFTING POINTS	Structural			12/04/2024				I
11	1724000437-MAC-DS-00011	00	1724000437-MAC-DS-00011	00	CDS52847	00	EQUIPMENT DATA SHEETS INCLUDING PSA, ETC.	Eng-Mechanical			29/03/2024		X		A
12	1724000437-MAC-DS-00012	00	1724000437-MAC-DS-00012	00	CVV52848	00	PACKAGE EQUIPMENT NOISE DATA SHEETS INCLUDING PSA, ETC.	Eng-Mechanical			10/05/2024		X		A
13	1724000437-MAC-DS-00013	00	1724000437-MAC-DS-00013	00	CVV52866	00	INSTRUMENT DATA SHEETS	Eng-Mechanical			12/04/2024				I
14	1724000437-EL-LIS-00014	00	1724000437-EL-LIS-00014	00	CVV52850	00	ELECTRICAL LOAD LIST	Eng-Mechanical			05/04/2024		X	X	A
15	1724000437-IN-LIS-00015	00	1724000437-IN-LIS-00015	00	CVV52851	00	I/O LIST	Eng-Mechanical			05/04/2024		X		A
16	1724000437-IN-LIS-00016	00	1724000437-IN-LIS-00016	00	CLS52852	00	INSTRUMENT LIST WITH SET POINTS/CONTROL/ALARM/SHUTDOWN	Eng-Mechanical			12/04/2024		X		A
17	1724000437-EL-LIS-00017	00	1724000437-EL-LIS-00017	00	CVV52853	00	CABLES LIST	Eng-Mechanical			05/04/2024				I
18	1724000437-PR-PID-00018	00	1724000437-PR-PID-00018	00	CPN52854	00	PACKAGE P&ID	Eng-Mechanical			22/03/2024		X	X	A
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22	1724000437-QC-PRO-00022	00	1724000437-QC-PRO-00022	00	CTP52858	00	HYDROSTATIC AND OR PNEUMATIC TEST PROCEDURE	Eng-Mechanical			12/04/2024				A
23	1724000437-QC-PRO-00023	00	1724000437-QC-PRO-00023	00	CTP52859	00	FAT (FACTORY ACCEPTANCE TEST) PROCEDURE	Eng-Mechanical			12/04/2024				A
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24	1724000437-QC-DB-00024	00	1724000437-QC-DB-00024	00	CVV52860	00	MANUFACTURERS RECORD BOOK (FINAL DOSSIER)	CERT			18/10/2024				A
25	1724000437-QC-LIS-00025	00	1724000437-QC-LIS-00025	00	CVV52861	00	MANUFACTURERS RECORD BOOK (FINAL DOSSIER) - INDEX	QUA			31/05/2024				A
26	1724000437-MAC-LIS-00026	00	1724000437-MAC-LIS-00026	00	CVV52862	00	ATEX REGISTER	QUA			12/04/2024				A
27	1724000437-MAC-LIS-00027	00	1724000437-MAC-LIS-00027	00	CVV52863	00	ATEX DOCUMENTATION	QUA			19/07/2024				A
							SPARES & MAINTENANCE DATA								
28	1724000437-COM-LIS-00028	00	1724000437-COM-LIS-00028	00	CSP52864	00	SPARE PARTS LIST (2 YEARS AND COMMISSIONING & START-UP)	Eng-Mechanical			31/05/2024				A
29	1724000437-MAC-MAN-00029	00	1724000437-MAC-MAN-00029	00	CMI52865	00	INSTALLATION, OPERATING AND MAINTENANCE MANUAL (INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)	Eng-Mechanical			05/09/2024				I
							HANDLING, SHIPPING & SITE INSTALLATION								
30	1724000437-QC-PRO-00030	00	1724000437-QC-PRO-00030	00	CVV52866	00	HANDLING, PRESERVATION AND PACKAGING PROCEDURE	LOG			05/09/2024				I

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Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE
ELECTRICAL LOAD LIST

Document Number: 1724000437-EL-LIS-00014

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Giuseppe Cavallo	19/09/24

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

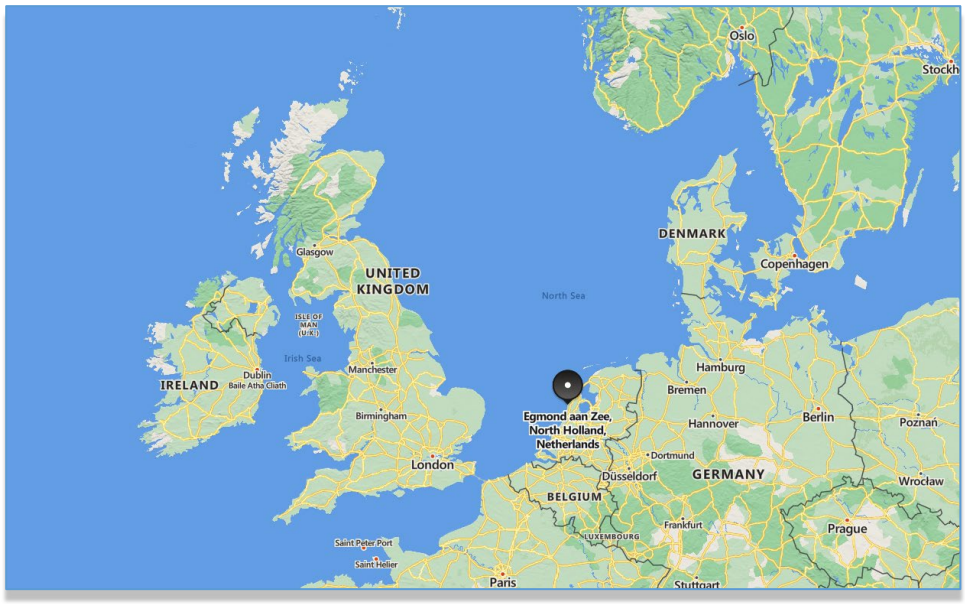


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



Figure 2 - Wind Park Details

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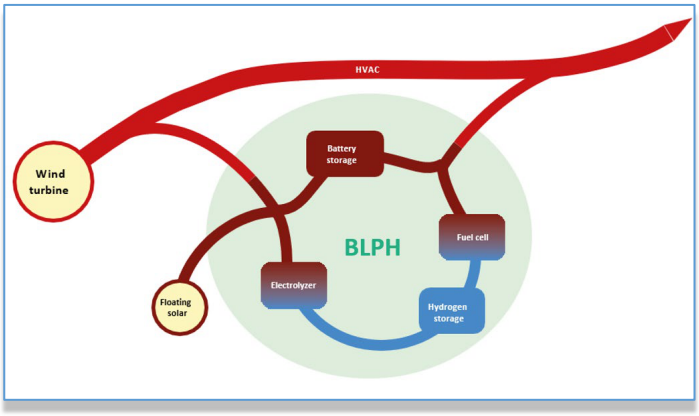


Figure 3 – BLPH Concept

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.

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2 DOCUMENT SCOPE

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

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Doc. No.	Description
1724000437-PR-PID-00018	PACKAGE P&ID
1724000437-MAC-DS-00011	EQUIPMENT DATA SHEETS INCLUDING PSA, 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	Power	Note
Utilities	1,0		230V-1Ph+N+PE 50Hz	0.5 kW	Not managed by PLC
PLC	1,0	64-LP-001	230V-1Ph+N+PE 50Hz (UPS)	1,0 kW	
Solenoid valve		64-XY-051	24VDC	15 W	power supply is managed directly by the UCP
Solenoid valve		64-XY-052	24VDC	15 W	power supply is managed directly by the UCP
Solenoid valve		64-XY-053	24VDC	15 W	power supply is managed directly by the UCP
Solenoid valve		64-XY-054	24VDC	15 W	power supply is managed directly by the UCP
Solenoid valve		64-XY-055	24VDC	15 W	power supply is managed directly by the UCP
Solenoid valve		64-XY-056	24VDC	15 W	power supply is managed directly by the UCP
Solenoid valve		64-XY-057	24VDC	15 W	power supply is managed directly by the UCP
Solenoid valve		64-XY-058	24VDC	15 W	power supply is managed directly by the UCP
Solenoid valve		64-XY-059	24VDC	15 W	power supply is managed directly by the UCP
Pressure Transmitter		64-PIT-051	24VDC	0.5 W	power supply is managed directly by the UCP
Pressure Transmitter		64-PIT-052	24VDC	0.5 W	power supply is managed directly by the UCP
Pressure Transmitter		64-PIT-053	24VDC	0.5 W	power supply is managed directly by the UCP
Pressure Transmitter		64-PIT-057	24VDC	0.5 W	power supply is managed directly by the UCP
Pressure Transmitter		64-PIT-059	24VDC	0.5 W	power supply is managed directly by the UCP
Differential Pressure Transmitter		64-PDIT-056	24VDC	0.5 W	power supply is managed directly by the UCP
Oxygen Analyzer		64-AIT-051	24VDC	0.5 W	power supply is managed directly by the UCP

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Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE A-64000

I/O LIST

Document Number: 1724000437-IN-LIS-00015

Equipment 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	05/06/2025

		ıction (AFC)	GT	MC	TM
		ıction (AFC)	GT	MC	TM
		v (IFR)	GT	MC	TM
		v (IFR)	GT	MC	TM
00	30/04/2024	Issue for Review (IFR)	GT	MC	TM
Rev.	Date	Description	Prepared	Reviewed	Approved

COES

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

ISSUER:

ISSUER DOCUMENT CODE :

DOCUMENT TITLE :

INPUT-OUTPUT LIST

PROJECT DESCRIPTION :

COES_PSA 64-LP-001 (PSA LOCAL PANEL)

CLIENT :

CUSTOMER'S REFERENCES :

JOB
SYSTEM OR EQUIPMENT
CONTRACT
P. & ID.

0.3	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
Rev.	**Date**	**Purpose of issue**	**Prepared by**	**Checked by**	**Approved by**

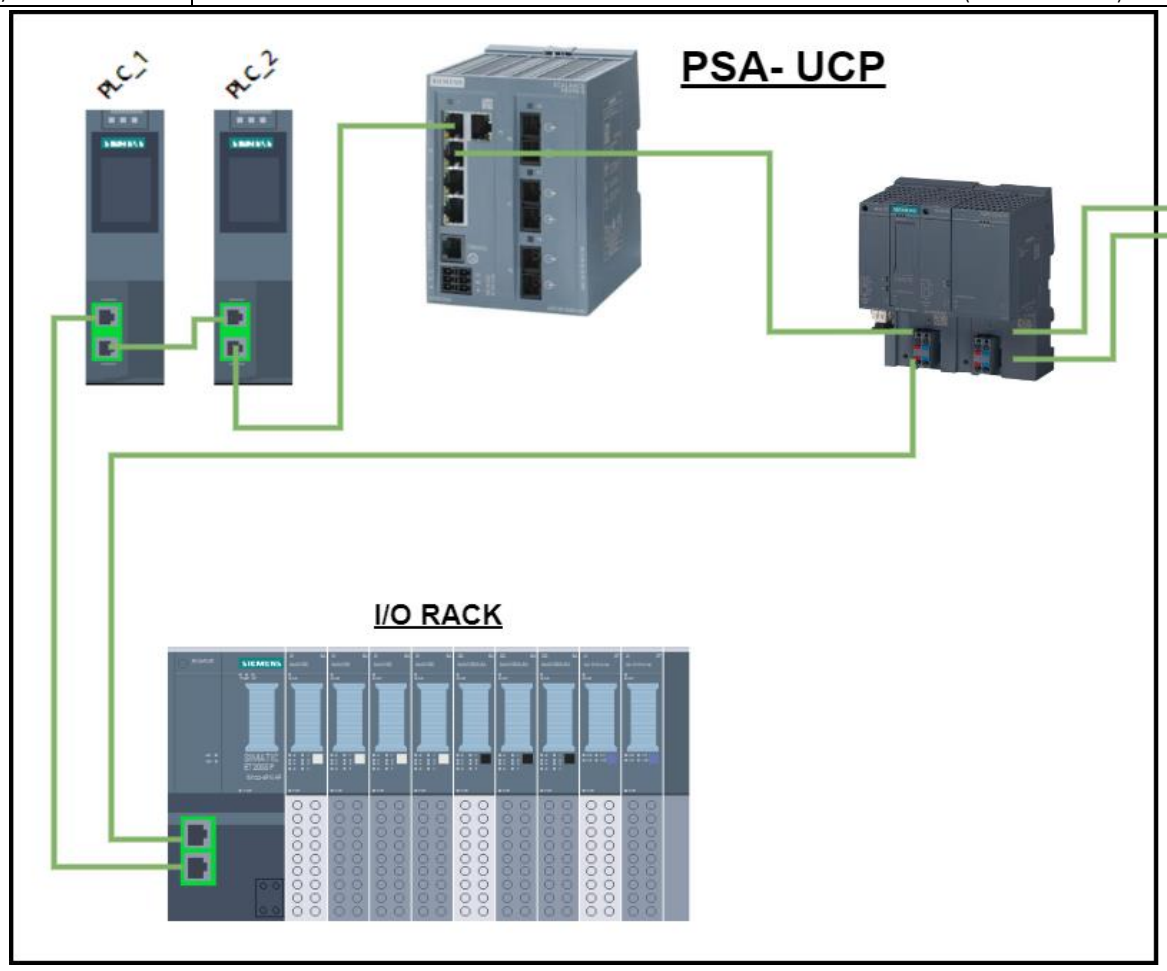
HARDWARE CONFIGURATION

N. SLOT	CODE	DESCRIPTION
N2 A-64000 (PSA 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	192.168.9.1 / 255.255.255.0	REDUNDANCY CPUs SYSTEM ADDRESS
2	192.168.9.2 / 255.255.255.0	PLC 1 ADDRESS
3	192.168.9.3 / 255.255.255.0	PLC 2 ADDRESS
4	192.168.9.4 / 255.255.255.0	SWITCH ADDRESS
5	192.168.9.5 / 255.255.255.0	INTERFACE MODULE ADDRESS (I/O RACK)
6	192.168.9.6 / 255.255.255.0	COUPLER ADDRESS (IN THE RING)
7	192.168.9.7 / 255.255.255.0	COUPLER ADDRESS(NOT IN THE RING)



N2 A-64000 (PSA 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	VALVE 64-XV-051 OPEN LIMIT SWITCH	64-ZSH-051	
RACK F1 SLOT 1 IN 1	%I0.1	VALVE 64-XV-051 CLOSED LIMIT SWITCH	64-ZSL-051	
RACK F1 SLOT 1 IN 2	%I0.2	VALVE 64-XV-052 OPEN LIMIT SWITCH	64-ZSH-052	
RACK F1 SLOT 1 IN 3	%I0.3	VALVE 64-XV-052 CLOSED LIMIT SWITCH	64-ZSL-052	
RACK F1 SLOT 1 IN 4	%I0.4	VALVE 64-XV-053 OPEN LIMIT SWITCH	64-ZSH-053	
RACK F1 SLOT 1 IN 5	%I0.5	VALVE 64-XV-053 CLOSED LIMIT SWITCH	64-ZSL-053	
RACK F1 SLOT 1 IN 6	%I0.6	VALVE 64-XV-054 OPEN LIMIT SWITCH	64-ZSH-054	
RACK F1 SLOT 1 IN 7	%I0.7	VALVE 64-XV-054 CLOSED LIMIT SWITCH	64-ZSL-054	
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	VALVE 64-XV-055 OPEN LIMIT SWITCH	64-ZSH-055	
RACK F1 SLOT 2 IN 1	%I1.1	VALVE 64-XV-055 CLOSED LIMIT SWITCH	64-ZSL-055	
RACK F1 SLOT 2 IN 2	%I1.2	VALVE 64-XV-056 OPEN LIMIT SWITCH	64-ZSH-056	
RACK F1 SLOT 2 IN 3	%I1.3	VALVE 64-XV-056 CLOSED LIMIT SWITCH	64-ZSL-056	
RACK F1 SLOT 2 IN 4	%I1.4	VALVE 64-XV-057 OPEN LIMIT SWITCH	64-ZSH-057	
RACK F1 SLOT 2 IN 5	%I1.5	VALVE 64-XV-057 CLOSED LIMIT SWITCH	64-ZSL-057	
RACK F1 SLOT 2 IN 6	%I1.6	VALVE 64-XV-058 OPEN LIMIT SWITCH	64-ZSH-058	
RACK F1 SLOT 2 IN 7	%I1.7	VALVE 64-XV-058 CLOSED LIMIT SWITCH	64-ZSL-058	
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 64-XV-059 OPEN LIMIT SWITCH	64-ZSH-059	
RACK F1 SLOT 3 IN 1	%I2.1	VALVE 64-XV-059 CLOSED LIMIT SWITCH	64-ZSL-059	
RACK F1 SLOT 3 IN 2	%I2.2	INTERNAL CABINET THERMOSTAT	64-TH-001	
RACK F1 SLOT 3 IN 3	%I2.3	LOCAL START PUSH BUTTON	64-HS-001	
RACK F1 SLOT 3 IN 4	%I2.4	LOCAL STOP PUSH BUTTON	64-HS-002	
RACK F1 SLOT 3 IN 5	%I2.5	LOCAL ALARM RESET	64-HS-003	
RACK F1 SLOT 3 IN 6	%I2.6	LOCAL REMOTE SELECTOR STATUS	64-HS-004	
RACK F1 SLOT 3 IN 7	%I2.7	SHUTDOWN ALARM FROM SIS - INDICATION ONLY (0=FAULT)	64-ESD-001	This standard signal is only an indication of cumulative critical alarms: 64-XS-001 (processed by SIL 2 Relay) & Emergency pushbutton on 63-LP-001
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 64-XV-060 OPEN LIMIT SWITCH	64-ZSH-060	
RACK F1 SLOT 4 IN 1	%I3.1	VALVE 64-XV-060 CLOSED LIMIT SWITCH	64-ZSL-060	
RACK F1 SLOT 4 IN 2	%I3.2	VALVE 64-XV-061 OPEN LIMIT SWITCH	64-ZSH-061	
RACK F1 SLOT 4 IN 3	%I3.3	VALVE 64-XV-061 CLOSED LIMIT SWITCH	64-ZSL-061	
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	VALVE 64-XV-051 COMMAND	64-XV-051	
RACK F1 SLOT 5 OUT 1	%Q0.1	VALVE 64-XV-052 COMMAND	64-XV-052	
RACK F1 SLOT 5 OUT 2	%Q0.2	VALVE 64-XV-053 COMMAND	64-XV-053	
RACK F1 SLOT 5 OUT 3	%Q0.3	VALVE 64-XV-054 COMMAND	64-XV-054	
RACK F1 SLOT 5 OUT 4	%Q0.4	VALVE 64-XV-055 COMMAND	64-XV-055	
RACK F1 SLOT 5 OUT 5	%Q0.5	VALVE 64-XV-056 COMMAND	64-XV-056	
RACK F1 SLOT 5 OUT 6	%Q0.6	VALVE 64-XV-057 COMMAND	64-XV-057	
RACK F1 SLOT 5 OUT 7	%Q0.7	VALVE 64-XV-058 COMMAND	64-XV-058	
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	VALVE 64 XV-059 COMMAND	64-XV-059	
RACK F1 SLOT 6 OUT 1	%Q1.1	SPARE		
RACK F1 SLOT 6 OUT 2	%Q1.2	RUNNING SYSTEM LAMP	64-XL-003	
RACK F1 SLOT 6 OUT 3	%Q1.3	GENERAL ALARM SYSTEM LAMP	64-XA-001	
RACK F1 SLOT 6 OUT 4	%Q1.4	NITROGEN GENERATOR RUNNING (TO DCS)	64-XL-003-DCS	
RACK F1 SLOT 6 OUT 5	%Q1.5	NITROGEN GENERATOR ALARM (TO DCS)	64-XA-001-DCS	
RACK F1 SLOT 6 OUT 6	%Q1.6	VALVE 64 XV-060 COMMAND	64-XV-060	
RACK F1 SLOT 6 OUT 7	%Q1.7	VALVE 64 XV-061 COMMAND	64-XV-061	
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 64-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	INLET PRESSUTE TRANSMITTER	64-PT-051	
RACK F1 SLOT 8 A. IN. 1	%IW6	TOWER 1 PRESSURE TRANSMITTER	64-PT-052	
RACK F1 SLOT 8 A. IN. 2	%IW8	TOWER 2 PRESSURE TRANSMITTER	64-PT-053	
RACK F1 SLOT 8 A. IN. 3	%IW10	OUTLET B PRESSURE TRANSMITTER	64-PT-057	
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	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER	64-PT-059	
RACK F1 SLOT 9 A. IN. 1	%IW14	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS	64-PDIT-056	
RACK F1 SLOT 9 A. IN. 2	%IW16	OXYGEN TRANSMITTER	64-AT-051	
RACK F1 SLOT 9 A. IN. 3	%IW18	SPARE		
RACK 1 SLOT 9	SERVER MODULE	6ES7193-6PA00-0AA0		

N2 A-64000

Rev 4

PROFINET SIGNALS TABLE

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						R	
1001	0	BOOL	FILTER_1-H	DIFFERENTIAL PRESSURE EXCEEDED FOR AFTER FILTER 1 - ALARM	0=ALARM, 1=OK			R	
	1	BOOL	FILTER_2-H	DIFFERENTIAL PRESSURE EXCEEDED FOR AFTER FILTER 2 - ALARM	0=ALARM, 1=OK			R	
	2	BOOL	FILTERS-H	DIFFERENTIIAL PRESSURE EXCEEDED FOR BOTH AFTER FILTER	0=ALARM, 1=OK			R	
	3	BOOL		SPARE				R	
	4	BOOL	STOP_REQUEST	STOP TAKEN WAITING UNTIL THE END OF PHASE 5	1 = IN PROGRESS 0 = DONE			R	
	5	BOOL		SPARE				R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1002	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	
1003	0	BOOL	64-TH-001-H	INTERNAL CABINET THERMOSTAT - ALARM	0=ALARM, 1=OK			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	
1004	0	BOOL	64-XY-051-H	VALVE 64-XY-051 ALARM	0=ALARM, 1=OK			R	
	1	BOOL	64-XY-052-H	VALVE 64-XY-052 ALARM	0=ALARM, 1=OK			R	
	2	BOOL	64-XY-053-H	VALVE 64-XY-053 ALARM	0=ALARM, 1=OK			R	
	3	BOOL	64-XY-054-H	VALVE 64-XY-054 ALARM	0=ALARM, 1=OK			R	
	4	BOOL	64-XY-055-H	VALVE 64-XY-055 ALARM	0=ALARM, 1=OK			R	
	5	BOOL	64-XY-056-H	VALVE 64-XY-056 ALARM	0=ALARM, 1=OK			R	
	6	BOOL	64-XY-057-H	VALVE 64-XY-057 ALARM	0=ALARM, 1=OK			R	
	7	BOOL	64-XY-058-H	VALVE 64-XY-058 ALARM	0=ALARM, 1=OK			R	
1005	0	BOOL	64-XY-059-H	VALVE 64-XY-059 ALARM	0=ALARM, 1=OK			R	
	1	BOOL	64-XY-060-H	VALVE 64-XY-060 ALARM	0=ALARM, 1=OK			R	
	2	BOOL	64-XY-061-H	VALVE 64-XY-061 ALARM	0=ALARM, 1=OK			R	
	3	BOOL		SPARE				R	
	4	BOOL		SPARE				R	
	5	BOOL		SPARE				R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1006	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	
1007	0	BOOL	64-PT-051-LL	INLET PRESSURE TRANSMITTER - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	1	BOOL	64-PT-051-L	INLET PRESSURE TRANSMITTER - LOW ALARM (L)	0=ALARM, 1=OK			R	
	2	BOOL	64-PT-051-H	INLET PRESSURE TRANSMITTER - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	3	BOOL	64-PT-051-HH	INLET PRESSURE TRANSMITTER - HIGH HIGH ALARM (HH)	0=ALARM, 1=OK			R	
	4	BOOL	64-PT-052-LL	TOWER 1 PRESSURE TRANSMITTER - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	5	BOOL	64-PT-052-L	TOWER 1 PRESSURE TRANSMITTER - LOW ALARM (L)	0=ALARM, 1=OK			R	
	6	BOOL	64-PT-052-H	TOWER 1 PRESSURE TRANSMITTER - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	7	BOOL	64-PT-052-HH	TOWER 1 PRESSURE TRANSMITTER - HIGH HIGH ALARM (HH)	0=ALARM, 1=OK			R	
1008	0	BOOL	64-PT-053-LL	TOWER 2 PRESSURE TRANSMITTER - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	1	BOOL	64-PT-053-L	TOWER 2 PRESSURE TRANSMITTER - LOW ALARM (L)	0=ALARM, 1=OK			R	
	2	BOOL	64-PT-053-H	TOWER 2 PRESSURE TRANSMITTER - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	3	BOOL	64-PT-053-HH	TOWER 2 PRESSURE TRANSMITTER - HIGH HIGH ALARM (HH)	0=ALARM, 1=OK			R	
	4	BOOL	64-PT-057-LL	OUTLET B PRESSURE TRANSMITTER - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	5	BOOL	64-PT-057-L	OUTLET B PRESSURE TRANSMITTER - LOW ALARM (L)	0=ALARM, 1=OK			R	
	6	BOOL	64-PT-057-H	OUTLET B PRESSURE TRANSMITTER - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	7	BOOL	64-PT-057-HH	OUTLET B PRESSURE TRANSMITTER - HIGH HIGH ALARM (HH)	0=ALARM, 1=OK			R	
1009	0	BOOL	64-PT-059-LL	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	1	BOOL	64-PT-059-L	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER - LOW ALARM (L)	0=ALARM, 1=OK			R	
	2	BOOL	64-PT-059-H	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	3	BOOL	64-PT-059-HH	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER - HIGH HIGH ALARM (HH)	0=ALARM, 1=OK			R	
	4	BOOL	64-PDIT-056-LL	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	5	BOOL	64-PDIT-056-L	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS - LOW ALARM (L)	0=ALARM, 1=OK			R	
	6	BOOL	64-PDIT-056-H	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	7	BOOL	64-PDIT-056-HH	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS - HIGH HIGH ALARM (HH)	0=ALARM, 1=OK			R	
1010	0	BOOL	64-AT-051-LL	OXYGEN TRANSMITTER - LOW LOW ALARM (LL)	0=ALARM, 1=OK			R	
	1	BOOL	64-AT-051-L	OXYGEN TRANSMITTER - LOW ALARM (L)	0=ALARM, 1=OK			R	
	2	BOOL	64-AT-051-H	OXYGEN TRANSMITTER - HIGH ALARM (H)	0=ALARM, 1=OK			R	
	3	BOOL	64-AT-051-HH	OXYGEN TRANSMITTER - 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	64-PT-051-BADPV	INLET PRESSURE TRANSMITTER - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	1	BOOL	64-PT-052-BADPV	TOWER 1 PRESSURE TRANSMITTER - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	2	BOOL	64-PT-053-BADPV	TOWER 2 PRESSURE TRANSMITTER - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	3	BOOL	64-PT-057-BADPV	OUTLET B PRESSURE TRANSMITTER - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	4	BOOL	64-PT-059-BADPV	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	5	BOOL	64-PDIT-056-BADPV	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	6	BOOL	64-AT-051-BADPV	OXYGEN TRANSMITTER - BAD PROCESS VALUE	0=ALARM, 1=OK			R	
	7	BOOL		SPARE				R	
1012	0	BOOL	64-ESD-SIS-001-H	PLANT SHUTDOWN ALARM (SIS)	0=SHUTDOWN ALARM, 1=OK			R	PLANT STATUS
	1	BOOL	64-ALARM-PLANT	PLANT GENERAL ALARM	0=CUMULATIVE STANDARD ALARM, 1=OK			R	
	2	BOOL	64-PLANT-READY	PLANT READY	0=NOT READY, 1=READY TO START			R	
	3	BOOL	64-PLANT-RUNNING	PLANT RUNNING	0=STOPPED, 1=RUNNING			R	
	4	BOOL	64-PLANT-LOCA-REM	PLANT IN REMOTE MODE	0=LOCAL (PLC), 1=REMOTE (DCS)			R	
	5	BOOL		SPARE				R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1013	0	BOOL	64-XY-051-DCS	VALVE 64-XY-051 COMMAND	1 = COMMAND			R	
	1	BOOL	64-XY-052-DCS	VALVE 64-XY-052 COMMAND	1 = COMMAND			R	
	2	BOOL	64-XY-053-DCS	VALVE 64-XY-053 COMMAND	1 = COMMAND			R	
	3	BOOL	64-XY-054-DCS	VALVE 64-XY-054 COMMAND	1 = COMMAND			R	
	4	BOOL	64-XY-055-DCS	VALVE 64-XY-055 COMMAND	1 = COMMAND			R	
	5	BOOL	64-XY-056-DCS	VALVE 64-XY-056 COMMAND	1 = COMMAND			R	
	6	BOOL	64-XY-057-DCS	VALVE 64-XY-057 COMMAND	1 = COMMAND			R	
	7	BOOL	64-XY-058-DCS	VALVE 64-XY-058 COMMAND	1 = COMMAND			R	
1014	0	BOOL	64-XY-059-DCS	VALVE 64-XY-059 COMMAND	1 = COMMAND			R	
	1	BOOL	64-XY-060-DCS	VALVE 64-XY-060 COMMAND	1 = COMMAND			R	
	2	BOOL	64-XY-061-DCS	VALVE 64-XY-061 COMMAND	1 = COMMAND			R	
	3	BOOL		SPARE				R	
	4	BOOL		SPARE				R	
	5	BOOL		SPARE				R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1015	0	BOOL	64-ZSH-051	VALVE 64-XY-051 OPEN	1 = OPEN			R	
	1	BOOL	64-ZSL-051	VALVE 64-XY-051 CLOSED	1 = CLOSED			R	
	2	BOOL	64-ZSH-052	VALVE 64-XY-052 OPEN	1 = OPEN			R	
	3	BOOL	64-ZSL-052	VALVE 64-XY-052 CLOSED	1 = CLOSED			R	

1015	4	BOOL	64-ZSH-053	VALVE 64-XY-053 OPEN	1 = OPEN			R	
	5	BOOL	64-ZSL-053	VALVE 64-XY-053 CLOSED	1 = CLOSED			R	
	6	BOOL	64-ZSH-054	VALVE 64-XY-054 OPEN	1 = OPEN			R	
	7	BOOL	64-ZSL-054	VALVE 64-XY-054 CLOSED	1 = CLOSED			R	
1016	0	BOOL	64-ZSH-055	VALVE 64-XY-055 OPEN	1 = OPEN			R	
	1	BOOL	64-ZSL-055	VALVE 64-XY-055 CLOSED	1 = CLOSED			R	
	2	BOOL	64-ZSH-056	VALVE 64-XY-056 OPEN	1 = OPEN			R	
	3	BOOL	64-ZSL-056	VALVE 64-XY-056 CLOSED	1 = CLOSED			R	
	4	BOOL	64-ZSH-057	VALVE 64-XY-057 OPEN	1 = OPEN			R	
	5	BOOL	64-ZSL-057	VALVE 64-XY-057 CLOSED	1 = CLOSED			R	
	6	BOOL	64-ZSH-058	VALVE 64-XY-058 OPEN	1 = OPEN			R	
	7	BOOL	64-ZSL-058	VALVE 64-XY-058 CLOSED	1 = CLOSED			R	
1017	0	BOOL	64-ZSH-059	VALVE 64-XY-059 OPEN	1 = OPEN			R	
	1	BOOL	64-ZSL-059	VALVE 64-XY-059 CLOSED	1 = CLOSED			R	
	2	BOOL	64-ZSH-060	VALVE 64-XY-060 OPEN	1 = OPEN			R	
	3	BOOL	64-ZSL-060	VALVE 64-XY-060 CLOSED	1 = CLOSED			R	
	4	BOOL	64-ZSH-061	VALVE 64-XY-061 OPEN	1 = OPEN			R	
	5	BOOL	64-ZSL-061	VALVE 64-XY-061 CLOSED	1 = CLOSED			R	
	6	BOOL		SPARE				R	
	7	BOOL		SPARE				R	
1018	/	REAL (IEEE 754)	64-PT-051-PV	INLET PRESSURE TRANSMITTER - PROCESS VALUE	range 0..16 barg			R	**MEASURES**
1022	/	REAL (IEEE 754)	64-PT-052-PV	TOWER 1 PRESSURE TRANSMITTER - PROCESS VALUE	range 0..16 barg			R	
1026	/	REAL (IEEE 754)	64-PT-053-PV	TOWER 2 PRESSURE TRANSMITTER - PROCESS VALUE	range 0..16 barg			R	
1030	/	REAL (IEEE 754)	64-PT-057-PV	OUTLET B PRESSURE TRANSMITTER - PROCESS VALUE	range 0..16 barg			R	
1034	/	REAL (IEEE 754)	64-PT-059-PV	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER - PROCESS VALUE	range 0..16 barg			R	
1038	/	REAL (IEEE 754)	64-PDIT-056-PV	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS - PROCESS VALUE	range 0..1 barg			R	
1042	/	REAL (IEEE 754)	64-AT-051-PV	OXYGEN TRANSMITTER - PROCESS VALUE	range 0..100%			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	FILTER_IN_USE	INFORMATION ABOUT WHICH AFTER FILTER HAS MASTER ROLE	1= FILTER A ; 2 = FILTER B			R	
1092	/	INT	CURRENT_PHASE	INFORMATION ABOUT CURRENT PHASE	0= READY TO START ; 1= A: GEN, B: DEP ; 2= EQ ; 3= A: DEP, B: GEN ; 4= EQ			R	
1094	/	INT		SPARE - INTEGER PARAMETER 001				R	
1096	/	INT	WATCHDOG_INT	WATCHDOG TO CHECK COMMUNICATION	INCREMENTED by 1 every second from 0 up to 32767			R	
1098	/	INT		SPARE - INTEGER PARAMETER 002				R	
1100	/	INT		SPARE - INTEGER PARAMETER 003				R	
1102	/	INT		SPARE - INTEGER PARAMETER 004				R	
1104	/	INT		SPARE - INTEGER PARAMETER 005				R	
1106	/	INT		SPARE - INTEGER PARAMETER 006				R	
1108	/	INT		SPARE - INTEGER PARAMETER 007				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	

N2 A-64000

PROFINET SIGNALS TABLE

Rev 4

N. BYTE	N. BIT	DATA TYPE	TAG	DESCRIPTION	MEANING	SCALING	OFFSET	READ/WRITE	
	0	BOOL	64-START-PLANT-CMD	REMOTE START COMMAND	1 = START (PULSE 1 sec)			W	**REMOTE COMMANDS**
	1	BOOL	64-STOP-PLANT-CMD	REMOTE STOP COMMAND	0 = STOP (PULSE 1 sec)			W	
	2	BOOL		SPARE				W	
	3	BOOL	64-ACK-ALARM	REMOTE ALARMS ACKNOWLEDGE	1 = ACK (PULSE 1 sec)			W	
	4	BOOL	CHANGE_FILTER	CHANGE WORKING FILTER	1= CHANGE (PULSE 1 SEC)			W	
	5	BOOL	WATCHDOG_BIT	WATCHDOG TO CHECK CONNECTION STATUS WITH DCS	1= ALWAYS AS OK CONDITION 0= FAULT			W	
	6	BOOL		SPARE				W	
1150	7	BOOL		SPARE				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 (IEEE 754)		SPARE - REAL PARAMETER 001					**PARAMETERS**
1156	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 002				W	
1160	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 003				W	
1164	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 004				W	
1168	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 005				W	
1172	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 006				W	
1176	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 007				W	
1180	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 008				W	
1184	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 009				W	
1188	/	REAL (IEEE 754)		SPARE - REAL PARAMETER 010				W	
1192	/	INT		SPARE - INTEGER PARAMETER 001				W	
1194	/	INT		SPARE - INTEGER PARAMETER 002				W	
1196	/	INT		SPARE - INTEGER PARAMETER 003				W	
1198	/	INT		SPARE - INTEGER PARAMETER 004				W	
1200	/	INT		SPARE - INTEGER PARAMETER 005				W	
1202	/	INT		SPARE - INTEGER PARAMETER 006				W	
1204	/	INT		SPARE - INTEGER PARAMETER 007				W	
1206	/	INT		SPARE - INTEGER PARAMETER 008				W	
1208	/	INT		SPARE - INTEGER PARAMETER 009				W	
1210	/	INT		SPARE - INTEGER PARAMETER 010				W	
1212	/	TIME (DINT)	PHASE_TIME_1	SET PHASE 1 DURATION [ms]	can't be lower than 50 seconds			W	
1216	/	TIME (DINT)	PHASE_TIME_2	SET PHASE 2 DURATION [ms]	can't be lower than 10 seconds			W	
1220	/	TIME (DINT)	PHASE_TIME_3	SET PHASE 3 DURATION [ms]	can't be lower than 50 seconds			W	
1224	/	TIME (DINT)	PHASE_TIME_4	SET PHASE 4 DURATION [ms]	can't be lower than 10 seconds			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)

NITROGEN GENERATION PACKAGE

STRUMENT LIST

CONTROL / ALARM / SHUTDOWN

ber: 1724000437-IN-LIS-00016

ocument Class: 2

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Sign	Date
Giuseppe Cavallo	23/04/25

05	02/04/2025	Accepted for Construction (AFC)	GT	MC	TM
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Rev.	Date	Description	Prepared	Reviewed	Approved

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Item	TAG	SERVICE	SIGNAL	RANGE	SET POINT	NOTES
Pressure transmitter	64-PT-051	PSA inlet pressure	4-20mA	0 / 16 barg	8 barg	L ALARM
Pressure transmitter	64-PT-052 64-PT-053	PSA tower pressure	4-20mA	0 / 16 barg	8 barg	L ALARM
					10 barg	H ALARM
Pressure transmitter	64-PT-057	PSA after filters outlet pressure	4-20mA	0 / 16 barg	7.5 barg	L ALARM
Pressure transmitter	64-PT-059	N2 receiver pressure	4-20mA	0 / 16 barg	7.5 barg	L ALARM
Differential pressure transmitter	64-PDIT-056	Post-filter pressure drop	4-20mA	0 / 1 bar	0.5 bar	H ALARM
Oxygen analyzer	64-AT-051	Outlet O2 content	4-20mA	0 / 5%	3%	H ALARM
					5%	HH ALARM
Pressure gauge	64-PI-054 64-PI-055	PSA tower pressure	N/A	0 / 16 barg	N/A	
Pressure gauge	64-PI-058	N2 receiver pressure	N/A	0 / 16 barg	N/A	

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Item	TAG	SERVICE	SIGNAL	RANGE	SET POINT	NOTES
Solenoid valve	64-XY-051 64-XY-052 64-XY-053 64-XY-054 64-XY-055 64-XY-056 64-XY-057 64-XY-058 64-XY-059 64-XY-060 64-XY-061	Pneumatic on-off valves actuation	24 VDC	0 / 9 barg	N/A	N/A
Pneumatic on-off valve	64-XV-051 64-XV-052 64-XV-053 64-XV-054 64-XV-055 64-XV-056 64-XV-057	PSA towers change-over and regeneration	N/A	0 / 9 barg	N/A	N/A
Pneumatic on-off valve	64-XV-058	N2 discharge	N/A	0 / 9 barg	N/A	N/A
Pneumatic on-off valve	64-XV-059	N2 discharge	N/A	0 / 9 barg	N/A	N/A
Pneumatic on-off valve	64-XV-060 64-XV-061	Post-filters change-over	N/A	0 / 9 barg	N/A	N/A
Pressure safety valves	64-PSV-001 64-PSV-002	PSA package overpressure protection	N/A	N/A	12 barg	N/A
Pressure safety valves	64-PSV-003 64-PSV-004	N2 Receiver Overpressure protection	N/A	N/A	12 barg	N/A

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Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE U-64000

CABLE LIST

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Giuseppe Cavallo	25/01/25

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Rev.	Description
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01	Issue for Information (IFI)

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2	
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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.

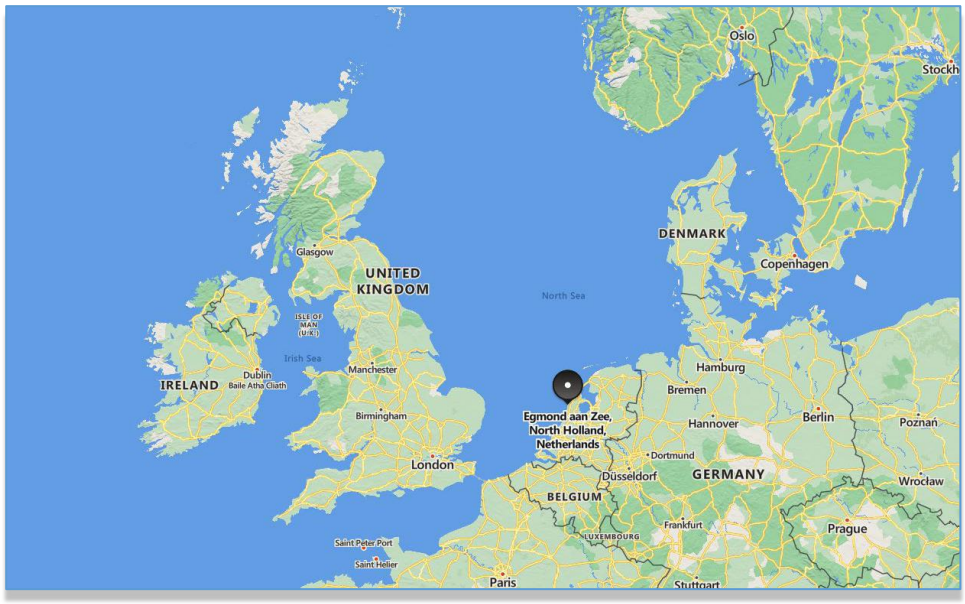


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



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.

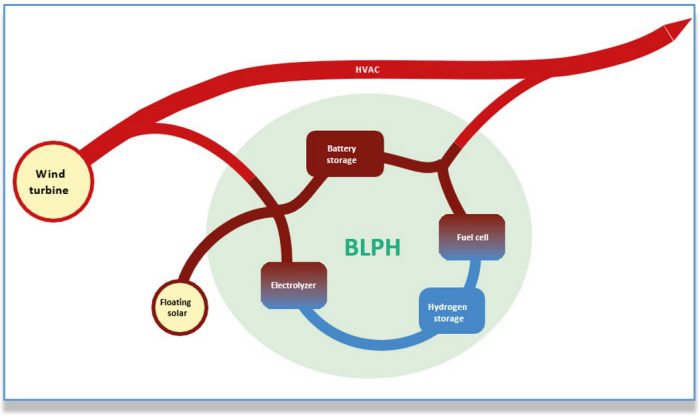


Figure 3 – BLPH Concept

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-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-64PT051	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-PT-051	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ANS	C-64PT052	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-PT-052	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ANS	C-64PT053	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-PT-053	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ANS	C-64PT057	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-PT-057	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ANS	C-64PDIT056	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-PDIT-056	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ANS	C-64AIT051	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-AIT-051	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ANS	* C-64PT059	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-PT-059	64-LP-001	N.A.	Double compression	ISO M20x1,5
0	ZS	C-64ZSL051	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSL-051	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-64ZSH051	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSH-051	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-64ZSL052	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSL-052	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-64ZSH052	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSH-052	64-LP-001	TBA	Double compression	ISO M20x1,5
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0	ZS	C-64ZSL054	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSL-054	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-64ZSH054	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSH-054	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-64ZSL055	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSL-055	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-64ZSH055	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSH-055	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-64ZSL056	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSL-056	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-64ZSH056	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSH-056	64-LP-001	TBA	Double compression	ISO M20x1,5
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0	ZS	C-64ZSH057	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSH-057	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-64ZSL058	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSL-058	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-64ZSH058	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSH-058	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-64ZSL059	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSL-059	64-LP-001	TBA	Double compression	ISO M20x1,5
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0	ZS	C-64ZSH060	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSH-060	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-64ZSL061	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSL-061	64-LP-001	TBA	Double compression	ISO M20x1,5
0	ZS	C-64ZSH061	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x1mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-ZSH-061	64-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-64XY051	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-XY-051	64-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-64XY052	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-XY-052	64-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-64XY053	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-XY-053	64-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-64XY054	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-XY-054	64-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-64XY055	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-XY-055	64-LP-001	TBA	Double compression	ISO M20x1,5
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0	SOV	C-64XY057	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-XY-057	64-LP-001	TBA	Double compression	ISO M20x1,5

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0	SOV	C-64XY058	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-XY-058	64-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-64XY059	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-XY-059	64-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-64XY060	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-XY-060	64-LP-001	TBA	Double compression	ISO M20x1,5
0	SOV	C-64XY061	XLPE/OS/PVC/SWB/PVC - 300V	circular 1x2x2,5mm2 + shield	Grey	Black(+) White(-)	X		SWB Armored	NO	IEC 60332-3-22	64-XY-061	64-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)

NITROGEN GENERATION PACKAGE

ATEX REGISTER

Document Number: 1724000437-MAC-LIS-00026

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Sign	Date
Giuseppe Cavallo	12/02/25

Document Class: 2

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

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	02	64-PIT-051	Pressure transmitter	N2 Package upstream PSA Towers	EMERSON	2051CG4A02A1KS5E1M5D4T1Q4Q8HR7	24CLPC0044337	II 1/2 G Ex db IIC T6...T4 Ga/Gb	1724000437-MAC-DS-00013	KEMA 08ATEX0090X	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	YES
2	02	64-PIT-052	Pressure transmitter	N2 Package PSA Towers	EMERSON	2051CG4A02A1KS5E1M5D4T1Q4Q8HR7	24CLPC0044338	II 1/2 G Ex db IIC T6...T4 Ga/Gb	1724000437-MAC-DS-00013	KEMA 08ATEX0090X	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	YES
3	02	64-PIT-053	Pressure transmitter	N2 Package PSA Towers	EMERSON	2051CG4A02A1KS5E1M5D4T1Q4Q8HR7	24CLPC0044339	II 1/2 G Ex db IIC T6...T4 Ga/Gb	1724000437-MAC-DS-00013	KEMA 08ATEX0090X	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	YES
4	02	64-PIT-057	Pressure transmitter	N2 Package downstream Post-filters	EMERSON	2051CG4A02A1KS5E1M5D4T1Q4Q8HR7	24CLPC0044340	II 1/2 G Ex db IIC T6...T4 Ga/Gb	1724000437-MAC-DS-00013	KEMA 08ATEX0090X	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	YES
5	02	64-PIT-059	Pressure transmitter	N2 Receiver	EMERSON	2051CG4A02A1KS5E1M5D4T1Q4Q8HR7	24CLPC0044341	II 1/2 G Ex db IIC T6...T4 Ga/Gb	1724000437-MAC-DS-00013	KEMA 08ATEX0090X	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	YES
6	02	64-PDIT-056	Differential Pressure transmitter	N2 Package Post-filters	EMERSON	2051CD3A02A1KS5E1M5D4T1Q4Q8HR7	24CLPC0044344	II 1/2 G Ex db IIC T6...T4 Ga/Gb	1724000437-MAC-DS-00013	KEMA 08ATEX0090X	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	YES
7	02	64-PI-054	Pressure gauge	N2 Package PSA Towers	WIKA	233.30	8975QOD8	II 2G Ex h IIC T6 ... T1 Gb X	1724000437-MAC-DS-00013	Declaration of Conformity by Wika n. 11564220	SAFE	None	1724000437	COES Srl	U-64000	N.A.	YES	YES
8	02	64-PI-055	Pressure gauge	N2 Package PSA Towers	WIKA	233.30	8975QOD9	II 2G Ex h IIC T6 ... T1 Gb X	1724000437-MAC-DS-00013	Declaration of Conformity by Wika n. 11564220	SAFE	None	1724000437	COES Srl	U-64000	N.A.	YES	YES
9	02	64-PI-058	Pressure gauge	N2 Receiver	WIKA	233.30	8975QODA	II 2G Ex h IIC T6 ... T1 Gb X	1724000437-MAC-DS-00013	Declaration of Conformity by Wika n. 11564220	SAFE	None	1724000437	COES Srl	U-64000	N.A.	YES	YES
10	02	64-AT-051	Oxygen analyzer	N2 Package downstream PSA Towers	GE SENSING	XM02	2432080	Ex db IIC T6 Gb	1724000437-MAC-DS-00013	INERIS 21ATEX0021X	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	YES
11	02	64-XY-051	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62188/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000437-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	NO
12	02	64-XY-052	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62188/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000437-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	NO
13	02	64-XY-053	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62188/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000437-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	NO
14	02	64-XY-054	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62188/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000437-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	NO
15	02	64-XY-055	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62188/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000437-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	NO
16	02	64-XY-056	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62188/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000437-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	NO
17	02	64-XY-057	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62188/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000437-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	NO
18	02	64-XY-058	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62188/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000437-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	NO
19	02	64-XY-059	Solenoid valve	Actuated valve instrument air supply	NADI	C28I60D0C	LOT. 62188/24	Ex db IIC T6 Ga/Gb Ex tb IIIC T65°C Db Ex h IIC T6 Ga	1724000437-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	NO
20	02	64-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	1724000437-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	NO
21	02	64-XY-061	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	1724000437-MAC-DS-00013	EPT 12 ATEX 0784	SAFE	None	1724000437	COES Srl	U-64000	N.A.	NO	NO

Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE
ATEX DOCUMENTATION

Document Number: 1724000437-MAC-LIS-00027

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Sign	Date
Filippo Zanellati	06/02/2025

Document Class: 2

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

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11564220	Sheet 6
INERIS 21ATEX0021X	Sheet 7
EPT 12 ATEX 0784	Sheet 11

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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

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 # ATTESTATION D'EXAMEN UE DE TYPE
EU-TYPE EXAMINATION CERTIFICATE

3 Numéro de l'attestation d'examen UE de type / *Number of the EU-Type Examination Certificate*

INERIS 21ATEX0021X INDICE / *ISSUE* : 00

4 Appareil ou système de protection / *Equipment or protective system*:

Analyseur de gaz TYPE XMTC & Analyseur d'oxygène TYPE XMO2
Gas analyzer TYPE XMTC & Oxygen analyzer TYPE XMO2

5 Fabricant / *Manufacturer*: **Panametrics LLC**

6 Adresse / *Address*: **1100 Technology Park Drive**
Billerica MA 01821
United States of America

7 Cet appareil ou système de protection et toute autre variante acceptable de celui-ci sont décrits dans l'annexe de la présente attestation et dans les documents descriptifs cités dans cette annexe.

This equipment or protective system and any acceptable variation thereto is specified in the Annex of this certificate and the descriptive documents therein referred to.

8 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) certifie que cet appareil ou système de protection répond aux exigences essentielles de sécurité et de santé en ce qui concerne la conception et la construction des appareils et des systèmes de protection destinés à être utilisés en atmosphères explosibles, décrites en annexe ii de la directive.

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), certifies that this equipment or protective system fulfils the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

Les procédures de certification sont disponibles sur www.ineris.fr.
The rules of certification are available on Ineris website on: www.ineris.fr.

Les examens et les essais sont consignés dans le rapport :
The examinations and the tests are recorded in report:

N° **036541**

IM-1915AD - Mise en application le 06 mars 2020

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Only the entire document including annexes may be reprinted.

Institut national de l'environnement industriel et des risques
Parc technologique Alata • BP 2 • F-60550 Verneuil-en-Halatte
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

9 Le respect des exigences essentielles de sécurité et de santé est assuré par :

The respect of the Essential Health and Safety Requirements has been assured by:

- la conformité à / *Conformity with:*

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

- les solutions spécifiques adoptées par le fabricant pour satisfaire aux exigences essentielles de sécurité et de santé décrites dans les documents descriptifs /

  Specific solutions adopted by the manufacturer to meet the Essential Health and Safety Requirements described in the descriptive documents

10 Si le signe X est placé à la suite du numéro de l'attestation d'examen UE de type, il indique que cet appareil ou système de protection est soumis à des conditions spéciales d'utilisation, mentionnées dans l'annexe de la présente attestation.

If the sign X is placed after the number of the EU type examination certificate, it indicates that this equipment and protective system is subject to the Specific Conditions of Use, mentioned in the annex of this certificate.

11 Cette attestation d'examen UE de type se rapporte uniquement à la conception, aux examens et essais de l'appareil ou système de protection spécifié conformément à la directive 2014/34/UE. D'autres exigences de cette directive s'appliquent à la fabrication et à la fourniture de cet appareil ou système de protection, celles-ci ne sont pas couvertes par cette attestation.

This EU-Type Examination Certificate relates only to the design, examinations 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 requirements are not covered by this certificate.

12 Le marquage de l'appareil ou du système de protection doit contenir :

The marking of the equipment or the protective system shall include the following:

Ex II 2 G

Verneuil-en-Halatte, 2022-02-14

Le directeur général de l'Ineris
Par délégation
The Chief Executive Officer of Ineris
By delegation

IM-1915AD - Mise en application le 06 mars 2020

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13 ANNEXE

15 DESCRIPTION DE L'APPAREIL OU DU SYSTEME DE PROTECTION :

Le XMTC et le XMO2 sont des boîtiers cylindriques antidéflagrants qui peuvent être fabriqués en acier inoxydable ou d'un alliage d'aluminium. Les pare-flammes sont certifiés et couverts par le numéro de certificat INERIS 12ATEX9013U selon les normes EN IEC 60079-0:2018 et EN 60079-1:2014.

Le XMTC mesure la concentration d'un gaz dans un mélange de gaz binaire en mesurant la conductivité thermique du gaz échantillon et en la comparant à la conductivité thermique du gaz de référence sélectionné. Le XMO2 mesure la concentration d'oxygène dans un mélange gazeux en utilisant les propriétés paramagnétiques uniques de l'oxygène.

Les deux modèles utilisent des entrées ¾" de NPT. L'équipement est mis à la terre intérieurement et extérieurement par des connexions de terre vissées et sont clairement marqués sur les enveloppes. Le XMO2 et le XMTC sont tous deux évalués à 24 Vdc, 25 Watts.

PARAMETRES RELATIFS A LA SECURITE :

Tension nominale : 24 VDC
Puissance nominale : 25 W
Pour le système de confinement, la pression maximale interne est 2 barg / 0.3 MPa.

MARQUAGE :

Le marquage doit être lisible et indélébile ; il doit comporter les indications suivantes :

Panametrics LLC
Billerica MA 01821, USA
XMTC ou XMO2
INERIS 21ATEX0021X
(Numéro de série)
(Année de construction)
⟨Ex⟩ II 2 G
Ex db IIC T6 Gb
T. Amb = -20°C à + 65°C pour XMTC
T. Amb = -20°C à + 55°C pour XMO2

AVERTISSEMENTS :
NE PAS OUVRIR EN PRESENCE D'UNE ATMOSPHERE EXPLOSIVE

L'ensemble du marquage peut être réalisé dans la langue du pays d'utilisation.

L'appareil ou le système de protection doit aussi porter le marquage normalement prévu par les normes de construction qui le concernent.

13 ANNEX

15 DESCRIPTION OF THE EQUIPMENT OR THE PROTECTIVE SYSTEM:

The XMTC and XMO2 are cylindrical flameproof enclosures that can be made from either stainless steel or aluminum alloy. The flame arrestors are certified and covered by the certificate number INERIS 12ATEX9013U in accordance with the standards EN IEC 60079-0:2018 and EN 60079-1:2014.

The XMTC measures the concentration of a gas in a binary gas mixture by measuring the thermal conductivity of the sample gas and comparing it to the thermal conductivity of selected gas reference. The XMO2 measures the concentration of oxygen in a gas mixture by utilizing the unique paramagnetic properties of oxygen.

Both models utilize ¾" NPT entries. The equipment is earthed internally and externally via screwed earthing connections and are clearly marked on the enclosures. Both the XMO2 and XMTC are rated 24 Vdc, 25 Watts.

PARAMETERS RELATING TO THE SAFETY:

Rated voltage: 24 VDC
Maximum power: 25 W
For the containment system, the maximum internal pressure is 2 barg / 0.3MPa.

MARKING:

Marking has to be readable and indelible; it has to include the following indications:

Panametrics LLC
Billerica MA 01821, USA
XMTC or XMO2
INERIS 21ATEX0021X
(Serial Number)
(Year of Construction)
⟨Ex⟩ *II 2 G*
Ex db IIC T6 Gb
T. Amb. = -20°C to +65°C for XMTC
T. Amb. = -20°C to +55°C for XMO2

WARNINGS :
DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT

Marking may be carried out in the language of the country of use.

The protective system or equipment has also to carry the marking normally stipulated by its construction standards.

IM-1915AD - Mise en application le 06 mars 2020

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EXAMENS ET ESSAIS INDIVIDUELS :

Conformément au § 16.2 de la norme EN 60079-1, le matériel est dispensé de l'épreuve individuelle compte tenu du fait qu'il a subi un essai de type sous 19.92 bar (soit 4 fois la pression de référence).

Conformément au § G.4.1 de la norme EN 60079-1, le système de confinement est dispensé de l'épreuve individuelle compte tenu du fait qu'il a subi un essai de type sous 8 bar (soit 4 fois la pression interne maximum).

ROUTINE EXAMINATIONS AND TESTS:

In accordance with clause 16.2 of the EN 60079-1 standard, the equipment is exempted of routine test due to the fact that it has undergone a static type test at 19.92 bar (i.e. 4 times the reference pressure).

In accordance with clause G.4.1 of the EN 60079-1 standard, the containment system is exempted of routine test due to the fact that it has undergone a static type test at 8 bar (i.e. 4 times the maximum internal pressure).

16 DOCUMENTS DESCRIPTIFS :

Les documents descriptifs cités ci-après, constituent la documentation technique de l'appareil, objet de la présente attestation.

16 DESCRIPTIVE DOCUMENTS:

The descriptive documents quoted hereafter constitute the technical documentation of the equipment, subject of this certificate.

Titre / *Title*	Réf. / *Ref.*	Rév. / *Rev.*	Date / *Date*
Certification drawing XMO2 XMTC (sheets 1 to 4)	752-168 rev G – SWD/000/00	G	2022.01.14
Certification and Safety statements for the Panametrics XMO2 Gas Analyzer (Sheets 1 & 2)	CSS-0007B (XMO2)	B	2022.01
Certification and Safety statements for the Panametrics XMTC Gas Analyzer (Sheets 1 & 2)	CSS-0006B (XMTC)	B	2022.01

17 CONDITIONS SPECIALES D'UTILISATION :

- Les joints antidéflagrants ont des valeurs différentes de celles spécifiées dans la norme EN 60079-1. Contactez le fabricant pour toute réparation.
- Le débit d'entrée maximum est de 2.667 L/min. Un limiteur de débit en amont est requis.
- Pour XMO2, la concentration maximale d'oxygène est de 21%.

Les autres conditions d'utilisation sont définies dans la notice d'instructions.

17 SPECIFIC CONDITIONS OF USE:

- *The flameproof joints have different values from those specified in the EN 60079-1 standard. Contact manufacturer before attempting any repairs.*
- *The maximum inlet flow rate is 2.667 L/min. An up-stream flow limiting device is required.*
- *For XMO2, the maximum oxygen concentration is 21%.*

The other conditions of use are stipulated in the instructions.

18 EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE :

Le respect des exigences essentielles de sécurité et de santé est assuré par :

- La conformité aux normes listées au paragraphe (9).
- L'ensemble des dispositions adoptées par le constructeur et décrites dans les documents descriptifs.

18 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS:

The respect of the Essential Health and Safety Requirements is ensured by:

- *Conformity to the standards quoted in clause (9).*
- *All provisions adopted by the manufacturer and defined in the descriptive documents.*

IM-1915AD - Mise en application le 06 mars 2020

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eurofins | Product Testing

[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	④⑤⑥	
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		④⑤⑥	

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

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

Dionisio Bucchieri
Directive Responsible

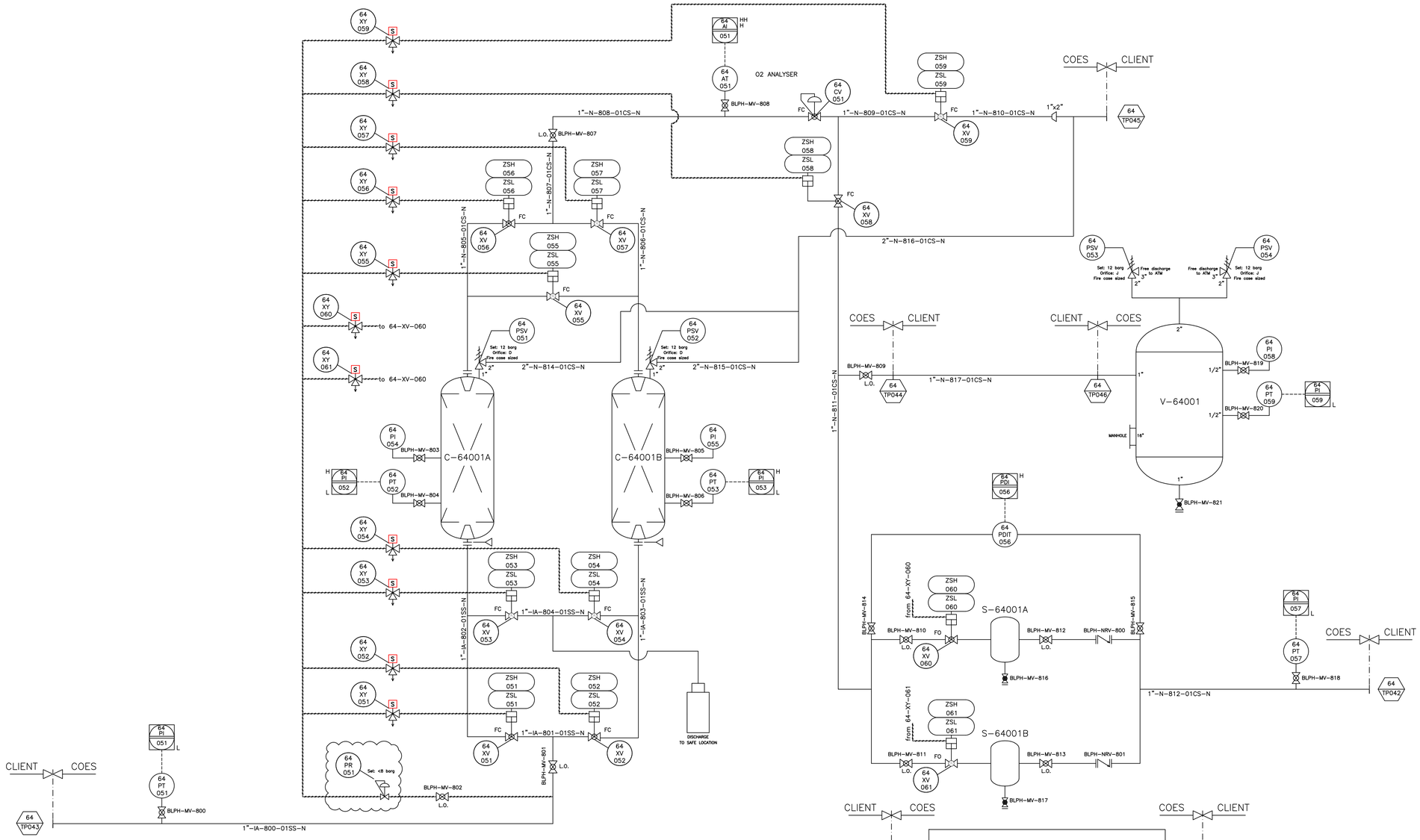
End of Certificate

DRAWING NO. 1724000437-PR-PID-00018 REV. 06

TAG: C-64001A/C-64001B	
PSA TOWERS	
DESIGN CAPACITY	150 Nm³/h
DESIGN PRESSURE	12 barg
DESIGN TEMPERATURE	80°C
OPERATING PRESSURE	9 barg
MATERIAL	CARBON STEEL

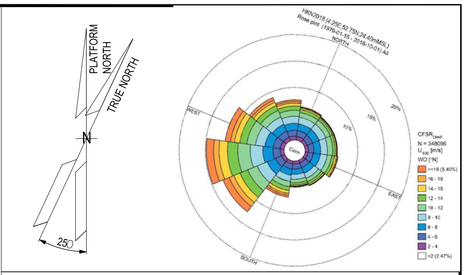
TAG: S-64001A/S-64001B	
PSA AFTER-FILTERS	
DESIGN CAPACITY	60 Nm³/h
DESIGN PRESSURE	12 barg
DESIGN TEMPERATURE	80°C
OPERATING PRESSURE	8.5 barg
MATERIAL	CARBON STEEL

TAG: V-64001	
N2 RECEIVER	
DESIGN PRESSURE	12 barg
DESIGN TEMPERATURE	80°C
OPERATING PRESSURE	8.4 barg
VOLUME	11 m³
DIAMETER	2000 mm
T-T	3126 mm
MATERIAL	LTCS



BATTERY LIMIT CONNECTIONS

POS.	DESCRIPTION	TYPE	DIMENSIONS	DN	MATERIAL	FLOW (normal)	FLOW (design)	NOTES
TP043	DRY AIR INLET	ANSI B16.5 - RF	ø1" 150#	25	SS 316/316L	125 Nm³/h @ 9 barg	150 Nm³/h @ 9 barg	
TP042	NITROGEN OUTLET	ANSI B16.5 - RF	ø1" 150#	25	CS	50 Nm³/h @ 8 barg	60 Nm³/h @ 8 barg	PURITY=97%
TP045	NITROGEN VENT	ANSI B16.5 - RF	ø2" 150#	50	CS	MAX 50 Nm³/h	MAX 60 Nm³/h	LOW PURITY
TP044	CONNECTION TO RECEIVER	ANSI B16.5 - RF	ø1" 150#	25	CS			
TP046	INLET/OUTLET RECEIVER	ANSI B16.5 - RF	ø1" 150#	25	CS			



NOTES

1) NITROGEN RECEIVER IS SUPPLIED LOOSE
2) FOR THE EXCHANGED SERIAL SIGNALS SEE VENDOR'S DOCUMENT "I/O LIST" NUMBER 1724000437-IN-LIS-00015
3) INSTRUMENT HAS 30 MINUTES WARM UP TIME ON EACH POWER CYCLE

LEGEND

- SKID MOUNTED INSTRUMENT
- TIE-IN POINT
- SKID PLC SIGNAL
- SILENCER
- PROCESS LINE
- INSTRUMENT AIR / IMPULSE LINE
- ELECTRICAL / INSTRUMENT SIGNAL
- SOFTWARE SIGNAL
- TEMPORIZED DRAIN TRAP
- THREADED BALL VALVE
- ACTUATED BALL VALVE
- FLANGED BALL VALVE
- CHECK VALVE
- PRESSURE RELIEF VALVE
- SOLENOID VALVE
- SELF-ACTUATED BALL VALVE
- PRESSURE REDUCER

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	30/05/2025

coes

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
06	12/05/25	GT	MC	TM	ACCEPTED FOR CONSTRUCTION (AFC)
05	03/04/25	GT	MC	TM	ACCEPTED FOR CONSTRUCTION (AFC)
04	23/12/24	GT	MC	TM	ACCEPTED FOR CONSTRUCTION (AFC)
03	05/09/24	GT	MC	TM	ACCEPTED FOR CONSTRUCTION (AFC)
00	21/03/24	GT	MC	TM	ISSUE FOR REVIEW (IFR)

CROSSWIND — ROSETTI MARINO

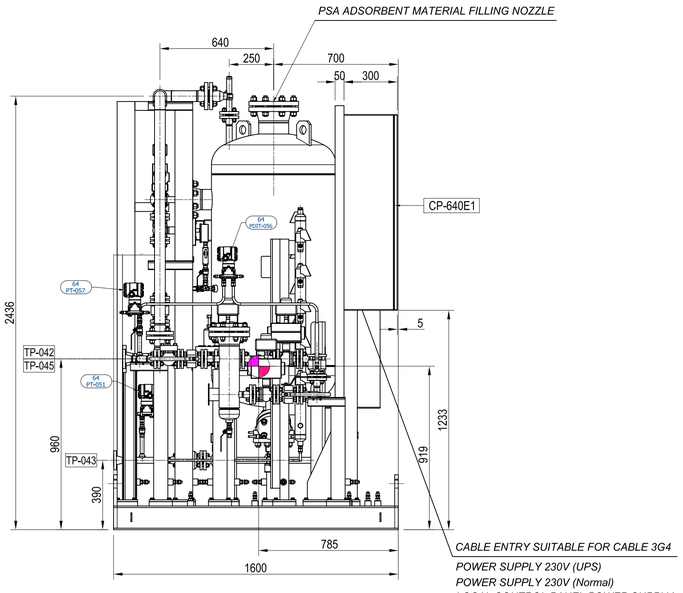
TITLE :
BASE LOAD POWER HUB (BLPH)
PACKAGE P&ID
NITROGEN GENERATION PACKAGE

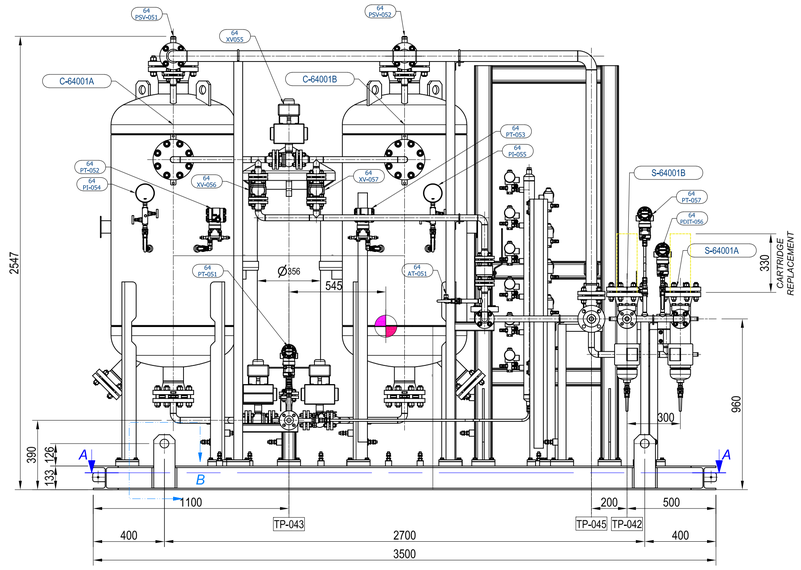
CONTRACT NO./TITLE	CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK			SCALE	N/A
DRAWN GT	CHECKED MC	APPROVED TM		DATE	12/05/25
A1	DRAWING NO. 1724000437-PR-PID-00018			SHEET 001	REV. 06

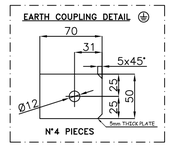
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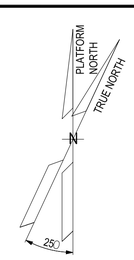
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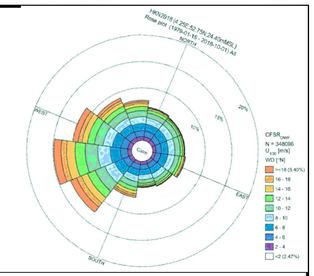
REV. 03









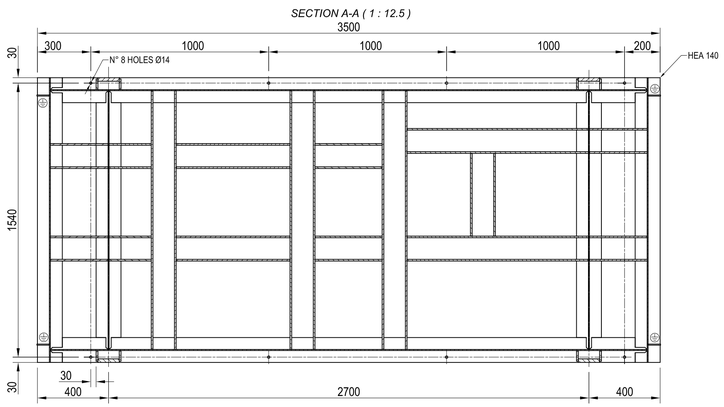


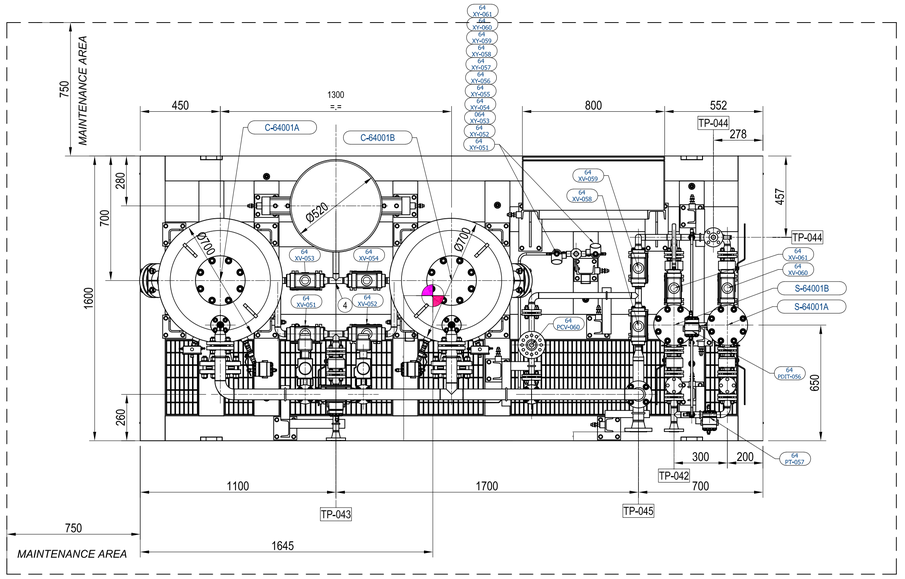
NOTES

1. SKID TOTAL WEIGHT: 5000 kg
2. FOR EQUIPMENT WEIGHT REFER TO EQUIPMENT DS, DOC. NO. 1724000437-MAC-DS-00011
3. FOR DESIGN PARAMETERS & CODES REFER TO EQUIPMENT DS, DOC. NO. 1724000437-MAC-DS-00011
4. FOR WELDING DETAILS REFER TO WELDING SPECIFICATION, DOC. NO. 1724000437-WEL-LIS-00020
5. FOR PAINTING DETAILS REFER TO PAINTING SPECIFICATION, DOC. NO. 1724000437-MAT-PRO-00021
6. NO LUBRICATION REQUIRED
7. FOR INSTRUMENT CABLES & CONNECTION DETAILS REFER TO DOC. NO. 1724000437-MAC-DG-00009

LEGEND

SECTION A-A (1 : 12.5)





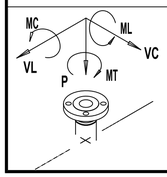
HOLDS

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

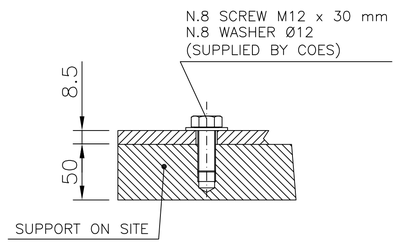
NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
Giuseppe Cavallo	14/01/25

	FOUNDATION LOADS TABLE		
	LIFTING	EMPTY	OPERATION
VERTICAL (kN)	8.2	7.5	8.2
SHEAR Y (kN)	N.A.	7.23	7.23
SHEAR X (kN)	N.A.	3.54	3.54
MOMENT Y (kNm)	N.A.	0.04	0.04
MOMENT X (kNm)	N.A.	0	0



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	1.8	1.5	1.8	0.3	0.4	0.2
C	1.8	1.5	1.8	0.3	0.4	0.2
D	1.8	1.5	1.8	0.3	0.4	0.2



NAMEPLATE "COES"

MANUFACTURER	COES SRL – STEZZANO (BG)		
SERVICE	NITROGEN GENERATION PACKAGE		
YEAR	2024	SERIAL NUMBER	I240008
WEIGHT	5000 kg	ITEM	A-64000
DISCHARGE N2 PROCESS DATA			
FLOW	60 Nm3/h	PRESSURE	8 barg
TEMPERATURE	35°C	N2 PURITY	97%
DESIGN DATA			
PRESSURE	12 barg	TEMPERATURE	-29 / +80°C
CE 0425	2014/68/EU – Cat. IV		

TAG NUMBER OF EQUIPMENTS	
TAG	DESCRIPTION
C-64001A/B	PSA TOWERS
S-64001A/B	PSA AFTER FILTERS

CONNECTIONS			
POS.	TYPE	SERVICE	MATERIAL
TP-043	ø 1" ANSI B16.5 150# R.F.	DRY AIR INLET	SS 316/316L.
TP-042	ø 1" ANSI B16.5 150# R.F.	NITROGEN OUTLET	C.S.
TP-045	ø 2" ANSI B16.5 150# R.F.	NITROGEN VENT	C.S.
TP-044	ø 1" ANSI B16.5 150# R.F.	CONNECTION TO RECEIVER	C.S.

COES

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
03	27/12/24	GT	MC	TM	ACCEPTED FOR CONSTRUCTION (AFC)
02	22/07/24	GT	MC	TM	ISSUE FOR REVIEW (IFR)
01	08/05/24	GT	MC	TM	ISSUE FOR REVIEW (IFR)
00	26/03/24	GT	MC	TM	ISSUE FOR REVIEW (IFR)

CROSSWIND

ROSETTI MARINO

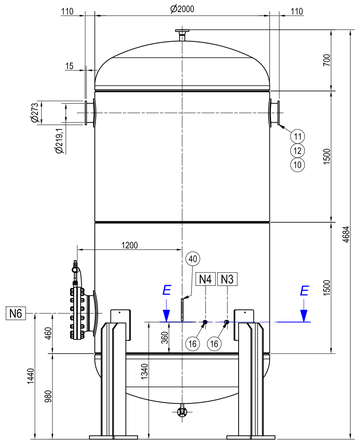
TITLE : BASE LOAD POWER HUB (BLPH)
PACKAGE GENERAL ARRANGEMENT
NITROGEN GENERATION PACKAGE

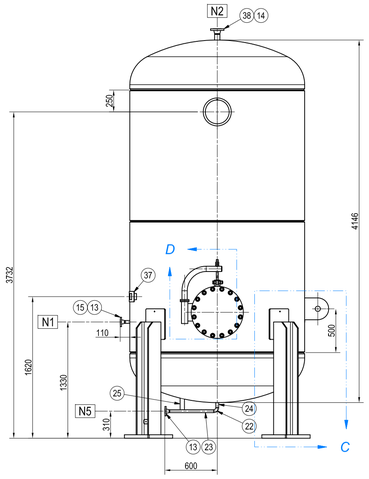
CONTRACT NO./TITLE	CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK	SCALE	N/A
DRAWN GT	CHECKED MC	APPROVED TM	DATE 27/12/24

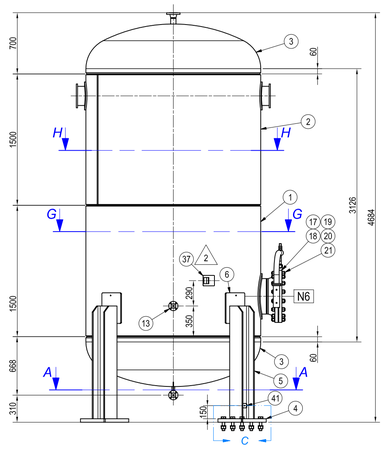
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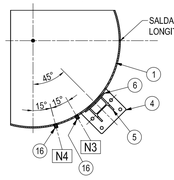
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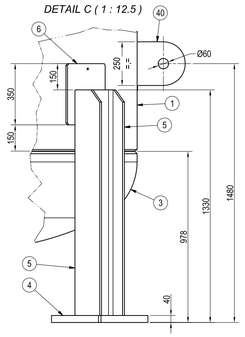


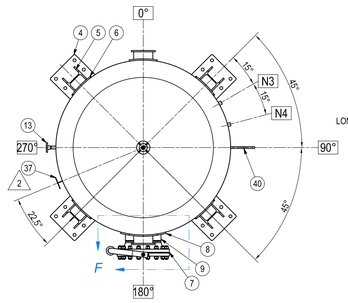


SECTION E-E (1 : 25)

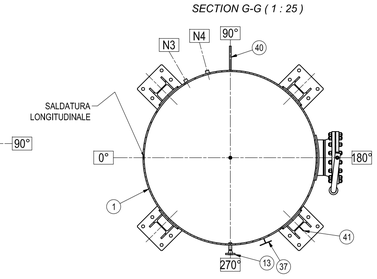


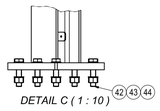
DETAIL C (1 : 12.5)





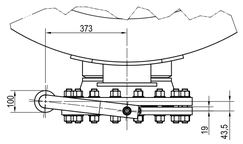
SECTION G-G (1 : 25)



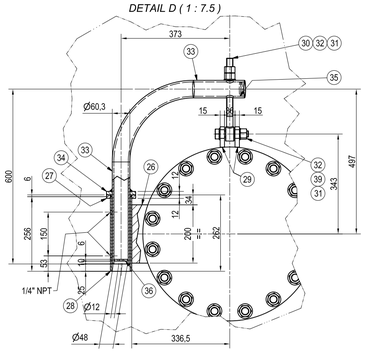


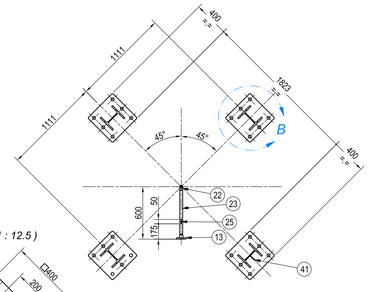
DETAIL C (1 : 10)

DETAIL F (1 : 10)



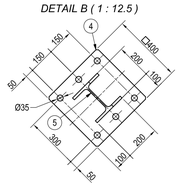
DETAIL D (1 : 7.5)

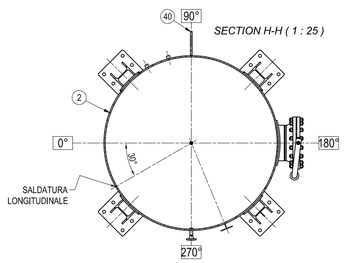




SECTION A-A (1 : 25)

DETAIL B (1 : 12.5)





SECTION H-H (1 : 25)

NAMEPLATE DETAIL

MANUFACTURER	COES SRL - STEZZANO (BG)
EQUIPMENT	N2 RECEIVER V-64001
SERIAL NUMBER	S240120 YEAR 2024
DESIGN CODE	ASME VIII Div. 1 Ed. 2021 / PED 2014/68/UE
CONFORMITY	Category IV
FLUID	N2
DESIGN PRESSURE	12 barg
DESIGN TEMPERATURE	-29 / + 80°C
TEST PRESSURE	17.2 barg
CORROSION ALLOWANCE	3 mm
WEIGHT	4000 kg
VOLUME	11000 l

CE 0425

ELENCO PARTI / BILL OF MATERIAL

POS	QTY	DESCRIPTION	MATERIAL	WGT		TEST	COD. COES
1	1	SHELL øe2000 Thk. 15 L=1500 (Manhole 16" side)	SA 516 Gr.70	1080		B	L3723
2	1	SHELL øe2000 Thk. 15 L=1500	SA 516 Gr.70	1095,6		B	L3724
3	2	ELL. HEAD øi1970 Thk. 15mm (Thk. 12.75mm min.)	SA 516 Gr.70	1112,3		B	L3716
4	4	PLATE 400x400 thk=40 N° 6 HOLES Ø35	SA 516 Gr.70	194		C	L3719
5	5160,000 mm	PROFILE HEB 200 L=1290	S 355 J2	314,8		C	F7552
6	4	PAD 350x300 thk=15	SA 516 Gr.70	50		B	L3720
7	1	FLANGE W.N.16" Sch. 40 150# RF	SA 350 Gr. LF2 Cl.1	66,3		B	H1000
8	1	PAD Øe=510 Øi=410 thk=15 for Man Hole	SA 516 Gr.70	9,3		B	L3721
9	1	SHELL øe407 Thk. 15 L=110	SA 516 Gr.70	13,6		B	L3722
10	2	PAD Øe=320 Øi=220 thk=15 for Trunnion	SA 516 Gr.70	9,8		B	L3718
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	12,5		C	D9560
13	2	FLANGE W.N.1" Sch. XXS 150# RF	SA 350 Gr. LF2 Cl.1	2,6		B	L3726
14	80,000 mm	PIPE SMLSS 2 Sch.160	SA 333 Gr. 6	0,9		B	C1399
15	80,000 mm	PIPE SMLSS 1 Sch.XXS	SA 333 Gr. 6	0,4		B	D9604
16	2	COUPLING 1/2" NPT-F 6000#	SA 350 Gr. LF2 Cl.1	0,7		B	K1337
17	1	GKT SPIRAL WOUND 16" 150# Thk. 4.5mm	316L+GRAPHITE	2		C	F8428
18	1	FLANGE BLIND B16,5 16" 150# RF	SA 350 Gr. LF2 Cl.1	76,2		B	L3727
19	32	WASHER 1	C.S.	1,5		C	C5634
20	32	NUT 1" UNC	SA 194 Gr.7	5,6	*	B	J2840
21	16	STUD-BOLT 1" UNC x 155	SA 320 Gr.L7	9,9	*	B	H9373
22	1	ELBOW L.R. 90° 1" Sch. XXS	SA 420 WPL6	0,3		B	D9605
23	502,528 mm	PIPE SMLSS 1 Sch.XXS	SA 333 Gr. 6	2,7		B	D9604
24	73,000 mm	PIPE SMLSS 1 Sch.XXS	SA 333 Gr. 6	0,4		B	D9604
25	200,000 mm	PLATE 50 x 6 L=132,5 mm	SA 516 Gr.70	0,3		B	L4381
26	1	PLATE 200x55 thk=18 (DAVIT 16" 150#)	SA 516 Gr.70	1,2		B	L4382
27	1	ROD Øe=100 Øi=74 Thk=12	SA 516 Gr.70	0,3		C	L4016
28	256,000 mm	PIPE SMLSS 2 1/2 Sch.40 L=256	SA 333 Gr. 6	2,2		C	G6831
29	2	PLATE 50x70 Thk. 15 mm FOR DAVIT 16"	SA 516 Gr.70	0,6		B	L4383
30	1	LIFTING EYE M22x260	SA 350 Gr. LF2 Cl.1	1		C	L4375
31	3	WASHER A 22	C 40	0,1		C	3393
32	3	NUT M22 UNI 5587	SA 194 Gr.7	0,3		C	L1368
33	1	BENDING PIPE SMLSS 2" SCH. 40 L=920 (DAVIT 16" 150#)	SA 333 Gr. 6	6,8		C	L4385
34	1	ROD Øe=100 Øi=61 Thk=12	SA 516 Gr.70	0,5		C	L4376
35	1	DISK Øe=48 Øi=12 thk=6	SA 516 Gr.70	0,1		C	L4377
36	1	DISK Øe=48 Øi=12 thk=6	SA 516 Gr.70	0,1		C	L4378
37	1	SUPPORT NAMEPLATE 140x120 Thk.4mm	SA 516 Gr.70	0,5		B	E4247
38	1	FLANGE W.N.2" Sch. 160 150# RF	SA 350 Gr. LF2 Cl.1	3,1		B	F7664
39	1	SCREW - M22 x 100 - UNI 5739	SA 320 Gr.L7	0,4		C	L0436
40	1	LIFTING LUG A=250 E=150 HOLE Ø60 THK=20	SA 516 Gr.70	9,3		B	L3717
41	1	EARTHING LUG 70 x 50 Thk.6	SA 516 Gr.70	0,2		C	L5167
42	24	SCREW - M30 x 140 - UNI 5739	Cl. 8.8	0,4		C	L5163
43	48	WASHER A 30	C 40	9,3		C	9169
44	24	NUT M30 UNI 5587	Cl. 8	0,2		C	L5164

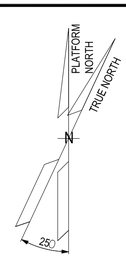
MATERIAL TEST SYMB. (according to EN 10204)

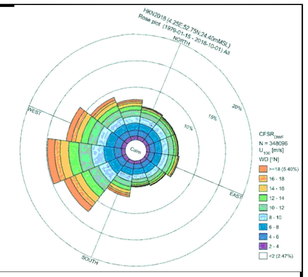
A	Tested material (3.2)
B	Material with certificate of manufacturer (3.1)
C	Material without certificate
D	Material with certificate of manufacturer (2.2)

POS	DESCRIPTION	PIPE CONN.
N1	IN/OUT	WN 1" 150# RF SCH. XXS
N2	PSV	WN 2" 150# RF SCH. XXS
N3	PRESSURE GAUGE PG	COUPLING 1/2"NPTF 6000#
N4	PRESSURE TRANSMITTER PT	COUPLING 1/2" NPTF 6000#
N5	DRAIN	WN 1" 150# RF SCH. XXS
N6	MAN HOLE	WNF 16" 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		8	barg	
	Hydrotest pressure vertical		17,2	barg	
	Hydrotest pressure horizontal		N.A.	barg	
	Static head in design		0	barg	
	MAWP		12,72	barg	at temperature of 80 °C
Temperat.	Design temperature		80	°C	
	Working temperature		-	°C	
	M.D.M.T. @ MAWP		-29	°C	
	Test temperature min.		10	°C	
Miscellaneous	Corrosion allowance		3	mm	
	Out of roundness		1%		
	Insulation		-	mm	
	Capacity		11000,0	ℓ	
	Tollerance on thickness	Plates	0.25 (>4); 6% (<=4)	mm	
		Pipes	-12.5	%	
		Forgings	=0/1	mm	
Fluid	Nature		N2		
	Physical state		GAS		Group 2
	Specific weight		11,43	kg/m³	
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. 1724000437-MAT-PRO-00021		
	Internal Finishing		According to Coating Specification no. 1724000437-MAT-PRO-00021		
Ext. Loads	Wind		YES	note:	Project Spec. 123A90-DDL-ST-SP-90017
	Seismic		YES	note:	Project Spec. 123A90-DDL-ST-SP-90017
Weight	Empty		4000,0	kg	
	Hydrotest condition		15000,0	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. 1724000437-WEL-LIS-00020.
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	23/04/25

COES

REV.	DATE	DRN	CHKD	APPD	DESCRIPTION
04	03/04/25	STC	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	28/05/24	STC	GT	TM	ISSUE FOR INFORMATION (IFI)

CROSSWIND

ROSETTI MARINO

TITLE :

BASE LOAD POWER HUB (BLPH)
EQUIPMENT SECTIONAL DRAWING WITH BILL OF MATERIAL
NITROGEN GENERATION PACKAGE N2 RECEIVER

CONTRACT NO./TITLE CW-I-WP4-2023-05/HOLLANDSE KUST NOORD WIND PARK | SCALE 1:35

DRAWN STC | CHECKED GT | APPROVED TM | DATE 03/04/25

A1 | DRAWING NO. 1724000437-MAC-DD-00006 | SHEET 001 | REV. 04

File Name : 1724000437-MAC-DD-00006

Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE A-64000
PACKAGE PIPING SCHEMATICS AND BILL OF MATERIALS

Document Number: 1724000437-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.

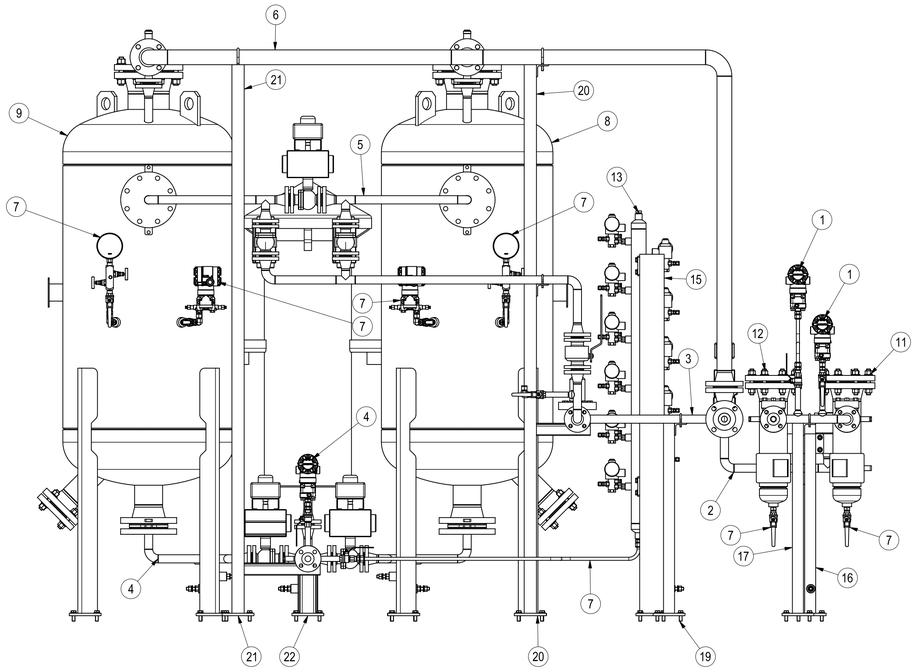
Sign	Date
Giuseppe Cavallo	09/01/25

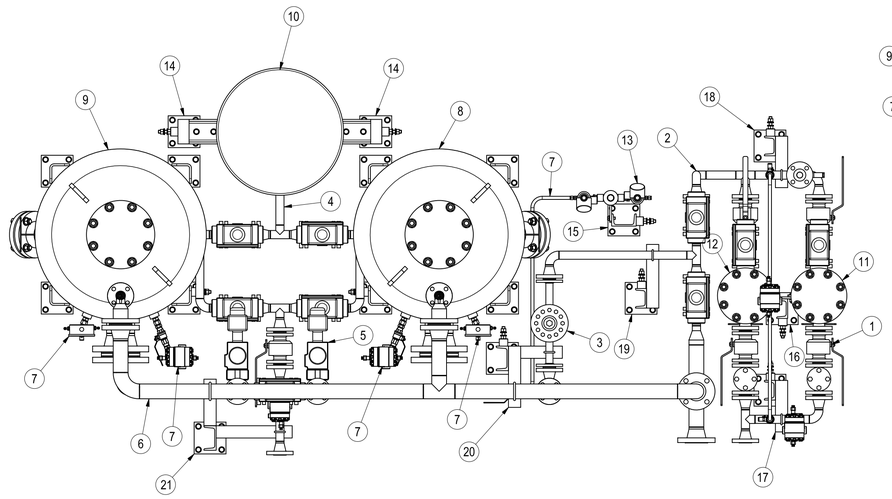
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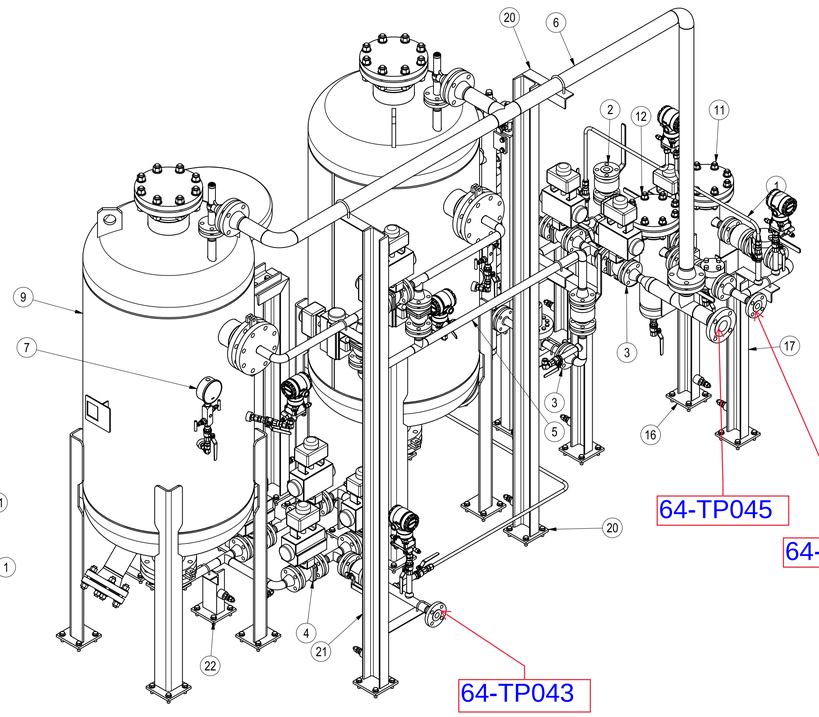
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01	24/12/2024	Accepted for Construction (AFC)	GT	MC	TM
00	03/09/2024	Issue for Review (IFR)	GT	MC	TM

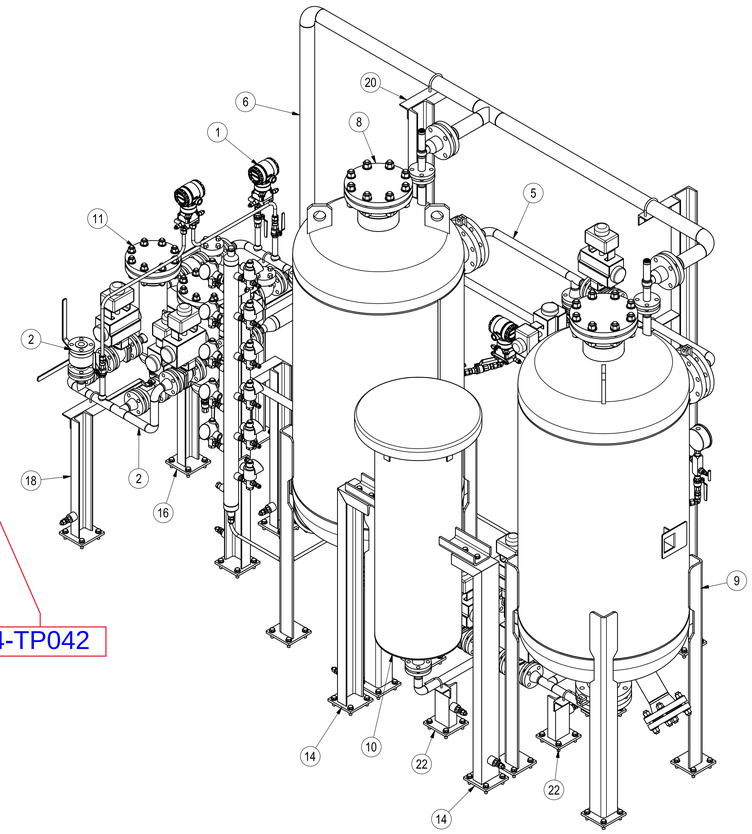
COES

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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT (kg)	NOTE	COD. COES
1	1	PIPING 01 - LTCS		26		L4580
2	1	PIPING 02 - LTCS		73.3		L4581
3	1	PIPING 03 - LTCS		52.7		L4582
4	1	PIPING 04 - SS		120		L4583
5	1	PIPING 05 - LTCS		91.5		L4584
6	1	PIPING 06 - LTCS		50.3		L4585
7	1	HOOK UPS		12		L4594
8	1	VESSEL N2 Ø700	SA 516 Gr.70	338.6	CCO54050	L4388
9	1	VESSEL N2 Ø700	SA 516 Gr.70	338.6	CCO54050	L4388
10	1	N2 SILENCER 1" 150# RF		73	CCO54051	L4394
11	1	DUST FILTER IN/OUT 1" 150#	SA 516 Gr.70	36	CCO54049	L4391
12	1	DUST FILTER IN/OUT 1" 150#	SA 516 Gr.70	36	CCO54049	L4391
13	1	ASSIEME COLLETTORE 2" - N° 11 EV 1/4" NPT		21.1	L4593	L4593
14	2	SILENCER SUPPORT		29.5	L4590	L4590
15	1	PALINA SUPPORTO COLLETTORE 2"		17.4	L4595	L4595
16	1	PALINA DI FISSAGGIO FILTRI		8.9	L5183	L5183
17	1	SUPPORTO PIPING 1" H=802		9.4	L5184	L5184
18	1	SUPPORTO PIPING 1" H=602		7.6	L5185	L5185
19	1	SUPPORTO PIPING 1" H=802		9.5	L5186	L5186
20	1	SUPPORTO PIPING 1" H1=802 - 1" H2=1370 - 2" H3=2268.5		28.4	L5187	L5187
21	1	SUPPORTO PIPING 1" H1=232 - 1" H2=1697 - 2" H3=2278.5		28.3	L5188	L5188
22	3	SUPPORTO PIPING 1" H=232		12	L5189	L5189

REV	DATE	DESCRIPTION	PREPARED	APPROVED
1	24/12/2024	REVISION	STC	GT
0	21/08/2024	ISSUE	STC	GT

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SERIAL N°:
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SCALA / SCALE: 1 : 12.5

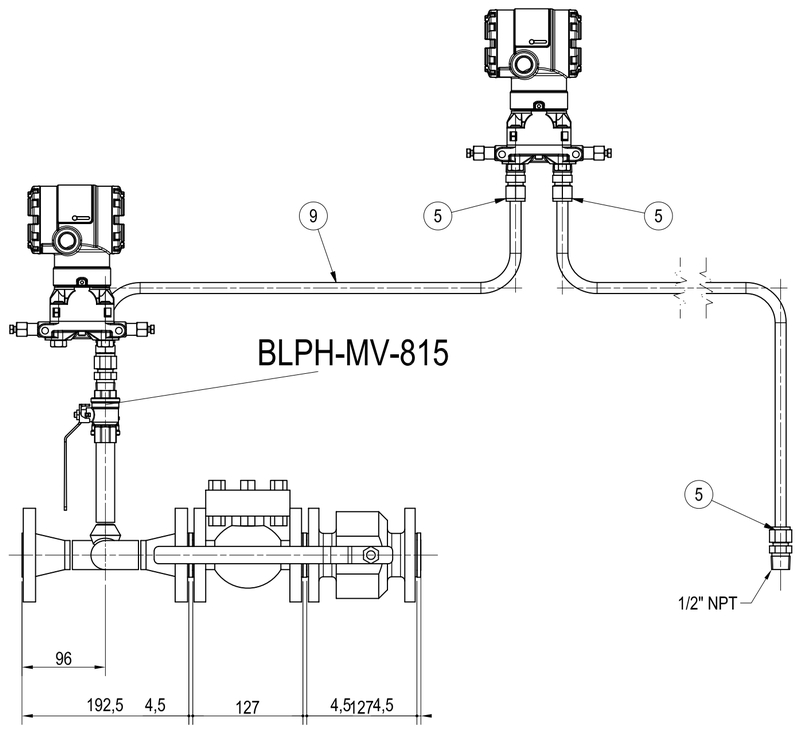
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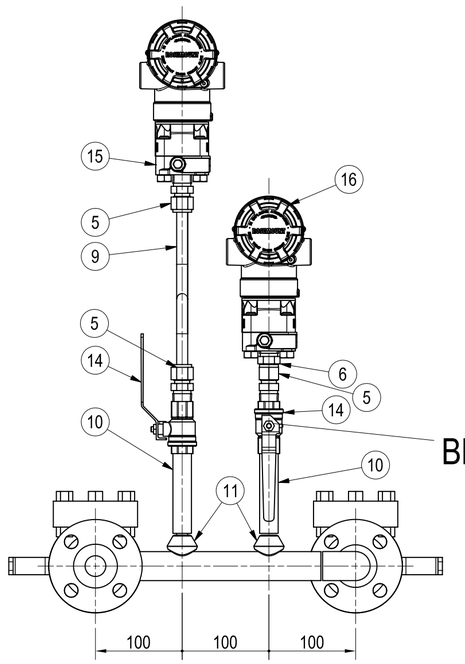
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PIPING ASSEMBLY
COES CODE L4579

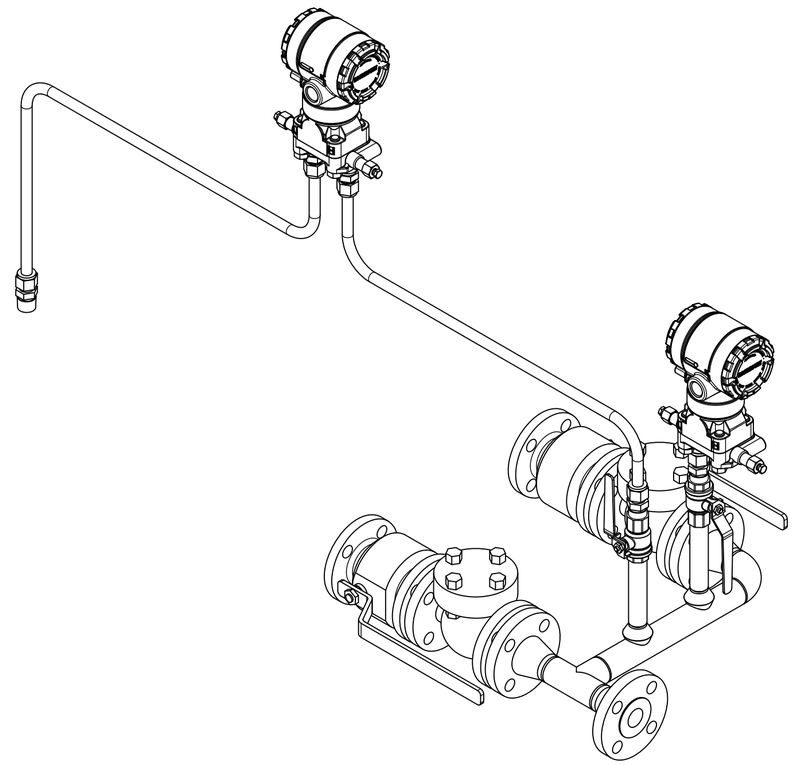
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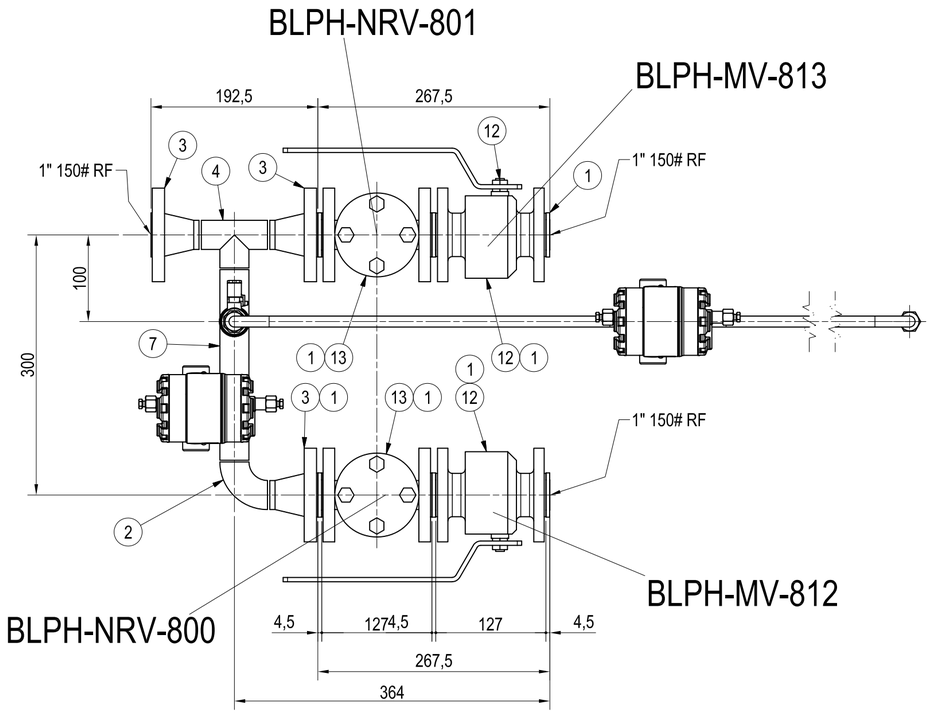
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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	6	GKT SPIRAL WOUND 1" 150# Thk. 4.5mm	316L+GRAPHITE	0.3 kg		C3052
2	1	ELBOW L.R. 90° 1" Sch. 80	SA 420 WPL6	0.2 kg		D6263
3	3	FLANGE W.N.1" Sch. 80 150# RF	SA 350 Gr. LF2 Cl.1	3.5 kg		D6282
4	1	TEE 1" Sch.80	SA 420 WPL6	0.3 kg		D6278
5	5	MALE CONNECTOR Ø1/2 x 1/2 NPT/M	AISI 316	0.5 kg	P-8-8-DM	G5521
6	1	MALE ADAPTER Ø1/2 x 1/2 NPT/M	AISI 316	0.1 kg	P-8-8-AM	G7465
7	219.800 mm	PIPE SMLSS 1 Sch.80	SA 333 Gr. 6	0.7 kg		D6261
8	855.500 mm	TUBING 1/2" x 1,65	Acciaio	0.4 kg		D1577
9	659.000 mm	TUBING 1/2" x 1,65	Acciaio	0.3 kg		D1577
10	200.000 mm	PIPE SMLSS 1/2 Sch.40	SA 333 Gr. 6	0.3 kg		F8764
11	2	WELDOLET DN 1" x 1/2" Sch.80	SA 350 Gr. LF2 Cl.1	0.1 kg		L5179
12	2	BALL VALVE 1" 150#RF - ART. 68J000 SPLIT BODY FB	SA 352 LCC	9.6 kg		L4626
13	2	PISTON CHECK VALVE BB FB FL 1" LF2/F6 150# RF	SA 350 Gr. LF2 Cl.1	9.3 kg		L4446
14	2	BALL VALVE 1/2"NPTF ATEX	SA 351 CF8M	0.5 kg		L3428
16	1	PRESSURE TRANSMITTER 2051CG4 - INTEGRATED MANIFOLD		0.5 kg		L4361
15	1	Differential Pressure Transmitter EMERSON MOD.2051CD3A02A1KS5E1M5D4T1Q4Q8HR7		0.5 kg		L4362









REV	DATE	DESCRIPTION	PREPARED	APPROVED
1	24/12/2024	REVISION	STC	GT
0	21/08/2024	ISSUE	STC	GT

COMMESSA N° JOB N°	167/24	SERIAL N°	FORMATO SIZE A2	SCALA SCALE	1 : 5

coes

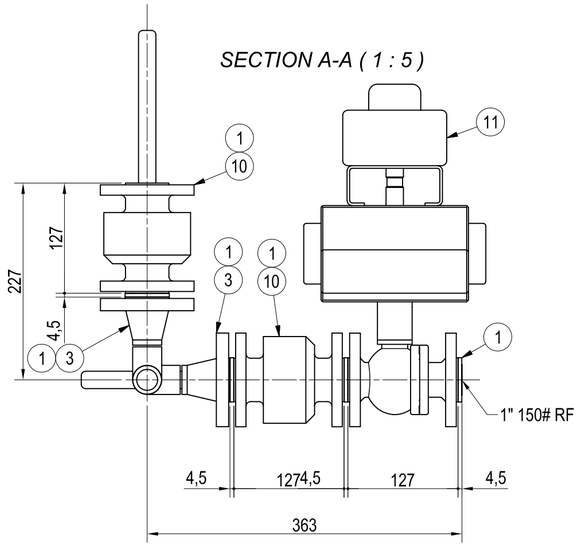
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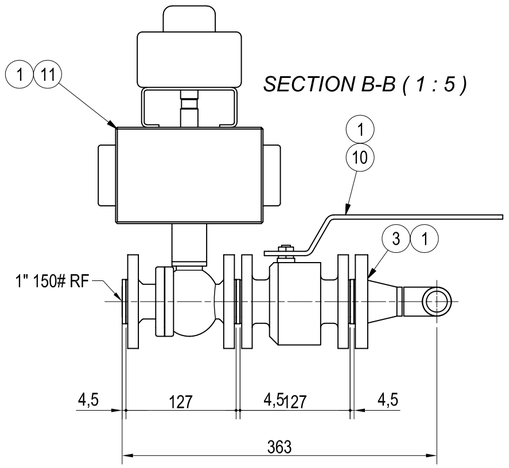
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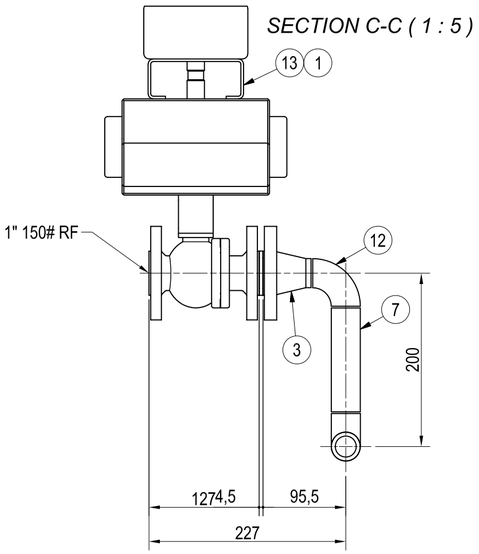
FOGLIO SHEET 2 DI OF 8

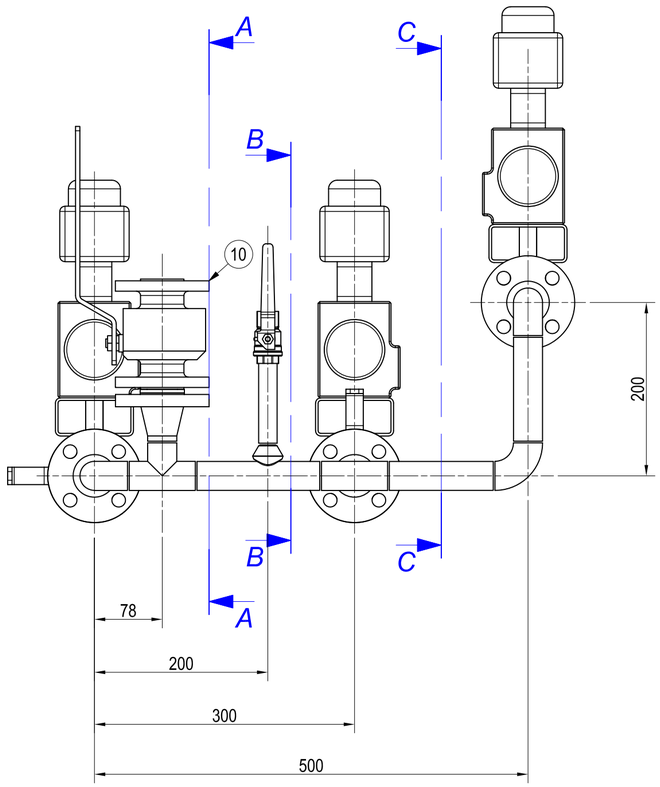
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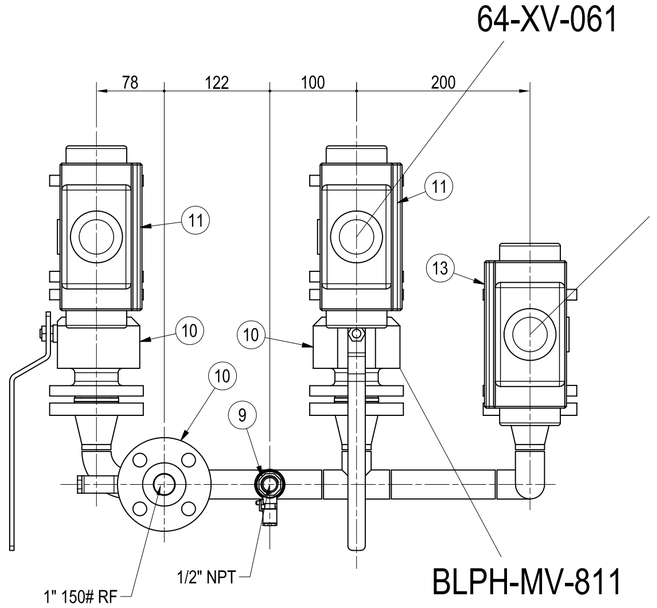
ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	8	GKT SPIRAL WOUND 1" 150# Thk. 4.5mm	316L+GRAPHITE	0.4 kg		C3052
2	100.000 mm	PIPE SMLSS 1/2 Sch.40	SA 333 Gr. 6	0.1 kg		F8764
3	4	FLANGE W.N.1" Sch. 80 150# RF	SA 350 Gr. LF2 Cl.1	4.6 kg		D6282
4	2	TEE 1" Sch.80	SA 420 WPL6	0.6 kg		D6278
5	141.600 mm	PIPE SMLSS 1 Sch.80	SA 333 Gr. 6	0.4 kg		D6261
6	119.800 mm	PIPE SMLSS 1 Sch.80	SA 333 Gr. 6	0.4 kg		D6261
7	119.800 mm	PIPE SMLSS 1 Sch.80	SA 333 Gr. 6	0.4 kg		D6261
8	1	WELDOLET DN 1" x 1/2" Sch.80	SA 350 Gr. LF2 Cl.1	0.1 kg		L5179
9	1	BALL VALVE 1/2"NPTF	AISI 316	0.3 kg		31227
10	3	BALL VALVE 1" 150#RF - ART. 68J000 SPLIT BODY FB	SA 352 LCC	14.4 kg		L4626
11	2	PNEUMATIC BALL VALVE Ø1" 150# RF-68J000-SR75-04-CL	SA 352 LCC	34 kg	FAIL OPEN	L4625
13	1	PNEUMATIC BALL VALVE Ø1" 150# RF-68J000-SR75-04-CL	SA 352 LCC	17 kg	FAIL CLOSE	L4623
12	3	ELBOW L.R. 90° 1" Sch. 80	SA 420 WPL6	0.6 kg		D6263

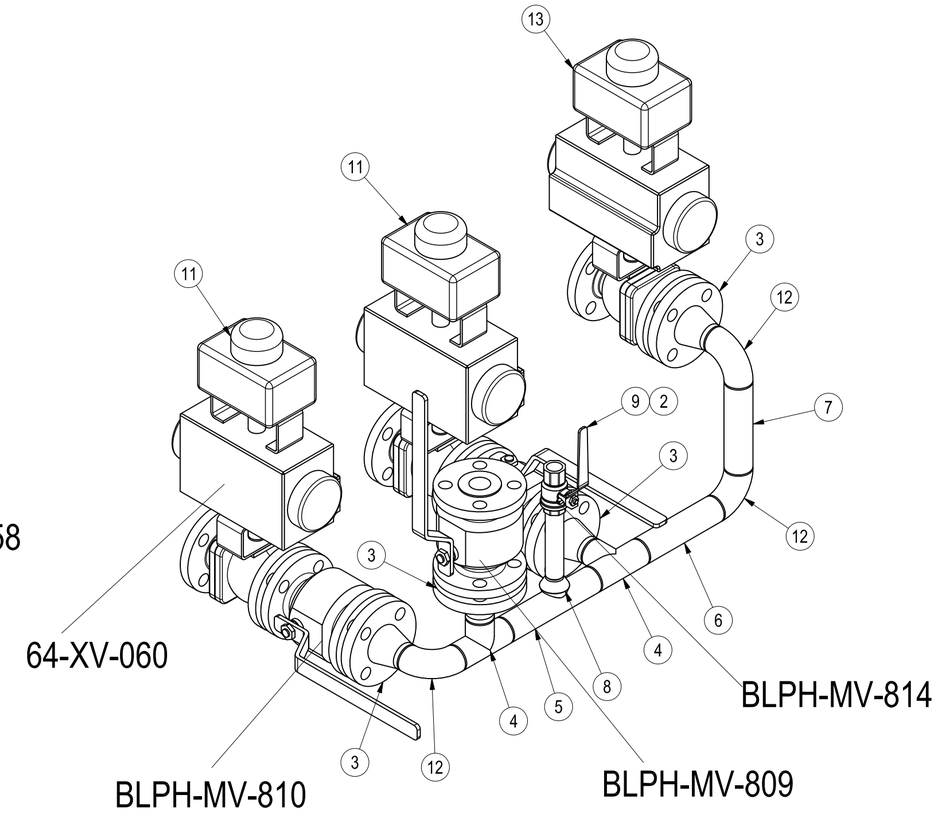












1	24/12/2024	REVISION	STC	GT
0	21/08/2024	ISSUE	STC	GT
REV	DATE	DESCRIPTION	PREPARED	APPROVED

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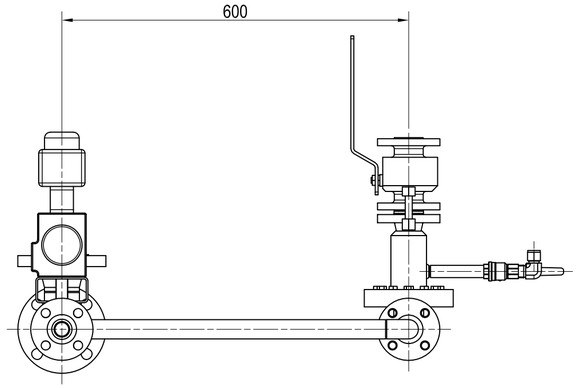
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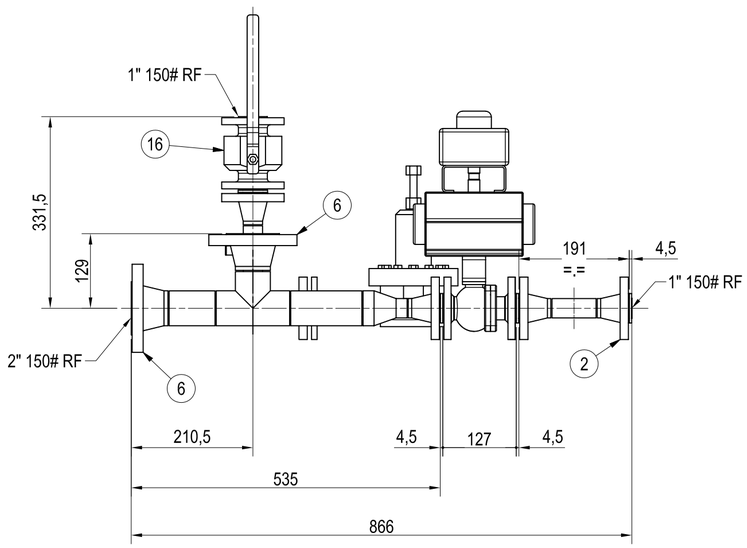
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- PIPING 02 -
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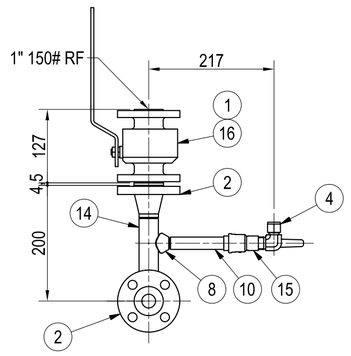
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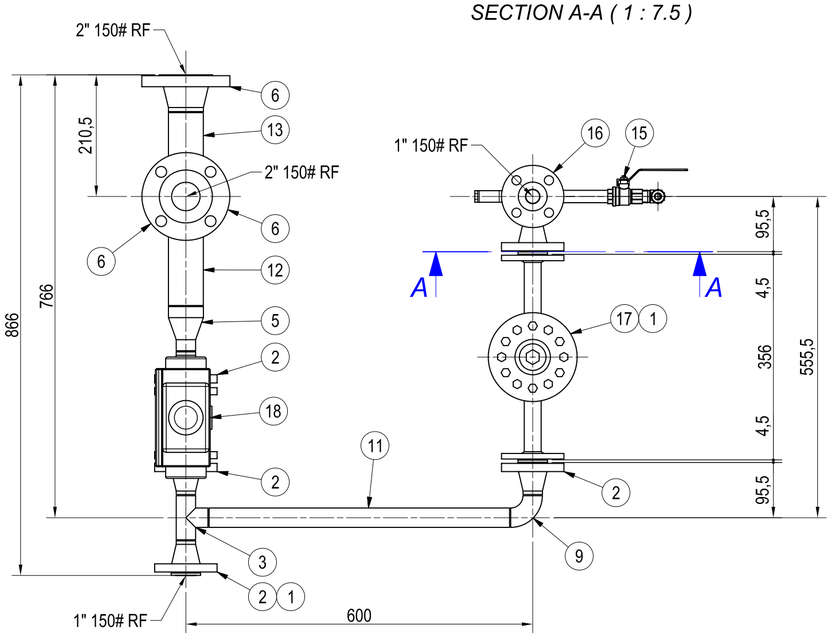
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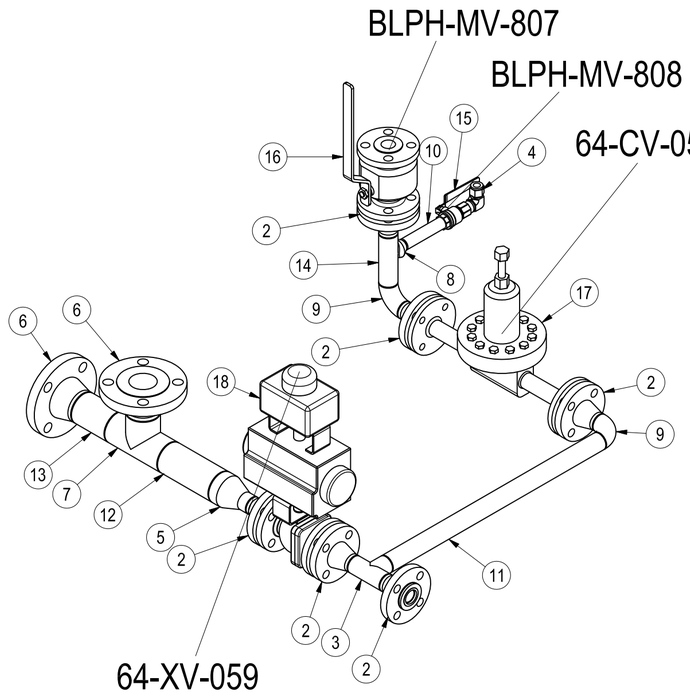






SECTION A-A (1 : 7.5)





ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	6	GKT SPIRAL WOUND 1" 150# Thk. 4.5mm	316L+GRAPHITE	0.3 kg		C3052
2	6	FLANGE W.N.1" Sch. 80 150# RF	SA 350 Gr. LF2 Cl.1	7 kg		D6282
3	1	TEE 1" Sch.80	SA 420 WPL6	0.3 kg		D6278
4	1	ELBOW 90° CONNECTOR Ø1/2 x 1/2 NPT/M	AISI 316	0.1 kg	P-8-8-GM	G7466
5	1	CONC_REDUCTION 2" x 1" Sch.80	SA 420 WPL6	0.4 kg		G5816
6	2	FLANGE W.N.2" Sch. 80 150# RF	SA 350 Gr. LF2 Cl.1	5.8 kg		F0529
7	1	TEE 2" Sch.80	SA 420 WPL6	1.2 kg		C1407
8	1	WELDOLET DN 1" x 1/2" Sch.80	SA 350 Gr. LF2 Cl.1	0.1 kg		L5179
9	2	ELBOW L.R. 90° 1" Sch.80	SA 420 WPL6	0.4 kg		D6263
10	100.000 mm	PIPE SMLSS 1/2 Sch.40	SA 333 Gr. 6	0.1 kg		F8764
11	519.800 mm	PIPE SMLSS 1" Sch.80S	SA 312 TP316L	1.7 kg		C0792
12	123.000 mm	PIPE SMLSS 2 Sch.80	SA 333 Gr. 6	0.9 kg		C1402
13	79.484 mm	PIPE SMLSS 2 Sch.80	SA 333 Gr. 6	0.6 kg		C1402
14	102.528 mm	PIPE SMLSS 1 Sch.80	SA 333 Gr. 6	0.3 kg		D6261
15	1	BALL VALVE 1/2"NPTF ATEX	SA 351 CF8M	0.3 kg		L3428
16	1	BALL VALVE 1" 150#RF - ART. 68J000 SPLIT BODY FB	SA 352 LCC	4.8 kg		L4626
17	1	Back Pressure Regulator MR98H-3048-2347838	SA 216 WCC	11.4 kg		1" 150# RF
18	1	PNEUMATIC BALL VALVE Ø1" 150# RF-68J000-SR75-04-CL	SA 352 LCC	17 kg	FAIL CLOSE	L4623

REV	DATE	DESCRIPTION	PREPARED	APPROVED
1	24/12/2024	REVISION	STC	GT
0	21/08/2024	ISSUE	STC	GT

COMMESSA N° / JOB N°	167/24	SERIAL N°	FORMATO / SIZE	A2	SCALA / SCALE 1 : 7.5

coes

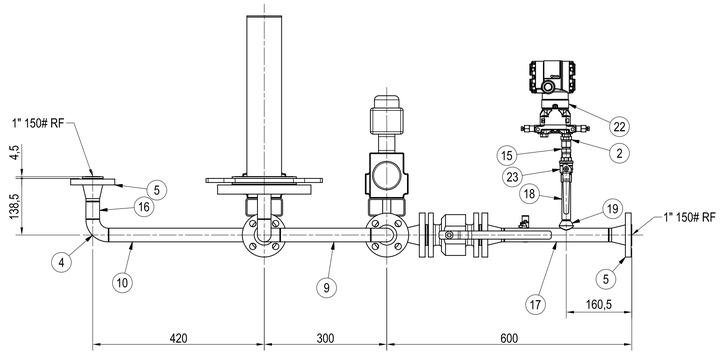
ROSETTI MARINO
N2 SKID - BLPH NETHERLAND
- PIPING 03 -
COES CODE L4582

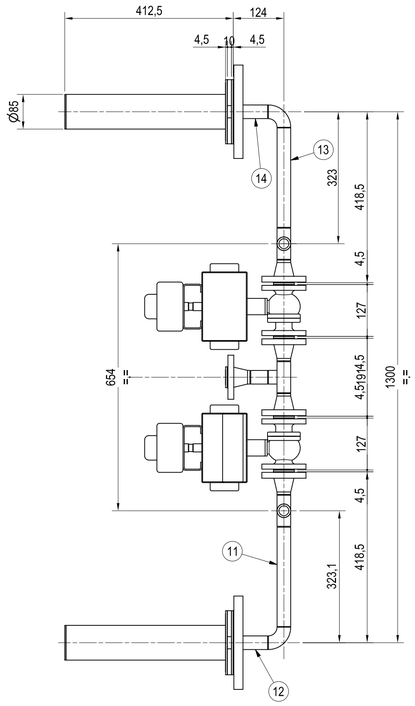
DISEGNO N° / DRAWING N° CCO54058

FOGLIO / SHEET 4 DI / OF 8

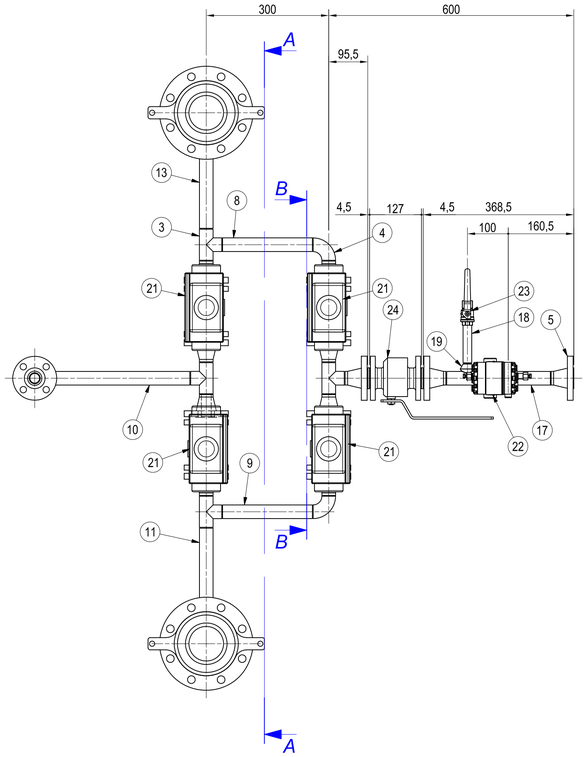
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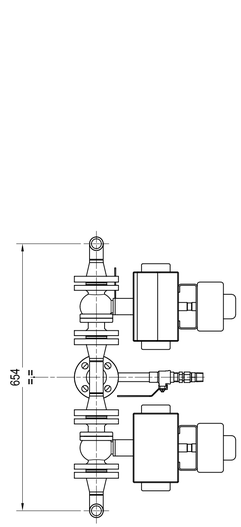
ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	11	GKT SPIRAL WOUND 1" 150# Thk. 4.5mm	316L+GRAPHITE	0.5 kg		C3052
2	1	MALE ADAPTER Ø1/2 x 1/2 NPT/M	AISI 316	0.1 kg	P-8-8-AM	G7465
3	4	TEE 1" Sch.80S	SA 403 WP316/316L	1.3 kg		D0611
4	5	ELBOW L.R. 90° 1" Sch.80S	SA 403 WP316/316L	1 kg		C4372
5	12	FLANGE W.N.1" Sch. 80S 150# RF	SA 182 F316/316L	14.3 kg		C4188
6	4	GKT SPIRAL WOUND 4" 150# Thk. 4.5mm	316L+GRAPHITE	1.6 kg		D0778
7	2	FLANGE BLIND B16.5 4" 150# RF	SA 213 TP316/316L	14.1 kg		C7362
8	219.800 mm	PIPE SMLSS 1" Sch.80S	SA 312 TP316L	0.7 kg		C0792
9	219.800 mm	PIPE SMLSS 1" Sch.80S	SA 312 TP316L	0.7 kg		C0792
10	340.300 mm	PIPE SMLSS 1" Sch.80S	SA 312 TP316L	1.1 kg		C0792
11	243.356 mm	PIPE SMLSS 1" Sch.80S	SA 312 TP316L	0.8 kg		C0792
12	60.524 mm	PIPE SMLSS 1" Sch.80S	SA 312 TP316L	0.2 kg		C0792
13	243.356 mm	PIPE SMLSS 1" Sch.80S	SA 312 TP316L	0.8 kg		C0792
14	60.524 mm	PIPE SMLSS 1" Sch.80S	SA 312 TP316L	0.2 kg		C0792
15	1	MALE CONNECTOR Ø1/2 x 1/2 NPT/M	AISI 316	0.1 kg	P-8-8-DM	G5521
16	41.528 mm	PIPE SMLSS 1" Sch.80S	SA 312 TP316L	0.1 kg		C0792
17	253.784 mm	PIPE SMLSS 1" Sch.40S	SA 312 TP316L	0.6 kg		11603
18	200.000 mm	PIPE SMLSS 1/2" Sch.40S	SA 312 TP316/316L	0.3 kg		C5215
19	2	WELDOLET DN 1" x 1/2" Sch.40S	SA 182 F316/316L	0.2 kg		L5180
20	2	CESTELLO Ø85 L=400 FLG. 4" 150#	S 275 JR	7.9 kg	CCO02242	C2579
21	4	PNEUMATIC BALL VALVE Ø1" 150# RF-68J000-SR75-04-CL	SA 352 LCC	68 kg	FAIL CLOSE	L4624
22	1	PRESSURE TRANSMITTER 2051CG4 - INTEGRATED MANIFOLD	ALUMINUM	0.5 kg		L4361
23	2	BALL VALVE 1/2"NPTF ATEX	SA 351 CF8M	0.5 kg		L3428
24	1	BALL VALVE 1" 150#RF - ART. 68J000 SPLIT BODY FB	SA 351 CF8M	4.8 kg		L4621



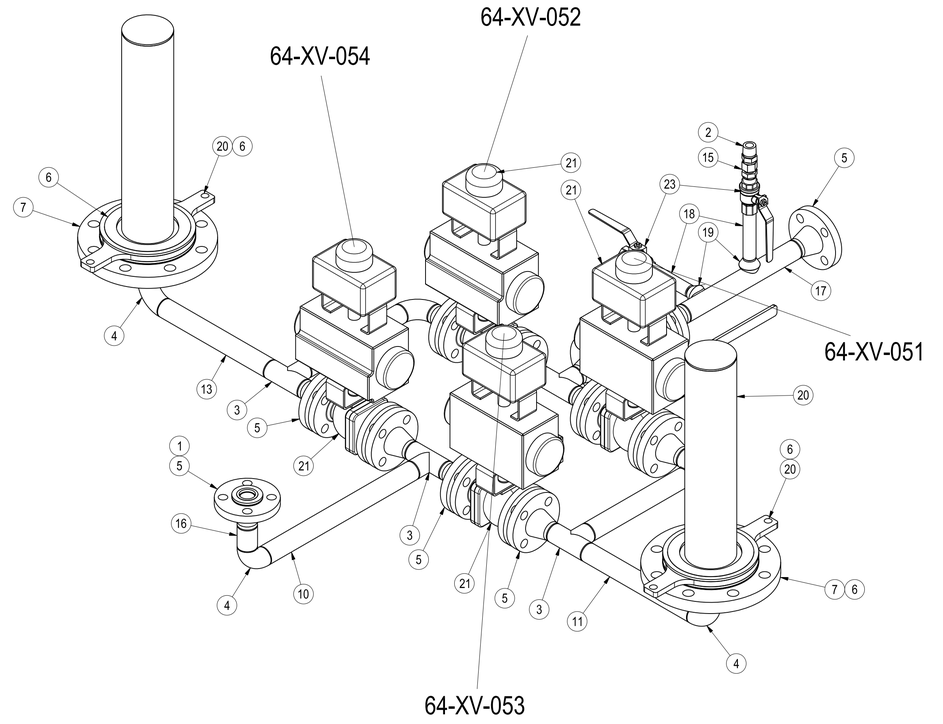


SECTION A-A (1 : 7.5)





SECTION B-B (1 : 7.5)

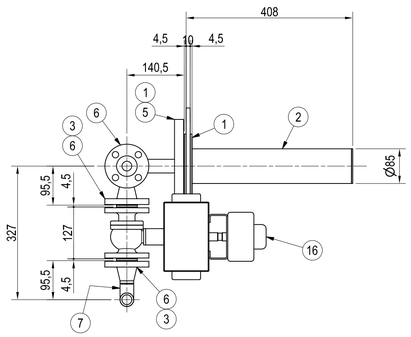


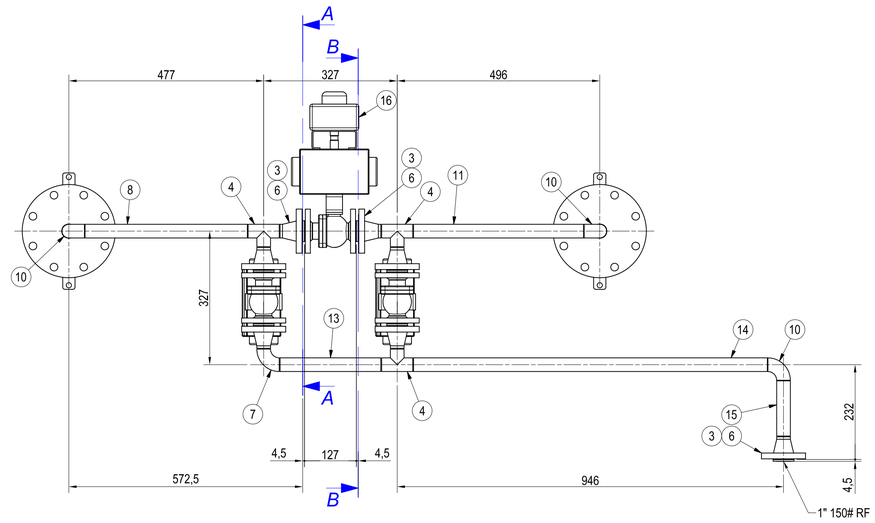
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0	21/08/2024	ISSUE		STC	GT
REV	DATE	DESCRIPTION		PREPARED	APPROVED
COMMESSA N° JOB N°	167/24	SERIAL N°	FORMATO SIZE A1	SCALA SCALE	1 : 7.5
coes	ROSETTI MARINO N2 SKID - BLPH NETHERLAND - PIPING 04 - COES CODE L4583			DISEGNO N° DRAWING N°	CCO54058
				FOGLIO SHEET 5	DI OF 8

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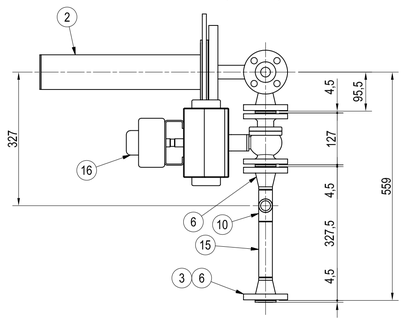
ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	4	GKT SPIRAL WOUND 4" 150# Thk. 4.5mm	316L+GRAPHITE	1.6 kg		D0778
2	2	CESTELLO Ø85 L=400 FLG. 4" 150#	S 275 JR	7.9 kg	CCO02242	C2579
3	7	GKT SPIRAL WOUND 1" 150# Thk. 4.5mm	316L+GRAPHITE	0.3 kg		C3052
4	3	TEE 1" Sch.80	SA 420 WPL6	0.9 kg		D6278
5	2	FLANGE BLIND B16.5 4" 150# RF	SA 350 Gr. LF2 Cl.1	13.7 kg		C0696
6	7	FLANGE W.N.1" Sch. 80 150# RF	SA 350 Gr. LF2 Cl.1	8.1 kg		D6282
7	1	ELBOW L.R. 90° 1" Sch. 80	SA 420 WPL6	0.2 kg		D6263
8	397.328 mm	PIPE SMLSS 1 Sch.80	SA 333 Gr. 6	1.3 kg		D6261
9	77.040 mm	PIPE SMLSS 1 Sch.80	SA 333 Gr. 6	0.2 kg		D6261
10	3	ELBOW L.R. 90° 1" Sch.80	SA 420 WPL6	0.6 kg		D6263
11	416.328 mm	PIPE SMLSS 1 Sch.80	SA 333 Gr. 6	1.3 kg		D6261
12	77.040 mm	PIPE SMLSS 1 Sch.80	SA 333 Gr. 6	0.2 kg		D6261
13	246.744 mm	PIPE SMLSS 1 Sch.80	SA 333 Gr. 6	0.8 kg		D6261
14	866.328 mm	PIPE SMLSS 1 Sch.80	SA 333 Gr. 6	2.8 kg		D6261
15	135.084 mm	PIPE SMLSS 1 Sch.80	SA 333 Gr. 6	0.4 kg		D6261
16	3	PNEUMATIC BALL VALVE Ø1" 150# RF-68J000-SR75-04-CL	SA 352 LCC	51 kg	FAIL OPEN	L4623

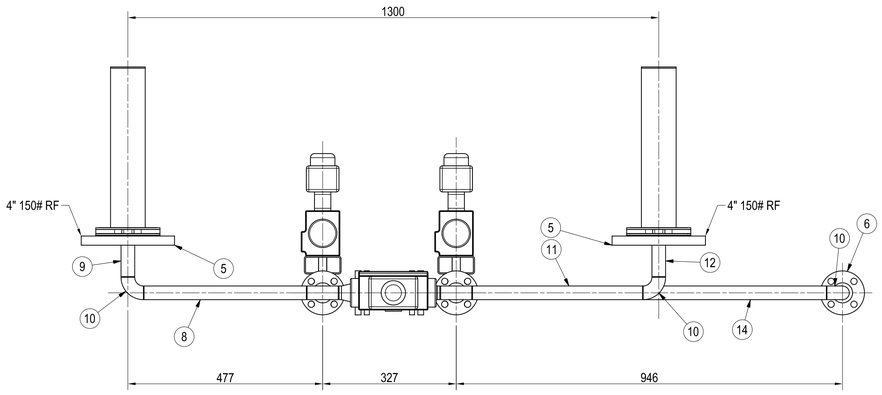
SECTION A-A (1 : 7.5)

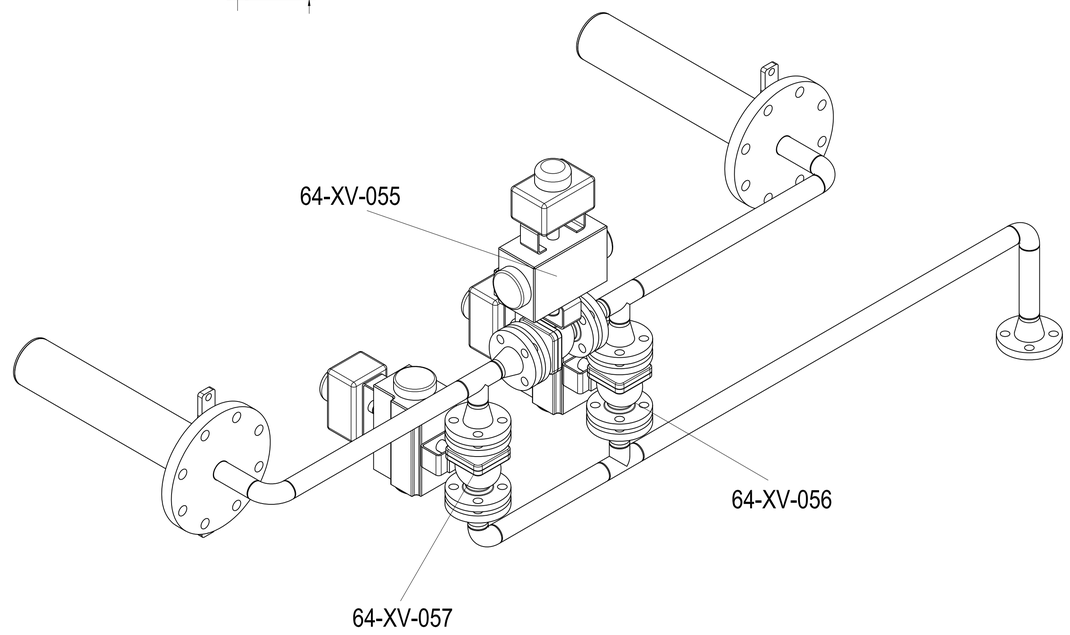




SECTION B-B (1 : 7.5)







REV	DATE	DESCRIPTION	PREPARED	APPROVED
1	24/12/2024	REVISION	STC	GT
0	21/08/2024	ISSUE	STC	GT

COMMESSA N° / JOB N° 167/24 | SERIAL N° | FORMATO / SIZE A1 | SCALA / SCALE 1 : 7.5

coes

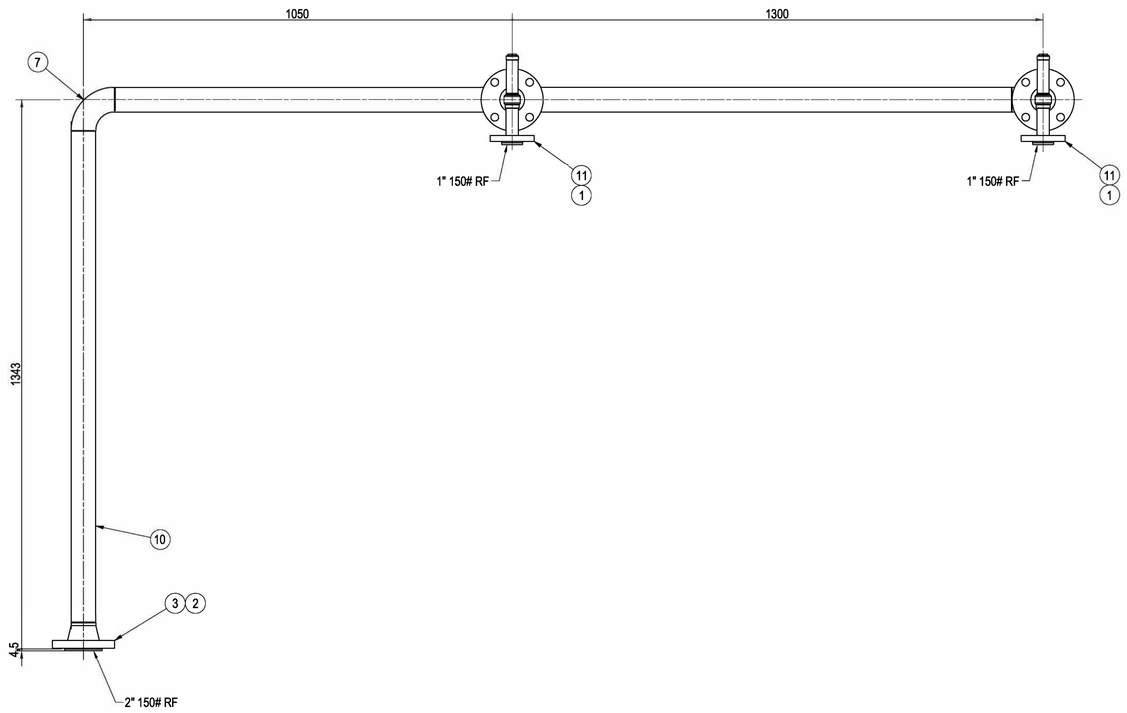
ROSETTI MARINO
N2 SKID - BLPH NETHERLAND
- PIPING 05 -
COES CODE L4584

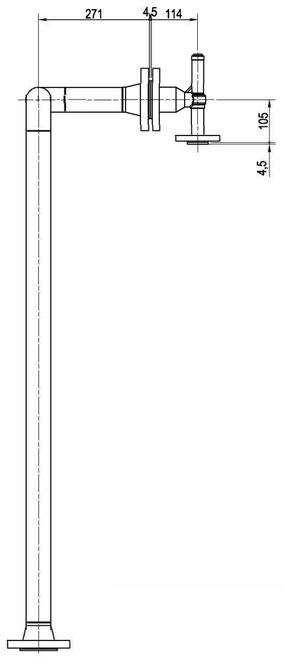
DISEGNO N° / DRAWING N° CCO54058

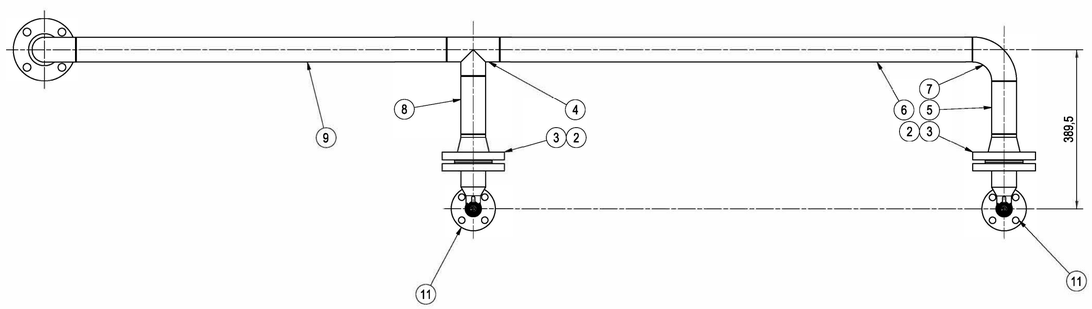
FOGLIO / SHEET 6 | DI / OF 8

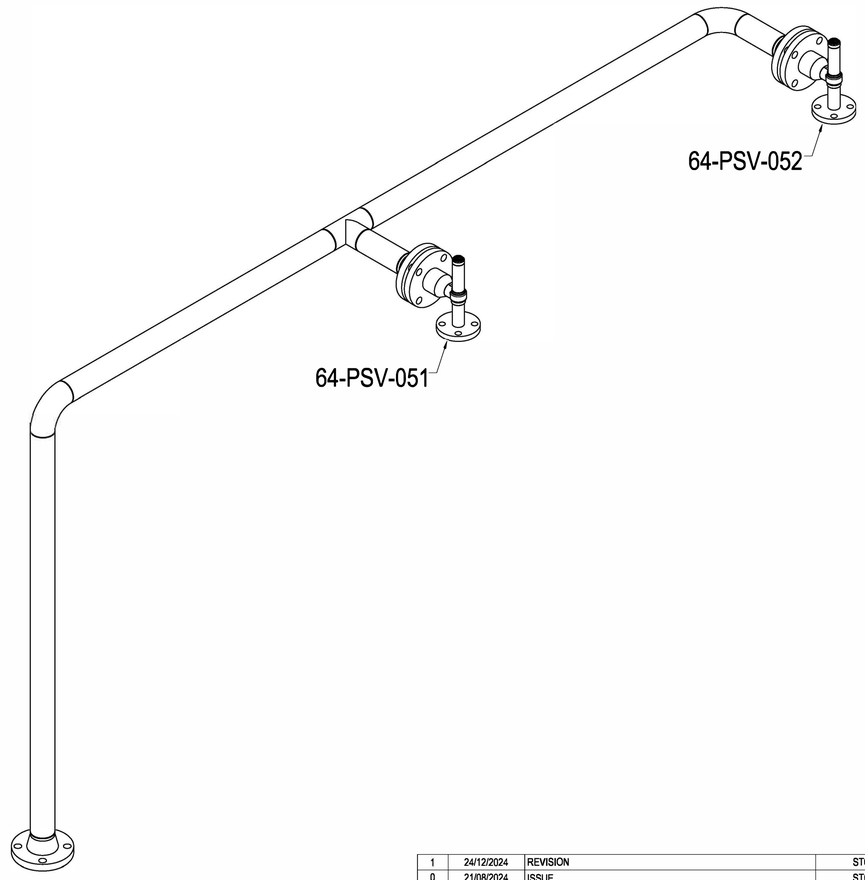
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ELENCO PARTI / BILL OF MATERIAL						
POS	QTY	DESCRIPTION	MATERIAL	WGT	NOTE	COD. COES
1	2	GKT SPIRAL WOUND 1" 150# Thk. 4.5mm	316L+GRAPHITE	0.1 kg		C3052
2	3	GKT SPIRAL WOUND 2" 150# Thk. 4.5mm	316L+GRAPHITE	0.5 kg		C2416
3	3	FLANGE W.N.2" Sch. 80 150# RF	SA 350 Gr. LF2 Cl.1	8.7 kg		F0529
4	1	TEE 2" Sch.80	SA 420 WPL6	1.2 kg		C1407
5	127.816 mm	PIPE SMLSS 2 Sch.80	SA 333 Gr. 6	1 kg		C1402
6	1156.800 mm	PIPE SMLSS 2 Sch.80	SA 333 Gr. 6	8.7 kg		C1402
7	2	ELBOW L.R. 90° 2" Sch.80	SA 420 WPL6	1.8 kg		C1403
8	140.016 mm	PIPE SMLSS 2 Sch.80	SA 333 Gr. 6	1 kg		C1402
9	906.800 mm	PIPE SMLSS 2 Sch.80	SA 333 Gr. 6	6.8 kg		C1402
10	1199.800 mm	PIPE SMLSS 2 Sch.80	SA 333 Gr. 6	9 kg		C1402
11	2	PSV N2 G10-API IN=1" 150# OUT=2" 150# - 12 barg	AISI 316/316L	11.6 kg		L4438









1	24/12/2024	REVISION		STC	GT
0	21/08/2024	ISSUE		STC	GT
REV	DATE	DESCRIPTION		PREPARED	APPROVED
COMMESSA N° JOB N° 167/24		SERIAL N°	FORMATO SIZE A1	SCALA SCALE 1 : 7.5	
coes	ROSETTI MARINO N2 SKID - BLPH NETHERLAND - PIPING 06 - COES CODE L4585			DISEGNO N° DRAWING N° CCO54058	
				FOGLIO SHEET 7	DI OF 8

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CROSSWIND	HOLLANDSE KUST NOORD WIND PARK Project Contract No. CW-I-WP4-2023-05	ROSETTI MARINO
Document Title:	PACKAGE WIRING DIAGRAM INCLUDING LAYOUT OF PACKAGE CONTROL PANEL	Sheet 1 of 52 Date: 30/04/2025 Rev: 05

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	21/05/2025

GENERATION PACKAGE

E WIRING DIAGRAM

OF PACKAGE CONTROL PANEL

: 1724000437-MAC-DG-00009

cument Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
05	30/04/2025	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	08/05/2024	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.		02.05.2024	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.		23.01.2025	COMMENTS AFTER COMMISSIONING
F					

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

TEST CERTIFICATE N	2024.134

ELECTRICAL CABINET	=PLANT +LOCATION	WORK ORDER SERIAL NUMBER

TITLE

COMMAND AND CONTROL SWITCHBOARDS NITROGEN GENERATION PACKAGE 64-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:
1724000437-MAT-PRO-00021

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.
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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 NITROGEN - WIRING DIAGRAM	d241024-WD		02
	WORK ORDER N. 2024.4813_001	LOCATION	NEXT 03
DESCRIPTION: COVER			TOTAL 52

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 NITROGEN - WIRING DIAGRAM

DESCRIPTION
MARKS OF IDENTIFIERS ACC. TO IEC 204-2

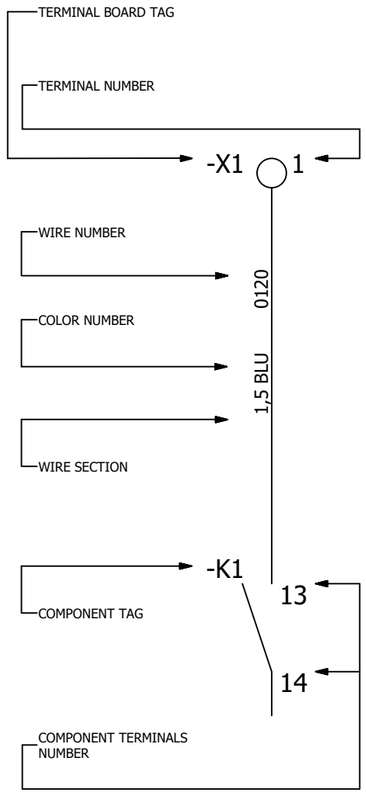
PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= NITROGEN	03
DATE	APPROVED	LOCATION	NEXT
02.05.2024		+ QE	04
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4813_001	d241024-WD		52

TABLE SYMBOLS

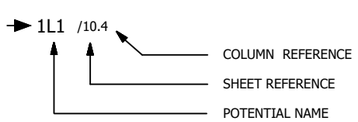
DEFINITION OF IDENTIFIERS (CEI3-34)		
CODE 1	PLANT	=
CODE 2	LOCATION	+
CODE 3	TAG	-
CODE 4	TERMINAL	:

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

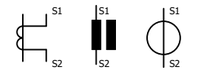
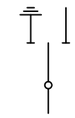
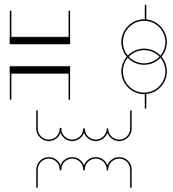
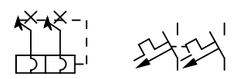
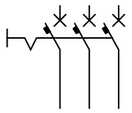
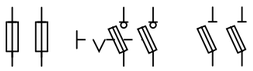
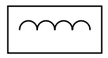
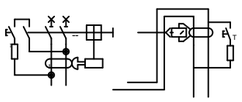
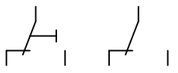
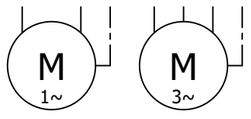
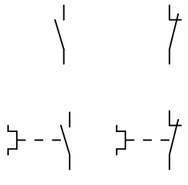
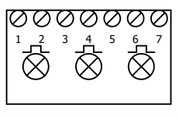
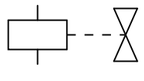
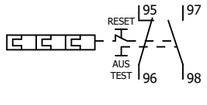
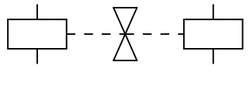
REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

PLANT
COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM

DESCRIPTION
COMMON SYMBOLS

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= NITROGEN	04
DATE	APPROVED	LOCATION	NEXT
02.05.2024		+ QE	05
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4813_001	d241024-WD		52

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				POWER TRANSFORMER
	AUTOMATIC SWITCH		MINIMUM VOLTAGE COIL		MEDIUM VOLTAGE SWITCH		
	CAPACITOR POLARIZD CAPACITOR						
	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 NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 05
DESCRIPTION: COMMON SYMBOLS	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 06
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

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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E	23.01.2025	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.			

coes 20th 1997 - 2017

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM		PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 06
DESCRIPTION: INDEX PAGES		DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 07
		WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

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

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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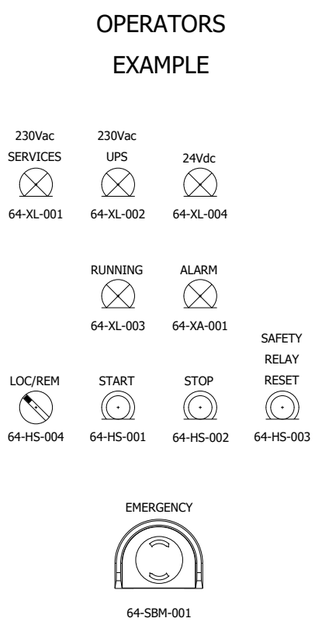
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D	18.11.2024	O.A			
C	04.09.2024	O.A.			
B	01.08.2024	O.A.			
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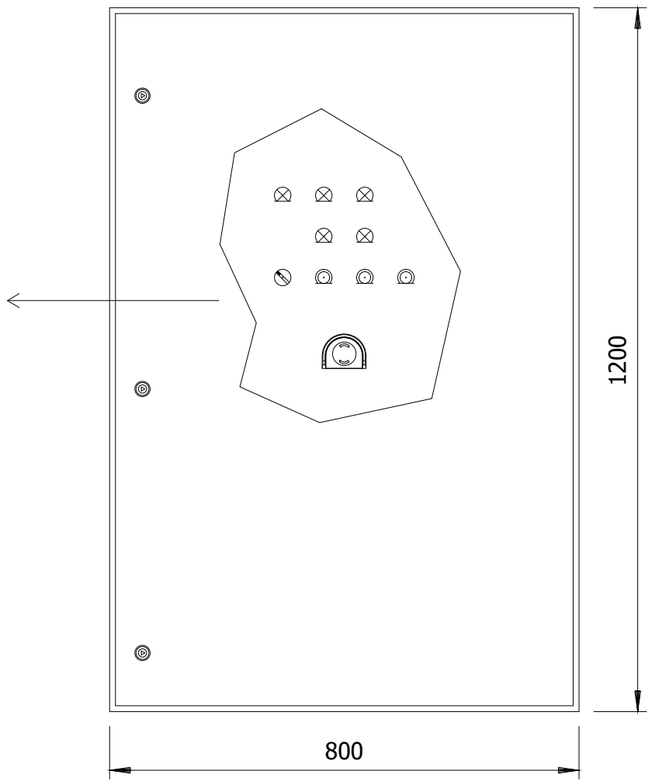
PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 07
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 08
DESCRIPTION: INDEX PAGES	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

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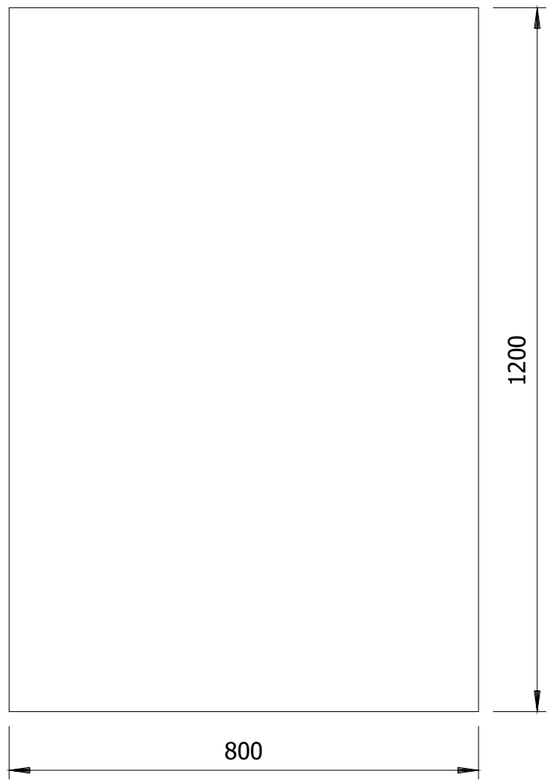
64-LP-001

FRONT

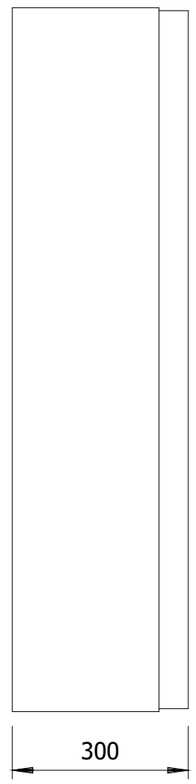




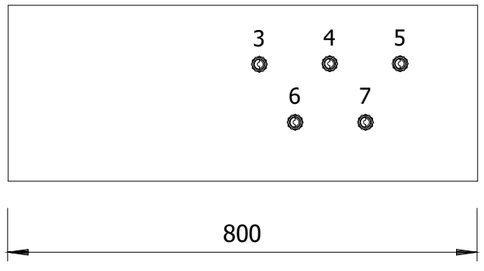
FRONT WITHOUT DOOR



SIDE



FRONT BOTTTOM



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4 =M20 CABLE "83111-CEL"

5 =M20 CABLE "C-64-XS-001/B400-SIS-001"

6 =M20 CABLE "C-64-XA-003/B400-SIS-001"

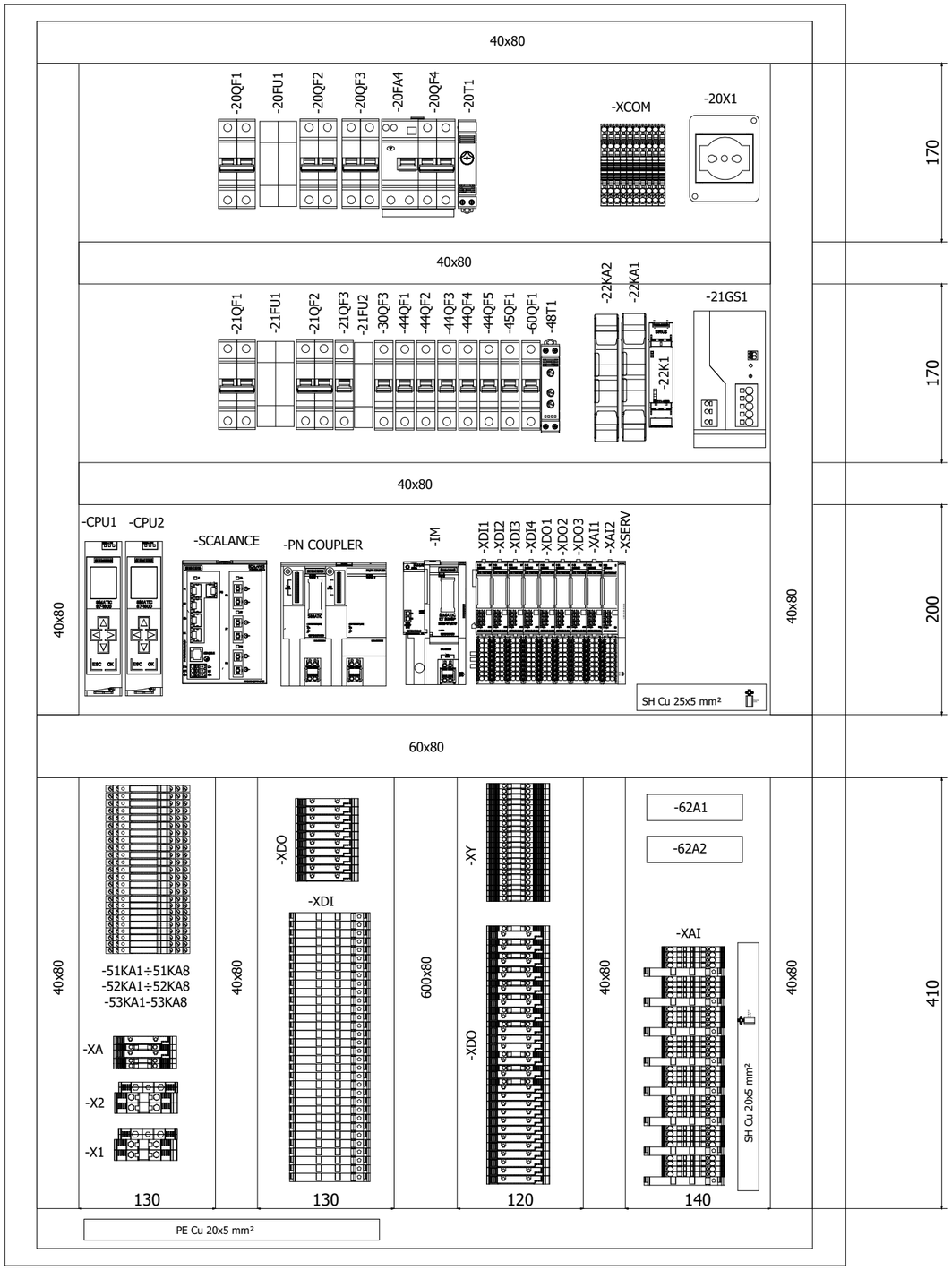
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REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024				
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM

DESCRIPTION: EXTERNAL VIEWS

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= NITROGEN	08
DATE	APPROVED	LOCATION	NEXT
02.05.2024		+ QE	09
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4813_001	d241024-WD		52



64-LP-001

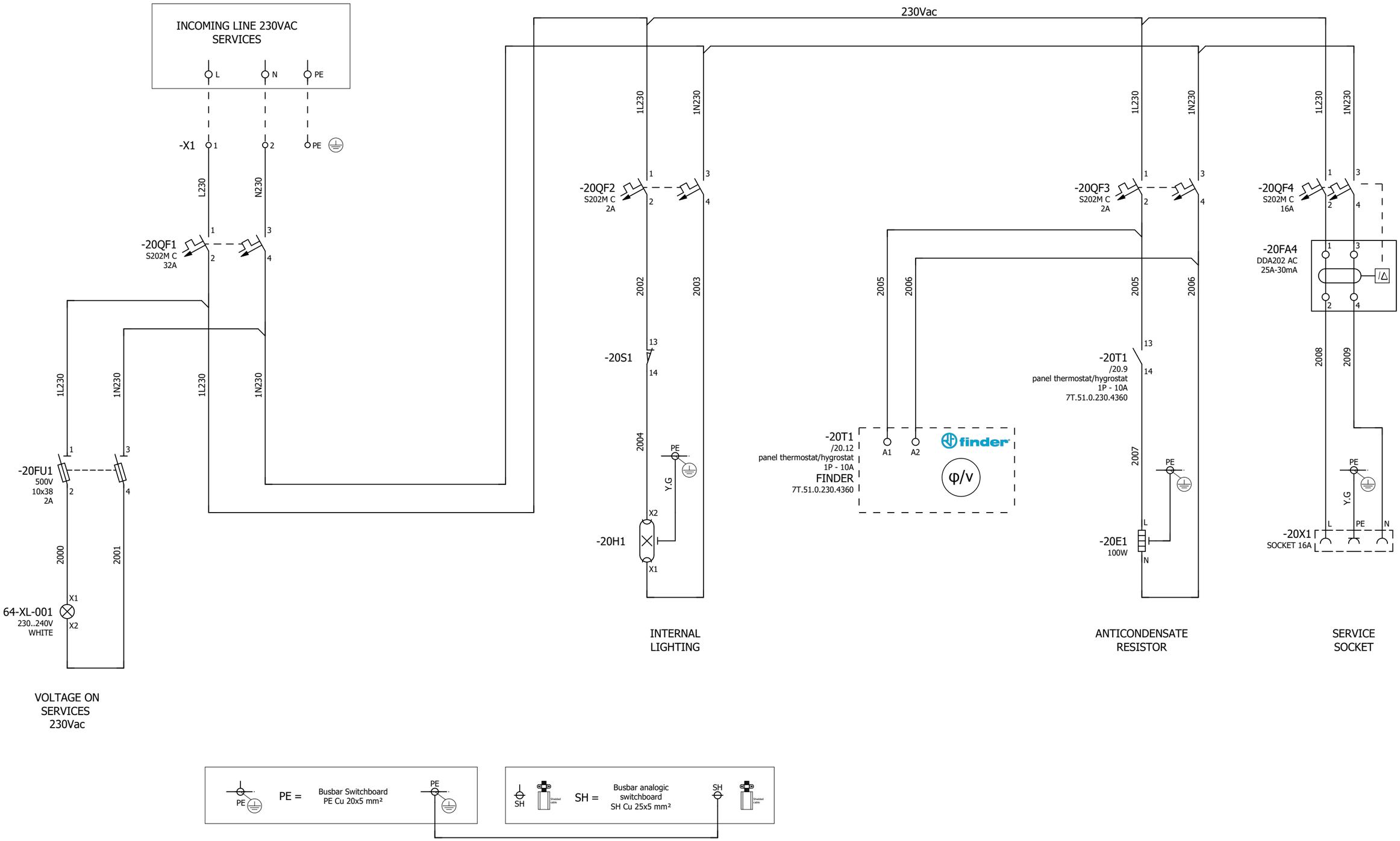
INTERNAL

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

coes 20th coes 1997 - 2017

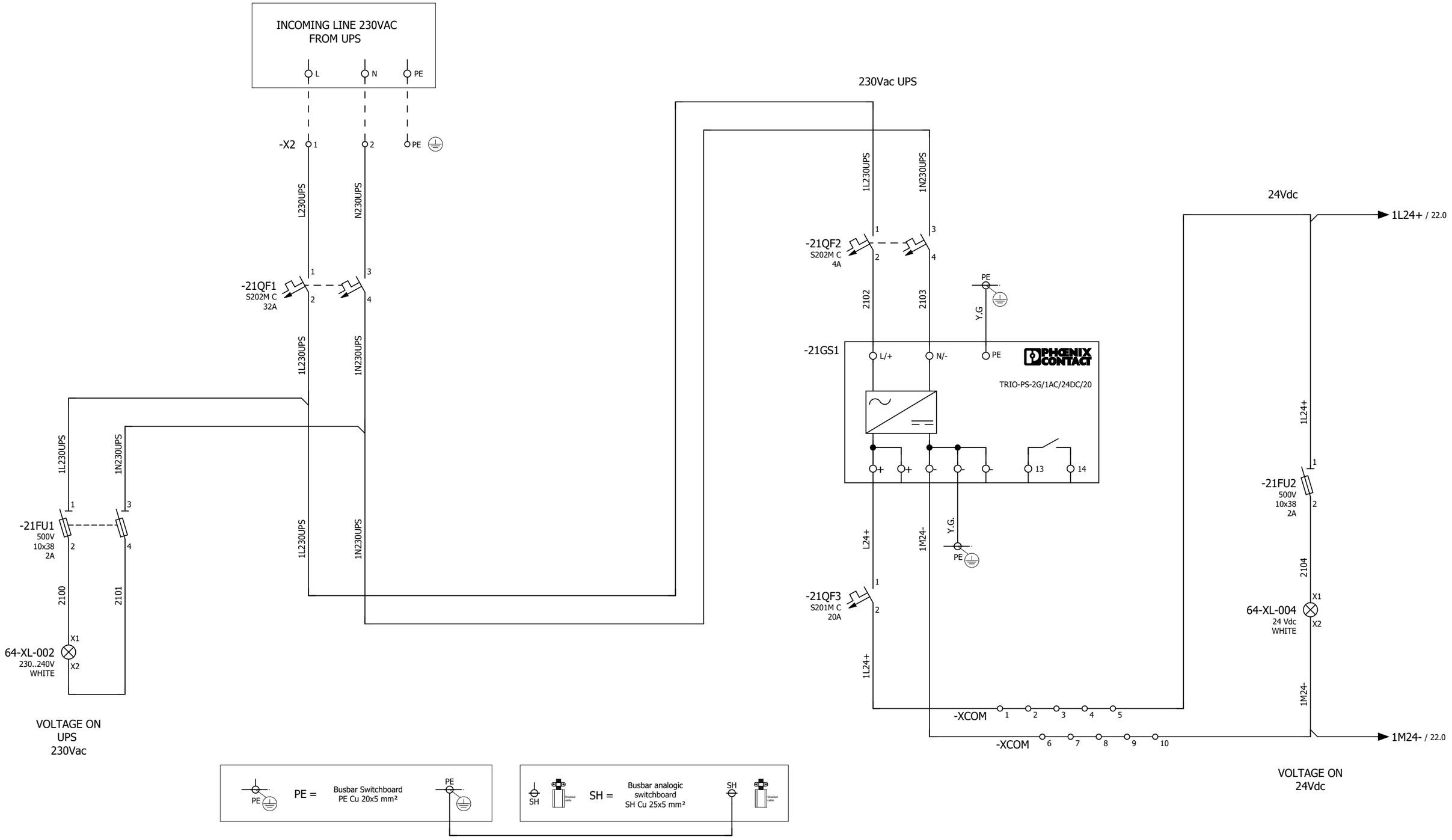
PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: INTERNAL VIEWS	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	

PAGE	NEXT	TOTAL SHEETS
09	10	52



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

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: INCOMING LINE 230Vac SERVICES	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	TOTAL SHEETS: 52
			PAGE: 10
			NEXT: 11



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

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
DESCRIPTION: INCOMING LINE 230Vac FROM UPS	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	TOTAL SHEETS: 52
			PAGE: 11
			NEXT: 12

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

24Vdc

21.15 / 1L24+ → 1L24+ / 30.0

+FIELD
/ +24V
/ 0Vdc
Shut-Down Command
from SIS 64-XS-001
(0=FAULT)

-XA 1 2
5x20F
2A

2200 2201

-22KA1
1 2 3 4
RELAY SIL
GMI.D5244D
Output I
15/16 14 13 COM NO NC
Output I
19/20 18 17 COM NO NC

2202 2203

1L24+
-XA 3
5x20F
2A
2204 2205

64-SBM-001
/22.6
RED
EMERGENCY
21 22

64-HS-003 E
/48.10
SAFETY RELAY
RESET
13 14
2206 2207

1L24+ 1L24+ 1L24+

22L24+

2208 2209

64-SBM-001
/22.9
RED
EMERGENCY
21 22

-22K1
A1 T1 IN1 T2 IN2 T3 IN3 T4 IN
13 23 33 41
Logic
Autostart / Monitored Start
SIEMENS
3SK1111-1AB30
A2
14 24 34 42

1M24-

22L1+ 22L2+

22L2+ / 51.0
VALVE POWER SUPPLY

22L1+ / 48.14
SHUTDOWN INDICATION

2210 1M24-

-22KA2
1 2 3 4
RELAY SIL
GMI.D5244D
Output I
15/16 14 13 COM NO NC
Output I
19/20 18 17 COM NO NC

2211 2212

-XA 4 5

+FIELD
CUMULATIVE
CRITICAL ALARM
TO SIS 64-XA-003
(0=FAULT)

21.15 / 1M24- → 1M24- / 30.0

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

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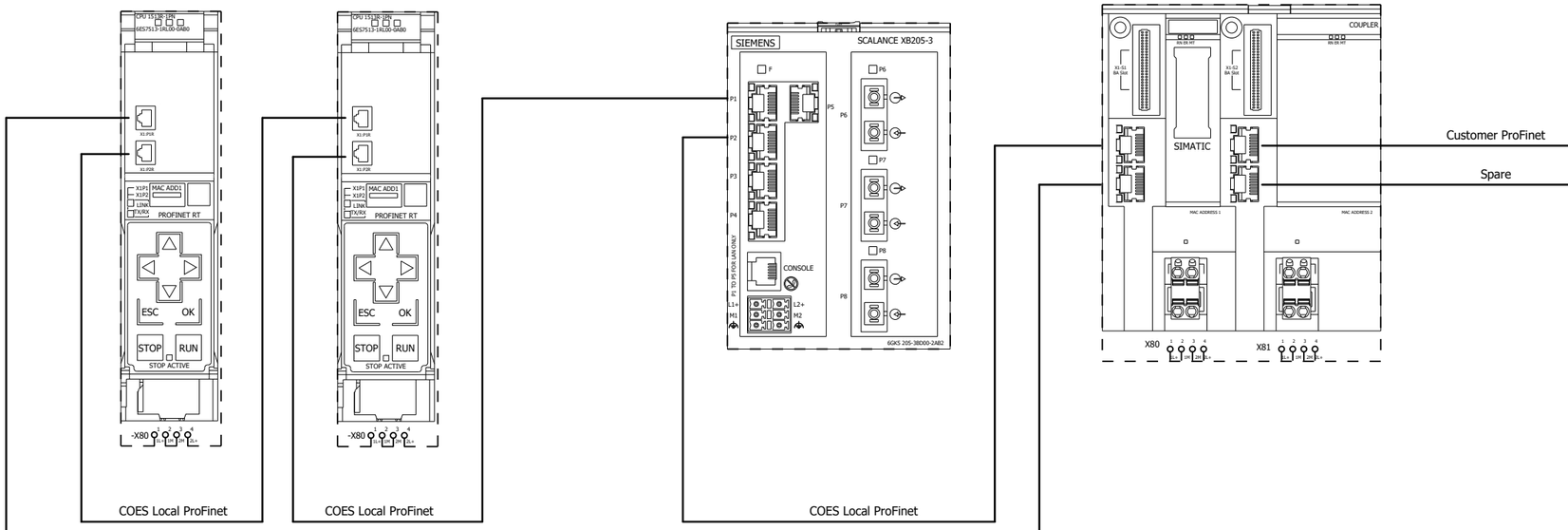
PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 12
DESCRIPTION: SAFETY RELAY 24Vdc	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 13
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

CPU 1

CPU 2

SCALANCE

PN/PN COUPLER

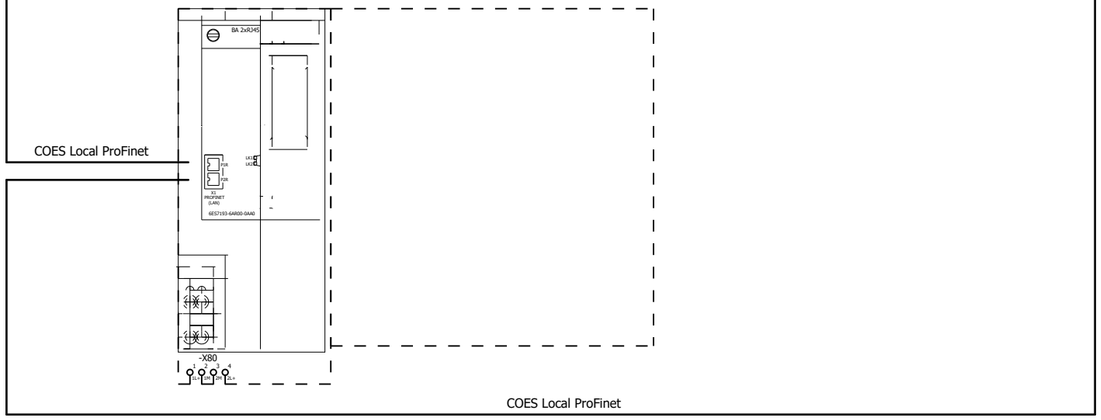


NOTE:
this ProFinet cable
is not in COES'S
scope of supply

CUSTOMER'S
PROFINET
NETWORK

FIELD

I/O RACK



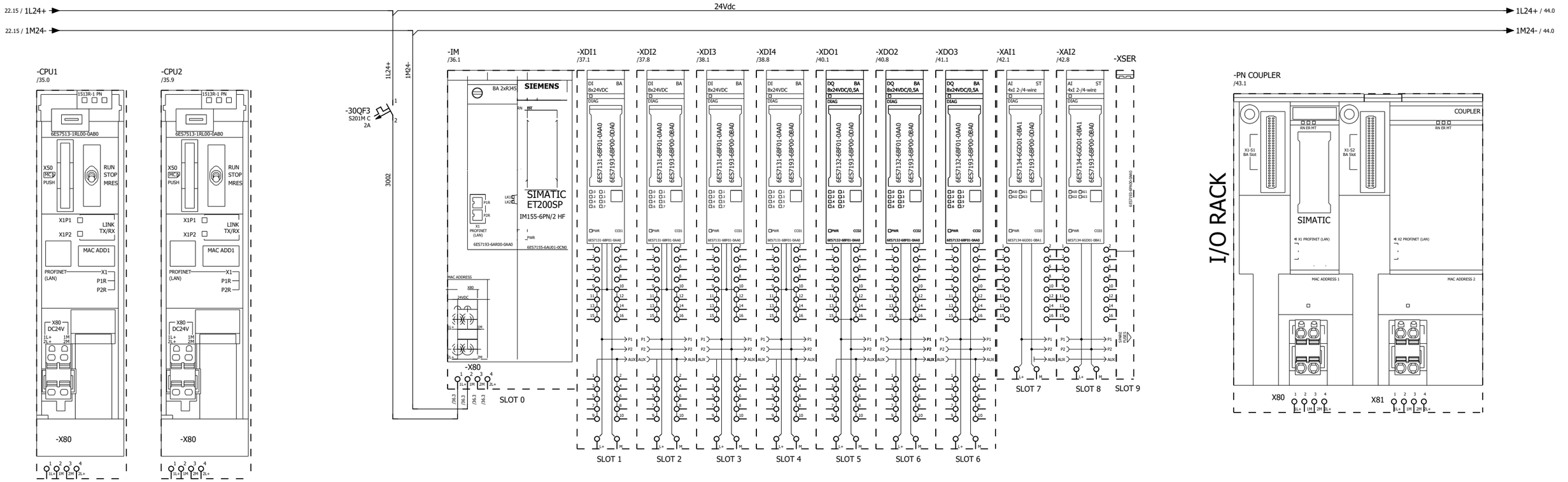
NITROGEN UCP

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

PLANT
COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM

DESCRIPTION
NETWORK ARCHITECTURE

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= NITROGEN	13
DATE	APPROVED	LOCATION	NEXT
02.05.2024		+ QE	14
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4813_001	d241024-WD		52



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

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: PLC CONFIGURATION	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	

PAGE	NEXT	TOTAL SHEETS
14	15	52

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 NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 15
DESCRIPTION: SUMMARY CPU	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 16
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

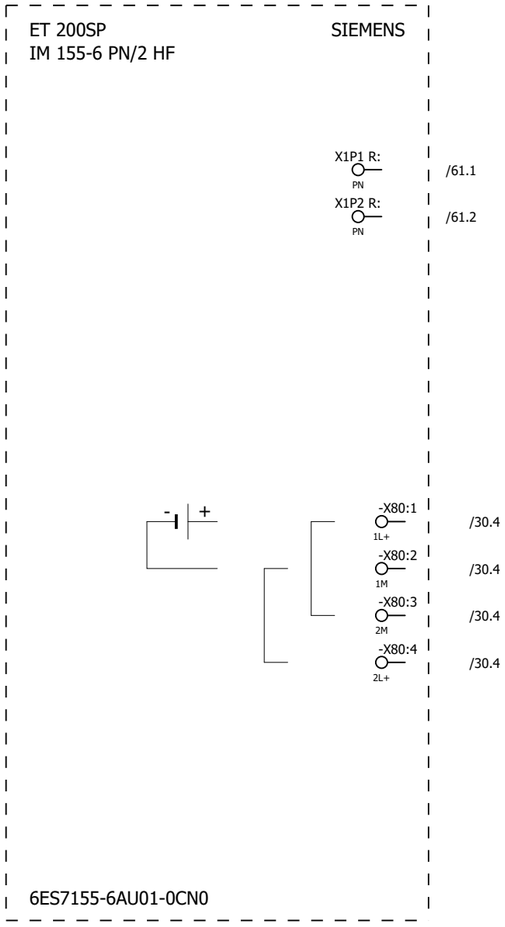
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

/30.4

-IM

SIE.6ES7155-6AU01-0CN0

SIE.6ES7193-6AR00-0AA0



REV.	DATE	PREPARED	REV.	DATE	PREPARED

coes 20th coes 1997 - 2017

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 16
DESCRIPTION: SUMMARY CARDS I/O RACK	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 17
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

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	64-ZSH-051	VALVE 64-XV-051 OPEN LIMIT SWITCH		
%I0.1	/46.2	64-ZSL-051	VALVE 64-XV-051 CLOSED LIMIT SWITCH		
%I0.2	/46.4	64-ZSH-052	VALVE 64-XV-052 OPEN LIMIT SWITCH		
%I0.3	/46.6	64-ZSL-052	VALVE 64-XV-052 CLOSED LIMIT SWITCH		
%I0.4	/46.8	64-ZSH-053	VALVE 64-XV-053 OPEN LIMIT SWITCH		
%I0.5	/46.10	64-ZSL-053	VALVE 64-XV-053 CLOSED LIMIT SWITCH		
%I0.6	/46.12	64-ZSH-0514	VALVE 64-XV-054 OPEN LIMIT SWITCH		
%I0.7	/46.14	64-ZSL-054	VALVE 64-XV-054 CLOSED LIMIT SWITCH		
	/44.1		POWER SUPPLY WHITE CARD DIGITAL INPUT -XDI1		
	/44.1				

SIEMENS

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

-XDI2
/30.6

%I1.0	/47.0	64-ZSH-055	VALVE 64-XV-055 OPEN LIMIT SWITCH		
%I1.1	/47.2	64-ZSL-055	VALVE 64-XV-055 CLOSED LIMIT SWITCH		
%I1.2	/47.4	64-ZSH-056	VALVE 64-XV-056 OPEN LIMIT SWITCH		
%I1.3	/47.6	64-ZSL-056	VALVE 64-XV-056 CLOSED LIMIT SWITCH		
%I1.4	/47.8	64-ZSH-057	VALVE 64-XV-057 OPEN LIMIT SWITCH		
%I1.5	/47.10	64-ZSL-057	VALVE 64-XV-057 CLOSED LIMIT SWITCH		
%I1.6	/47.12	64-ZSH-058	VALVE 64-XV-058 OPEN LIMIT SWITCH		
%I1.7	/47.14	64-ZSL-058	VALVE 64-XV-058 CLOSED LIMIT SWITCH		

SIEMENS

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

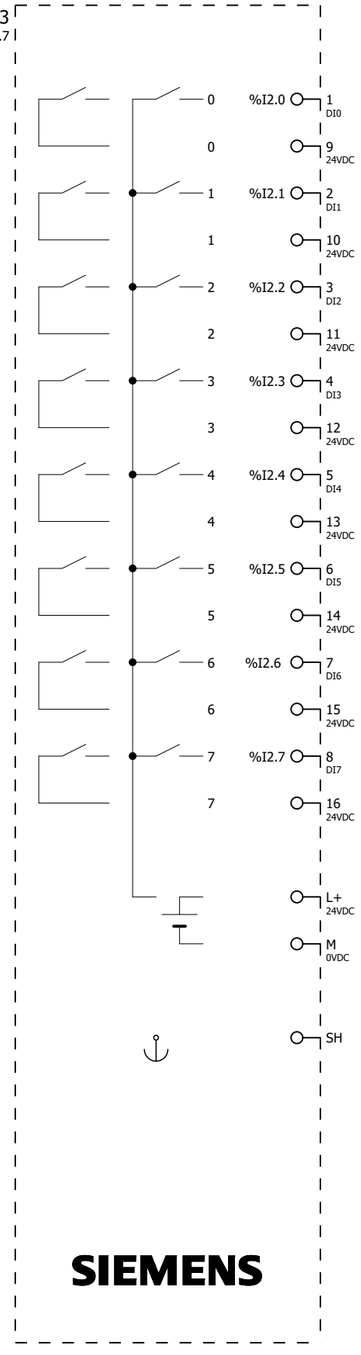
coes 20th 1997 - 2017

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 17
DESCRIPTION: SUMMARY CARDS I/O RACK	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 18
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

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

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

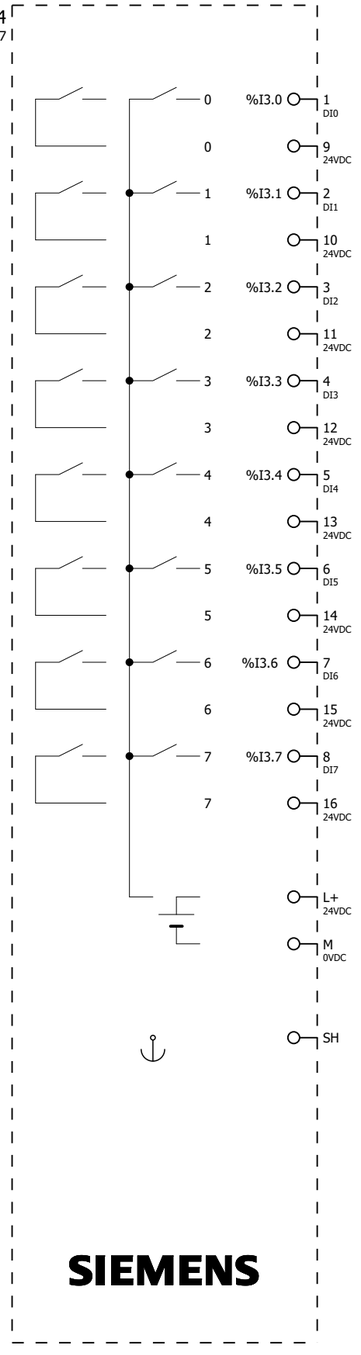
-XDI3
/30.7



/48.0	64-ZSH-059	VALVE 64-XV-059 OPEN LIMIT SWITCH		
/48.2	64-ZSL-059	VALVE 64-XV-059 CLOSED LIMIT SWITCH		
/48.4	64-TH-001	INTERNAL CABINET THERMOSTAT		
/48.6	64-HS-001	LOCAL START PUSH BUTTON		
/48.8	64-HS-002	LOCAL STOP PUSH BUTTON		
/48.10	64-HS-003	LOCAL ALARM RESET		
/48.12	64-HS-004	LOCAL REMOTE SELECTOR STATUS		
/48.14	64-ESD-001	SHUTDOWN ALARM FROM SIS - INDICATION ONLY		

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

-XDI4
/30.7



/49.0	64-ZSH-060	VALVE 64-XV-060 OPEN LIMIT SWITCH		
/49.2	64-ZSL-060	VALVE 64-XV-060 CLOSED LIMIT SWITCH		
/49.4	64-ZSH-061	VALVE 64-XV-061 OPEN LIMIT SWITCH		
/49.6	64-ZSL-061	VALVE 64-XV-061 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.			
A	30.05.2024	O.A.			

coes 20th 1997 - 2017

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: SUMMARY CARDS I/O RACK	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	

PAGE	NEXT	TOTAL SHEETS
18	19	52

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

-XDO1
/30.8

%Q0.0	/51.0	64-XV-051	VALVE 64-XV-051 COMMAND		
%Q0.1	/51.2	64-XV-052	VALVE 64-XV-052 COMMAND		
%Q0.2	/51.4	64-XV-053	VALVE 64-XV-053 COMMAND		
%Q0.3	/51.6	64-XV-054	VALVE 64-XV-054 COMMAND		
%Q0.4	/51.8	64-XV-055	VALVE 64-XV-055 COMMAND		
%Q0.5	/51.10	64-XV-056	VALVE 64-XV-056 COMMAND		
%Q0.6	/51.12	64-XV-057	VALVE 64-XV-057 COMMAND		
%Q0.7	/51.14	64-XV-058	VALVE 64-XV-058 COMMAND		
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	64-XV-059	VALVE 64-XV-059 COMMAND		
%Q1.1	/52.2		SPARE		
%Q1.2	/52.4	64-XL-003	RUNNING SYSTEM LAMP		
%Q1.3	/52.6	64-XA-001	GENERAL ALARM SYSTEM LAMP		
%Q1.4	/52.8	64-XL-003-DCS	NITROGEN GENERATOR RUNNING (TO DCS)		
%Q1.5	/52.10	64-XA-001-DCS	NITROGEN GENERATOR ALARM (TO DCS)		
%Q1.6	/52.12	64-XV-060	VALVE 64 XV-060 COMMAND		
%Q1.7	/52.14	64-XV-061	VALVE 64 XV-061 COMMAND		
L+ 24VDC					
M 0VDC					
SH					

SIEMENS

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

PLANT
COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM

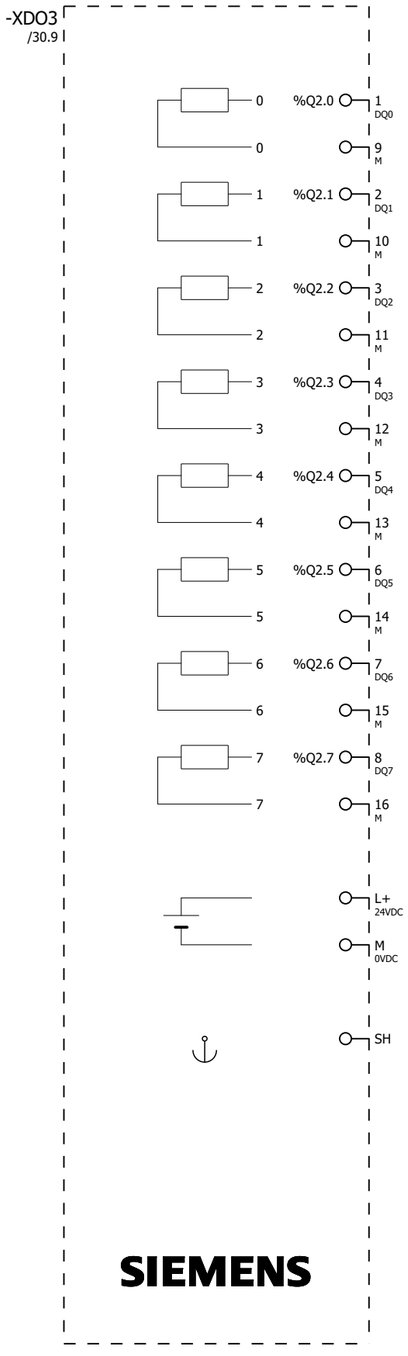
DESCRIPTION
SUMMARY CARDS I/O RACK

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= NITROGEN	19
DATE	APPROVED	LOCATION	NEXT
02.05.2024		+ QE	20
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4813_001	d241024-WD		52

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



/53.0	SPARE		
/53.2	SPARE		
/53.4	SPARE		
/53.6	SPARE		
/53.8	SPARE		
/53.10	SPARE		
/53.12	SPARE		
/53.14	SPARE		

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

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PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 20
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 21
DESCRIPTION: SUMMARY CARDS I/O RACK	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

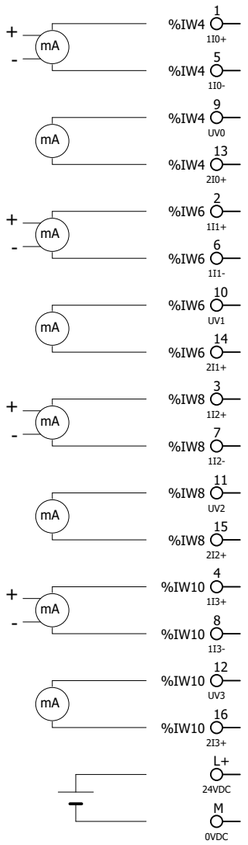
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

/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	64_PT_051	INLET PRESSUTE TRANSMITTER		
/54.2				
/54.5				
/54.5				
/54.6	64_PT_052	TOWER 1 PRESSUTE TRANSMITTER		
/54.6				
/54.9				
/54.9				
/54.10	64_PT_053	TOWER 2 PRESSUTE TRANSMITTER		
/54.10				
/54.13				
/54.13				
/54.14	64_PT_057	OUTLET B PRESSUTE TRANSMITTER		
/54.14				
/44.6		POWER SUPPLY WHITE CARD ANALOG INPUT -XAI1		
/44.7				

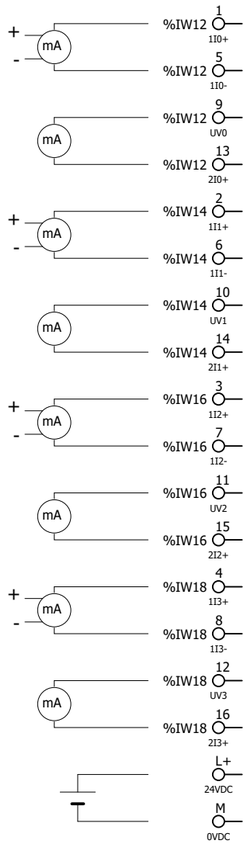
6ES7134-6GD01-0BA1

/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	64_PT_059	PRESSURE TRANSMITTER INSTRUMENT AIR RECIEVER	
/55.2			
/55.5			
/55.5			
/55.6	64_PDIT_056	DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS	
/55.6			
/55.10	64_AT_051	OXYGEN TRANSMITTER	
/55.10			
/55.10			
/55.11			
/55.13			
/55.13			
/55.14	_XAI_45	SPARE	
/55.14			

6ES7134-6GD01-0BA1

REV.	DATE	PREPARED	REV.	DATE	PREPARED
E	23.01.2025	O.A.			
A	30.05.2024	O.A.			

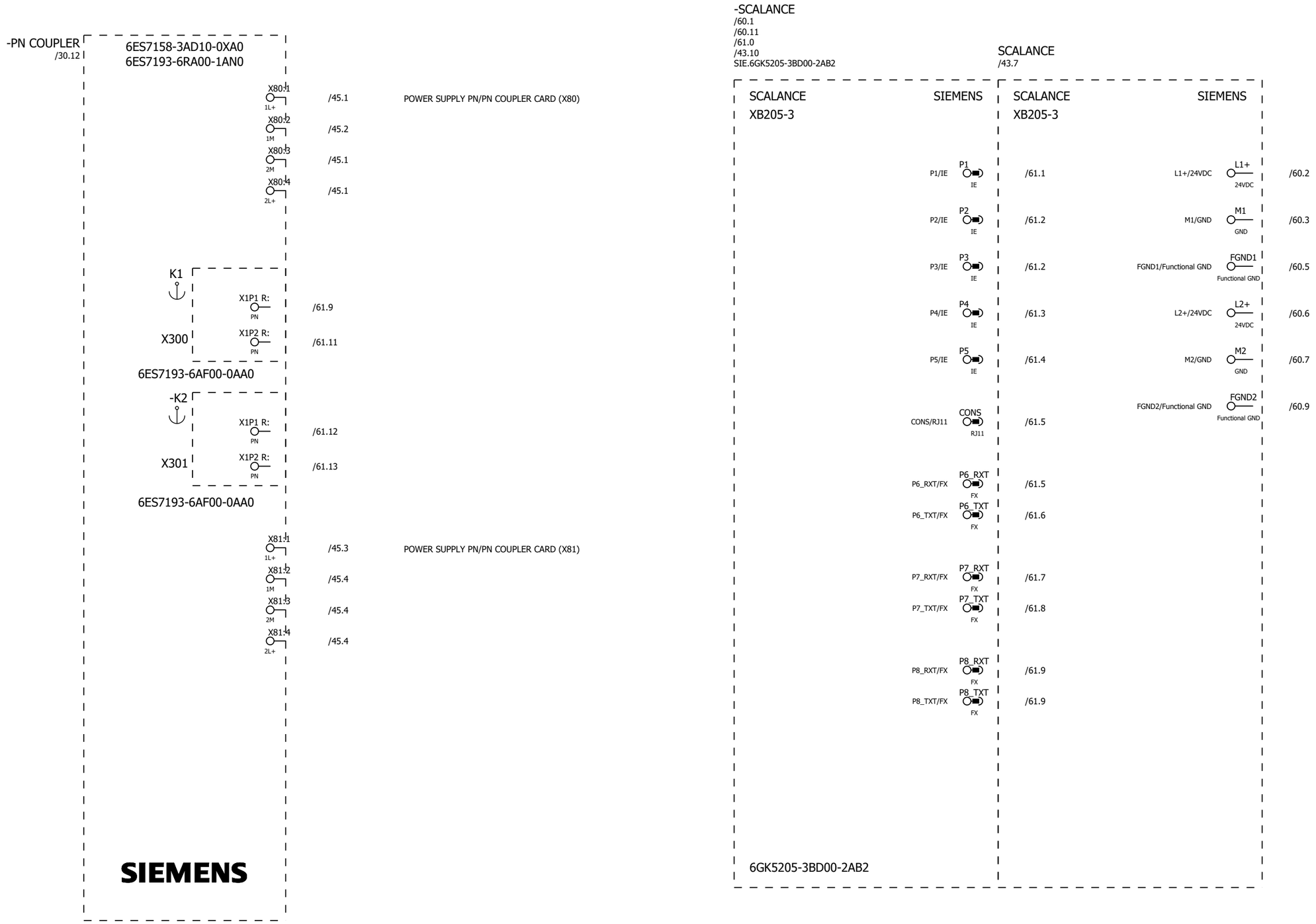
coes 20th 1997 - 2017

PLANT
COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM

DESCRIPTION
SUMMARY CARDS I/O RACK

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= NITROGEN	21
DATE	APPROVED	LOCATION	NEXT
02.05.2024		+ QE	22
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4813_001	d241024-WD		52

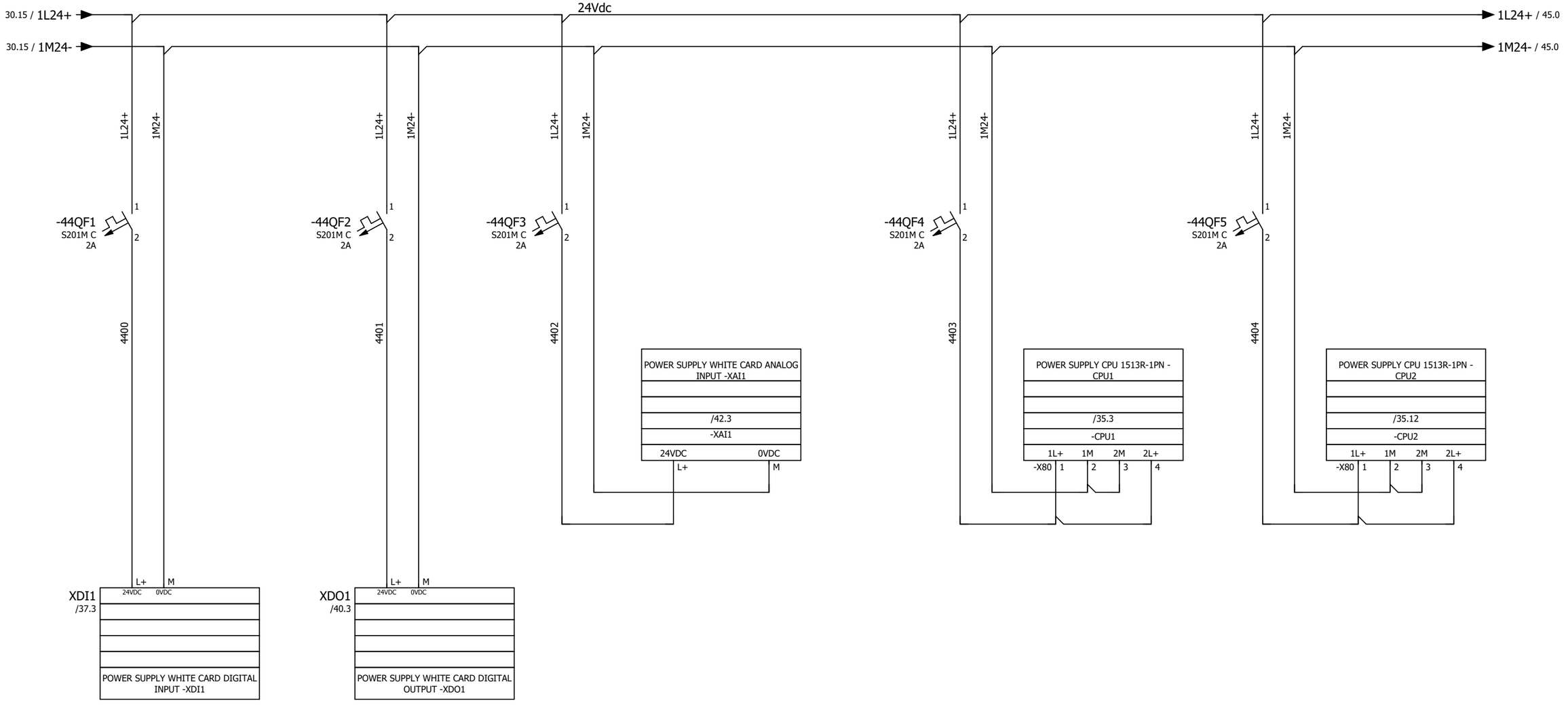
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15



REV.	DATE	PREPARED	REV.	DATE	PREPARED

coes 20th coes 1997 - 2017

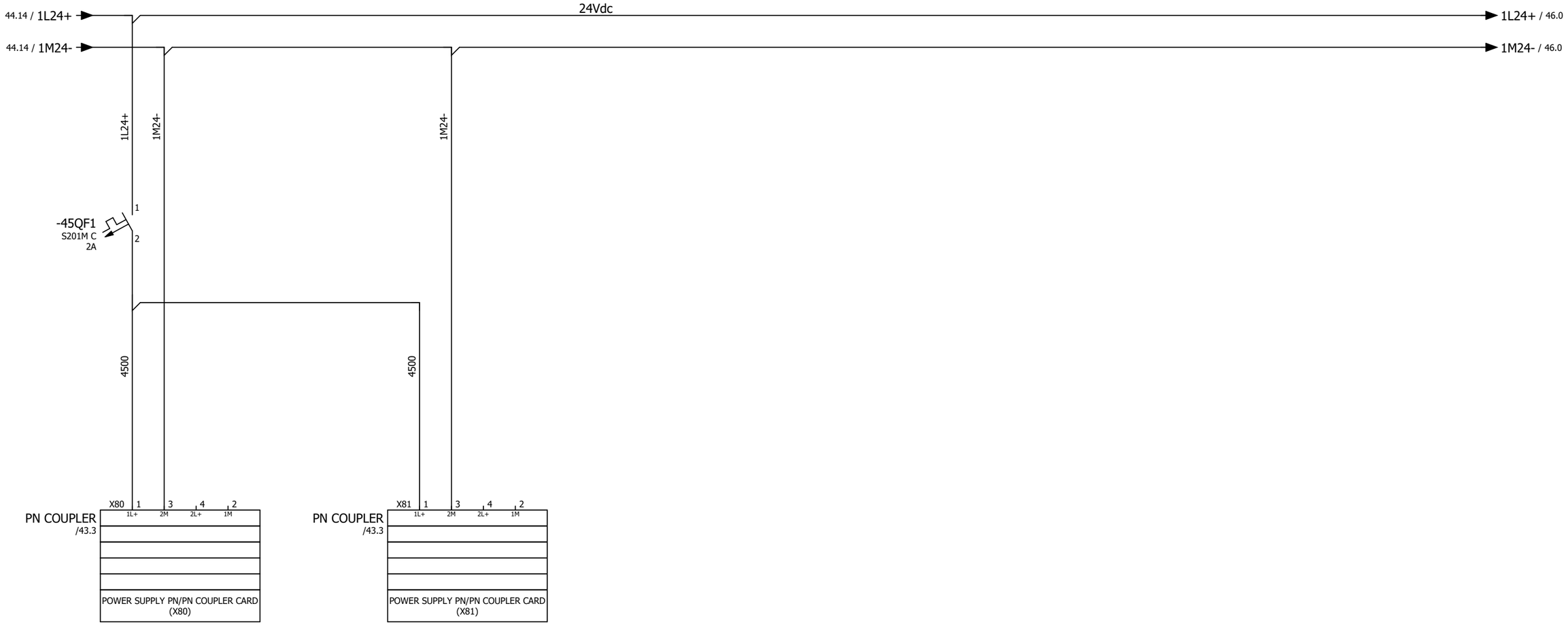
PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 22
DESCRIPTION: SUMMARY CARD PN COUPLER AND SWITCH SCALANCE	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 23
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52



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

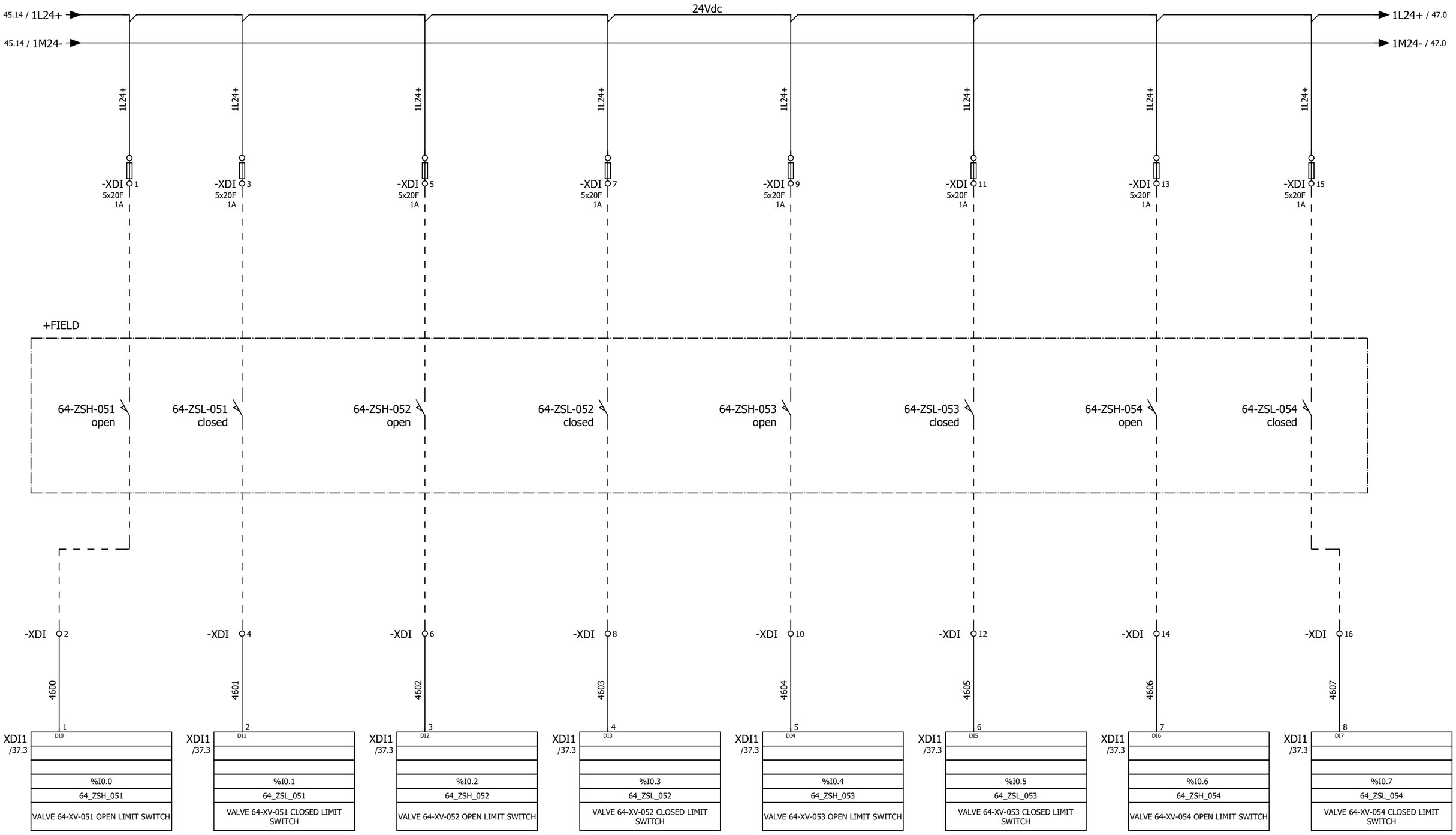
PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: POWER SUPPLY CPU AND CARDS I/O RACK	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	

PAGE	NEXT	TOTAL SHEETS
23	24	52



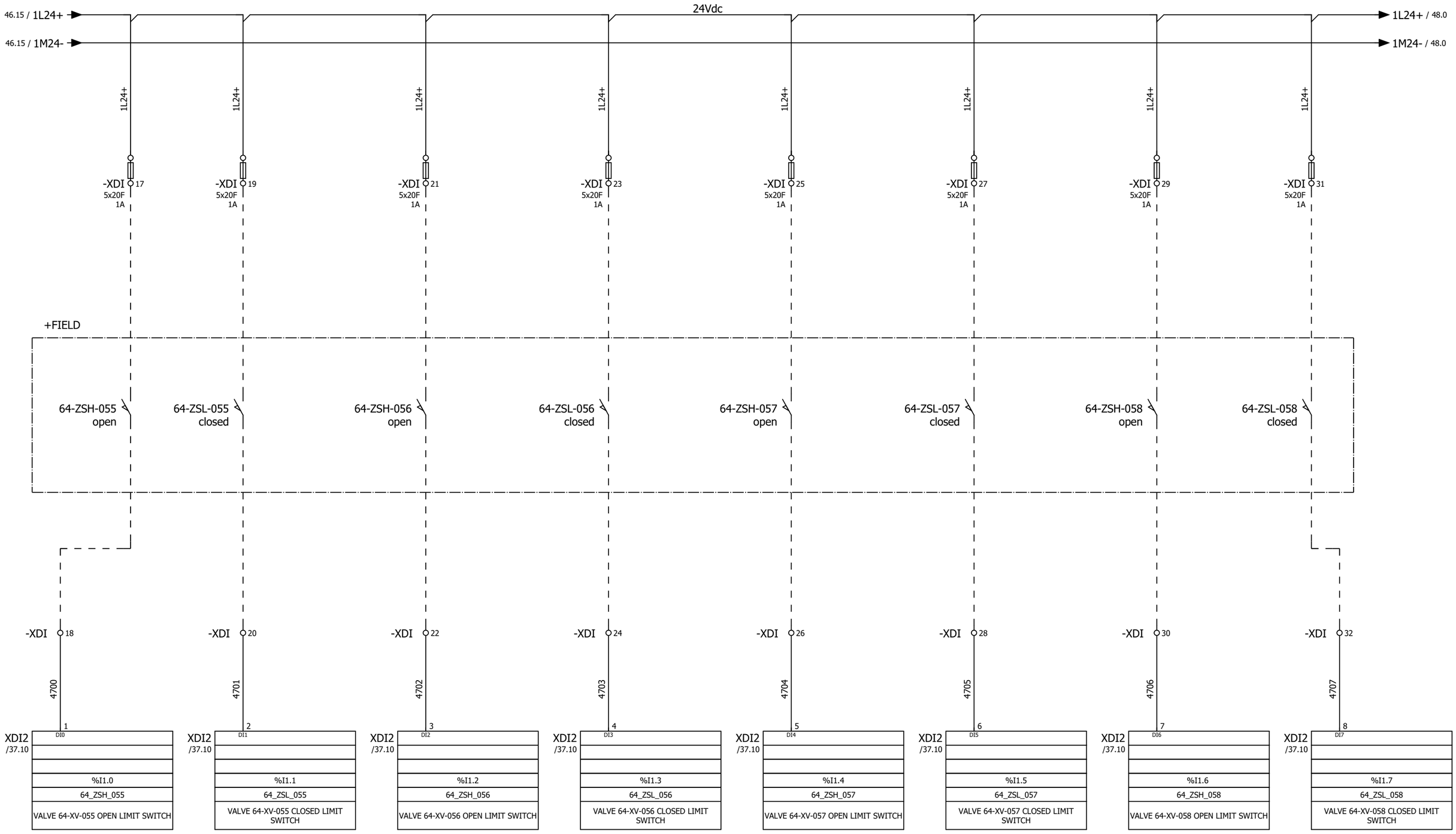
REV.	DATE	PREPARED	REV.	DATE	PREPARED

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 24
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 25
DESCRIPTION: POWER SUPPLY PN/PN COUPLER	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52



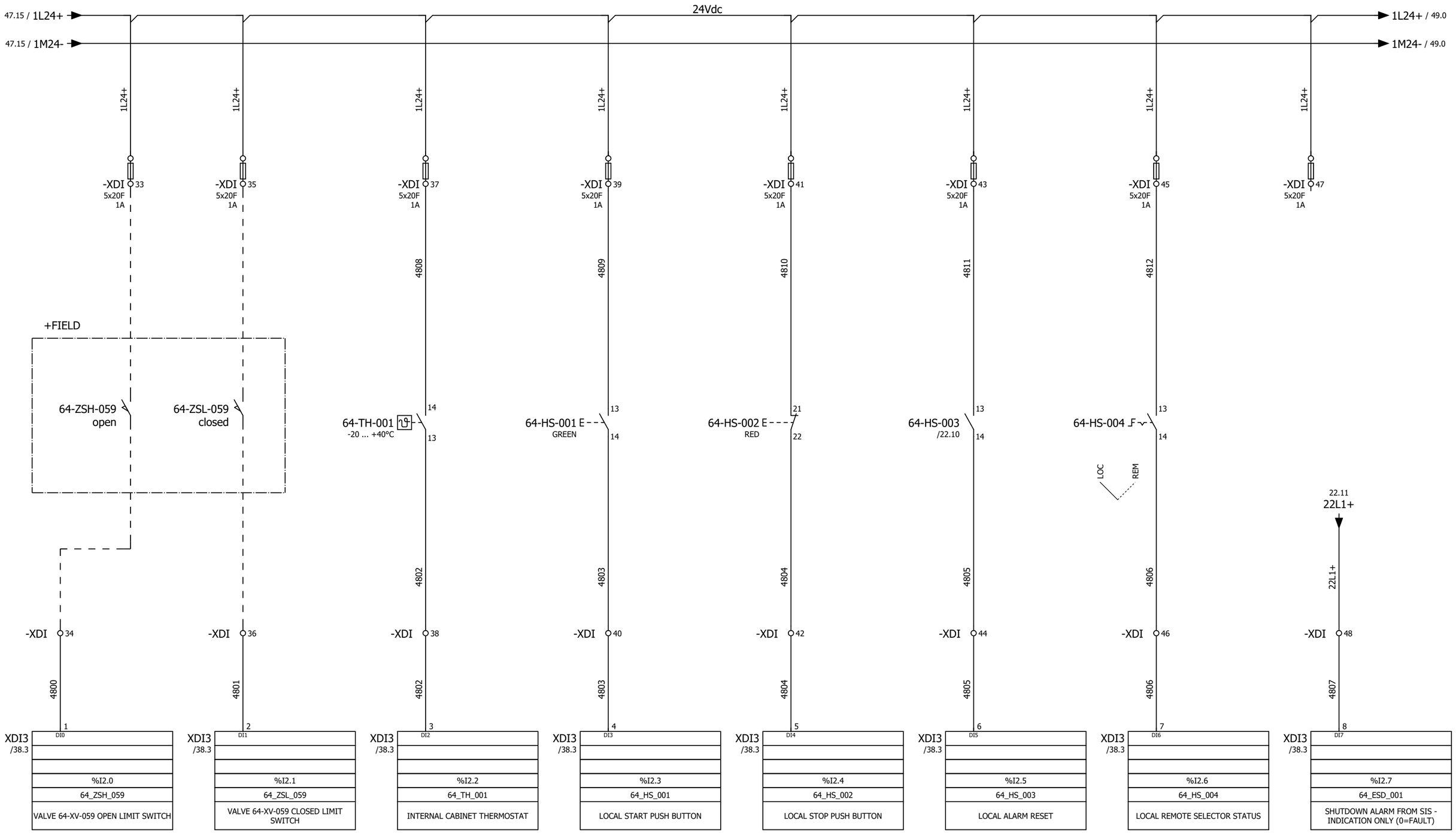
REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
DESCRIPTION: DIGITAL INPUT I/O RACK	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	TOTAL SHEETS: 52
			PAGE: 25
			NEXT: 26



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

PLANT	COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED	CHECKED	PLANT	PAGE
		ASSOLARI O.	TIRABOSCHI T.	= NITROGEN	26
DESCRIPTION		DATE	APPROVED	LOCATION	NEXT
	DIGITAL INPUT I/O RACK	02.05.2024		+ QE	27
		WORK ORDER N	DRAWING N		TOTAL SHEETS
		2024.4813_001	d241024-WD		52

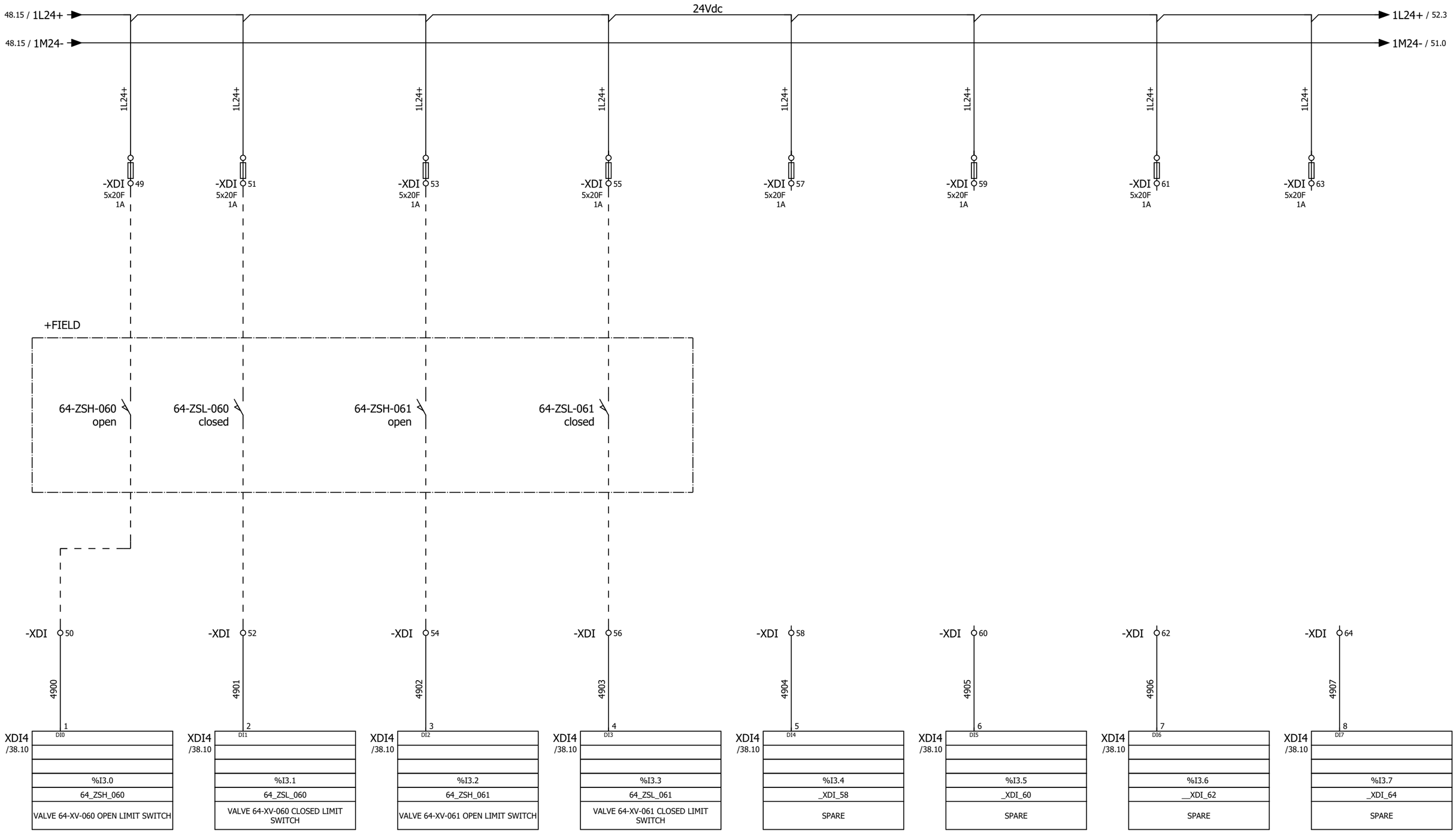


REV.	DATE	PREPARED	REV.	DATE	PREPARED
C	04.09.2024	O.A.			
A	30.05.2024	O.A.			

PLANT
COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM

DESCRIPTION
DIGITAL INPUT I/O RACK

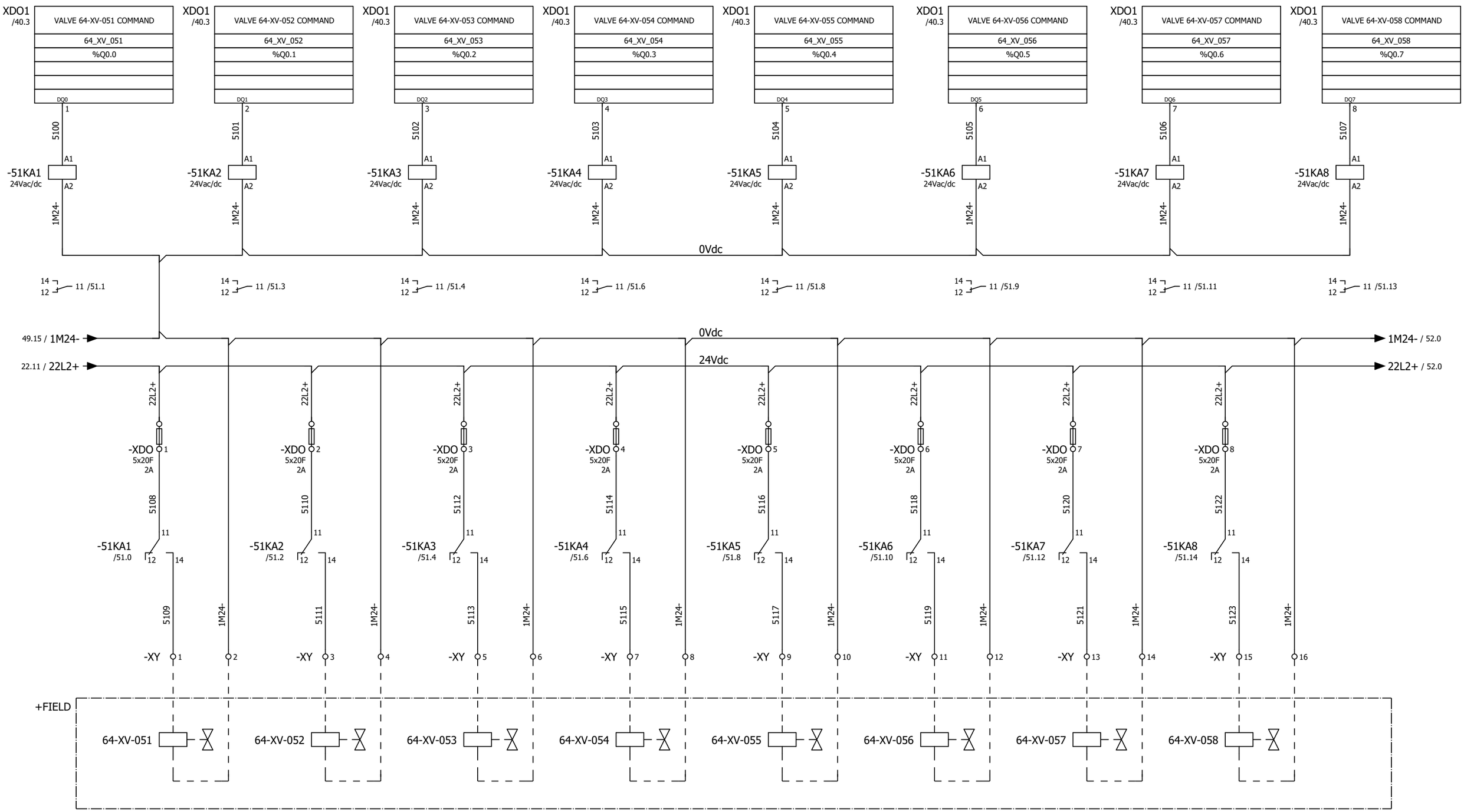
PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= NITROGEN	27
DATE	APPROVED	LOCATION	NEXT
02.05.2024		+ QE	28
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4813_001	d241024-WD		52



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

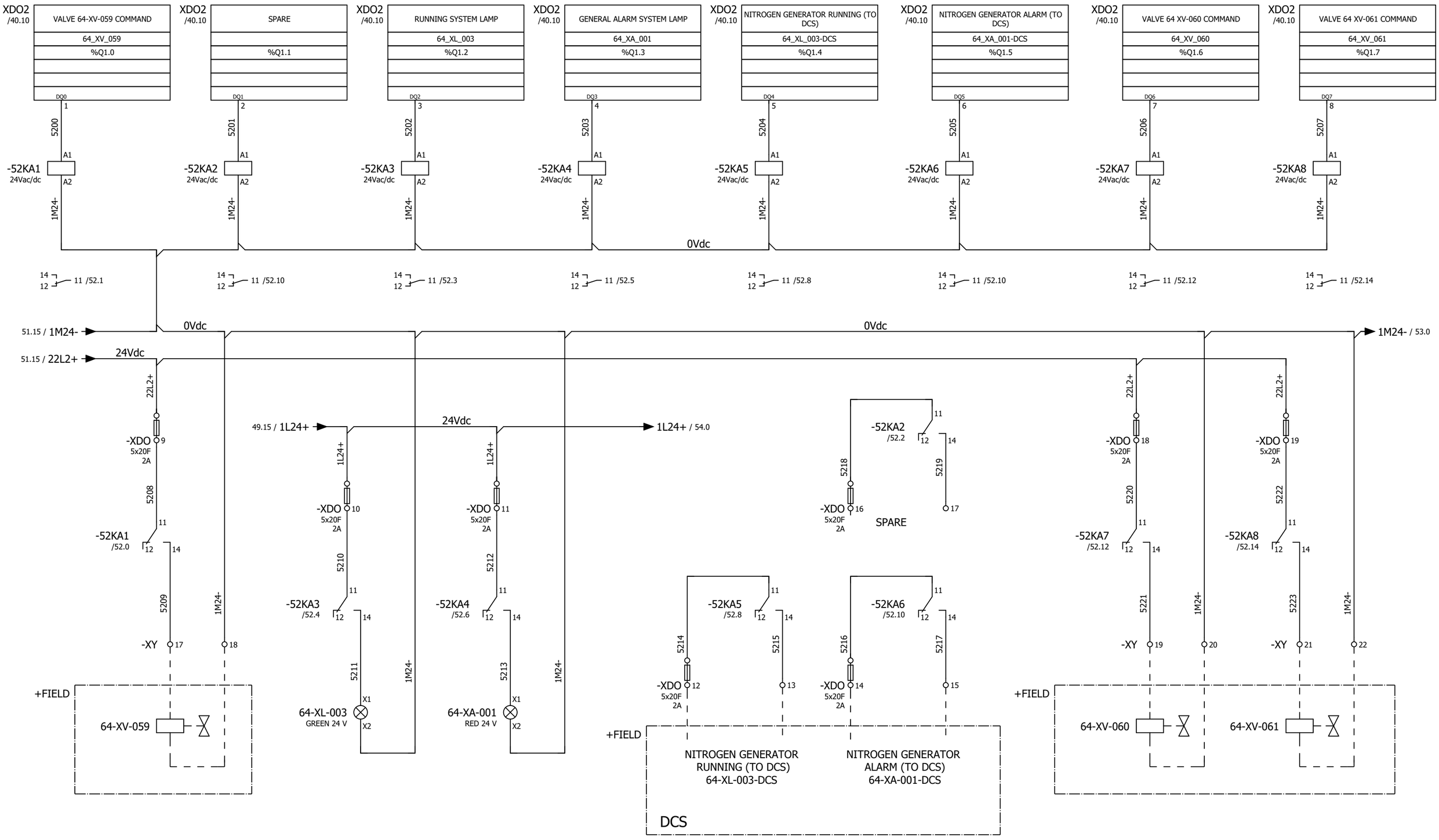
PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
DESCRIPTION: DIGITAL INPUT I/O RACK	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	TOTAL SHEETS: 52
			PAGE: 28
			NEXT: 29

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



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

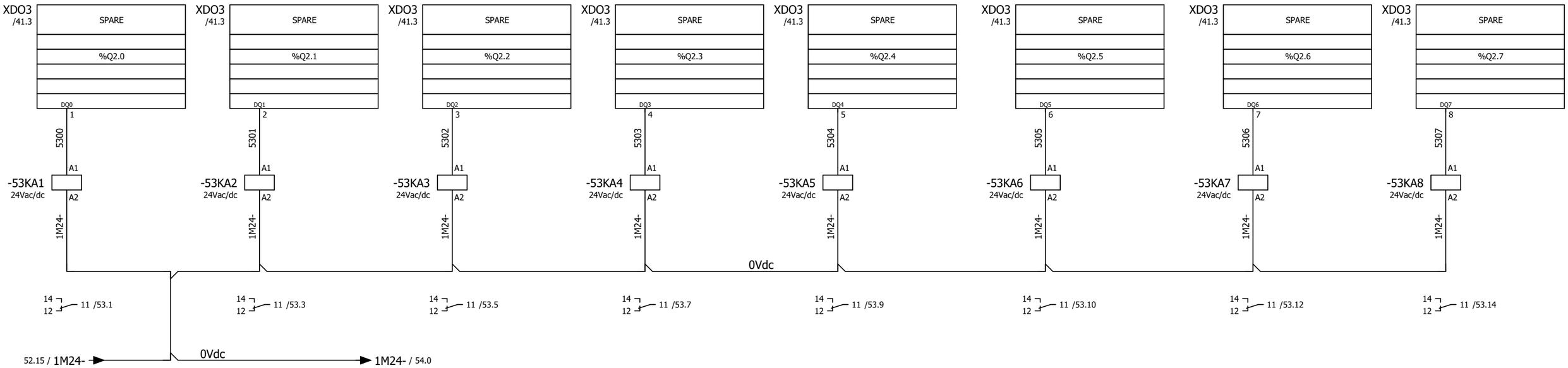
PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
DESCRIPTION: DIGITAL OUTPUT I/O RACK	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	TOTAL SHEETS: 52
			PAGE: 29
			NEXT: 30

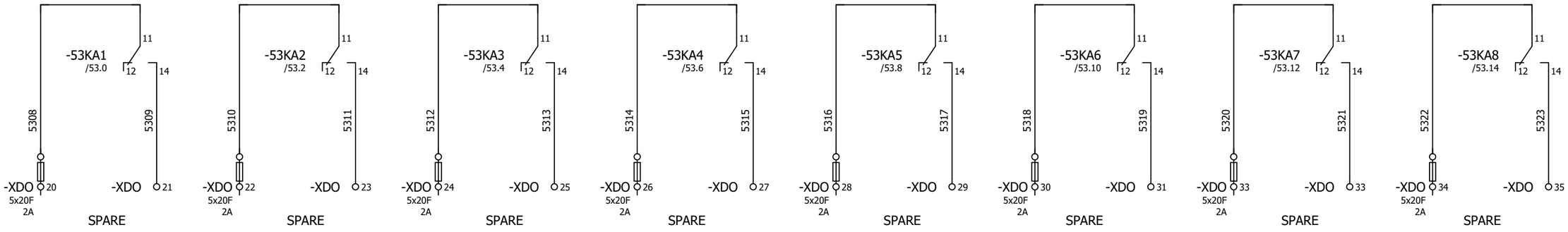


REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: DIGITAL OUTPUT I/O RACK	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	TOTAL SHEETS: 52
			PAGE: 30
			NEXT: 31

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



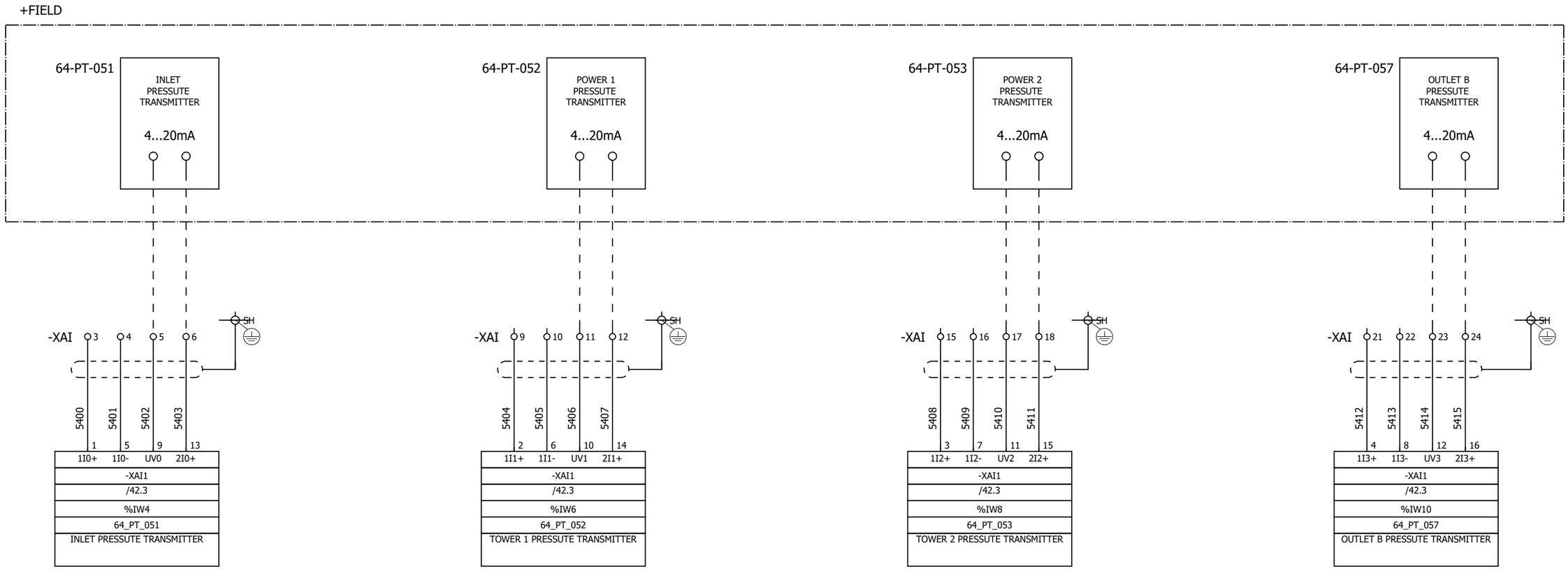


REV.	DATE	PREPARED	REV.	DATE	PREPARED
B	01.08.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: DIGITAL OUTPUT I/O RACK	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	

PAGE	NEXT	TOTAL SHEETS
31	32	52

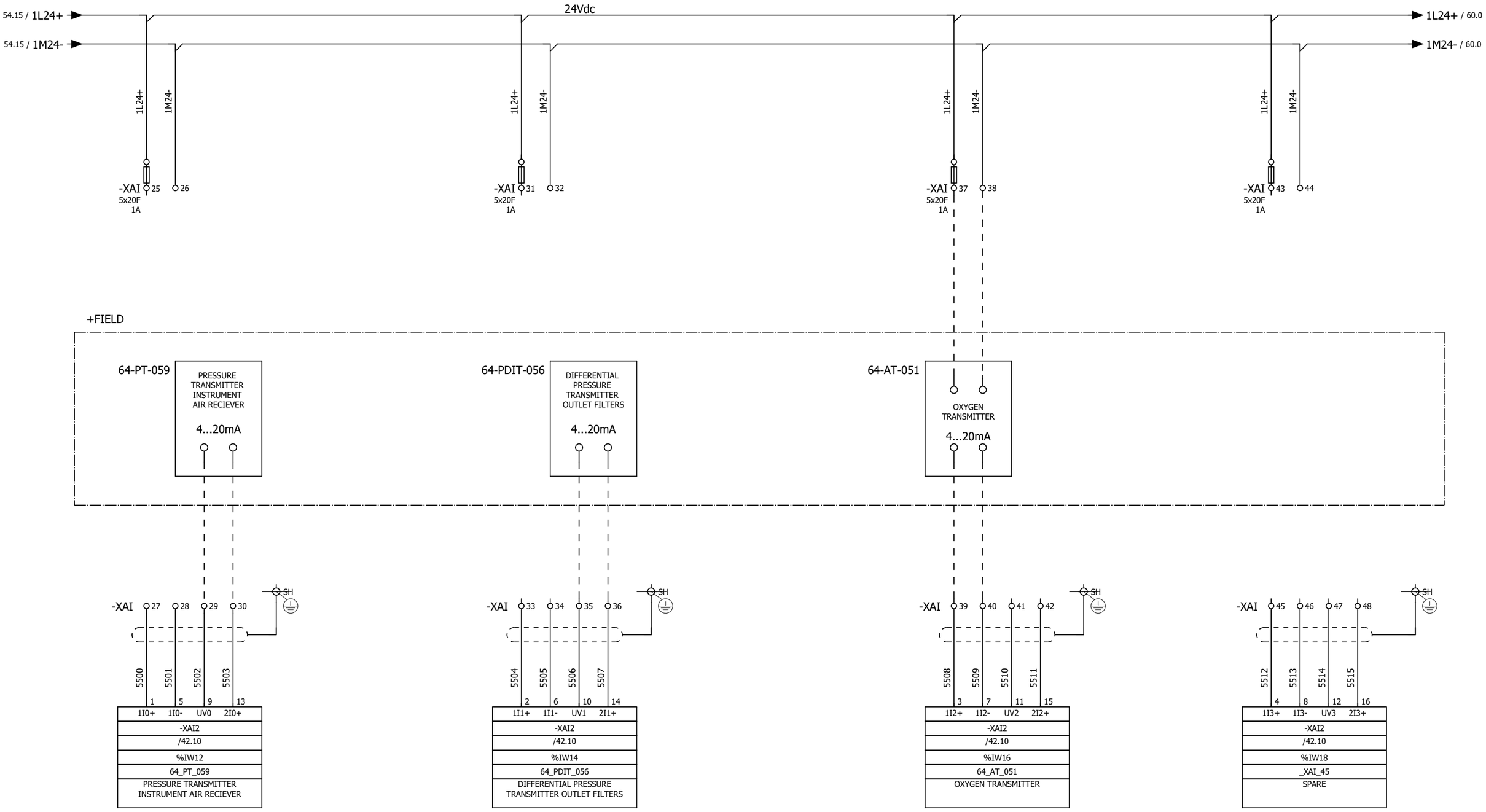




REV.	DATE	PREPARED	REV.	DATE	PREPARED
A	30.05.2024	O.A.			

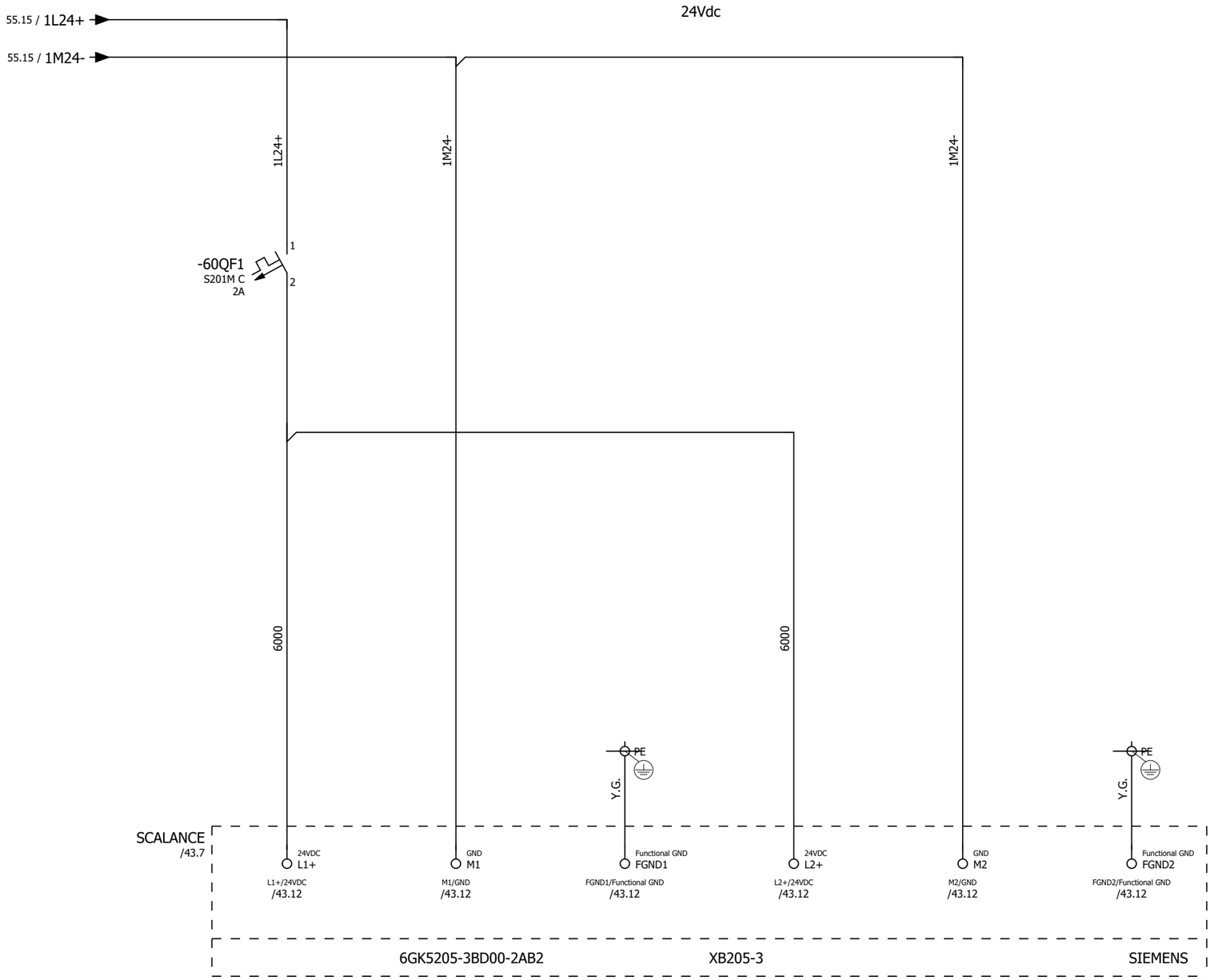
PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
DESCRIPTION: ANALOG INPUT I/O RACK	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	

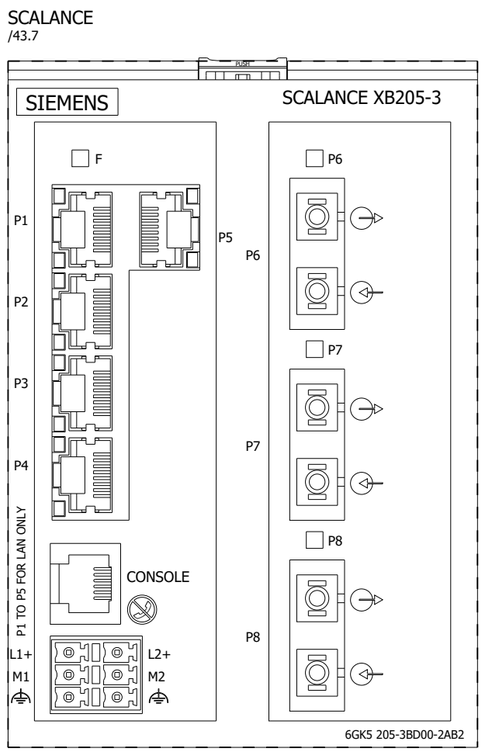
PAGE	NEXT	TOTAL SHEETS
32	33	52



REV.	DATE	PREPARED	REV.	DATE	PREPARED
E	23.01.2025	O.A.			
D	18.11.2024	O.A.			
A	30.05.2024	O.A.			

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
DESCRIPTION: ANALOG INPUT I/O RACK	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	TOTAL SHEETS: 52
			PAGE: 33
			NEXT: 34



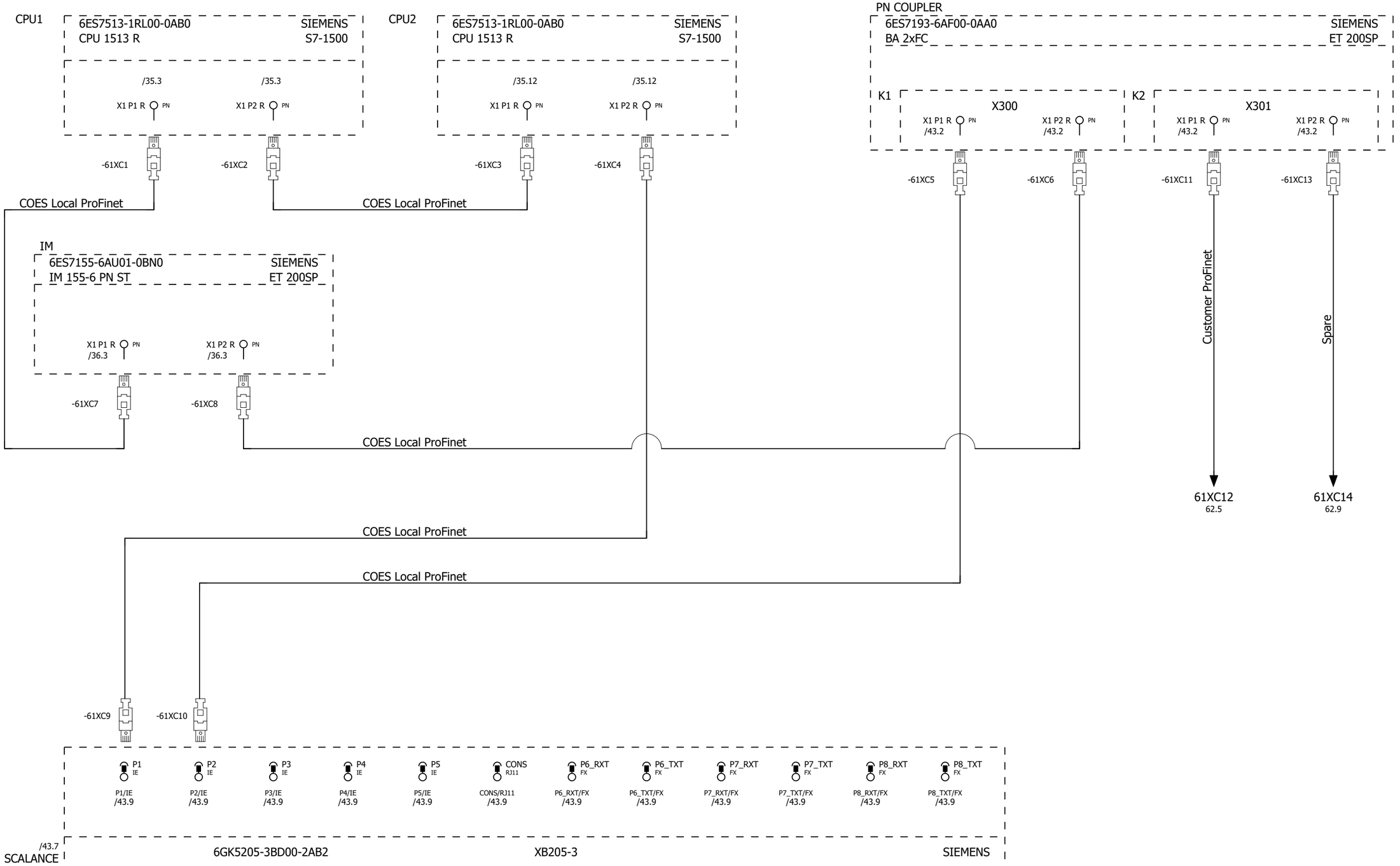


REV.	DATE	PREPARED	REV.	DATE	PREPARED

PLANT
COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM

DESCRIPTION
AUXILIARY CIRCUIT SWTCH 5 PORT PROFINET

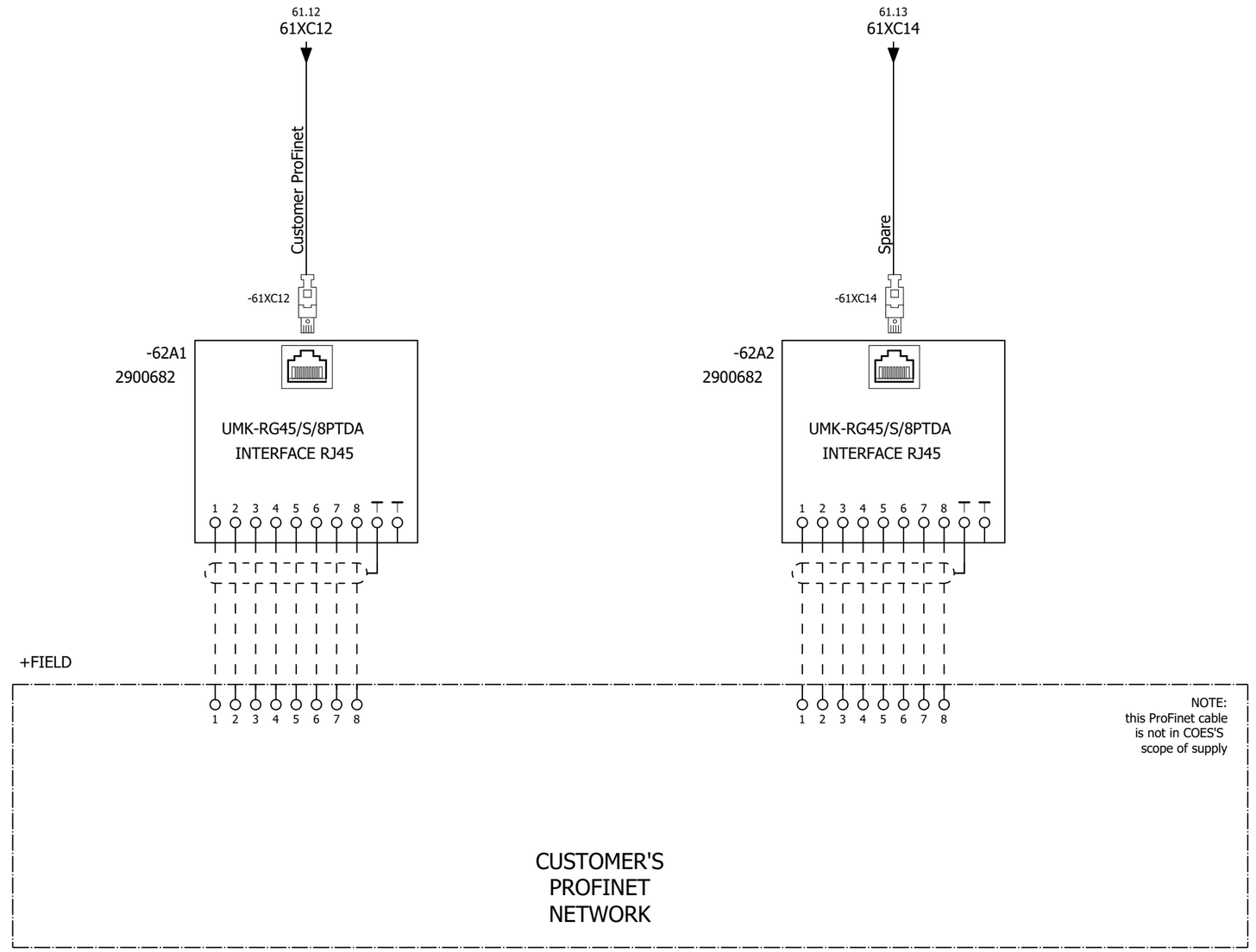
PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= NITROGEN	34
DATE	APPROVED	LOCATION	NEXT
02.05.2024		+ QE	35
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4813_001	d241024-WD		52



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

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: CONNECTION ProfiNet INTERNAL SWITCHBOARD	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	

PAGE	NEXT	TOTAL SHEETS
35	36	52



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

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 36
DESCRIPTION: CONNECTION ProfiNet EXTERNAL SWITCHBOARD	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 37
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

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

TERMINAL STRIP

=NITROGEN+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 NITROGEN - WIRING DIAGRAM	PREPARED ASSOLARI O.	CHECKED TIRABOSCHI T.	PLANT = NITROGEN	PAGE 37
DESCRIPTION TERMINAL BOARD -X1	DATE 02.05.2024	APPROVED	LOCATION + QE	NEXT 38
	WORK ORDER N 2024.4813_001	DRAWING N d241024-WD		TOTAL SHEETS 52

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

TERMINAL STRIP

=NITROGEN+QE-X2

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	TERMINAL JUM: TERM. NUM.	PLANT – DESTIN. DEVICE: CONNECT.	PLANT – DESTIN. DEVICE: DEVICE IDENT. CODE
/21.3	1	-21QF1	L230UPS	WDU 10	-	1		-L
/21.3	3	-21QF1	N230UPS	WDU 10	-	2		-N
/21.4		-PE		WPE 10	-	PE		

REV.	DATE	PREPARED	REV.	DATE	PREPARED

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 38
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 39
DESCRIPTION: TERMINAL BOARD -X2	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

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

TERMINAL STRIP

=NITROGEN+QE-XA

SWITCHBOARD	DESTIN. DEVICE	SHEET AND COLUMN	/22.1	/22.2	/21.14	/22.10	/22.13	/22.13
		CONNECT.			1	13	15/16	14
		DEVICE IDENT. CODE			-21FU2	-22K1	-22KA2	-22KA2
		WIRING			1L24+	1L24+	2211	2212
	TERMINAL JUM	TERM. TYPE	WSI 6	WDU 2.5	WSI 6		WDU 2.5	WDU 2.5
			-	-	-		-	-
		TERM. NUM.	1	2	3		4	5
PLANT	DESTIN. DEVICE	CONNECT.	1	2	A1			
		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 NITROGEN - WIRING DIAGRAM	PREPARED ASSOLARI O.	CHECKED TIRABOSCHI T.	PLANT = NITROGEN	PAGE 39
DESCRIPTION TERMINAL BOARD -XA	DATE 02.05.2024	APPROVED	LOCATION + QE	NEXT 40
	WORK ORDER N 2024.4813_001	DRAWING N d241024-WD		TOTAL SHEETS 52

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

TERMINAL STRIP

=NITROGEN+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-64-ZSH-051		KDKS 1/35 DB	-	1	-45QF1
2	/46.1		+FIELD-64-ZSH-051			-	1	-XDI1
3	/46.2		+FIELD-64-ZSL-051		KDKS 1/35 DB	-		
4	/46.2		+FIELD-64-ZSL-051			-	2	-XDI1
5	/46.4		+FIELD-64-ZSH-052		KDKS 1/35 DB	-		
6	/46.4		+FIELD-64-ZSH-052			-	3	-XDI1
7	/46.6		+FIELD-64-ZSL-052		KDKS 1/35 DB	-		
8	/46.6		+FIELD-64-ZSL-052			-	4	-XDI1
9	/46.8		+FIELD-64-ZSH-053		KDKS 1/35 DB	-		
10	/46.8		+FIELD-64-ZSH-053			-	5	-XDI1
11	/46.10		+FIELD-64-ZSL-053		KDKS 1/35 DB	-		
12	/46.10		+FIELD-64-ZSL-053			-	6	-XDI1
13	/46.12		+FIELD-64-ZSH-054		KDKS 1/35 DB	-		
14	/46.12		+FIELD-64-ZSH-054			-	7	-XDI1
15	/46.14		+FIELD-64-ZSL-054		KDKS 1/35 DB	-		
16	/46.14		+FIELD-64-ZSL-054			-	8	-XDI1
17	/47.1		+FIELD-64-ZSH-055		KDKS 1/35 DB	-		
18	/47.1		+FIELD-64-ZSH-055			-	1	-XDI2
19	/47.2		+FIELD-64-ZSL-055		KDKS 1/35 DB	-		
20	/47.2		+FIELD-64-ZSL-055			-	2	-XDI2
21	/47.4		+FIELD-64-ZSH-056		KDKS 1/35 DB	-		
22	/47.4		+FIELD-64-ZSH-056			-	3	-XDI2
23	/47.6		+FIELD-64-ZSL-056		KDKS 1/35 DB	-		
24	/47.6		+FIELD-64-ZSL-056			-	4	-XDI2
25	/47.8		+FIELD-64-ZSH-057		KDKS 1/35 DB	-		
26	/47.8		+FIELD-64-ZSH-057			-	5	-XDI2
27	/47.10		+FIELD-64-ZSL-057		KDKS 1/35 DB	-		
28	/47.10		+FIELD-64-ZSL-057			-	6	-XDI2
29	/47.12		+FIELD-64-ZSH-058		KDKS 1/35 DB	-		
30	/47.12		+FIELD-64-ZSH-058			-	7	-XDI2
31	/47.14		+FIELD-64-ZSL-058		KDKS 1/35 DB	-		
32	/47.14		+FIELD-64-ZSL-058			-	8	-XDI2
33	/48.1		+FIELD-64-ZSH-059		KDKS 1/35 DB	-		
34	/48.1		+FIELD-64-ZSH-059			-	1	-XDI3
35	/48.2		+FIELD-64-ZSL-059		KDKS 1/35 DB	-		
36	/48.2		+FIELD-64-ZSL-059			-	2	-XDI3
37	/48.4	14	-64-TH-001	4808	KDKS 1/35 DB	-		
38	/48.4	13	-64-TH-001	4802		-	3	-XDI3
39	/48.6	13	-64-HS-001	4809	KDKS 1/35 DB	-		
40	/48.6	14	-64-HS-001	4803		-	4	-XDI3

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

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 40
DESCRIPTION: TERMINAL BOARD -XDI	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 41
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

TERMINAL STRIP

=NITROGEN+QE-XDI

			41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
SWITCHBOARD	DESTIN. DEVICE	SHEET AND COLUMN	/48.8	/48.8	/48.10	/48.10	/48.12	/48.12		/22.10	/49.1	/49.1	/49.2	/49.2	/49.4	/49.4	/49.6	/49.6								
		CONNECT.	21	22	13	14	13	14		14																
		DEVICE IDENT. CODE	-64-HS-002	-64-HS-002	-64-HS-003	-64-HS-003	-64-HS-004	-64-HS-004		-22K1	+FIELD-64-ZSH-060	+FIELD-64-ZSH-060	+FIELD-64-ZSL-060	+FIELD-64-ZSL-060	+FIELD-64-ZSH-061	+FIELD-64-ZSH-061	+FIELD-64-ZSL-061	+FIELD-64-ZSL-061								
		WIRING	4810	4804	4811	4805	4812	4806		22L1+																
	TERMINAL JUM	TERM. TYPE	KDKS 1/35 DB		KDKS 1/35 DB		KDKS 1/35 DB		KDKS 1/35 DB		KDKS 1/35 DB		KDKS 1/35 DB		KDKS 1/35 DB		KDKS 1/35 DB		KDKS 1/35 DB		KDKS 1/35 DB		KDKS 1/35 DB		KDKS 1/35 DB	
			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TERM. NUM.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
PLANT	DESTIN. DEVICE	CONNECT.		5		6		7		8		1		2		3		4		5		6		7	10	8
		DEVICE IDENT. CODE		-XDI3		-XDI3		-XDI3		-XDI3		-XDI4		-XDI4		-XDI4		-XDI4		-XDI4		-XDI4		-XDI4	-XDO	-XDI4

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

PLANT	COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM
DESCRIPTION	TERMINAL BOARD -XDI
PREPARED	ASSOLARI O.
CHECKED	TIRABOSCHI T.
PLANT	= NITROGEN
PAGE	41
DATE	02.05.2024
APPROVED	
LOCATION	+ QE
NEXT	42
WORK ORDER N	2024.4813_001
DRAWING N	d241024-WD
TOTAL SHEETS	52

TERMINAL STRIP

=NITROGEN+QE-XDO

SWITCHBOARD	DESTIN. DEVICE		SHEET AND COLUMN	CONNECT.	DEVICE IDENT. CODE	WIRING	TERMINAL JUM	TERM. TYPE	TERM. NUM.
			/51.1	11	-51KA1	5108		WSI 6	1
			/51.3	11	-51KA2	5110		WSI 6	2
			/51.4	11	-51KA3	5112		WSI 6	3
			/51.6	11	-51KA4	5114		WSI 6	4
			/51.8	11	-51KA5	5116		WSI 6	5
			/51.9	11	-51KA6	5118		WSI 6	6
			/51.11	11	-51KA7	5120		WSI 6	7
			/51.13	11	-51KA8	5122		WSI 6	8
			/52.1	11	-52KA1	5208		WSI 6	9
			/52.3	11	-52KA3	5210		WSI 6	10
			/52.5	11	-52KA4	5212		WSI 6	11
			/52.7					WSI 6	12
			/52.8	14	-52KA5	5215		WDU 2.5	13
			/52.9					WSI 6	14
			/52.10	14	-52KA6	5217		WDU 2.5	15
								WSI 6	16
			/52.10	14	-52KA2	5219		WDU 2.5	17
			/52.12	11	-52KA7	5220		WSI 6	18
			/52.14	11	-52KA8	5222		WSI 6	19
								WSI 6	20
			/53.1	14	-53KA1	5309		WDU 2.5	21
								WSI 6	22
			/53.3	14	-53KA2	5311		WDU 2.5	23
								WSI 6	24
			/53.5	14	-53KA3	5313		WDU 2.5	25
								WSI 6	26
			/53.7	14	-53KA4	5315		WDU 2.5	27
								WSI 6	28
			/53.9	14	-53KA5	5317		WDU 2.5	29
								WSI 6	30
			/53.10	14	-53KA6	5319		WDU 2.5	31
								WSI 6	33
			/53.12	14	-53KA7	5321		WDU 2.5	33
								WSI 6	34
			/53.14	14	-53KA8	5323		WDU 2.5	35
PLANT	DESTIN. DEVICE	DEVICE IDENT. CODE	CONNECT.						
		-22K1	24						
		-XDI	63						
		-XAI	1						
		-52KA5	11						
		-52KA6	11						
		-52KA2	11						
		-53KA1	11						
		-53KA2	11						
		-53KA3	11						
		-53KA4	11						
		-53KA5	11						
		-53KA6	11						
		-53KA7	11						
		-53KA8	11						

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

coes 20th coes 1997 - 2017

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
DESCRIPTION: TERMINAL BOARD -XDO	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	TOTAL SHEETS: 52

TERMINAL STRIP

=NITROGEN+QE-XY

SWITCHBOARD	DESTIN. DEVICE	SHEET AND COLUMN	/51.1	/51.0	/51.2	/51.3		/51.4		/51.6		/51.8		/51.9		/51.11		/51.13	/52.0	/52.2	/52.1	/52.0	/52.2	/52.3	/52.12	/52.5	/52.14	/53.0	/53.2
		CONNECT.	14	A2	A2	14		14		14		14		14		14		14	A2	A2	14	A2	A2	X2	14	X2	14	A2	A2
		DEVICE IDENT. CODE	-51KA1	-51KA1	-51KA2	-51KA2		-51KA3		-51KA4		-51KA5		-51KA6		-51KA7		-51KA8	-52KA1	-52KA2	-52KA1	-52KA1	-52KA2	-64-XL-003	-52KA7	-64-XA-001	-52KA8	-53KA1	-53KA2
		WIRING	5109	1M24-	1M24-	5111		5113		5115		5117		5119		5121		5123	1M24-	1M24-	5209	1M24-	1M24-	1M24-	5221	1M24-	5223	1M24-	1M24-
	TERMINAL JUM	TERM. TYPE	WDU 2.5	WDU 2.5		WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5		WDU 2.5	WDU 2.5			WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5	
			-			-		-		-		-		-		-		-									-		
		TERM. NUM.	1	2		3	4	5	6	7	8	9	10	11	12	13	14	15	16		17	18			19	20	21	22	
PLANT	DESTIN. DEVICE	CONNECT.																											
		DEVICE IDENT. CODE	+FIELD-64-XV-051	+FIELD-64-XV-051		+FIELD-64-XV-052	+FIELD-64-XV-052	+FIELD-64-XV-053	+FIELD-64-XV-053	+FIELD-64-XV-054	+FIELD-64-XV-054	+FIELD-64-XV-055	+FIELD-64-XV-055	+FIELD-64-XV-056	+FIELD-64-XV-056	+FIELD-64-XV-057	+FIELD-64-XV-057	+FIELD-64-XV-058	+FIELD-64-XV-058		+FIELD-64-XV-059	+FIELD-64-XV-059			+FIELD-64-XV-060	+FIELD-64-XV-060	+FIELD-64-XV-061	+FIELD-64-XV-061	

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

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 43
DESCRIPTION: TERMINAL BOARD -XY	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 44
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

TERMINAL STRIP

=NITROGEN+QE-XAI

TERM. NUM.	SWITCHBOARD – DESTIN. DEVICE – SHEET AND COLUMN	SWITCHBOARD – DESTIN. DEVICE – CONNECT.	SWITCHBOARD – DESTIN. DEVICE – DEVICE IDENT. CODE	SWITCHBOARD – WIRING	TERMINAL JUM – TERM. TYPE	PLANT – DESTIN. DEVICE – CONNECT.	PLANT – DESTIN. DEVICE – DEVICE IDENT. CODE
1					KDKS 1/35 DB	11	-XDO
2	/52.5	X2	-64-XA-001	1M24-			
3	/54.1	1	-XAI1	5400	WDU 2.5		
4	/54.1	5	-XAI1	5401	WDU 2.5		
5	/54.2	9	-XAI1	5402	WDU 2.5		+FIELD-64-PT-051
6	/54.2	13	-XAI1	5403	WDU 2.5		+FIELD-64-PT-051
7					KDKS 1/35 DB		
8							
9					WDU 2.5	2	-XAI1
10					WDU 2.5	6	-XAI1
11	/54.6		+FIELD-64-PT-052	0Vdc	WDU 2.5	10	-XAI1
12	/54.6		+FIELD-64-PT-052	0Vdc	WDU 2.5	14	-XAI1
13					KDKS 1/35 DB		
14							
15					WDU 2.5	3	-XAI1
16					WDU 2.5	7	-XAI1
17	/54.10		+FIELD-64-PT-053	0Vdc	WDU 2.5	11	-XAI1
18	/54.10		+FIELD-64-PT-053	0Vdc	WDU 2.5	15	-XAI1
19					KDKS 1/35 DB		
20							
21					WDU 2.5	4	-XAI1
22					WDU 2.5	8	-XAI1
23	/54.14		+FIELD-64-PT-057	0Vdc	WDU 2.5	12	-XAI1
24	/54.14		+FIELD-64-PT-057	0Vdc	WDU 2.5	16	-XAI1
25					KDKS 1/35 DB		
26							
27	/55.1	1	-XAI2	5500	WDU 2.5		
28	/55.1	5	-XAI2	5501	WDU 2.5		
29	/55.2	9	-XAI2	5502	WDU 2.5		+FIELD-64-PT-059
30	/55.2	13	-XAI2	5503	WDU 2.5		+FIELD-64-PT-059
31					KDKS 1/35 DB		
32							
33					WDU 2.5	2	-XAI2
34					WDU 2.5	6	-XAI2
35	/55.6		+FIELD-64-PDIT-056	0Vdc	WDU 2.5	10	-XAI2
36	/55.6		+FIELD-64-PDIT-056	0Vdc	WDU 2.5	14	-XAI2
37					KDKS 1/35 DB		
38							
39					WDU 2.5	3	-XAI2
40					WDU 2.5	7	-XAI2

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

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM

DESCRIPTION: TERMINAL BOARD -XAI

PREPARED	CHECKED	PLANT	PAGE
ASSOLARI O.	TIRABOSCHI T.	= NITROGEN	44
DATE	APPROVED	LOCATION	NEXT
02.05.2024		+ QE	45
WORK ORDER N	DRAWING N		TOTAL SHEETS
2024.4813_001	d241024-WD		52

TERMINAL STRIP

=NITROGEN+QE-XAI

SWITCHBOARD	DESTIN. DEVICE	SHEET AND COLUMN	/55.10	/55.10		/60.3				
		CONNECT.				M1				
		DEVICE IDENT. CODE	+FIELD-64-AT-051	+FIELD-64-AT-051		-SCALANCE				
		WIRING	0Vdc	0Vdc		1M24-				
	TERMINAL JUM	TERM. TYPE	WDU 2.5	WDU 2.5	KDKS 1/35 DB		WDU 2.5	WDU 2.5	WDU 2.5	WDU 2.5
			-	-		-	-	-	-	-
		TERM. NUM.	41	42	43	44	45	46	47	48
PLANT	DESTIN. DEVICE	CONNECT.	11	15	1		4	8	12	16
		DEVICE IDENT. CODE	-XAI2	-XAI2	-60QF1		-XAI2	-XAI2	-XAI2	-XAI2

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

coes 20th 1997 - 2017

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 45
DESCRIPTION: TERMINAL BOARD -XAI	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 46
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

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

TERMINAL STRIP

=NITROGEN+QE-XCOM

			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					-64-XL-004

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

PLANT: COMMAND AND CONTROL SWITCHBOARDS NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN	PAGE: 46
DESCRIPTION: TERMINAL BOARD -XCOM	DATE: 02.05.2024	APPROVED:	LOCATION: + QE	NEXT: 47
	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD		TOTAL SHEETS: 52

COMPONENT LIST

COMPONENT TAG	QUANTITY	DESCRIPTION	ARTICLE CODE	CONSTRUCTOR	SHEET
-64-HS-001	1	Green flush complete pushbutton Ø22 spring return 1NO "unmarked"	SE.XB4BA31	SCHNEIDER	48
-64-HS-002	1	Red flush complete pushbutton Ø22 spring return 1NC "unmarked"	SE.XB4BA42	SCHNEIDER	48
-64-HS-003	1	Blue flush complete pushbutton Ø22 spring return 1NO	SE.XB4BA61	SCHNEIDER	22
-64-HS-003	1	Harmony XB4/XB5 1NO contact	SE.ZBE101	SCHNEIDER	22
-64-HS-004	1	Black selector switch Ø22 2-position stay put 1NO+1NC 600V	SE.XB4BD25	SCHNEIDER	48
-64-SBM-001	1	Red Ø40 Emergency stop, switching off Ø22 latching turn release 2NC+1NO	SE.XB4BS84441	SCHNEIDER	22
-64-SBM-001	1	Round guard for Ø 40 Emergency stop, plastic, yellow, 63.5 mm	SE.ZB4BZ1905	SCHNEIDER	22
-64-TH-001	1	Panel thermostat, 1 contacts NO (-20...+40)°C	FIN.7T.81.0.000.2301	FINDER	48
-64-XA-001	1	Red complete pilot light Ø22 plain lens with integral LED 24V	SE.XB4BVB4	SCHNEIDER	52
-64-XL-001	1	White complete pilot light Ø22 plain lens with integral LED 230...240V	SE.XB4BVM1	SCHNEIDER	20
-64-XL-002	1	White complete pilot light Ø22 plain lens with integral LED 230...240V	SE.XB4BVM1	SCHNEIDER	21
-64-XL-003	1	Green complete pilot light Ø22 plain lens with integral LED 24V	SE.XB4BVB3	SCHNEIDER	52
-64-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
-21FU1	1	FUSE HOLDER 2P 10X38 , 32A 690V	LOV.FB01F2P	LOVATO	21
-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
-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

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 NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: COMPONENT LIST	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	

PAGE	NEXT	TOTAL SHEETS
47	48	52

COMPONENT LIST

COMPONENT TAG	QUANTITY	DESCRIPTION	ARTICLE CODE	CONSTRUCTOR	SHEET
-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
-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

COMPONENT LIST

COMPONENT TAG	QUANTITY	DESCRIPTION	ARTICLE CODE	CONSTRUCTOR	SHEET
-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
-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

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 NITROGEN - WIRING DIAGRAM	PREPARED: ASSOLARI O.	CHECKED: TIRABOSCHI T.	PLANT: = NITROGEN
	DATE: 02.05.2024	APPROVED:	LOCATION: + QE
DESCRIPTION: COMPONENT LIST	WORK ORDER N: 2024.4813_001	DRAWING N: d241024-WD	

COMPONENT LIST

COMPONENT TAG	QUANTITY	DESCRIPTION	ARTICLE CODE	CONSTRUCTOR	SHEET
-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
-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

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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
F.MURA	29-07-2025

Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE A-64000

PACKAGE CAUSE EFFECT MATRIX /LOGIC DIAGRAMS

Document Number: 1724000437-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

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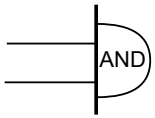
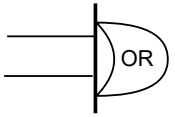
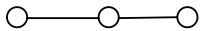
CUSTOMER	END USER
R ROSETTI MARINO	CROSSWIND

DOCUMENT NUMBER:
"64-LP-001 LOGIC DIAGRAM"

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

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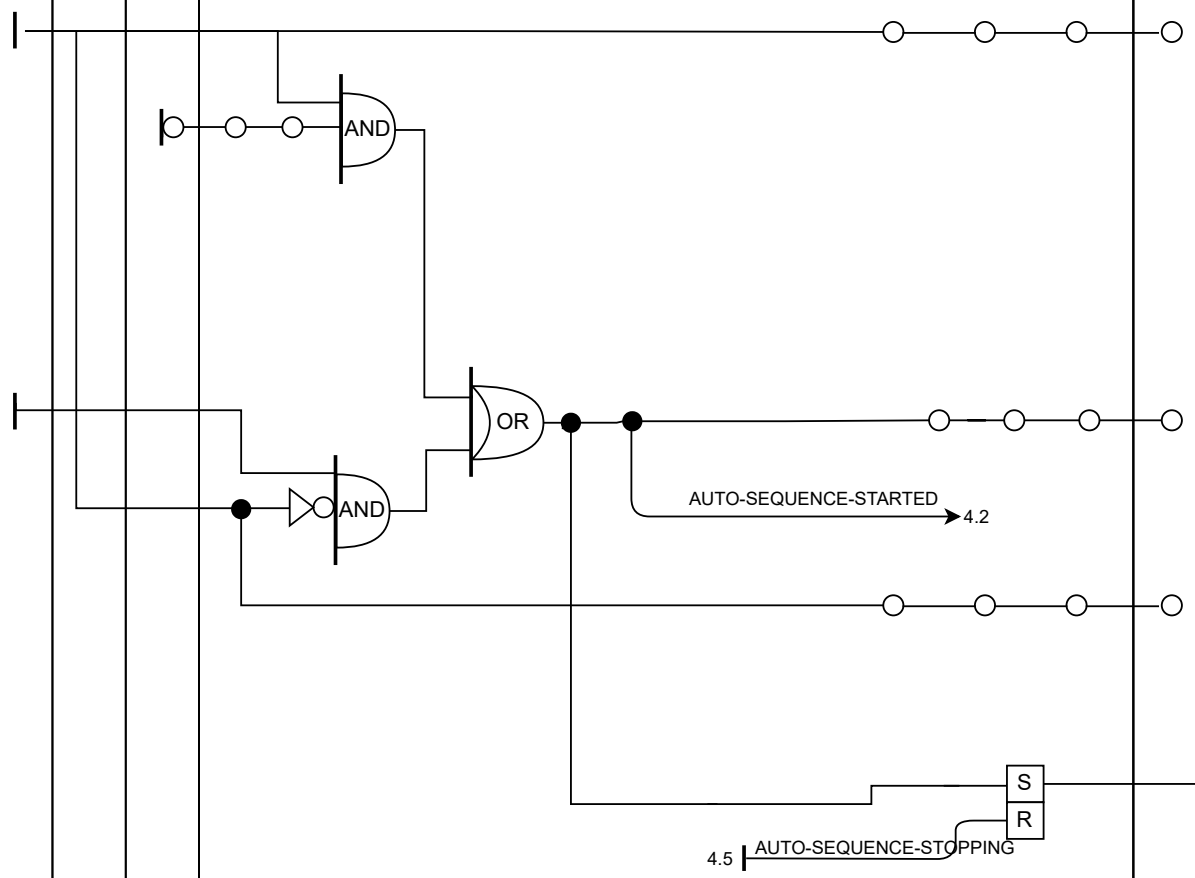
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SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	LOGIC GATE: "AND" INPUT A B / OUTPUT Q: 0 0 0; 0 1 0; 1 0 0; 1 1 1		LOGIC GATE: "OR" INPUT A B / OUTPUT Q: 0 0 0; 0 1 1; 1 0 1; 1 1 1
	LOGIC GATE: "NOT" INPUT A / OUTPUT Q: 0 1; 1 0	LOGIC CONTROL FOR VALVES (with 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		

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		R. BERETTA	R. MANZONI	R. MANZONI	3		9

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INPUTS					PLC SEQUENCE MODE	OUTPUTS				
DESCRIPTION	FIELD		LCP	PCS		PCS	LCP	FIELD		DESCRIPTION
64-HS-004 LOCAL REMOTE SELECTOR STATUS 0=LOCAL 1=REMOTE										THE PACKAGE WORKS ONLY IN REMOTE 64-PLANT-LOCA-REM
START SIGNAL FROM 64-START-PLANT-CMD 0=NO ACT 1=START										
64 -HS-001 LCP START PUSHBUTTON 0=NO_ACT; 1=START										AUTOMATIC SEQUENCE STARTED 64-XL-003-DCS NITROGEN GENERATOR RUNNING (TO DCS)
										THE PACKAGE WORKS ONLY IN LOCAL 64-PLANT-LOCA-REM
										64-XL-003 LCP RUNNING STATUS LAMP

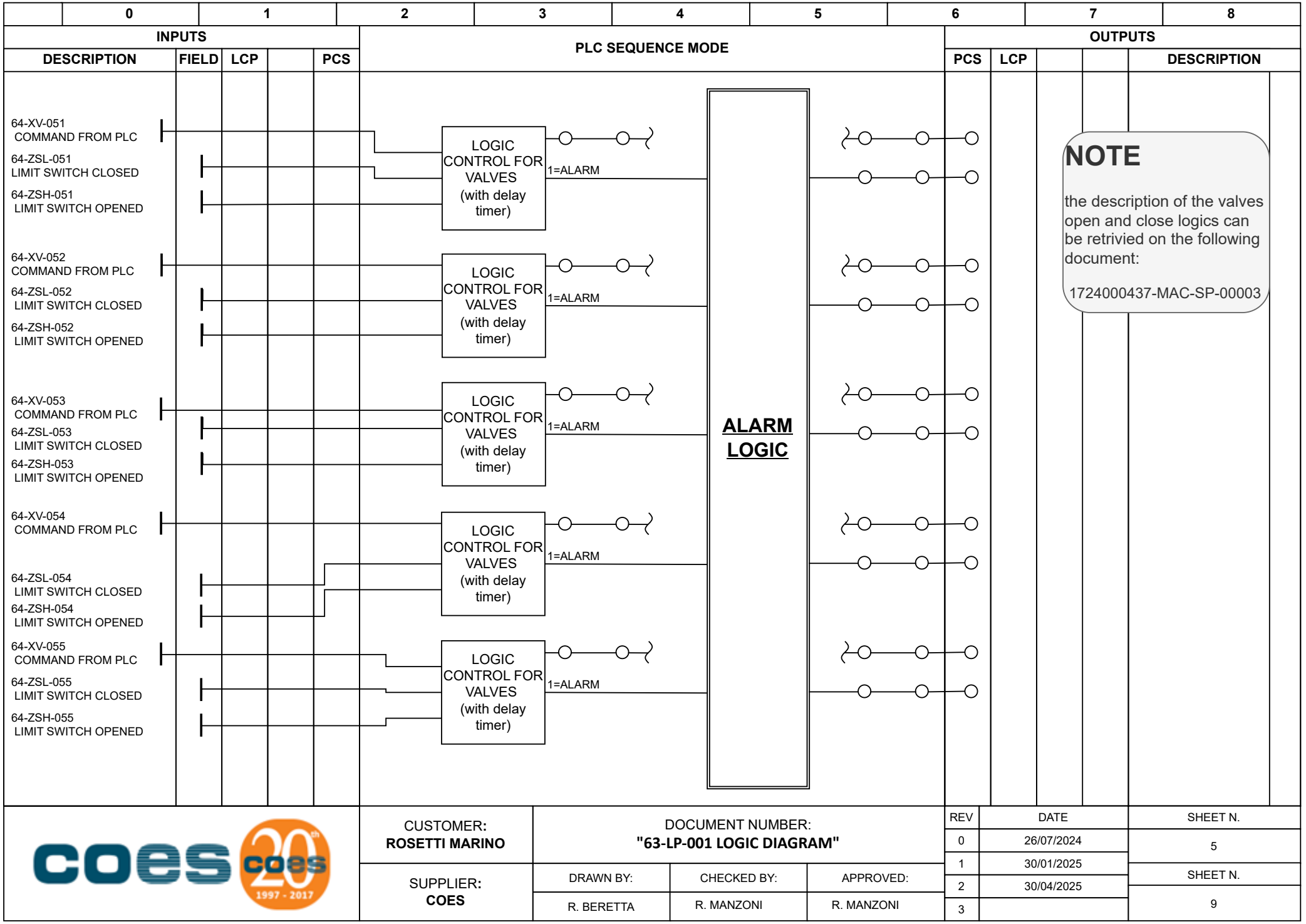


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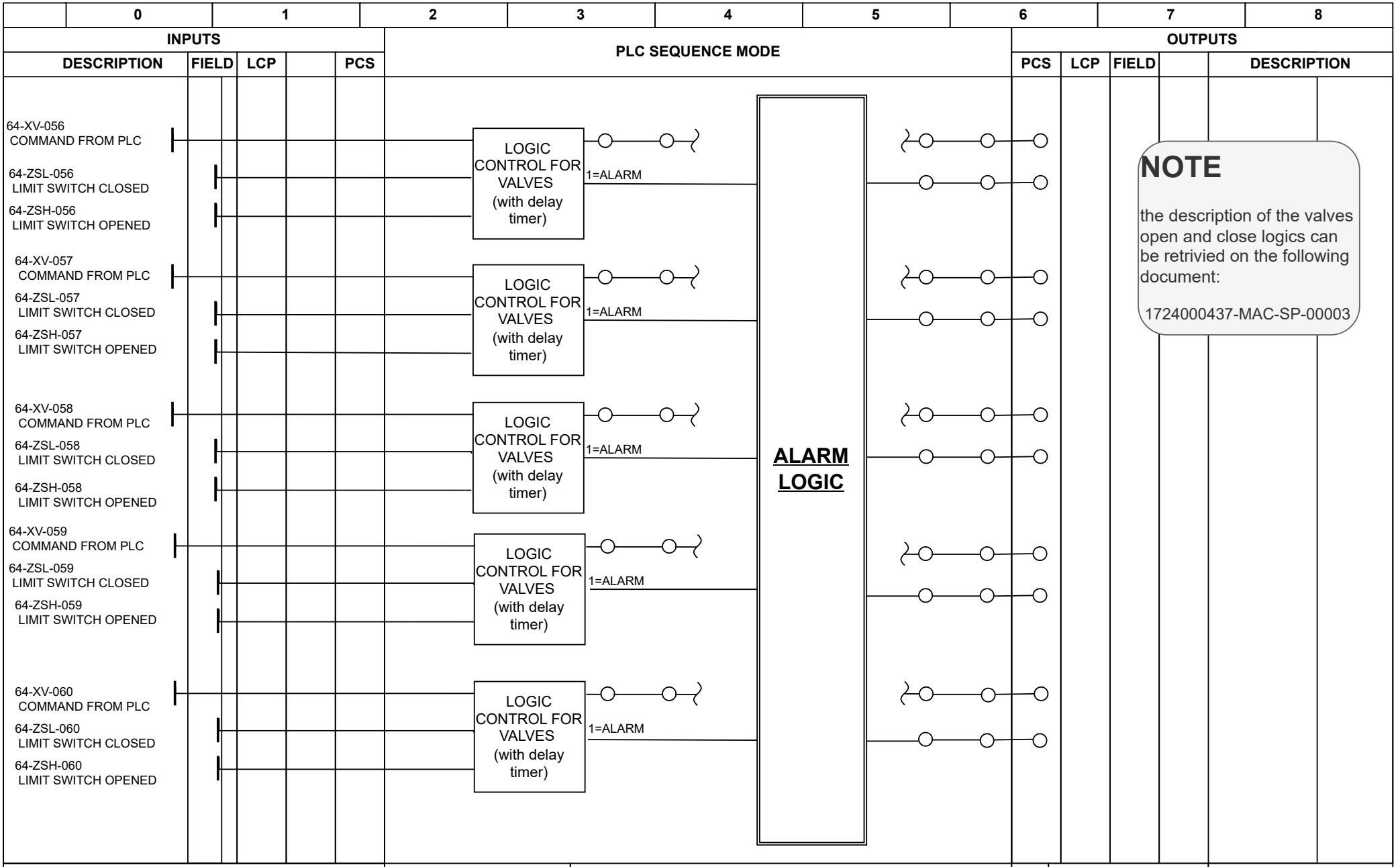
INPUTS					PLC SEQUENCE MODE	OUTPUTS				
DESCRIPTION	FIELD	LCP	SIS	PCS		PCS	LCP	FIELD	SIS	DESCRIPTION
64-XS-001 SHUT-DOWN COMMAND FROM SIS (0= Fault) (NOT DIRECTLY CONNECTED TO PLC)					NOTE: THIS LOGIC "OR" IS NOT INSIDE THE PLC BUT IS MADE BY A SIL SAFETY RELAY.					SHUTDOWN ALARM FROM SIS 64-ESD-01 (0=FAULT) (CONNECTED TO PLC)
64-SBM-001 LCB-EMERGENCY PUHSBUTTON 0=EMERGENCY 1=NO ACT (NOT DIRECTLY CONNECTED TO PLC)										CUMULATIVE CRITICAL ALARM TO SIS 64-XA-003 (0=FAULT) (CONNECTED TO PLC)
STOP SIGNAL FROM 64-STOP-PLANT-CMD 0= STOP 1= NO ACT					3.4 AUTO-SEQUENCE-STARTED					
64-HS-002 LCP STOP PUSHBUTTON 0=STOP; 1=NO ACT					OR, AND AUTO-SEQUENCE-STOPPING 3.5					
SHUTDOWN ALARM FROM SIS 64-ESD-01 (0=FAULT) (CONNECTED TO PLC)					OR					64-XA-001 LCP GENERAL ALARM LAMP
AT LEAST 1 ALARM PRESENT IN THE SYSTEM 0 = OK; 1 = ALARM										64-ALARM-PLANT NITROGEN GENERATOR ALARM (TO DCS)

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	SUPPLIER: **COES**	DRAWN BY: R. BERETTA	CHECKED BY: R. MANZONI	APPROVED: R. MANZONI	SHEET N. 4 SHEET N. 9



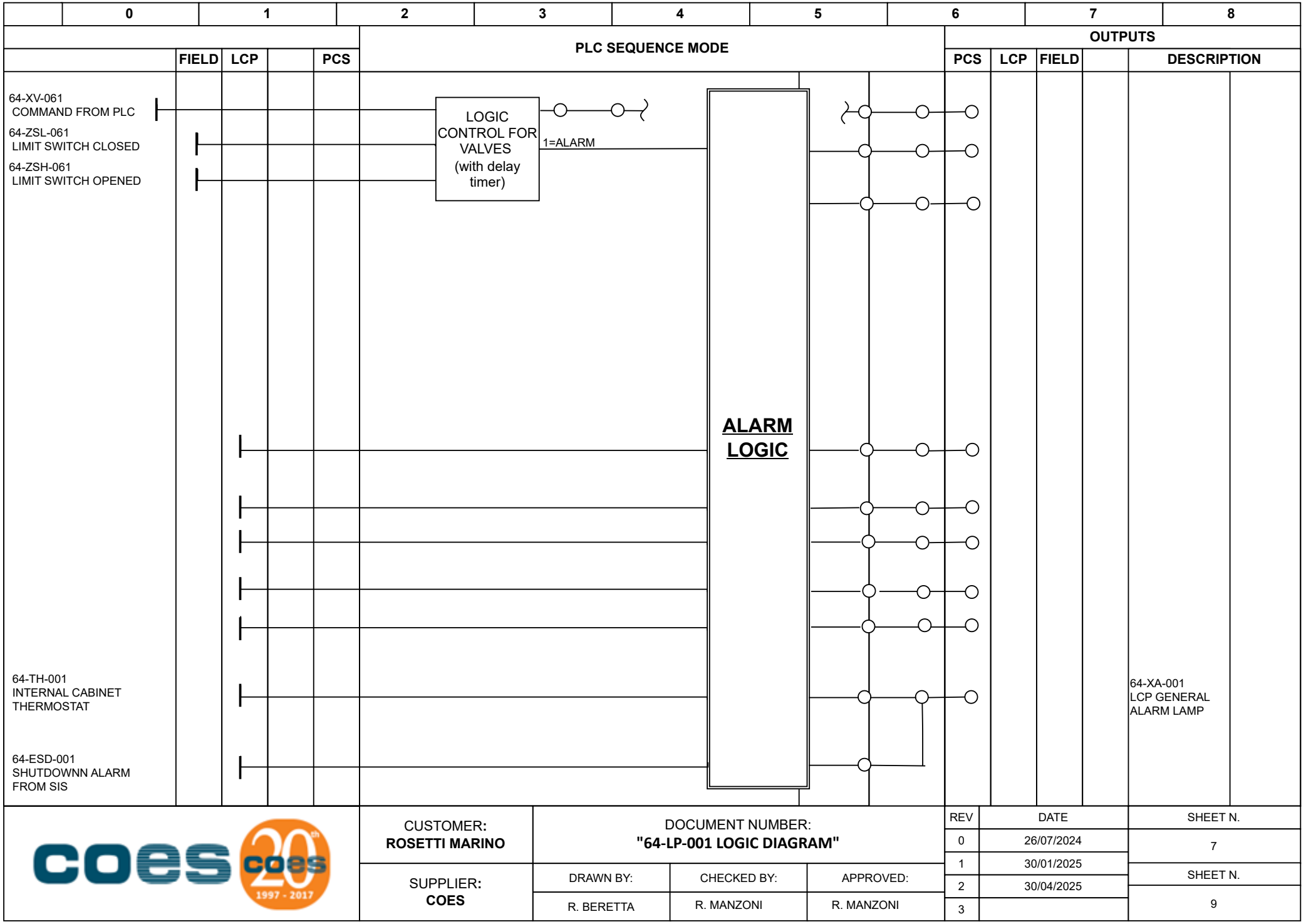
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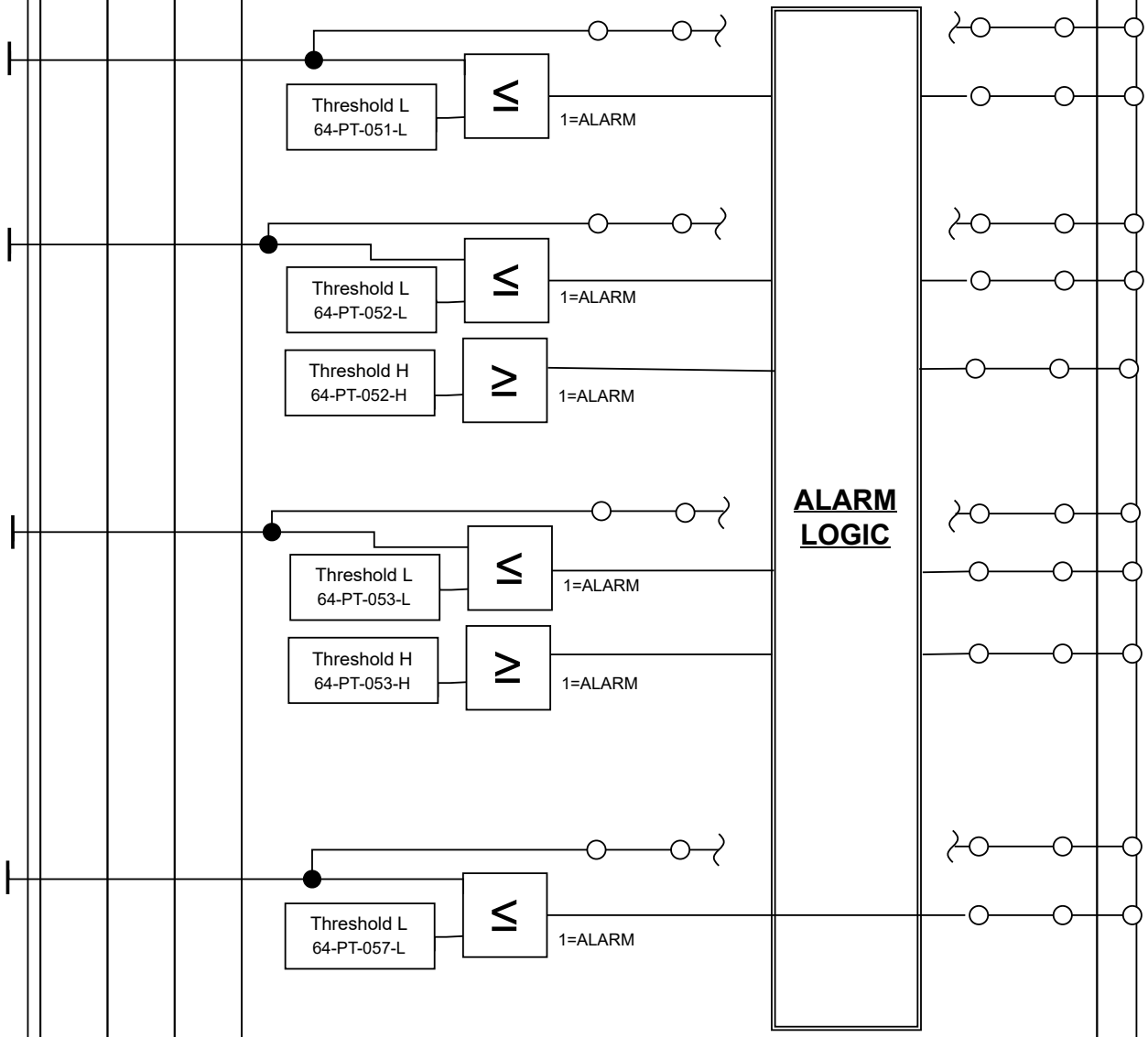
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INPUTS

DESCRIPTION	FIELD	LCP		PCS
64-PT-051 INLET PRESSURE TRANSMITTER				
64-PT-052 TOWER 1 PRESSURE TRANSMITTER				
64-PT-053 TOWER 2 PRESSURE TRANSMITTER				
64-PT-057 OUTLET B PRESSURE TRANSMITTER				

PLC SEQUENCE MODE



OUTPUTS

PCS	LCP	FIELD		DESCRIPTION
				64-PT-051 INLET PRESSURE TRANSMITTER VALUE
				64-PT-0051 ALARM L SIGNAL
				64-PT-052 TOWER 1 PRESSURE TRANSMITTER VALUE
				64-PT-052 ALARM L SIGNAL
				64-PT-052 ALARM H SIGNAL
				64-PT-053 TOWER 2 PRESSURE TRANSMITTER VALUE
				64-PT-053 ALARM L SIGNAL
				64-PT-053 ALARM H SIGNAL
				64-PT-057 OUTLET B PRESSURE TRANSMITTER VALUE
				64-PT-057 ALARM L SIGNAL

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CUSTOMER:
ROSETTI MARINO

SUPPLIER:
COES

DOCUMENT NUMBER:
"64-LP-001 LOGIC DIAGRAM"

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8

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
64-PT-059 PRESSURE TRANSMITTER NITROGEN RECEIVER					Threshold L 64-PT-059-L ≤ 1=ALARM					64-PT-059 PRESSURE TRANSMITTER NITROGEN RECEIVER VALUE
										64-PT-059 ALARM L SIGNAL
64-PDIT-056 DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS					Threshold H 64-PDIT-056-H ≥ 1=ALARM					64-PDIT-056 DIFFERENTIAL PRESSURE TRANSMITTER OUTLET FILTERS VALUE
										64-PDIT-056 ALARM H SIGNAL
64-AT-051 OXYGEN ANALYZER TRANSMITTER					Threshold H 64-AT-051-H ≥ 1=ALARM					64-AT-051 OXYGEN ANALUZER TRANSMITTER VALUE
					Threshold HH 64-AT-051-HH ≥ 1=ALARM					64-AT-051 ALARM H SIGNAL
										64-AT-051 ALARM HH SIGNAL

ALARM LOGIC

NOTE

the description of the logic related to the oxygen level can be retrivied on the following document:

1724000437-MAC-SP-00003

CUSTOMER: **ROSETTI MARINO**	DOCUMENT NUMBER: **"64-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	9
1	30/01/2025	SHEET N.
2	30/04/2025	9
3		

Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE A-64000
PACKAGE STRUCTURAL CALCULATION REPORT
INCLUDING FIXING POINTS and LIFTING POINTS

Document Number: 1724000437-ST-RE-00010

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1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
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4	APPROVAL NOT REQUIRED

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Sign	Date
Giuseppe Cavallo	14/01/25

Document Class: 3

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Rev.	Date	Description	Prepared	Reviewed	Approved

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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.

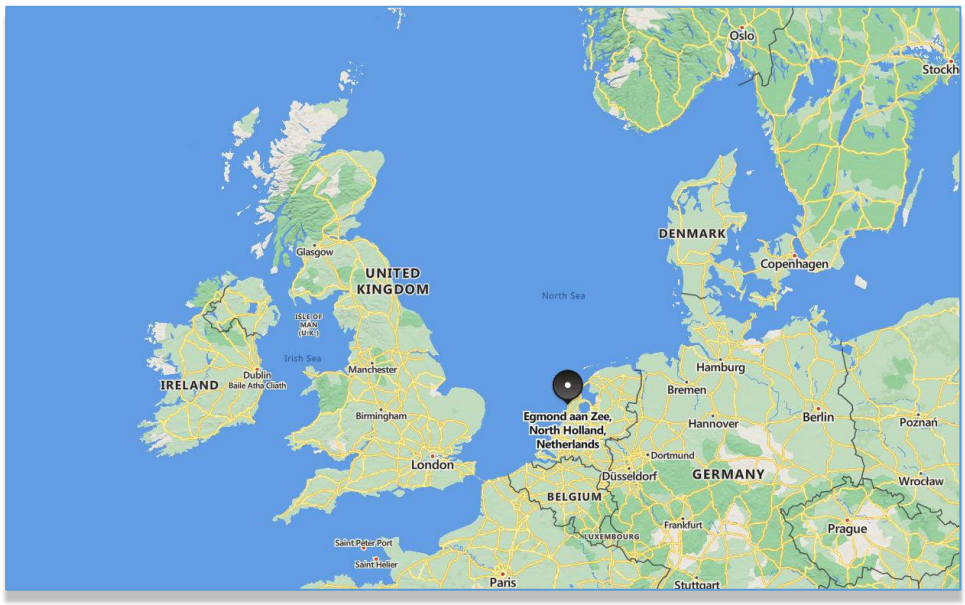


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

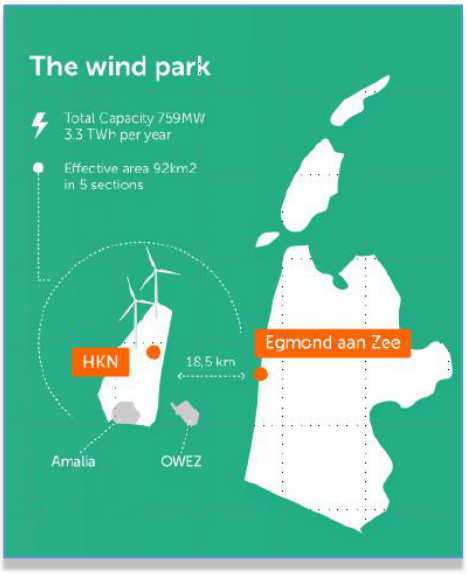


Figure 2 - Wind Park Details

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.

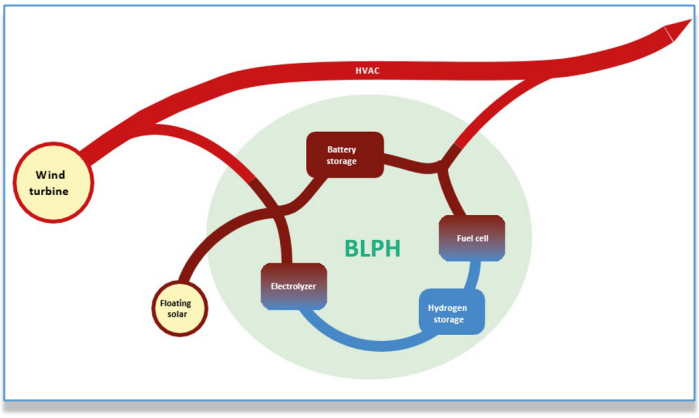


Figure 3 – BLPH Concept

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
1724000437-PR-PID-00018	PACKAGE P&ID
1724000437-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 nitrogen generation package 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:

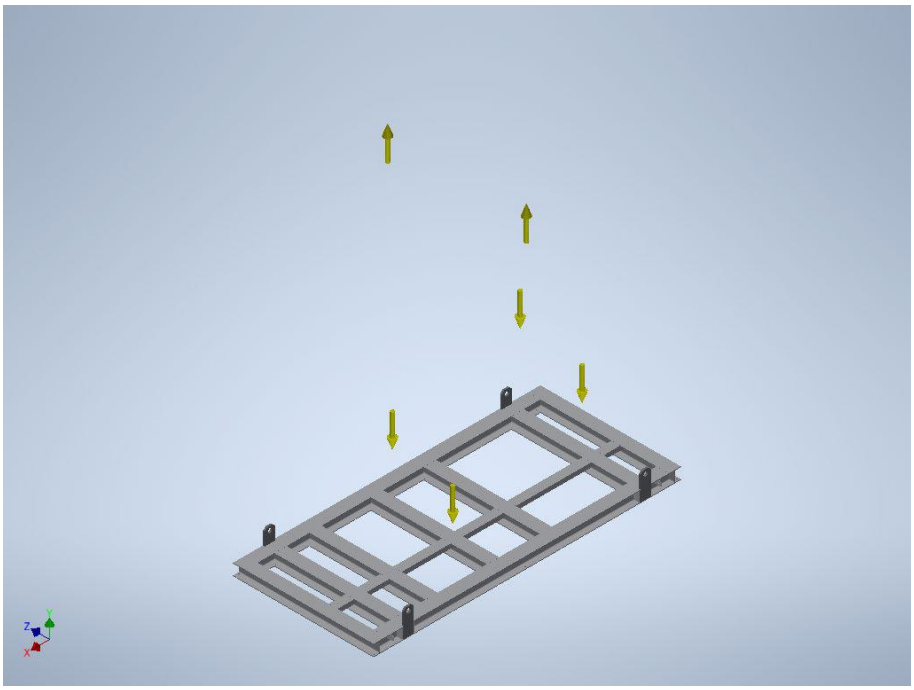
Item	Weight (kg)	Weight (N)
PSA	2500	24525
Filter group	250	2452,5
Control Panel (UCP)	350	3433,5
Baseframe	800	7848
TOTAL (including piping and valves)	5000	49050

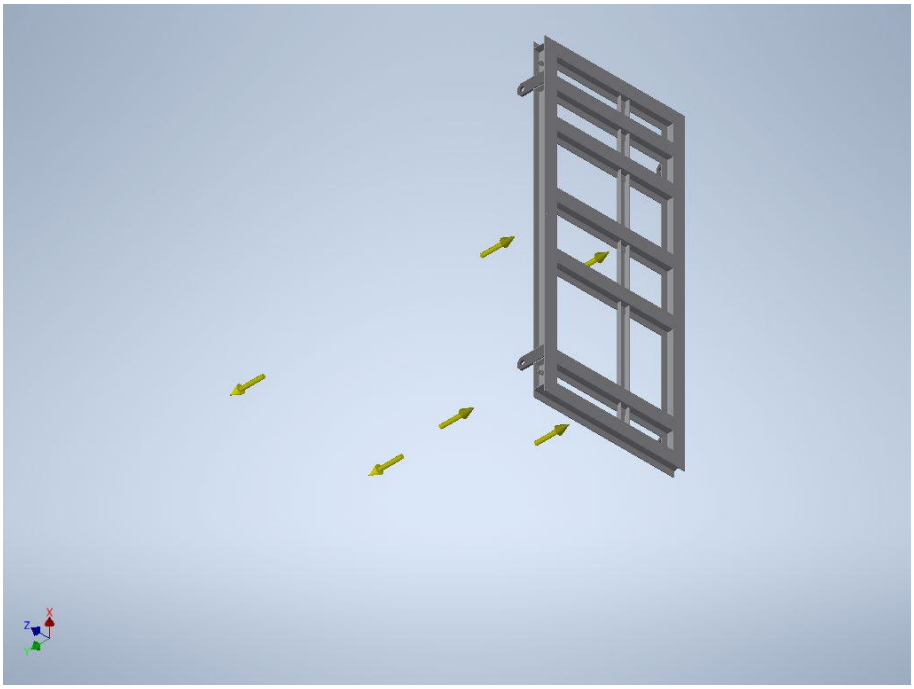
Each load has been applied as concentrated in each center of gravity.

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

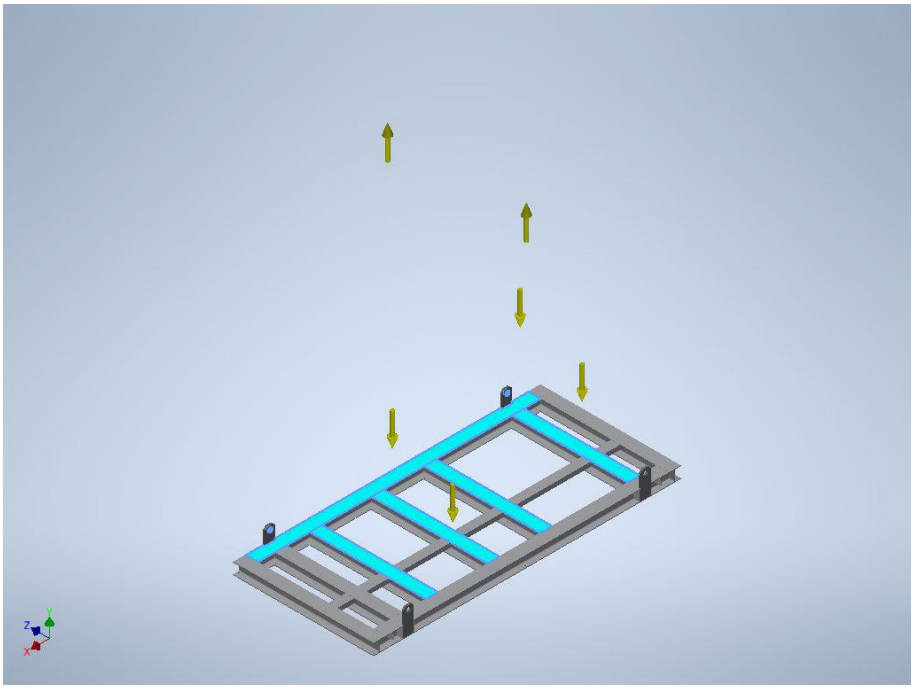
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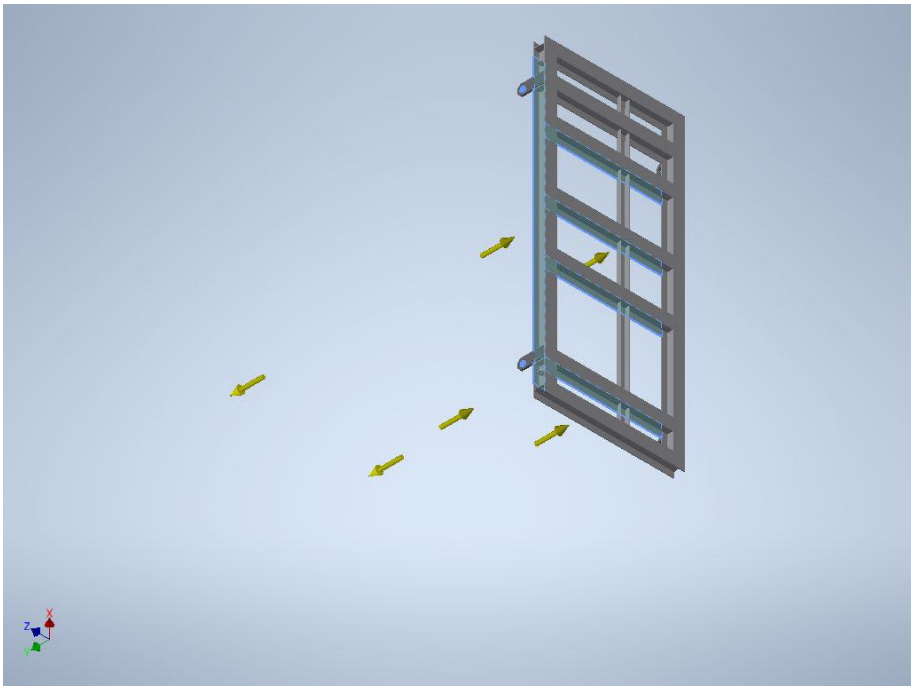
Gravity



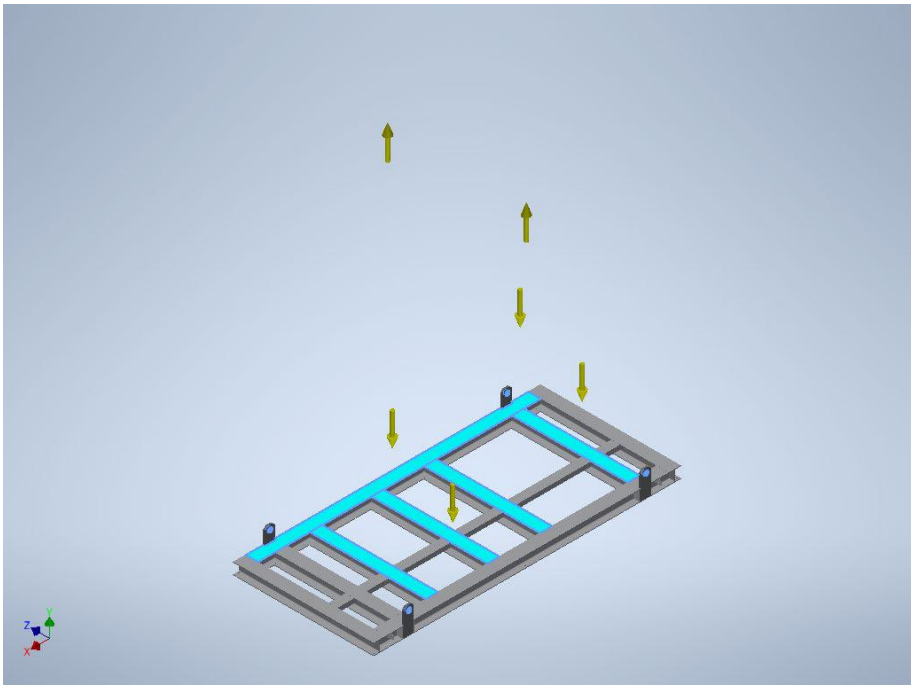


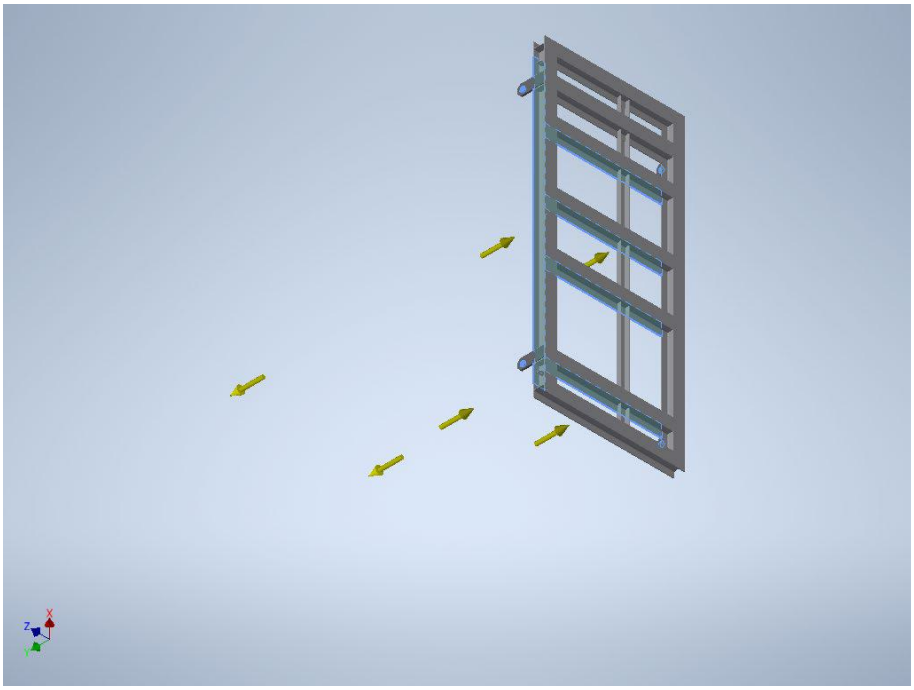
Lifting load_1 (applied according to the lifting sketch)



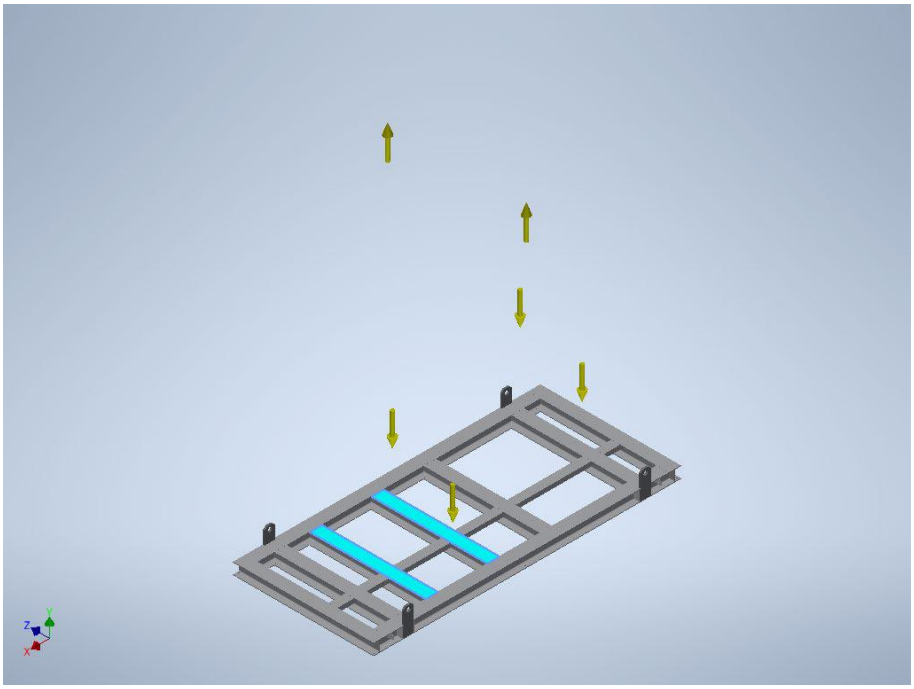


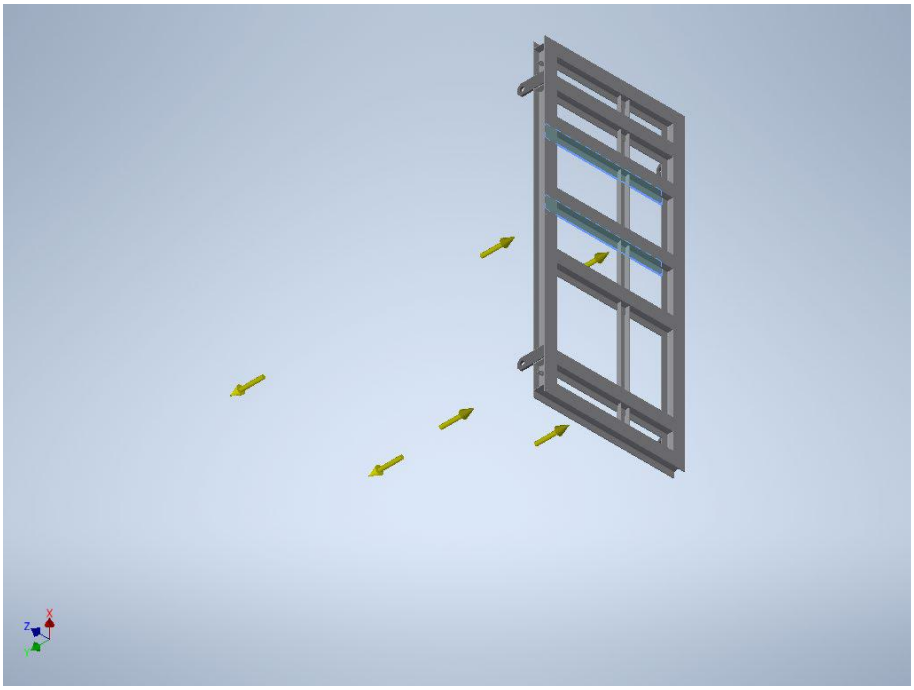
Lifting load_2 (applied according to the lifting sketch)



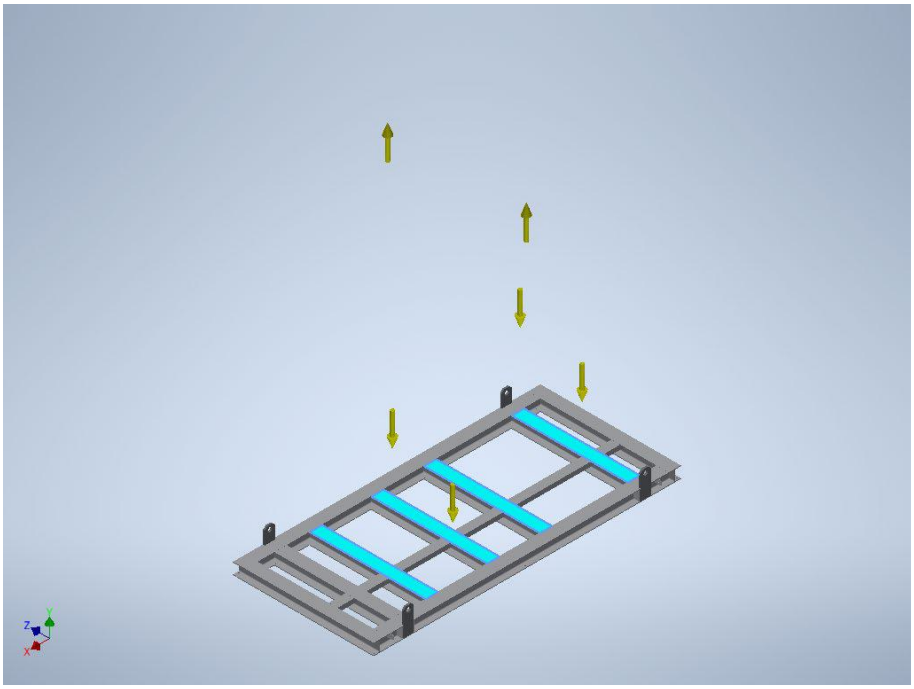


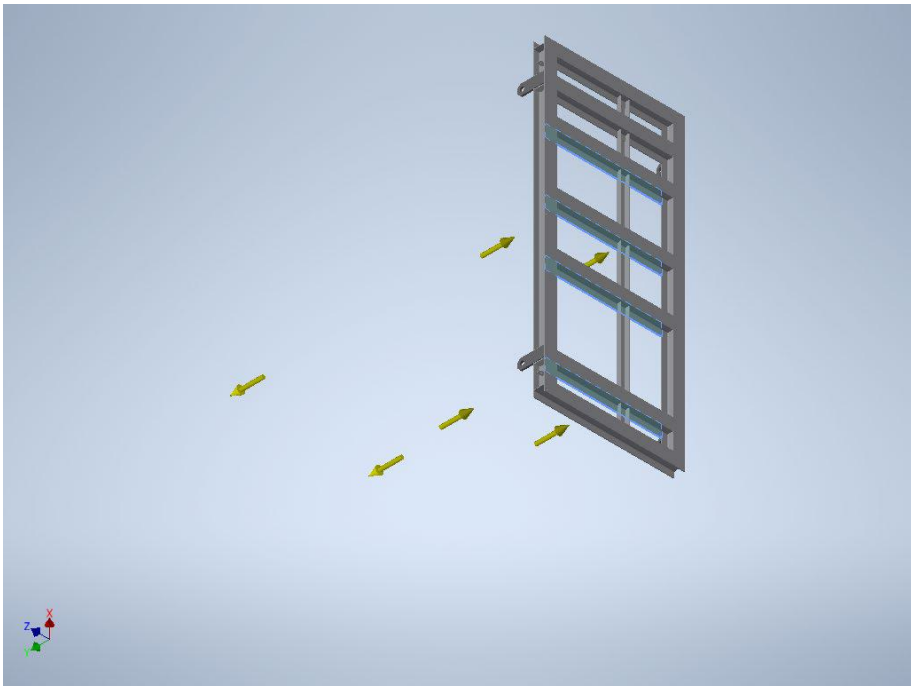
PSA



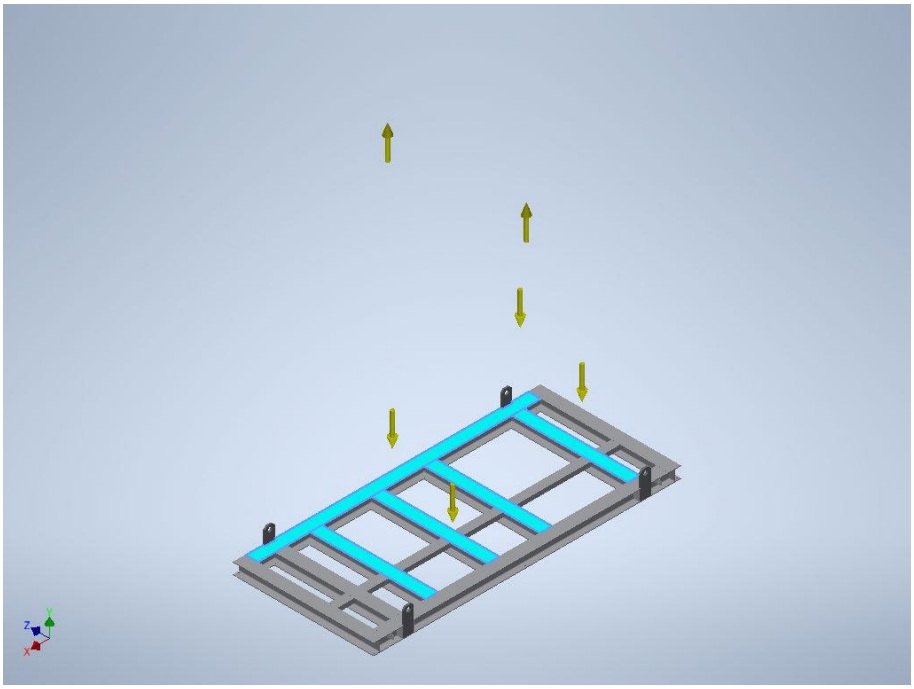


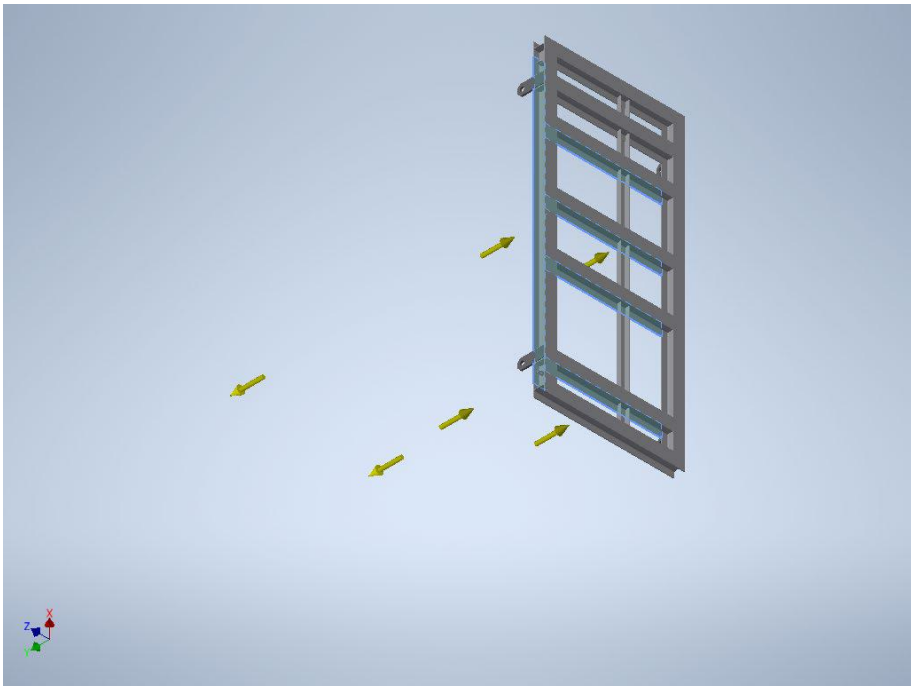
Filter group



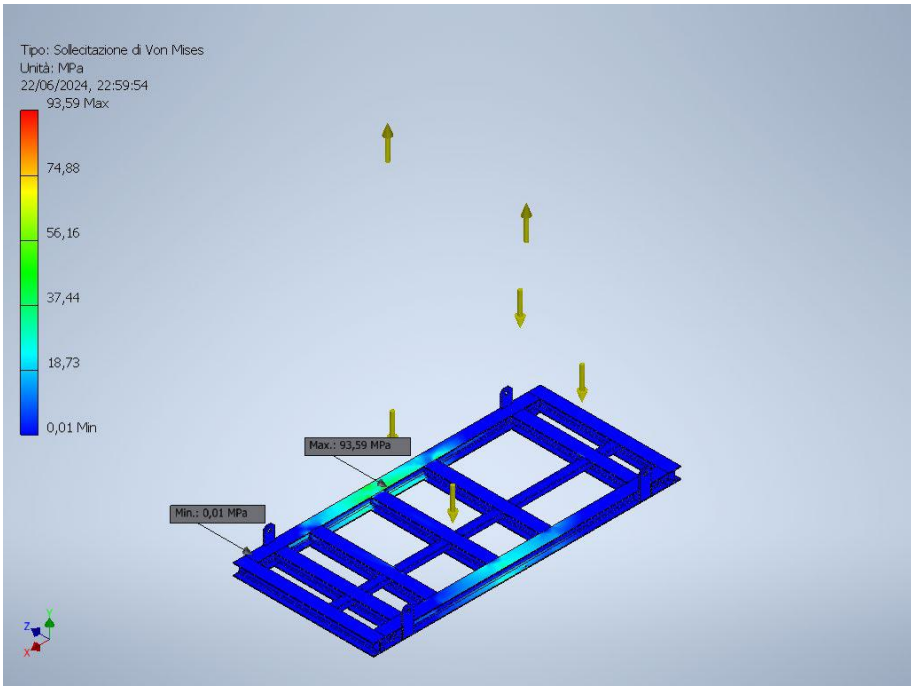


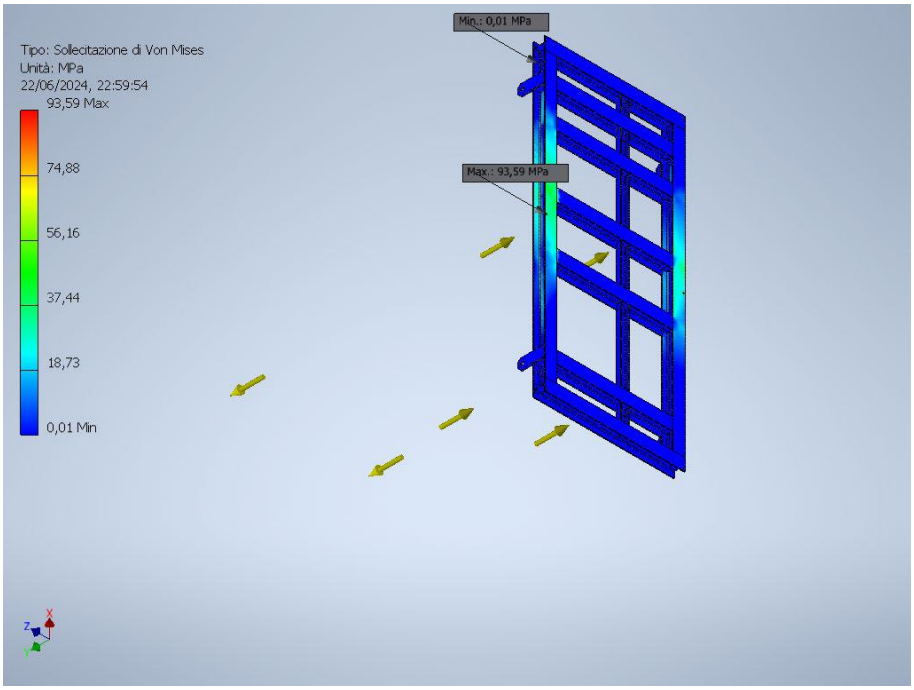
Local Control Panel (LCP)



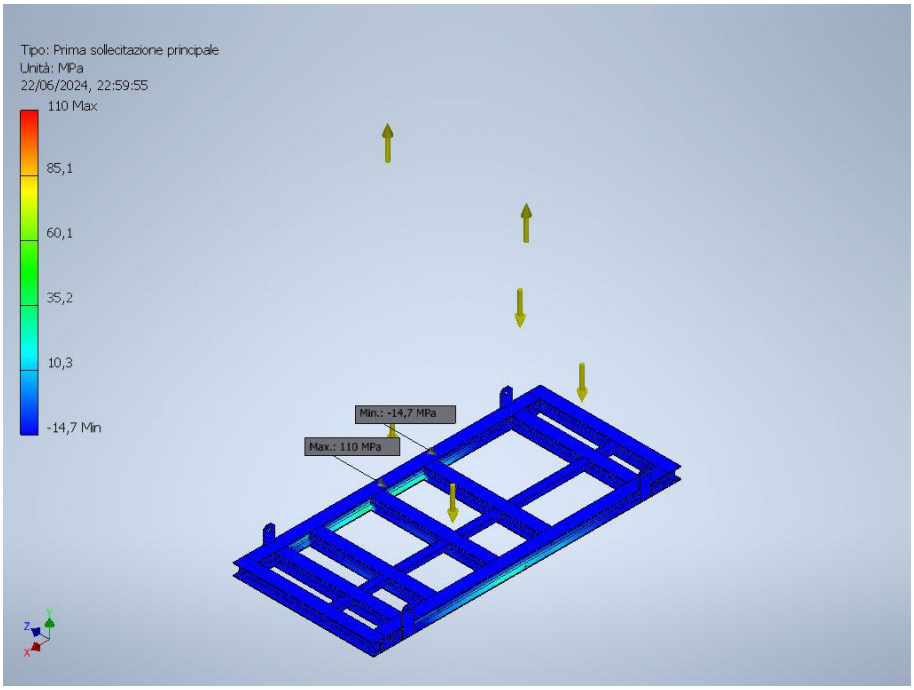


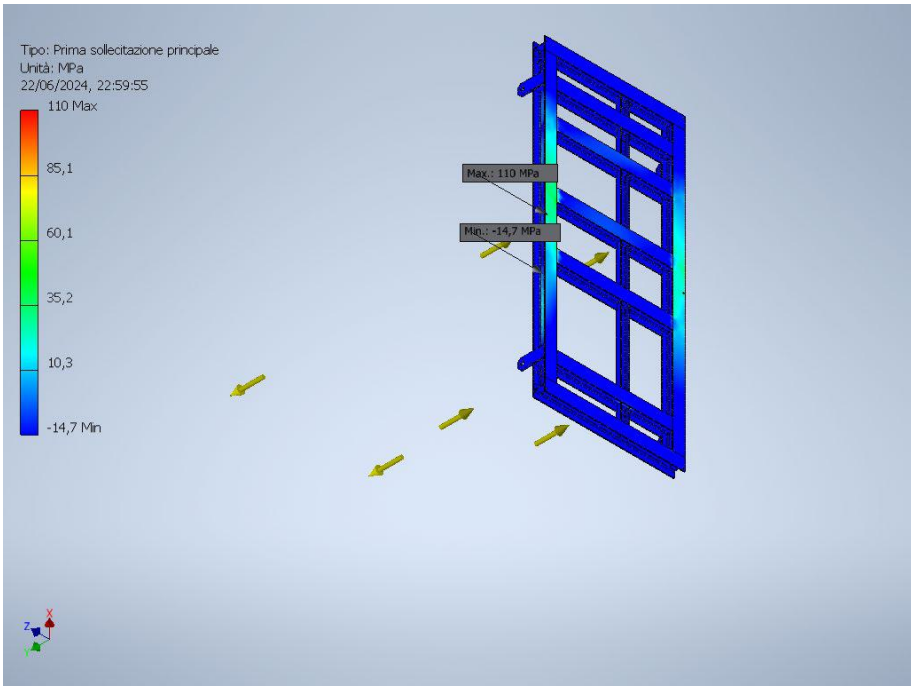
Von Mises stress



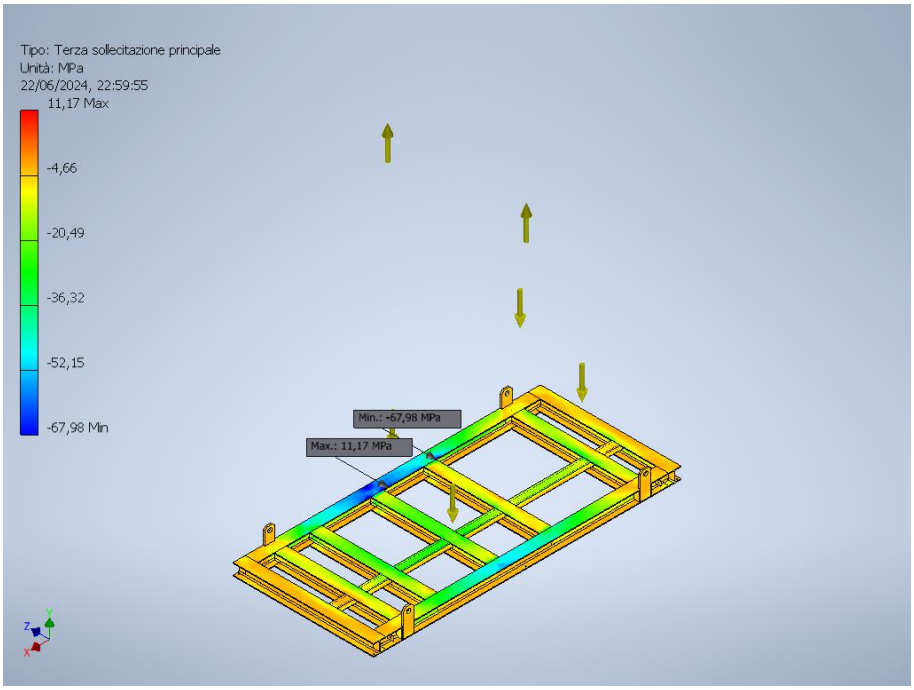


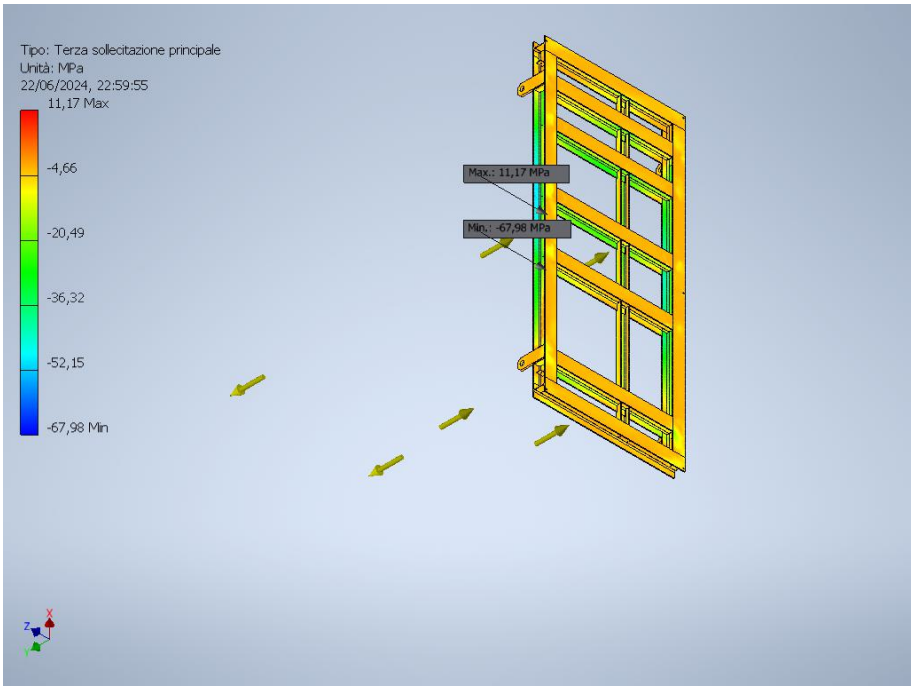
First principal stress



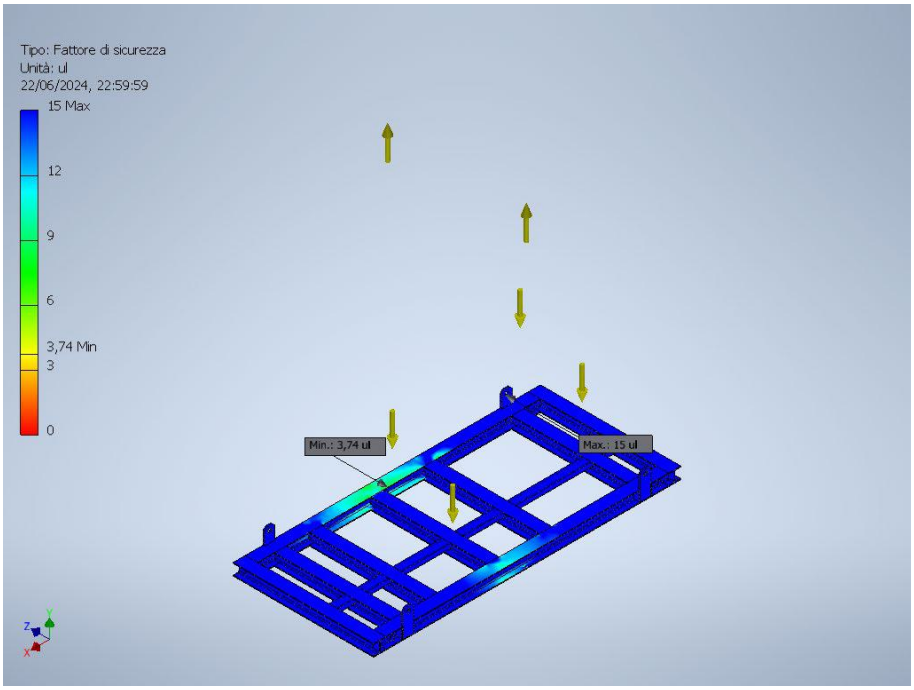


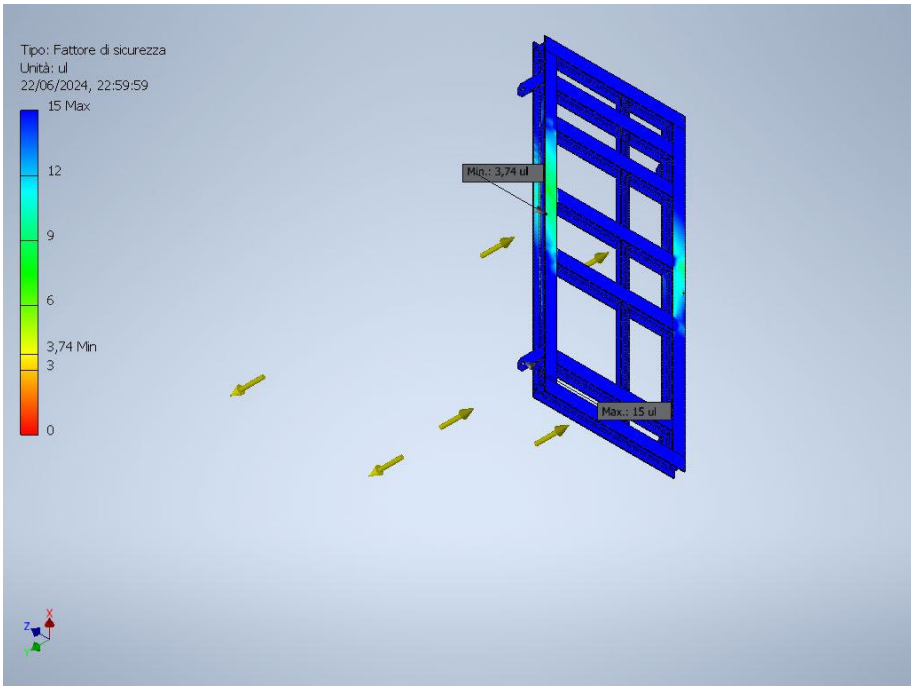
Third principal stress





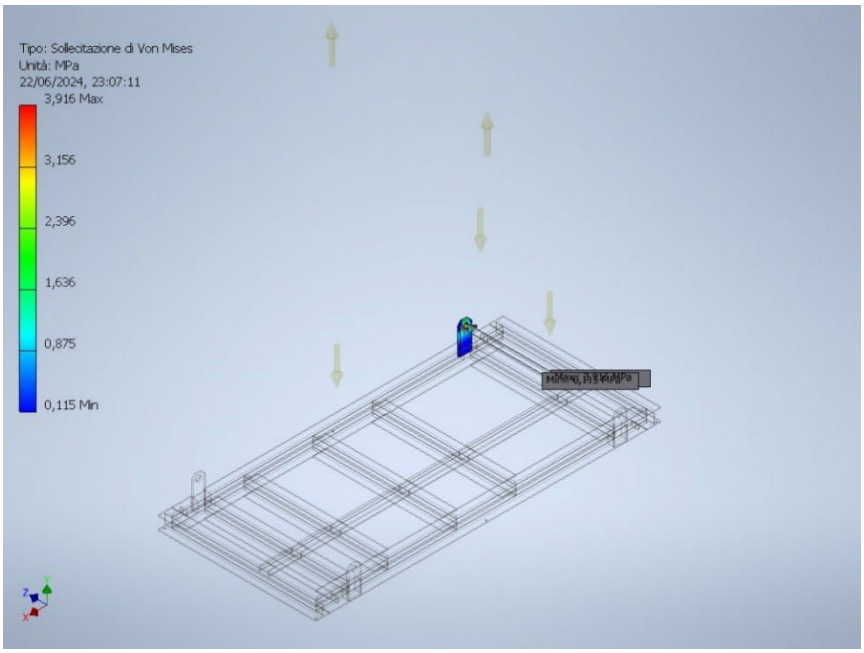
Safety factor

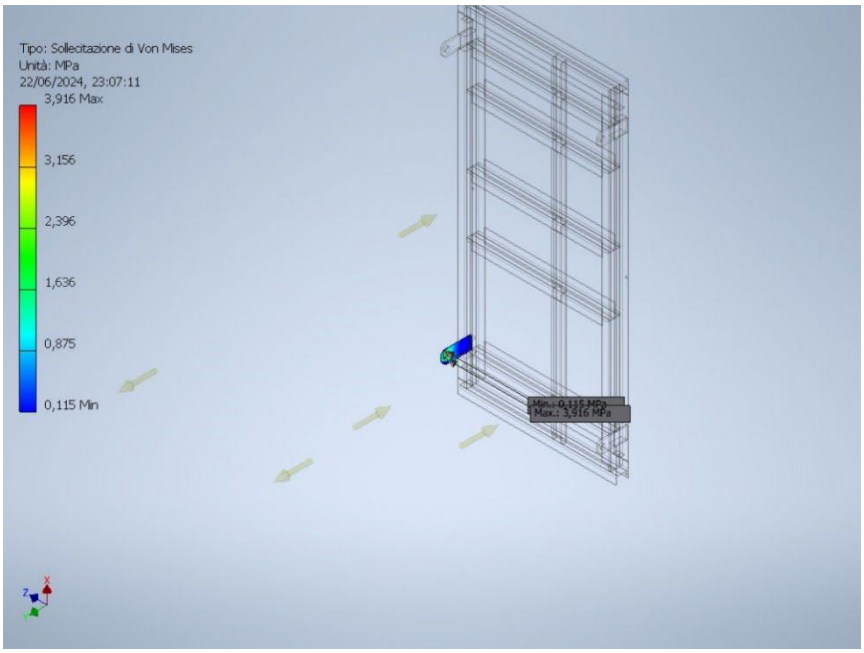




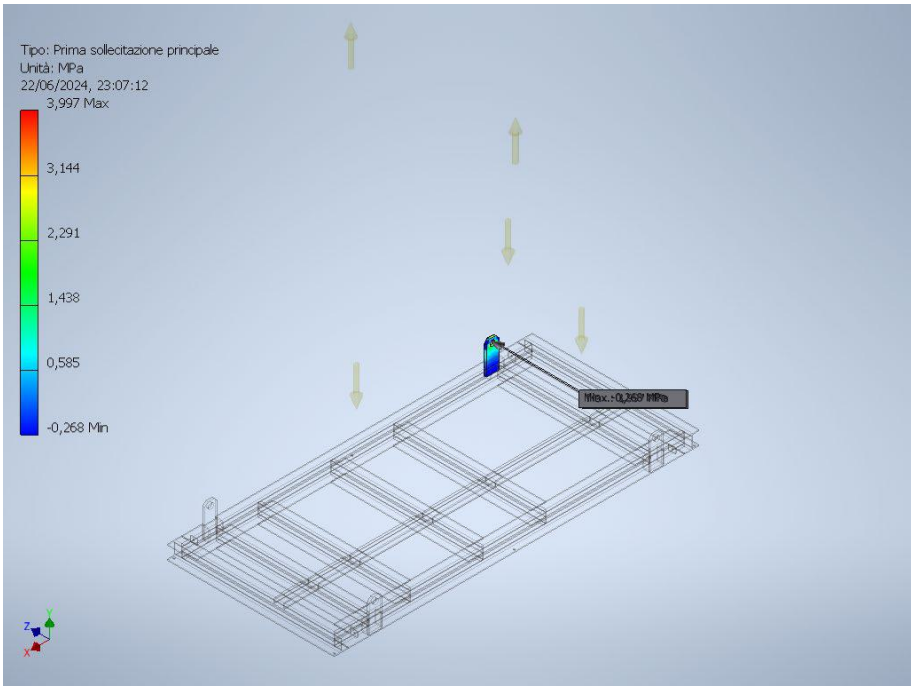
3.4 PADEYE ANALYSIS

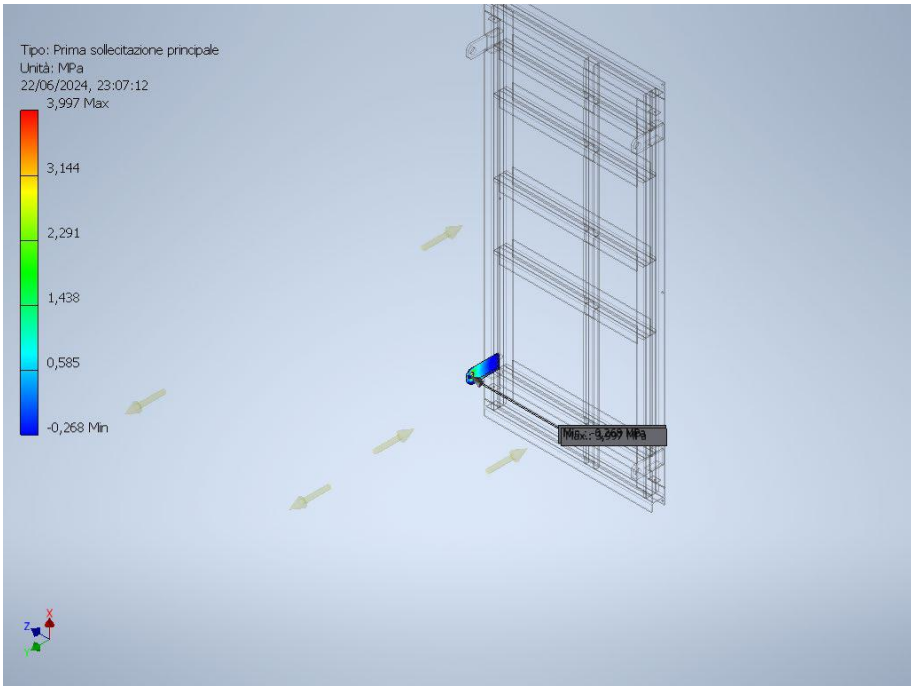
Von Mises stress



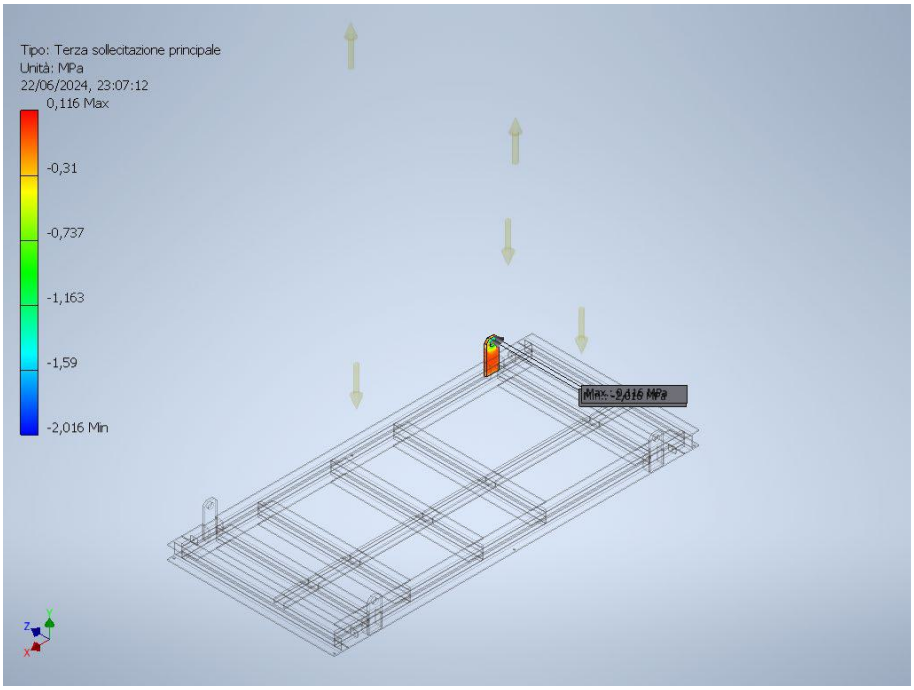


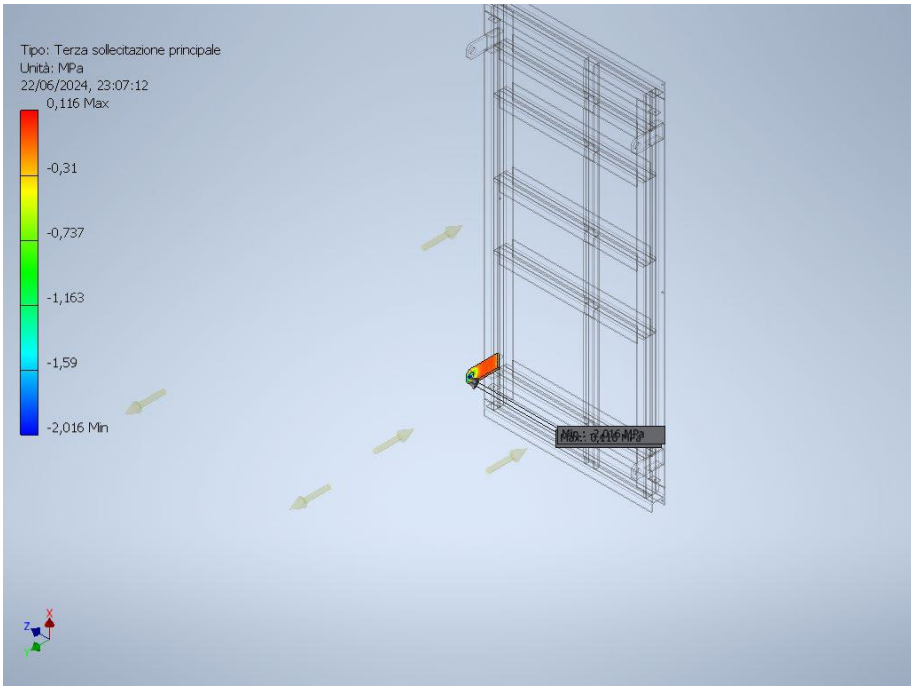
First principal stress



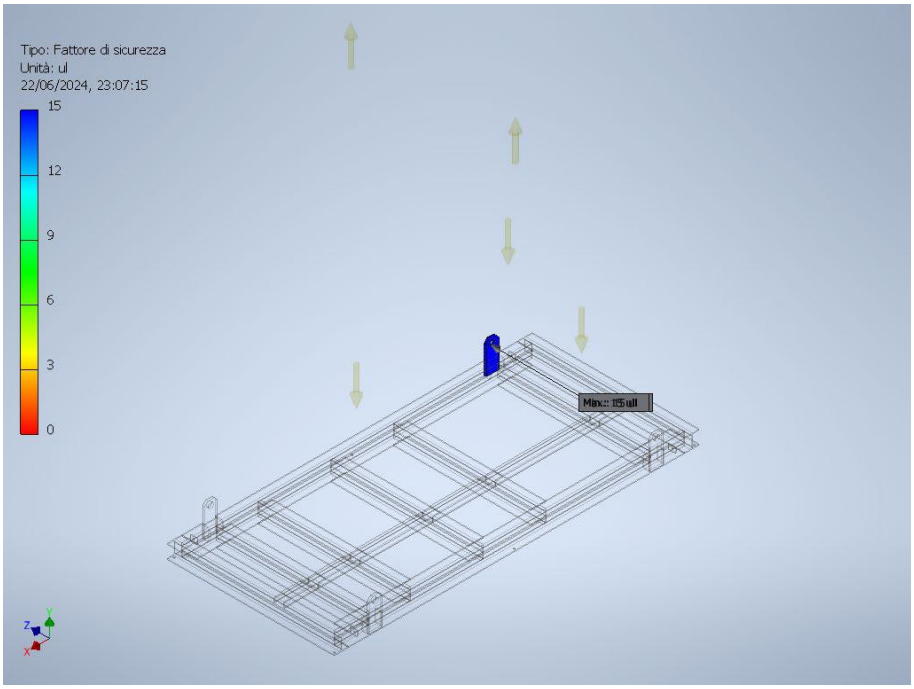


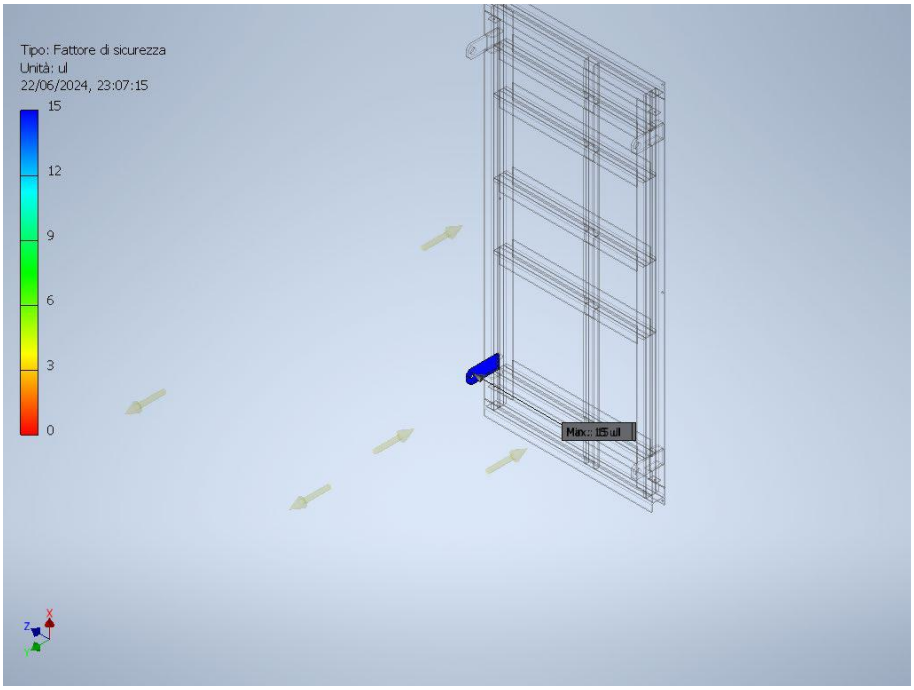
Third principal stress





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)
PSA	2500	24525
Filter group	250	2452,5
Control Panel (UCP)	350	3433,5
Baseframe	800	7848
TOTAL (including piping and valves)	5000	49050

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)

$F_{w\text{-}X} = 7086$ N

$F_{w\text{-}Z} = 14172$ N

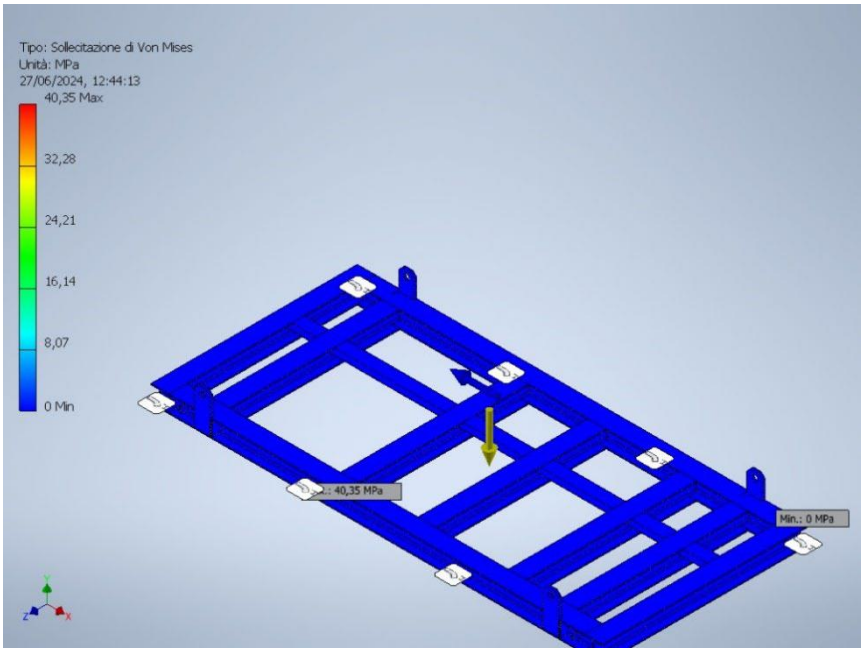
Calculation cases are:

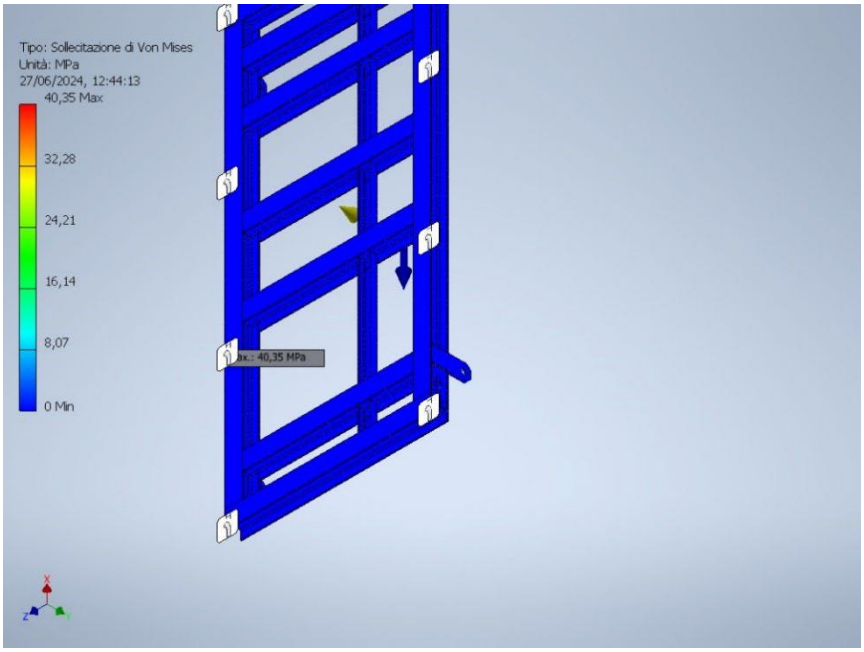
- Permanent load + Wind action along X- direction
- Permanent load + Wind action along X+ direction
- Permanent load + Wind action along Z- direction
- Permanent load + Wind action along Z+ direction

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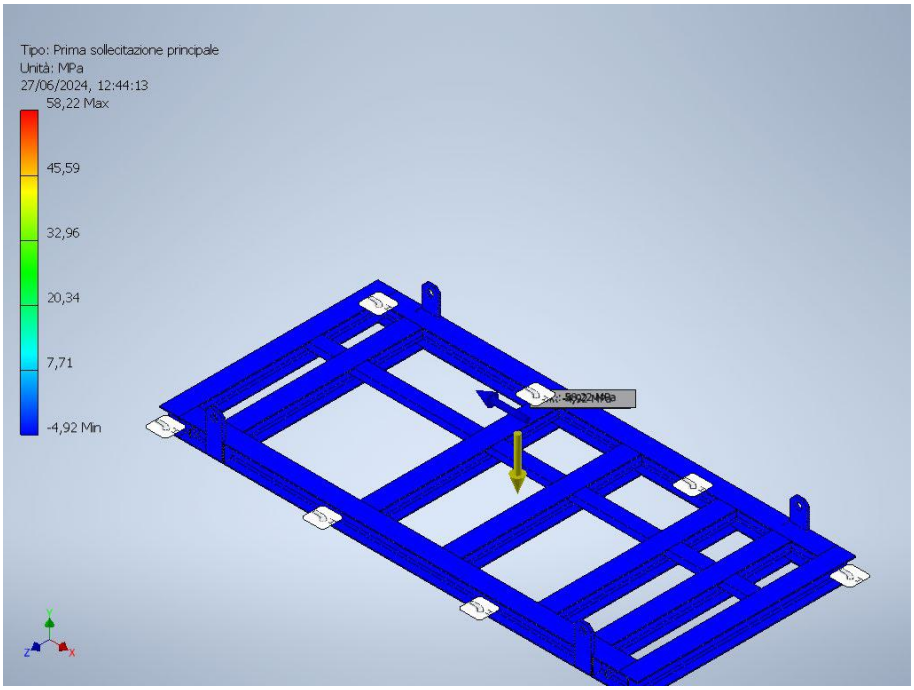
3.5.1 PERMANENT LOAD + WIND (X- DIRECTION)

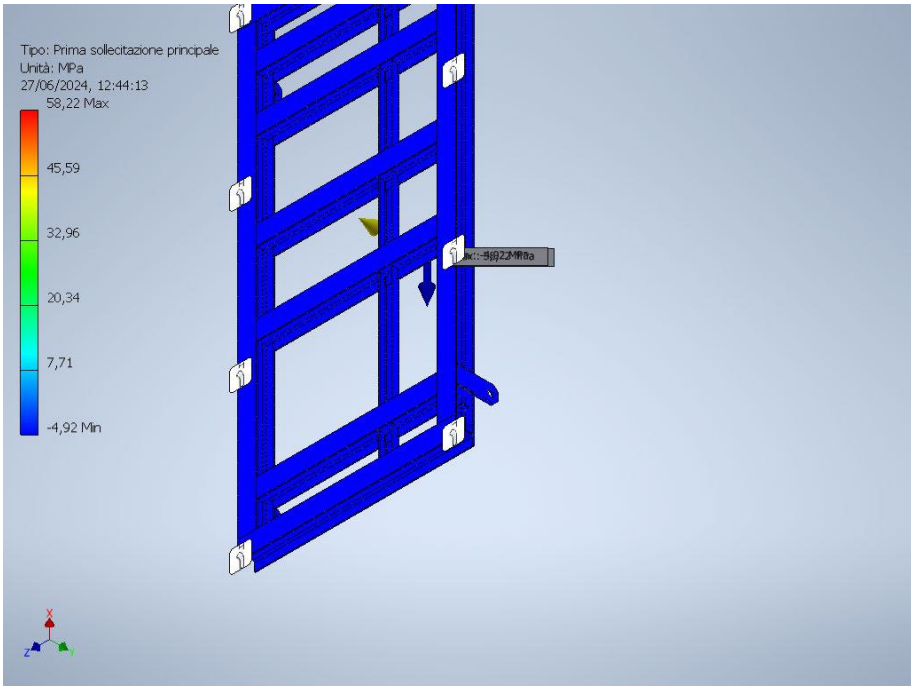
Von Mises stress



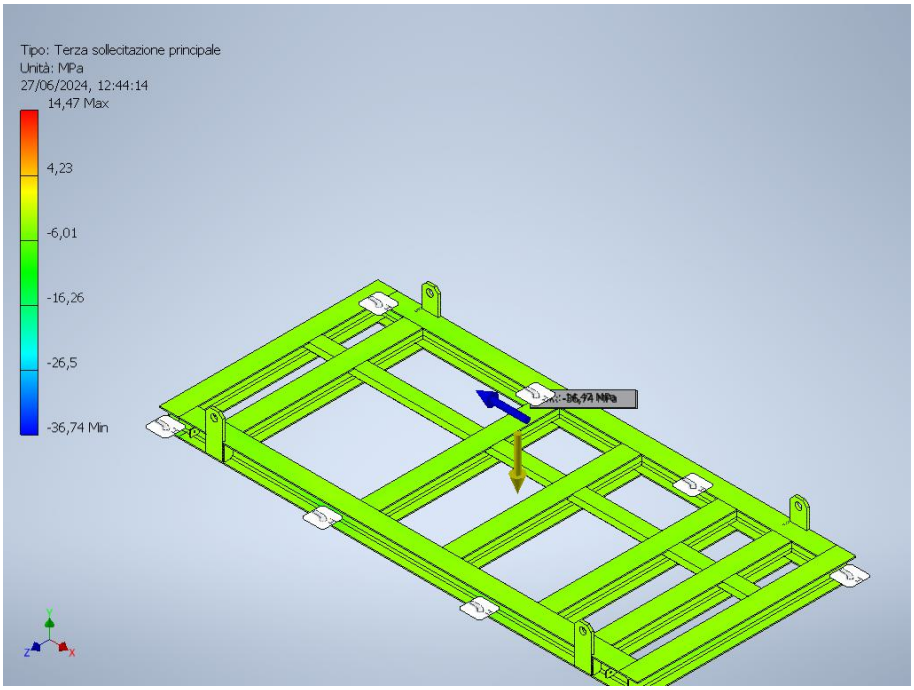


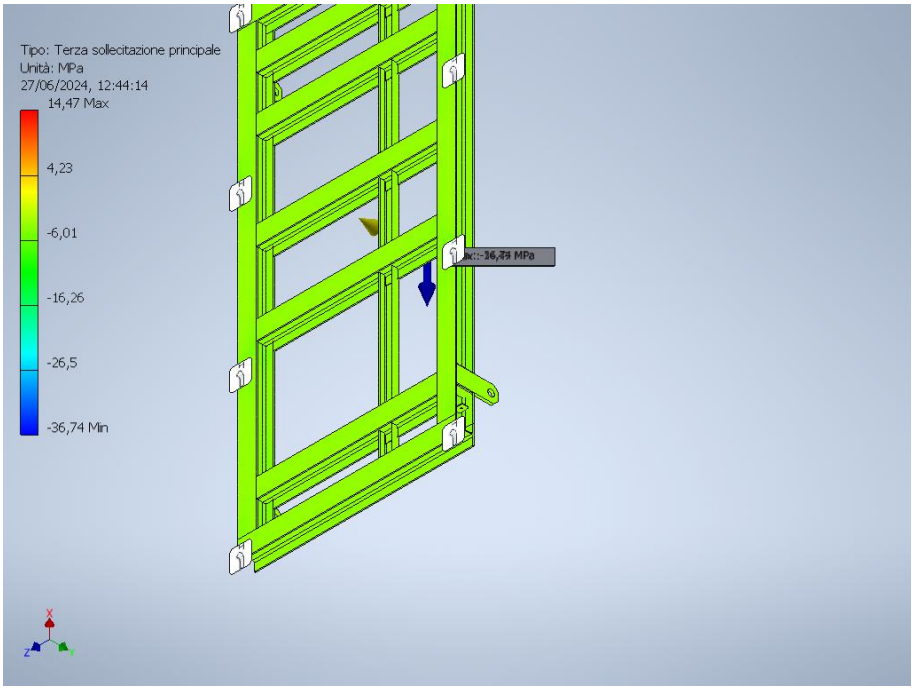
First principal stress



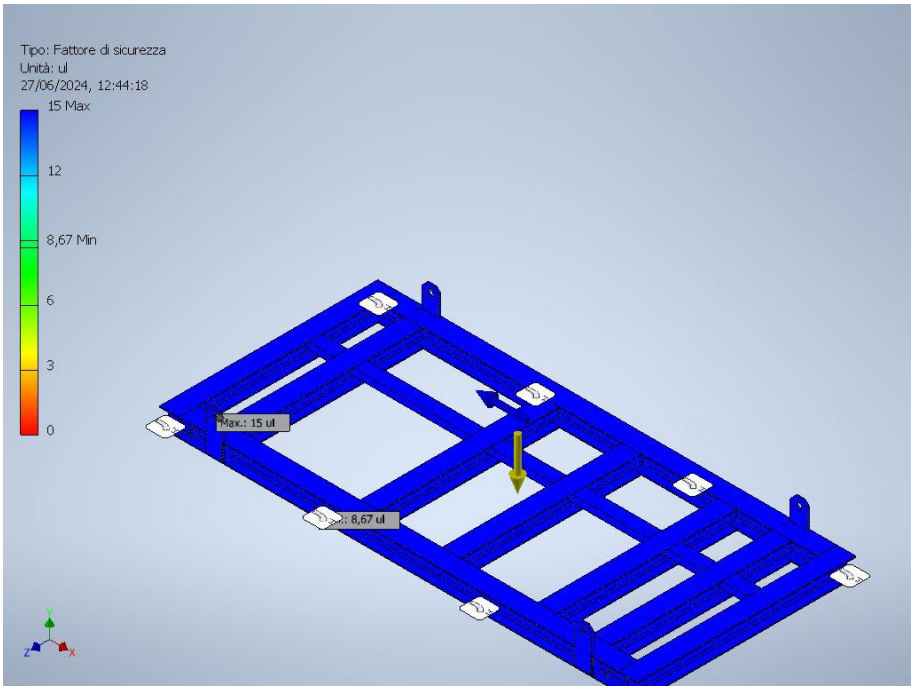


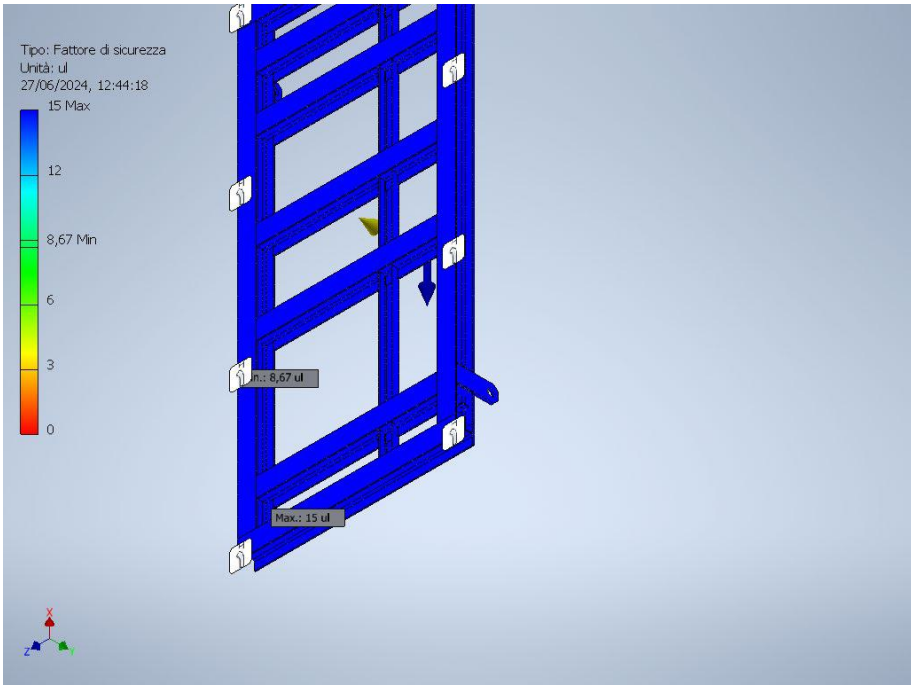
Third principal stress





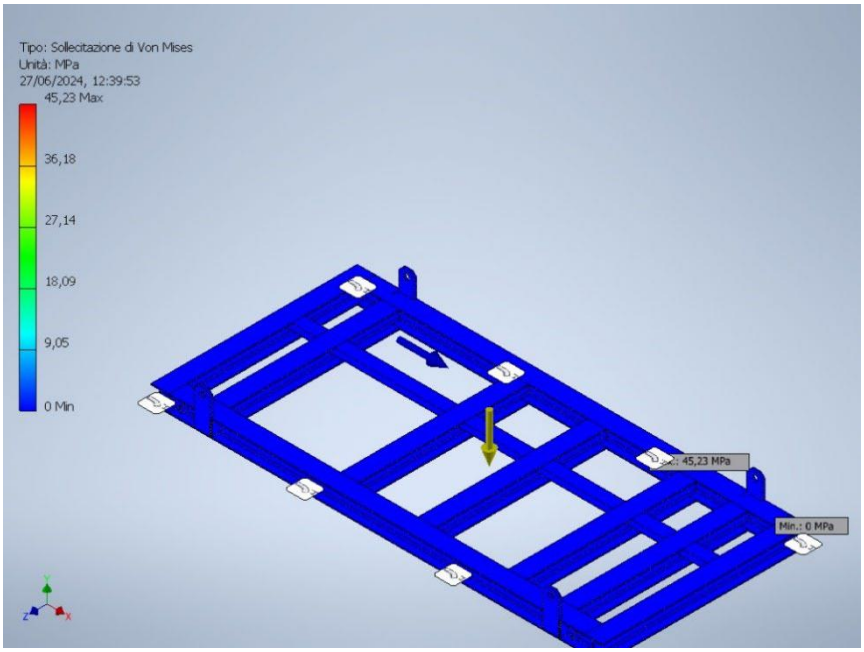
Safety factor

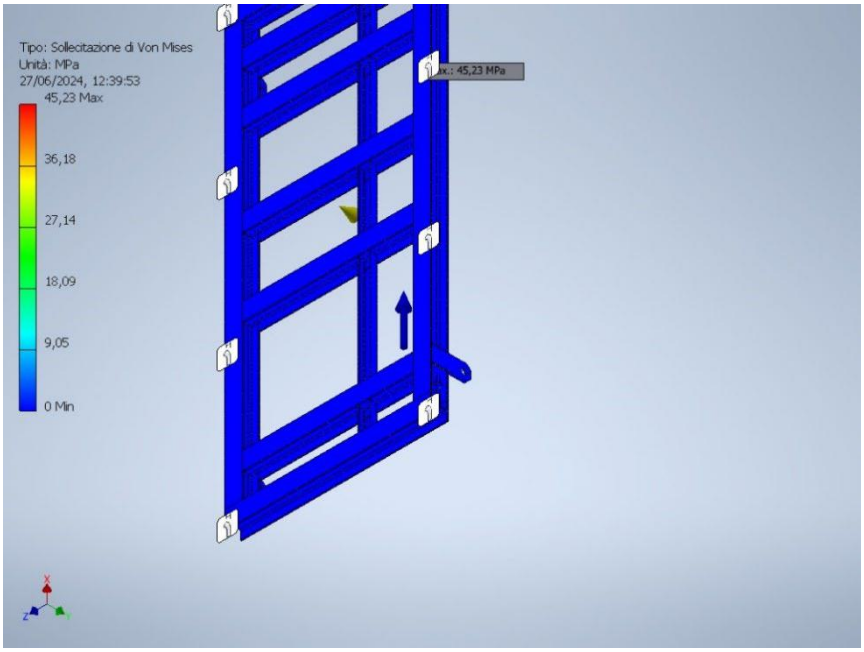




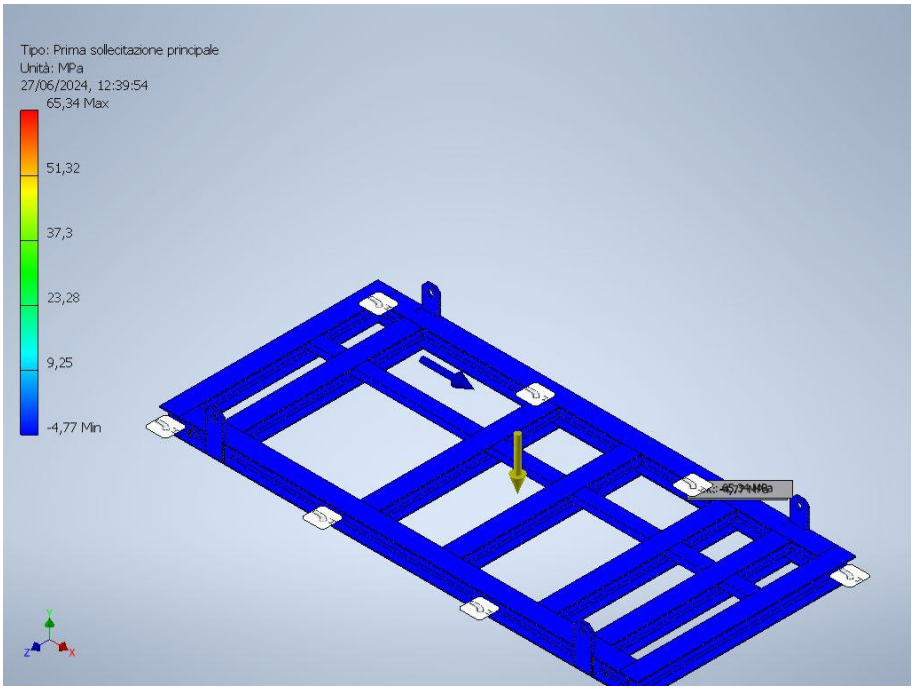
3.5.2 PERMANENT LOAD + WIND (X+ DIRECTION)

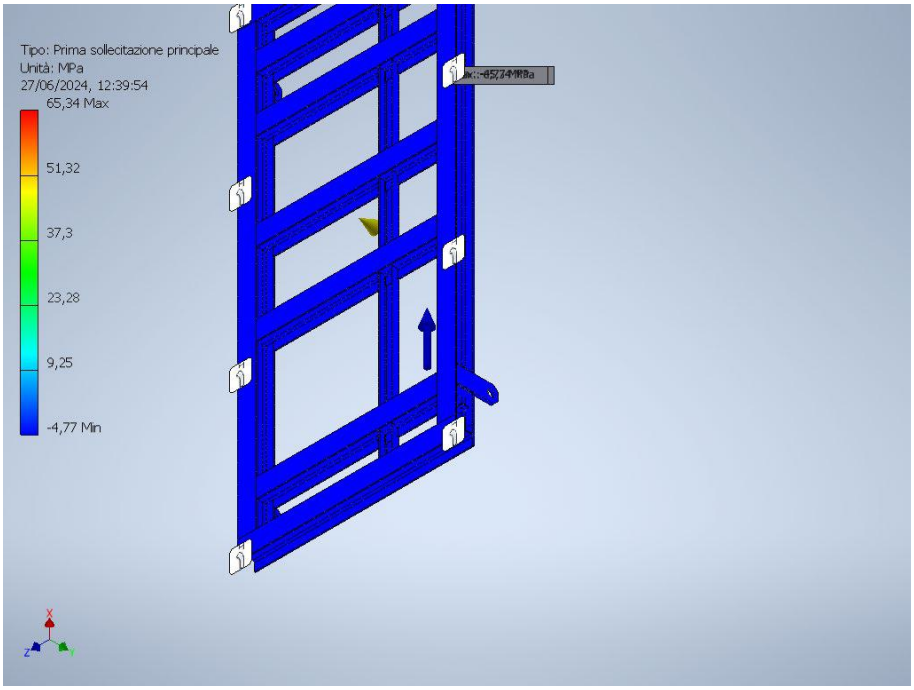
Von Mises stress



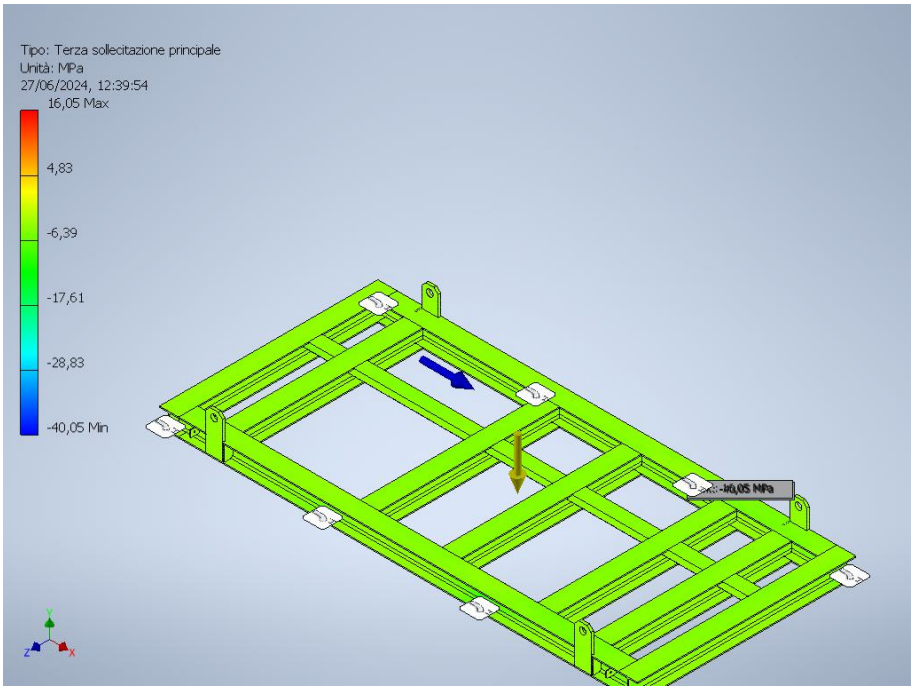


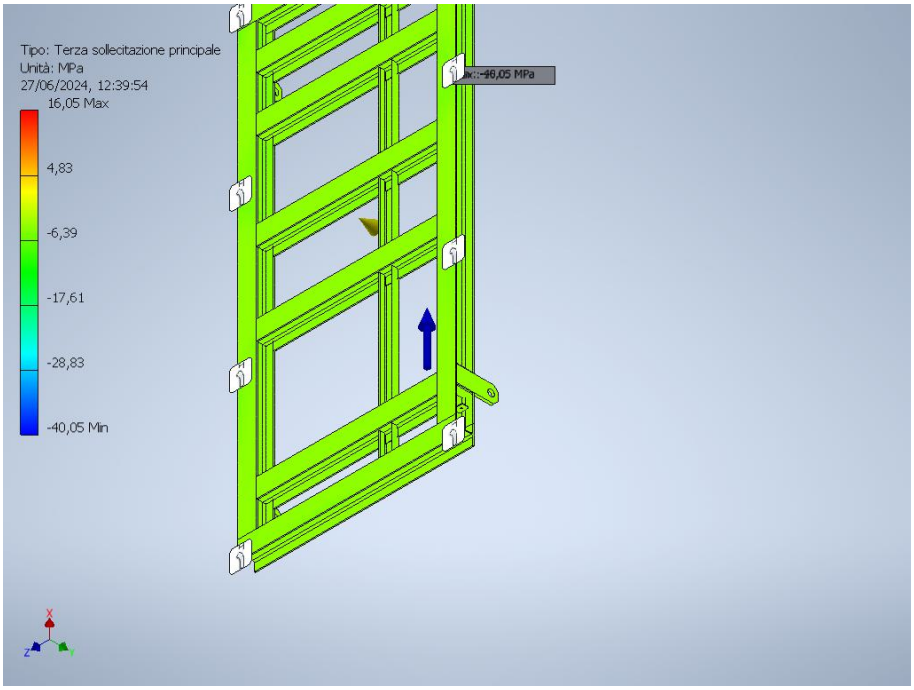
First principal stress



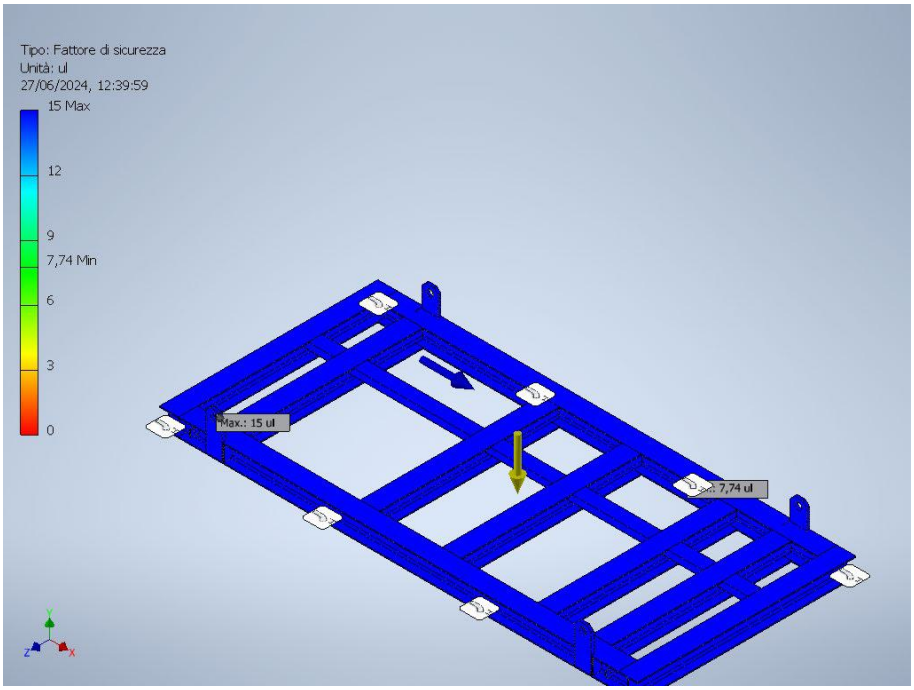


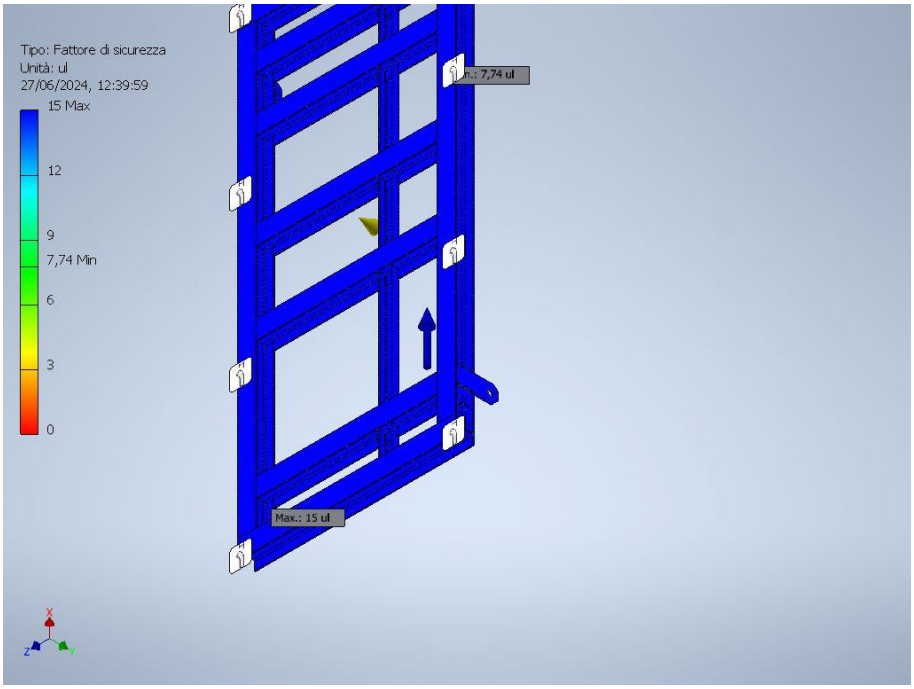
Third principal stress





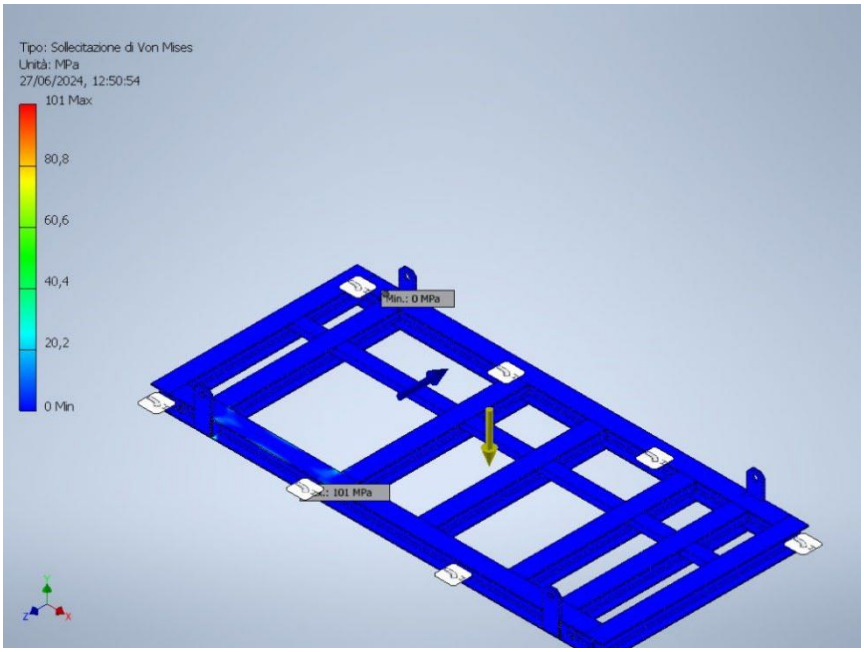
Safety factor

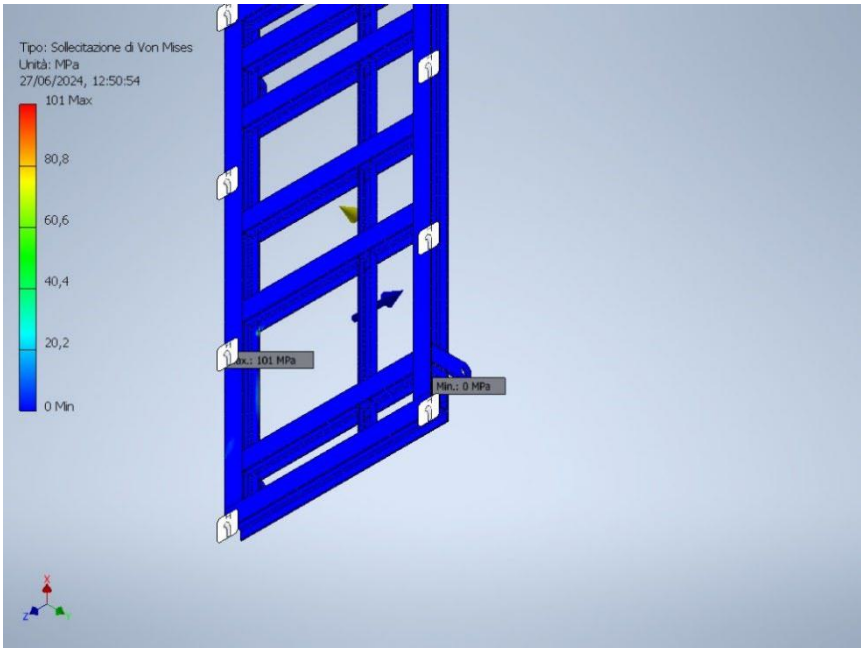




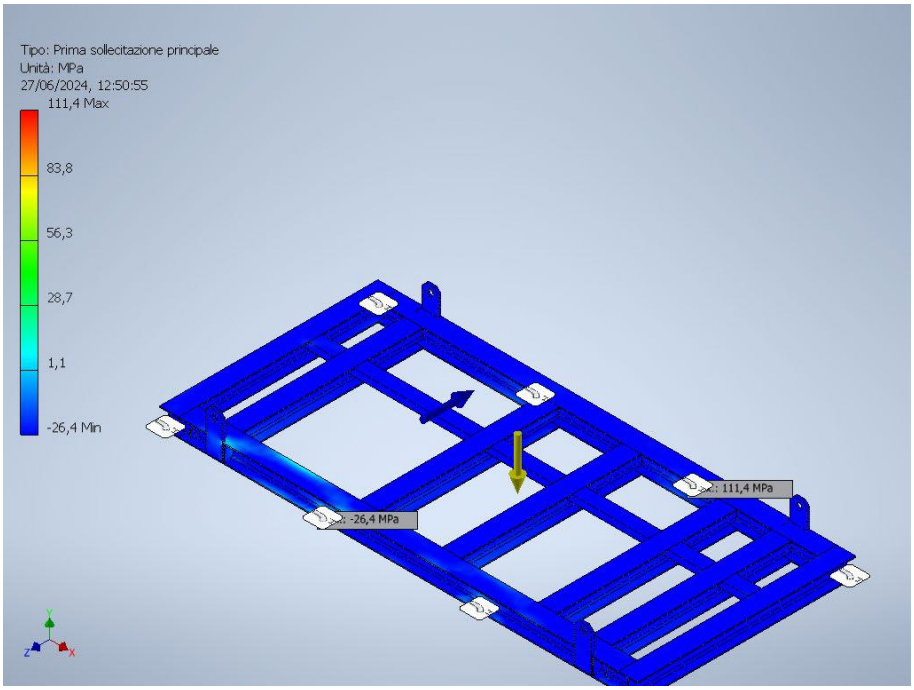
3.5.3 PERMANENT LOAD + WIND (Z- DIRECTION)

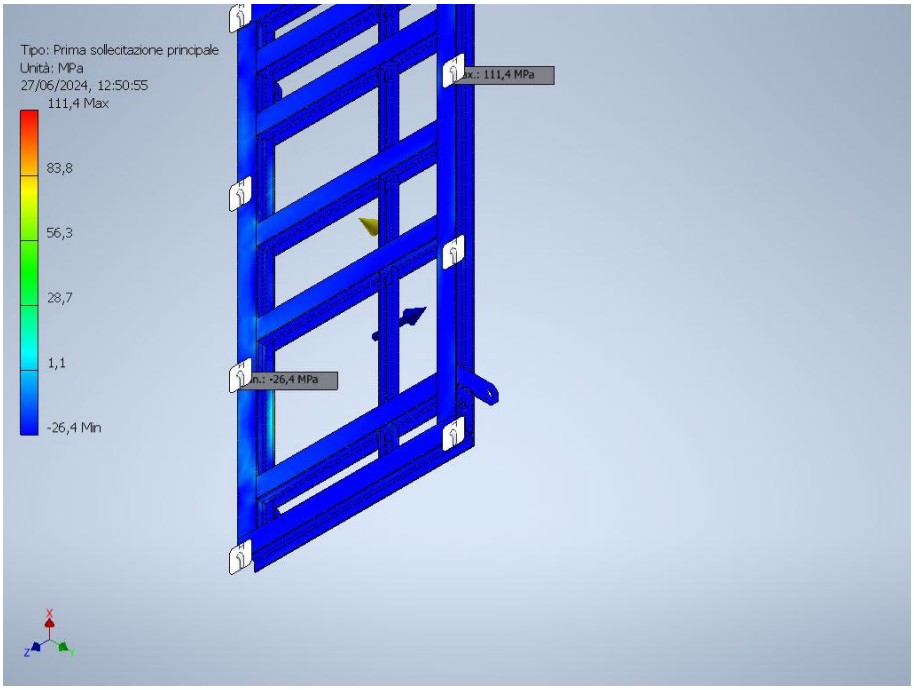
Von Mises stress





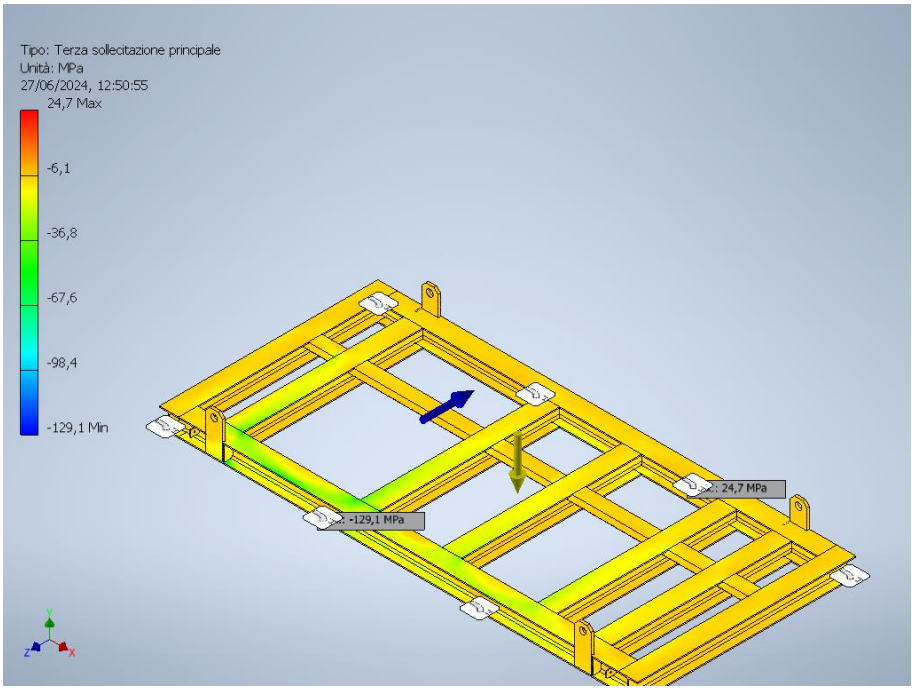
First principal stress

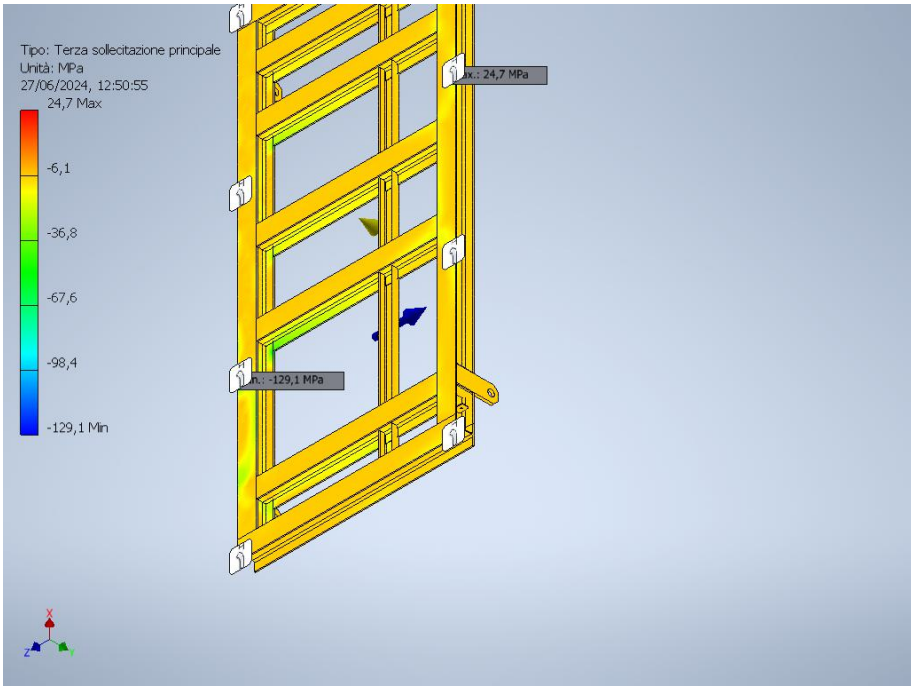




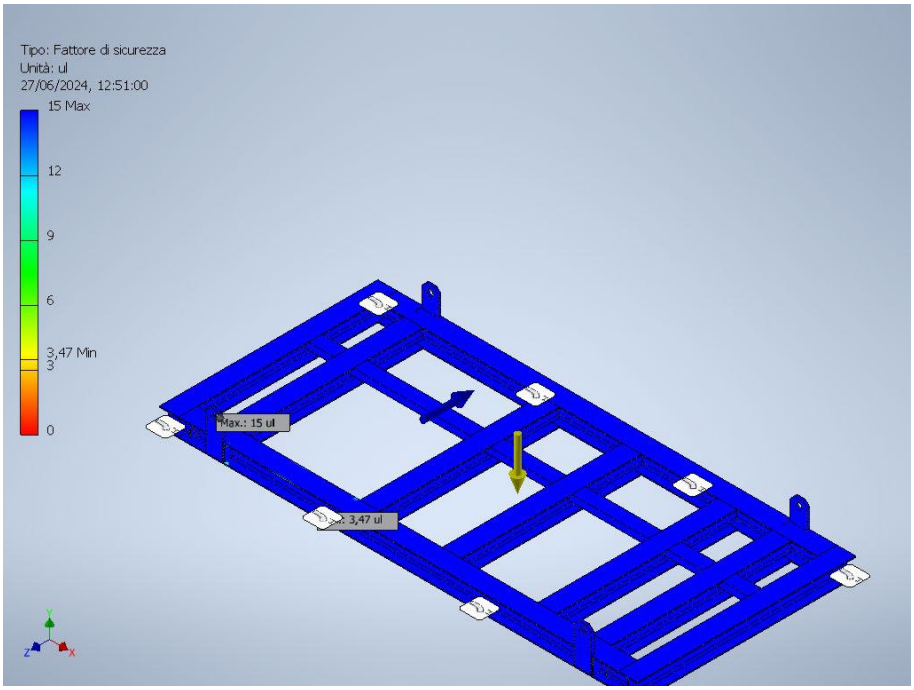
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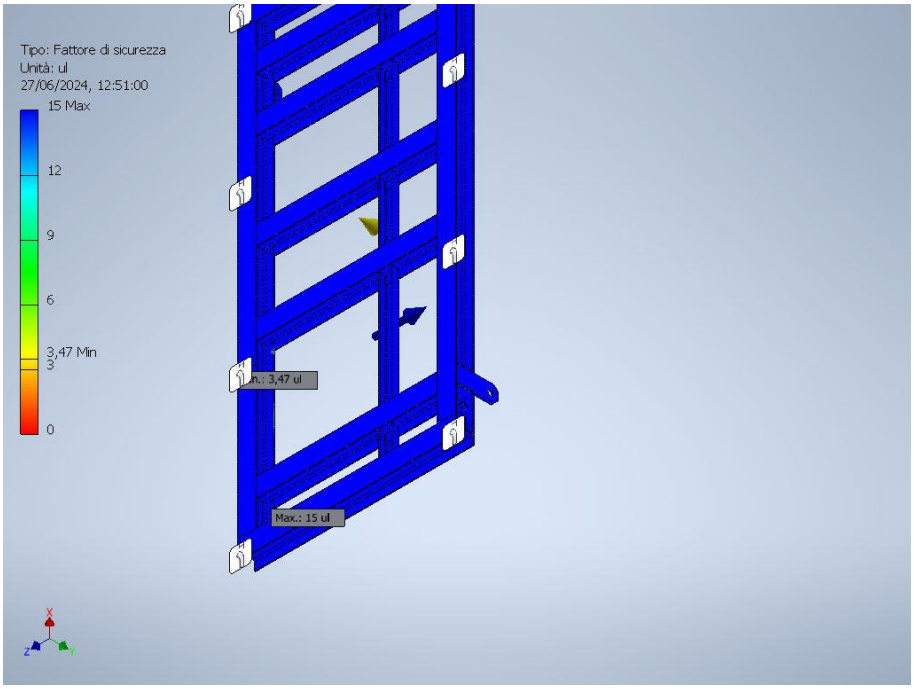
Third principal stress





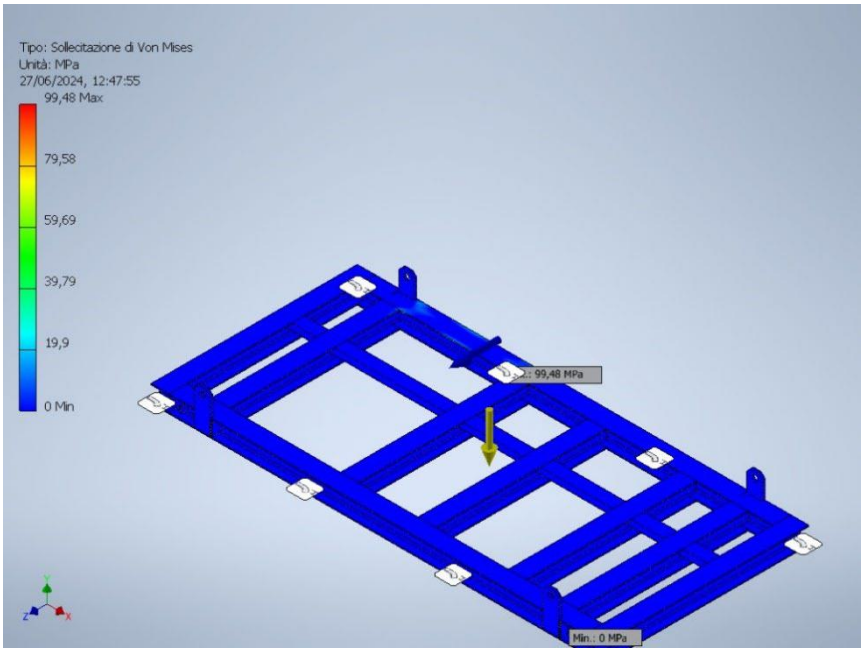
Safety factor

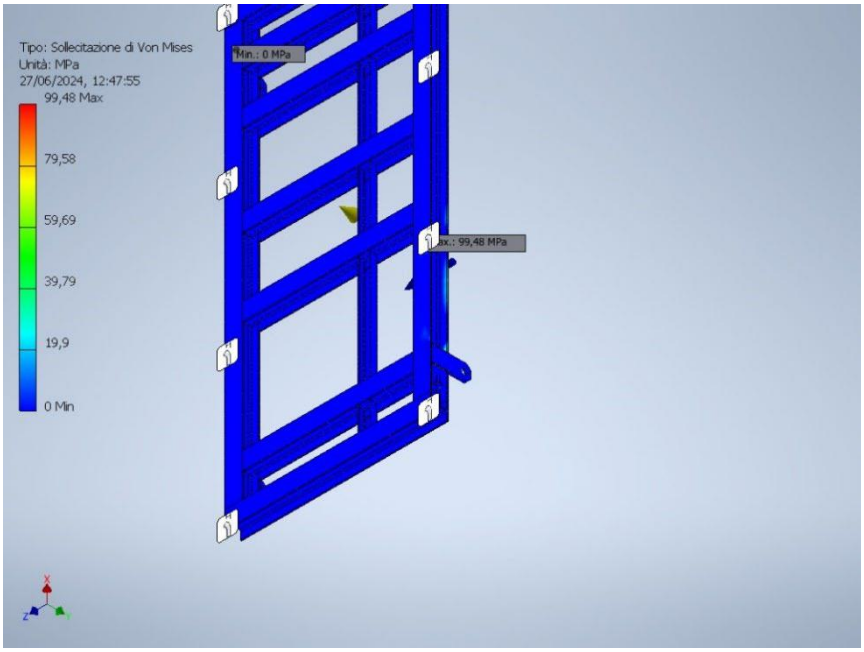




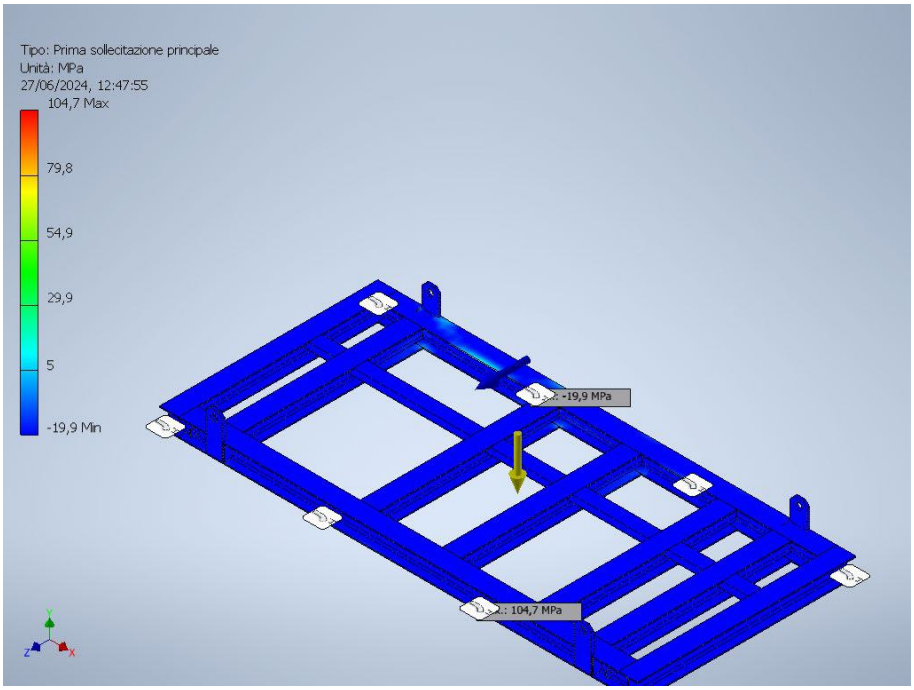
3.5.4 PERMANENT LOAD + WIND (Z+ DIRECTION)

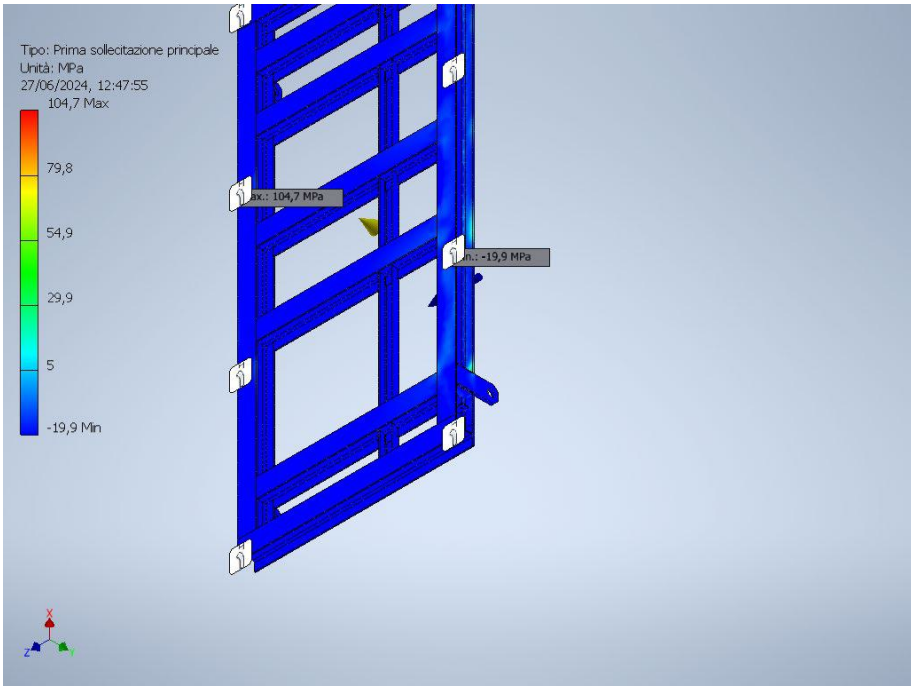
Von Mises stress



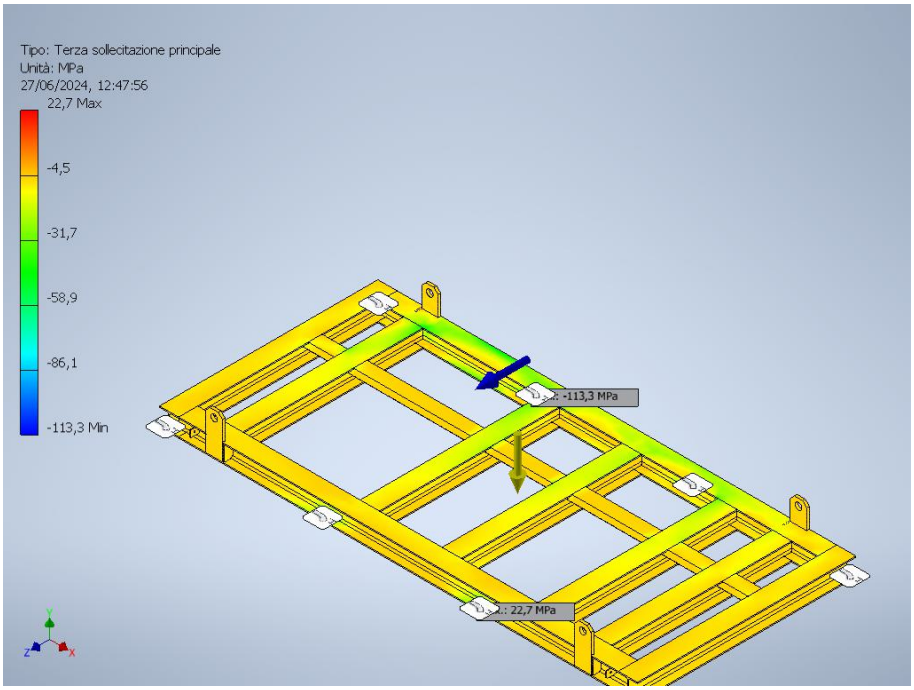


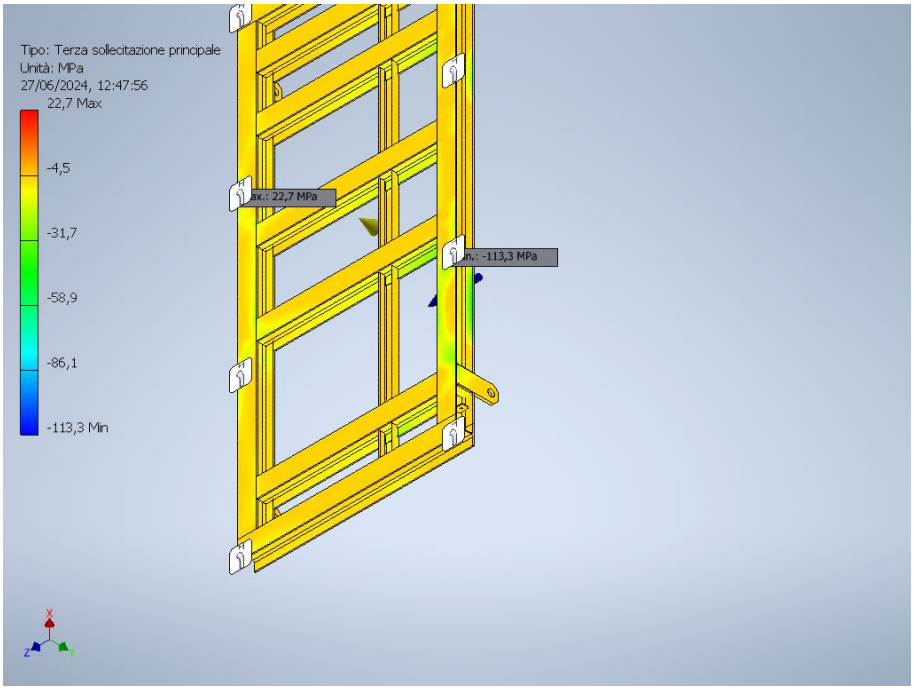
First principal stress



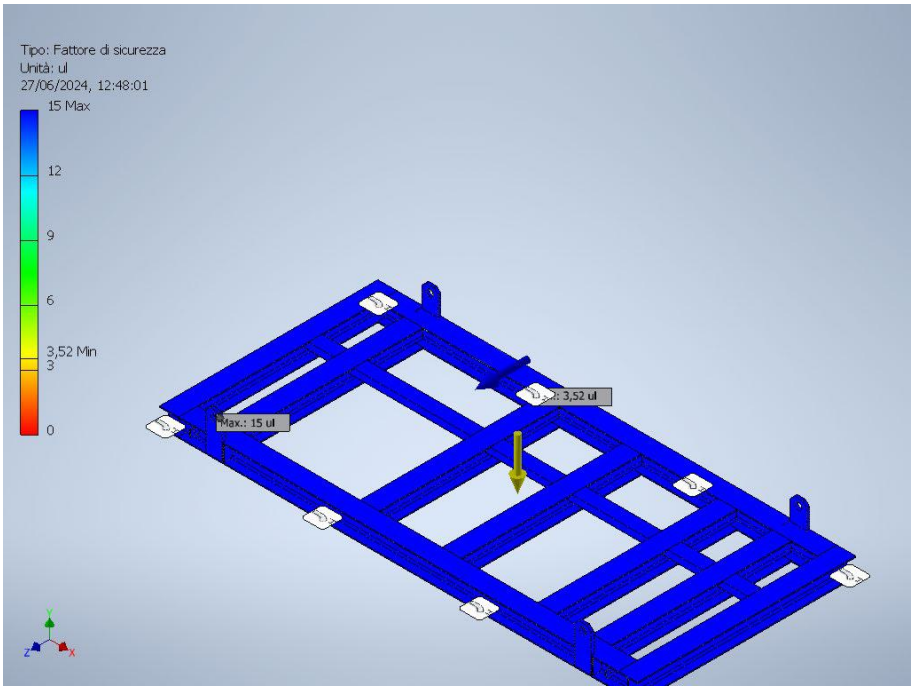


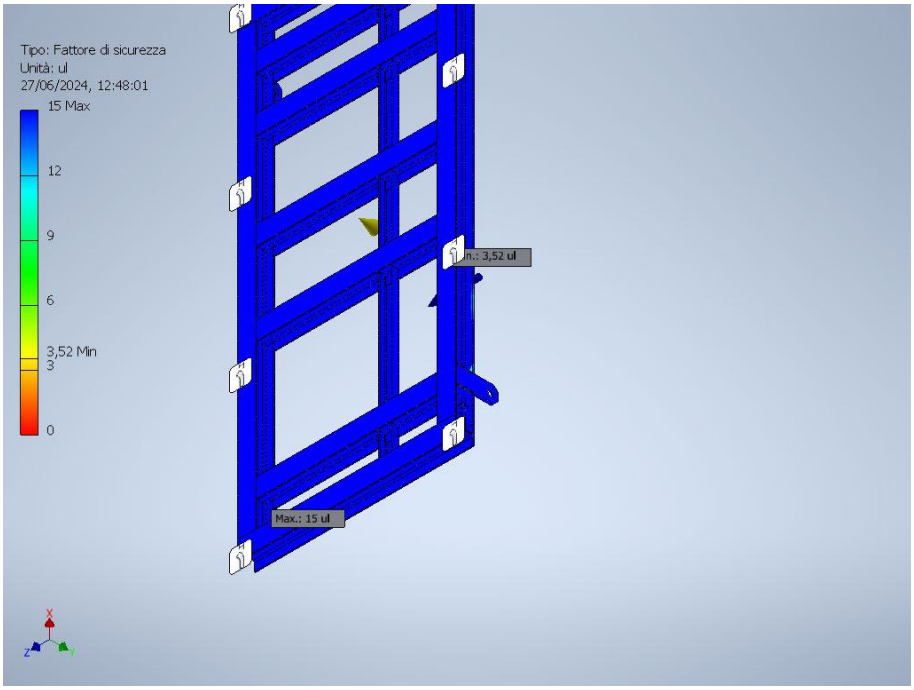
Third principal stress





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:

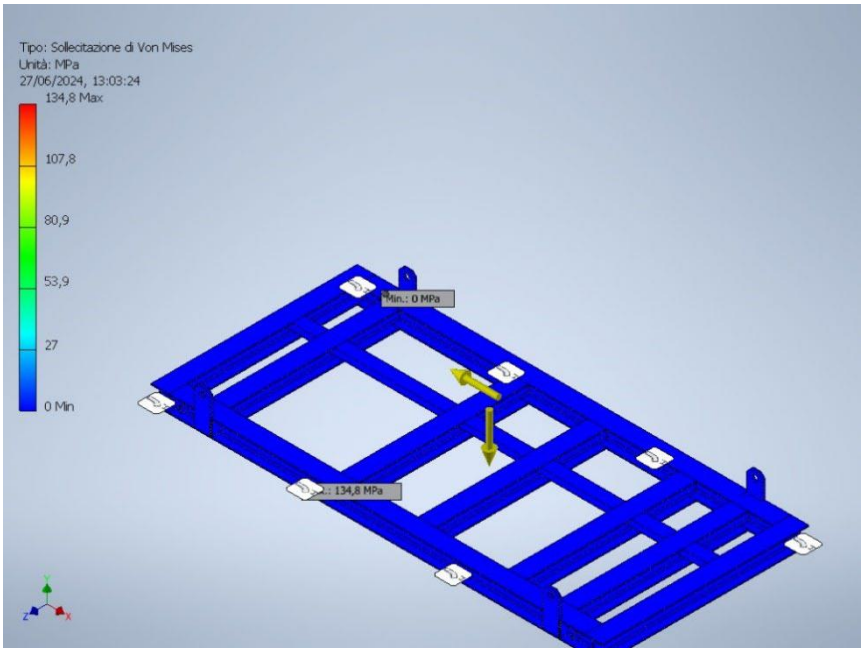
- Transportation load + Wind action along X- direction
- Transportation load + Wind action along X+ direction
- Transportation load + Wind action along Z- direction
- Transportation load + Wind action along Z+ direction

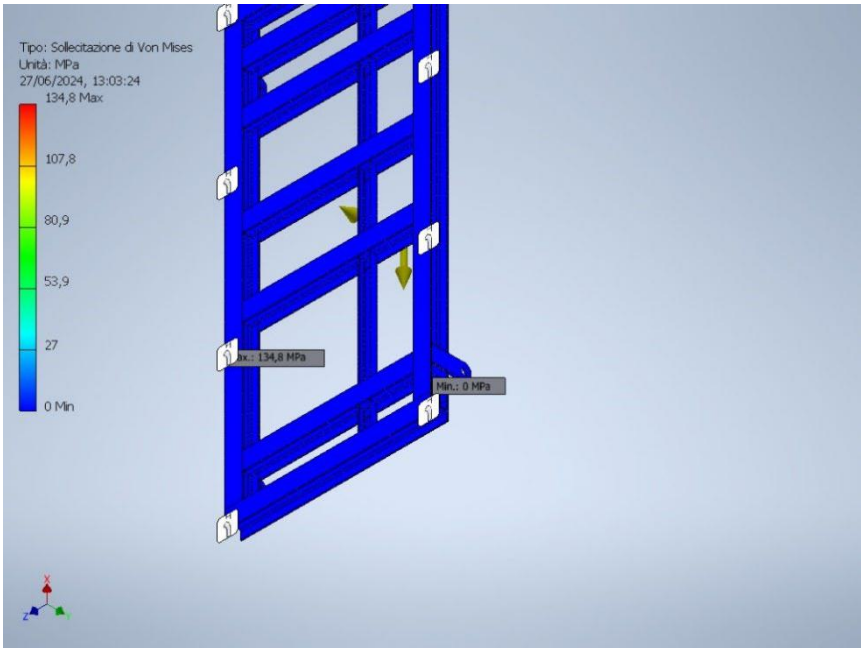
To be more conservative, transportation load and wind actions have been considered acting in the same direction for each calculation case.

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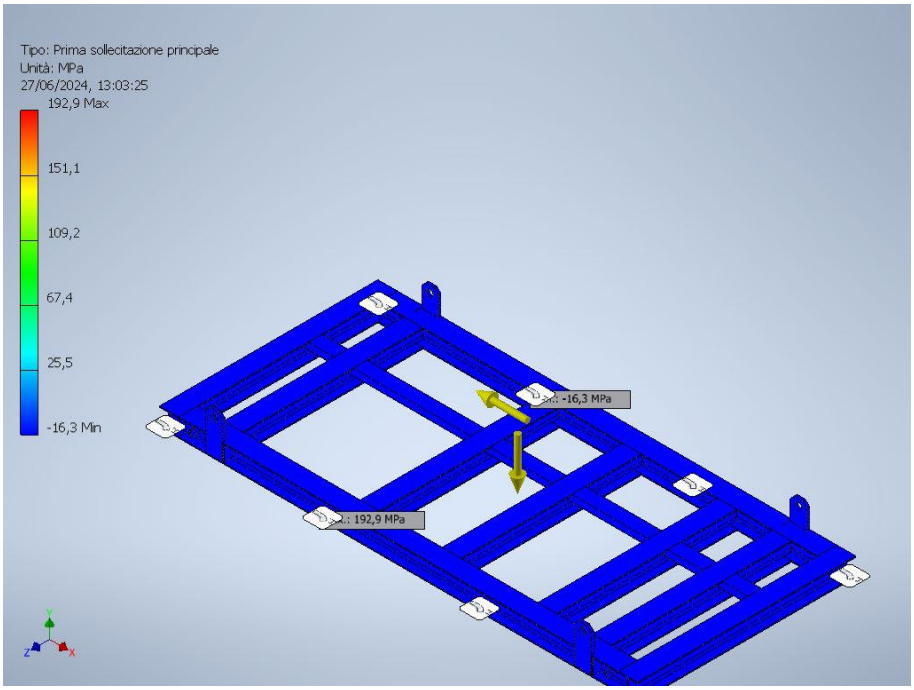
3.6.1 TRANSPORTATION LOAD + WIND (X- DIRECTION)

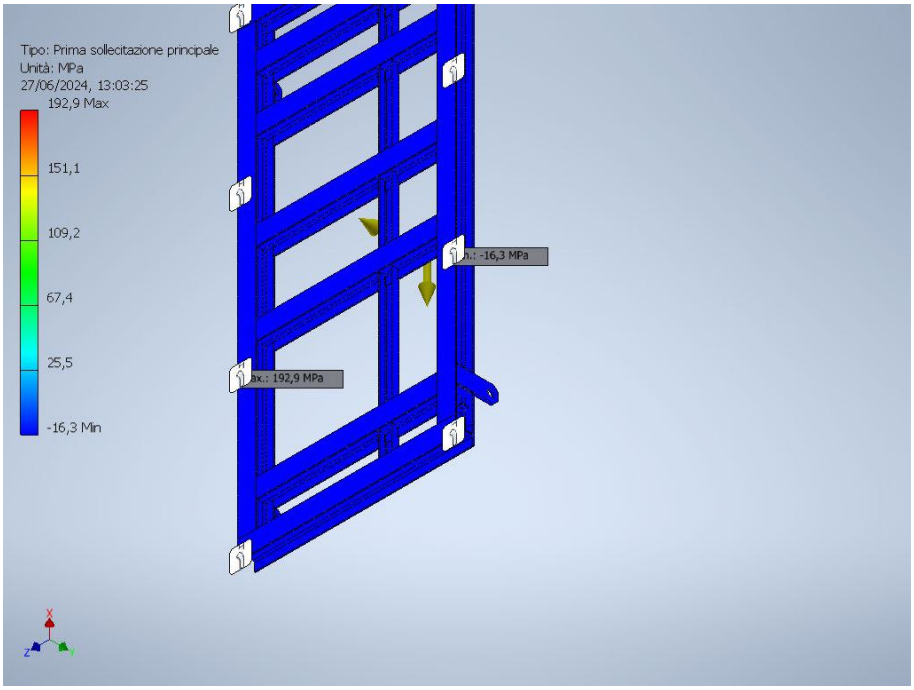
Von Mises stress



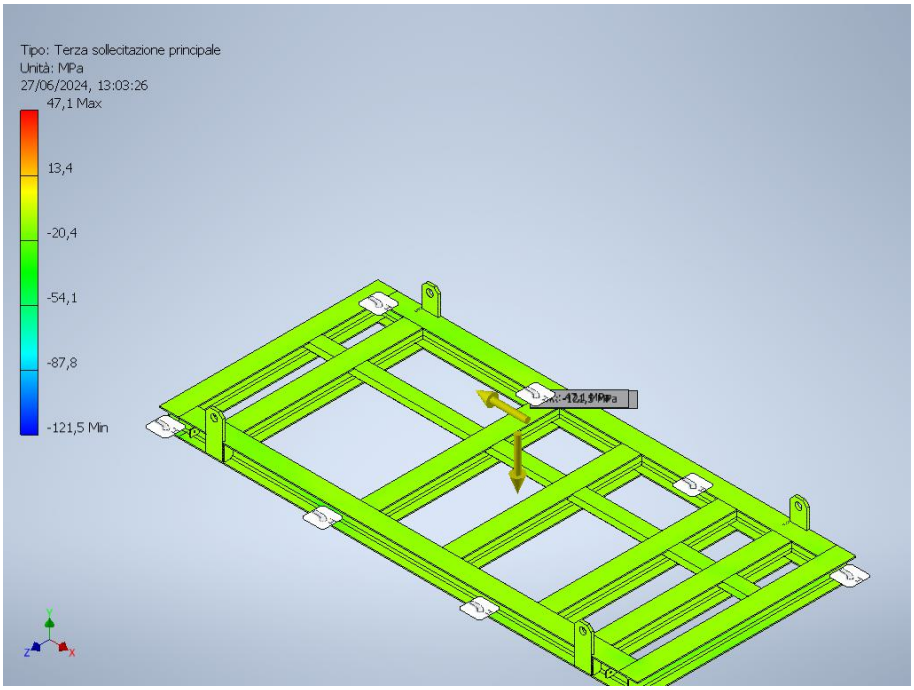


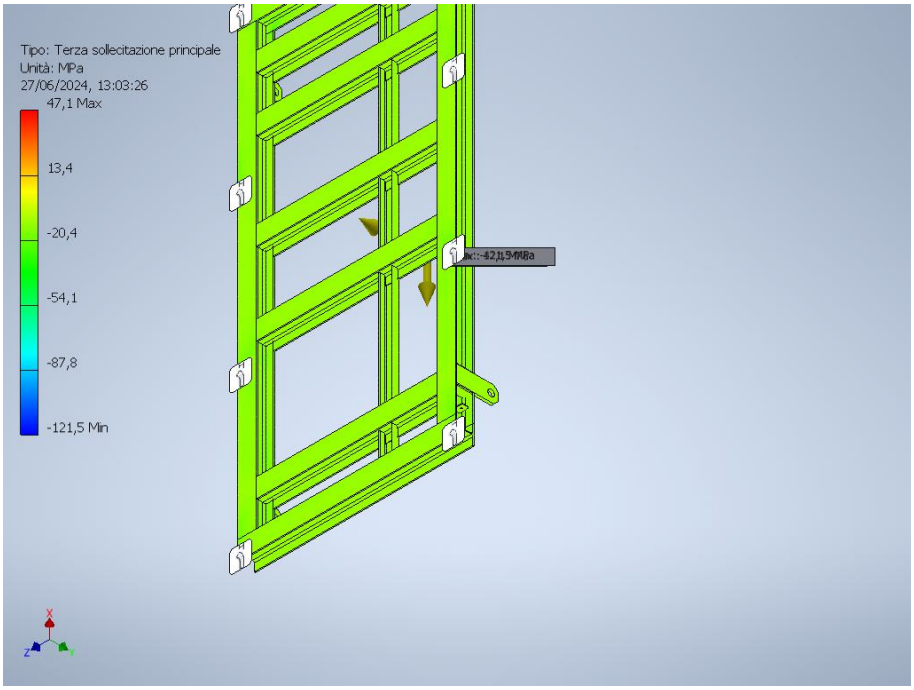
First principal stress



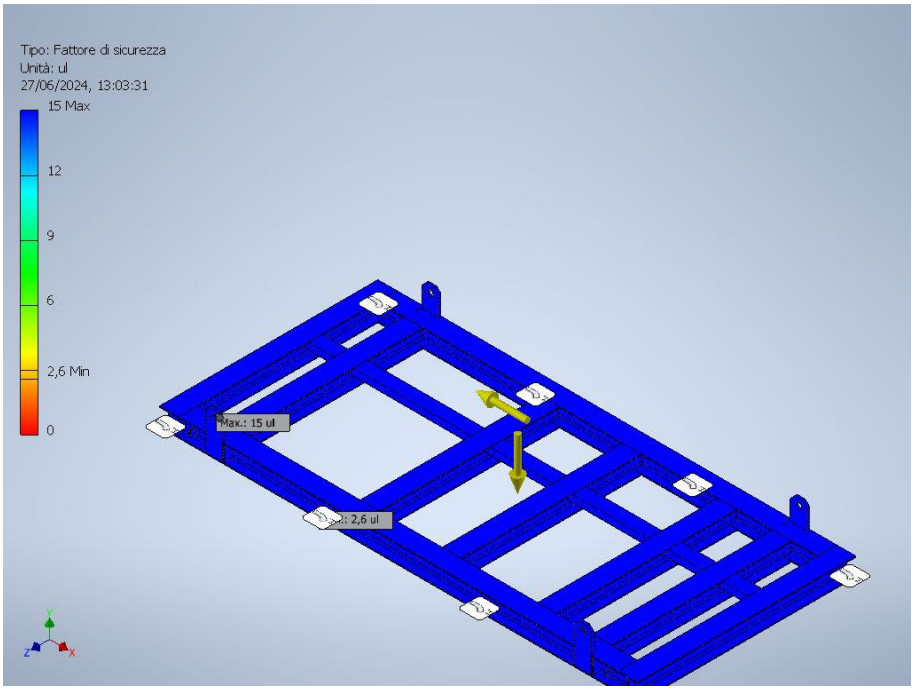


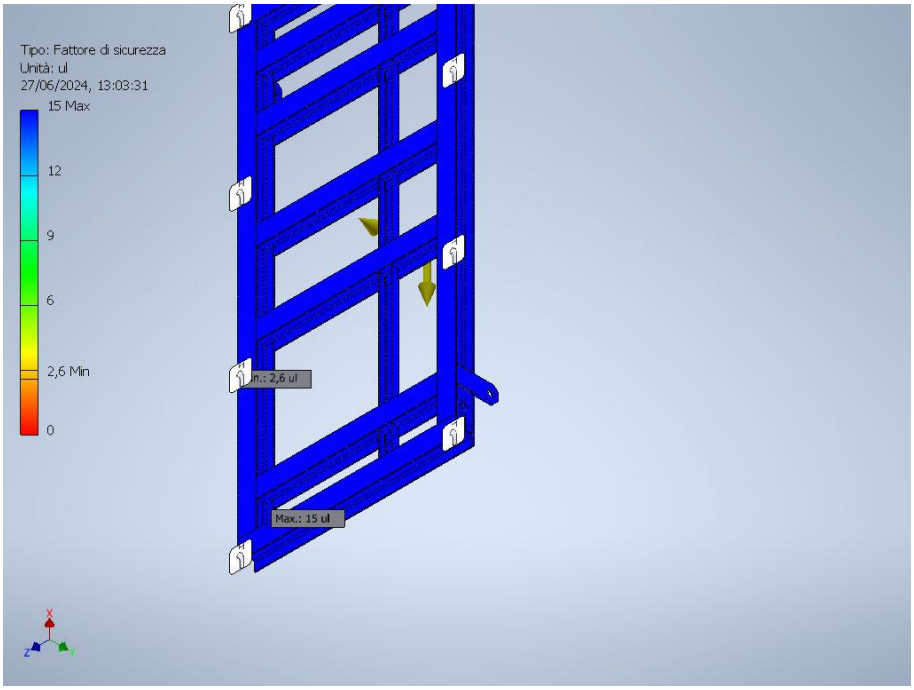
Third principal stress





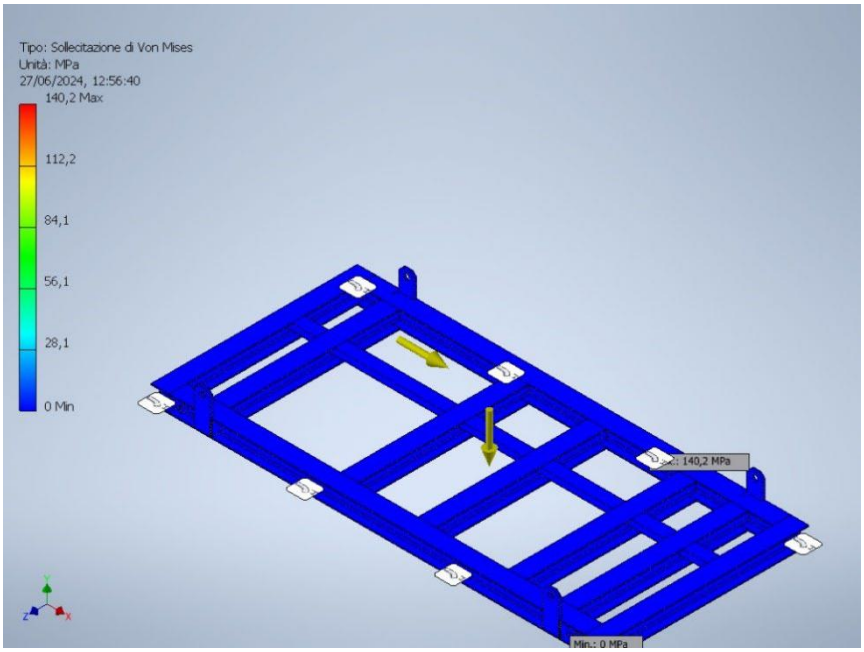
Safety factor

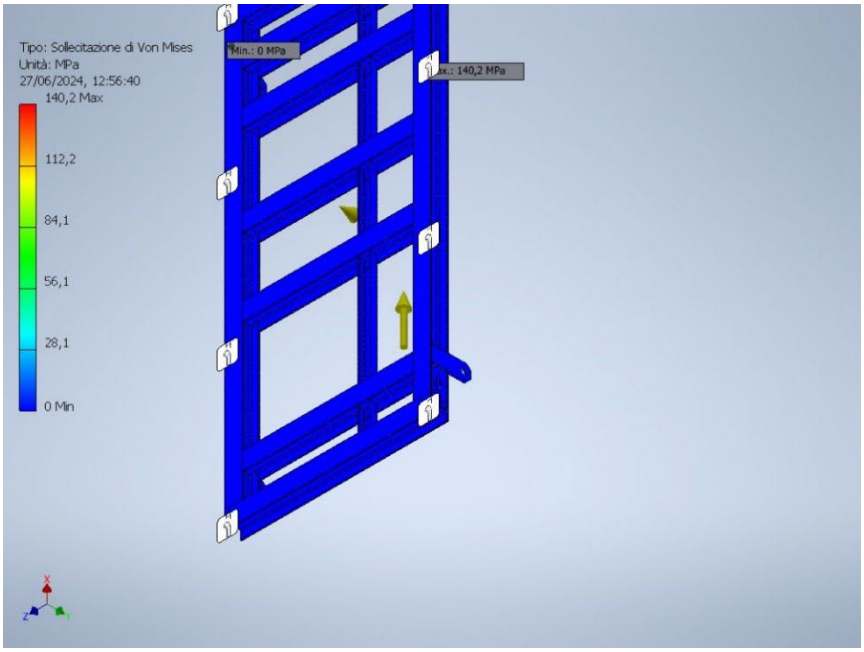




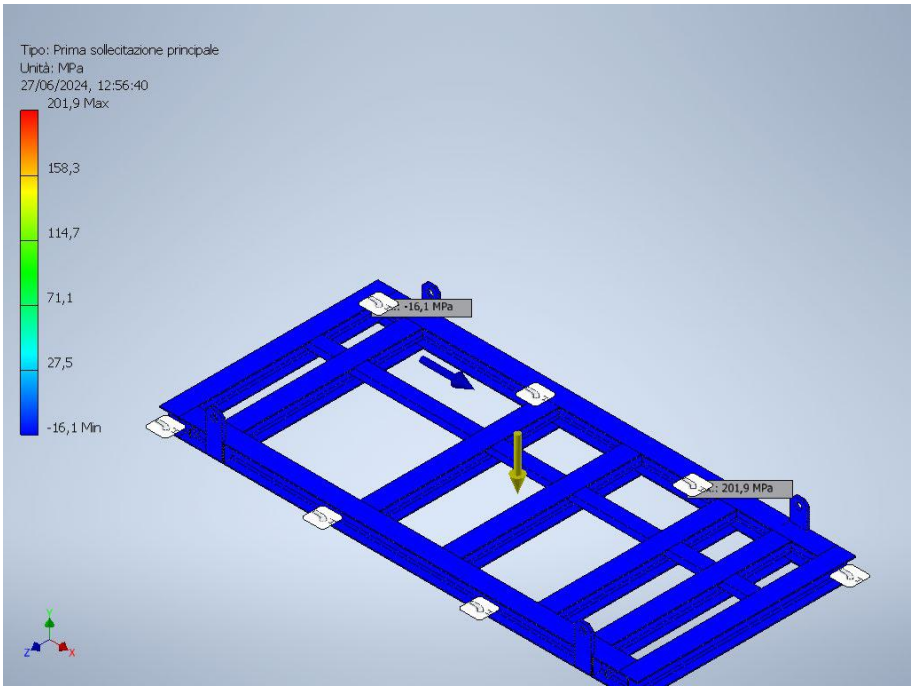
3.6.2 TRANSPORTATION LOAD + WIND (X+ DIRECTION)

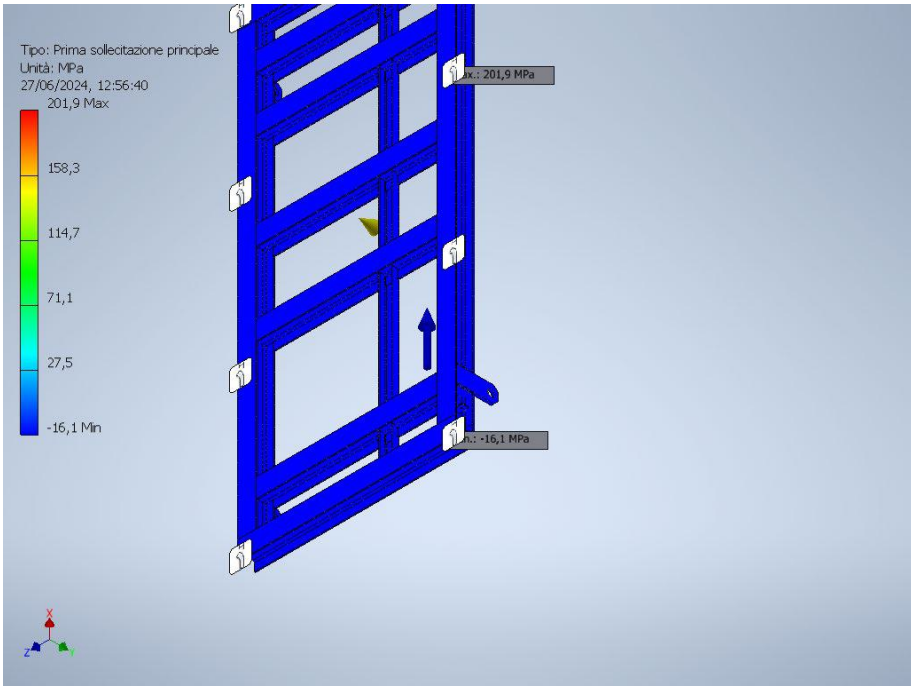
Von Mises stress



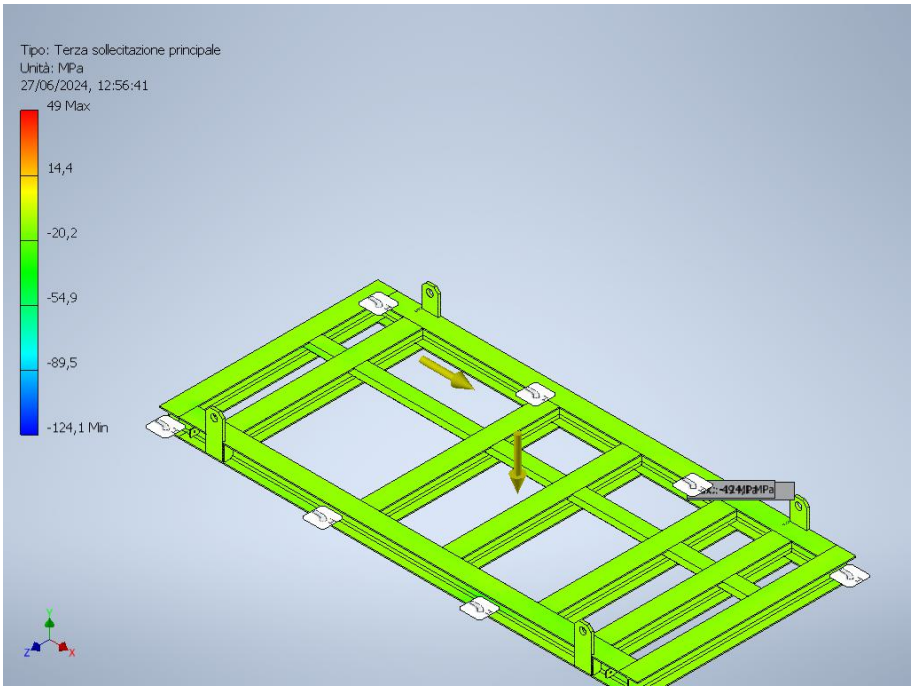


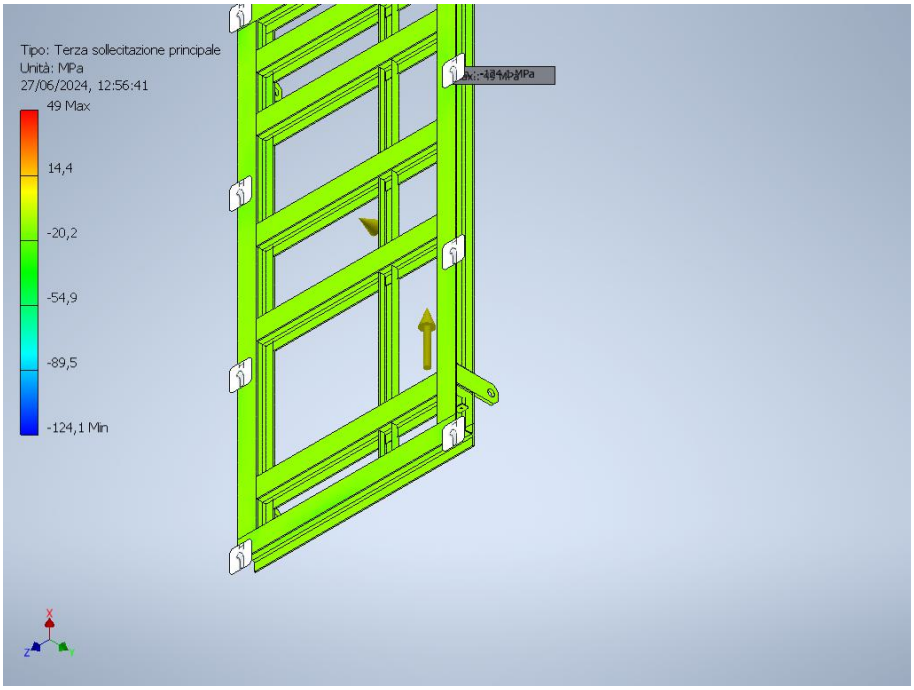
First principal stress



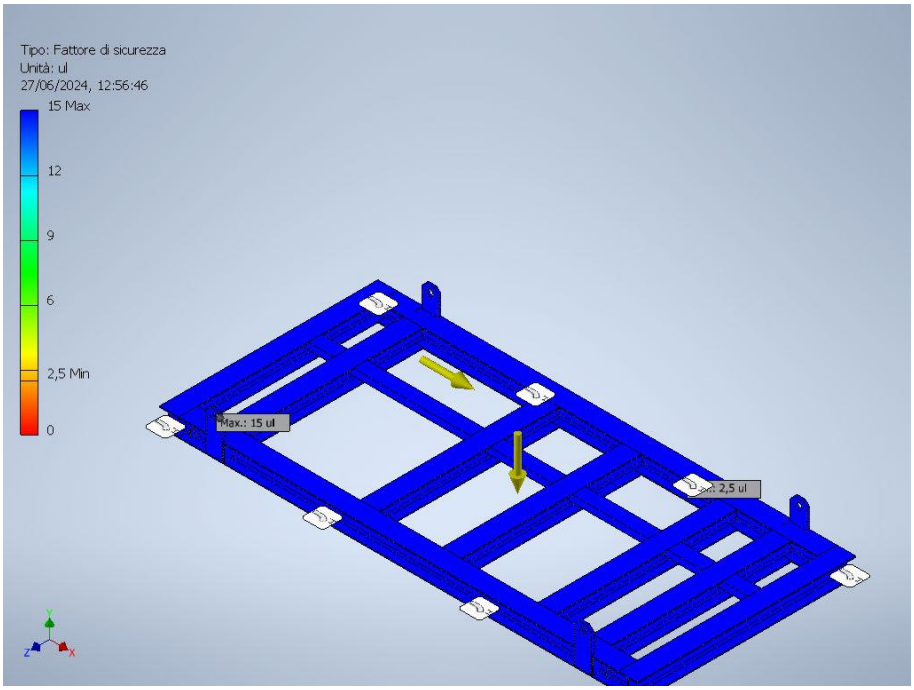


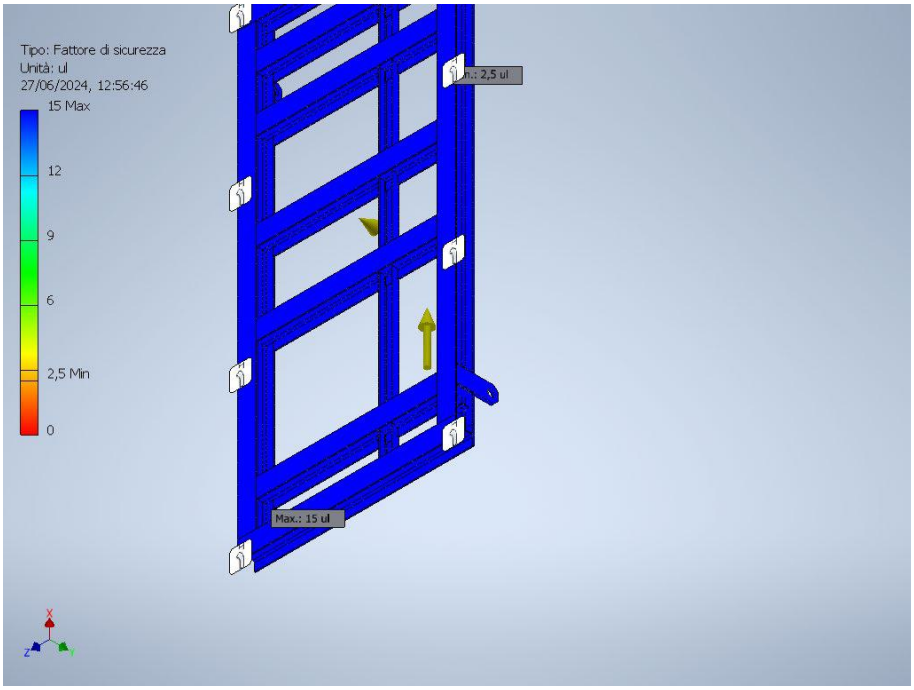
Third principal stress





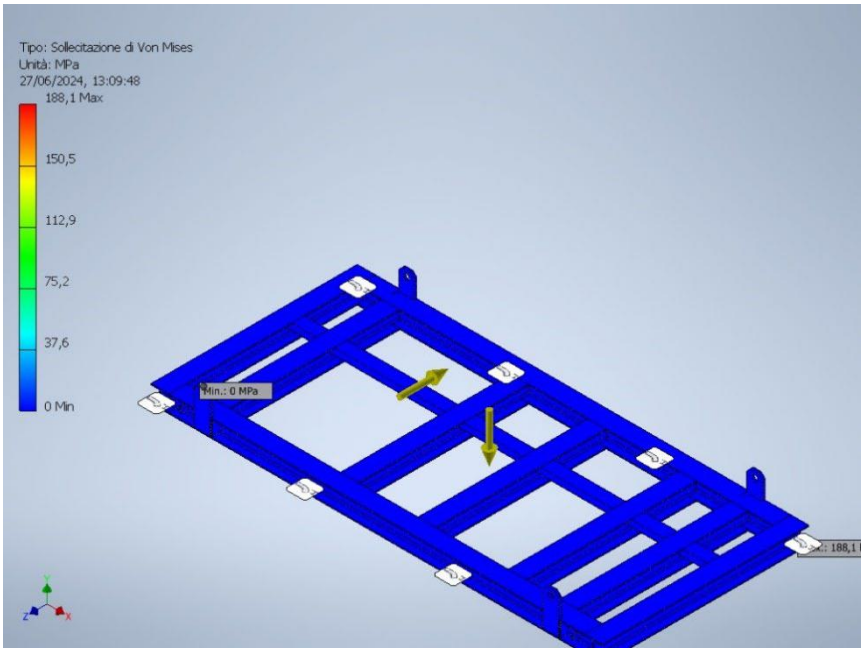
Safety factor

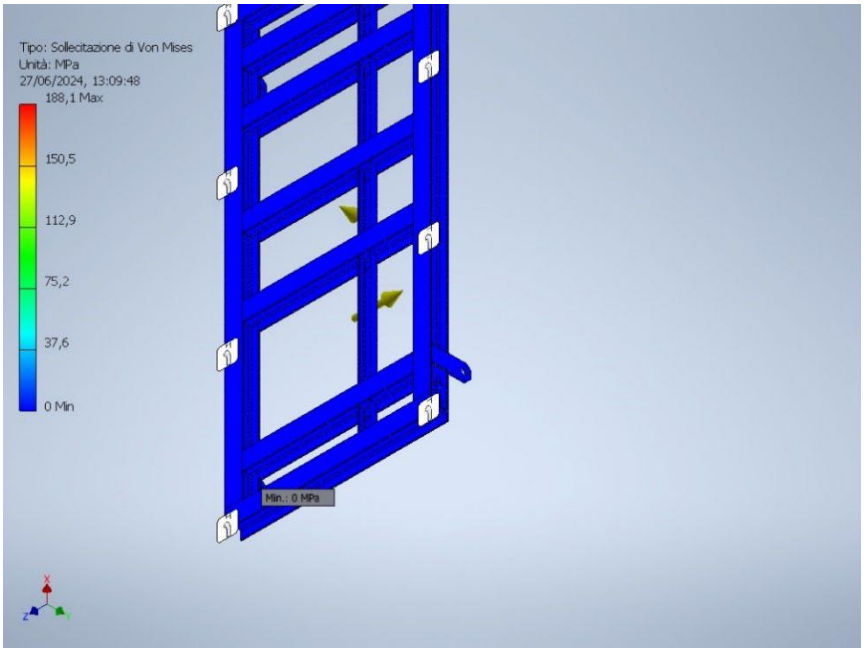




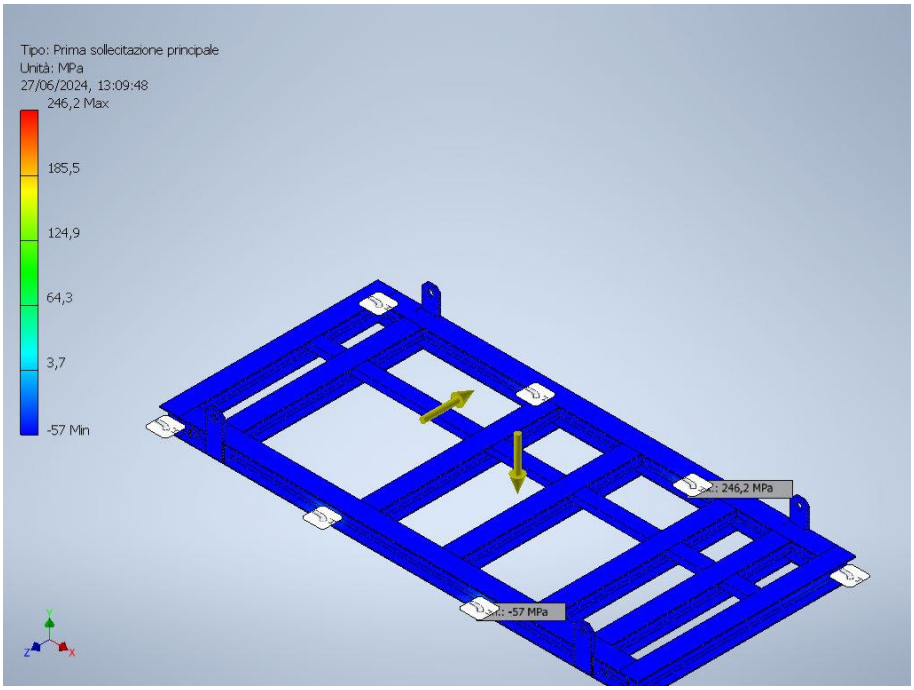
3.6.3 TRANSPORTATION LOAD + WIND (Z- DIRECTION)

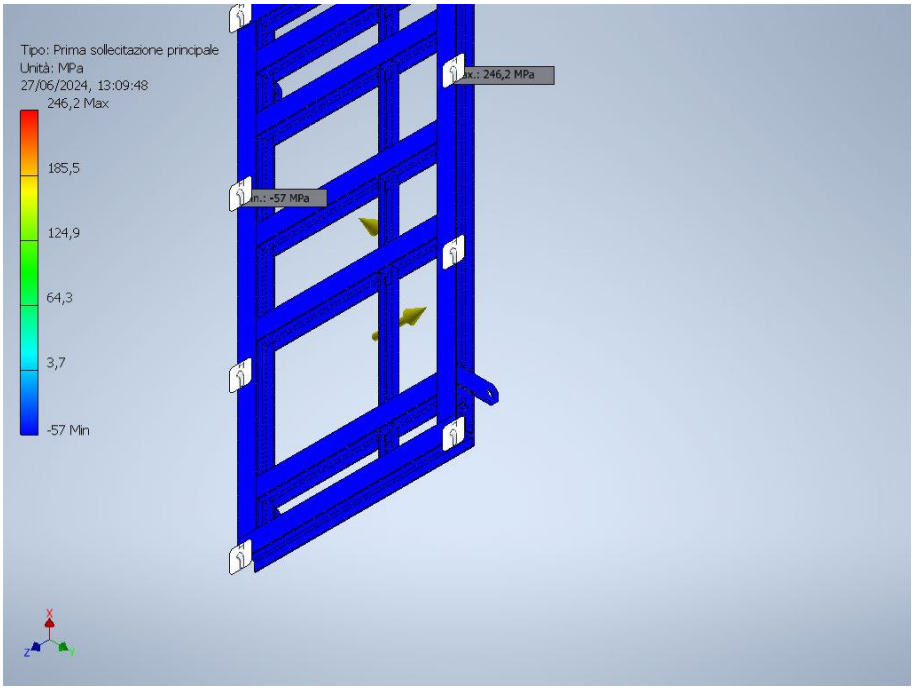
Von Mises stress



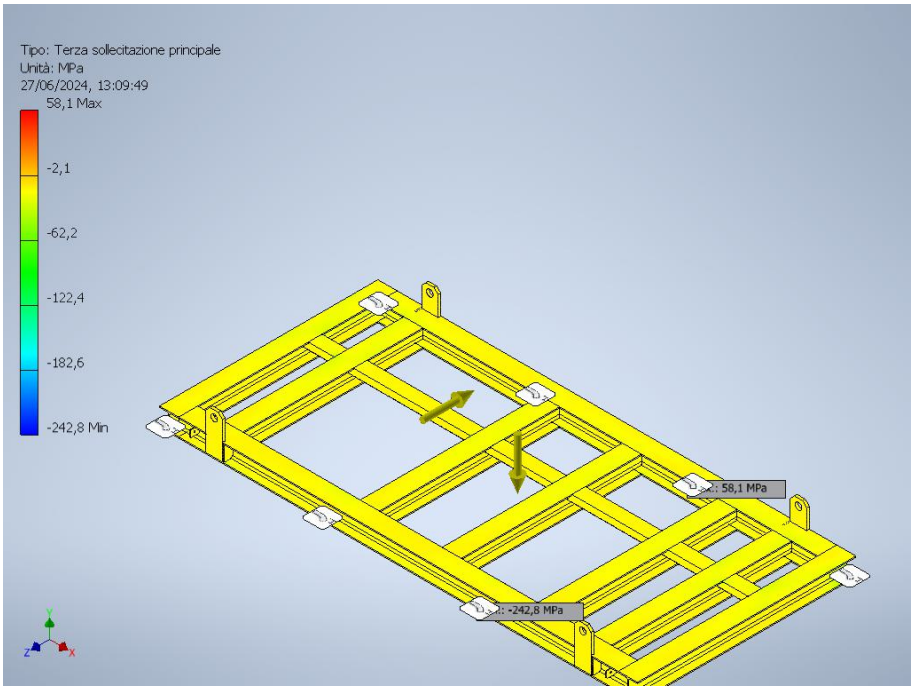


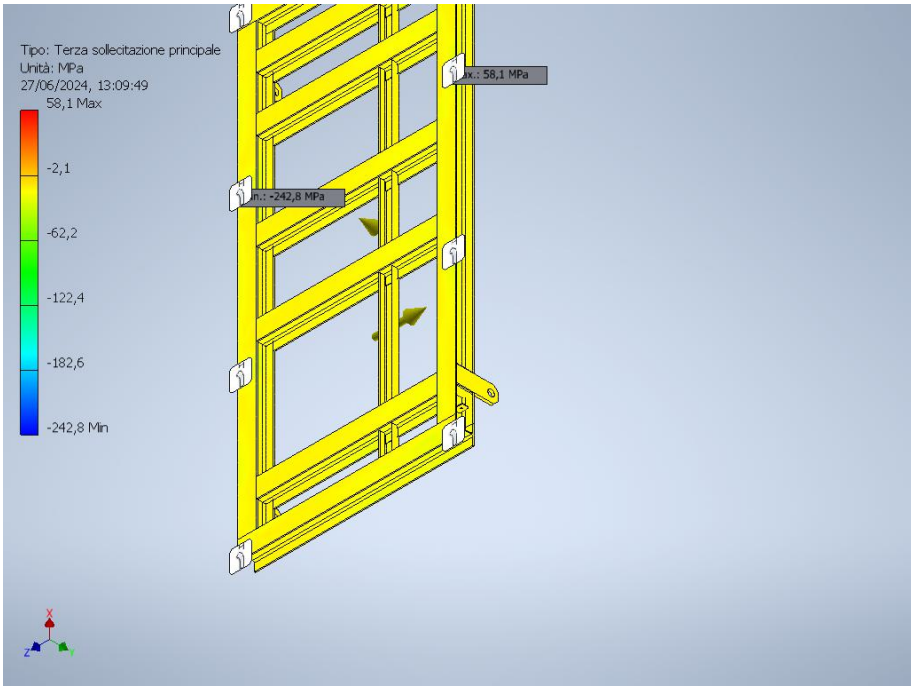
First principal stress



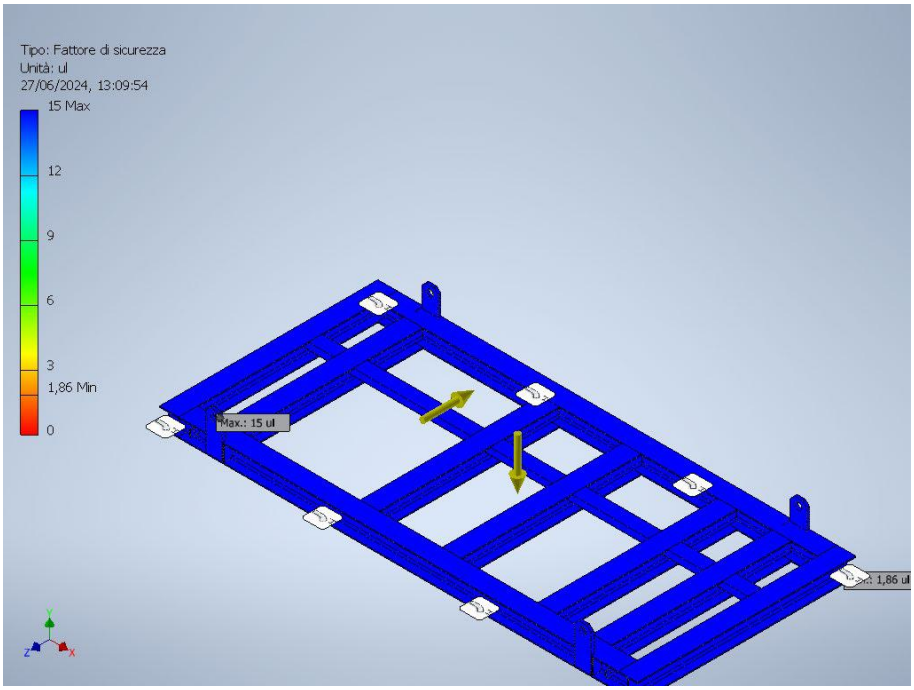


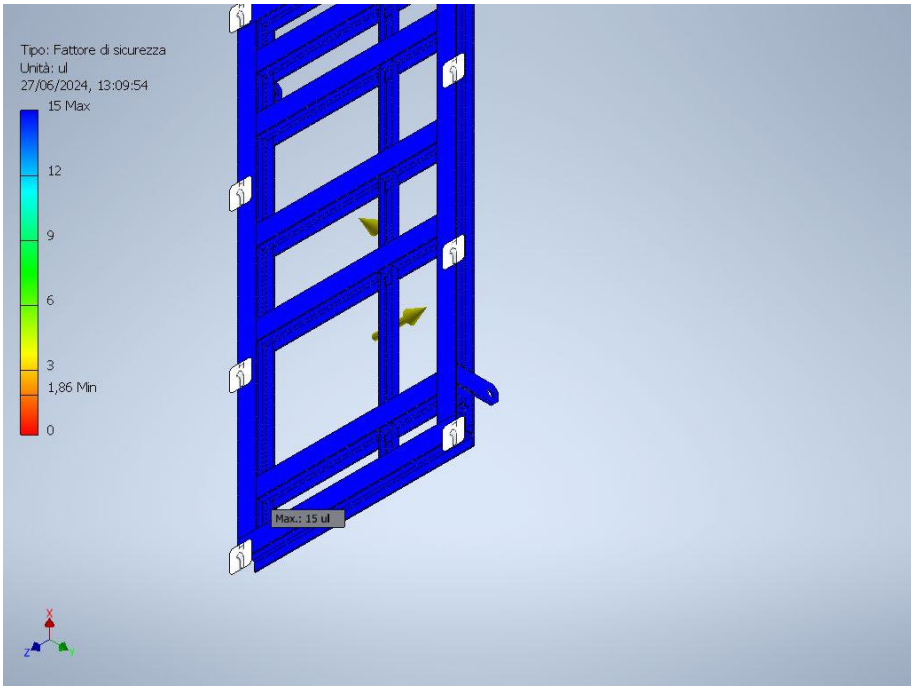
Third principal stress





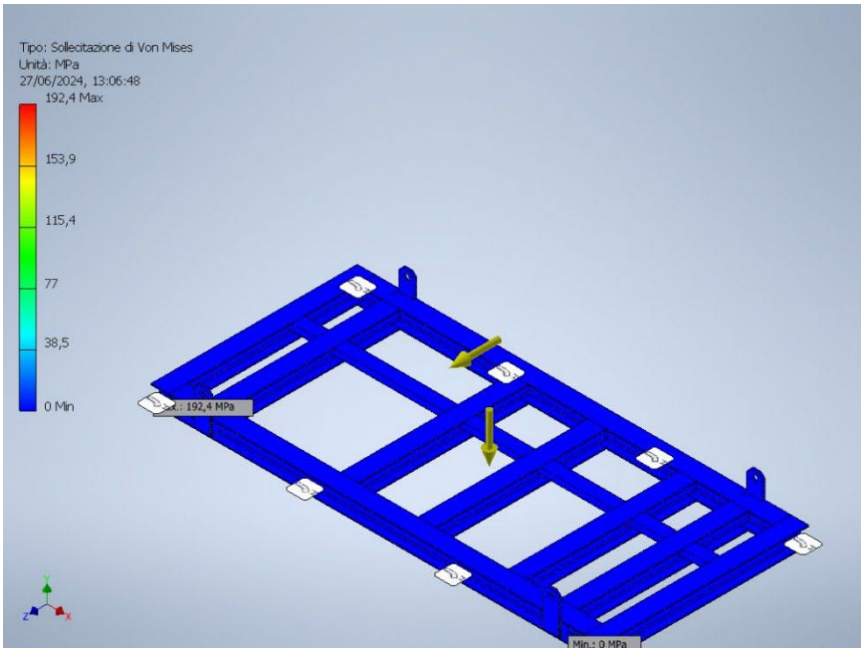
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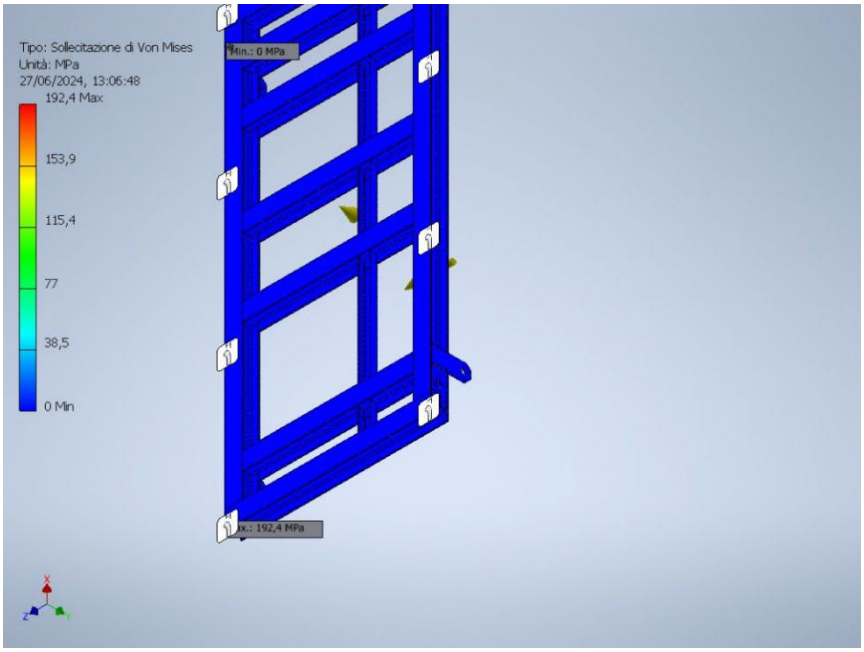




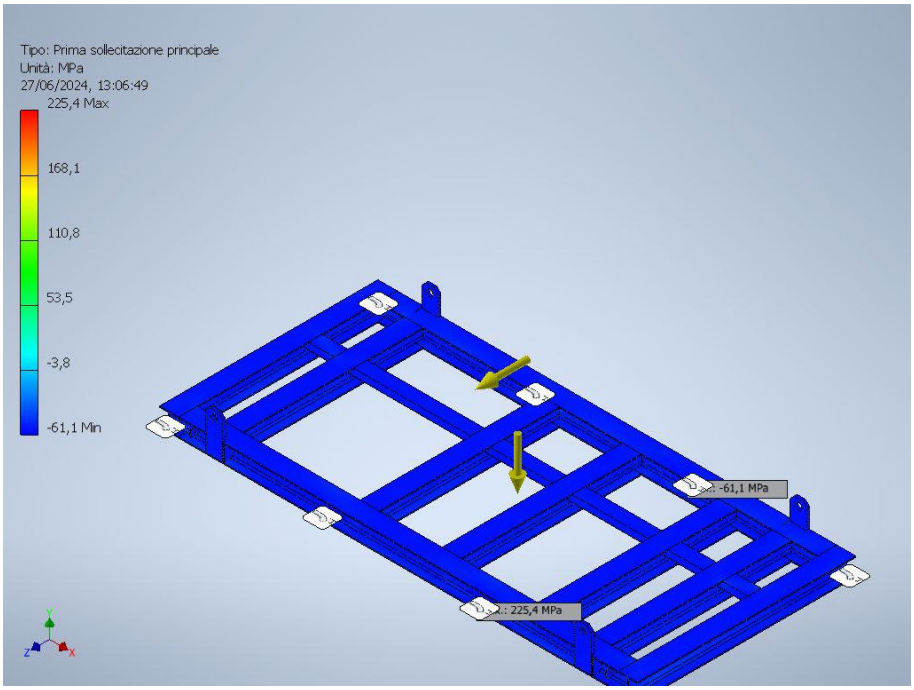
3.6.4 TRANSPORTATION LOAD + WIND (Z+ DIRECTION)

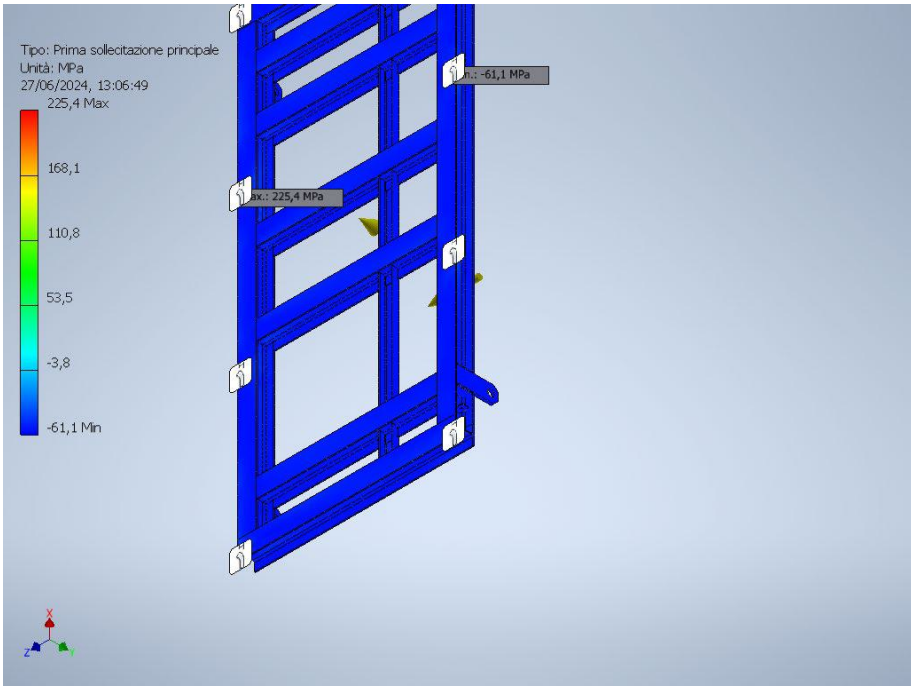
Von Mises stress



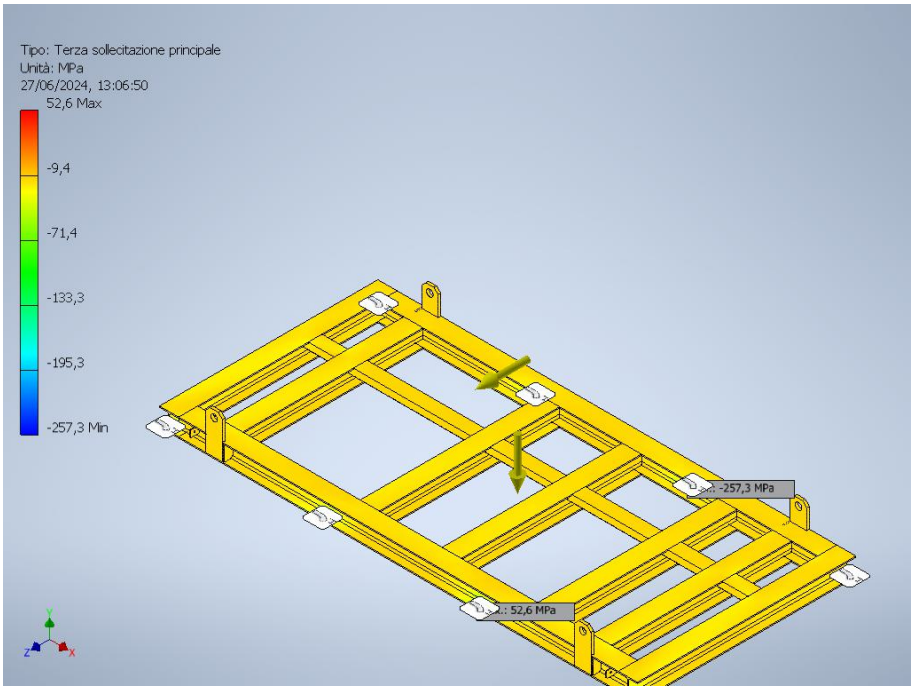


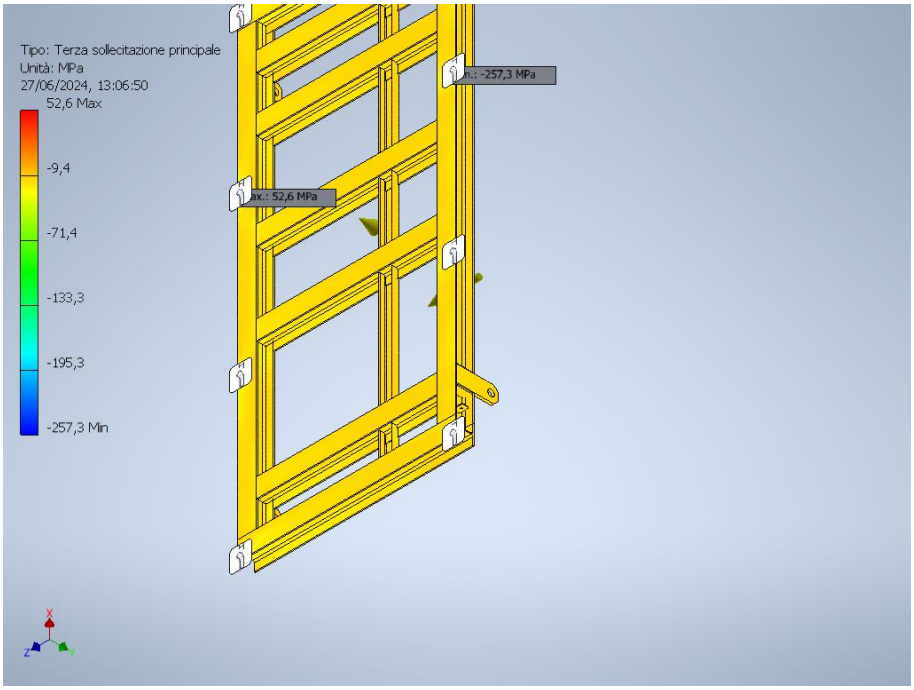
First principal stress



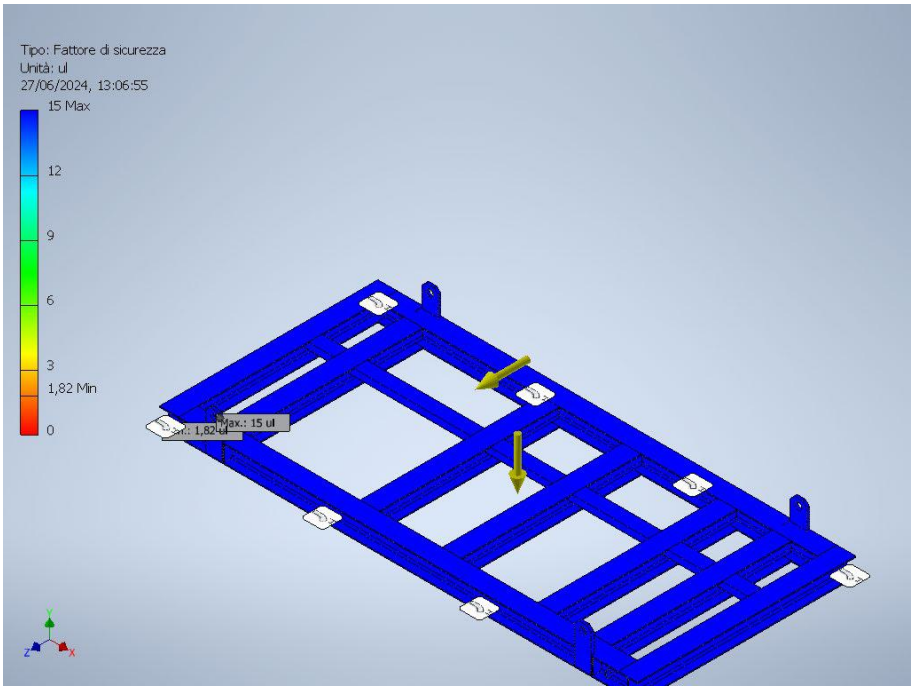


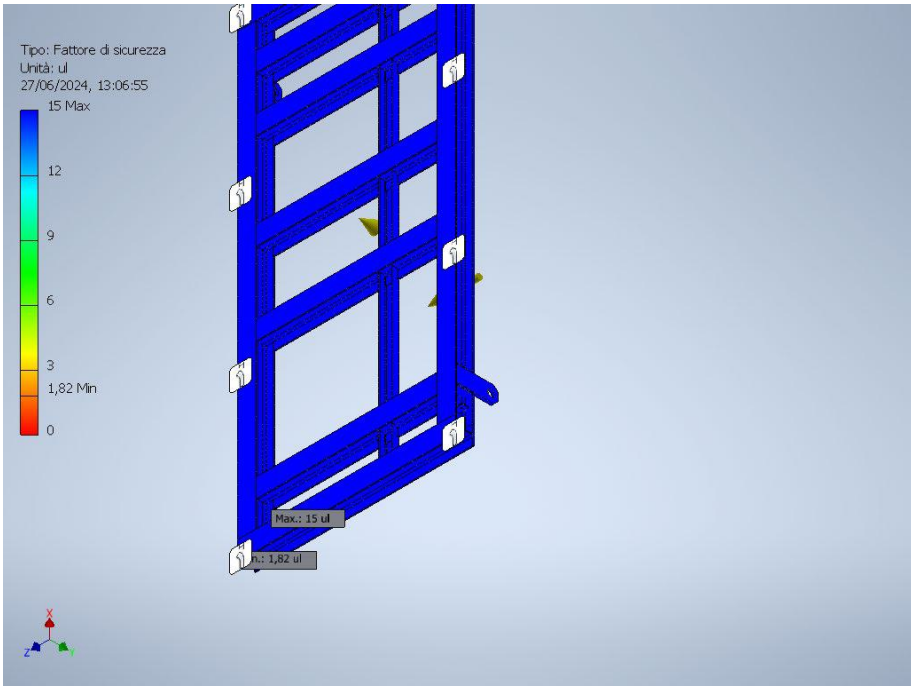
Third principal stress





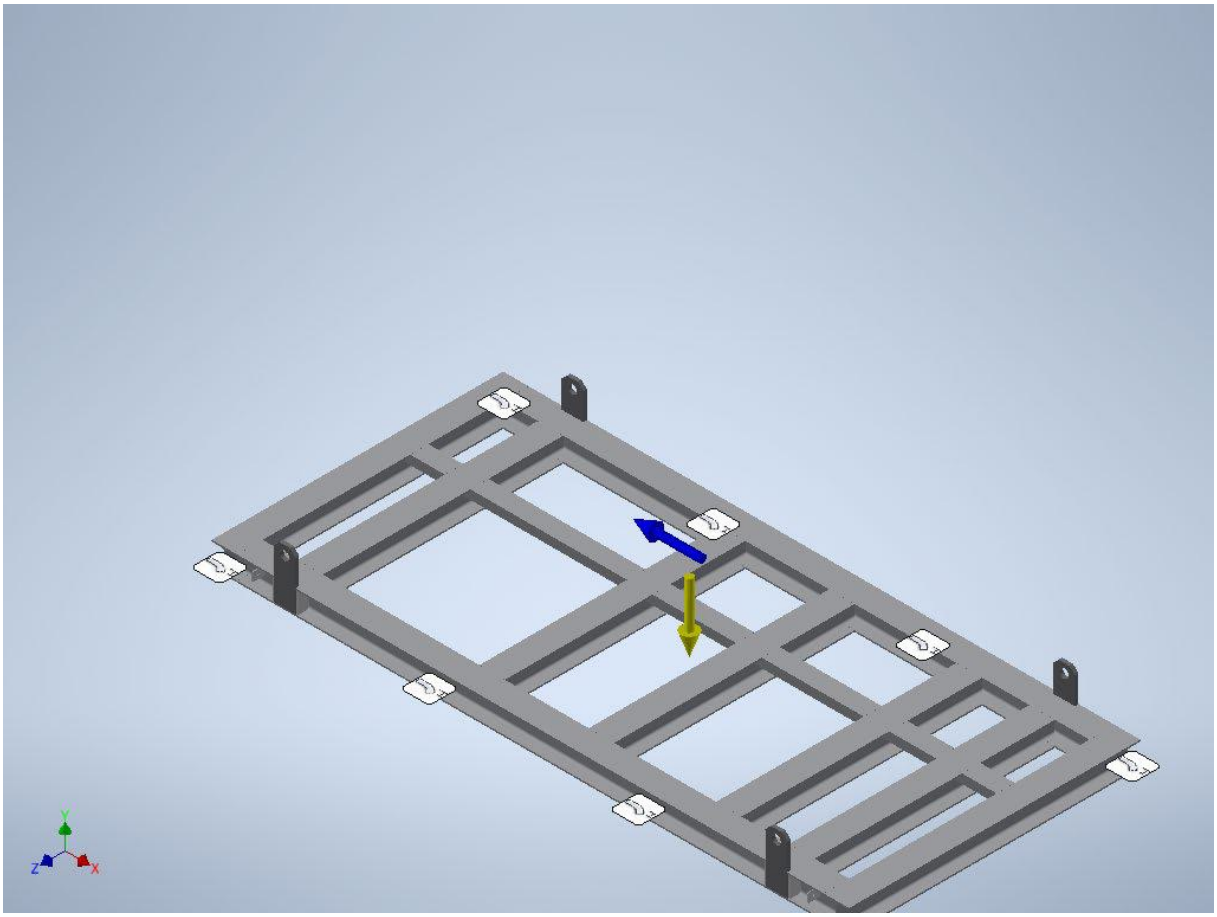
Safety factor





3.7 ANCHOR BOLTS CHECK

The skid is constrained to the main structure in no.8 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		Momento di reazione	
	Intensità	Componente (X,Y,Z)	Intensità	Componente (X,Y,Z)
Vincolo di fissaggio:1	953,481	-759,395	5,743	1,884
		-241,636		-3,258
		-523,506		-4,338
Vincolo di fissaggio:2	914,648	-785,647	7,480	-2,289
		-243,072		5,513
		400,321		-4,507
Vincolo di fissaggio:3	1315,950	-634,428	30,559	30,550
		1112,450		-0,183
		-302,764		0,719
Vincolo di fissaggio:4	1941,440	-1455,680	16,279	6,560
		964,290		4,150
		-848,721		-14,309
Vincolo di fissaggio:5	2000,460	-1487,350	22,785	-7,601
		968,326		-2,660
		923,040		-21,314
Vincolo di fissaggio:6	1349,900	-560,094	31,181	-31,131
		1172,690		-1,752
		365,121		0,256
Vincolo di fissaggio:7	812,095	-674,650	12,612	-11,951
		443,855		-3,690
		85,665		1,621
Vincolo di fissaggio:8	850,948	-728,808	11,922	11,406
		427,915		3,179
		-99,200		1,391

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-0,56	X	0,03
Y	1,17	Y	0,01
Z	0,92	Z	0,00

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-1,49	X	-0,03
Y	-0,24	Y	0,00
Z	-0,85	Z	-0,02

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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	1833,910	1339,200	20,666	-7,593
		914,468		1,033
		856,459		19,192
Vincolo di fissaggio:2	1748,520	1298,780	21,068	7,716
		887,678		-2,853
		-763,228		19,395
Vincolo di fissaggio:3	1129,110	986,275	14,316	13,983
		508,699		-2,949
		-208,264		-0,846
Vincolo di fissaggio:4	733,707	617,398	6,407	-1,752
		-195,604		-6,001
		344,796		1,401
Vincolo di fissaggio:5	789,998	609,002	4,783	1,718
		-191,936		2,919
		-465,160		3,378
Vincolo di fissaggio:6	1024,910	856,356	14,404	-14,255
		530,022		1,783
		190,180		-1,042
Vincolo di fissaggio:7	1328,460	699,782	28,171	28,142
		1061,690		-1,197
		-384,601		0,438
Vincolo di fissaggio:8	1354,040	679,085	28,842	-28,814
		1089,780		-0,910
		429,700		0,875

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	1,34	X	0,03
Y	1,09	Y	0,00
Z	0,86	Z	0,02

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	0,61	X	-0,03
Y	-0,20	Y	-0,01
Z	-0,76	Z	0,00

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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	1509,590	1421,790	11,719	-9,468
		448,142		3,240
		-237,824		6,099
Vincolo di fissaggio:2	3966,000	982,321	49,260	13,372
		1531,500		33,272
		-3524,020		33,774
Vincolo di fissaggio:3	6421,680	-2562,120	63,413	61,475
		2581,490		-15,482
		-5292,390		-1,539
Vincolo di fissaggio:4	3908,560	-2348,860	28,089	9,843
		1534,980		-13,028
		-2720,930		-22,856
Vincolo di fissaggio:5	994,434	763,208	19,939	-8,997
		526,105		15,457
		360,037		-8,816
Vincolo di fissaggio:6	5529,690	4755,480	10,279	4,912
		-2423,490		-8,677
		1445,550		2,501
Vincolo di fissaggio:7	8209,050	3982,340	75,821	56,043
		2539,350		51,069
		-6714,250		0,140
Vincolo di fissaggio:8	7943,080	-6992,860	79,546	-11,839
		-2670,560		77,823
		2657,160		11,440

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	4,76	X	0,06
Y	2,58	Y	0,08
Z	2,66	Z	0,03

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-6,99	X	-0,01
Y	-2,67	Y	-0,02
Z	-6,71	Z	-0,02

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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	4077,310	1360,140	50,471	-13,529
		1575,440		-35,228
		3506,060		33,515
Vincolo di fissaggio:2	1887,840	1800,310	12,939	9,024
		560,341		-5,335
		93,904		7,585
Vincolo di fissaggio:3	5118,560	4212,700	13,427	-6,954
		-2530,380		10,806
		-1431,770		3,892
Vincolo di fissaggio:4	852,432	482,983	21,478	12,430
		602,082		-17,080
		-361,753		-3,880
Vincolo di fissaggio:5	3998,310	-2660,430	37,952	-12,395
		1544,710		12,269
		2553,910		-33,707
Vincolo di fissaggio:6	6483,640	-2598,040	61,138	-60,559
		2624,160		8,363
		5329,310		-0,765
Vincolo di fissaggio:7	7578,470	-6553,940	76,304	7,961
		-2835,900		-74,804
		-2537,090		12,777
Vincolo di fissaggio:8	8325,220	3955,850	78,646	-56,214
		2526,290		-54,923
		6875,920		2,934

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	4,21	X	0,01
Y	2,62	Y	0,01
Z	6,88	Z	0,03

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-6,55	X	-0,06
Y	-2,84	Y	-0,07
Z	-2,54	Z	-0,03

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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	10029,700	-6259,460	87,061	37,181
		-3992,750		-7,884
		-6743,360		-78,327
Vincolo di fissaggio:2	9520,700	-6345,660	92,743	-40,419
		-3938,430		25,118
		5904,660		-79,603
Vincolo di fissaggio:3	5540,090	-4154,310	96,734	96,564
		3600,200		4,261
		-687,622		3,853
Vincolo di fissaggio:4	7097,460	-6151,200	51,452	16,137
		2774,890		25,476
		-2199,240		-41,688
Vincolo di fissaggio:5	7342,170	-6230,310	68,065	-20,157
		2810,120		-18,892
		2682,140		-62,207
Vincolo di fissaggio:6	5574,640	-4043,590	96,202	-95,585
		3685,940		-10,642
		1067,630		2,272
Vincolo di fissaggio:7	4301,410	-4269,050	14,849	-3,273
		-159,761		13,415
		501,803		5,459
Vincolo di fissaggio:8	3963,900	-3926,770	14,135	3,127
		-139,577		-12,736
		-522,978		5,274

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-3,93	X	0,10
Y	3,69	Y	0,03
Z	5,90	Z	0,01

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-6,35	X	-0,10
Y	-3,99	Y	-0,02
Z	-6,74	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	7159,540	6061,350	63,095	-20,402
		2732,670		15,515
		2655,480		57,655
Vincolo di fissaggio:2	6787,920	5866,630	65,975	20,797
		2644,710		-22,300
		-2159,620		58,505
Vincolo di fissaggio:3	5105,370	5104,240	12,518	0,352
		-2,969		-11,316
		-107,369		-5,341
Vincolo di fissaggio:4	9371,620	5939,610	70,540	-35,606
		-3965,710		-36,341
		6068,070		48,860
Vincolo di fissaggio:5	10021,300	6129,010	89,524	36,722
		-3965,770		11,847
		-6865,380		80,783
Vincolo di fissaggio:6	4379,330	4378,900	11,035	0,301
		-36,391		9,578
		48,864		-5,471
Vincolo di fissaggio:7	5504,070	3997,100	93,461	92,941
		3605,610		-9,834
		-1147,840		-0,416
Vincolo di fissaggio:8	5538,280	3903,060	93,936	-93,813
		3627,500		4,618
		1509,940		1,332

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	6,13	X	0,09
Y	3,63	Y	0,02
Z	6,07	Z	0,08

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	3,90	X	-0,09
Y	-3,97	Y	-0,04
Z	-6,87	Z	-0,01

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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:2	13116,600	3002,630	164,710	62,586
		6903,890		68,701
		-10740,800		135,987
Vincolo di fissaggio:3	7228,090	-220,289	123,014	121,945
		4872,390		-16,149
		-5334,470		-1,059
Vincolo di fissaggio:4	12920,300	-4946,220	109,620	46,559
		7307,120		-35,131
		-9438,010		-92,815
Vincolo di fissaggio:5	6040,970	3839,570	83,131	22,995
		-3819,850		-9,131
		-2675,780		79,363
Vincolo di fissaggio:6	7507,200	910,543	126,630	126,567
		-5669,190		-2,676
		-4836,240		2,972
Vincolo di fissaggio:7	7520,630	-542,286	120,190	117,868
		-5485,530		22,882
		-5116,120		-5,408
Vincolo di fissaggio:8	6481,150	1214,070	99,421	94,926
		3974,910		29,314
		-4973,080		3,797
Vincolo di fissaggio:1	7114,850	-3262,470	75,648	15,825
		-3390,970		31,366
		-5336,540		-66,995

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	3,84	X	0,13
Y	7,31	Y	0,07
Z	-2,68	Z	0,14

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-4,95	X	0,02
Y	-5,67	Y	-0,04
Z	-10,74	Z	-0,09

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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:2	6774,150	-2895,760	75,912	-14,625
		-3327,480		-27,622
		5141,160		-69,179
Vincolo di fissaggio:3	7400,780	778,801	128,935	-128,235
		-5621,690		12,924
		4749,900		3,598
Vincolo di fissaggio:4	6339,540	3538,850	55,257	-4,367
		-3853,360		11,841
		3580,210		53,796
Vincolo di fissaggio:5	12453,800	-5597,080	163,139	-62,672
		7231,360		38,793
		8454,460		-145,539
Vincolo di fissaggio:6	7454,840	66,443	123,403	-123,194
		5052,430		7,170
		5481,160		-0,475
Vincolo di fissaggio:7	6467,760	1266,080	100,282	-93,229
		3879,860		-36,367
		5017,540		6,511
Vincolo di fissaggio:8	7611,770	-477,523	122,625	-121,745
		-5642,760		-14,548
		5086,280		-1,884
Vincolo di fissaggio:1	13392,500	3316,800	166,277	-61,617
		6974,550		-78,498
		10941,400		133,002

MAX			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	3,54	X	0,00
Y	7,23	Y	0,04
Z	10,94	Z	0,13

min			
Forza di reazione [kN]		Momento di reazione [kNm]	
	Componente (X,Y,Z)		Componente (X,Y,Z)
X	-5,60	X	-0,13
Y	-5,64	Y	-0,08
Z	3,58	Z	-0,15

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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	4,76	2,62	6,88
Transportation + wind Max	8.8	M12	6,13	7,31	10,94
Static + wind min	8.8	M12	-6,99	-2,84	-6,71
Transportation + wind min	8.8	M12	-6,35	-5,67	-10,74

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	2,62	6,88	54,32	36,22
Transportation + wind Max	8.8	M12	7,31	10,94	54,32	36,22
Static + wind min	8.8	M12	2,84	6,71	54,32	36,22
Transportation + wind min	8.8	M12	5,67	6,35	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

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 192,405 MPa

- the maximum calculated First Principal Stress is equal to 246,163 MPa

- the maximum calculated Third Principal Stress is equal to 58,114 MPa

The displacement can be considered negligible.

Safety factor is 1,82.

The actual design of the structure can be considered acceptable.

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Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE
NITROGEN RECEIVER CALCULATION

Document Number: 1724000437-MAC-CA-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

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	12/12/2025

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
03	03/02/2025	Accepted for Construction (AFC)	GT	MC	TM
02	21/12/2024	Accepted for Construction (AFC)	GT	MC	TM
01	07/07/2024	Issue for Review (IFR)	GT	MC	TM
00	28/05/2024	Issue for Review (IFR)	GT	MC	TM

COES

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DESIGN CALCULATION

In Accordance with ASME Section VIII Division 1

ASME Code Version : 2023

Analysis Performed by : Coes S.r.l.

Job File : ...\N2 Receiver R2.pvdb

Date of Analysis : Dec 21,2024 8:58am

PV Elite 26 SP1, March 2024

Vessel Design Summary:

ASME Code, Section VIII Division 1, 2023

Diameter Spec : 2000.000 mm. OD

Vessel Design Length, Tangent to Tangent	3120.00	mm.
Distance of Bottom Tangent above Grade	0.00	mm.
Specified Datum Line Distance	60.00	mm.
Internal Design Temperature	80	°C
Internal Design Pressure	12.000	barg
External Design Temperature	-8	°C
Maximum Allowable Working Pressure	12.72	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	12.500	0.00	12.770	3.0000	No	No
Cylinder	12.500	0.00	13.460	3.0000	N/A	No
Cylinder	12.500	0.00	13.460	3.0000	N/A	No
Ellipse	12.500	0.00	12.770	3.0000	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	15.0	12.5	12.0	...	1.00	0.85

Cylinder	2000.0	2000.0	15.0	14.9	13.6	...	0.85	0.85
Cylinder	3000.0	1000.0	15.0	14.9	13.6	...	0.85	0.85
Ellipse	3060.0	60.0	15.0	12.5	12.0	...	1.00	0.85

Loads for Foundation/Support Design:

Total Wind Shear on top of all Legs	1394.	kgf
Total Earthquake Shear on top of all Legs	2437.	kgf
Total Wind Moment at top of all Legs	1692.	kg.m.
Total Earthquake Moment at top of all Legs	2802.	Kg.m.
Wind Load Case Test Moment on Support	558.	Kg.m.
Test Case Wind Shear on Support	460.	Kgf
Max. Wind Shear on one Leg (top & bottom)	516.	Kgf
Max. Earthq. Shear on one Leg (top & bottom)	901.	Kgf
Max. Wind Moment at base of one Leg	665.	Kg.m.
Max. Earthquake Moment at base of one Leg	1162.	Kg.m.
Max. Vertical Load (Wt. + Wind) on one Leg	1632.	Kgf
Max. Vertical Load (Wt. + Eq.) on one Leg	2133.	Kgf

For the Pressure Test Case:

Max. Wind Shear on one Leg (top & bottom)	170.	Kgf
Max. Wind Moment at base of one Leg	219.	Kg.m.
Max. Vertical Load (Wt. + Wind) on one Leg	4132.	Kgf
Max. Vertical Load (Wt. + Eq.) on one Leg	3880.	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	0.035	n/a	Passed
LEGS	WRC-107/537	0.730	n/a	Passed
LEGS	WRC-107/537	0.543	n/a	Passed

Weights:

Fabricated - Bare W/O Removable Internals	3994.0	kg.
Shop Test - Fabricated + Water (Full)	15520.5	kg.
Shipping - Fab. + Rem. Intls.+ Shipping App.	3994.0	kg.
Erected - Fab. + Rem. Intls.+ Insul. (etc)	3994.0	kg.
Empty - Fab. + Intls. + Details + Wghts.	3994.0	kg.
Operating - Empty + Operating Liquid (No CA)	3994.0	kg.
Field Test - Empty Weight + Water (Full)	15520.5	kg.

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Nozzle Calculation Summary (barg & mm.):

Description	MAWP	Ext	MAPNC	UG-45	[tr]	Weld Path	Areas or Stresses
Drain	12.77	...	...	OK	5.95	OK	No Calc[*]
PG	13.46	...	...	OK	6.12	OK	No Calc[*]
PT	13.46	...	...	OK	6.12	OK	No Calc[*]
IN/OUT	13.46	...	...	OK	5.95	OK	No Calc[*]
MAN HOLE	12.72	...	...	...		OK	Passed
PSV	12.77	...	...	OK	6.42	OK	No Calc[*]

Nozzle MAWP Summary:

Minimum MAWP Nozzles	:	12.72 Nozzle	: MAN HOLE
Minimum MAWP Shells/Flanges	:	12.72 Element	:
Minimum MAPnc Shells/Flanges	:	17.43 Element	:
Computed Vessel M.A.W.P.	:	12.72 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	52.401
20	PG	360.000	75.000	61.800
20	PT	360.000	105.000	61.800
20	IN/OUT	360.000	180.000	57.101
20	MAN HOLE	460.000	270.000	764.800
50	PSV	0.000	0.000	97.700

The nozzle spacing is computed by the following:

= sqrt($ll^2 + lc^2$) 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	...	...	112.58	150
IN/OUT	1.000 in	XXS	WNF	1.315	9.093	...	...	47.77	150
PG	1.500 in	Actual	None	1.500	8.382	...	...	47.81	...
PT	1.500 in	Actual	None	1.500	8.382	...	...	47.81	...
PSV	2.000 in	160	WNF	2.375	8.738	...	...	112.75	150
MAN HOLE	16.000 in	Actual	WNF	16.000	15.000	510.00	15.00	68.81	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	12.500	10.000	...	...	...
IN/OUT	SA-333 6	14.850	10.000	...	...	...
PG	SA-350 LF2	14.850	10.000	...	...	...
PT	SA-350 LF2	14.850	10.000	...	...	...
PSV	SA-333 6	12.500	10.000	...	...	...
MAN HOLE	SA-516 70	14.850	15.000	10.000	15.000	...

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
IN/OUT	300.000	180.0	32.78	0.00	Node: 20
PG	300.000	75.0	32.78	0.00	Node: 20
PT	300.000	105.0	32.78	0.00	Node: 20
PSV	...	0.0	100.00	0.00	Node: 50
MAN HOLE	400.000	270.0	32.78	0.00	Node: 20

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Bill of Materials:

QTY	DESCRIPTION	MATERIAL
2	ELLIPTICAL HEAD: 2.0 X 1, 15.0mm. THK X 1975.0mm. ID X 60.0mm.	SA-516 70
4	LEGS, SHAPE: HE200B 1290.0mm	...
4	BASEPLATES: 400.0mm X 400.0mm X 40.0mm	SA-516 70
24	BASEPLATE BOLTS: 30.0mm	SA-307 B
4	LEG RE-PADS: 300.000mm X 350.000mm X 15.000mm	SA-516 70
2	TRUNNIONS:	SA-516 70
2	TRUNNION PADS: 320.0mm OD X 219.1mm ID X 15.0mm THK	
1	CLASS 150 GR 1.1, 16.0" BLIND FLANGE(S)	SA-350 LF2
1	CYLINDRICAL SEGMENT 15.0mm. THK X 3008.9mm. X 2000.0mm.	SA-516 70
1	CYLINDRICAL SEGMENT 15.0mm. THK X 2991.7mm. X 2000.0mm.	SA-516 70
1	CYLINDRICAL SEGMENT 15.0mm. THK X 189.1mm. X 2000.0mm.	SA-516 70
1	CYLINDRICAL SEGMENT 15.0mm. THK X 3002.7mm. X 1000.0mm.	SA-516 70
1	CYLINDRICAL SEGMENT 15.0mm. THK X 3187.1mm. X 1000.0mm.	SA-516 70
1	CYLINDRICAL SEGMENT 15.0mm. THK X 0.0mm. X 1000.0mm.	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	-29	-29	0.997	12.500	1.00	No
	[7]	!	-29	-40	-29	0.796	15.000	1.00	No
	[8]	!	-29	-40	-29	0.806	14.850	0.85	No
	[8]	!	-29	-40	-29	0.806	14.850	0.85	No
	[10]	!	-29	-29	-29	0.997	12.500	1.00	No
	[7]	!	-29	-40	-29	0.796	15.000	1.00	No
Drain	[1]	!	-46	-104		0.023	7.957	1.00	No
Nozzle Flg	[5]	!	-46	-66					
PG	[1]	!	-46	-104		0.032	8.382	1.00	No
PT	[1]	!	-46	-104		0.032	8.382	1.00	No
IN/OUT	[1]	!	-46	-104		0.036	7.957	1.00	No
Nozzle Flg	[5]	!	-46	-66					
MAN HOLE	[1]	B	-16	-30	-29	0.760	14.850	1.00	No
Nozzle Flg	[5]	B	-46	-48					
PSV	[1]	!	-46	-104		0.054	7.645	1.00	No
Nozzle Flg	[5]	!	-46	-67					
Nozl. Bolting	[22]		-48			1.000	63.500	1.00	No
Warmest MDMT:			-16	-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	cm²
Moment	ft. lbs.	0.1383	Kg.m.
Stress	lbs./sq.in.	0.0069	N./mm²
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./cm³
Ins. Density	lbs./cu.ft.	0.1600E-04	kg./cm³
Fluid Density	lbs./cu.ft.	0.1600E-04	kg./cm³
Wind Speed	miles/hr	1.6093	Km/hr
Tray Weight	lbs./sq.ft.	0.0005	Kgs/cm²
Inertia	in.^4	41.6231	cm^4
G Load	G's	1.0000	g's
Wind Load	lbs./sq.ft.	4.8825	Kgs/m²
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	80.0	°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	2000	mm.
Element Thickness	12.5	mm.
Internal Corrosion Allowance	3	mm.
Nominal Thickness	15	mm.
External Corrosion Allowance	0	mm.
Design Internal Pressure	12	barg
Design Temperature Internal Pressure	80	°C
Design External Pressure	0	barg
Design Temperature External Pressure	-8	°C
Effective Diameter Multiplier	1.2	

Material Name	SA-516 70 [Impact Tested]	
Allowable Stress, Ambient	137.9	N./mm²
Allowable Stress, Operating	137.9	N./mm²
Allowable Stress, Hydrotest	179.27	N./mm²
Material Density	0.00775	kg./cm³
P Number Thickness	30.988	mm.
Yield Stress, Operating	242.93	N./mm²
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)	1.9812	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	30	
Element Type	Cylinder	
Description		
Distance "FROM" to "TO"	2000	mm.
Element Outside Diameter	2000	mm.
Element Thickness	14.85	mm.
Internal Corrosion Allowance	3	mm.
Nominal Thickness	15	mm.
External Corrosion Allowance	0	mm.
Design Internal Pressure	12	barg
Design Temperature Internal Pressure	80	°C
Design External Pressure	0	barg
Design Temperature External Pressure	-8	°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	75.0	
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	300	mm.
Nozzle Diameter	1.5	in.
Nozzle Schedule	None	
Nozzle Class	None	
Layout Angle	105.0	
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	IN/OUT	
Dist. from "FROM" Node / Offset dist	300	mm.
Nozzle Diameter	1	in.
Nozzle Schedule	XXS	
Nozzle Class	150	
Layout Angle	180.0	
Blind Flange (Y/N)	N	
Weight of Nozzle (Used if > 0)	1.6319	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	400	mm.
Nozzle Diameter	16	in.
Nozzle Schedule	None	
Nozzle Class	150	
Layout Angle	270.0	
Blind Flange (Y/N)	Y	
Weight of Nozzle (Used if > 0)	74.097	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	2220	mm.
Leg Orientation	2	
Number of Legs	4	
Section Identifier	HE200B	
Length of Legs	1290	mm.

Element#	3/4	
Element From Node	30	
Element To Node	50	
Element Type	Cylinder	
Description		
Distance "FROM" to "TO"	1000	mm.
Element Outside Diameter	2000	mm.
Element Thickness	14.85	mm.
Internal Corrosion Allowance	3	mm.
Nominal Thickness	15	mm.
External Corrosion Allowance	0	mm.
Design Internal Pressure	12	barg

Design Temperature Internal Pressure	80	°C
Design External Pressure	0	barg
Design Temperature External Pressure	-8	°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	2000	mm.
Element Thickness	12.5	mm.
Internal Corrosion Allowance	3	mm.
Nominal Thickness	15	mm.
External Corrosion Allowance	0	mm.
Design Internal Pressure	12	barg
Design Temperature Internal Pressure	80	°C
Design External Pressure	0	barg
Design Temperature External Pressure	-8	°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	PSV	
Dist. from "FROM" Node / Offset dist	0	mm.
Nozzle Diameter	2	in.
Nozzle Schedule	160	
Nozzle Class	150	
Layout Angle	0.0	
Blind Flange (Y/N)	N	
Weight of Nozzle (Used if > 0)	4.5645	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	30	...	2060	...	2000
30	50	...	3060	...	1000
50	60	...	3120	...	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./mm²	Element#
10	20	12.5	15	3	2000	137.9	1
20	30	12.5	15	3	2000	117.22	2
30	50	12.5	15	3	2000	117.22	3
50	60	12.5	15	3	2000	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	12.77	17.43	12.5	11.9559	1
20	30	12	13.46	17.51	14.85	13.6195	2
30	50	12	13.46	17.51	14.85	13.6195	3
50	60	12	12.77	17.43	12.5	11.9559	4
Minimum			12.72	17.43			

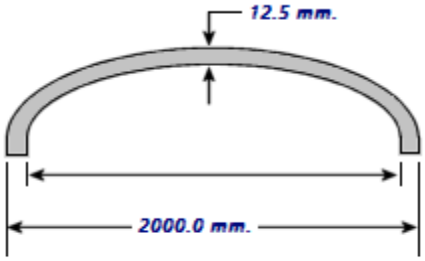
MAWP: 12.72 barg, limited by: Nozzle Reinforcement.

Elements Suitable for Design Internal Pressure.

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Internal Pressure Calculation Results:

ASME Code, Section VIII Division 1, 2023



Internal Pressure Results for: Element # 1

Elliptical Head Design Information:			
Design Pressure P	12.500 barg	Int. Design Temperature	80 °C
Material	SA-516 70	Ext. Design Temperature	-8 °C
Length	60.000 mm.	External Pressure Chart	CS-2
		UNS Number	K02700
Int. Corr. All. c	3.0000 mm.	Allowable Stress (ope) S	137.9 N./mm²
Ext. Corr. All. ce	0.0000 mm.	Allowable Stress (amb) Sa	137.9 N./mm²
Outside Diameter Do	2000.000 mm.	Actual Stress	129.9 N./mm²
Spec. Min. Thk t or e	12.5000 mm.	Spec. Nominal Thk.	15.000 mm.
Surface Area	47355.8 cm²	SG of Contents	0.000
Element Volume	1192442.6 cm³	Weight of Contents	0.0 Kgf
Empty Weight	594.6 Kgf	Operating Weight	594.6 Kgf
		Comp. All. Ope. Stress	108.5 N./mm²
		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: 24.812 mm.
Head inner surface maximum deviation inside the specified shape, 0.625% of D: 12.406 mm.

Required Thickness due to Internal Pressure [tr]:
= (P*Do*Kcor)/(2*S*E+2*P*(Kcor-0.1)) per Appendix 1-4 (c)
= (12.5*2000*0.996)/(2*137.9*1+2*12.5*(0.996-0.1))
= 8.9559 + 3.0000 = 11.9559 mm.

Max. Allowable Working Pressure at given Thickness, corroded [MAWP]:
Less Operating Hydrostatic Head Pressure of 0.500 barg
= (2*S*E*t)/(Kcor*Do-2*t*(Kcor-0.1)) per Appendix 1-4 (c)
= (2*137.9*1*9.5)/(0.996*2000-2*9.5*(0.996-0.1))
= 13.27 - 0.5 = 12.77 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*12.5)/(1*2000-2*12.5*(1-0.1))

= 17.43 barg

Actual stress at given pressure and thickness, corroded [Sact]:
= (P*(Kcor*Do-2*t*(Kcor-0.1)))/(2*E*t)
= (12.5*(0.996*2000-2*9.5*(0.996-0.1)))/(2*1*9.5)
= 129.938 N./mm²

Straight Flange Required Thickness:
= (P*Ro)/(S*E+0.4*P) + ca per Appendix 1-1 (a)(1)
= (12.5*1000)/(137.9*1+0.4*12.5)+3
= 12.032 mm.

Straight Flange Maximum Allowable Working Pressure:
Less Operating Hydrostatic Head Pressure of 0.500 barg
= (S*E*t)/(Ro-0.4*t) per Appendix 1-1 (a)(1)
= (137.9 * 1 * 12)/(1000 - 0.4 * 12)
= 16.63 - 0.5 = 16.13 barg

Factor K, corroded condition [Kcor]:
= (2 + (Inside Diameter/(2 * Inside Head Depth))²)/6
= (2 + (1981/(2 * 496.8))²)/6
= 0.995980

Percent Elong. per UCS-79, VIII-1-01-57 (75*tnom/Rf)*(1-Rf/Ro) 3.286 %

MDMT Calculations in the Knuckle Portion:

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

MDMT Calculations in the Head Straight Flange:

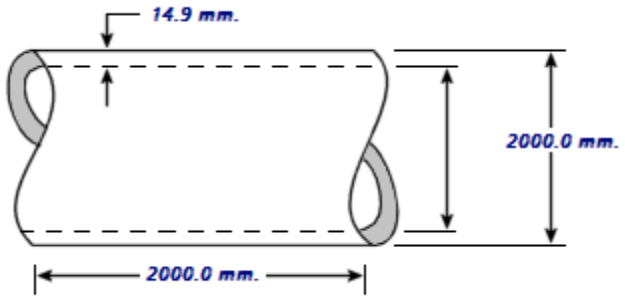
Note: This Element/Detail was specified as being Impact Tested.

Tolerance for Formed Heads per UG-81(a):
Head inner surface maximum deviation outside the specified shape, 1.25% of D: 24.812 mm.
Head inner surface maximum deviation inside the specified shape, 0.625% of D: 12.406 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	12.500 barg	Int. Design Temperature	80 °C
Material	SA-516 70	Ext. Design Temperature	-8 °C
Length	2000.000 mm.	External Pressure Chart	CS-2
		UNS Number	K02700
Int. Corr. All. c	3.0000 mm.	Allowable Stress (ope) S	137.9 N./mm²
Ext. Corr. All. ce	0.0000 mm.	Allowable Stress (amb) Sa	137.9 N./mm²
Outside Diameter Do	2000.000 mm.	Actual Stress	123.5 N./mm²
Spec. Min. Thk t or e	14.8500 mm.	Spec. Nominal Thk.	15.000 mm.
Surface Area	125682.6 cm²	SG of Contents	0.000
Element Volume	6099053.0 cm³	Weight of Contents	0.0 Kgf
Empty Weight	1450.2 Kgf	Operating Weight	1450.2 Kgf
		Comp. All. Ope. Stress	115.8 N./mm²

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)
= (12.5*1000)/(137.9*0.85+0.4*12.5)
= 10.6195 + 3.0000 = 13.6195 mm.

Max. Allowable Working Pressure at given Thickness, corroded [MAWP]:
Less Operating Hydrostatic Head Pressure of 0.500 barg
= (S*E*t)/(Ro-0.4*t) per Appendix 1-1 (a)(1)
= (137.9*0.85*11.85)/(1000-0.4*11.85)
= 13.96 - 0.5 = 13.46 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*14.85)/(1000-0.4*14.85)
= 17.51 barg

Actual stress at given pressure and thickness, corroded [Sact]:
= (P*(Ro-0.4*t))/(E*t)
= (12.5*((1000-0.4*11.85))/(0.85*11.85)

= 123.519 N./mm²

% Elongation per Table UG-79-1 (50*tnom/Rf*(1-Rf/Ro)) 0.756 %

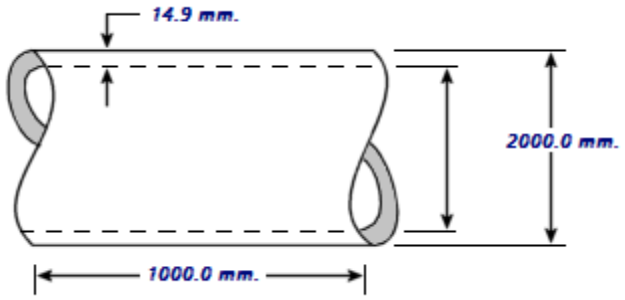
Minimum Design Metal Temperature Results:

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	12.500 barg	Int. Design Temperature	80 °C
Material	SA-516 70	Ext. Design Temperature	-8 °C
Length	1000.000 mm.	External Pressure Chart	CS-2
		UNS Number	K02700
Int. Corr. All. c	3.0000 mm.	Allowable Stress (ope) S	137.9 N./mm²
Ext. Corr. All. ce	0.0000 mm.	Allowable Stress (amb) Sa	137.9 N./mm²
Outside Diameter Do	2000.000 mm.	Actual Stress	123.5 N./mm²
Spec. Min. Thk t or e	14.8500 mm.	Spec. Nominal Thk.	15.000 mm.
Surface Area	62841.3 cm²	SG of Contents	0.000
Element Volume	3049526.5 cm³	Weight of Contents	0.0 Kgf
Empty Weight	725.1 Kgf	Operating Weight	725.1 Kgf
		Comp. All. Ope. Stress	115.8 N./mm²

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)
= (12.5*1000)/(137.9*0.85+0.4*12.5)
= 10.6195 + 3.0000 = 13.6195 mm.

Max. Allowable Working Pressure at given Thickness, corroded [MAWP]:
Less Operating Hydrostatic Head Pressure of 0.500 barg
= (S*E*t)/(Ro-0.4*t) per Appendix 1-1 (a)(1)
= (137.9*0.85*11.85)/(1000-0.4*11.85)
= 13.96 - 0.5 = 13.46 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*14.85)/(1000-0.4*14.85)
= 17.51 barg

Actual stress at given pressure and thickness, corroded [Sact]:
= (P*(Ro-0.4*t))/(E*t)
= (12.5*((1000-0.4*11.85))/(0.85*11.85)

= 123.519 N./mm²

% Elongation per Table UG-79-1 (50*tnom/Rf*(1-Rf/Ro)) 0.756 %

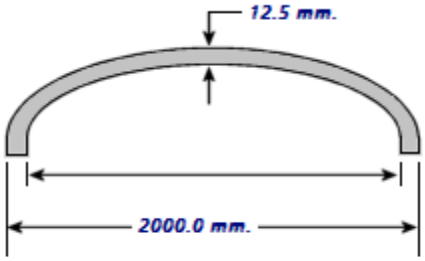
Minimum Design Metal Temperature Results:

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	12.500 barg	Int. Design Temperature	80 °C
Material	SA-516 70	Ext. Design Temperature	-8 °C
Length	60.000 mm.	External Pressure Chart	CS-2
		UNS Number	K02700
Int. Corr. All. c	3.0000 mm.	Allowable Stress (ope) S	137.9 N./mm²
Ext. Corr. All. ce	0.0000 mm.	Allowable Stress (amb) Sa	137.9 N./mm²
Outside Diameter Do	2000.000 mm.	Actual Stress	129.9 N./mm²
Spec. Min. Thk t or e	12.5000 mm.	Spec. Nominal Thk.	15.000 mm.
Surface Area	47355.8 cm²	SG of Contents	0.000
Element Volume	1192442.6 cm³	Weight of Contents	0.0 Kgf
Empty Weight	594.6 Kgf	Operating Weight	594.6 Kgf
		Comp. All. Ope. Stress	108.5 N./mm²
		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: 24.812 mm.
Head inner surface maximum deviation inside the specified shape, 0.625% of D: 12.406 mm.

Required Thickness due to Internal Pressure [tr]:
= (P*Do*Kcor)/(2*S*E+2*P*(Kcor-0.1)) per Appendix 1-4 (c)
= (12.5*2000*0.996)/(2*137.9*1+2*12.5*(0.996-0.1))
= 8.9559 + 3.0000 = 11.9559 mm.

Max. Allowable Working Pressure at given Thickness, corroded [MAWP]:
Less Operating Hydrostatic Head Pressure of 0.500 barg
= (2*S*E*t)/(Kcor*Do-2*t*(Kcor-0.1)) per Appendix 1-4 (c)
= (2*137.9*1*9.5)/(0.996*2000-2*9.5*(0.996-0.1))
= 13.27 - 0.5 = 12.77 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*12.5)/(1*2000-2*12.5*(1-0.1))

= 17.43 barg

Actual stress at given pressure and thickness, corroded [Sact]:
= (P*(Kcor*Do-2*t*(Kcor-0.1)))/(2*E*t)
= (12.5*(0.996*2000-2*9.5*(0.996-0.1)))/(2*1*9.5)
= 129.938 N./mm²

Straight Flange Required Thickness:
= (P*Ro)/(S*E+0.4*P) + ca per Appendix 1-1 (a)(1)
= (12.5*1000)/(137.9*1+0.4*12.5)+3
= 12.032 mm.

Straight Flange Maximum Allowable Working Pressure:
Less Operating Hydrostatic Head Pressure of 0.500 barg
= (S*E*t)/(Ro-0.4*t) per Appendix 1-1 (a)(1)
= (137.9 * 1 * 12)/(1000 - 0.4 * 12)
= 16.63 - 0.5 = 16.13 barg

Factor K, corroded condition [Kcor]:
= (2 + (Inside Diameter/(2 * Inside Head Depth))²)/6
= (2 + (1981/(2 * 496.8))²)/6
= 0.995980

Percent Elong. per UCS-79, VIII-1-01-57 (75*tnom/Rf)*(1-Rf/Ro) 3.286 %

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: 24.812 mm.
Head inner surface maximum deviation inside the specified shape, 0.625% of D: 12.406 mm.

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Hydrostatic Test Pressure Results:

UG99(b)	= 1.30 * M.A.W.P. * Sa/S	16.539 barg
UG99b(b)(35)	= 1.30 * Design Pres * Sa/S	15.600 barg
UG99(c)	= 1.30 * M.A.P. - Head(Hyd)	22.608 barg
UG100	= 1.10 * M.A.W.P. * Sa/S	13.995 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.	12.723 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./mm² & barg):

From	To	Stress	Allowable	Ratio	Pressure
10	20	138.9	179.3	0.775	17.56
20	30	137.9	179.3	0.769	17.51
30	50	136.3	179.3	0.761	17.31
50	60	136.2	179.3	0.760	17.21

Stress ratios for Nozzle and Pad Materials (N./mm²):

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
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
PSV	Nozzle	117.90	117.90	1.000
Minimum				1.000

Stress ratios for Pressurized Vessel Elements (N./mm²):

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./mm²):

Description	Ambient	Operating	Ratio
Drain	2.52	153.28	0.016

PG	3.27	179.27	0.018
PT	3.27	179.27	0.018
IN/OUT	2.51	153.28	0.016
MAN HOLE	22.97	179.27	0.128
PSV	5.25	153.28	0.034

Elements Suitable for Test Pressure.

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External Pressure Results Summary:

External Pressure Calculation Results:

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External Pressure Calculations:

From	To	Section Length mm.	Outside Diameter mm.	Corroded Thickness mm.	Factor A	Factor B N./mm²
10	20	No Calc	2000	9.5	0.00065972	65.9574
20	30	3449.17	2000	11.85	0.0003482	34.8118
30	50	3449.17	2000	11.85	0.0003482	34.8118
50	60	No Calc	2000	9.5	0.00065972	65.9574

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	12.5	No Calc	...	3.481
20	30	14.85	No Calc	...	2.75
30	50	14.85	No Calc	...	2.75
50	60	12.5	No Calc	...	3.481
Minimum					2.75

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	30	3449.17	No Calc	No Calc	No Calc
30	50	3449.17	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	594.63	1192442	475.704	1202781	...
20	30	1450.19	6099053	1161.9	6136256	...
30	50	725.097	3049526	580.95	3068128	...
50	60	594.63	1192442	475.704	1202781	...
Total		3364	11533464.00	2694	11609948.00	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	1.9812	...	-597.5	...	Drain
20	Nozl	0.28886	259.216	300	-967.407	PG
20	Nozl	0.28886	-259.216	300	-967.407	PT
20	Nozl	1.63186	-1001.53	300	...	IN/OUT
20	Nozl	74.097	...	400	1001.53	MAN HOLE
20	Legs	512.88	...	-295	...	LEGS
50	Nozl	4.5645	...	597.5	...	PSV
30	Trun	33.7444	...	750	...	Trunnions

Total Weight of Each Detail Type:

Nozzles	82.9
Legs	512.9
Trunnions	33.7
Sum of the Detail Weights	629.5 kg.

Weight Summation Results: (kg.)

	Fabricated	Shop Test	Shipping	Erected	Empty	Operating
Main Elements	3364.5	3364.5	3364.5	3364.5	3364.5	3364.5
Nozzles	82.9	82.9	82.9	82.9	82.9	82.9
Legs	512.9	512.9	512.9	512.9	512.9	512.9
Trunnions	33.7	33.7	33.7	33.7	33.7	33.7
Test Liquid	...	11526.4	...	...	...	...
Totals	3994.0	15520.5	3994.0	3994.0	3994.0	3994.0

Weight Summary:

Fabricated Wt.	- Bare Weight without Removable Internals	3994.0 kg.
Shop Test Wt.	- Fabricated Weight + Water (Full)	15520.5 kg.
Shipping Wt.	- Fab. Weight + removable Intls.+ Shipping App.	3994.0 kg.
Erected Wt.	- Fab. Wt + or - loose items (trays,platforms etc.)	3994.0 kg.
Ope. Wt. no Liq	- Fab. Weight + Internals. + Details + Weights	3994.0 kg.
Operating Wt.	- Empty Weight + Operating Liq. Uncorroded	3994.0 kg.
Field Test Wt.	- Empty Weight + Water (Full)	15520.5 kg.

Weights used in Vortex Shedding Calculations:

Mass of the Upper 1/3 of the Vertical Vessel (operating)	1049.6 kg.

Mass of the Upper 1/3 of the Vertical Vessel (filled w/water) 4795.7 kg.
Mass of the Upper 1/3 of the Vertical Vessel (empty) 1309.8 kg.

Surface Areas of Elements:

From	To	Outside Surface Area cm²	Inside Surface Area cm²
10	20	47355.8	46005
20	30	125683	123798
30	50	62841.3	61898.8
50	60	47355.8	46005
Total		283235.5	277706.4 cm²
Total		304.9	298.9 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. Kg.m.	Oper. Wgt. No Liquid kg.
10	20	596.611	596.611	1788.33	...	596.611
20	Legs	267.137	267.137	1333.82	73.6532	267.137
Legs	30	1259.36	1259.36	6288.01	...	1259.36
30	50	758.841	758.841	3806.51	...	758.841
50	60	599.194	599.194	1790.91	...	599.194

Cumulative Vessel Weight

From	To	Cumulative Ope Wgt. No Liquid kg.	Cumulative Oper. Wgt. kg.	Cumulative Hydro. Wgt. kg.
10	20	...	...	...
20	Legs	-596.611	-596.611	-1788.33
Legs	30	2617.4	2617.4	11885.4
30	50	1358.04	1358.04	5597.42
50	60	599.194	599.194	1790.91

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. Kg.m.	Cumulative Oper. Mom. Kg.m.	Cumulative Hydro. Mom. Kg.m.
10	20	...	...	...
20	Legs	73.6532	73.6532	73.6532
Legs	30	...	...	...
30	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	18.30	19.60	80	150	GR 1.1	...	...	...	...
IN/OUT	18.30	19.60	80	150	GR 1.1	...	...	...	...
MAN HOLE	18.30	19.60	80	150	GR 1.1	...	...	...	...
PSV	18.30	19.60	80	150	GR 1.1	...	...	...	...
Min Rating	18.300	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( 9.772/( 386 * |( 316.1 )| ))) Imperial units
  = 17.784 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 49.4595 Hz.

Natural Frequency [fn]:
```
  = 1 / ( 2 * pi * sqrt( wyy /( 386 * |( wy )| )))
  = 1/( 2 * pi * sqrt( 9.772/( 386 * |( 316.1 )| ))) Imperial units
  = 17.784 Hz.
```

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

The Natural Frequency for the Vessel (Ope...) is 49.4595 Hz.

Natural Frequency [fn]:
```
  = 1 / ( 2 * pi * sqrt( wyy /( 386 * |( wy )| )))
  = 1/( 2 * pi * sqrt( 857/( 386 * |( 6444 )| ))) Imperial units
  = 8.575 Hz.
```

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

The Natural Frequency for the Vessel (Filled) is 24.4563 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	3796.504 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/m³) * Vref² - Metric Units
= 0.00261 * Vref² - Imperial Units
= 0.00261(based on mph units) * 144²
= 20.9 psf
In chosen units:
= 102 Kgs/m²

Dynamic Coefficient - per Section 9 [Cd]
Average Diameter = 2000 mm.
H/D = 3120/2000 = 1.56

From Section 9:
Cd = 1.05

Roughness Coefficient- paragraph 8.2 [cr(z)]
Wind Height for first element = 323.5 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 * 1.098
= 155.1 Kgf

Summary:

Element	Hgt z	qref	Ce(z)	Cr(z)	Area	Force

	mm.	Kgs/m²			cm²	Kgf
Node 10 - 20	323.496	102.031	1.883	0.901	10982.6	155.099
Node 20 - 30	1553.750	102.031	1.883	0.901	48000.0	677.867
Node 30 - 50	3053.750	102.031	2.104	0.973	24000.0	378.603
Node 50 - 60	3796.504	102.031	2.221	1.010	10982.6	182.922

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
 :: 0/3120 = 0

 :: [ D / L² ] * 10⁴ < 8 (English Units, ft.)
 :: [ 6.562/10.24² ] * 10⁴ = 626.2 [Geometry Violation]
```

Compute the vibration possibility. If Vp > 0.40047E-06 no chance. [Vp]:

```
  = W / ( L * Dr²)
  = 3324/( 3120 * 2000² )
  = 0.26633E-06
```

Compute the damping factor Df which is a measure of instability [Df]:

```
  = W * Dl/ ( L * Dr² )
  = 3324 * 0.03/( 3120 * 2000² )
  = 0.499
```

Compute the critical wind velocity [Vc]:

```
  = 3.4 * f * Dr
  = 3.4 * 49.46 * 6.562
  = 1103.427 mile/hr  [1775.746 Km/hr]
```

Compute the velocity at the top of the tower [Vw]:

```
  = V30 * ( L / ( 30 + BaseHeight ))^0.143
  = 144 * ( 3120/( 30 + 0 ))^0.143
  = 123.476 Km/hr
```

Compute the maximum gust velocity using the gust response factor Gh [Vg]:

```
  = Vw * Gh
  = 123.5 * 1
  = 123.476 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 49.4595 Hz.

Wind Load Calculation:

From	To	Wind Height mm.	Wind Diameter mm.	Wind Area cm²	Wind Pressure Kgs/m²	Element Wind Load Kgf
10	20	323.496	2400	10982.6	141.222	155.099
20	30	1553.75	2400	48000	141.222	677.867
30	50	3053.75	2400	24000	157.751	378.603
50	60	3796.5	2400	10982.6	166.556	182.922

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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 49.4595 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	596.611	417.628	417.628	...
20	Legs	410	267.137	186.996	186.996	...
Legs	30	1235	1259.36	881.554	881.554	...
30	50	2560	758.841	531.189	531.189	...
50	60	3090	599.194	419.436	419.436	...

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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 Kg.m.	Earthquake Bending Kg.m.
10	20	592.754	...	...	...	...
20	Legs	175	155.099	417.628	37.6516	101.383
Legs	30	825	1394.49	2436.8	1691.85	2802.44
30	50	2150	561.524	950.625	416.636	786.866
50	60	2892.75	182.922	419.436	44.4059	101.822

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	...	0.31229	0.31229	0.00036243
20	Legs	155.099	0.31233	0.31244	0.00036331
Legs	30	1394.49	0.31394	0.31642	0.00036577
30	50	561.524	0.31814	0.31993	0.00036604
50	60	182.922	0.32004	0.32015	0.00036604

Critical Wind Velocity for Tower Vibration:

From	To	1st Crit. Wind Speed Km/hr	2nd Crit. Wind Speed Km/hr
10	20	2130.9	13318.1
20	30	2130.9	13318.1
30	50	2130.9	13318.1
50	60	2130.9	13318.1

Allowable deflection at the Tower Top (Ope)(6.000"/100ft. Criteria)
Allowable deflection : 15.600 Actual deflection : 0.320 mm.

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Longitudinal Stress Constants:

From	To	Metal Area New cm²	Metal Area Corroded cm²	Section Modulus New mm³	Section Modulus Corroded mm³
10	20	780.49	594.068	38539768	29422564
20	30	926.124	740.144	45623604	36571208
30	50	926.124	740.144	45623604	36571208
50	60	780.49	594.068	38539768	29422564

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Longitudinal Allowable Stresses:

From	To	Tensile N./mm²	Hydrotest Tensile N./mm²	Compressive N./mm²	Hydrotest Compressive N./mm²
10	20	140.658	182.855	-108.49	-117.405
20	Legs	140.658	182.855	-115.755	-122.453
Legs	30	140.658	182.855	-115.755	-122.453
30	50	140.658	182.855	-115.755	-122.453
50	60	140.658	182.855	-108.49	-117.405

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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./mm²	Longitudinal Stress External Pressure N./mm²	Longitudinal Stress Hydrotest Pressure N./mm²
10	20	64.9183	...	67.4427
20	30	51.8706	...	56.5799
30	50	51.8706	...	56.5799
50	60	64.9183	...	67.4427

Longitudinal Stresses due to Weight Loads for these Conditions:

From	To	Wght. Str. Empty N./mm²	Wght. Str. Operating N./mm²	Wght. Str. Hydrotest N./mm²	Wght. Str. Emp. Mom. N./mm²	Wght. Str. Opr. Mom. N./mm²
10	20	...	...	...	...	...
20	Legs	0.07905	0.07905	0.18937	0.01975	0.01975
Legs	30	-0.3468	-0.3468	-0.27716	...	...
30	50	-0.17994	-0.17994	-0.1438	...	...
50	60	-0.098915	-0.098915	-0.075289	...	...

Longitudinal Stresses due to Weight Loads and Bending for these Conditions:

From	To	Wght. Str. Hyd. Mom. N./mm²	Bend. Str. Oper. Wind N./mm²	Bend. Str. Oper. Equ. N./mm²	Bend. Str. Hyd. Wind N./mm²	Bend. Str. Hyd. Equ. N./mm²
10	20	...	...	...	...	...
20	Legs	0.015831	0.010096	0.027186	0.0026707	...
Legs	30	...	0.45367	0.75148	0.12001	...
30	50	...	0.11172	0.211	0.029553	...
50	60	...	0.014801	0.033938	0.0037288	...

Longitudinal Stresses due to these Conditions:

From	To	Vortex Shedding Operating Case N./mm²	Vortex Shedding Empty Case N./mm²	Vortex Shedding Test Case N./mm²	Earthquake Empty Case N./mm²
10	20	...	...	...	...
20	Legs	...	...	...	0.027186
Legs	30	...	...	...	0.75148
30	50	...	...	...	0.211
50	60	...	...	...	0.033938

Longitudinal Stresses due to Applied Axial Forces:

		Longitudinal Stress	Longitudinal Stress

From	To	Y Forces Wind N./mm²	Y Forces Seismic N./mm²
10	20	...	...
20	Legs	...	...
Legs	30	...	...
30	50	...	...
50	60	...	...

Longitudinal Stresses due to User Forces and Moments:

From	To	Wind For/Mom Corroded N./mm²	Earthquake For/Mom Corroded N./mm²	Wind For/Mom No Corrosion N./mm²	Earthquake For/Mom No Corrosion N./mm²
10	20	...	...	...	...
20	Legs	...	...	...	...
Legs	30	...	...	...	...
30	50	...	...	...	...
50	60	...	...	...	...

Bending Stresses due to Blast Load:

From	To	Bending Stress N./mm²
10	20	...
20	Legs	...
Legs	30	...
30	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	108.49	0.0000	0.0000
20	0.11	140.66		115.75	0.0008	
20	0.11	140.66	-0.80	115.75	0.0008	0.0069
30		140.66	-0.29	115.75		0.0025
50		140.66	-0.11	108.49		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	108.49	0.0000	0.0000
20	0.13	140.66		115.75	0.0009	
20	0.40	140.66	-1.10	115.75	0.0029	0.0095
30	0.03	140.66	-0.39	115.75	0.0002	0.0034
50		140.66	-0.13	108.49		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	108.49	0.0000	0.0000
20	0.11	140.66		115.75	0.0008	
20	0.11	140.66	-0.80	115.75	0.0008	0.0069
30		140.66	-0.29	115.75		0.0025
50		140.66	-0.11	108.49		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	108.49	0.0000	0.0000
20	0.13	140.66		115.75	0.0009	
20	0.40	140.66	-1.10	115.75	0.0029	0.0095
30	0.03	140.66	-0.39	115.75	0.0002	0.0034
50		140.66	-0.13	108.49		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	182.86	0.00	117.41	0.0000	0.0000
20	0.21	182.86		122.45	0.0011	
20		182.86	-0.40	122.45		0.0032
30		182.86	-0.17	122.45		0.0014
50		182.86	-0.08	117.41		0.0007

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	182.86	0.00	117.41	0.0000	0.0000
20	0.21	182.86		122.45	0.0011	
20		182.86	-0.28	122.45		0.0023
30		182.86	-0.14	122.45		0.0012
50		182.86	-0.08	117.41		0.0006

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	64.92	140.66		108.49	0.4615	
20	51.98	140.66		115.75	0.3695	
20	51.98	140.66		115.75	0.3695	
30	51.80	140.66		115.75	0.3683	
50	64.83	140.66		108.49	0.4609	

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	64.92	140.66		108.49	0.4615	
20	52.00	140.66		115.75	0.3697	
20	52.28	140.66		115.75	0.3716	
30	51.90	140.66		115.75	0.3690	
50	64.85	140.66		108.49	0.4611	

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	108.49	0.0000	0.0000
20	0.11	140.66		115.75	0.0008	
20	0.11	140.66	-0.80	115.75	0.0008	0.0069
30		140.66	-0.29	115.75		0.0025
50		140.66	-0.11	108.49		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	108.49	0.0000	0.0000
20	0.13	140.66		115.75	0.0009	
20	0.40	140.66	-1.10	115.75	0.0029	0.0095
30	0.03	140.66	-0.39	115.75	0.0002	0.0034
50		140.66	-0.13	108.49		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	67.44	182.86		117.41	0.3688	
20	56.79	182.86		122.45	0.3106	
20	56.42	182.86		122.45	0.3086	
30	56.47	182.86		122.45	0.3088	
50	67.37	182.86		117.41	0.3684	

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	67.44	182.86		117.41	0.3688	
20	56.79	182.86		122.45	0.3105	
20	56.30	182.86		122.45	0.3079	
30	56.44	182.86		122.45	0.3086	
50	67.37	182.86		117.41	0.3684	

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	64.92	140.66		108.49	0.4615	
20	51.97	140.66		115.75	0.3695	
20	51.52	140.66		115.75	0.3663	
30	51.69	140.66		115.75	0.3675	
50	64.82	140.66		108.49	0.4608	

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	64.92	140.66		108.49	0.4615	
20	51.93	140.66		115.75	0.3692	
20	51.59	140.66		115.75	0.3668	
30	51.73	140.66		115.75	0.3677	
50	64.84	140.66		108.49	0.4610	

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	64.92	140.66		108.49	0.4615	
20	51.97	140.66		115.75	0.3695	
20	51.52	140.66		115.75	0.3663	

30	51.69	140.66		115.75	0.3675
50	64.82	140.66		108.49	0.4608

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	64.92	140.66		108.49	0.4615	
20	51.97	140.66		115.75	0.3695	
20	51.52	140.66		115.75	0.3663	
30	51.69	140.66		115.75	0.3675	
50	64.82	140.66		108.49	0.4608	

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	108.49	0.0000	0.0000
20	0.10	140.66		115.75	0.0007	
20		140.66	-0.35	115.75		0.0030
30		140.66	-0.18	115.75		0.0016
50		140.66	-0.10	108.49		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	64.92	140.66		108.49	0.4615	
20	51.97	140.66		115.75	0.3695	
20	51.52	140.66		115.75	0.3663	
30	51.69	140.66		115.75	0.3675	
50	64.82	140.66		108.49	0.4608	

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	108.49	0.0000	0.0000
20	0.10	140.66		115.75	0.0007	
20		140.66	-0.35	115.75		0.0030
30		140.66	-0.18	115.75		0.0016
50		140.66	-0.10	108.49		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	64.92	140.66		108.49	0.4615	
20	51.97	140.66		115.75	0.3695	
20	51.52	140.66		115.75	0.3663	
30	51.69	140.66		115.75	0.3675	
50	64.82	140.66		108.49	0.4608	

Absolute Maximum of the all of the Stress Ratio's 0.4615

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	64.9	...	...	...	64.9	+ Tens

Element # 1	64.9	...	...	...	...	-	Comp
Element # 2	51.9	0.1	...	...	52.0	+	Tens
Element # 2	51.9	0.1	-0.0	-0.0	...	-	Comp
Element # 2	51.9	-0.3	...	0.5	52.0	+	Tens
Element # 2	51.9	-0.3	...	-0.5	...	-	Comp
Element # 3	51.9	-0.2	...	0.1	51.8	+	Tens
Element # 3	51.9	-0.2	...	-0.1	...	-	Comp
Element # 4	64.9	-0.1	...	...	64.8	+	Tens
Element # 4	64.9	-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	608.202 mm.
Center of Gravity of the Legs	-235.000 mm.
Center of Gravity of the Trunnions	2810.000 mm.
Center of Gravity of Bare Shell New and Cold	1560.000 mm.
Center of Gravity of Bare Shell Corroded	1560.000 mm.
Vessel CG in the Operating Condition	1271.981 mm.
Vessel CG in the Fabricated (Shop/Empty) Condition	1320.318 mm.
Vessel CG in the Test Condition	1498.320 mm.

Rigging Analysis Results:

- Lifting weight based on the user selected calculated empty weight

Total Effective Length of Vessel for this analysis		3120.00 mm.
Total vessel weight (No Liquid)	Twt	3994.03 Kgf
Impact weight multiplication factor	Imp	1.50
Design lifting weight, DWT = Imp * Twt		5991.04 Kgf
Elevation of the Tailing Lug (bottom)		0.00 mm.
Elevation of the Lifting Lug (top)		2810.00 mm.
Design Reaction force at the tailing lug		3176.07 Kgf
Design Reaction force at the Trunnions		2814.97 Kgf
CG distance during field lifting operation		1320.32 mm.
CG distance from tailing lug		1320.32 mm.
CG distance from the nearer lifting lug/trunnion		1320.32 mm.
Compressive Allowable Increase Factor		1.00

Critical Values: (N./mm², mm.)

	Max Stress	Elevation	Allowables	
Bending	0.12	2860.00	102.04	(UG-23)
Shear	0.26	2660.00	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 Kg.m.	Bending Stress N./mm²	Shear Force Kgf	Shear Stress N./mm²
0.00	0.0	0.0	371.7	0.0
460.00	147.9	0.0	44.0	0.0
1660.00	456.6	0.1	869.9	0.1
2460.00	10.9	0.0	2034.2	0.2
3060.00	316.4	0.1	178.6	0.0

Unity Check (Actual Stress / Allowable Stress):

Maximum Unity Check is 0.00114 at elevation 2860 mm. - Must be <=1

Note: The rigging analysis is performed using a uniformly distributed load.

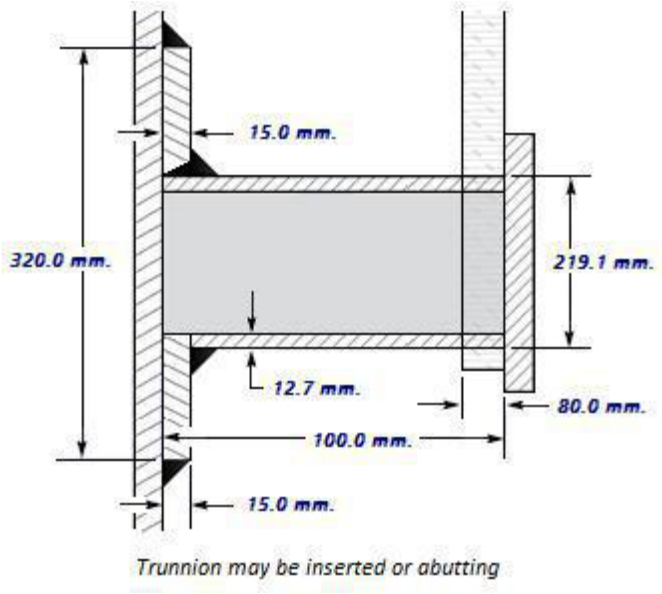
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Trunnion Analysis:

Input Data:

Trunnion Material		SA-516 70	
Trunnion Yield Stress	Sy	262.01	N./mm²
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	15.0000	mm.
Pad Edge Fillet Weld Thk	Tfp	15.0000	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./mm²):

Bending Stress Allowable:	172.9	N./mm²
Shear Stress Allowable:	104.8	N./mm²
Bearing Stress Allowable:	196.5	N./mm²

Angle	Trunnion Lifting Load	Bending Stress	Shear Stress	Bearing Stress	Unity Check	Pass Fail
0	1407.5	2.1	1.7	0.8	0.028	Pass
5	1459.6	2.1	1.7	0.8	0.029	Pass
10	1509.1	2.2	1.8	0.8	0.030	Pass
15	1556.9	2.3	1.9	0.9	0.031	Pass
20	1603.8	2.3	1.9	0.9	0.032	Pass
25	1650.6	2.4	2.0	0.9	0.033	Pass
30	1697.9	2.5	2.0	0.9	0.034	Pass
35	1746.5	2.6	2.1	1.0	0.035	Pass
40	1797.2	2.6	2.1	1.0	0.036	Pass
45	1851.1	2.7	2.2	1.0	0.037	Pass
50	1909.2	2.8	2.3	1.1	0.038	Pass
55	1973.3	2.9	2.3	1.1	0.039	Pass

60	2045.3	3.0	2.4	1.1	0.041	Pass
65	2128.3	3.1	2.5	1.2	0.042	Pass
70	2226.4	3.3	2.7	1.2	0.044	Pass
75	2346.4	3.4	2.8	1.3	0.047	Pass
80	2499.0	3.7	3.0	1.4	0.050	Pass
85	2703.1	4.0	3.2	1.5	0.054	Pass
90	2995.5	4.4	3.6	1.7	0.059	Pass

Trunnion Calculation Results:

Trunnion Lifting Load [Tlf]:
= Resultant Load * Impact Factor
= 1997 * 1.5
= 2995.5 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 * 2996
= 179.7 Kg.m.

Trunnion Calculated Bending Stress [Sbc]:
= Tmom * 9.807/Z
= 179.7 * 9.807/401811
= 4.39 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 cm²

Trunnion Calculated Shear Stress [Ssc]:
= Tlf/Txsa
= 2996/82.35
= 3.57 N./mm [Passed] Ssc < 0.4 * Sy * Occfac (104.80)

Trunnion Unity Check [Uchk]:
= Sbc/Sba + Ssc/Ssa
= 4.387/172.9 + 3.567/104.8
= 0.059 [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
= 179.7/37703
= 4.767 Kgf/mm.

Required Fillet Weld Leg Size at Edge of Trunnion [Wsr]:
= max(10mm, fs/(0.4 * Sy))
= max(10mm, 4.767/(0.4 * 262))
= 10.000 mm.

Trunnion Bearing Contact Area [Tbca]:
= Tod * Tt
= 219.1 * 80

= 175.3 cm²

Trunnion Bearing Stress [Sbec]:
= Tlf/Tbca
= 2996/175.3
= 1.68 N./mm [Passed] Sbec < min(0.75 * SY * Occfac, 0.9 * Sy) (196.51)

Summary of Results:

Trunnion Unity Check Value: 0.0594 Must be less than or equal to 1

Comparison of Stress Values versus Allowables: (N./mm²)

Type of Stress	Actual	Allowable	Pass/Fail
Bending Stress	4.39	172.93	Pass
Shear Stress	3.57	104.80	Pass
Bearing Stress	1.68	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	1970.300	mm.
Vessel Thickness	Tv	14.850	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./mm²
Nozzle Hot S.I. Allowable	SNmh	137.90	N./mm²
Thickness of Reinforcing Pad	Tpad	15.000	mm.
Diameter of Reinforcing Pad	Dpad	350.000	mm.
Design Internal Pressure	Dp	0.000	barg
Include Pressure Thrust		No	

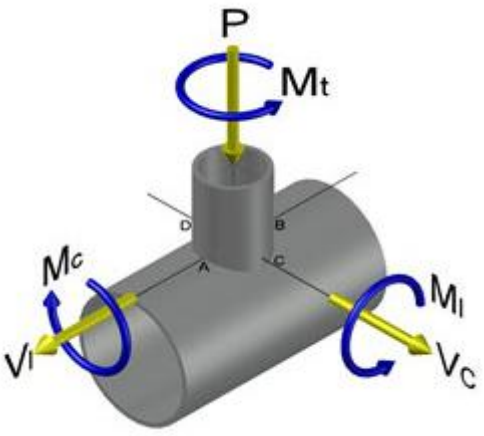
External Forces and Moments in WRC 107/537 Convention:

Radial Load	(SUS)	P	0.0	Kgf
Longitudinal Shear	(SUS)	Vl	2995.5	Kgf
Circumferential Shear	(SUS)	Vc	0.0	Kgf
Circumferential Moment	(SUS)	Mc	0.0	Kg.m.

Longitudinal Moment	(SUS)	Ml	179.7	Kg.m.
Torsional Moment	(SUS)	Mt	0.0	Kg.m.

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( 992.575 ( 14.85 - 0 ) )
  = 645.144 mm.
```

WRC 107 Stress Calculation for SUStained loads:

Radial Load	P	0.0	Kgf
Circumferential Shear	VC	0.0	Kgf
Longitudinal Shear	VL	2995.5	Kgf
Circumferential Moment	MC	0.0	Kg.m.
Longitudinal Moment	ML	179.7	Kg.m.
Torsional Moment	MT	0.0	Kg.m.

Dimensionless Parameters used : Gamma = 33.50

Dimensionless Loads for Cylindrical Shells at Attachment Junction:

Curves read for 1979	Beta	Figure	Value	Location
N(PHI) / (P/Rm)	0.107	4C	5.892	(A,B)
N(PHI) / (P/Rm)	0.107	3C	5.073	(C,D)
M(PHI) / (P)	0.107	2C1	0.090	(A,B)
M(PHI) / (P)	0.107	1C	0.123	(C,D)
N(PHI) / (MC/(Rm**2 * Beta))	0.107	3A	0.988	(A,B,C,D)
M(PHI) / (MC/(Rm * Beta))	0.107	1A	0.096	(A,B,C,D)
N(PHI) / (ML/(Rm**2 * Beta))	0.107	3B	3.336	(A,B,C,D)
M(PHI) / (ML/(Rm * Beta))	0.107	1B	0.046	(A,B,C,D)

N(x) / (P/Rm)	0.107	3C	5.073	(A,B)
N(x) / (P/Rm)	0.107	4C	5.892	(C,D)
M(x) / (P)	0.107	1C1	0.129	(A,B)
M(x) / (P)	0.107	2C	0.090	(C,D)
N(x) / (MC/(Rm**2 * Beta))	0.107	4A	1.455	(A,B,C,D)
M(x) / (MC/(Rm * Beta))	0.107	2A	0.052	(A,B,C,D)
N(x) / (ML/(Rm**2 * Beta))	0.107	4B	0.949	(A,B,C,D)
M(x) / (ML/(Rm * Beta))	0.107	2B	0.073	(A,B,C,D)

Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Attachment Junction (N./mm²)

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	-1.8	-1.8	1.8	1.8	0.0	0.0	0.0	0.0
Circ. Bend. ML	-5.1	5.1	5.1	-5.1	0.0	0.0	0.0	0.0
Tot. Circ. Str.	-6.9	3.2	6.9	-3.2	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	-0.5	-0.5	0.5	0.5	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.	-8.6	7.6	8.6	-7.6	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	-2.6	-2.6	2.6	2.6
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	-2.6	-2.6	2.6	2.6
Str. Int.	8.6	7.6	8.6	7.6	5.1	5.1	5.1	5.1

Dimensionless Parameters used : Gamma = 66.84

Dimensionless Loads for Cylindrical Shells at Pad Edge:

Curves read for 1979	Beta	Figure		Value	Location
N(PHI) / (P/Rm)	0.154	4C		9.425	(A,B)
N(PHI) / (P/Rm)	0.154	3C		6.186	(C,D)
M(PHI) / (P)	0.154	2C1		0.037	(A,B)
M(PHI) / (P)	0.154	1C	!	0.071	(C,D)
N(PHI) / (MC/(Rm**2 * Beta))	0.154	3A		2.669	(A,B,C,D)
M(PHI) / (MC/(Rm * Beta))	0.154	1A		0.075	(A,B,C,D)
N(PHI) / (ML/(Rm**2 * Beta))	0.154	3B		6.870	(A,B,C,D)
M(PHI) / (ML/(Rm * Beta))	0.154	1B		0.026	(A,B,C,D)
N(x) / (P/Rm)	0.154	3C		6.186	(A,B)
N(x) / (P/Rm)	0.154	4C		9.425	(C,D)
M(x) / (P)	0.154	1C1		0.072	(A,B)
M(x) / (P)	0.154	2C	!	0.038	(C,D)

N(x) / (MC/(Rm**2 * Beta))	0.154	4A	5.020	(A,B,C,D)
M(x) / (MC/(Rm * Beta))	0.154	2A	0.036	(A,B,C,D)
N(x) / (ML/(Rm**2 * Beta))	0.154	4B	2.673	(A,B,C,D)
M(x) / (ML/(Rm * Beta))	0.154	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./mm²)

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	-5.4	-5.4	5.4	5.4	0.0	0.0	0.0	0.0
Circ. Bend.	ML	-8.1	8.1	8.1	-8.1	0.0	0.0	0.0	0.0
Tot. Circ. Str.		-13.4	2.7	13.4	-2.7	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	-2.1	-2.1	2.1	2.1	0.0	0.0	0.0	0.0
Long. Bend.	ML	-10.6	10.6	10.6	-10.6	0.0	0.0	0.0	0.0
Tot. Long. Str.		-12.7	8.5	12.7	-8.5	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	-3.6	-3.6	3.6	3.6
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	-3.6	-3.6	3.6	3.6
Str. Int.		13.4	8.5	13.4	8.5	7.2	7.2	7.2	7.2

WRC 107/537 Stress Summations:

Vessel Stress Summation at Attachment Junction (N./mm²)

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)		-1.8	-1.8	1.8	1.8	0.0	0.0	0.0	0.0
Circ. Q (SUS)		-5.1	5.1	5.1	-5.1	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)		-0.5	-0.5	0.5	0.5	0.0	0.0	0.0	0.0
Long. Q (SUS)		-8.1	8.1	8.1	-8.1	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	-2.6	-2.6	2.6	2.6

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)	1.8	1.8	1.8	1.8	5.1	5.1	5.1	5.1
Pm+Pl+Q (Total)	8.6	7.6	8.6	7.6	5.1	5.1	5.1	5.1

Vessel Stress Summation Comparison (N./mm²):

Type of Stress Int.	Max. S.I.	S.I. Allowable	Result
Pm (SUS)	0.00	137.90	Passed
Pm+Pl (SUS)	5.12	206.85	Passed
Pm+Pl+Q (TOTAL)	8.61	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./mm²)

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)	-5.4	-5.4	5.4	5.4	0.0	0.0	0.0	0.0
Circ. Q (SUS)	-8.1	8.1	8.1	-8.1	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)	-2.1	-2.1	2.1	2.1	0.0	0.0	0.0	0.0
Long. Q (SUS)	-10.6	10.6	10.6	-10.6	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	-3.6	-3.6	3.6	3.6
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)	5.4	5.4	5.4	5.4	7.2	7.2	7.2	7.2
Pm+Pl+Q (Total)	13.4	8.5	13.4	8.5	7.2	7.2	7.2	7.2

Vessel Stress Summation Comparison (N./mm²):

Type of Stress Int.	Max. S.I.	S.I. Allowable	Result
Pm (SUS)	0.00	137.90	Passed
Pm+Pl (SUS)	7.20	206.85	Passed
Pm+Pl+Q (TOTAL)	13.44	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		1290.000	mm.
Effective Leg Length	Leglen	1090.000	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	mm^3
Section Modulus (weak axis)		200000.812	mm^3
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		2802.4	Kg.m.
Total Weight Load at top of Legs	W	3481.1	Kgf
Total Shear force at top of Legs		2436.8	Kgf
Additional force in Leg due to Bracing	Fadd	0.0	Kgf
Occasional Load Factor	Occfac	1.000	
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	15.000	mm.

Maximum Shear at top of one Leg [Vleg]:
= (max(Wind, Seismic, Blast) + applied forces)(Imax / Itot)
= (2437)(5696/15407)
= 900.88 Kgf

Axial Compression, Leg furthest from the Neutral Axis [Sma]:
= W/Nleg + (Mleg/(Nlegm*Rn))/Aleg
= 34138/4 + (27480394/(2 * 1110))/7810
= 2.68 $N./mm^2$

Axial Compression, Leg closest to the Neutral Axis [Sva]:
= (W / Nleg) / Aleg
= (3481/4)/78.1
= 1.09 $N./mm^2$

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(1-(21.5)²/(2*127.2²))248.2/(5/3+3(21.5)/(8*127.2)-(21.5³)/(8*127.2³)
= 141.47 $N./mm^2$

Bending at the Bottom of the Leg closest to the N.A. [S]:
= (Vleg * Leglen / Smdwa)
= (900.9 * 1090/200001)
= 48.15 $N./mm^2$

Allowable Bending Stress[Sb]:
= (0.6 * Fy * Occfac)
= (0.6 * 248.2 * 1)
= 148.93 N./mm²

AISC Unity Check [Sc](must be <= to 1 and > 0) :
= (Sma/Sa)+(0.85*S)/((1-Sma/Spex)*Sb)
= (2.678/141.5)+(0.85 *48.15)/((1 -2.678/2266) *148.9)
= 0.2941

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	3.0000	mm.
Vessel Diameter	Dv	1970.300	mm.
Vessel Thickness	Tv	14.850	mm.
Design Temperature	T1	80.0	C
Vessel Material		SA-516 70	
Vessel UNS Number		K02700	
Vessel Cold S.I. Allowable	Smc	137.90	N./mm²
Vessel Hot S.I. Allowable	Smh	137.90	N./mm²

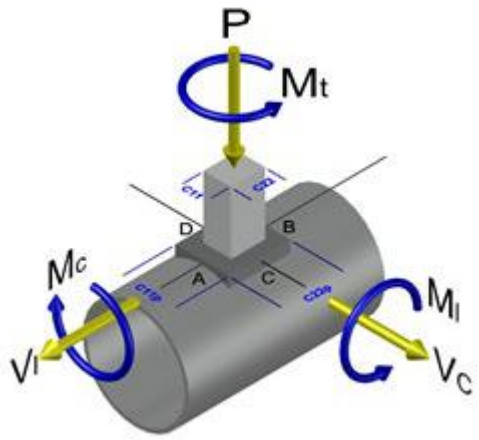
See ASME VIII Div. 1, UG-23(e), for determination of the SPS allowable.

Attachment Type	Type	Rectangular	
Parameter C11	C11	200.00	mm.
Parameter C22	C22	330.95	mm.
Thickness of Reinforcing Pad	Tpad	15.000	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	870.3	Kgf
Global Force (SUS)	Fz	0.0	Kgf
Global Moment (SUS)	Mx	0.0	Kg.m.
Global Moment (SUS)	My	0.0	Kg.m.
Global Moment (SUS)	Mz	95.7	Kg.m.
Internal Pressure (SUS)	P	12.00	barg
Include Pressure Thrust		No	
Global Force (OCC)	Fx	900.9	Kgf
Global Force (OCC)	Fy	1262.4	Kgf

Global Force (OCC)	Fz	0.0	Kgf
Global Moment (OCC)	Mx	0.0	Kg.m.
Global Moment (OCC)	My	0.0	Kg.m.
Global Moment (OCC)	Mz	629.8	Kg.m.
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	870.3	Kgf
Circumferential Moment	MC	0.0	Kg.m.
Longitudinal Moment	ML	-95.7	Kg.m.
Torsional Moment	MT	0.0	Kg.m.

Dimensionless Parameters used : Gamma = 37.30

Dimensionless Loads for Cylindrical Shells at Attachment Junction:

Curves read for 1979	Beta	Figure	Value	Location
N(PHI) / (P/Rm)	0.161	4C	5.735	(A,B)
N(PHI) / (P/Rm)	0.161	3C	4.246	(C,D)
M(PHI) / (P)	0.120	2C1	0.075	(A,B)
M(PHI) / (P)	0.120	1C	0.108	(C,D)
N(PHI) / (MC/(Rm**2 * Beta))	0.118	3A	1.251	(A,B,C,D)
M(PHI) / (MC/(Rm * Beta))	0.129	1A	0.091	(A,B,C,D)
N(PHI) / (ML/(Rm**2 * Beta))	0.140	3B	4.122	(A,B,C,D)
M(PHI) / (ML/(Rm * Beta))	0.134	1B	0.039	(A,B,C,D)
N(x) / (P/Rm)	0.142	3C	4.697	(A,B)

N(x) / (P/Rm)	0.142	4C	6.047	(C,D)
M(x) / (P)	0.145	1C1	0.096	(A,B)
M(x) / (P)	0.145	2C	0.059	(C,D)
N(x) / (MC/(Rm**2 * Beta))	0.118	4A	1.875	(A,B,C,D)
M(x) / (MC/(Rm * Beta))	0.154	2A	0.044	(A,B,C,D)
N(x) / (ML/(Rm**2 * Beta))	0.140	4B	1.330	(A,B,C,D)
M(x) / (ML/(Rm * Beta))	0.152	2B	0.053	(A,B,C,D)

Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Attachment Junction (N./mm²)

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	0.9	0.9	-0.9	-0.9	0.0	0.0	0.0	0.0
Circ. Bend. ML	2.3	-2.3	-2.3	2.3	0.0	0.0	0.0	0.0
Tot. Circ. Str.	3.1	-1.4	-3.1	1.4	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	2.7	-2.7	-2.7	2.7	0.0	0.0	0.0	0.0
Tot. Long. Str.	3.1	-2.3	-3.1	2.3	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	-0.5	-0.5	0.5	0.5
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	-0.5	-0.5	0.5	0.5
Str. Int.	3.1	2.3	3.1	2.3	1.0	1.0	1.0	1.0

Dimensionless Parameters used : Gamma = 83.89

Dimensionless Loads for Cylindrical Shells at Pad Edge:

Curves read for 1979	Beta	Figure		Value	Location
N(PHI) / (P/Rm)	0.178	4C		10.412	(A,B)
N(PHI) / (P/Rm)	0.178	3C		5.682	(C,D)
M(PHI) / (P)	0.159	2C1		0.030	(A,B)
M(PHI) / (P)	0.159	1C	!	0.067	(C,D)
N(PHI) / (MC/(Rm**2 * Beta))	0.159	3A		3.282	(A,B,C,D)
M(PHI) / (MC/(Rm * Beta))	0.170	1A		0.067	(A,B,C,D)
N(PHI) / (ML/(Rm**2 * Beta))	0.167	3B		7.710	(A,B,C,D)
M(PHI) / (ML/(Rm * Beta))	0.167	1B		0.019	(A,B,C,D)
N(x) / (P/Rm)	0.169	3C		6.079	(A,B)
N(x) / (P/Rm)	0.169	4C		10.698	(C,D)
M(x) / (P)	0.171	1C1		0.057	(A,B)
M(x) / (P)	0.171	2C	!	0.036	(C,D)
N(x) / (MC/(Rm**2 * Beta))	0.159	4A		6.791	(A,B,C,D)

```
M(x)   / ( MC/(Rm    * Beta) )   0.190   2A        0.028   (A,B,C,D)
N(x)   / ( ML/(Rm**2 * Beta) )   0.167   4B        3.281   (A,B,C,D)
M(x)   / ( ML/(Rm    * Beta) )   0.175   2B        0.023   (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./mm²)

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	3.3	3.3	-3.3	-3.3	0.0	0.0	0.0	0.0
Circ. Bend.	ML	4.7	-4.7	-4.7	4.7	0.0	0.0	0.0	0.0
Tot. Circ. Str.		8.0	-1.4	-8.0	1.4	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	1.4	1.4	-1.4	-1.4	0.0	0.0	0.0	0.0
Long. Bend.	ML	5.3	-5.3	-5.3	5.3	0.0	0.0	0.0	0.0
Tot. Long. Str.		6.7	-3.8	-6.7	3.8	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	-1.0	-1.0	1.0	1.0
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	-1.0	-1.0	1.0	1.0
Str. Int.		8.0	3.8	8.0	3.8	2.1	2.1	2.1	2.1

WRC 107 Stress Calculation for OCCasional loads:

```
Radial Load                          P        900.9  Kgf
Circumferential Shear               VC          0.0  Kgf
Longitudinal Shear                  VL       1262.4  Kgf
Circumferential Moment              MC          0.0  Kg.m.
Longitudinal Moment                 ML       -629.8  Kg.m.
Torsional Moment                    MT          0.0  Kg.m.

Dimensionless Parameters used :   Gamma = 37.30
```

Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Attachment Junction (N./mm²)

Type of Stress	Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb.	P	-1.9	-1.9	-1.9	-1.9	-1.4	-1.4	-1.4	-1.4
Circ. Bend.	P	-5.5	5.5	-5.5	5.5	-7.9	7.9	-7.9	7.9
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	5.9	5.9	-5.9	-5.9	0.0	0.0	0.0	0.0
Circ. Bend. ML	14.8	-14.8	-14.8	14.8	0.0	0.0	0.0	0.0
Tot. Circ. Str.	13.3	-5.3	-28.1	12.5	-9.3	6.5	-9.3	6.5
Long. Memb. P	-1.5	-1.5	-1.5	-1.5	-2.0	-2.0	-2.0	-2.0
Long. Bend. P	-7.1	7.1	-7.1	7.1	-4.4	4.4	-4.4	4.4
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	2.5	2.5	-2.5	-2.5	0.0	0.0	0.0	0.0
Long. Bend. ML	17.9	-17.9	-17.9	17.9	0.0	0.0	0.0	0.0
Tot. Long. Str.	11.8	-9.9	-29.0	21.0	-6.3	2.4	-6.3	2.4
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.	13.3	9.9	29.0	21.0	9.5	6.6	9.5	6.6

Dimensionless Parameters used : Gamma = 83.89
Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Edge of Reinforcing Pad (N./mm²)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb. P	-7.8	-7.8	-7.8	-7.8	-4.3	-4.3	-4.3	-4.3
Circ. Bend. P	-11.4	11.4	-11.4	11.4	-25.5	25.5	-25.5	25.5
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	21.8	21.8	-21.8	-21.8	0.0	0.0	0.0	0.0
Circ. Bend. ML	30.8	-30.8	-30.8	30.8	0.0	0.0	0.0	0.0
Tot. Circ. Str.	33.5	-5.4	-71.9	12.6	-29.7	21.2	-29.7	21.2
Long. Memb. P	-4.6	-4.6	-4.6	-4.6	-8.0	-8.0	-8.0	-8.0
Long. Bend. P	-21.3	21.3	-21.3	21.3	-13.6	13.6	-13.6	13.6
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	9.4	9.4	-9.4	-9.4	0.0	0.0	0.0	0.0
Long. Bend. ML	34.7	-34.7	-34.7	34.7	0.0	0.0	0.0	0.0
Tot. Long. Str.	18.2	-8.4	-70.0	42.0	-21.6	5.5	-21.6	5.5
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	-1.5	-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.	33.5	8.4	71.9	42.0	30.0	21.4	30.0	21.4

WRC 107/537 Stress Summations:

Vessel Stress Summation at Attachment Junction (N./mm²)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Pm (SUS)	43.6	44.8	43.6	44.8	43.6	44.8	43.6	44.8
Circ. Pm (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Pm(TOTAL)	43.6	44.8	43.6	44.8	43.6	44.8	43.6	44.8
Circ. Pl (SUS)	0.9	0.9	-0.9	-0.9	0.0	0.0	0.0	0.0
Circ. Pl (OCC)	4.0	4.0	-7.8	-7.8	-1.4	-1.4	-1.4	-1.4
Circ. Pl(TOTAL)	4.9	4.9	-8.7	-8.7	-1.4	-1.4	-1.4	-1.4
Circ. Q (SUS)	2.3	-2.3	-2.3	2.3	0.0	0.0	0.0	0.0
Circ. Q (OCC)	9.3	-9.3	-20.3	20.3	-7.9	7.9	-7.9	7.9
Circ. Q (TOTAL)	11.6	-11.6	-22.6	22.6	-7.9	7.9	-7.9	7.9
Long. Pm (SUS)	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8
Long. Pm (OCC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Pm(TOTAL)	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8
Long. Pl (SUS)	0.4	0.4	-0.4	-0.4	0.0	0.0	0.0	0.0
Long. Pl (OCC)	1.0	1.0	-4.0	-4.0	-2.0	-2.0	-2.0	-2.0
Long. Pl(TOTAL)	1.3	1.3	-4.4	-4.4	-2.0	-2.0	-2.0	-2.0
Long. Q (SUS)	2.7	-2.7	-2.7	2.7	0.0	0.0	0.0	0.0
Long. Q (OCC)	10.9	-10.9	-25.0	25.0	-4.4	4.4	-4.4	4.4
Long. Q (TOTAL)	13.6	-13.6	-27.7	27.7	-4.4	4.4	-4.4	4.4
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	-0.5	-0.5	0.5	0.5
Shear Pl (OCC)	0.0	0.0	0.0	0.0	-0.7	-0.7	0.7	0.7
Shear Pl(TOTAL)	0.0	0.0	0.0	0.0	-1.2	-1.2	1.2	1.2
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)	43.6	44.8	43.6	44.8	43.6	44.8	43.6	44.8
Pm (SUS+OCC)	43.6	44.8	43.6	44.8	43.6	44.8	43.6	44.8
Pm+Pl (SUS)	44.5	45.7	42.7	43.9	43.6	44.8	43.6	44.8
Pm+Pl (SUS+OCC)	48.5	49.7	34.9	36.1	42.2	43.4	42.2	43.4
Pm+Pl+Q (Total)	60.1	38.1	22.7	58.7	34.3	51.4	34.3	51.4

Vessel Stress Summation Comparison (N./mm²):

Type of Stress Int.	Max. S.I.	S.I. Allowable	Result
Pm (SUS)	44.77	137.90	Passed
Pm (SUS+OCC)	44.77	165.48	Passed
Pm+Pl (SUS)	45.67	206.85	Passed
Pm+Pl (SUS+OCC)	49.68	248.22	Passed
Pm+Pl+Q (TOTAL)	60.05	485.85	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./mm²)

Type of Stress	Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Pm (SUS)		99.5	100.7	99.5	100.7	99.5	100.7	99.5	100.7
Circ. Pm (OCC)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Circ. Pm(TOTAL)		99.5	100.7	99.5	100.7	99.5	100.7	99.5	100.7
Circ. Pl (SUS)		3.3	3.3	-3.3	-3.3	0.0	0.0	0.0	0.0
Circ. Pl (OCC)		14.0	14.0	-29.6	-29.6	-4.3	-4.3	-4.3	-4.3
Circ. Pl(TOTAL)		17.3	17.3	-33.0	-33.0	-4.3	-4.3	-4.3	-4.3
Circ. Q (SUS)		4.7	-4.7	-4.7	4.7	0.0	0.0	0.0	0.0
Circ. Q (OCC)		19.4	-19.4	-42.2	42.2	-25.5	25.5	-25.5	25.5
Circ. Q (TOTAL)		24.1	-24.1	-46.9	46.9	-25.5	25.5	-25.5	25.5
Long. Pm (SUS)		49.7	49.7	49.7	49.7	49.7	49.7	49.7	49.7
Long. Pm (OCC)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long. Pm(TOTAL)		49.7	49.7	49.7	49.7	49.7	49.7	49.7	49.7
Long. Pl (SUS)		1.4	1.4	-1.4	-1.4	0.0	0.0	0.0	0.0
Long. Pl (OCC)		4.9	4.9	-14.0	-14.0	-8.0	-8.0	-8.0	-8.0
Long. Pl(TOTAL)		6.3	6.3	-15.4	-15.4	-8.0	-8.0	-8.0	-8.0
Long. Q (SUS)		5.3	-5.3	-5.3	5.3	0.0	0.0	0.0	0.0
Long. Q (OCC)		13.3	-13.3	-56.0	56.0	-13.6	13.6	-13.6	13.6
Long. Q (TOTAL)		18.6	-18.6	-61.3	61.3	-13.6	13.6	-13.6	13.6
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	-1.0	-1.0	1.0	1.0
Shear Pl (OCC)		0.0	0.0	0.0	0.0	-1.5	-1.5	1.5	1.5
Shear Pl(TOTAL)		0.0	0.0	0.0	0.0	-2.5	-2.5	2.5	2.5
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)		99.5	100.7	99.5	100.7	99.5	100.7	99.5	100.7
Pm (SUS+OCC)		99.5	100.7	99.5	100.7	99.5	100.7	99.5	100.7
Pm+Pl (SUS)		102.8	104.0	96.2	97.4	99.5	100.7	99.5	100.7
Pm+Pl (SUS+OCC)		116.8	118.0	66.5	67.7	95.3	96.5	95.3	96.5
Pm+Pl+Q (Total)		140.9	93.9	46.5	114.7	69.9	122.0	69.9	122.0

Vessel Stress Summation Comparison (N./mm²):

Type of Stress Int.	Max. S.I.	S.I. Allowable	Result
Pm (SUS)	100.68	137.90	Passed
Pm (SUS+OCC)	100.68	165.48	Passed
Pm+Pl (SUS)	103.99	206.85	Passed
Pm+Pl (SUS+OCC)	118.01	248.22	Passed
Pm+Pl+Q (TOTAL)	140.94	485.85	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./mm²
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./mm²
Bolt Allowable Shear Stress	SBShear	28.96	N./mm²
Anchor Bolt Nominal Diameter	BOD	30.0000	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./mm²

Leg Baseplate and Bolting Analysis, including Moments

Shear Stress in a Single Bolt [taub]:
  = Shear Force/(Bolt Area * Number of Bolts)
  = 2437/(5.03 * 24)
  = 2.0 N./mm². Must be less than 29.0 N./mm².

I-Beam Leg

Base Plate Available Area [AA]:
  = B * D
  = 400 * 400
  = 1600.000 cm²

Clearance Between The Bolt And The Leg Edge [BCL]:
  = z - BOD / 2
  = 50 - 30/2
  = 35.000 mm.

Moment at Baseplate [MOMENT]:
  = Vleg * Lleg
  = 900.9 * 1290
  = 1162.162 Kg.m.

Axial Load on the baseplate [P]:
  = 998.507 Kgf, based on governing load combination.

Eccentricity [e]:
  = MOMENT * Conv_Factor / P
  = 1162 * 9807/998.5
  = 1163.877 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(1164 - 0.5 * 400)
= 2891.631 mm.

Value [K2]:
= 6 * n * Ast/B(F + e)
= 6 * 9.449 * 15.09/400 (150 + 1164)
= 2809.905 cm²

Distance [K3]:
= -K2(0.5 * D + F)
= -2810 (0.5 * 400 + 150)
= -983466.062 mm³

Solving For The Effective Bearing Length Using Iteration [Y]:
:: Y³ + K1 * Y² + K2 * Y + K3 = 0
:: Y³ + 2892 * Y² + 2810 * Y - 983466 = 0
= 139.641 mm.

Term [NUM]:
= D/2 - Y/3 - e
= 400/2 - 139.6/3 - 1164
= -1010.424 mm.

Term [DENOM]:
= D/2 - Y/3 + F
= 400/2 - 139.6/3 + 150
= 303.453 mm.

Total Bolt Tension Force [T]:
= - P * NUM/DENOM
= - 998.5 * -1010/303.5
= 3324.785 Kgf

Overturning Moment Due To Bolt In Tension [Mt]:
= T(0.5 * D + F - Y)
= 3325 (0.5 * 400 + 150 - 139.6)
= 699.411 Kg.m.

Bearing Pressure [FC]:
= 2(P + T)/(Y * B)
= 2(998.5 + 3325)/(139.6 * 400)
= 15.18 barg [<= FCPRIME (206.84)]

Equivalent Bearing Pressure [f1]:
= FC(Y - a)/Y
= 15.18 (139.6 - 100)/139.6
= 4.309 barg

Overturning Moment Due To Bearing Pressure [Mc]:
= (a² * B/6) * (f1 + 2 * FC)
= (100² * 400/6) * (4.309 + 2 * 15.18)
= 235.702 Kg.m.

The Baseplate Required Thickness [TREQ]:
= sqrt(6 * max(Mt, Mc) / (B * 1.5 * SBA))
= sqrt(6 * 699.4/(400 * 206.9))
= 22.302 mm.

Required bolt area per D. Moss [ABREQM]:
= T/STBA

= 3325/48.26
= 6.7555 cm² [< Ast (15.09) --> PASSED]

Distance from Top of Legs to Vessel CG [CD_DIST]:
= 862 mm.

Total Overturning Moment at Baseplate [Mbb]:
= (Mleg / max(CD_DIST, minDist)) * (CD_DIST + Lleg)
= (2802/max(862, 38.1)) * (862 + 1290)
= 6996.444 Kg.m.

Required Total Bolt Area per Leg per H. Bednar [ABREQB]:
= (1/(Nleg * STBA)) * ((4 * Mbb/(Rn * 2)) - W)
= (1/(4 * 48.26)) * ((4 * 6996/(2220)) - 3994)
= 4.3747 cm²

Available Total Bolt Corr. Area per Leg [ABAVL]:
= As * NBT
= 5.03 * 6
= 30.1779 cm² [> ABREQB (4.37) --> PASSED]

Baseplate & Bolting Summary of Results: (mm., cm²)

	Actual	Required	Pass/Fail
Baseplate Thickness	40.000	22.302	Pass
Bolt Root Area (Bednar)	30.18	4.37	Pass
Bolt Root Area (D. Moss)	15.09	6.76	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		1290.000	mm.
Effective Leg Length	Leglen	1090.000	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	mm^3
Section Modulus (weak axis)		200000.812	mm^3
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		558.3	Kg.m.
Total Weight Load at top of Legs	W	15007.6	Kgf
Total Shear force at top of Legs		460.2	Kgf
Additional force in Leg due to Bracing	Fadd	0.0	Kgf
Occasional Load Factor	Occfac	1.000	
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	15.000	mm.

Maximum Shear at top of one Leg [Vleg]:
= (max(Wind, Seismic, Blast) + applied forces)(Imax / Itot)
= (460.2)(5696/15407)
= 170.13 Kgf

Axial Compression, Leg furthest from the Neutral Axis [Sma]:
= W/Nleg + (Mleg/(Nlegm*Rn))/Aleg
= 147172/4 + (5474738/(2 * 1110))/7810
= 5.03 N./mm²

Axial Compression, Leg closest to the Neutral Axis [Sva]:
= (W / Nleg) / Aleg
= (15008/4)/78.1
= 4.71 N./mm²

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(1-(21.5)²/(2*127.2²))248.2/(5/3+3(21.5)/(8*127.2)-(21.5³)/(8*127.2³)
= 141.47 N./mm²

Bending at the Bottom of the Leg closest to the N.A. [S]:
= (Vleg * Leglen / Smdwa)
= (170.1 * 1090/200001)
= 9.09 N./mm²

Allowable Bending Stress[Sb]:
= (0.6 * Fy * Occfac)
= (0.6 * 248.2 * 1)
= 148.93 N./mm²

AISC Unity Check [Sc](must be <= to 1 and > 0) :
= (Sma/Sa)+(0.85*S)/((1-Sma/Spex)*Sb)
= (5.027/141.5)+(0.85 *9.093)/((1 -5.027/2266) *148.9)
= 0.0875

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.

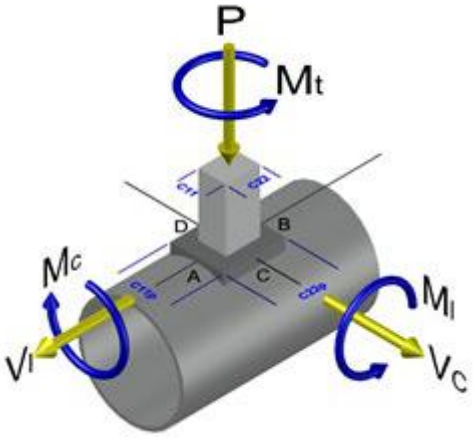
Input Echo, WRC107/537 Item 1, Description: LEGS

Diameter Basis for Vessel	Vbasis	ID	
Cylindrical or Spherical Vessel	Cylsph	Cylindrical	
Internal Corrosion Allowance	Cas	0.0000	mm.
Vessel Diameter	Dv	1970.300	mm.
Vessel Thickness	Tv	14.850	mm.
Design Temperature	T1	80.0	C
Vessel Material		SA-516 70	
Vessel UNS Number		K02700	
Vessel Cold S.I. Allowable	Smc	179.27	N./mm²
Vessel Hot S.I. Allowable	Smh	179.27	N./mm²
Attachment Type	Type	Rectangular	
Parameter C11	C11	200.00	mm.
Parameter C22	C22	330.95	mm.
Thickness of Reinforcing Pad	Tpad	15.000	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	3751.9	Kgf
Global Force (SUS)	Fz	0.0	Kgf
Global Moment (SUS)	Mx	0.0	Kg.m.
Global Moment (SUS)	My	0.0	Kg.m.
Global Moment (SUS)	Mz	412.7	Kg.m.
Internal Pressure (SUS)	P	12.00	barg
Include Pressure Thrust		No	
Global Force (OCC)	Fx	170.1	Kgf
Global Force (OCC)	Fy	251.5	Kgf
Global Force (OCC)	Fz	0.0	Kgf
Global Moment (OCC)	Mx	0.0	Kg.m.
Global Moment (OCC)	My	0.0	Kg.m.

Global Moment (OCC)	Mz	120.4	Kg.m.
Occasional Internal Pressure (OCC)	Pvar	5.47	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	3751.9	Kgf
Circumferential Moment	MC	0.0	Kg.m.
Longitudinal Moment	ML	-412.7	Kg.m.
Torsional Moment	MT	0.0	Kg.m.

Dimensionless Parameters used : Gamma = 33.50

Dimensionless Loads for Cylindrical Shells at Attachment Junction:

Curves read for 1979	Beta	Figure	Value	Location
N(PHI) / (P/Rm)	0.161	4C	5.213	(A,B)
N(PHI) / (P/Rm)	0.161	3C	3.917	(C,D)
M(PHI) / (P)	0.120	2C1	0.079	(A,B)
M(PHI) / (P)	0.120	1C	0.112	(C,D)
N(PHI) / (MC/(Rm**2 * Beta))	0.118	3A	1.080	(A,B,C,D)
M(PHI) / (MC/(Rm * Beta))	0.129	1A	0.092	(A,B,C,D)
N(PHI) / (ML/(Rm**2 * Beta))	0.140	3B	3.677	(A,B,C,D)
M(PHI) / (ML/(Rm * Beta))	0.135	1B	0.040	(A,B,C,D)
N(x) / (P/Rm)	0.142	3C	4.317	(A,B)
N(x) / (P/Rm)	0.142	4C	5.495	(C,D)
M(x) / (P)	0.146	1C1	0.100	(A,B)
M(x) / (P)	0.146	2C	0.063	(C,D)

N(x) / (MC/(Rm**2 * Beta))	0.118	4A	1.611 (A,B,C,D)
M(x) / (MC/(Rm * Beta))	0.155	2A	0.045 (A,B,C,D)
N(x) / (ML/(Rm**2 * Beta))	0.140	4B	1.165 (A,B,C,D)
M(x) / (ML/(Rm * Beta))	0.153	2B	0.057 (A,B,C,D)

Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Attachment Junction (N./mm²)

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	3.1	3.1	-3.1	-3.1	0.0	0.0	0.0	0.0
Circ. Bend. ML	8.1	-8.1	-8.1	8.1	0.0	0.0	0.0	0.0
Tot. Circ. Str.	11.2	-5.0	-11.2	5.0	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	1.3	1.3	-1.3	-1.3	0.0	0.0	0.0	0.0
Long. Bend. ML	10.1	-10.1	-10.1	10.1	0.0	0.0	0.0	0.0
Tot. Long. Str.	11.4	-8.8	-11.4	8.8	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	-1.9	-1.9	1.9	1.9
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	-1.9	-1.9	1.9	1.9
Str. Int.	11.4	8.8	11.4	8.8	3.7	3.7	3.7	3.7

Dimensionless Parameters used : Gamma = 66.84

Dimensionless Loads for Cylindrical Shells at Pad Edge:

Curves read for 1979	Beta	Figure		Value	Location
N(PHI) / (P/Rm)	0.178	4C		8.782	(A,B)
N(PHI) / (P/Rm)	0.178	3C		5.223	(C,D)
M(PHI) / (P)	0.159	2C1		0.035	(A,B)
M(PHI) / (P)	0.159	1C	!	0.070	(C,D)
N(PHI) / (MC/(Rm**2 * Beta))	0.159	3A		2.655	(A,B,C,D)
M(PHI) / (MC/(Rm * Beta))	0.172	1A		0.071	(A,B,C,D)
N(PHI) / (ML/(Rm**2 * Beta))	0.167	3B		6.569	(A,B,C,D)
M(PHI) / (ML/(Rm * Beta))	0.168	1B		0.023	(A,B,C,D)
N(x) / (P/Rm)	0.169	3C		5.555	(A,B)
N(x) / (P/Rm)	0.169	4C		9.000	(C,D)
M(x) / (P)	0.171	1C1		0.064	(A,B)
M(x) / (P)	0.171	2C	!	0.036	(C,D)
N(x) / (MC/(Rm**2 * Beta))	0.159	4A		5.114	(A,B,C,D)
M(x) / (MC/(Rm * Beta))	0.193	2A		0.030	(A,B,C,D)
N(x) / (ML/(Rm**2 * Beta))	0.167	4B		2.697	(A,B,C,D)
M(x) / (ML/(Rm * Beta))	0.177	2B		0.028	(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./mm²)

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	9.7	9.7	-9.7	-9.7	0.0	0.0	0.0	0.0
Circ. Bend.	ML	15.2	-15.2	-15.2	15.2	0.0	0.0	0.0	0.0
Tot. Circ. Str.		24.9	-5.4	-24.9	5.4	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	4.2	4.2	-4.2	-4.2	0.0	0.0	0.0	0.0
Long. Bend.	ML	17.7	-17.7	-17.7	17.7	0.0	0.0	0.0	0.0
Tot. Long. Str.		21.9	-13.6	-21.9	13.6	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	-3.5	-3.5	3.5	3.5
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	-3.5	-3.5	3.5	3.5
Str. Int.		24.9	13.6	24.9	13.6	7.1	7.1	7.1	7.1

WRC 107 Stress Calculation for OCCasional loads:

Radial Load	P	170.1	Kgf
Circumferential Shear	VC	0.0	Kgf
Longitudinal Shear	VL	251.5	Kgf
Circumferential Moment	MC	0.0	Kg.m.
Longitudinal Moment	ML	-120.4	Kg.m.
Torsional Moment	MT	0.0	Kg.m.

Dimensionless Parameters used : Gamma = 33.50

Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Attachment Junction (N./mm²)

Type of Stress	Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb.	P	-0.3	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	-0.2
Circ. Bend.	P	-0.9	0.9	-0.9	0.9	-1.3	1.3	-1.3	1.3
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	0.9	0.9	-0.9	-0.9	0.0	0.0	0.0	0.0
Circ. Bend.	ML	2.4	-2.4	-2.4	2.4	0.0	0.0	0.0	0.0

Tot. Circ. Str.	2.1	-0.9	-4.5	2.1	-1.5	1.0	-1.5	1.0
Long. Memb. P	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3
Long. Bend. P	-1.1	1.1	-1.1	1.1	-0.7	0.7	-0.7	0.7
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	2.9	-2.9	-2.9	2.9	0.0	0.0	0.0	0.0
Tot. Long. Str.	2.0	-1.7	-4.7	3.5	-1.0	0.4	-1.0	0.4
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	-0.1	-0.1	0.1	0.1
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	-0.1	-0.1	0.1	0.1
Str. Int.	2.1	1.7	4.7	3.5	1.5	1.1	1.5	1.1

Dimensionless Parameters used : Gamma = 66.84
Stress Concentration Factors: Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Edge of Reinforcing Pad (N./mm²)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Memb. P	-1.0	-1.0	-1.0	-1.0	-0.6	-0.6	-0.6	-0.6
Circ. Bend. P	-1.6	1.6	-1.6	1.6	-3.2	3.2	-3.2	3.2
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	2.8	2.8	-2.8	-2.8	0.0	0.0	0.0	0.0
Circ. Bend. ML	4.4	-4.4	-4.4	4.4	0.0	0.0	0.0	0.0
Tot. Circ. Str.	4.7	-1.0	-9.9	2.2	-3.8	2.6	-3.8	2.6
Long. Memb. P	-0.6	-0.6	-0.6	-0.6	-1.0	-1.0	-1.0	-1.0
Long. Bend. P	-2.9	2.9	-2.9	2.9	-1.7	1.7	-1.7	1.7
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	1.2	1.2	-1.2	-1.2	0.0	0.0	0.0	0.0
Long. Bend. ML	5.2	-5.2	-5.2	5.2	0.0	0.0	0.0	0.0
Tot. Long. Str.	2.9	-1.7	-9.9	6.2	-2.7	0.6	-2.7	0.6
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.	4.7	1.7	9.9	6.2	3.8	2.6	3.8	2.6

WRC 107/537 Stress Summations:

Vessel Stress Summation at Attachment Junction (N./mm²)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl

Circ. Pm (SUS)	39.0	40.2	39.0	40.2	39.0	40.2	39.0	40.2
Circ. Pm (OCC)	17.8	18.3	17.8	18.3	17.8	18.3	17.8	18.3
Circ. Pm(TOTAL)	56.8	58.6	56.8	58.6	56.8	58.6	56.8	58.6
Circ. Pl (SUS)	3.1	3.1	-3.1	-3.1	0.0	0.0	0.0	0.0
Circ. Pl (OCC)	0.6	0.6	-1.2	-1.2	-0.2	-0.2	-0.2	-0.2
Circ. Pl(TOTAL)	3.7	3.7	-4.3	-4.3	-0.2	-0.2	-0.2	-0.2
Circ. Q (SUS)	8.1	-8.1	-8.1	8.1	0.0	0.0	0.0	0.0
Circ. Q (OCC)	1.5	-1.5	-3.3	3.3	-1.3	1.3	-1.3	1.3
Circ. Q (TOTAL)	9.6	-9.6	-11.4	11.4	-1.3	1.3	-1.3	1.3
Long. Pm (SUS)	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
Long. Pm (OCC)	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
Long. Pm(TOTAL)	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4
Long. Pl (SUS)	1.3	1.3	-1.3	-1.3	0.0	0.0	0.0	0.0
Long. Pl (OCC)	0.1	0.1	-0.6	-0.6	-0.3	-0.3	-0.3	-0.3
Long. Pl(TOTAL)	1.4	1.4	-1.9	-1.9	-0.3	-0.3	-0.3	-0.3
Long. Q (SUS)	10.1	-10.1	-10.1	10.1	0.0	0.0	0.0	0.0
Long. Q (OCC)	1.8	-1.8	-4.1	4.1	-0.7	0.7	-0.7	0.7
Long. Q (TOTAL)	11.9	-11.9	-14.2	14.2	-0.7	0.7	-0.7	0.7
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	-1.9	-1.9	1.9	1.9
Shear Pl (OCC)	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1	0.1
Shear Pl(TOTAL)	0.0	0.0	0.0	0.0	-2.0	-2.0	2.0	2.0
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)	39.0	40.2	39.0	40.2	39.0	40.2	39.0	40.2
Pm (SUS+OCC)	56.8	58.6	56.8	58.6	56.8	58.6	56.8	58.6
Pm+Pl (SUS)	42.1	43.3	35.9	37.1	39.2	40.4	39.2	40.4
Pm+Pl (SUS+OCC)	60.5	62.3	52.5	54.3	56.7	58.5	56.7	58.5
Pm+Pl+Q (Total)	70.1	52.7	41.1	65.6	55.5	59.7	55.5	59.7

Vessel Stress Summation Comparison (N./mm²):

Type of Stress Int.	Max. S.I.	S.I. Allowable	Result
Pm (SUS)	40.22	179.27	Passed
Pm (SUS+OCC)	58.56	215.12	Passed
Pm+Pl (SUS)	43.32	268.90	Passed
Pm+Pl (SUS+OCC)	62.28	322.69	Passed
Pm+Pl+Q (TOTAL)	70.12	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./mm²)

Type of Stress Load	Stress Intensity Values at Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Circ. Pm (SUS)	79.0	80.2	79.0	80.2	79.0	80.2	79.0	80.2
Circ. Pm (OCC)	36.0	36.6	36.0	36.6	36.0	36.6	36.0	36.6
Circ. Pm(TOTAL)	115.1	116.8	115.1	116.8	115.1	116.8	115.1	116.8
Circ. Pl (SUS)	9.7	9.7	-9.7	-9.7	0.0	0.0	0.0	0.0
Circ. Pl (OCC)	1.8	1.8	-3.8	-3.8	-0.6	-0.6	-0.6	-0.6
Circ. Pl(TOTAL)	11.6	11.6	-13.6	-13.6	-0.6	-0.6	-0.6	-0.6
Circ. Q (SUS)	15.2	-15.2	-15.2	15.2	0.0	0.0	0.0	0.0
Circ. Q (OCC)	2.8	-2.8	-6.0	6.0	-3.2	3.2	-3.2	3.2
Circ. Q (TOTAL)	18.0	-18.0	-21.2	21.2	-3.2	3.2	-3.2	3.2
Long. Pm (SUS)	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5
Long. Pm (OCC)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Long. Pm(TOTAL)	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5
Long. Pl (SUS)	4.2	4.2	-4.2	-4.2	0.0	0.0	0.0	0.0
Long. Pl (OCC)	0.6	0.6	-1.8	-1.8	-1.0	-1.0	-1.0	-1.0
Long. Pl(TOTAL)	4.7	4.7	-6.0	-6.0	-1.0	-1.0	-1.0	-1.0
Long. Q (SUS)	17.7	-17.7	-17.7	17.7	0.0	0.0	0.0	0.0
Long. Q (OCC)	2.3	-2.3	-8.1	8.1	-1.7	1.7	-1.7	1.7
Long. Q (TOTAL)	20.0	-20.0	-25.8	25.8	-1.7	1.7	-1.7	1.7
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	-3.5	-3.5	3.5	3.5
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	-3.8	-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)	79.0	80.2	79.0	80.2	79.0	80.2	79.0	80.2
Pm (SUS+OCC)	115.1	116.8	115.1	116.8	115.1	116.8	115.1	116.8
Pm+Pl (SUS)	88.7	89.9	69.3	70.5	79.3	80.5	79.3	80.5
Pm+Pl (SUS+OCC)	126.6	128.4	101.5	103.3	114.7	116.5	114.7	116.5
Pm+Pl+Q (Total)	144.6	110.4	80.3	124.5	111.5	119.6	111.5	119.6

Vessel Stress Summation Comparison (N./mm²):

Type of Stress Int.	Max. S.I.	S.I. Allowable	Result
Pm (SUS)	80.22	179.27	Passed
Pm (SUS+OCC)	116.81	215.12	Passed
Pm+Pl (SUS)	89.94	268.90	Passed
Pm+Pl (SUS+OCC)	128.37	322.69	Passed
Pm+Pl+Q (TOTAL)	144.61	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./mm²

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./mm²
Bolt Allowable Shear Stress	SBShear	28.96	N./mm²
Anchor Bolt Nominal Diameter	BOD	30.0000	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./mm²

Leg Baseplate and Bolting Analysis, including Moments

Shear Stress in a Single Bolt [taub]:
  = Shear Force/(Bolt Area * Number of Bolts)
  = 2437/(5.03 * 24)
  = 2.0 N./mm². Must be less than 29.0 N./mm².

I-Beam Leg

Base Plate Available Area [AA]:
  = B * D
  = 400 * 400
  = 1600.000 cm²

Clearance Between The Bolt And The Leg Edge [BCL]:
  = z - BOD / 2
  = 50 - 30/2
  = 35.000 mm.

Moment at Baseplate [MOMENT]:
  = Vleg * Lleg
  = 170.1 * 1290
  = 219.470 Kg.m.

Axial Load on the baseplate [P]:
  = 998.507 Kgf, based on governing load combination.

Eccentricity [e]:
  = MOMENT * Conv_Factor / P
  = 219.5 * 9807/998.5
  = 219.794 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(219.8 - 0.5 * 400)
= 59.383 mm.

Value [K2]:
= 6 * n * Ast/B(F + e)
= 6 * 9.449 * 15.09/400 (150 + 219.8)
= 790.855 cm²

Distance [K3]:
= -K2(0.5 * D + F)
= -790.9 (0.5 * 400 + 150)
= -276799.062 mm³

Solving For The Effective Bearing Length Using Iteration [Y]:
:: Y³ + K1 * Y² + K2 * Y + K3 = 0
:: Y³ + 59.38 * Y² + 790.9 * Y - 276799 = 0
= 206.547 mm.

Term [NUM]:
= D/2 - Y/3 - e
= 400/2 - 206.5/3 - 219.8
= -88.643 mm.

Term [DENOM]:
= D/2 - Y/3 + F
= 400/2 - 206.5/3 + 150
= 281.151 mm.

Total Bolt Tension Force [T]:
= - P * NUM/DENOM
= - 998.5 * -88.64/281.2
= 314.817 Kgf

Overturning Moment Due To Bolt In Tension [Mt]:
= T(0.5 * D + F - Y)
= 314.8 (0.5 * 400 + 150 - 206.5)
= 45.162 Kg.m.

Bearing Pressure [FC]:
= 2(P + T)/(Y * B)
= 2(998.5 + 314.8)/(206.5 * 400)
= 3.12 barg [<= FCPRIME (206.84)]

Equivalent Bearing Pressure [f1]:
= FC(Y - a)/Y
= 3.118 (206.5 - 100)/206.5
= 1.608 barg

Overturning Moment Due To Bearing Pressure [Mc]:
= (a² * B/6) * (f1 + 2 * FC)
= (100² * 400/6) * (1.608 + 2 * 3.118)
= 53.324 Kg.m.

The Baseplate Required Thickness [TREQ]:
= sqrt(6 * max(Mt, Mc) / (B * 1.5 * SBA))
= sqrt(6 * 53.32/(400 * 206.9))
= 6.158 mm.

Required bolt area per D. Moss [ABREQM]:
= T/STBA
= 314.8/48.26
= 0.6397 cm² [< Ast (15.09) --> PASSED]

Distance from Top of Legs to Vessel CG [CD_DIST]:
  = 1088 mm.

Total Overturning Moment at Baseplate [Mbb]:
  = (Mleg / max(CD_DIST, minDist)) * (CD_DIST + Lleg)
  = (558.3/max(1088, 38.1)) * (1088 + 1290)
  = 1220.087 Kg.m.

Required Total Bolt Area per Leg per H. Bednar [ABREQB]:
  = (1/(Nleg * STBA)) * ((4 * Mbb/(Rn * 2)) - W)
  = (1/(4 * 48.26)) * ((4 * 1220/(2220)) - 3994)
  = -0.9122 cm² --> (No tension in bolts)

Baseplate & Bolting Summary of Results: (mm., cm²)

	Actual	Required	Pass/Fail
Baseplate Thickness	40.000	6.158	Pass
Bolt Root Area (D. Moss)	15.09	0.64	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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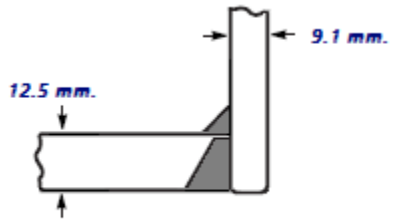
Input, Nozzle Desc: Drain From: 10

Pressure for Reinforcement Calculations	P	12.500	barg
Temperature for Internal Pressure	Temp	80	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N./mm²
Parent Allowable Stress At Ambient	Sva	137.90	N./mm²
Inside Diameter of Elliptical Head	D	1975.00	mm.
Aspect Ratio of Elliptical Head	Ar	2.00	
Head Finished (Minimum) Thickness	t	12.5000	mm.
Head Internal Corrosion Allowance	c	3.0000	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./mm²
Allowable Stress At Ambient	Sna	117.90	N./mm²
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	3.0000	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	12.5000	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)
  = 12.5*1981*0.897/(2*137.9*1-0.2*12.5)
  = 8.0651 mm.
```

Reqd thk per App. 1 of Nozzle Wall, trn [Int. Press]
```
  = R( exp([P/(Sn*E)] - 1 ) per Appendix 1-2 (a)(1)
  = 10.61(exp([12.5/(117.9*1]-1)
  = 0.1131 mm.
```

UG-40, Limits of Reinforcement: [Internal Pressure]
```
Parallel to Vessel Wall (Diameter Limit)            Dl    52.4010  mm.
Parallel to Vessel Wall                          Rn+tn+t    26.2005  mm.
Normal to Vessel Wall (Thickness Limit), no pad   Tlnp    15.2330  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 = 3.1131 mm.
Wall Thickness per UG16(b),                      tr16b = 5.5000 mm.
Wall Thickness, shell/head, internal pressure     trb1 = 11.9510 mm.
Wall Thickness                 tb1 = max(trb1, tr16b) = 11.9510 mm.
Wall Thickness                 tb2 = max(trb2, tr16b) = 5.5000 mm.
Wall Thickness per table UG-45                   tb3 = 5.9464 mm.
```

Determine Nozzle Thickness candidate [tb]:
```
  = min[ tb3, max( tb1,tb2) ]
  = min[ 5.946, max( 11.95, 5.5 ) ]
  = 5.9464 mm.
```

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
```
  = max( ta, tb )
  = max( 3.113, 5.946 )
  = 5.9464 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) -66 °C

Where the Stress Reduction Ratio per UCS-66(i)(2) is :
Design Pressure/Ambient Rating = 12.50/19.60 = 0.638

Weld Size Calculations, Description: Drain

Intermediate Calc. for nozzle/shell Welds Tmin 6.0932 mm.

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	4.2652 = 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 : 0.0781 mm.
The Cut Length for this Nozzle is, Drop + Ho + H + T : 112.5781 mm.

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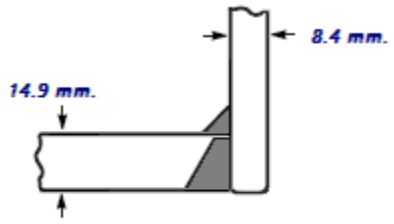
Input, Nozzle Desc: PG From: 20

Pressure for Reinforcement Calculations	P	12.500	barg
Temperature for Internal Pressure	Temp	80	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N./mm²
Parent Allowable Stress At Ambient	Sva	137.90	N./mm²
Inside Diameter of Cylindrical Shell	D	1970.00	mm.
Shell Finished (Minimum) Thickness	t	14.8500	mm.
Shell Internal Corrosion Allowance	c	3.0000	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./mm²
Allowable Stress At Ambient	Sna	137.90	N./mm²
Diameter Basis (for tr calc only)		Outside	
Layout Angle		75.00	deg
Diameter		1.5000	in.
Size and Thickness Basis		Actual	
Actual Thickness	tn	8.3820	mm.
Corrosion Allowance	can	3.0000	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)
= 12.5*988/(137.9*1-0.6*12.5)
= 9.0053 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)
= 12.5*19.05/(137.9*1+0.4*12.5)
= 0.1721 mm.

UG-40, Limits of Reinforcement: [Internal Pressure]

Parallel to Vessel Wall (Diameter Limit)	Dl	61.8000	mm.
Parallel to Vessel Wall	Rn+tn+t	30.9000	mm.
Normal to Vessel Wall (Thickness Limit), no pad	Tlnp	13.4550	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	= 3.1721 mm.
Wall Thickness per UG16(b),	tr16b	= 5.5000 mm.
Wall Thickness, shell/head, internal pressure	trb1	= 12.0053 mm.
Wall Thickness	tb1 = max(trb1, tr16b)	= 12.0053 mm.
Wall Thickness	tb2 = max(trb2, tr16b)	= 5.5000 mm.
Wall Thickness per table UG-45	tb3	= 6.1200 mm.

Determine Nozzle Thickness candidate [tb]:
= min[tb3, max(tb1,tb2)]
= min[6.12, max(12.01, 5.5)]
= 6.1200 mm.

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
= max(ta, tb)
= max(3.172, 6.12)
= 6.1200 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 5.3820 mm.

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	3.7674 = 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 : 0.1842 mm.
The Cut Length for this Nozzle is, Drop + Ho + H + T : 47.8092 mm.

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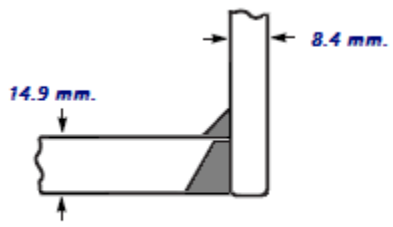
Input, Nozzle Desc: PT From: 20

Pressure for Reinforcement Calculations	P	12.500	barg
Temperature for Internal Pressure	Temp	80	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N./mm²
Parent Allowable Stress At Ambient	Sva	137.90	N./mm²
Inside Diameter of Cylindrical Shell	D	1970.00	mm.
Shell Finished (Minimum) Thickness	t	14.8500	mm.
Shell Internal Corrosion Allowance	c	3.0000	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./mm²
Allowable Stress At Ambient	Sna	137.90	N./mm²
Diameter Basis (for tr calc only)		Outside	
Layout Angle		105.00	deg
Diameter		1.5000	in.
Size and Thickness Basis		Actual	
Actual Thickness	tn	8.3820	mm.
Corrosion Allowance	can	3.0000	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)
= 12.5*988/(137.9*1-0.6*12.5)
= 9.0053 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)
= 12.5*19.05/(137.9*1+0.4*12.5)
= 0.1721 mm.

UG-40, Limits of Reinforcement: [Internal Pressure]

Parallel to Vessel Wall (Diameter Limit)	Dl	61.8000	mm.
Parallel to Vessel Wall	Rn+tn+t	30.9000	mm.
Normal to Vessel Wall (Thickness Limit), no pad	Tlnp	13.4550	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	= 3.1721 mm.
Wall Thickness per UG16(b),	tr16b	= 5.5000 mm.
Wall Thickness, shell/head, internal pressure	trb1	= 12.0053 mm.
Wall Thickness	tb1 = max(trb1, tr16b)	= 12.0053 mm.
Wall Thickness	tb2 = max(trb2, tr16b)	= 5.5000 mm.
Wall Thickness per table UG-45	tb3	= 6.1200 mm.

Determine Nozzle Thickness candidate [tb]:
= min[tb3, max(tb1,tb2)]
= min[6.12, max(12.01, 5.5)]
= 6.1200 mm.

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
= max(ta, tb)
= max(3.172, 6.12)
= 6.1200 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 5.3820 mm.

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	3.7674 = 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 : 0.1842 mm.
The Cut Length for this Nozzle is, Drop + Ho + H + T : 47.8092 mm.

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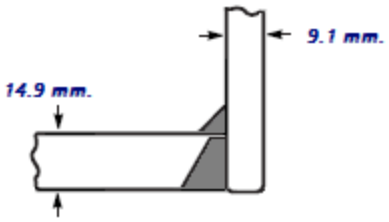
Input, Nozzle Desc: IN/OUT From: 20

Pressure for Reinforcement Calculations	P	12.500	barg
Temperature for Internal Pressure	Temp	80	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N./mm²
Parent Allowable Stress At Ambient	Sva	137.90	N./mm²
Inside Diameter of Cylindrical Shell	D	1970.00	mm.
Shell Finished (Minimum) Thickness	t	14.8500	mm.
Shell Internal Corrosion Allowance	c	3.0000	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./mm²
Allowable Stress At Ambient	Sna	117.90	N./mm²
Diameter Basis (for tr calc only)		Outside	
Layout Angle		180.00	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	3.0000	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	1.315	in.
Actual Thickness Used in Calculation	0.358	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)
= 12.5*988/(137.9*1-0.6*12.5)
= 9.0053 mm.

Reqd thk per App. 1 of Nozzle Wall, trn [Int. Press]
= Ro(1 - exp(-P/(Sn*E))) per Appendix 1-2 (a)(1)
= 16.7(1-exp(-12.5/(117.9*1)))
= 0.1761 mm.

UG-40, Limits of Reinforcement: [Internal Pressure]

Parallel to Vessel Wall (Diameter Limit)	Dl	57.1010	mm.
Parallel to Vessel Wall	Rn+tn+t	28.5505	mm.
Normal to Vessel Wall (Thickness Limit), no pad	Tlnp	15.2330	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 = 3.1761 mm.
Wall Thickness per UG16(b),	tr16b = 5.5000 mm.
Wall Thickness, shell/head, internal pressure	trb1 = 12.0053 mm.
Wall Thickness	tb1 = max(trb1, tr16b) = 12.0053 mm.
Wall Thickness	tb2 = max(trb2, tr16b) = 5.5000 mm.
Wall Thickness per table UG-45	tb3 = 5.9464 mm.

Determine Nozzle Thickness candidate [tb]:
= min[tb3, max(tb1,tb2)]
= min[5.946, max(12.01, 5.5)]
= 5.9464 mm.

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
= max(ta, tb)
= max(3.176, 5.946)
= 5.9464 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) -66 °C

Where the Stress Reduction Ratio per UCS-66(i)(2) is :
Design Pressure/Ambient Rating = 12.50/19.60 = 0.638

Weld Size Calculations, Description: IN/OUT

Intermediate Calc. for nozzle/shell Welds Tmin 6.0932 mm.

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	4.2652 = 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 : 0.1416 mm.
The Cut Length for this Nozzle is, Drop + Ho + H + T : 47.7665 mm.

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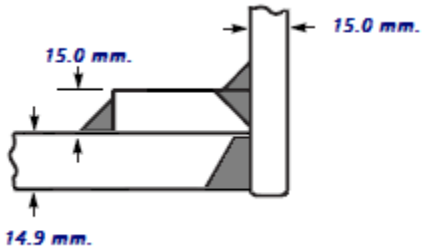
Input, Nozzle Desc: MAN HOLE From: 20

Pressure for Reinforcement Calculations	P	12.500	barg
Temperature for Internal Pressure	Temp	80	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N./mm²
Parent Allowable Stress At Ambient	Sva	137.90	N./mm²
Inside Diameter of Cylindrical Shell	D	1970.00	mm.
Shell Finished (Minimum) Thickness	t	14.8500	mm.
Shell Internal Corrosion Allowance	c	3.0000	mm.
Shell External Corrosion Allowance	co	0.0000	mm.
Distance from Bottom/Left Tangent		460.00	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./mm²
Allowable Stress At Ambient	Sna	137.90	N./mm²
Diameter Basis (for tr calc only)		Outside	
Layout Angle		270.00	deg
Diameter		16.0000	in.
Size and Thickness Basis		Actual	
Actual Thickness	tn	15.0000	mm.
Flange Material		SA-350 LF2	
Flange Type		Weld Neck Flange	
Corrosion Allowance	can	3.0000	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	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./mm²
Pad Allowable Stress At Ambient	Spa	137.90	N./mm²
Diameter of Pad along vessel surface	Dp	510.0000	mm.
Thickness of Pad	te	15.0000	mm.
Weld leg size between Pad and Shell	Wp	10.0000	mm.
Groove weld depth between Pad and Nozzle	Wgpn	15.0000	mm.
Reinforcing Pad Width		51.8000	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          16.000  in.
Actual Thickness Used in Calculation                  0.591  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)
  = 12.5*988/(137.9*1-0.6*12.5)
  = 9.0053 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)
  = 12.5*203.2/(137.9*1+0.4*12.5)
  = 1.8354 mm.
```

UG-40, Limits of Reinforcement: [Internal Pressure]
```
Parallel to Vessel Wall (Diameter Limit)            Dl   764.8000  mm.
Parallel to Vessel Wall, opening length              d   382.4000  mm.
Normal to Vessel Wall (Thickness Limit), pad side Tlwp    29.6250  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: (cm²)

AREA AVAILABLE, A1 to A5		Design	External	Mapnc
Area Required	Ar	34.436	NA	NA
Area in Shell	A1	10.878	NA	NA
Area in Nozzle Wall	A2	6.023	NA	NA
Area in Inward Nozzle	A3	0.000	NA	NA

Area in Welds	A41+A42+A43	3.249	NA	NA
Area in Element	A5	15.540	NA	NA
TOTAL AREA AVAILABLE	Atot	35.689	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:	501.6449	15.0000	mm.
Based on given Pad Diameter:	510.0000	13.7903	mm.
Based on Shell or Nozzle Thickness:	502.6070	14.8500	mm.

Area Required [A]:
= (d * tr*F + 2 * tn * tr*F * (1-fr1)) UG-37(c)
= (382.4*9.005*1+2*12*9.005*1*(1-1))
= 34.436 cm²

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)
= 382.4 (1 * 11.85 - 1 * 9.005) - 2 * 12
(1 * 11.85 - 1 * 9.005) * (1 - 1)
= 10.878 cm²

Area Available in Nozzle Wall Projecting Outward [A2]:
= (2 * Tlwp) * (tn - trn) * fr2
= (2 * 29.63) * (12 - 1.835) * 1
= 6.023 cm²

Area Available in Welds [A41 + A42 + A43]:
= (Wo² - Ar Lost)*Fr3+((Wi-can/0.707)² - Ar Lost)*fr2 + Wp²*fr4
= (2.249) * 1 + (0) * 1 + 10² * 1
= 3.249 cm²

Area Available in Element [A5]:
= (min(Dp,DL)-(Nozzle OD))*(min(tp,Tlwp,te)) * fr4
= (510 - 406.4) * 15 * 1
= 15.540 cm²

UG-45 Minimum Nozzle Neck Thickness Requirement:
Wall Thickness for Internal/External pressures ta = 4.8354 mm.

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
= ta
= 4.8354 mm.

Available Nozzle Neck Thickness = 15.0000 mm. -> OK

Nozzle Junction Minimum Design Metal Temperature (MDMT) Calculations:

Nozzle Neck to Flange Weld, Curve: B

Govrn. thk, tg = 15, tr = 1.835, c = 3 mm., E✱ = 1
Thickness Ratio = tr * E✱/(tg - c) = 0.153, Temp. Reduction = 78 °C

Min Metal Temp. w/o impact per UCS-66, Curve B	-16 °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 = 15, tr = 1.835, c = 3 mm., E✱ = 1
Thickness Ratio = tr * E✱/(tg - c) = 0.153, Temp. Reduction = 78 °C

Min Metal Temp. w/o impact per UCS-66, Curve B -16 °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 = 15, tr = 1.835, c = 3 mm., E✱ = 1
Thickness Ratio = tr * E✱/(tg - c) = 0.153, Temp. Reduction = 78 °C

Min Metal Temp. w/o impact per UCS-66, Curve B -16 °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 = 14.85, tr = 9.005, c = 3 mm., E✱ = 1
Thickness Ratio = tr * E✱/(tg - c) = 0.76, Temp. Reduction = 13 °C

Min Metal Temp. w/o impact per UCS-66, Curve B -16 °C
Min Metal Temp. at Required thickness (UCS 66.1) -30 °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 = 14.85, tr = 9.005, c = 3 mm., E✱ = 1
Thickness Ratio = tr * E✱/(tg - c) = 0.76, Temp. Reduction = 13 °C

Min Metal Temp. w/o impact per UCS-66, Curve B -16 °C
Min Metal Temp. at Required thickness (UCS 66.1) -30 °C
Min Metal Temp. w/o impact per UG-20(f) -29 °C

Gov. MDMT of the Nozzle : -30 °C
Gov. MDMT of the Reinforcement Pad : -30 °C
Gov. MDMT of the nozzle to shell joint welded assembly : -30 °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 = 12.50/19.60 = 0.638

Weld Size Calculations, Description: MAN HOLE

Intermediate Calc. for nozzle/shell Welds Tmin 12.0000 mm.
Intermediate Calc. for pad/shell Welds TminPad 12.0000 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	6.0000 = 0.5*TminPad	7.0700 = 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, (34.44 - 10.88 + 2 * 12 * 1 *
    (1 * 11.85 - 9.005 ) )137.9 )
  = 34086.25 Kgf
```

Note: F is always set to 1.0 throughout the calculation.

Weld Load [W1]:

```
  = (A2+A5+A4-(Wi-Can/.707)²*fr2)*Sv
  = ( 6.023 + 15.54 + 3.249 - 0 * 1 ) * 137.9
  = 34888.51 Kgf
```

Weld Load [W2]:

```
  = (A2 + A3 + A4 + (2 * tn * t * fr1)) * Sv
  = ( 6.023 + 0 + 2.25 + ( 2.844 ) ) * 137.9
  = 15631.67 Kgf
```

Weld Load [W3]:

```
  = (A2+A3+A4+A5+(2*tn*t*fr1))*S
  = ( 6.023 + 0 + 3.249 + 15.54 + ( 2.844 ) ) * 137.9
  = 38887.63 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 ) * 406.4 * 15 * 0.49 * 137.9
  = 65978. Kgf
```

Shear, Pad Element Weld [Spew]:

```
  = (pi/2) * DP * WP * 0.49 * SEW
  = ( 3.142/2.0 ) * 510 * 10 * 0.49 * 137.9
  = 55198. Kgf
```

Shear, Nozzle Wall [Snw]:

```
  = (pi *( Dlr + Dlo )/4 ) * ( Thk - Can ) * 0.7 * Sn
  = (3.142 * 197.2 ) * ( 15 - 3 ) * 0.7 * 137.9
  = 73177. Kgf
```

Tension, Pad Groove Weld [Tpgw]:

```
  = ( pi/2) * Dlo * Wgpn * 0.74 * Seg
  =  (3.142/2 ) * 406.4 * 15 * 0.74 * 137.9
  = 99640. Kgf
```

Tension, Shell Groove Weld [Tngw]:

```
  = (pi/2) * Dlo * ( T - cas ) * 0.74 * Sng
  = ( 3.142/2.0 ) * 406.4 * ( 14.85 - 3 ) * 0.74 * 137.9
  = 78715. Kgf
```

See UG-41 and UW-15 for clarification of allowable stresses.

Strength of Failure Paths:

Failure Path [Path 1-1]:

```
  = ( SPEW + SNW ) = ( 55198 + 73177 ) = 128374 Kgf
```

Failure Path [Path 2-2]:

```
  = ( Sonw + Tpgw + Tngw + Sinw )
  = ( 65978 + 99640 + 78715 + 0 ) = 244333 Kgf
```

Failure Path [Path 3-3]:

```
  = ( Spew + Tngw + Sinw )
  = ( 55198 + 78715 + 0 ) = 133913 Kgf
```

Summary of Failure Path Calculations:

```
 Path 1-1 = 128374  Kgf, must exceed W = 34086 Kgf    or W1 = 34888 Kgf
 Path 2-2 = 244332  Kgf, must exceed W = 34086 Kgf    or W2 = 15631 Kgf
 Path 3-3 = 133913  Kgf, must exceed W = 34086 Kgf    or W3 = 38887 Kgf
```

Maximum Allowable Pressure for this Nozzle at this Location:

```
 Converged Maximum Allowable Pressure in the Operating case: 12.72 barg
```

The Drop for this Nozzle is : 21.1874 mm.
The Cut Length for this Nozzle is, Drop + Ho + H + T : 68.8123 mm.

Percent Elongation Calculations:

```
 % Elongation per Table UG-79-1 (50*tnom/Rf*(1-Rf/Ro))  3.832 %
```

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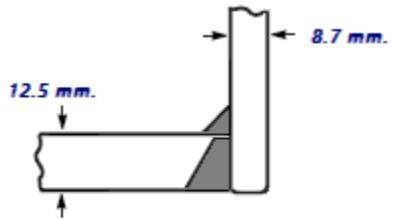
Input, Nozzle Desc: PSV From: 50

Pressure for Reinforcement Calculations	P	12.000	barg
Temperature for Internal Pressure	Temp	80	°C
Parent Material [Impact Tested]		SA-516 70	
Parent Allowable Stress at Temperature	Sv	137.90	N./mm²
Parent Allowable Stress At Ambient	Sva	137.90	N./mm²
Inside Diameter of Elliptical Head	D	1975.00	mm.
Aspect Ratio of Elliptical Head	Ar	2.00	
Head Finished (Minimum) Thickness	t	12.5000	mm.
Head Internal Corrosion Allowance	c	3.0000	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./mm²
Allowable Stress At Ambient	Sna	117.90	N./mm²
Diameter Basis (for tr calc only)		Inside	
Layout Angle		0.00	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	3.0000	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	12.5000	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: PSV

ASME Code, Section VIII, Div. 1, UG-37 to UG-45

Actual Inside Diameter Used in Calculation	1.687	in.
Actual Thickness Used in Calculation	0.344	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*1981*0.897/(2*137.9*1-0.2*12)
= 7.7422 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*24.42/(117.9*1-0.6*12)
= 0.2501 mm.

UG-40, Limits of Reinforcement: [Internal Pressure]

Parallel to Vessel Wall (Diameter Limit)	Dl	97.6996	mm.
Parallel to Vessel Wall, opening length	d	48.8498	mm.
Normal to Vessel Wall (Thickness Limit), no pad	Tlnp	14.3440	mm.

Taking a UG-36(c)(3)(a) exemption for nozzle: PSV.
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 =	3.2501 mm.
Wall Thickness per UG16(b),	tr16b =	5.5000 mm.
Wall Thickness, shell/head, internal pressure	trb1 =	11.5926 mm.
Wall Thickness	tb1 = max(trb1, tr16b) =	11.5926 mm.
Wall Thickness	tb2 = max(trb2, tr16b) =	5.5000 mm.
Wall Thickness per table UG-45	tb3 =	6.4200 mm.

Determine Nozzle Thickness candidate [tb]:
= min[tb3, max(tb1,tb2)]
= min[6.42, max(11.59, 5.5)]
= 6.4200 mm.

Minimum Wall Thickness of Nozzle Necks [tUG-45]:
= max(ta, tb)
= max(3.25, 6.42)
= 6.4200 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) -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: PSV

Intermediate Calc. for nozzle/shell Welds Tmin 5.7376 mm.

Results Per UW-16.1:

	Required Thickness	Actual Thickness
Nozzle Weld	4.0163 = 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 : 0.2544 mm.
The Cut Length for this Nozzle is, Drop + Ho + H + T : 112.7545 mm.

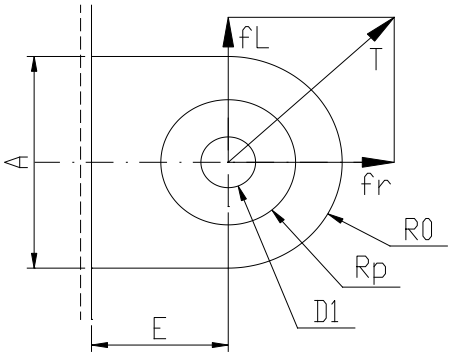
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	CLIENTE : **ROSETTI MARINO** ***CUSTOMER***	**COMM:** : **167/24** ***JOB:***	
		ITEM: : **N2 RECEIVER**	

Dimensionamento dei golfari di sollevamento

Design calculation of tailing lug

M	peso del serbatoio durante il sollevamento *weight of vessel during erection*	3940	kg
P	peso del serbatoio durante il sollevamento *weight of vessel during erection*	38651	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

$$T = \frac{P \times C_d}{n_s}$$

77302,8

Area richiesta al foro della spina, A_r
Area required at pin hole, A_r

$$A_r = \frac{T}{F_s}$$

560

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)

$$f_L = T \qquad M_b = f_L \times E$$

11595420

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

$$\sigma_b = \frac{M_b}{Z}$$

55,7

Ok!

Sforzi nella saldatura
Stress in the weld

$$A_{Rw} = 2 \times w_s \times l_s \times 0.707$$

5302,5

$$\tau_W = \frac{T}{A_{RW}}$$

14,58

Ok!

REV.	DESCRIZIONE DESCRIPTION	EMESSO ISSUED	APPROVATO APPROVED	DATA DATE
00	ISSUE	GT	TM	21-mag-24

Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE
EQUIPMENT DATA SHEETS
INCLUDING PSA, ETC.

Document Number: 1724000437-MAC-DS-00011

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

Document Class: 2

		r Construction (AFC)	GT	MC	TM
02	21/12/2024	Issue for Review (IFR)	GT	MC	TM
01	08/05/2024	Issue for Review (IFR)	GT	MC	TM
00	28/03/2024	Issue for Review (IFR)	GT	MC	TM
Rev.	Date	Description	Prepared	Reviewed	Approved

COES

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coes	CLIENTE / CUSTOMER	:	ROSETTI MARINO	COMM: / JOB:	:	167/24	
	RIFERIMENTO / REFERENCE	:	CROSSWIND	UNITA' / ITEM	:	/	
	IMPIANTO / DRYING UNIT	:	NITROGEN GENERATION PACKAGE	FOGLIO N° / SHEET	:	1	DI / OF : 3

FOGLIO DATI PER IMPIANTO GENERATORE AZOTO
NITROGEN GENERATOR DATA SHEET

DATI GENERALI
GENERAL DATA

1	QUANTITA' / QUANTITY	:	1
2	ITEM / TAG	:	C-64001A/B
3	SERVIZIO / SERVICE	:	NITROGEN GENERATOR
4	RIGENERAZIONE / REGENERATION	:	PSA

DATI PROGETTO MECCANICO
MECHANICAL DESIGN DATA

5	PRESSIONE PROGETTO SERBATOI / VESSELS DESIGN PRESSURE	:	12 barg	TEMPERATURA PROGETTO SERBATOI / VESSELS DESIGN TEMPERATURE	:	-29 / +80°C
6	MATERIALE SERBATOI / VESSELS MATERIAL	:	SA 516 Gr.70	SOVRASPESS. CORROSIONE SERBATOI / VESSELS CORROSION OVER-THICKNESS	:	3 mm
7	NORMATIVA PROGETTO SERBATOI / VESSELS DESIGN CODE	:	ASME VIII DIV.1	NORMATIVA COLLAUDO SERBATOI / VESSELS INSPECTION CODE	:	2014/68/EU PED (CAT. IV)
8	TIPO FONDI / HEAD TYPE	:	ELLIPTICAL 2:1	SPESSORE VIROLA / SHELL THICKNESS	:	8 mm
9				SPESSORE FONDI / HEAD THICKNESS	:	8 mm (6.72 mm M.A.F.)

DATI FUNZIONALI
FUNCTIONAL DATA

10	PORTATA ARIA IN INGRESSO / INLET AIR FLOWRATE	:	150	Nm^3/h
11	PRESSIONE DI ESERCIZIO / OPERATING PRESSURE	:	9	barg
12	TEMPERATURA DI ESERCIZIO / OPERATING TEMPERATURE	:	35	°C
13	PUNTO DI RUGIADA IN INGRESSO / INLET DEW POINT	:	-40	°C
14	TIPO MATERIALE ADSORBENTE / DESICCANT MATERIAL TYPE	:	CARBON MOLECULAR SIEVE	
15	QUANTITA' ADSORBENTE PER TORRE / DESICCANT QUANTITY/EACH TOWER	:	200	kg
16	PORTATA AZOTO IN USCITA / OUTLET NITROGEN FLOWRATE	:	60	Nm^3/h
17	PUREZZA AZOTO IN USCITA / OUTLET NITROGEN PURITY	:	97	%
18	POTENZA TOTALE INSTALLATA / TOTAL DEMANDE RATE	:	0.5 kW 1.5 kW	from normal power supply from UPS
19	PERDITA DI CARICO / PRESSURE DROP	:	0.5	bar
20	DURATA CICLO / LENGHT OF CYCLE	:	1+1	min
21	CONSUMO kWh PER RIGENERAZIONE / kWh CONSUMPTION/EACH REGENERATION	:	/	
22	TENSIONE DI ALIMENTAZIONE / SUPPLY VOLTAGE	:	Normal supply: 230V 1Ph+N+PE Power supply from UPS: 230V 1Ph+N+PE	
23	GRADO DI PROTEZIONE / PROTECTION DEGREE	:	IP 65	
24	CLASSIFICAZIONE AREA / AREA CLASSIFICATION	:	SAFE	
25	RADIOGRAFIE / RT TEST	:	☐ YES	☒ NO
26	VERNICIATURA / PAINTING	:	☒ EXTERNAL ACC. TO 1724000437-MAT-PRO-00021	☐ INTERNAL
26	ZINCATURA / GALVANIZING	:	☐ YES	☒ NO
27	RUMOROSITA' / NOISE LEVEL	:	85dB(A) max PRESSURE LEVEL at 1 m	
28	SILENZIATORE / SILENCER	:	☒ INCLUDED IN PACKAGE	☐ NO
29	Notes: - details of nozzle are included into equipment sectional drawing - UCP details are included in document no. 1724000437-MAC-DG-00009			

REV. / REV.	DESCRIZIONE / DESCRIPTION	EMESSO / ISSUED	APPROVATO / APPROVED	DATA / DATE
03	ACCEPTED FOR CONSTRUCTION	GT	TM	03-feb-25
02	ISSUE FOR REVIEW	GT	TM	21-dic-24
01	ISSUE FOR REVIEW	GT	TM	08-mag-24
00	ISSUE FOR REVIEW	GT	TM	28-mar-24

coes	CLIENTE / CUSTOMER	:	ROSETTI MARINO	COMM: / JOB:	:	167/24	
	RIFERIMENTO / REFERENCE	:	CROSSWIND	UNITA' / ITEM	:	/	
	IMPIANTO / DRYING UNIT	:	NITROGEN GENERATION PACKAGE	FOGLIO N° / SHEET	:	2	DI : 3 OF

FOGLIO DATI PER SERBATOIO
PRESSURE VESSEL DATA SHEET

DATI PROGETTO MECCANICO
MECAHNICAL DESIGN DATA

1	QUANTITA' / QUANTITY	:	1			
2	ITEM / TAG	:	V-64001			
3	SERVIZIO / SERVICE	:	SERBATOIO AZOTO / NITROGEN VESSEL			
4	TIPO / TYPE	:	VERTICALE / VERTICAL			
5	MATERIALE / MATERIAL	:	LTCS			
6	NORMATIVA PROGETTO / DESIGN CODE	:	ASME VIII DIV.1	NORMATIVA COLLAUDO / INSPECTION CODE	:	2014/68/EU PED
7	MATERIALE / MATERIAL	:	SA 516 Gr.70	SOVRASPESS. CORROSIONE / CORROSION OVER-THICKNESS	:	3 mm
8	PRESSIONE PROGETTO / DESIGN PRESSURE	:	12 barg	TEMPERATURA PROGETTO / DESIGN TEMPERATURE	:	-29 / +80 °C
9	DIAMETRO ESTERNO / EXTERNAL DIAMETER	:	2000 mm	LUNGHEZZA T/T / T/T LENGHT	:	3126 mm
10	TIPO FONDI / HEAD TYPE	:	ELLIPTICAL 2:1	SPESSORE FONDO / HEAD THICKNESS	:	15 mm (12.75 M.A.F.)
11	VOLUME / VOLUME	:	11 m^3	SPESSORE VIROLA / SHELL THICKNESS	:	15 mm
12	RADIOGRAFIE / RT TEST	:	☒ YES SPOT	☐ NO		
11	VERNICIATURA / PAINTING	:	☒ EXTERNAL ACC. TO 1724000437-MAT-PRO-00021	☐ INTERNAL		
12	ZINCATURA / GALVANIZING	:	☐ YES	☒ NO		
13	Notes: - details of nozzle are included into equipment sectional drawing, doc. no. 1724000437-MAC-DD-00006					
14						

ELENCO CONNESSIONI
NOZZLES LIST

	SIGLA / TAG	DIAMETRO / DIAMETER	TIPO / TYPE	SERIE / RATING	SERVIZIO / SERVICE	NOTE / REMARKS
15						
16	N1	1"	WN	ANSI 150	PROCESS INLET/OUTLET	
17	N2	1"	WN	ANSI 150	SAFETY VALVE	
18	N3	1/2"	NPT	6000#	PRESSURE GAUGE	COUPLING
19	N4	1/2"	NPT	6000#	PRESSURE TRANSMITTER	COUPLING
20	N5	1"	WN	ANSI 150	DRAIN	
21	N6	16"	WN	ANSI 150	MAN HOLE	
22						
23						

STRUMENTI - ACCESSORI
INSTRUMENTS - ACCESSORIES

24	☒	VALVOLA DI SICUREZZA / SAFETY VALVE
25	☒	MANOMETRO / PRESSURE GAUGE
26	☒	TRASMETTITORE DI PRESSIONE / PRESSURE TRANSMITTER
27	☒	VALVOLA DI DRENAGGIO MANUALE / MANUAL DRAIN VALVE
28	☐	SCARICATORE DI CONDENSA / DRAIN TRAP
29		

REV. / REV.	DESCRIZIONE / DESCRIPTION	EMESSO / ISSUED	APPROVATO / APPROVED	DATA / DATE
03	ACCEPTED FOR CONSTRUCTION	GT	TM	03-feb-25
02	ISSUE FOR REVIEW	GT	TM	21-dic-24
01	ISSUE FOR REVIEW	GT	TM	08-mag-24
00	ISSUE FOR REVIEW	GT	TM	28-mar-24

coes	CLIENTE / CUSTOMER	:	ROSETTI MARINO	COMM: / JOB:	:	167/24	
	RIFERIMENTO / REFERENCE	:	CROSSWIND	UNITA' / ITEM	:	/	
	IMPIANTO / DRYING UNIT	:	NITROGEN GENERATION PACKAGE	FOGLIO N° / SHEET	:	3	DI / OF : 3

FOGLIO DATI PER FILTRO
FILTER DATA SHEET

DATI GENERALI
GENERAL DATA

1	QUANTITA' / QUANTITY	:	2
2	ITEM / TAG	:	S-64001A/B
3	SERVIZIO / SERVICE	:	DUST REMOVING
4			

DATI PROGETTO CALDARERIA
VESSELS DESIGN DATA

5	PRESSIONE PROGETTO / DESIGN PRESSURE	:	12 barg	TEMPERATURA PROGETTO / DESIGN TEMPERATURE	:	-29 / +80 °C	
6	MATERIALE / MATERIAL	:	LTCS	SOVRASPESS. CORROSIONE / CORROSION OVER-THICKNESS	:	3 mm	
7	NORMATIVA PROGETTO / DESIGN CODE	:	ASME VIII DIV.1	NORMATIVA COLLAUDO / INSPECTION CODE	:	2014/68/EU PED	
8							

DATI FUNZIONALI
FUNCTIONAL DATA

9	GAS DA TRATTARE / GAS TO BE TREATED	:	NITROGEN 97%	PORTATA IN INGRESSO / INLET FLOWRATE	:	60 Nm^3/h	
10	PRESSIONE DI ESERCIZIO / OPERATING PRESSURE	:	8.5 barg	TEMPERATURA DI ESERCIZIO / OPERATING TEMPERATURE	:	35 °C	
11	PERDITA DI CARICO/FILTRO PULITO / PRESSURE DROP/CLEAN FILTER	:	0.1 bar	PERDITA DI CARICO/FILTRO SPORCC / PRESSURE DROP/DIRTY FILTER	:	0.3 bar	
12	EFFICIENZA / EFFICIENCY	:	99.9 %	GRADO DI FILTRAZIONE / FILTRATION DEGREE	:	1 μm	
13	OLIO RESIDUO / RESIDUAL OIL	:	N/A				
14							

CARATTERISTICHE ELEMENTI FILTRANTI
FILTRATION ELEMENTS DATA

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	:	30A	
17							

STRUMENTI - ACCESSORI
INSTRUMENTS - ACCESSORIES

18	☐ BY-PASS FILTRO / FILTER BY-PASS						
19	☒ TUBAZIONE DI RACCORDO FILTRO / CONNECTION PIPE TO FILTER						
20	☒ VALVOLE INTERCETTAZIONE / ON/OFF VALVES	☒	2 VIE / 2-WAY	☐	3 VIE / 3-WAY	☐	AUTOMATICHE / AUTOMATIC
21	☐ MANOMETRO DIFFERENZIALE / DIFFERENTIAL PRESSURE GAUGE						
22	☒ TRASMETTITORE DI PRESSIONE DIFFERENZIALE / DIFFERENTIAL PRESSURE TRANSMITTER	AS PER P&ID NO. 1724000437-PR-PID-00018					
23	☒ VALVOLA DI DRENAGGIO / DRAIN VALVE						
24	☐ SCARICATORE DI CONDENSA / STEAM TRAP			☐	AUTOMATICO / AUTOMATIC	☐	GALLEGGIANTE / FLOATING
25	☐ VALVOLE DI SICUREZZA / SAFETY VALVES						
26	☒ VERNICIATURA / PAINTING	☒	EXTERNAL ACC. TO 1724000437-MAT-PRO-00021	☐	INTERNAL		

NOTE / REMARKS :

REV. / REV.	DESCRIZIONE / DESCRIPTION	EMESSO / ISSUED	APPROVATO / APPROVED	DATA / DATE
03	ACCEPTED FOR CONSTRUCTION	GT	TM	03-feb-25
02	ISSUE FOR REVIEW	GT	TM	21-dic-24
01	ISSUE FOR REVIEW	GT	TM	08-mag-24
00	ISSUE FOR REVIEW	GT	TM	28-mar-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	09/01/25

ase Load Power Hub (BLPH)

ROGEN GENERATION PACKAGE

PACKAGE EQUIPMENT NOISE DATA SHEETS INCLUDING PSA, ETC.

Document Number: 1724000437-MAC-DS-00012

Document Class: 2

02	21/12/2024	Accepted for Construction (AFC)	GT	SG	TM
01	03/09/2024	Accepted for Construction (AFC)	GT	SG	TM
00	01/07/2024	Issue for Review (IFR)	GT	SG	TM
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)

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.

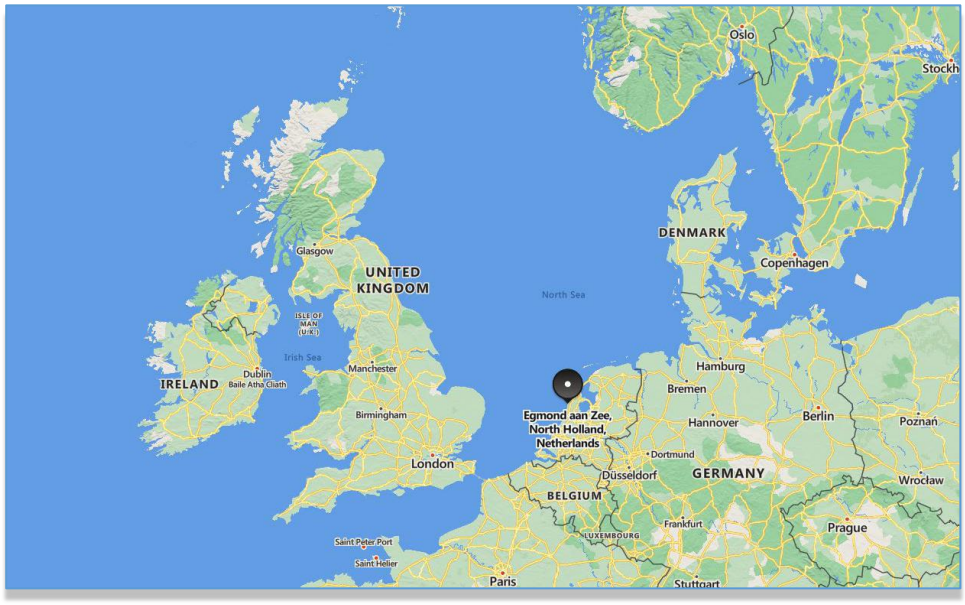


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



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.

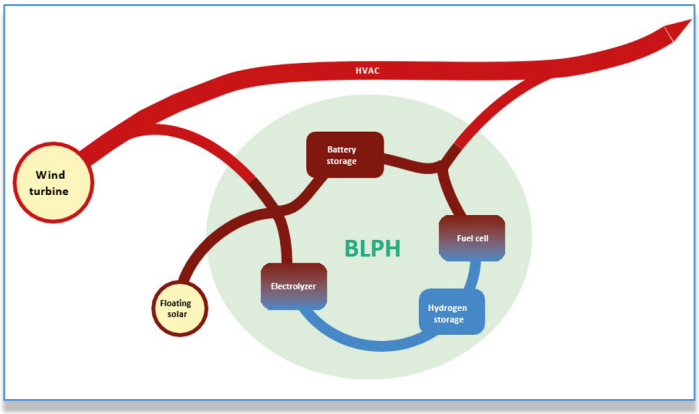


Figure 3 – BLPH Concept

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

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 COMPLETE SKID									
	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 Nitrogen generation package baseplate	80	77	80	79	73	69	68	60	84

NOTE: PSA Towers are not a source of noise.

Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE A-64000
INSTRUMENT DATA SHEETS

er: 1724000437-MAC-DS-00013

ocument Class: 3

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
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3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
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Sign	Date
Giuseppe Cavallo	24/04/25

		ormation (IFI)	GT	MC	TM
		ormation (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	20/05/2024	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)
03	Issue for Information (IFI)
04	Issue for Information (IFI)

HOLDS LIST

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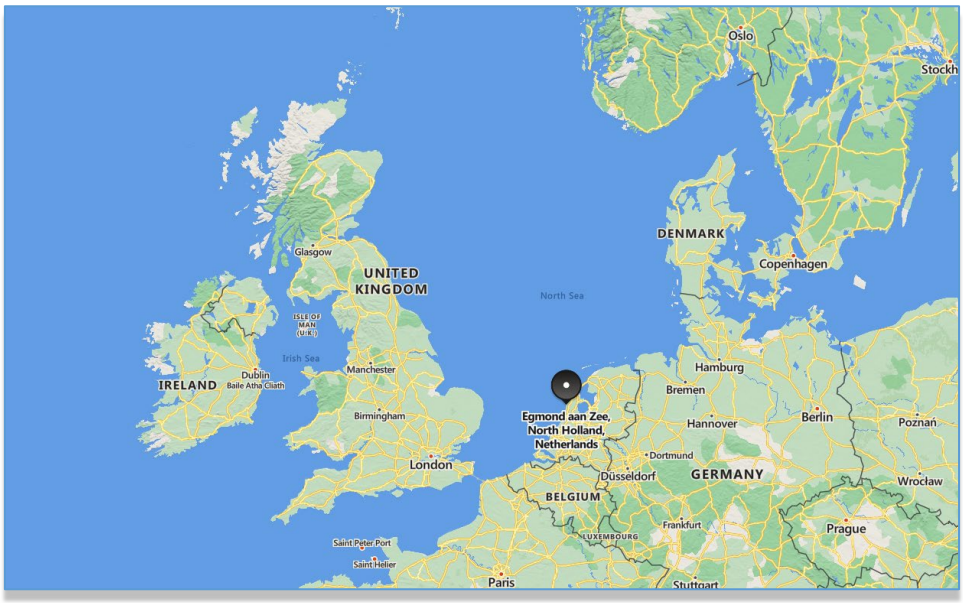


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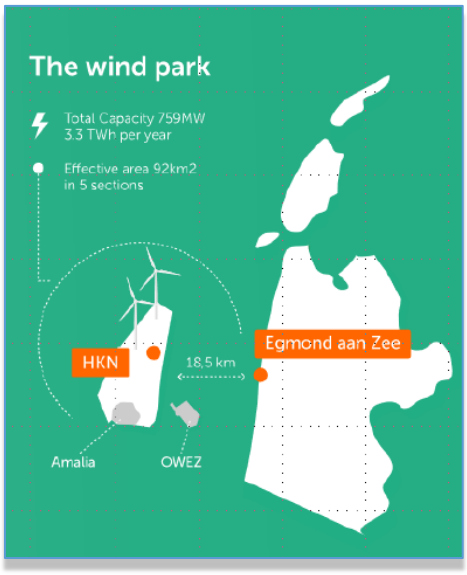


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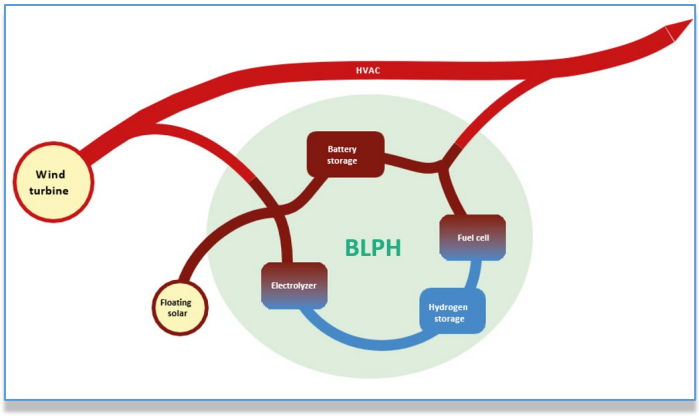


Figure 3 – BLPH Concept

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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
1724000437-PR-PID-00018	PACKAGE P&ID
1724000437-MAC-DS-00011	EQUIPMENT DATA SHEETS INCLUDING PSA, 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
RF	RAISED FACE

Table 2 - Definitions and Abbreviations

3 INSTRUMENT DATASHEET

PRESSURE TRANSMITTER			
General	1	Tag number	64-PIT-051
	2	Service	Instrument air inlet 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	80°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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PRESSURE TRANSMITTER			
General	1	Tag number	64-PIT-052, 64-PIT-053
	2	Service	PSA tower pressure
	3	Quantity	2
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°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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PRESSURE TRANSMITTER			
General	1	Tag number	64-PIT-057
	2	Service	Nitrogen outlet pressure
	3	Quantity	1
Process	4	Fluid	Nitrogen
	5	Operating pressure	8 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°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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PRESSURE TRANSMITTER			
General	1	Tag number	64-PIT-059
	2	Service	Nitrogen receiver pressure
	3	Quantity	1
Process	4	Fluid	Nitrogen
	5	Operating pressure	8 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°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	64-PDIT-056
	2	Service	After-filters pressure drop
	3	Quantity	1
Process	4	Fluid	Nitrogen
	5	Operating pressure	8 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°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	64-PI-054, 64-PI-055
	2	Service	PSA towers pressure
	3	Quantity	2
Process	4	Fluid	Air
	5	Operating pressure	9 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°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	2 Valves
Purchase	32	Instruments Manufacturer	WIKA
	33	Model	233.30
Notes	34		

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PRESSURE GAUGES			
General	1	Tag number	64-PI-058
	2	Service	Nitrogen receiver pressure
	3	Quantity	1
Process	4	Fluid	Nitrogen
	5	Operating pressure	8 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°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	2 Valves
Purchase	32	Instruments Manufacturer	WIKA
	33	Model	233.30
Notes	34		

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OXYGEN ANALYZER			
General	1	Tag number	64-AT-051
	2	Service	PSA Outlet oxygen content
	3	Quantity	1
Process	4	Fluid	Nitrogen
	5	Operating pressure	8 barg
	6	Operating temperature	40°C
	7	Design pressure	12 barg
	8	Design temperature	80°C
	9	Area classification	Safe
	10	Ambient temperature	-8.4 ÷ 25°C
Transmitter	11	Analog output	4÷20mA
	12	Digital interface	0% to 5%
	13	Calibrated Range	0% ÷ 5%
	14	Power supply	24 VDC
	15	Accuracy	±1 of span
	16	Repeatability	±0.2% of span
	17	Execution	IP66
	18	Enclosure	SS 316
	19	Warm-up time	30 minutes
	20	Certification:	ATEX, Ex II 2 GD Ex d IIc TC
Probe	21	Mounting	Local
Accessories	22	Digital display	No
	23	Isolation valves	YES
Purchase	24	Manufacturer	GE SENSING
	25	Model	XM02-7-CE-3-1-0 XCAL-3-1-1-1
Notes	26		

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SOLENOID VALVE			
General	1	Tag number	64-XY-051, 64-XY-052, 64-XY-053, 64-XY-054, 64-XY-055, 64-XY-056, 64-XY-057, 64-XY-058, 64-XY-059, 64-XY-060, 64-XY-061
	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	64-PSV-051, 64-PSV-052
	2	Service	Vessel protection
	3	Quantity	2
	4	Type	Safety relief valve
Process	5	Fluid	N2
	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 barg
	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	64-PSV-053, 64-PSV-054
	2	Service	N2 receiver protection
	3	Quantity	2
	4	Type	Safety relief valve
Process	5	Fluid	N2
	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	2” ANSI 150# RF
	16	Outlet connection	3” ANSI 150# RF
	17	Orifice designation	J
	18	Set pressure	12 barg
	19	Back pressure	0 barg
	20	Overpressure	10%
Materials	21	Diaphragm seal	NO
	22	Body	SS316
Purchase	23	Manufacturer	N.G.I.
	24	Model	G32-API
Notes	25		

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ACTUATED VALVES			
General	1	Tag number	64-XV-051, 64-XV-052, 64-XV-053, 64-XV-054
	2	Service	ON-OFF actuated valves
	3	Quantity	4
	4	Type	Ball valve
Process	5	Fluid	N2
	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	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	CLOSE
Purchase	20	Manufacturer	VALPRES
	21	Model	ART.68J000
Notes	22		

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ACTUATED VALVES			
General	1	Tag number	64-XV-055, 64-XV-056, 64-XV-057, 64-XV-058, 64-XV-059
	2	Service	ON-OFF actuated valves
	3	Quantity	6
	4	Type	Ball valve
Process	5	Fluid	N2
	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	150#
	14	End connections	RF
	15	Material	A352 LCC
	16	Ball	A352 LCC
	17	Seat	FKM+GRAPHITE
Actuator	18	Type	RACK & PINION
	19	Fail position	CLOSE
Purchase	20	Manufacturer	VALPRES
	21	Model	ART.68J000
Notes	22		

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ACTUATED VALVES			
General	1	Tag number	64-XV-060, 64-XV-061
	2	Service	ON-OFF actuated valves
	3	Quantity	2
	4	Type	Ball valve
Process	5	Fluid	N2
	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	150#
	14	End connections	RF
	15	Material	A352 LCC
	16	Ball	A352 LCC
	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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Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE
INSPECTION TEST PLAN (ITP)

Document Number: 1724000437-QC-ITP-00002

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
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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
ROSETTI MARINO S.p.A. Shipbuilding Division Quality Control Dept.	06/08/2024

Document Class: 2

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

COES

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CUSTOMER: ROSETTI MARINO

PURCHASE ORDER: 1724000437

PROJECT: 123A90A - BASE LOAD POWER HUB PLATFORM

SCOPE OF SUPPLY: NO.1 NITROGEN GENERATOR PACKAGE

COES JOB: 167/24

2	GT	TM	07/07/2024	REVISION
1	GT	TM	22/05/2024	REVISION
0	GT	TM	22/03/2024	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	**NITROGEN GENERATOR PACKAGE**						
1.1	Check of completeness of the supply according to the purchase order	H	R	R	/	P.O. 1724000437	
1.2	Incoming materials certificates of materials: - Valves - Instruments - Raw materials	H	R	R	/	EN 10204	
1.3	Work Program (for welding refer to step 2.4)	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: 1724000437-MAC-LIS-00026	Only for instruments
1.8	Functional blank test	H	W	W	W	Approved FAT procedure: 1724000437-QC-PRO-00023	
1.9	Visual and dimensional check	H	W	W	W	General arrangement drawing: 1724000437-MAC-DA-00005 Piping & Instrument Diagram: 1724000437-PR-PID-00018	
1.10	Weight control	H	R	R	/	General arrangement drawing: 1724000437-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: 1724000437-MAT-PRO-00021	
1.14	Spare parts check (type, quantity and labelling)	H	R	R	/	P.O. 1724000437	
1.15	Packing, marking and packing list check	H	R	R	/	Approved packing procedure: 1724000437-QC-PRO-00030	
1.16	Final documentation review (Data Book)	H	R	R	/	Approved MRB Index: 1724000437-QC-LIS-00025	

Pos	Description	Coes	B	C	T	Reference document Acceptance criteria	Remarks
2	**FILTER / VESSELS**						
2.1	Drawings and Data Sheet approval check	R	R	R	R	Cross sectional drawings: 1724000437-MAC-DD-00006	
2.2	Review of unrefined material certificates (visual/dimensional, NDT, chemical analysis & mechanical properties)	H	R	R	R		
2.3	Welding procedures and welders' qualification (WPS+WQP+PQR) approval check	H	R	R	R	ASME IX / 2014/68/EU	
2.4	Start of welding	H	W	M	/	Approved welding book: 1724000437-WEL-LIS-00020	
2.5	Test procedure approval check	H	R	R	/	ASME V / 2014/68/EU	
2.6	NDT (Non Destructive Test) according to codes for type of material - RT 10% - PT 100%	H	W	M	/	ASME VIII Div.1 / 2014/68/EU	
2.7	Visual and dimensional examination of internal parts prior to installation	H	R	R	W	Cross sectional drawings: 1724000437-MAC-DD-00006	
2.8	Visual and dimensional check of the assembled vessel	H	W	W	W	Cross sectional drawings: 1724000437-MAC-DD-00006	
2.9	Hydrostatic test	H	W	W	W	2014/68/EU	
2.10	Check of nameplate and marking	H	R	R	W	2014/68/EU	
2.11	Painting Inspection (Type, color, surface preparation, primer, final, dry film thickness and certifications)	H	W	W	/	Approved painting procedure: 1724000437-MAT-PRO-00021	
2.12	Spare parts check (type, quantity and labelling)	H	R	R	/	P.O. 1724000437	
2.13	Completeness supply check according to the purchase order	H	R	R	/	P.O. 1724000437	
2.14	Packing, marking and packing list check	H	R	R	/	Approved packing procedure: 1724000437-QC-PRO-00030	
2.15	Final documentation review (Data Book)	H	R	R	/	Approved MRB Index: 1724000437-QC-LIS-00025	
2.16	Filtering elements check	H	R	R	/		
2.17	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)

ROSETTI MARINO

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2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
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4	APPROVAL NOT REQUIRED

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Sign	Date
D.CENACCHI	17/02/2025

NITROGEN GENERATION PACKAGE
WELDING BOOK (WPS, PQR, WELDERS QUALIFICATIONS, WELDING MAPS, ETC.)

Document Number: 1724000437-WEL-LIS-00020

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
03	08/02/2025	Accepted for Construction (AFC)	GT	MC	TM
02	21/12/2024	Accepted for Construction (AFC)	GT	MC	TM
01	03/09/2024	Issue for Review (IFR)	GT	MC	TM
00	07/06/2024	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)
03	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.

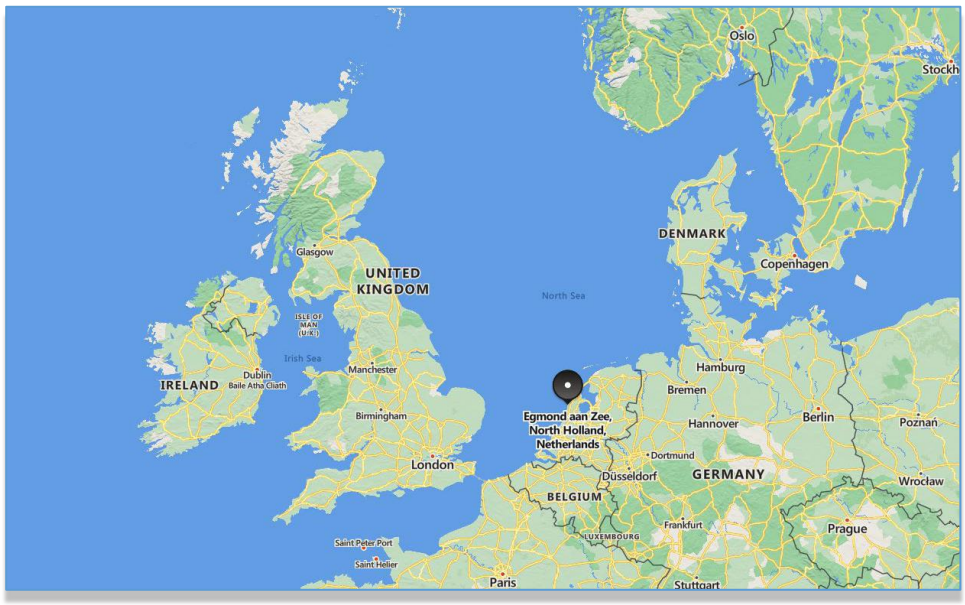


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



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.

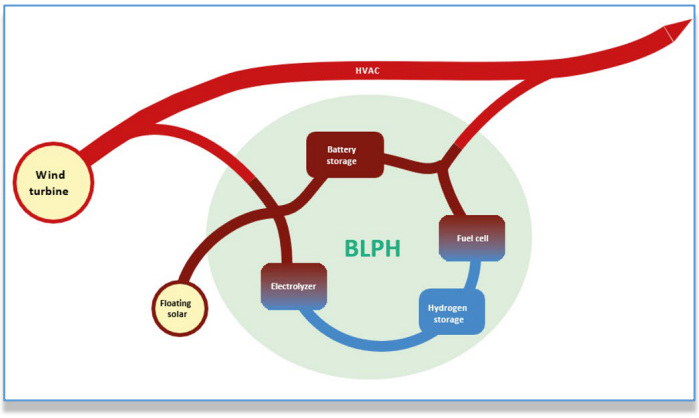


Figure 3 – BLPH Concept

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
1724000437-PR-PID-00018	PACKAGE P&ID
1724000437-MAC-DS-00011	EQUIPMENT DATA SHEETS INCLUDING PSA, ETC.
1724000437-QC-ITP-00002	INSPECTION TEST PLAN (ITP)
1724000437-NDT-PRO-00019	NDT PROCEDURES INCLUDING PERSONNEL QUALIFICATIONS
ASME B31.3	PROCESS PIPING
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

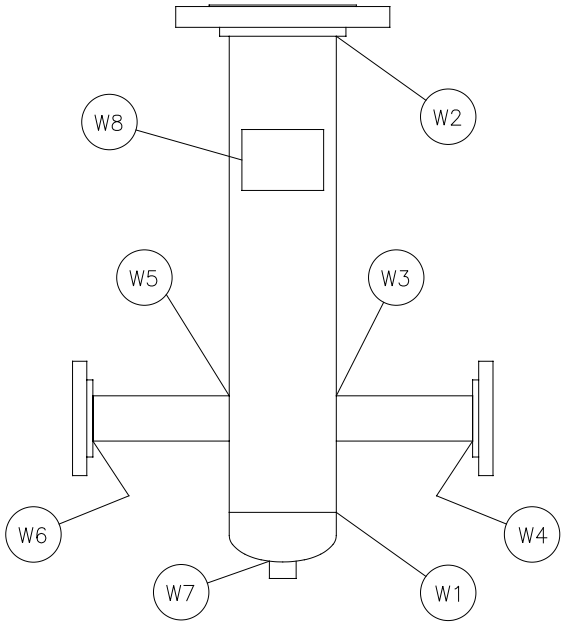
2.2 DEFINITIONS AND ABBREVIATIONS

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

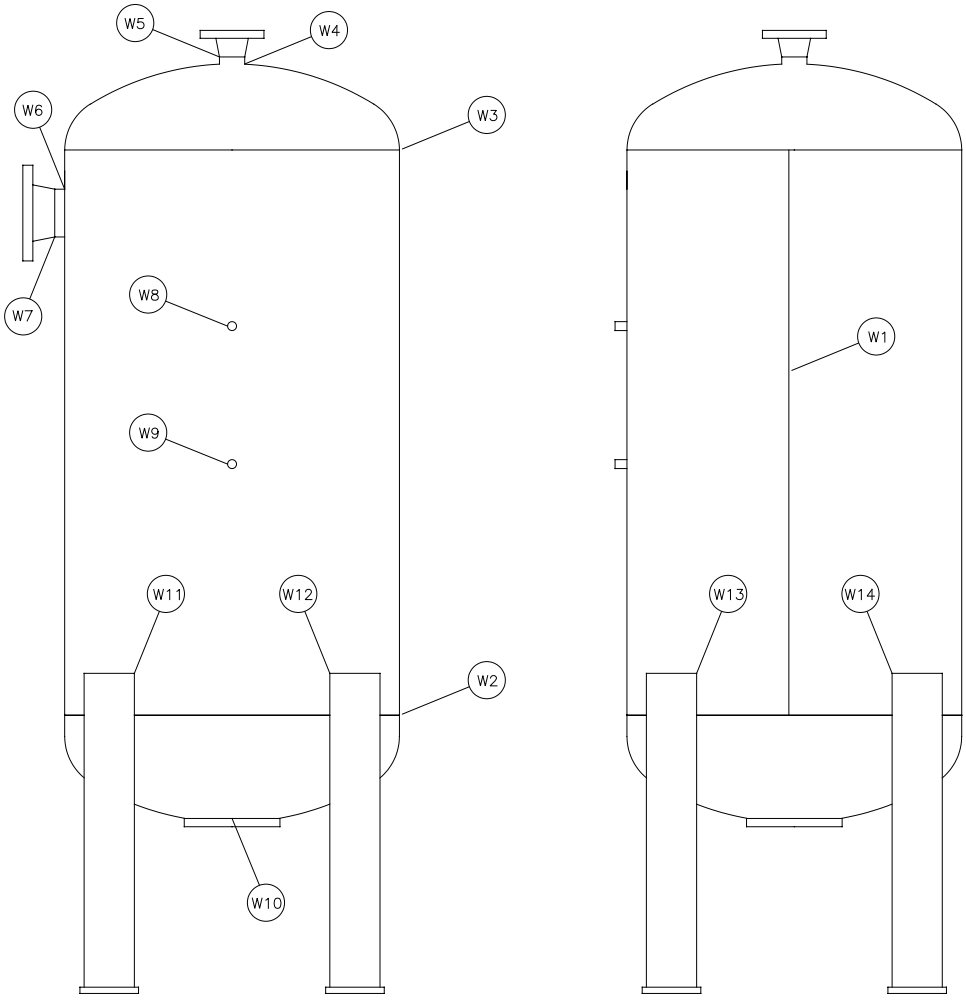
3.1 FILTERS WELDING MAP



Pos	Joint	Materials	WPS	PQR	Process	RT	PT	Welder
W1	Shell to head	SA 333 Gr.6 SA 420 WPL6	02/20-A1	02/20-A	GTAW SMAW	10%	100%	S2 - S4
W2	Shell to flange	SA 333 Gr.6 SA 350 LF2 Cl.1	02/20-A6	02/20-A	SMAW	/	100%	S2 - S4
W3	Pipe to shell	SA 333 Gr.6 SA 333 Gr.6	02/20-A2	02/20-A	GTAW SMAW	/	100%	S2 - S4
W4	Pipe to flange	SA 333 Gr.6 SA 350 LF2 Cl.1	02/20-A6	02/20-A	SMAW	/	100%	S2 - S4
W5	Pipe to shell	SA 333 Gr.6 SA 333 Gr.6	02/20-A2	02/20-A	GTAW SMAW	/	100%	S2 - S4
W6	Pipe to flange	SA 333 Gr.6 SA 350 LF2 Cl.1	02/20-A6	02/20-A	SMAW	/	100%	S2 - S4
W7	Head to coupling	SA 420 WPL6 SA 350 LF2 Cl.1	02/20-A2	02/20-A	GTAW SMAW	/	100%	S2 - S4
W8	Plate to shell	SA 516 Gr.70 SA 333 Gr.6	02/20-A6	02/20-A	SMAW	/	100%	S2 - S4

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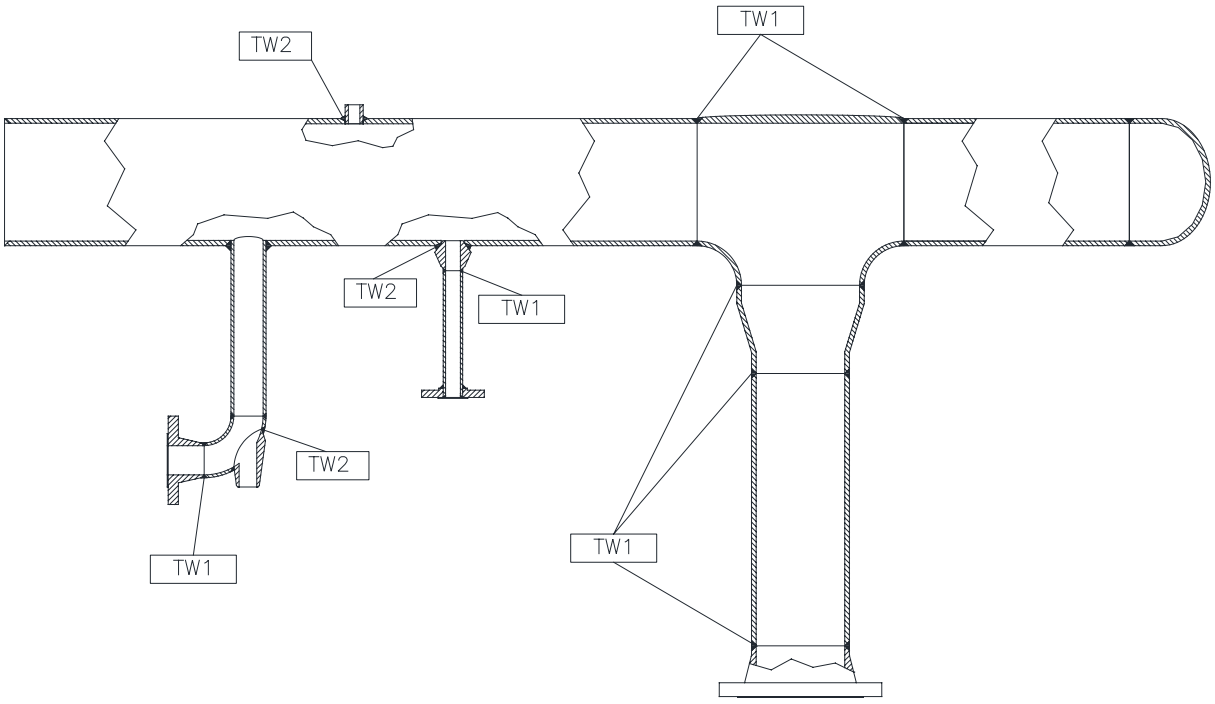
3.2 PSA VESSELS WELDING MAP



Pos	Joint	Materials	WPS	PQR	Process	RT	PT	Welder
W1	Longitudinal weld	SA 516 Gr.70 SA 516 Gr.70	02/20-A1	2/20-A	GTAW SMAW	10%	100%	S2 - S4
W2	Circumferential shell to head	SA 516 Gr.70 SA 516 Gr.70	02/20-A1	2/20-A	GTAW SMAW	10%	100%	S2 - S4
W3	Circumferential shell to head	SA 516 Gr.70 SA 516 Gr.70	02/20-A1	2/20-A	GTAW SMAW	10%	100%	S2 - S4
W4	Pipe to head	SA 333 Gr.6 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S2 - S4
W5	Flange to pipe	SA 350 LF2 Cl.1 SA 333 Gr.6	02/20-A1	2/20-A	GTAW SMAW	/	100%	S2 - S4
W6	Pipe to shell	SA 333 Gr.6 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S2 - S4
W7	Flange to pipe	SA 350 LF2 Cl.1 SA 333 Gr.6	02/20-A1	2/20-A	GTAW SMAW	/	100%	S2 - S4
W8	Half coupling to shell	SA 350 LF2 Cl.1 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S2 - S4
W9	Half coupling to shell	SA 350 LF2 Cl.1 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S2 - S4
W10	Plate head To head	SA 516 Gr.70 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S2 - S4
W11	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4
W12	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4
W13	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4
W14	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4

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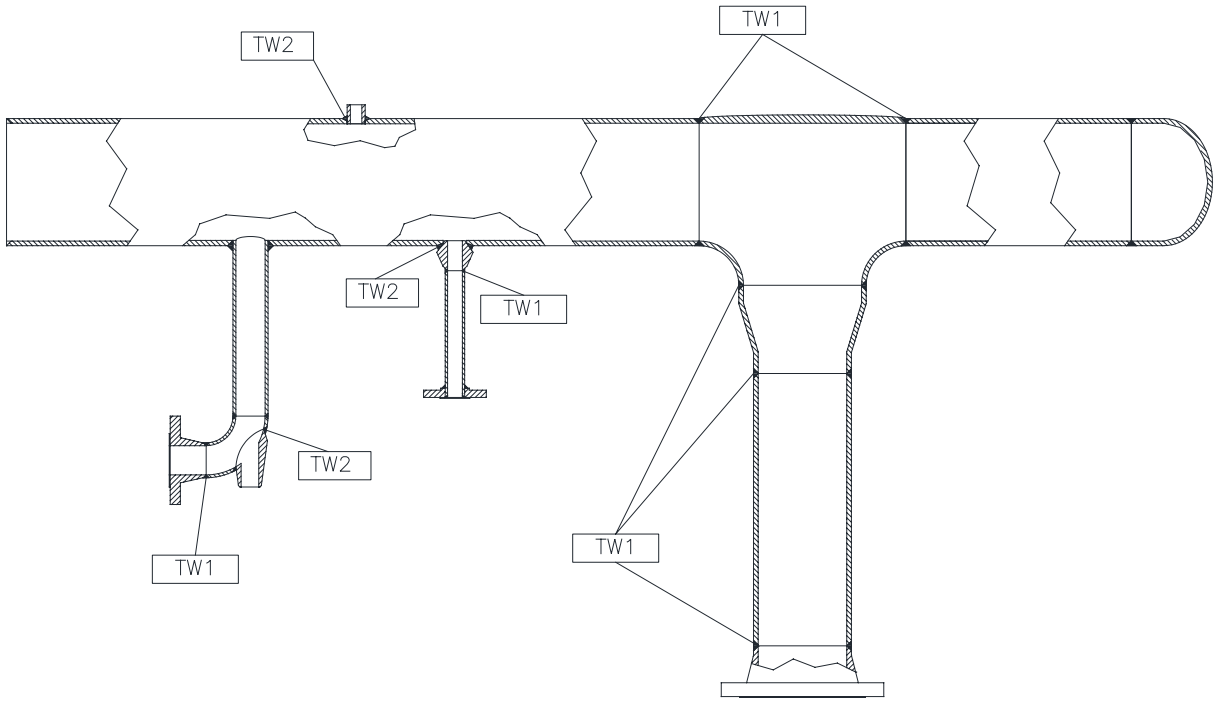
3.3 CARBON STEEL PIPING WELDING MAP (PIPING CLASS 01CS)



Pos	Joint	Thk.	Materials	WPS	PQR	Process	RT	PT	Welder
TW1	Butt Weld	1,5 to 4mm	SA 333 GR.6 SA 350 LF2 SA 420 WPL6	02/20-A3	02/20-A	GTAW	10%	100%	S2 - S4
TW1	Butt Weld	1,5 to 20mm	SA 333 GR.6 SA 350 LF2 SA 420 WPL6	02/20-A1	02/20-A	GTAW SMAW	10%	100%	S2 - S4
TW2	Branch full Penetration weld (set in)	1,5 to 20mm	SA 333 GR.6 SA 350 LF2 SA 420 WPL6	02/20-A2	02/20-A	GTAW SMAW	/	100%	S2 - S4
TW2	Branch full Penetration weld (set on)	1,5 to 20mm	SA 333 GR.6 SA 350 LF2 SA 420 WPL6	02/20-A4	02/20-A	GTAW SMAW	/	100%	S2 - S4

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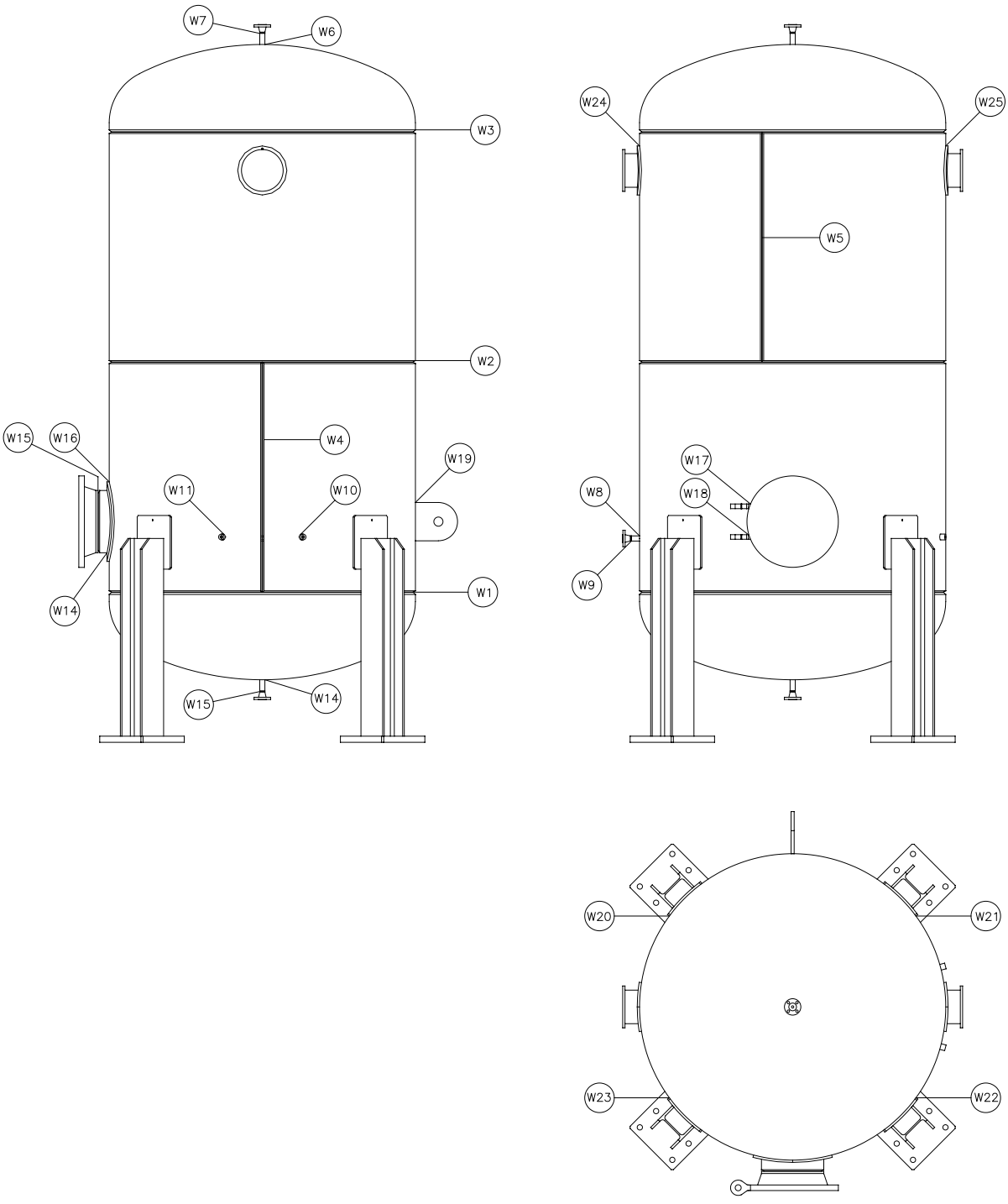
3.4 STAINLESS STEEL PIPING WELDING MAP (PIPING CLASS 01SS)



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 - S4
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 - S4
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%	S2 - 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%	S2 - S4

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3.5 N2 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%	S2 - 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%	S2 - 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%	S2 - S4
W4	Longitudinal weld	SA 516 Gr.70 SA 516 Gr.70	01/18-A1	1/18-A	GTAW SMAW SAW	10%	100%	S2 - S4
W5	Longitudinal weld	SA 516 Gr.70 SA 516 Gr.70	01/18-A1	1/18-A	GTAW SMAW SAW	10%	100%	S2 - S4
W6	Pipe to head	SA 333 Gr.6 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S2 - S4
W7	Flange to pipe	SA 350 LF2 Cl.1 SA 333 Gr.6	02/20-A1	2/20-A	GTAW SMAW	/	100%	S2 - S4
W8	Pipe to shell	SA 333 Gr.6 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S2 - S4
W9	Flange to pipe	SA 350 LF2 Cl.1 SA 333 Gr.6	02/20-A1	2/20-A	GTAW SMAW	/	100%	S2 - S4
W10	Coupling to shell	SA 350 LF2 Cl.1 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S2 - S4
W11	Coupling to shell	SA 350 LF2 Cl.1 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S2 - S4
W12	Pipe to head	SA 333 Gr.6 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S2 - S4
W13	Flange to pipe	SA 350 LF2 Cl.1 SA 333 Gr.6	02/20-A1	2/20-A	GTAW SMAW	/	100%	S2 - S4
W14	Manhole shell to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A2	2/20-A	GTAW SMAW	/	100%	S2 - S4
W15	Manhole shell to flange	SA 516 Gr.70 SA 350 LF2 Cl.1	02/20-A1	2/20-A	GTAW SMAW	/	100%	S2 - S4
W16	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4
W17	Plate to flange	SA 516 Gr.70 SA 350 LF2 Cl.1	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4
W18	Plate to flange	SA 516 Gr.70 SA 350 LF2 Cl.1	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4
W19	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4
W20	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4
W21	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4
W22	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4
W23	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4
W24	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4
W25	Plate to shell	SA 516 Gr.70 SA 516 Gr.70	02/20-A6	2/20-A	SMAW	/	100%	S2 - S4

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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 – 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

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

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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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ICIM

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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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 – 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.	-

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 – 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.

0251CM_09_IT

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*

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

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 – 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.	-

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 – 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*

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

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*

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
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

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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*

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Revalidation for qualification by examining body for the following 2 years

Data *Date*	Firma *Signature*	Esaminatore *Examiner*

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Confirmation of the validity by employer/welding coordinator/examining body for the following 6 months

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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

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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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PRD N° 004 B
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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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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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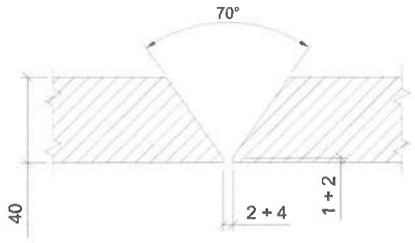
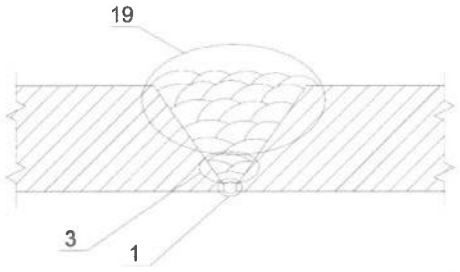
Certificato n°
Certificate No. **ICIM – WPQR – 007096 – 00**

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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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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ICIM – WPQR – 007096 – 00

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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Certificato n°
Certificate No. **ICIM – WPQR – 007096 – 00**

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
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

ICIM SpA
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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

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

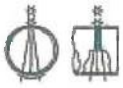
ESAME RADIOGRAFICO – UNI EN ISO 17636-1:2013
Radiographic test according – UNI EN ISO 17636-1:2013

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

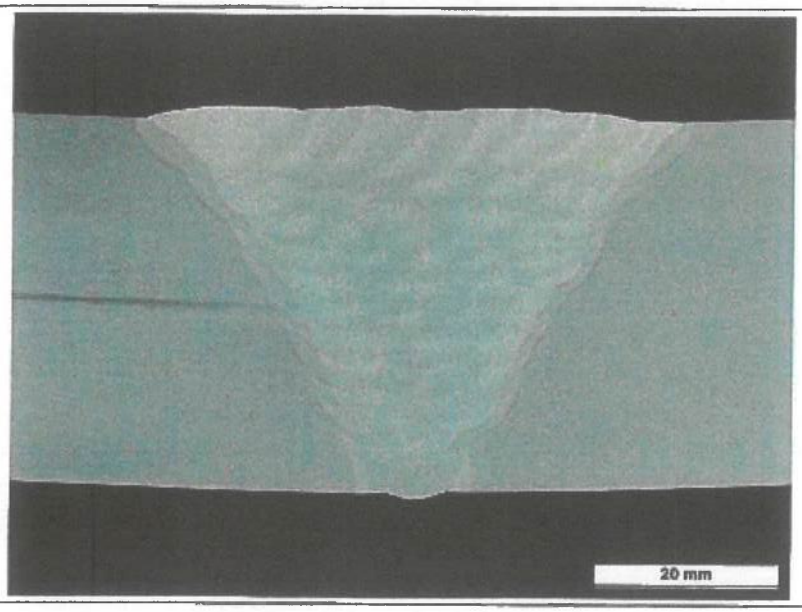
RINA S.p.A. No. Bo. 0125 Reviewed Witnessed 22/03/19

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

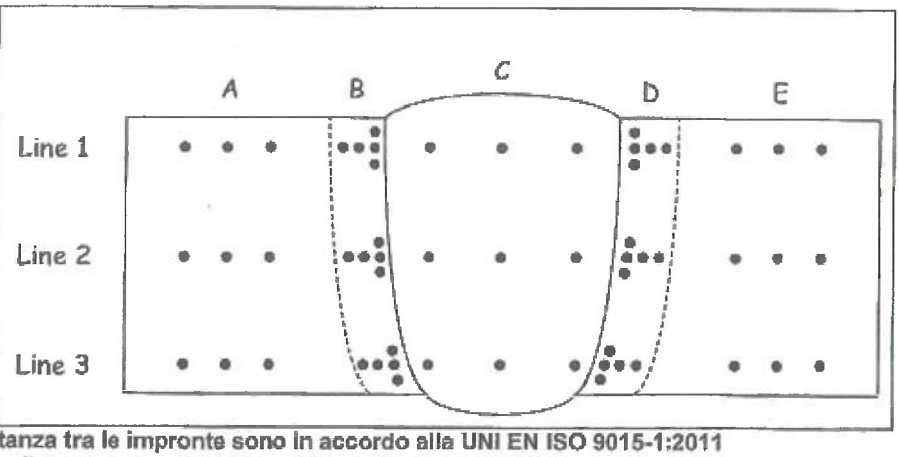
Quality Control Group S.r.l.

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*

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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.

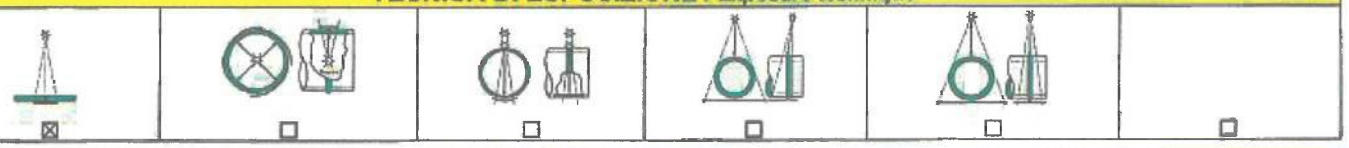
Dott. Ing. VALERIO COLOMBO

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

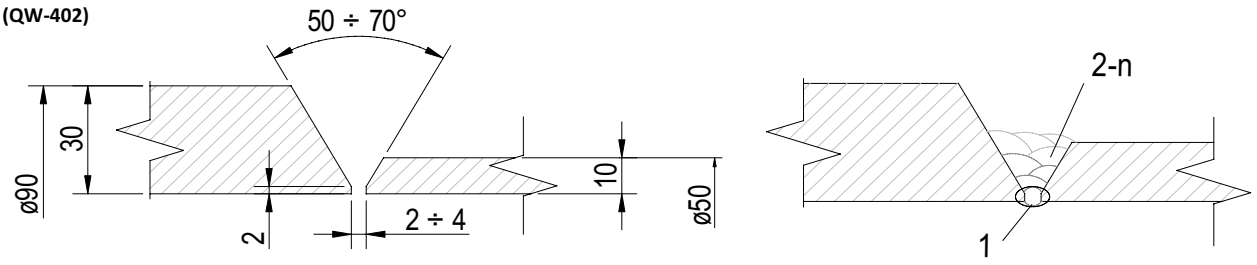
Company Name: **COES SRL Via Pontida, 265 STEZZANO 24040 (BG) - ITALY**

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

Laboratory of Medolago, Via Roma 79 - 24030 Medolago (BG) t. +39 035 901473 e-mail info@qualitycontrolgroup.com website www.qualitycontrolsrl.it

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.					

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ICIM S.p.A
Piazza Don Enrico Mapelli, 75
20099 SESTO SAN GIOVANNI
MILAN ITALY
info@icim.it

COES SRL 17/05/21 W R

Ente di Collaudo / Surveyor — Ente di Collaudo / Surveyor

☐ Reviewed ☒ Witnessed date 14/05/2021

Laboratory of Medolago, Via Roma 79 - 24030 Medolago (BG) t. +39 035 901473 e-mail info@qualitycontrolgroup.com website www.qualitycontrolsrl.it

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.*

COES SRL 17/05/21 W R

Ente di Collaudo / Surveyor

ICIM S.p.A
Piazza Don Enrico Mapelli, 75
20099 SESTO SAN GIOVANNI
MILAN ITALY

Ente di Collaudo / Surveyor

☐ Reviewed - ☐ Witnessed
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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Ente di Collaudo / Surveyor

☒ Reviewed - ☐ Witnessed

date 14/05/2021

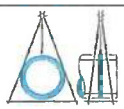
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ESAME RADIOGRAFICO – ASME V art.2 Ed. 2019 (*)

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	-----	2,5	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*	---

CQS SRL 17/05/21 W R

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Ente di Collaudo / Surveyor

Ente di Collaudo / Surveyor

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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	---	≥ 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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date 14/05/2021

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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

COES SRL 19/05/21 W R

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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			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*: ---

COGS SRL 17/05/21 W R

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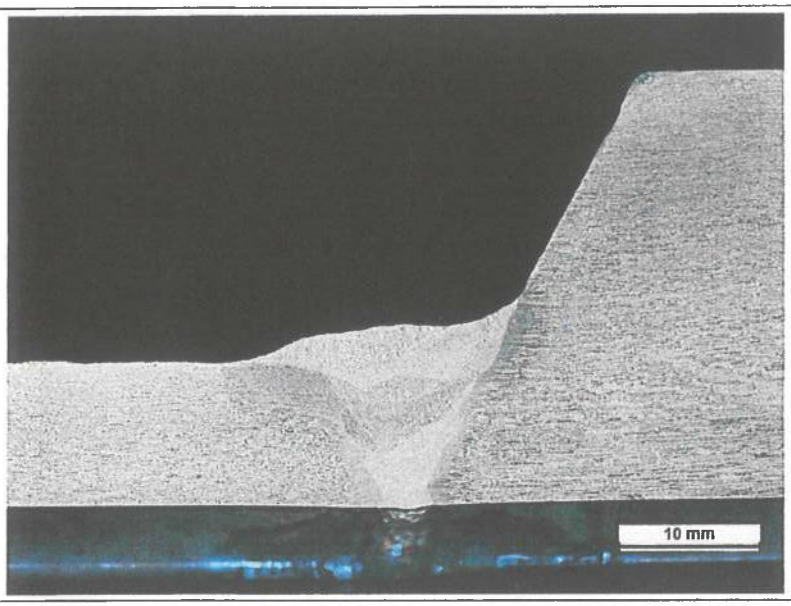
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date 14/05/2021

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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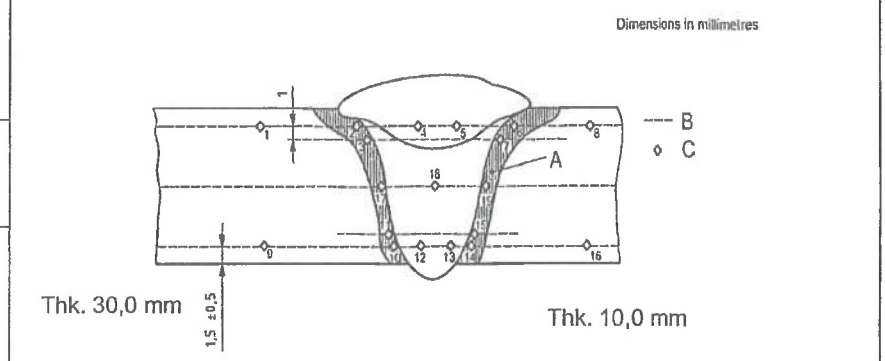
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14/05/2021
date

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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*

COES SRL 17/05/21 W R

Ente di Collaudo / Surveyor

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☐ Reviewed ☐ Witnessed

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

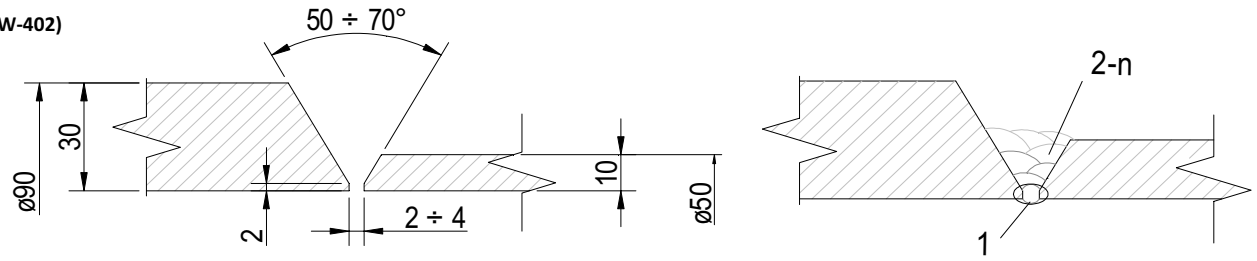
Company Name: **COES SRL Via Pontida, 265 STEZZANO 24040 (BG) - ITALY**

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

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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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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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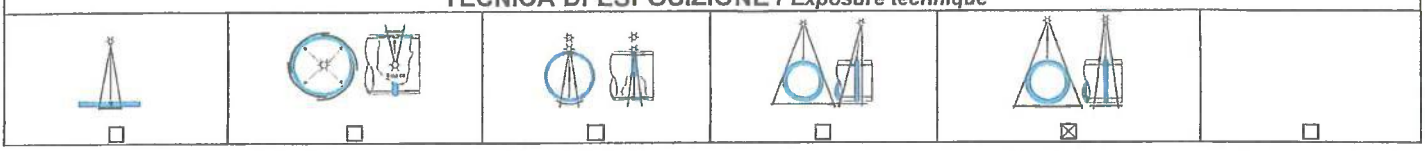
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ESAME RADIOGRAFICO – ASME V art.2 Ed. 2019 (*)

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	-----	2,7	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*	---

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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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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

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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*

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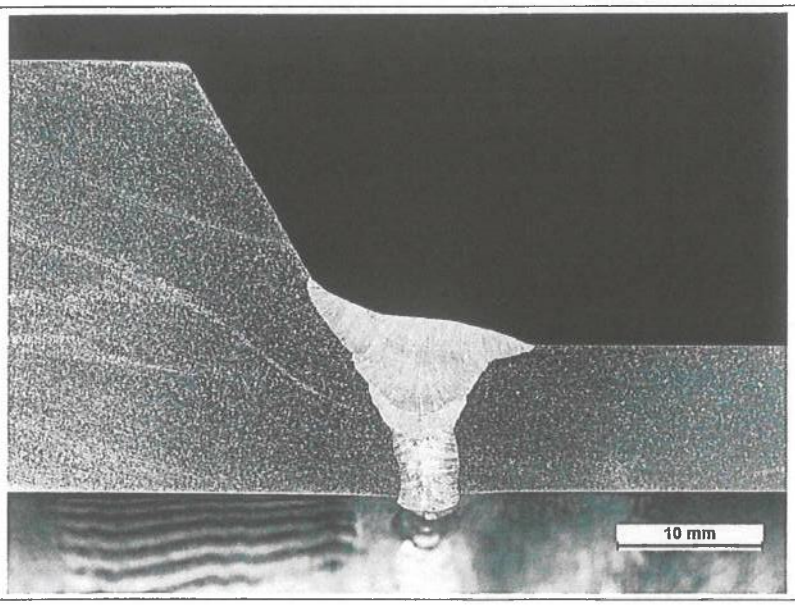
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ESAME MACROSCOPICO DELLE SALDATURE - ASTM E340-15

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

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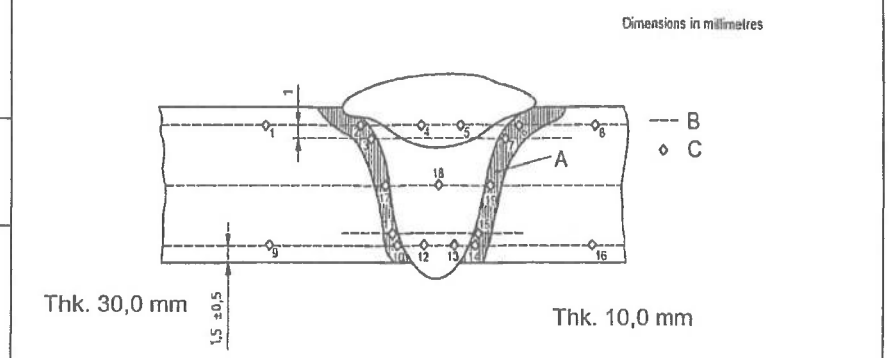
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date 14/05/2021

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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:* ---

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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

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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

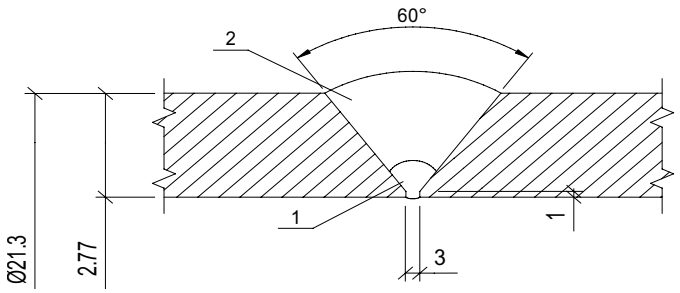
Company Name: **COES SRL Via Pontida, 265 STEZZANO 24040 (BG) - ITALY**

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:

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

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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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☐ Reviewed ☐ Witnessed
date 04/12/2017

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MEDOLAGO (BG)
LOCATELLI p.i. MARC

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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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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

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Liv. 2 - SN 778 ISO 9712
II° Liv. SNT-TC-1A
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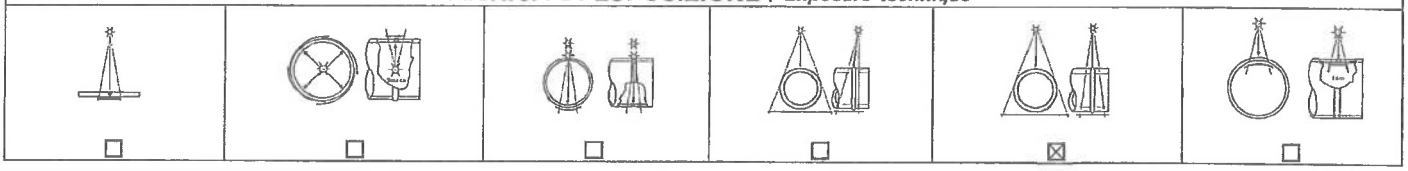
RAPPORTO DI PROVA N. / Test Report N.	DATA / Date	Foglio / Page	di / of
17/2303RP15	04/12/2017	4	7

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*

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Liv. 2 - EN 473 / ISO 9712
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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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...il testo non può essere riprodotto, salvo autorizzazione scritta del laboratorio

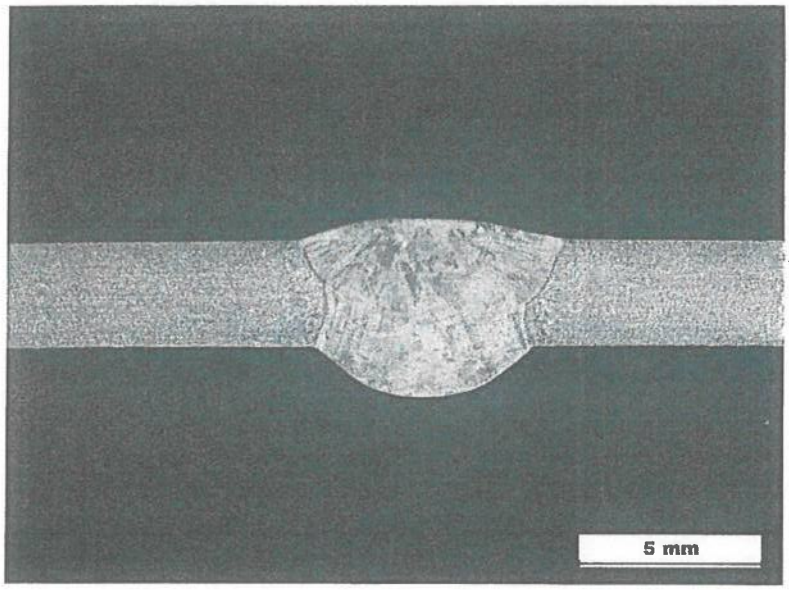
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CLIENTE *Customer* COES S.r.l. – STEZZANO (BG) **SAGGIO N.** *Test No.* 2303H

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.

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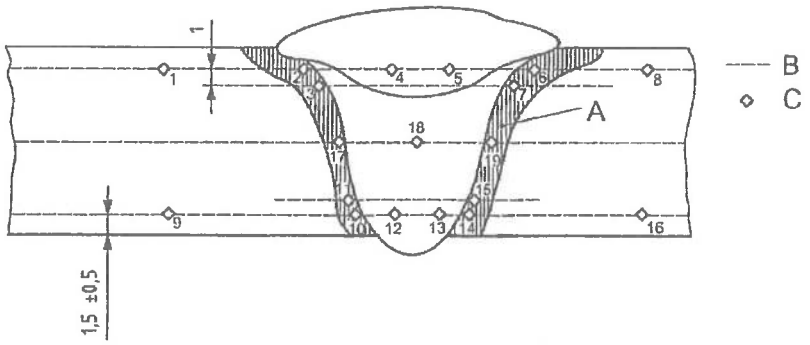
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Iscr. Reg. Imp. BG 12004 - C.C.I.A.A. BG 166333 - Cod. Fisc. e P.IVA 00663350163 - Cap. Soc. €101.490,00

CLIENTE / *Customer* COES S.r.l. – STEZZANO (BG) **SAGGIO N.** / *Test No.* 2303H

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*
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

QUALITY CONTROL S.r.l.
LOCATELLI p.i. MARC

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*

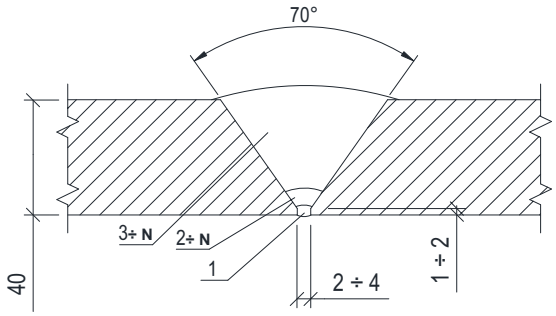
WPQR N.	PROCEDIMENTO DI SALDATURA *WELDING PROCESS*	POSIZIONE DI SALDATURA *WELDING POSITIONG*	TIPO DI GIUNTO *JOINT TYPE*
ICIM-WPQR-007096-00	141 + 111 + 121	PA	BW

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

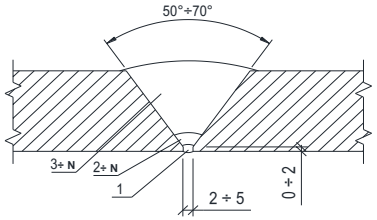
SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

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

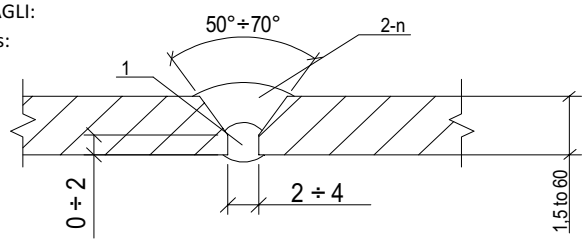
SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

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

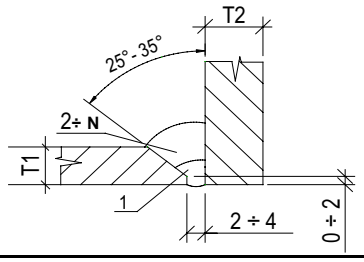
SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

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**	-	

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.:	**> 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

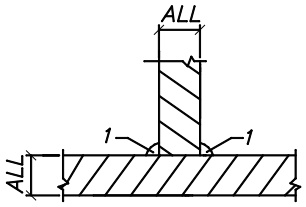
SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

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

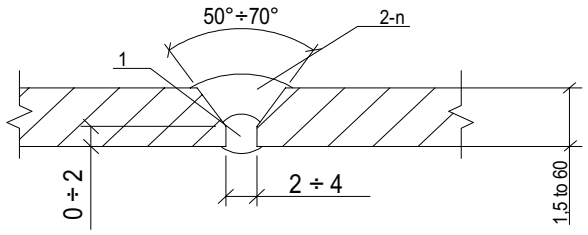
SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

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**	**-**	

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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	**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

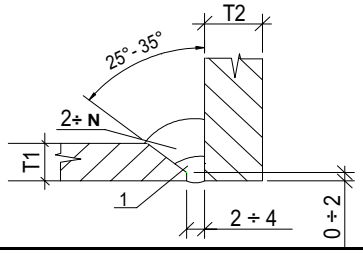
SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

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: 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

Via Pontida, 265 24040 STEZZANO (BG) - ITALY

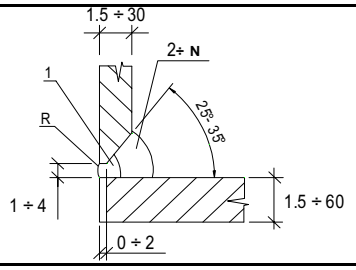
SPECIFICA DI PROCEDIMENTO SALDATURA
WELDING PROCEDURE SPECIFICATION

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**	**-**	

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. ZOI Data: 14/05/2021

Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE
NDT PROCEDURES
INCLUDING PERSONNEL QUALIFICATIONS

Document Number: 1724000437-NDT-PRO-00019

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
00	19/04/2024	Issue for Review (IFR)	GT	MC	TM

COES

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)
01	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.

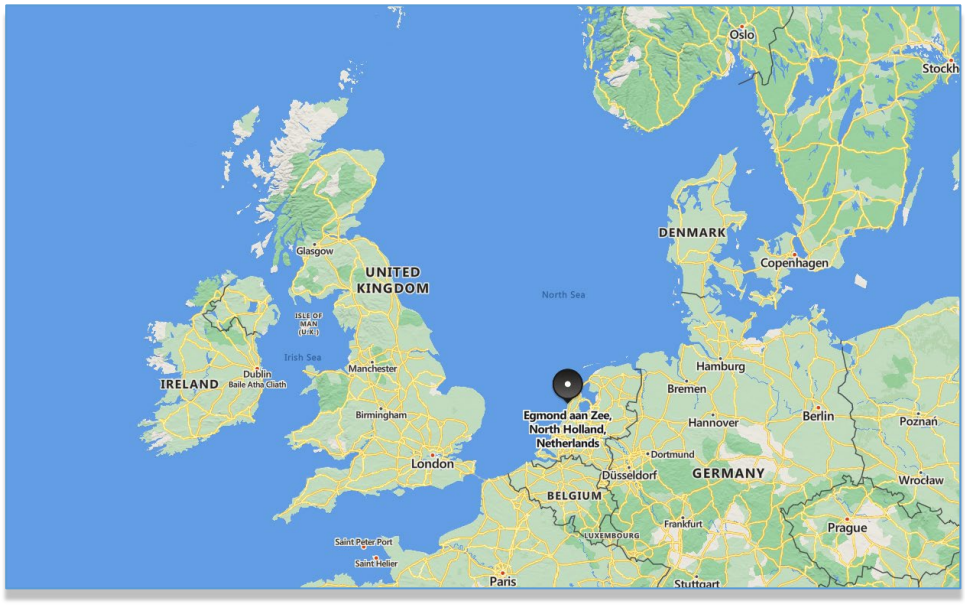


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



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.

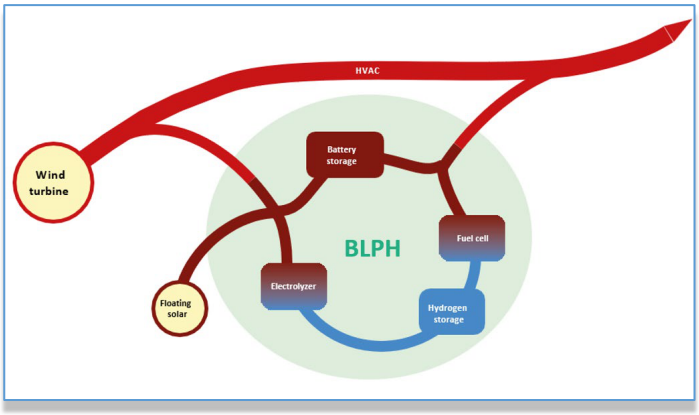


Figure 3 – BLPH Concept

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
1724000437-PR-PID-00018	PACKAGE P&ID
1724000437-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
1724000437-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

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
ISO 9712
MT-PT-RT-UT
11/09/2019

The President
Il Presidente

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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

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ASME PROCEDURE N° CTP03683

GENERAL PROCEDURE FOR RADIOGRAPHIC EXAMINATION

PROCEDURA DI ESAME RADIOGRAFICO

Rev	Issued by	Approved by	Date	Revision Description
7	O. Oldani (NDE Level III)	L. Testa (QCM)	21.12.2021	Revised par. 2, 3, 4.3, 6.1, 7.5, 7.6.2, 9.4, 10.1
6	O. Oldani (NDE Level III)	L. Testa (QCM)	30.12.2019	Revised par.1, 2, 4.2, 4.3, 5.1.1, 6.2, 7.6, 7.7, 8.3, 9.3, 10.1, 10.2
5	O. Oldani (NDE Level III)	M. Cattaneo (QCM)	04.10.2018	Revised par. 2, 4.2, 5.1, 6.1, 10.1, 10.2, Tables 1, 2 and 4
4	O. Oldani (NDE Level III)	M. Cattaneo (QCM)	10.02.2016	Revised par. 2, 5.1, 5.5, 7.4, 10, Tables 1, 2, 4, 5
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.

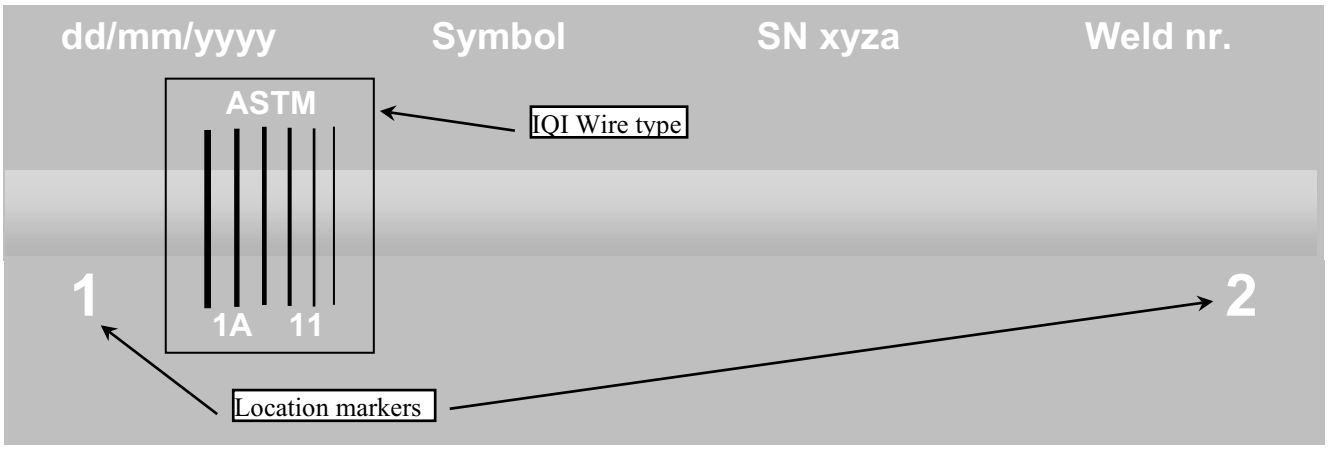


Figure 1 – System of identification
Figura 1 – Sistema di identificazione

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.

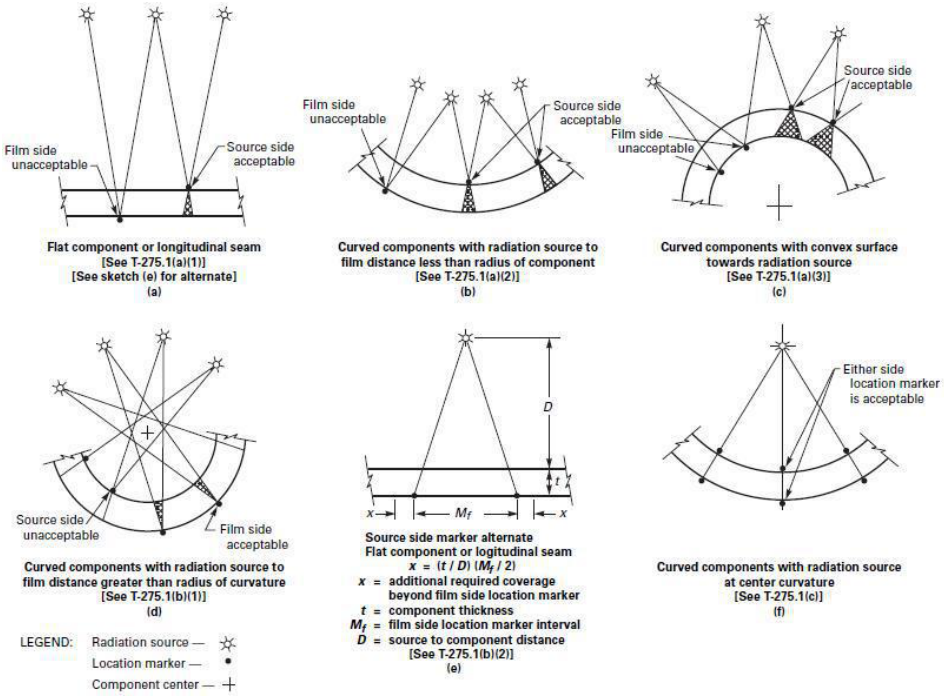


Figure 2 – Location makers
Figura 2 – Posizione marcatori

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.

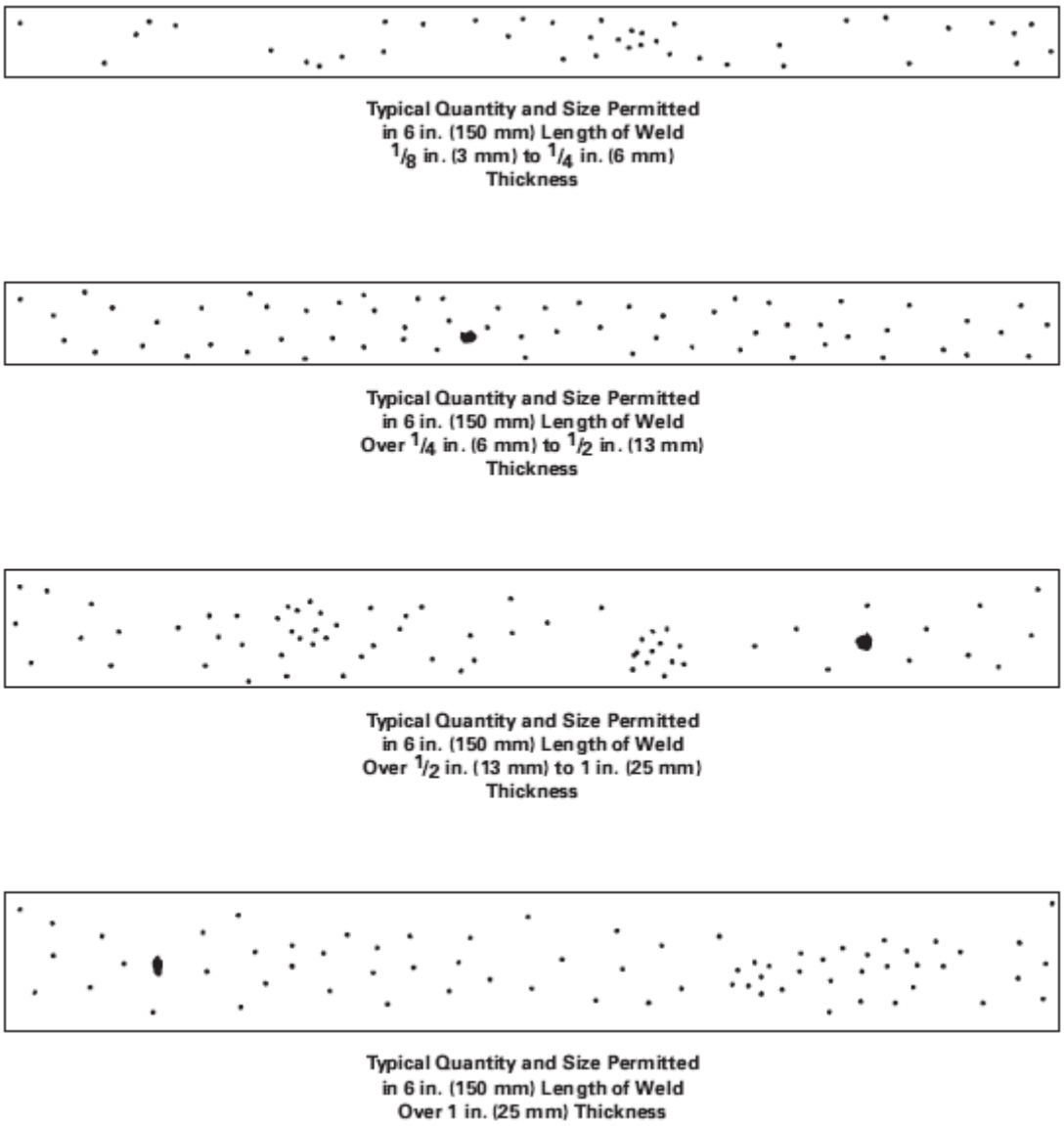


Figure 3 – Rounded indication chart for ASME BPVC sec. IX acceptance criteria
Figura 3 – Mappa delle indicazioni tondeggianti per criteri di accettabilità ASME BPVC sez. IX

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

ISTITUTO DI RICERCHE TECNOLOGICHE E COLLAUDI

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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		

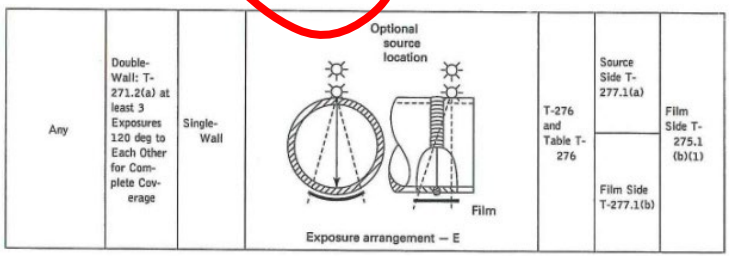
IRTEC SRL
SISTEMA DI QUALITA' CERTIFICATO ISO 9001:2008

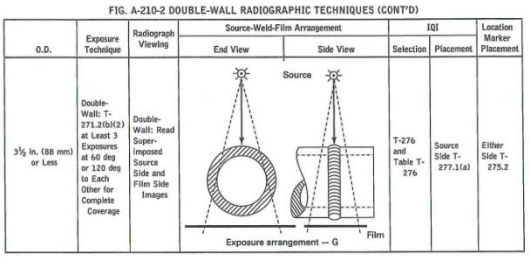
ISTITUTO DI RICERCHE TECNOLOGICHE E COLLAUDI

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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.

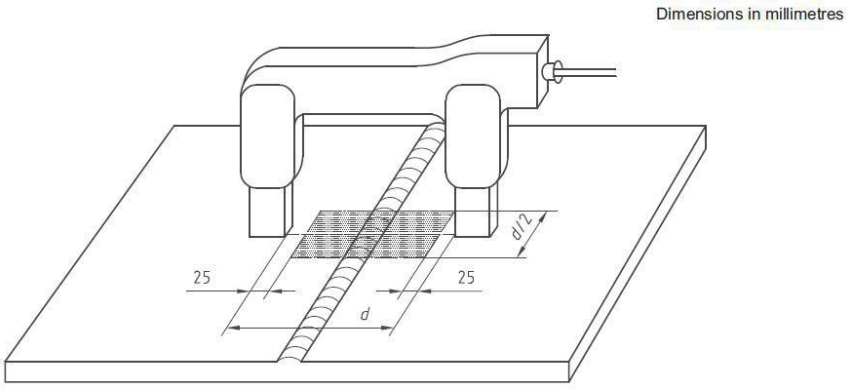


Figure 1a – Magnetized area
Figura 1a – Area magnetizzata

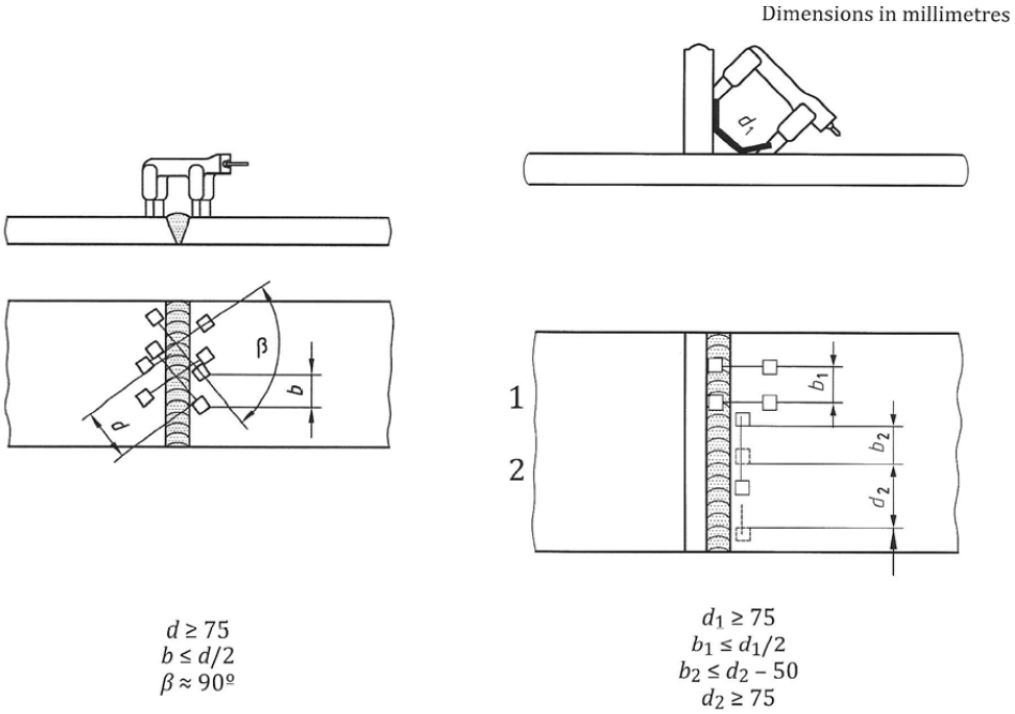


Figure 1b – Magnetization directions and overlap
Figura 1b – Direzione di magnetizzazione e sovrapposizione

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
ISO 9712 MT-PT-RT-UT
20/12/2019

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24040 COMUN NUOVO – Via Europa, 9

TEST REPORT MAGNETIC PARTICLE TESTING

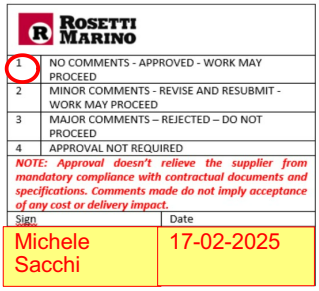
NUMBER:		**DATE:**	
CUSTOMER:		**N° ORDER:**	
SCOPE OF SUPPLY:		**COES JOB:**	
LOS S.N.:		**SERIAL NO.**	
SAMPLE:			
IDENTIFICATION:			
DATE OF TEST:			
TEST STANDARDS:			
TEST PROCEDURE			
ACCEPTANCE STANDARD:			
MATERIAL:		**URFACE CONDITION:**	
AREA INSPECTED:		**EXAMINATION COVERAGE:**	
MAGNETIZATION 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)

NITROGEN GENERATION PACKAGE A-64000
PAINTING PROCEDURE

Document Number: 1724000437-MAT-PRO-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
Michele Sacchi	17-02-2025

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
03	03/02/2025	Accepted for Construction (AFC)	GT	MC	TM
02	21/12/2024	Accepted for Construction (AFC)	GT	MC	TM
01	04/09/2024	Accepted for Construction (AFC)	GT	MC	TM
00	05/07/2024	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)

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.

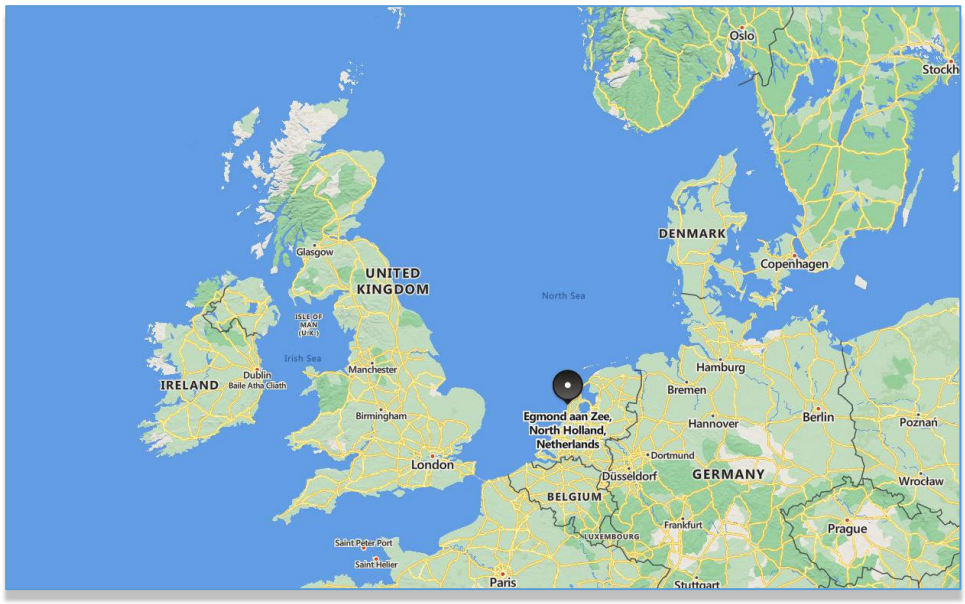


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



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.

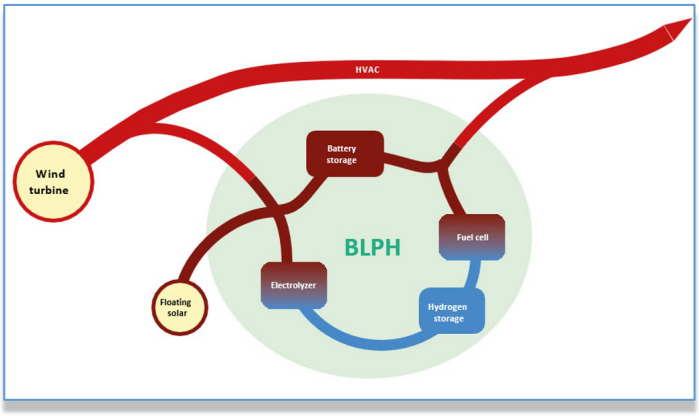


Figure 3 – BLPH Concept

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
1724000437-PR-PID-00018	PACKAGE P&ID
1724000437-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 Nigrogen Generation 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

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 painting equipment must be maintained in good working condition and daily cleaned in accordance with the paint supplier's instructions.

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 as per ASTM 4285.

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.

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 ISO 8501-1 Sa 2.5. 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
- available light is less than 500 lux.

Abrasive media shall have a conductivity less than 250µS/cm at 20°C and shall be tested in accordance with ASTM D 4940. Abrasive shall be grit type.

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

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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.

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.

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.

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 2.5 for C.S.. and SSPC-SP16 sweep blasting 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.

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Blasted Surface Roughness	ISO comparator ISO 8503-1	Spot check Min. 5 readings per 10 m2.	The surface profile shall be between 50 to 75µm, 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 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) • PIPING: White (RAL 9002) • MANUAL & ACTUATED VALVES: White (RAL 9002) • NITROGEN RECEIVER: White (RAL 9002)			

3.12.2 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)			

3.12.3 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.

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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 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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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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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.

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.

Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE A-64000

HYDROSTATIC TEST PROCEDURE

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

: 1724000437-QC-PRO-00022

:ument Class: 2

		ruction (AFC)	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)
01	Accepted for Construction (AFC)
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05	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.

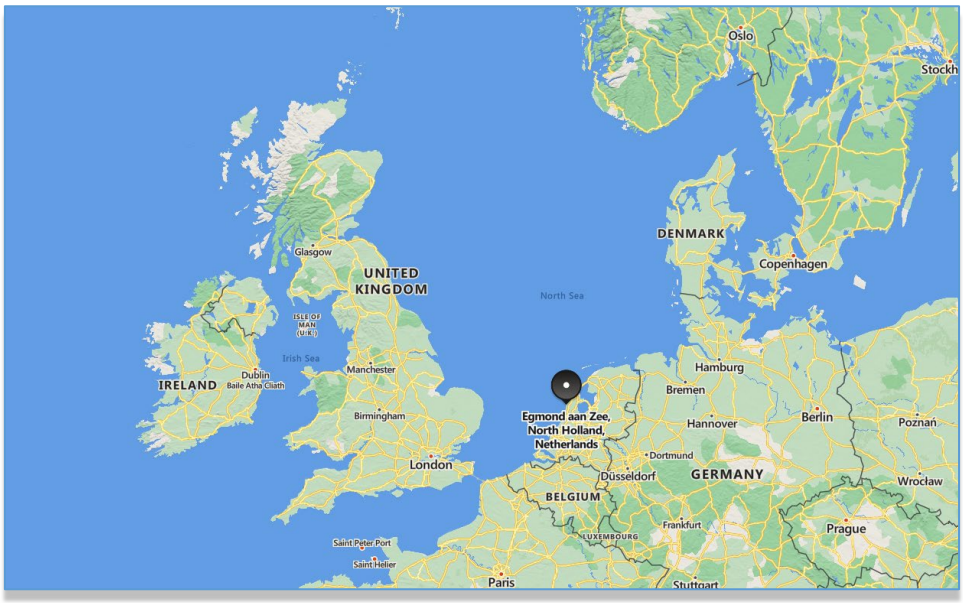


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

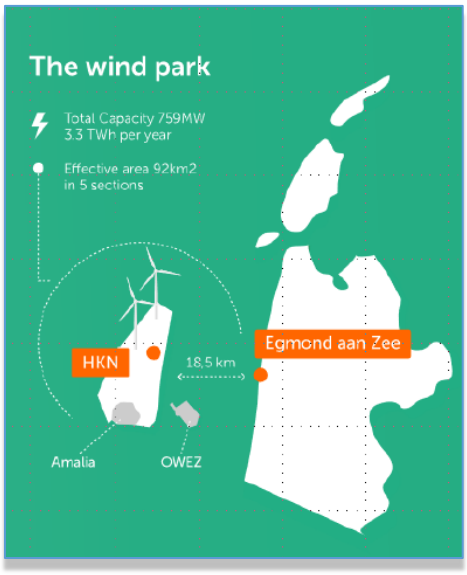


Figure 2 - Wind Park Details

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.

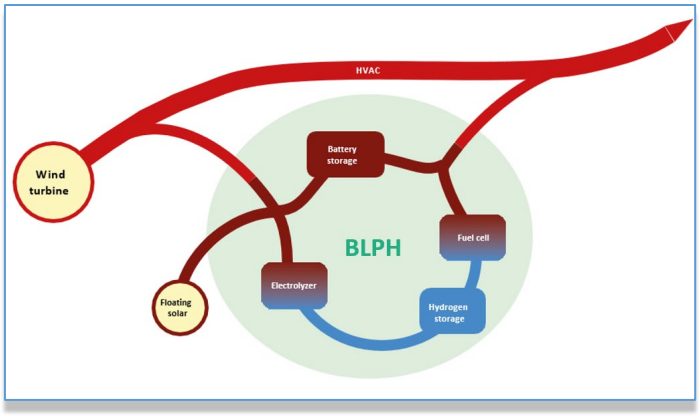


Figure 3 – BLPH Concept

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 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

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 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
PSA tower	C-64001A	S240129	12 barg	17.2 barg	Acc. to 2014/68/EU
PSA tower	C-64001B	S240130	12 barg	17.2 barg	Acc. to 2014/68/EU
After-Filter	S-64001A	S240131	12 barg	17.2 barg	Acc. to 2014/68/EU
After-Filter	S-64001B	S240132	12 barg	17.2 barg	Acc. to 2014/68/EU
N2 receiver	V-64001	S240120	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 as mentioned into paragraph 3.1 of this document, 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.

3.5.5 During testing it is not foreseen a significative ambient temperature change which could bring to a change of test pressure.

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)

NITROGEN GENERATION PACKAGE
FAT (FACTORY ACCEPTANCE TEST) PROCEDURE

Document Number: 1724000437-QC-PRO-00023

ROSETTI MARINO

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

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

Sign	Date
Giuseppe Cavallo	25/01/25

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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.

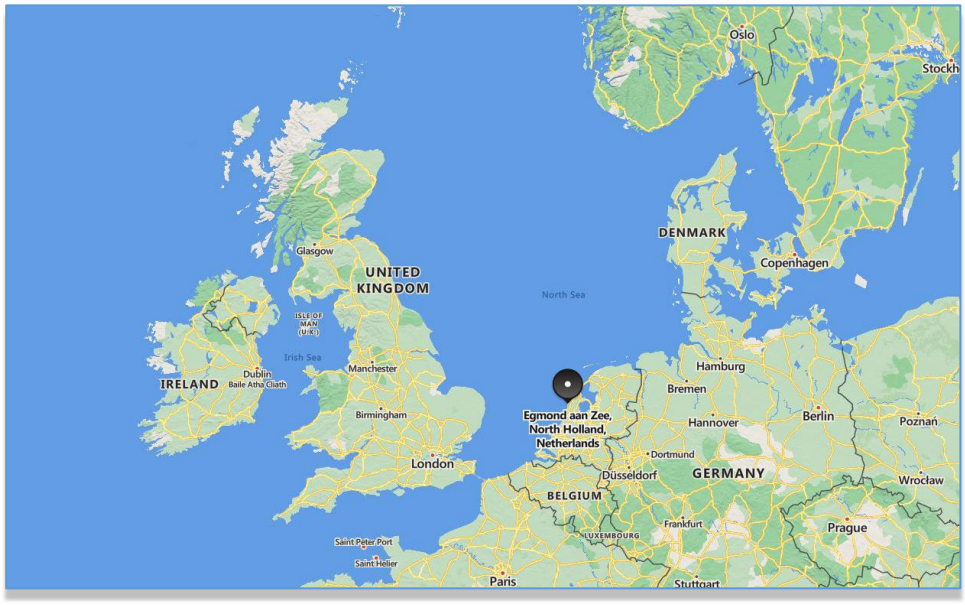


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



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.

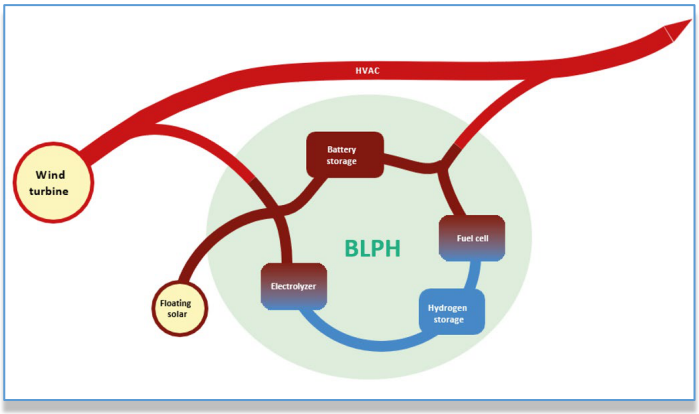


Figure 3 – BLPH Concept

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
1724000437-PR-PID-00018	PACKAGE P&ID
1724000437-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
1724000437-QC-ITP-00002	INSPECTION TEST PLAN (ITP)
1724000437-MAC-SP-00003	SYSTEM/PACKAGE FUNCTIONAL DESCRIPTION
1724000437-MAC-DG-00009	PACKAGE WIRING DIAGRAM INCLUDING LAYOUT OF PACKAGE CONTROL PANEL
1724000437-MAC-DS-00011	EQUIPMENT DATA SHEETS
1724000437-MAT-PRO-00021	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

Table 2 - Definitions and Abbreviations

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

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 nitrogen generation 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.

3.1.3 EXAMINATION

A bend meter is used for the dimensional inspection so that to verify that overall sizes of the generator 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 generator 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 ± 10 mm on the battery limits.

At least the following shall be checked:

- Foundation and/or fixation position check
- Tank drain position check (if applicable)
- Earthing position check
- Location of the terminal box
- All terminal points
- Visual check of flange surface condition at terminal points
- Electrical earthing continuity check (max 1Ω)
- Pipe routing and all the equipment connections and installations shall be in compliance with P&ID and GAD
- Instrument connection as per approved hook-ups

Test certificates shall be provided at the end of satisfactory test

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 nitrogen generator 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 I/O signals shall be validated.

A functional test of the Control/Safety Logics managed by Local Control Panel shall be executed.

The interface (hardwired and Serial) between Local Control Panel and Contractor's Control and Safety system, shall be checked.

Test certificates shall be provided at the end of satisfactory test

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 nitrogen generator 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.

Test certificates shall be provided at the end of satisfactory test

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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 nitrogen generator 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 nitrogen generator package is pressurized up to 7 barg and isolated to check that no leakage occurs.

During this test all valves installed in nitrogen generation package shall be in open position.

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.

The instruments used are the ones installed on the package according to reference P&ID, document no. 1724000437-PR-PID-00018.

Test certificates shall be provided at the end of satisfactory test

3.5 FAT PERFORMANCE TEST

3.5.1 SCOPE

This procedure has the scope of giving instructions to Coes personnel for the performance of functional test on complete nitrogen generator 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, at least no.2 complete operating cycles will be simulated, to verify the full functionality of the package, the good operation of all installed components and the proper sequence of all the different phases, as described in the functional description.

The test is carried out using Instrument air package, connected to the N2 package by means of flexible hoses.

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.

The following measured values will be checked:

- Check PSA adsorption/regeneration operating pressure by means of pressure gauges 64-PI-054 / 64-PI-055.
- Check after-filter pressure drop by means of differential pressure transmitter 64-PDIT-056.

Performance guarantees:

- Outlet N2 purity, by means of analyzer 64-AT-051 installed downstream PSA: 97%
- Outlet N2 package flowrate, by means of a flow indicator (shop test instrument) installed at the N2 package outlet: 60 Nm3/h (design conditions)
- Outlet N2 package pressure, by means of pressure transmitter 64-PIT-057: 8.1 barg

Performances of the N2 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.

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Functional test of all the installed transmitters wired from the local control panel to be considered during the functional test.

A functional test of the Control/Safety Logics managed by Local Control Panel shall be executed.

The interface (hardwired and Serial) between Local Control Panel and Contractor's Control and Safety system, shall be checked.

Test certificates shall be provided at the end of satisfactory test

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 nitrogen generator 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/color check to be performed (if applicable according painting procedure).

Instruments used to perform the test (magnetic induction instrument) shall have valid calibration certificates and shall be attached to FAT report

Test certificates shall be provided at the end of satisfactory test

3.7 LEGEND

QCI: quality control inspector

QCM: quality control manager

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Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE U-64000
HANDLING, PRESERVATION AND PACKAGING PROCEDURE

Document Number: 1724000437-QC-PRO-00030

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
M. Bl	10/01/2025

Document Class: 3

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

COES

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Revision / Change Log

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

HOLDS LIST

No.	Description
1	
2	
3	
4	

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3.1 SCOPE 9

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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.

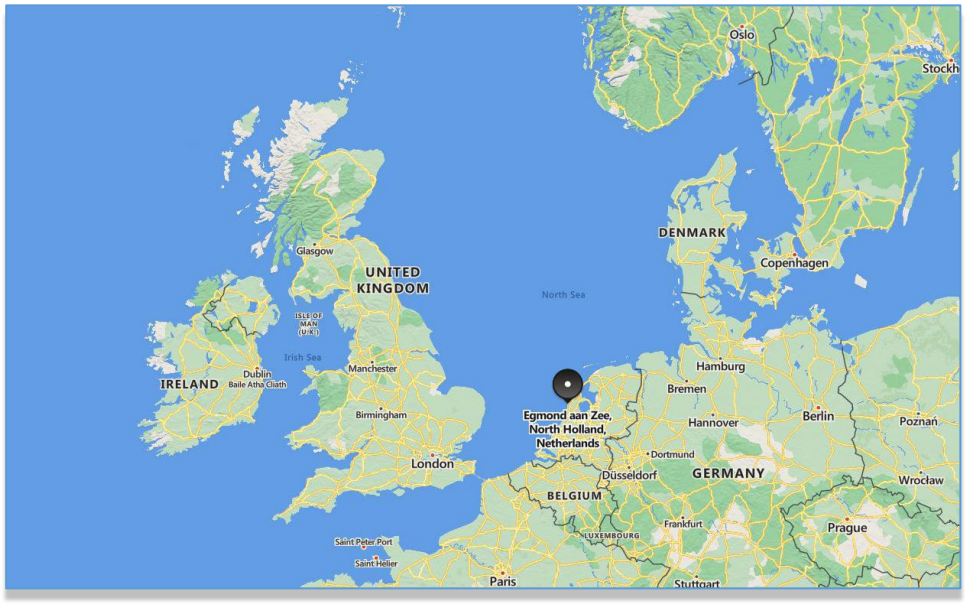


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



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.

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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.

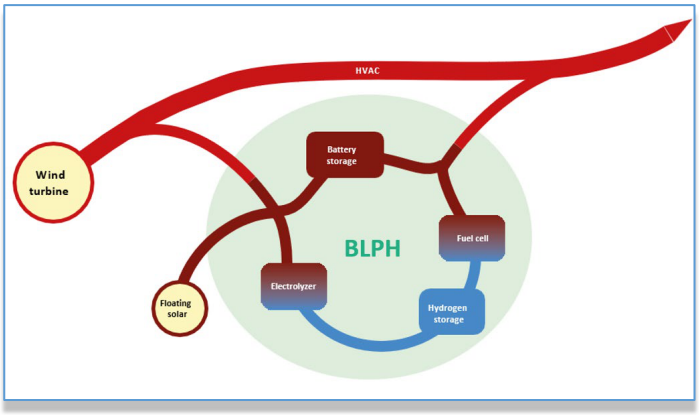


Figure 3 – BLPH Concept

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.

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1724000437-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

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3 HANDLING, PRESERVATION AND PACKING PROCEDURE

3.1 SCOPE

The N2 package will be delivered fully assembled, protected with a heat shrinkable film suitable for road transportation.

The N2 receiver will be delivered fully assembled (in terms of installed instruments and valves), on 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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E-mail : info@irtecsrl.com Web : www.irtecsrl.com

RAPP.DI PROVA N° RDP No	RA-240830
RIF. REF.	JA240331
DATA DATE	2024/09/16
FOGLIO SHEET	1 DI OF 2

RADIOGRAPHIC EXAMINATION REPORT

CLIENTE CUSTOMER	COES S.R.L. VIA PONTIDA , 265 - 24040 STEZZANO (BG)
COMMESSA JOB	C. 167/24
OGGETTO SUBJECT	RADIOGRAPHIC TESTING OF: PIPING // DRAWING: CCO54058
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 : SA333GR.6 :
Fittings : SA420WPL6 Flanges: SA350GR.LF2					

	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 5.54 mm Ø33.4 x 4.55 mm Ø21.3 x 2.77 mm	X Ray	Fig. G	60.3 mm 33.4 mm 21.3 mm	900 mm	7.5 mm 6.5 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
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**

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-1° & UNI EN ISO 9712	Francesco Morandi RT LEVEL II SNT-TC-1° & UNI EN ISO 9712		

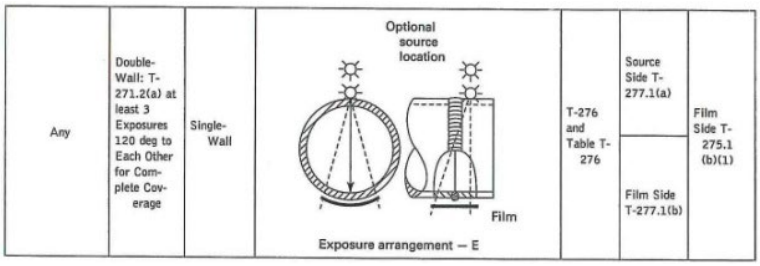
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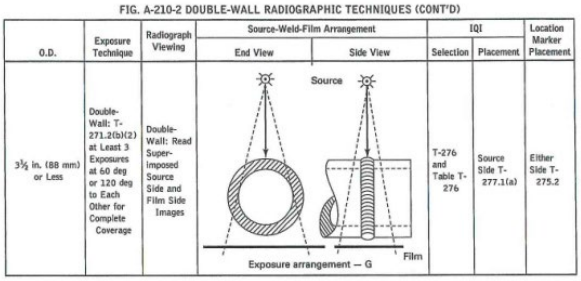
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E-mail : info@irtecsrl.com Web : www.irtecsrl.com

RAPP.DI PROVA N° RDP No	RA-240830
RIF. REF.	JA240331
DATA DATE	2024/09/16
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
CCO54058	2-Fig.G DWE-DWV	A	/	OK	CCO54058	2-Fig.G DWE-DWV	A	3	OK
SHEET 2		B	/	OK	SHEET 4		B	/	OK
W1 – 1”		C	/	OK	W2 – 2”		C	/	OK
CCO54058		A	/	OK	CCO54058		A	/	OK
SHEET 2		B	/	OK	SHEET 6		B	/	OK
W2 – 1”		C	14a	OK	W4 – 1”		C	/	OK
CCO54058		A	/	OK	CCO54058		A	/	OK
SHEET 3		B	/	OK	SHEET 6		B	/	OK
W10 – 1”		C	/	OK	W6 – 1”		C	/	OK
CCO54058		A	/	OK					
SHEET 3		B	/	OK					
W12 – 1/2”		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-1° & UNI EN ISO 9712	Francesco Morandi RT LEVEL II SNT-TC-1° & UNI EN ISO 9712		

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MD 8A RP RT1 R0	**RAPPORTO DI PROVA** / Test Report	RA240837	**Data** / Date	2024/09/19
	COMMESSA IRTEC/ IRTEC Job	JA240331	**PAGINA** / Page	1 / 2

RA240837 JA240331 2024/09/19 **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.167/24		
OGGETTO *SUBJECT*	RADIOGRAPHIC TESTING OF : N2 RECEIVER DWG : CCO52842 Rev.2 SN : S240120		
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 2000 x 15	//	Fig.1 SWE-SWI	17	15	700	715	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	50	Required	1.8÷4.0	Required	7	Single	☒
Ir 192						Back	0.027		Actual	2.8÷3.1	Actual	6	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

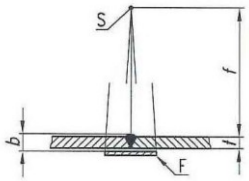
1	Cricche	Cracks	12	Mancanza di penetrazione	Lack of penetration
2a	Pori e porosità - Passata singola	Pores and porosity Single pass	13	Cricche di cratere	Cratercracks
2b	Pori e Porosità - Multipass	Pores and porosityMultipass	14a	Incisioni marginali	Undercuts
3	Porosità localizzata	Localized cluster 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

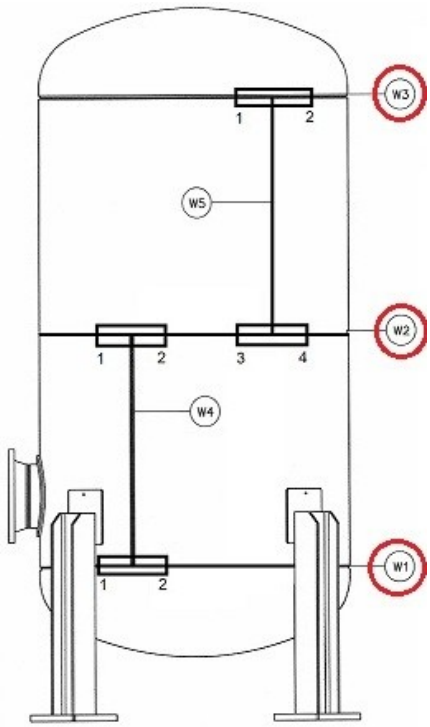
NOTE *REMARKS*	**RT COVERAGE : SPOT INDICATED BY THE CUSTOMER**	
OPERATORE *OPERATOR*	Lorefice-Nicolò Level 2 RT SNT-TC-1A - IRTEC certificate No. 17	
PROVE ESEGUITE IL *TEST PERFORMED ON*	2024/09/19	**Presso COES - STEZZANO** At the COES headquarters in STEZZANO

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
S240120	1-Fig.1 SWE-SWI	W1	1-2	14a	OK
		W2	1-2	//	OK
			3-4	//	OK
		W3	1-2	//	OK

Fig.1





Serial number: S240120
Subject: N2 RECEIVER
COES Job: 167/24
Drawing: CCO52842 Rev.2

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		

IRTEC SRL
SISTEMA DI QUALITA' CERTIFICATO ISO 9001:2008

ISTITUTO DI RICERCHE TECNOLOGICHE E COLLAUDI

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Tel. 02.90.96.15.41 • 2 - Fax 02.90.96.32.92
E-mail : info@irtecsrl.com Web : www.irtecsrl.com

RAPP.DI PROVA No. RDP No	RA-240838
RIF. REF.	JA240331
DATA DATE	2024/09/19
FOGLIO SHEET	1 DI OF 2

RADIOGRAPHIC EXAMINATION REPORT

CLIENTE CUSTOMER	COES S.R.L. VIA PONTIDA , 265 - 24040 STEZZANO (BG)
COMMESSA JOB	C.167/24
OGGETTO SUBJECT	RADIOGRAPHIC TESTING OF : PSA FILTERS DRWING: CCO5404 SERIAL NUMBERS: S240131/S240132
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	Pipes: SA 333 GR.6 / Flanges SA350GR.LF2

	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	Ø114 x 8.56 mm	X Ray	Fig. E	8.56 mm	700 mm	10 mm	ASTM1B11	Source side Film side ☒

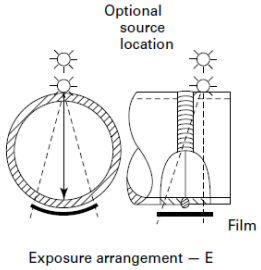
Tensione Voltage	Corrente Current	Dimens. sorgente Source size	Attività Ir 192 Ir 192 activity	Tipo Film Film type	Densità Density	Sensibilità Sensitivity	Geometric unsharpness (Ug)	Film
250 KV	3.0 mA	3.0 mm	//	AGFA D4	Required 1.8÷4.0 Actual 2.7-3.1	Required 6 Actual 6	0.08 mm	Single ☒ Double

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**

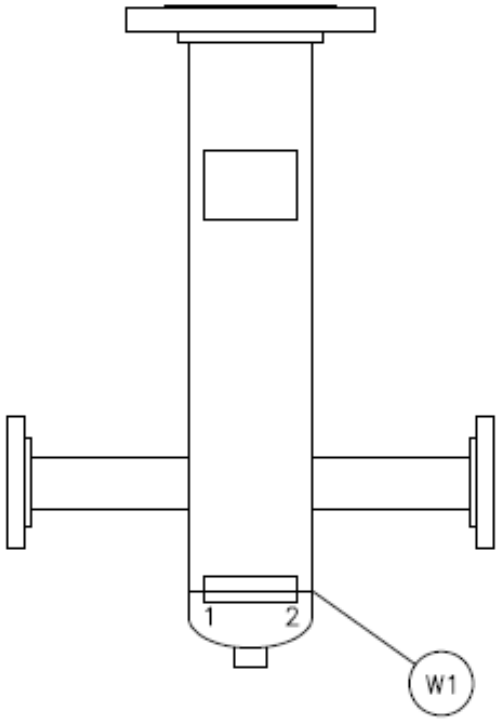
1	Cricche	Cracks	12	Mancanza di penetrazione	Lack of penetration
2a	Pori e porosità - Passata singola	Pores and porosity Single pass	13	Cricche di cratere	Crater cracks
2b	Pori e Porosità - Multipass	Pores and porosity Multipass	14a	Incisioni marginali	Undercuts
3	Porosità localizzata	Localized cluster 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		

SALDATURA WELD	TECNICA TECNIQUE	POSIZIONE POSITION	DIFETTI DEFECTS	ESITO RESULT
S240131	1-Fig.E DWE-SWV	W1 1-2	/	OK
S240132		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		

IRTEC SRL
SISTEMA DI QUALITA' CERTIFICATO ISO 9001:2008

ISTITUTO DI RICERCHE TECNOLOGICHE E COLLAUDI

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Tel. 02.90.96.15.41 • 2 - Fax 02.90.96.32.92
E-mail : info@irtecsrl.com Web : www.irtecsrl.com

RAPP.DI PROVA No. RDP No	RA-240839
RIF. REF.	JA240331
DATA DATE	2024/09/19
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 : PSA DRYER VESSEL DRWING: CCO54050 SERIAL NUMBERS: S240129/S240130
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	Plate: SA333GR.6 Flanges SA350GR.LF2

	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	Ø700 x 8 mm	X Ray	Fig. E	4,19 mm	700 mm	10 mm	ASTM1B11	Source side Film side ☒

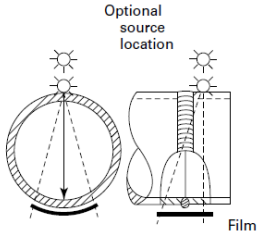
Tensione Voltage	Corrente Current	Dimens. sorgente Source size	Attività Ir 192 Ir 192 activity	Tipo Film Film type	Densità Density	Sensibilità Sensitivity	Geometric unsharpness (Ug)	Film
250 KV	3.0 mA	3.0 mm	//	AGFA D4	Required 1.8÷4.0 Actual 2.7-3.1	Required 6 Actual 6	0.08 mm	Single ☒ Double

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**

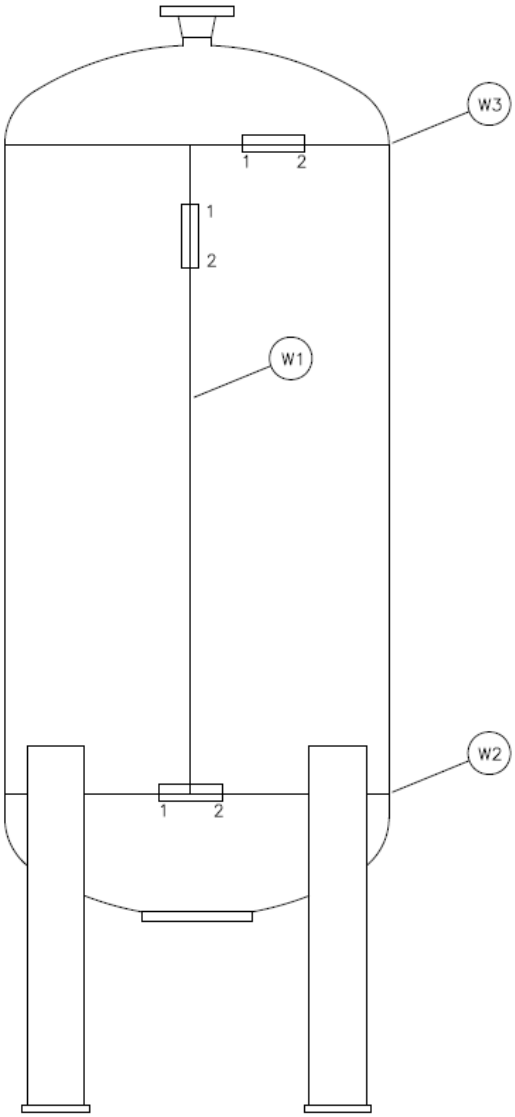
1	Cricche	Cracks	12	Mancanza di penetrazione	Lack of penetration
2a	Pori e porosità - Passata singola	Pores and porosity Single pass	13	Cricche di cratere	Crater cracks
2b	Pori e Porosità - Multipass	Pores and porosity Multipass	14a	Incisioni marginali	Undercuts
3	Porosità localizzata	Localized cluster 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		

SALDATURA WELD	TECNICA TECNIQUE	POSIZIONE POSITION	DIFETTI DEFECTS	ESITO RESULT	SALDATURA WELD	TECNICA TECNIQUE	POSIZIONE POSITION	DIFETTI DEFECTS	ESITO RESULT
S240129	1-Fig.E DWE-SWV	W1 1-2	14a	OK	S240130	1-Fig.E DWE-SWV	W1 1-2	/	OK
		W2 1-2	/	OK			W2 1-2	/	OK
		W3 1-2	/	OK			W3 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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e.mail: coes@coessrl.com

Sedi operative
24040 STEZZANO – Via Pontida, 265
24040 COMUN NUOVO – Via Europa, 9

TEST REPORT LIQUID PENETRANT EXAMINATION

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000437
Project:	123A90A - BASE LOAD POWER HUB PLATFORM	**Supply:**	N2 FILTER
Item:	A-64000	**Serial Number:**	S240131 / S240132
Coes Job:	167/24		

Sample:	100% OF WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54049 REV.0**		
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 24 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 24 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

Oliviero OLDANI
NDE III
MT-PT-RT-UT-VT
MT-PT-RT-UT-VT
MT-PT-RT-UT-VT

10/09/2024

The President
Il Presidente

COES Srl
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e.mail: coes@coessrl.com

Sedi operative
24040 STEZZANO – Via Pontida, 265
24040 COMUN NUOVO – Via Europa, 9

TEST REPORT LIQUID PENETRANT EXAMINATION

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000437
Project:	123A90A - BASE LOAD POWER HUB PLATFORM	**Supply:**	TOWER
Item:	A-64000	**Serial Number:**	S240129 / S240130
Coes Job:	167/24		

Sample:	100% OF WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54050 REV.0**		
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 23 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 23 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

Oliviero OLDANI
10/09/2024

The President
Il Presidente

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e.mail: coes@coessrl.com

Sedi operative
24040 STEZZANO – Via Pontida, 265
24040 COMUN NUOVO – Via Europa, 9

TEST REPORT LIQUID PENETRANT EXAMINATION

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000437
Project:	123A90A - BASE LOAD POWER HUB PLATFORM	**Supply:**	N2 RECEIVER
Item:	A-64000	**Serial Number:**	S240120
Coes Job:	167/24		

Sample:	100% OF WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO52842 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 19 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

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SURNAME / NAME

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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 19 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

Oliviero ORDANI
10/09/2024

The President
Il Presidente

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TEST REPORT LIQUID PENETRANT EXAMINATION

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000437
Project:	123A90A - BASE LOAD POWER HUB PLATFORM	**Supply:**	PIPING
Item:	A-64000		
Coes Job:	167/24		

Sample:	100% OF WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54058 REV.0**		
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 19 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 19 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

Oliviero DIODANI
10/09/2024

The President
Il Presidente

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TEST REPORT MAGNETIC PARTICLE TESTING

NUMBER:	CMT58135	**DATE:**	23 SET 2024
CUSTOMER:	ROSETTI MARINO	**N° ORDER:**	1724000437
PROJECT:	123A90A - BASE LOAD POWER HUB PLATFORM	**ITEM:**	A-64000
SCOPE OF SUPPLY:	BASEPLATE	**COES JOB:**	167/24

SAMPLE:	100% LIFTING LUGS
IDENTIFICATION:	CONSTRUCTION DWG: **CCO53360 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 23 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 23 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:**	1724000437
Project:	123A90A - BASE LOAD POWER HUB PLATFORM	**Supply:**	TOWER
Item:	A-64000	**Serial Number:**	S240129 / S240130
Coes Job:	167/24		

Sample:	100% VISUAL WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54050 REV.0**		
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 23 SET 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

COES Srl
QUALITY ASSURANCE
DATE 23 SET 2024
WITNESSED REVIEWED

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VISUAL TEST EXAMINATION OF WELDS

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000437
Project:	123A90A - BASE LOAD POWER HUB PLATFORM	**Item:**	A-64000
Supply:	BASEPLATE	**Coes Job:**	167/24

Sample:	100% VISUAL WELDS		
Identification:	CONSTRUCTION DRAWING **CCO53360 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 23 SET 2024 WITNESSED REVIEWED

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Level / Livello: Certified Operator

Method / Metodo: VT - Visual Examination

Technique / Tecnica: Direct unaided and aided

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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

COES Srl QUALITY ASSURANCE DATE 23 SET 2024 WITNESSED REVIEWED

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VISUAL TEST EXAMINATION OF WELDS

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000437
Project:	123A90A - BASE LOAD POWER HUB PLATFORM	**Supply:**	N2 FILTER
Item:	A-64000	**Serial Number:**	S240131 / S240132
Coes Job:	167/24		

Sample:	100% VISUAL WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54049 REV.0**		
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 24 SET 2024 WITNESSED REVIEWED		

Doc. N°: CTP58138

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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

COES Srl
QUALITY ASSURANCE
DATE 24 SET 2024
WITNESSED REVIEWED

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24040 COMUN NUOVO – Via Europa, 9

VISUAL TEST EXAMINATION OF WELDS

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000437
Project:	123A90A - BASE LOAD POWER HUB PLATFORM	**Supply:**	N2 RECEIVER
Item:	A-64000	**Serial Number:**	S240120
Coes Job:	167/24		

Sample:	100% VISUAL WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO52842 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 19 SET 2024 WITNESSED REVIEWED		

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NDE QUALIFICATION CERTIFICATE

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GRITTI MICHEL

SURNAME / NAME

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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
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Visual acuity verified on: 23/05/2024

The Quality Control Manager
Il Responsabile Controllo Qualità

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COES Srl
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DATE 19 SET 2024
WITNESSED
REVIEWED

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24040 COMUN NUOVO – Via Europa, 9

VISUAL TEST EXAMINATION OF WELDS

Customer:	ROSETTI MARINO	**Purchase Order:**	1724000437
Project:	123A90A - BASE LOAD POWER HUB PLATFORM	**Supply:**	PIPING
Item:	A-64000		
Coes Job:	167/24		

Sample:	100% VISUAL WELDS		
Identification:	CONSTRUCTION DRAWING: **CCO54058 REV.0**		
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 19 SET 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
DATE 19 SET 2024
WITNESSED ☒ REVIEWED

unoprima

RAPPORTO DI VERNICIATURA - Painting report

Data / Date: 14/10/24 Nr. 825 24

CLIENTE / Customer	OGGETTO / Object	COMMESSA / Job
COES	SKID STRUCTURE, PIPING SUPPORT, PIPING C.S., MANUAL AND ACTUATED VALVES, NITROGEN RECEIVER	167/24

COMMITTENTE FINALE / Final costumer	PROGETTO / Project	CICLO VERNICIATURA / Painting System
ROSETTI MARINO	HOLLANDSE KUST NOORD WIND PARK	SYSTEM 1 FOR EXTERNAL SURFACE OF UNINSULATED C.S.

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
08/10/2024	08:30 - 12:30	SA 2½	MEDIUM G Rz 70,15µm	12,65 mg/m²	CLASS 1

TEMPERATURA AMBIENTE / Air temperature	UMIDITA' RELATIVA / Relative umidity	PUNTO DI RUGIADA / Dew point	TEMPERATURA SUPPORTO / Surface temperature
16°C	76%	12,7°C	16°C

VERNICIATURA - Painting

DATA APPLICAZIONE / *Application Date*	08/10/2024	09/10/2024	10/10/2024	//////////
ORA APPLICAZIONE(DALLE - ALLE) / *Application Hour (From - To)*	13:30 - 16:50	14:30 - 17:30	14:30 - 17:30	//////////
TEMPERATURA AMBIENTE / Air temperature	21°C	17°C	20°C	ELCOMETER 319 TOP SN ZF 29428
UMIDITA' RELATIVA / Relative Humidity	66%	75%	73%	ELCOMETER 319 TOP SN ZF 29428
PUNTO DI RUGIADA / Dew point	15,4°C	12,6°C	15,1°C	ELCOMETER 319 TOP SN ZF 29428
TEMPERATURA SUPPORTO / Surface temperature	21°C	17°C	20°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	ZINC RICH PRIMER **AVANTGUARD 750**	EPOXY **HEMPADUR 45880**	POLYURETHANE **HEMPATHANE 55610**	//////////
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**	**284**	**380**	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 / Unoprimadnspector	ISPETTORE CLIENTE / Customer Inspector	ISPETTORE COMMITTENTE FINALE / Final customer Inspector
DATA - Date 14/10/24	DATA - Date	DATA - Date

unoprima

RAPPORTO DI VERNICIATURA - Painting report

Data / Date: 14/10/24 — Nr.: 826 24

CLIENTE / Customer	OGGETTO / Object	COMMESSA / Job
COES	**PIPING S.S., MANUAL AND ACTUATED VALVES S.S.**	**167/24**

COMMITTENTE FINALE / Final costumer	PROGETTO / Project	CICLO VERNICIATURA / Painting System
ROSETTI MARINO	**HOLLANDSE KUST NOORD WIND PARK**	**SYSTEM 6A FOR EXTERNAL SURFACE OF UNINSULATED S.S.**

PREPARAZIONE DELLA SUPERFICIE - Surface preparation

DATA / Date	ORA (DALLE - ALLE) / Hour (From - To)	CLEANING DEGREE *SSPC*	ANCHOR PROFILE *ISO 8503-2*	SALT TEST *ISO 8502-6/9*	DUST TEST *ISO 8502-3*
09/10/2024	10:00 - 12:00	SSPC SP 16	FINE G Rz 32,10µm	9,80mg/m²	CLASS 1

TEMPERATURA AMBIENTE / Air temperature	UMIDITA' RELATIVA / Relative umidity	PUNTO DI RUGIADA / Dew point	TEMPERATURA SUPPORTO / Surface temperature
16°C	72%	14,3°C	16°C

VERNICIATURA - Painting

DATA APPLICAZIONE *Application Date*	09/10/2024	10/10/2024	11/10/2024	//////////
ORA APPLICAZIONE(DALLE - ALLE) *Application Hour (From - To)*	13:30 - 15:00	13:30 - 15:00	13:30 - 15:00	//////////
TEMPERATURA AMBIENTE Air temperature	17°C	20°C	21°C	ELCOMETER 319 TOP SN ZF 29428
UMIDITA' RELATIVA Relative Humidity	75%	73%	70%	ELCOMETER 319 TOP SN ZF 29428
PUNTO DI RUGIADA Dew point	12,6°C	15,1°C	15,4°C	ELCOMETER 319 TOP SN ZF 29428
TEMPERATURA SUPPORTO Surface temperature	17°C	20°C	21°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	EPOXY **HEMPADUR 15570**	EPOXY MASTIC **HEMPADUR MASTIC 4588**	POLYURETHANE **HEMPATHANE 55610**	//////////
COLORE Color	STD GREY	STD GREY	RAL 9002	//////////
CONTROLLO FILM UMIDO µm Wet film thickness check	100	150	150	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	**94**	**255**	**330**	ELCOMETER 456TOP Instrument S.N.: SG00559 Probe S.N.: ZC12732
CONTROLLO MEK - Mek test - ASTM D 4752-03	N.A.	N.A.	N.A.	//////////

NOTE / Remarks

* PAINTING APPLICATION AS PER TDS INSTRUCTIONS
* 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: 14/10/24	DATA - Date	DATA - Date

SALVI - UNOPRIMA NS 476 — FROSIO cert. n°7023 LEV. III — CONTROLLO UNOPRIMA S.R.L. QUALITÀ

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

For Zinc Rich Primer AVANTGUARD 750

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 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

For Zinc Rich Primer AVANTGUARD 750

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	9588W
Base colour	00000
Product delivered	9588W00000
Batch number	223065286
Batch date	11/07/2023
Expiration date	Jul 2024
Page	1 / 1

For Epoxy HEMPADUR M 45880

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

For Epoxy HEMPADUR M 45880

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 (Portugal) Lda
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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

For Polyurethane HEMPATHANE 55610

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

For Epoxy HEMPADUR 15570

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

For Polyurethane HEMPATHANE 55610

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
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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

For Epoxy HEMPADUR 15570

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
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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

elcometer®
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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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: 24/09/2024 **N°CDC54419**

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000437
COES JOB:	167/24
ITEM:	no. 1 vessel
SERIAL NUMBER:	S240120
DRAWING:	1724000437-MAC-DD-00006_01

ACTIVITY	RESULT
VISUAL AND DIMENSIONAL CHECK	POSITIV
HYDROSTATIC TEST	POSITIV

NOTE			
TEST MEDIUM: ACQUA	TEST PRESSURE: 17.2 barg	POSITION: HORIZZONTAL	TEST DURATION: 60 min
TEST PROCEDURE:	1724000437-QC-PRO-00022_03		

PRESSURE GAUGES	RANGE	CALIBRATION EXPIRY
S141	0 ÷ 60 bar	19/01/2025
S137	0 ÷ 60 bar	19/01/2025

NOTES

24/09/2024
COES SRL
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24/9/24

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



Max CROSSWINDS
24/9/24 R

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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° 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	

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

STRUMENTAZIONE TERMOMETRICA E MANOMETRICA
DR. ING. GIUSEPPE GEMINI

per CROSSMIND
24/6/24

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

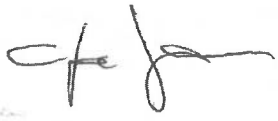
SCHEDA DI TARATURA
CALIBRATION SHEET

STRUMENTO: MANOMETRO DN 100 **INSTRUMENT:** PRESSURE GAUGE DN100	**CENTRO DI TARATURA:** Termaf **CALIBRATION CENTRE:**
MATRICOLA COES: 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:**	
COSTRUTTORE: Tube & Socket (Termaf) **MANUFACTURER:**	**NOTE:**

DATA: 19/01/2024
DATE:

FIRMA QCI
QCI SIGNATURA

FIRMA QCM
QCM SIGNATURE



CROSSWIND

24/9/24

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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	

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

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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Qualità dell'acqua - I parametri del tuo comune

Comune: Stezzano

Punto rete: Fontanella - Parco Via Gerole cerca

Parametro	Valore rilevato	Valore limite	Unità di misura
Concentrazione ioni idrogeno (pH)	**7,9**	6,5-9,5	Unita' pH
Residuo fisso (da calcolo)	**194**		mg/l
Durezza totale	**12**		°F
Conducibilità elettrica a 20°C	**277**	2500	µS/cm
Calcio	**34**		mg/l
Magnesio	**8**		mg/l
Ammonio	**< 0,1**	0,5	mg/l
Cloruro	**4**	250	mg/l
Solfato	**17**	250	mg/l
Potassio	**0,7**		mg/l
Sodio	**1,2**	200	mg/l
Arsenico	**< 1**	10	µg/l
Bicarbonato	**145**		mg/l
Cloro residuo libero	**< 0,10**		mg/l
Fluoruri	**0,05**	1,5	mg/l
Nitrato	**5**	50	mg/l
Nitrito	**< 0,05**	0,5	mg/l
Manganese	**< 5**	50	µg/l

Data di riferimento: 30/06/2024
Nota:
I valori di riferimento sono stabiliti dal D.Lgs. 18/2023
Per ulteriori informazioni contattare il numero 035.30.70.111
(selezione 3: "per informazioni su scarichi industriali ed analisi di laboratorio")
oppure inviare una email a info@uniacque.bg.it.
I valori n.d. che compaiono per il parametro cloro residuo libero in corrispondenza di alcuni punti rete, stanno ad indicare che l'approvvigionamento relativo non è sottoposto a clorazione (non disinfettato o disinfettato con altri metodi, es. UV)

Scarica Pdf

Pdf stampato in data: 24 Settembre 2024

Uniacque S.p.a.

Via delle Canovine, 21 24126 Bergamo

R.I. BG - P.I. e C.F. 03299640163 - Cap. Soc. € 36.000.000 i.v.

Report generato da Comune Facile

CROSSWIND
24/09/24 R

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e.mail: coes@coessrl.com

Sedi operative
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HYDROSTATIC TEST CERTIFICATE

Date: 01/10/2024 **N°CDC54576/A**

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000437
COES JOB:	167/24
ITEM:	no. 1 tower vessel
SERIAL NUMBER:	S240129
DRAWING:	CCO54050

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:	1724000437-QC-PRO-00022_03		

PRESSURE GAUGES	RANGE	CALIBRATION EXPIRY
S133	0 ÷ 40 bar	10/11/2024
S134	0 ÷ 40 bar	10/11/2024

NOTES

1/10/24
COES SRL
W R

LUCA DEL CASTELLO
on behalf of CROSSWIND
2024-10-01
W R M

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e.mail: coes@coessrl.com

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HYDROSTATIC TEST CERTIFICATE

Date: 01/10/2024

N°CDC54576/B

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000437
COES JOB:	167/24
ITEM:	no. 1 tower vessel
SERIAL NUMBER:	S240130
DRAWING:	CCO54050

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:	1724000437-QC-PRO-00022_03		

PRESSURE GAUGES	RANGE	CALIBRATION EXPIRY
S131	0 ÷ 40 bar	10/11/2024
S132	0 ÷ 40 bar	10/11/2024

NOTES

11/10/24
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 DN 100

MATRICOLA COES: S133
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: 70208

CENTRO DI TARATURA: Termaf
CALIBRATION CENTRE:

CERTIFICATO DI TARATURA: 4777
CERTIFICATE OF CALIBRATION:

SCADENZA TARATURA: 10/11/2024
CALIBRATION EXPIRY:

FREQUENZA DI CALIBRAZIONE: 1 ANNO
FREQUENCY OF CALIBRATION: 1 YEAR

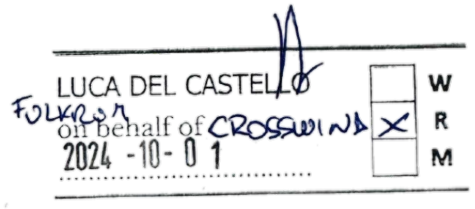
NOTE:

DATA: 10/11/2023
DATE:

FIRMA CQ
CQ SIGNATURE

FIRMA RGQ
RGQ SIGNATURE





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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
FULKROM on behalf of CROSSWIND
2024-10-01
W X
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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 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

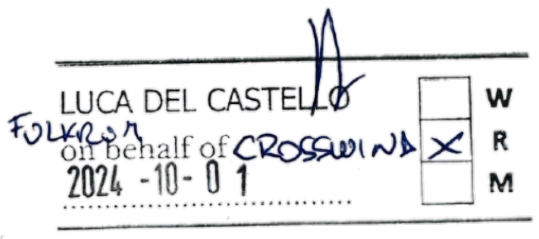
STRUMENTO: MANOMETRO DN 100 **INSTRUMENT:** PRESSURE GAUGE DN 100	**CENTRO DI TARATURA:** Termaf **CALIBRATION CENTRE:**
MATRICOLA COES: S134 **COES TAG**:	**CERTIFICATO DI TARATURA:** 4778 **CERTIFICATE OF CALIBRATION:**
RANGE: 0÷40 bar	**SCADENZA TARATURA:** 10/11/2024 **CALIBRATION EXPIRY:**
ACCURATEZZA 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





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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
FULKROM on behalf of CROSSWIND
2024 -10- 01
W ☐ 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

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	**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:

LUCA DEL CASTELLO
on behalf of CROSSWIND
2024 -10- 01

	W
X	R
	M

FIRMA CQ
CQ SIGNATURE

FIRMA RGQ
RGQ SIGNATURE

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° 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
FULKRUM on behalf of CROSSWIND
2024 -10- 01
W ☐ 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	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 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.
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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: S132
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: 70197

CENTRO DI TARATURA: Termaf
CALIBRATION CENTRE:

CERTIFICATO DI TARATURA: 4776
CERTIFICATE OF CALIBRATION:

SCADENZA TARATURA: 10/11/2024
CALIBRATION EXPIRY:

FREQUENZA DI CALIBRAZIONE: 1 ANNO
FREQUENCY OF CALIBRATION: 1 YEAR

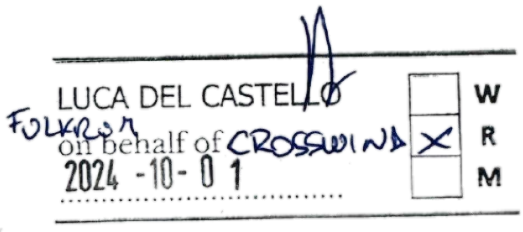
NOTE:

DATA: 10/11/2023
DATE:

FIRMA CQ
CQ SIGNATURE

FIRMA RGQ
RGQ SIGNATURE





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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	**MI/A1**
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
FULKRUM
on behalf of CROSSWIND
2024 -10- 01

W	R	M
	X	

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 TERMAF
DR. ING. GIUSEPPE GEMINI

Gli strumenti di misura utilizzati per la calibratura fanno parte del sistema ciclico di sorveglianza ISO 9001:2015.
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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: 26/09/2024 **N°CDC55690**

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000437
COES JOB:	167/24
ITEM:	PSA After Filters
SERIAL NUMBER:	S240131 – S240132
DRAWING:	CCO54049 REV.0

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:	1724000437-QC-PRO-00022_03		

PRESSURE GAUGES	RANGE	CALIBRATION EXPIRY
S133	0 ÷ 40 bar	10/11/2024
S134	0 ÷ 40 bar	10/11/2024

NOTES

COES SRL 26/09/24		

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



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www.termaf.it info@termaf.it
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.

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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



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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

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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: 23/09/2024 **N°CDC55691**

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000437
COES JOB:	167/24
ITEM:	Interconnecting piping
SERIAL NUMBER:	N.A.
DRAWING:	CCO54058 REV.0 (1724000437-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:	1724000437-QC-PRO-00022_03		

PRESSURE GAUGES	RANGE	CALIBRATION EXPIRY
S133	0 ÷ 40 bar	10/11/2024
S134	0 ÷ 40 bar	10/11/2024

NOTES

COES SRL
23/09/24

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



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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

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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



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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

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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: CML58188	**REV. 0**	**SHEET 1 OF 9**

CUSTOMER:	ROSETTI MARINO S.P.A.
PROJECT:	HOLLANDSE KIST NOORD WIND PARK PROJECT
OBJECT:	BASEPLATE
SERIAL No.:	//
DRAWING:	CCO53360
COES JOB:	167/24

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	3354,500 mm	PROFILE HEA 140 L=3354,5 mm	S 275 JR	TRAVI E PROFILATI DI PALLANZENO SPA	7809 2022	135302A	22 1668
2	3354,500 mm	PROFILE HEA 140 L=3354,5 mm	S 275 JR	TRAVI E PROFILATI DI PALLANZENO SPA	7809 2022	135302A	22 1668
3	1600,000 mm	PROFILE HEA 140 L=1600 mm	S 275 JR	TRAVI E PROFILATI DI PALLANZENO SPA	7809 2022	135302A	22 1668
4	1600,000 mm	PROFILE HEA 140 L=1600 mm	S 275 JR	TRAVI E PROFILATI DI PALLANZENO SPA	7809 2022	135302A	22 1668
5	1454,500 mm	PROFILE HEA 140 L=1454,5 mm	S 275 JR	TRAVI E PROFILATI DI PALLANZENO SPA	7809 2022	135302A	22 1668
6	1454,500 mm	PROFILE HEA 140 L=1454,5 mm	S 275 JR	TRAVI E PROFILATI DI PALLANZENO SPA	7809 2022	135302A	22 1668
7	1454,500 mm	PROFILE HEA 140 L=1454,5 mm	S 275 JR	TRAVI E PROFILATI DI PALLANZENO SPA	7809 2022	135302A	22 1668
8	1454,500 mm	PROFILE HEA 140 L=1454,5 mm	S 275 JR	TRAVI E PROFILATI DI PALLANZENO SPA	7809 2022	135302A	22 1668
14	1454,500 mm	PROFILE HEA 140 L=1454,5 mm	S 275 JR	TRAVI E PROFILATI DI PALLANZENO SPA	7809 2022	135302A	22 1668
16	324,500 mm	PROFILE - U 100x50x6 L=324,5 mm	S 275 JR	AFV BELTRAME GROUP	472117	BE 223642	24 2443
17	394,500 mm	PROFILE - U 100x50x6 L=394,5 mm	S 275 JR	AFV BELTRAME GROUP	472117	BE 223642	24 2443
18	694,500 mm	PROFILE - U 100x50x6 L=694,5 mm	S 275 JR	AFV BELTRAME GROUP	472117	BE 223642	24 2443
19	594,500 mm	PROFILE - U 100x50x6 L=594,5 mm	S 275 JR	AFV BELTRAME GROUP	472117	BE 223642	24 2443
20	324,500 mm	PROFILE - U 100x50x6 L=324,5 mm	S 275 JR	AFV BELTRAME GROUP	472117	BE 223642	24 2443
21	994,500 mm	PROFILE - U 100x50x6 L=994,5 mm	S 275 JR	AFV BELTRAME GROUP	472117	BE 223642	24 2443
24	928,000 mm	PLATE 50 x 10 L=116,000 mm	S 275 JR	FERRIERE BELLICINI SRL	2400687	9003911	24 2124
25	4	PLATE 70x50 Thk. 5mm	SA 240 TP316L	MARCEGAGLIA SPECIALTIES	10720102393	X2MV	20 2968

MARCEGAGLIA SPECIALTIES

Type: Inspection Certificate 3.1 AD-2000 EN10204 | Number: 10720102393 | Issued On: 12/02/2020

- 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 SP/
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	8251806669	Quality Control	Pages
Of	12/02/2020	Q.M.D./Q.M. L.Solazzi	2/2
Delivery note nr	2507000342	Plant Of Gazoldo	

Material: 50602129
Description: CXC003 5,00 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: 1591859578/50
Client Order: 2E/0000015
Client Date: 13/02/2020

Item	Identification Nr	Heat	Quantity
1	19H9010185	1017136	11160 KG
2	19H9014656	X2MV	13430 KG

Pacco 160498

Dimensional tolerances/
EN9444-2

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. 2019

Mark Tester/
- Organization inspection: CQ3

Terms of Delivery/

Identification Nr	Chemical Type	Mark	C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Ni (%)	Mo (%)	N (%)
19H9010185		19RF093389	.016	.430	.880	.0320	.0014	16.710	10.100	2.040	.0320
19H9014656		19YP016852	.020	.327	1.389	.0310	.0020	16.530	10.105	2.027	.0430

Identification Nr	Test position	Test direction	Mark	Rm [N/mm²]	Rp 0.2 [N/mm²]	RP 1 [N/mm²]	A5D (%)	A50 (%)	HRB B	HRB T
19H9010185	B	T	19RF093389	579	299	350	54.1	56.2	80	80
19H9014656	B	T	19YP016852	598	299	354	52.5	54.6	84	84

COES G.Q.
Ricezione data 29/09/2020 Sigla V.S.
Verificato data 06/10/2020 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:
- Renounced of counter signature agreed by TUV Rheinland (01/03/2012)

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

CE 0474 13 MARCEGAGLIA SPECIALTIES v. Bresciani, 16 46040 - Gazoldo D. I. Mantova - Italy
EN 10088-4:2009

20 2968

A01

Duferco TRAVI E PROFILATI

Azienda certificata ISO 9001:2015 ISO 14001:2015 ISO 45001:2018

TRAVI E PROFILATI DI PALLANZENO S.p.A.

SOCIETÁ A SOCIO UNICO
SEDE LEGALE
VIA SEMPIONE, 7 – 28834 PALLANZENO (VB)
TEL. 0324511 – FAX. 0324532705
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 PALLANZENO – VIA SEMPIONE, 7 28834 PALLANZENO (VB)

CERTIFICATO DI CONTROLLO/INSPECTION CERTIFICATE

A02 **Normativa** EN 10204 (3.1)

A03 **Numero:** 7809 2022 ✓ **del** 26/07/22

Pag. 1

Your Ref.: 337-2022

A06 **CLIENTE / *CUSTOMER:***

SIDERURGICA FERRO BULLONI S.P.A.

VIA BRIXIA ZUST 4

25125 BRESCIA(BS)

171145

A09 **DdT / *SHIPPING DOCUMENT:***

DDT/DELIVNOTE PA/7809

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*

CARATTERISTICHE MECCANICHE / *MECHANICAL PROPERTIES*

	(*)				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 %	
					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	CC3 Temp. °C
HEA 140		S275J0 +AR	1	14,10	0,09	0,60	0,19	0,035	0,0030	0,008	0,442	0,011	0,280
EN 10365		EN10025-2/EN10034	16	5.562	0,176	0,149	0,030	0,002	0,000	0,021	0,002		
No. 134078B	P	337-2022		42/002961	343	475	33	7,5	152,0	148,0	157,0	152,3	0
HEA 140		S275J0 +AR	1	14,10	0,08	0,63	0,20	0,018	0,0030	0,008	0,429	0,010	0,270
EN 10365		EN10025-2/EN10034	16	5.562	0,147	0,197	0,037	0,001	0,001	0,019	0,002		
No. 134956	P	337-2022		42/002961	327	444	33	7,5	219,0	190,0	220,0	209,7	0
HEA 140 ✓		S275J0 +AR ✓	1	14,10	0,08	0,65	0,19	0,016	0,0060	0,005	0,458	0,009	0,265
EN 10365		EN10025-2/EN10034	16	5.562	0,116	0,158	0,025	0,001	0,001	0,019	0,002		
No. 135302A ✓	P	337-2022		42/002961	322	444	33	7,5	213,0	216,0	202,0	210,3	0
[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]	[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]	[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]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]		
[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

COPIA CONFORME ALL'ORIGINALE
CERTIFICATO VALIDO PER KG 440
FORNITO ALLA DITTA COES SRL
CON NS. DDT DI CONSEGNA N° 8918 del 25/8/2022
BRESCIA 26/8/2022
p. SIDERURGICA FERRO BULLONI SPA

	Ricezione data	Sigla
COES	25/08/2022	V.S.
G.Q.	Verificato data 25/08/2022	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.l
Andrea Valmaggia

22 1668

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 S.p.A. via Sempione 7 - 28884 (VB), Italia
14
1608 CPR P166

EN10025-1:2004

S275J0 +AR

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*	:	Espressamente indicati nella DoP
Allungamento / *elongation*		*Espressed as indicated in the DoP*
Resilienza / *impact strength*		
Saldabilità / *weldability CEV*		

Durabilità / *durability:* NPD

02 N° 2022 DDT / PA/7809

FERRIERE BELLICINI S.r.l.

Stabilimento: Via Cav. Andrea Bellicini, 2/4
25040 Berzo Inferiore (Brescia)
Tel. +39 0364 301024 - Fax +39 0364 306398
E-mail info@ferrierebellicini.it

CERTIFICATO DI COLLAUDO (EN 10204 3,1)

CLIENTE: SIDERURGICA FERRO BULLONI SPA

Numero di certificato 2400687
Data di registrazione 25/06/2024

ANALISI CHIMICA																				
Nr. Colata	Diametro	Tipo	C	Mn	Si	P	S	Cr	Ni	Cu	Mo	N (ppm)	Ceq	Sezione mmq	Snervam. N/mmq	Resist. N/mmq	Allung.% A5%	Resilienza 20° C KV J	KV J	KV J
7727	120	S 275 JR	0,06	0,70	0,19	0,019	0,021	0,08	0,19	0,46	0,047	61	0,27	157,83	327	464	37,0			
65854	44	S 275 JR	0,10	0,73	0,24	0,040	0,027	0,14	0,18	0,35	0,040	89	0,30	159,80	320	459	37,0			
72747	18	S 275 JR	0,10	0,71	0,19	0,020	0,027	0,11	0,23	0,31	0,049	119	0,29	194,90	328	478	36,0			
72564	30Q	S 275 JR	0,10	0,75	0,20	0,029	0,029	0,09	0,23	0,40	0,053	104	0,30	330,32	302	458	37,0			
138505	20X8	S 275 JR	0,10	0,65	0,20	0,016	0,007	0,17	0,13	0,11	0,060	130	0,20	166,61	331	468	33,0			
S380	30X12	S 275 JR	0,10	0,75	0,19	0,020	0,021	0,10	0,20	0,16	0,040	99	0,23	960,47	329	457	36,0	139	142	137
73049	60X8	S 275 JR	0,10	0,79	0,21	0,015	0,020	0,10	0,22	0,12	0,060	116	0,24	280,68	344	455	37,0			
9003911	50X10	S 275 JR	0,17	0,72	0,23	0,035	0,014	0,00	0,02	0,01	0,000	45	0,29	485,10	318	476	34,0			

COPIA CONFORME ALL'ORIGINALE
CERTIFICATO VALIDO PER KG 417
FORNITO ALLA DITTA COES SM
CON NS. DDT DI CONSEGNA N° 7430 del 5/7/24
BRESCIA 5/7/24
p. SIDERURGICA FERRO BULLONI SPA

COES G.Q.	Ricezione data 05/07/2024	Sigla U.S.
	Verificato data 05/07/2024	Sigla U.S.

Allegato alla bolla 24000736 del 25/06/24.

Certifichiamo che il prodotto sopra elencato è conforme alla prescrizione dell'ordine in rispetto della norma: EN 10025-1-2, 10058 - 10060

Materiale fornito in barre di Qualità: S 275 JR

CE 0598

Materiale certificato CE prodotto con acciaio proveniente da forno ad arco elettrico, esente da radioattività, come garantito dalle acciaierie di provenienza

Resp. CQ: Lorenzo Silli

24 2124

AFV BELTRAME GROUP A04

Z04 CE 0398

complete CE Marking on next page

A06

A03 INSPECTION DOCUMENT N.: 472117
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 **S275J0+AR**

LOADING NUMBER: 764499 LOADING DATE: 27/08/2024 A08 INTERNAL ORDER: I 910235

IT.	B07 CAST	B01 SECTION	B09-B10-B11 DIMENSIONS mm	CE	LENGTH mt	C71→C82 C	Si	Mn	P	S	Cu	Cr	Ni	V	Mo	AlT	N	Ceq		
1	BE 223633	UPN	100X50X6	0398	6,00	0,11	0,15	0,58	0,031	0,015	0,44	0,19	0,14	0,004	0,02	0,003	0,0095	0,29		
1	BE 223642	UPN	100X50X6	0398	6,00	0,12	0,18	0,55	0,021	0,020	0,42	0,11	0,17	0,003	0,03	0,002	0,0099	0,28		
1	BE 223643	UPN	100X50X6	0398	6,00	0,11	0,17	0,56	0,033	0,018	0,53	0,21	0,18	0,003	0,03	0,003	0,0101	0,30		
2	BE 223743	UPN	100X50X6	0398	12,10	0,11	0,18	0,56	0,021	0,022	0,40	0,17	0,16	0,003	0,03	0,002	0,0097	0,28		
3	[redacted]																			
4	[redacted]																			

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.
1	BE 223633	VICENZA	EN 10279	2114376	1	2.309	325	449	31,7		79	98	93	90	0	5.0							
1	BE 223642	VICENZA	EN 10279	2114375	1	2.314	326	450	31,1		82	101	94	92	0	5.0							
1	BE 223643	VICENZA	EN 10279	6056270	1	2.306	295	419	37,8		103	103	100	102	0	5.0							
2	BE 223743	VICENZA	EN 10279	6056283	3	6.868	353	472	36,8		93	83	107	94	0	5.0							
3	[redacted]				3																		
4	[redacted]																						

Inspector | Factory: VICENZA | Z02 Date: 28/08/24 | A05 Quality Control Dept | Z02 Manufacturer's authorized inspection representative: Silvia Ghini

COES G.Q.	Ricezione data 05/09/2024	Sigla V.S.
	Verificato data 06/09/2024	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 348581 - 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

24 2443

AFV BELTRAME GROUP

CE
0398

MARCATURA DI CONFORMITA' CE
CE CONFORMITY MARKING

INSPECTION DOCUMENT N.: 472117

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	S275 J0+AR - EN 10025-2/2019 DOP N. AFV - 05_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 13254
FORNITO ALLA DITTA COESSIM
CON NS. DDT DI CONSEGNA N° 514124 del 514124
BRESCIA
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

Z01 We hereby certify that above mentioned materials have been delivered in accordance with the terms of order.
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C42 and C43 recalculated Impact test results respect to 10x10 standard section

AFV BELTRAME GROUP

DICHIARAZIONE DI PRESTAZIONE DECLARATION OF PERFORMANCE LEISTUNGSERKLÄRUNG	N. AFV - 05_08

1	Codice di identificazione unico del prodotto-tipo Unique identification code of the product-type Eindeutiger Kenncode des Produkttyps	S275J0 - 1.0143
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 für 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 Leistungsbeständigkeit	2+
6	Norma armonizzata Harmonised standard Harmonisierte Norm	EN 10025-1:2004
	Organismo notificato Notified body Notifizierte Stelle	Apave Italia CPM srl (0393) 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	
	(%)	≥ 23		≥ 22					
Resistenza a trazione Tensile strength Zugfestigkeit	spessore / thickness /dicke (mm)		< 3	≥ 3	≤ 100				
	(MPa)	430 - 580		410 - 560					
Carico unitario di snervamento Yield strength Streckgrenze	spessore / thickness /dicke (mm)		≤ 16	> 16	≤ 40	> 40	≤ 63		
	(MPa)	≥ 275		≥ 265		≥ 255			
Resilienza Impact strength Kerbschlagarbeit		≥ 27J (0°C)							
Saldabilità (composizione chimica) Weldability (chemical composition) Schweißeignung (chemische Zusammensetzung)	spessore / thickness /dicke (mm)		≤ 30	> 30	≤ 40	> 40	≤ 150		
	CEV (%)	≤ 0,40		≤ 0,40		≤ 0,42			
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. Für 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, 24/08/2020

+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: CML58189	**REV. 0**	**SHEET 1 OF 35**

CUSTOMER:	ROSETTI MARINO S.P.A.
PROJECT:	HOLLANDSE KIST NOORD WIND PARK PROJECT
OBJECT:	PSA N2 FILTER
SERIAL No.:	S240131-S240132
DRAWING:	CCO54049
COES JOB:	167/24

0	V. Girardello	C. Pilenga	01/10/2024	FIRST ISSUE
REV.	**ISSUED BY**	**CONTROLLED BY**	**DATE**	**DESCRIPTION**

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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 516 Gr.70	ARCELORMITTAL MEDITERANEE	730/0177224	730119028	23 2736
3	8	STUD-BOLT 5/8" UNC x 105	SA 320 Gr.L7	IPL SRL	2402793	BF4049	24 3111
4	16	NUT 5/8" UNC	SA 194 Gr.7	IPL SRL	2402468	68359	24 2460
7	1	FLANGE BLIND B16.5 4" 150# RF	SA 350 Gr. LF2 Cl.1	FAD SPA	7179/24	34903	24 2940
8	1	CAP 4" Sch.80	SA 420 WPL6	IRC SPA	7859	2C001	24 2892
9	1	ELBOW L.R. 90° 1" Sch. 160	SA 420 WPL6	IRC SPA	7859	187C043	24 2892
10	1	FLANGE W.N.4" Sch. 80 150# RF	SA 350 Gr. LF2 Cl.1	FAD SPA	7143/24	33961	24 2560
11	1	SPECIAL COUPLING FOR CARTRIDGE FILTER ARS-290-RB	S 355 J2	ORLANDI ACCIAI SPA	24000530060	283258	24 3188
12	32,528 mm	PIPE SMLSS 1 Sch.160	SA 333 Gr. 6	TUBOS REUNIDOS GROUP SLU	0000364390/2	131320	24 3875
13	350,000 mm	PIPE SMLSS 4 Sch.80	SA 333 Gr. 6	ARTROM STEEL TUBES SA	E4576	R62283	24 2479
14	1	PLATE 80x70 thk=8 - SUPPORT FILTER	SA 516 Gr.70	ARCELORMITTAL MEDITERRANEE	730/0292813	730315924	24 2463
15	1	HALF COUPLING 1/2" NPT-F 6000#	SA 350 Gr. LF2 Cl.1	TUROZZI F.LLI SRL	67589	L6974	24 2487
16	2	FLANGE W.N.1" Sch. 160 150# RF	SA 350 Gr. LF2 Cl.1	FAD SPA	7179/24	77435	24 2940
17	50,000 mm	PIPE SMLSS 1 Sch.160	SA 333 Gr. 6	TUBOS REUNIDOS GROUP SLU	0000364390/2	131320	24 3875

INSPECTION CERTIFICATE — NF EN 10204-3.1/DIN 50049-3.1.B/ISO 10474

N° 730/0177224 — Page 2 / FIN

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 (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. contrôlé / Control rolling
TM : Laminage thermomécanique / Thermo-mechanical forming
N : Normalisé / Normalizing
D : Détensionné / Stress relieving
O : 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	A06	210287 A07	GH2ASAM004 000160 A08	SA516G70-SA20/S5 ASME_SA516M-15 HOT ROLLED COIL, AS ROLLED CONE02309M4310000 B01 B02	LTC : LN B04

Traitement de référence (1) Treatment of test samples: BL — 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 Thicknes	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
5239073	730119028	001	1	4,000	1500,00		24148	1	T	P	PRISM	BL	20	454	578	27,9												

COES G.Q. — Ricezione data 13/10/2023 — Sigla — Verificato data 13/10/2023 — Sigla

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 730119028	C71 0,165	C72 1,408	C73 0,015	C74 0,002	C75 0,208	C76 0,032	C77 0,0001	C78 0,026	C79 0,019	C80 0,004	C81 0,004	C82 0,008	C83 0,020	C84 0,015	C85 0,002	C86	C87	C88	C89	C90 0,029	C91 0,068	C92	C96	C97		

Emplacement/Location(2): 1 Tête / Head, 2 Pied / Bottom, 3 1/2 longueur / Length — C01 — X:Divers / Mix

(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

(5)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

23-2736

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.

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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.

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21040 UBOLDO (VA)

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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

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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

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

INSPECTION CERTIFICATE NF EN 10204-3.1/DIN 50049-3.1.B/ISO 10474

N° 730/0292813 Page 2 / FIN

A02 A09/A03

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 / Normalisation rolling
A : Revenu / Tempering
TR : Trempé à l'eau / Water quenching
LTC : Laminé temp. contrôlée / Control rolling
TM : Laminage thermomécanique / Thermo-mechanical forming
N : Normalisé / Normalizing
D : Détensionné / Stress relieving
R : Adouci par recuit / Soft annealing

(1)

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: 230044 — A07

N° Commande Usine / Mill's Order Nbr: GH39SAM025 000010 — 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 (1): LTC : LN — B04

Traitement de référence / Treatment of test samples (1): BL,N — B05

Identification du produit / Product identification		Poste / Item	Nombre de pièces / Number of pieces	Dimensions / Sizes (mm)			Masse / Weight	Emplacement (2)	Traction / Tensile requirements										Emplacement (2)	Résilience / Impact testing							
Repère pièce / Plate number	Coulée / Heat			Epaisseur / Thickness	Largeur / Width	Longueur / Length	(kg) (7)	Loc	S (3)	Pos. Z(4)	Type	Réf Ref (8)	Temp.	Re05	Rm	A%				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	C62	C10		C03	C11	C12	C13	<-C14-C29		C80-C89->		C40	C02	C08	C62	<-	-C42-	->	C43
1904044	730315924	001	1	8,000	1500,00		26458	1	T	P	PRISM	BL	20	455	589	26,7				N	KV	T	- 51	P	34	60	94	63

COES SRL
VERIFIED IDENTICAL TO
SA 516 Ed. 2023
U.S.

COES G.Q.
Ricezione data 10/09/2024 Sigla U.S.
Verificato data 10/09/2024 Sigla 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	B07	B07 730315924	C71 0,174	C72 1,484	C73 0,016	C74 0,002	C75 0,230	C76 0,039	C77 0,0003	C78 0,025	C79 0,017	C80 0,004	C81 0,005	C82 0,008	C83 0,016	C84 0,018	C85 0,002	C86	C87	C88	C89	C90 0,029	C91 0,062	C92	C96	C97	
O/YCC																											

Emplacement/Location(2): 1 Tête / Head; 2 Pied / Bottom; 3 1/2 longueur / Length — C01
(3) Sens/Direction: L:Long / Longitudinal; T:Travers / Transverse; Z:Travers court / Through thick; X:Divers / Mix — 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.Math.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 11/09/23
Agent / Receiving Agent
F. SIXDENIERS Z02

255

24 2463

CTA Group

Customer	COES SRL		
PO. No.:	2263/24	Item:	
N. Pro.:			Date:
C. Code:			
Cta's Job:	24OC0003184	Date: 09/07/2024	Heat No.: R62283
Kg:	404	Mt.: 18,18	Pcs No.: 3

COD QC-3.1-ED.3 REV. 1/2023

ARTROM STEEL TUBES S.A.

Draganesti Str. 30, Slatina, jud. OLT, Romania 230119
Tel: +40 (249) 436862, 434640, 434641 Fax: +40 (249) 434330, 437288
E-mail: office.slatina@artrom.com www.artrom.com
EUID: ROONRC.J28/9/1991; J28/9/31.01.1991 VAT No. RO 1510210/199
Subscribed and Paid Share Capital: 291.587.538,34 lei

Digitally signed by ARTROM STEEL TUBES SA
This document is certified to be electronically controlled and approved.
Signature requested by Maria Carmen Ivancea on 2024-03-19 10:28:14.072+02:00
The original electronic document can pe retrieved by scanning the QR code in the left.

INSPECTION CERTIFICATE - EN 10204: 2004 (3.1)

No.: E4576 **Date: 12.03.2024** Page 1/2	**Manufacturer's mark:**	**Customer order no.:** **LS-0000003**	**PL: 11337**

CUSTOMER: Commerciale Tubi Acciaio S.P.A.

Specifications: ASTM A333: 18; ASME A333-21; ASME B36.10M:18; ASME Section II part A:21; ASME Section II part D, TAB.Y1-19; PED 2014/68/EU (Appendix 1, par. 4.3); Spec. MPD-02-PS-GS Rev. 1	**Dimensions: 114.3 x 8.56 x 5 500 to 6 100 mm** **Steel: Gr. 6**

Description: Hot rolled seamless steel pipes with bevelled ends ASME B16.25; clear lacquered; marking by painting at one end: ARTROM, standard, dimension, steel grade, 22.32 Kg/m, LENGTH (m), 19.0 MPa/NDE, HF, SMLS, 4" XS SCH.80, LT-45, heat no., LOT, mill inspector no. 5, technical control sign; marking at one end: heat no.

Heat no.: R62283	Lot no.: 542712		Steel melt and rolled in ROMANIA
Quantity	Pcs	Length m	Weight kg
	32	193.92	4330

Ladle Chemical Analyse (%)

C	Mn	S	P	Si	Ni	Cr	Mo	Cu	Al	Nb	Ti	N	V	B	Ca
0.19	1.07	0.004	0.014	0.21	0.09	0.08	0.02	0.22	0.023	0.001	0.001	0.009	0.002	0.0005	0.002

V+Nb+Ti+Cu+Mo+Cr: 0.324 CEIIW=0.409

Product Chemical Analyse (%)

C	Mn	S	P	Si	Ni	Cr	Mo	Cu	Al	Nb	Ti	V	B	Ca
0.19	1.09	0.007	0.013	0.21	0.08	0.08	0.02	0.21	0.023	0.001	0.002	0.002	0.0005	0.002
0.18	1.08	0.006	0.012	0.20	0.08	0.08	0.02	0.21	0.023	0.001	0.002	0.002	0.0005	0.002

CEIIW= 1. 0.411 / 2. 0.399

Mechanical Properties

Heat treatment: normalized at a temperature of 900°C, 14 min, cooled in still air Hydraulic test pressure (ASTM A999): 19.0 MPa for 5 sec.: OK Test Eddy Current acc. ASTM E309:2016/EN ISO 10893:1-2011/A1-2020: OK Flattening test (ASTM A999): OK	Charpy V–Notch (ASTM A370) KV/Longitudinal 6.67 x 10 [mm] 49 (47; 43; 56) J (-55°C) 54 (53; 58; 50) J (-50°C)	Melting process: electric arc furnace, fully killed Fine grain Hardness HBW: 150 – 153 Hardness HRC (acc. to NACE MR0175/ISO15156:2022 / NACE MR0103/ISO 17945:2015) Residual magnetism: max. 20 Gauss: OK

Hot yield strength at 343°C: 277 MPa (Strip longitudinal 5.10 x 8.80 = 44.90 mm²)
Hot yield strength at 538°C: 198 MPa (Strip longitudinal 5.40 x 8.75 = 47.27 mm²)

Visual inspection and dimensional check: OK
NO WELD REPAIR ON HEREBY CERTIFIED TUBES
The manufacturer of pipes is certified in acc. with ISO 9001: 2015, ISO 14001:2015 and ISO 45001:2018
THE PRODUCTS DELIVERED ARE CONTROLLED ON RADIOACTIVITY RESPECTIVELY ARE FREE FROM ADDITIONAL IONIC RADIATION AND MERCURY
The material "not contain intentional additions of elements such as lead, selenium, or sulphur to improve machinability"
Steel grade was treated with calcium for the shape control of micro inclusions.
La société ARTROM STEEL TUBES garantit que tous le produits, object cu Certificat susdit, respectent en leur Totalité les Specifications de l'article 15 de l'Arrete Ministériel du 24 Mars 1978 modifié. C max 0.25%, P max 0.05%, S max 0.05%, Rm (N/mm2) max700, A(Lo=5.65√So) min.16% long, Rm(A-2) min 10500, E max0.9, A (Lo=5.65√So) min14%trans, RA min 1050

Additional remarks: The requirements are fulfilled as per Annex 1 – Test results

Our tubes are rolled from steel with low carbon footprint, carefully melted in our own Romanian facilities only by recycling the ferrous scrap.

CHIEF OF QC & TESTING OF THE METALLURGICAL TUBES PRODUCTS
Dipl. Eng. Silviu Barbulescu

MILL INSPECTOR
Eng. Constantin Lupu

COES SRL
VERIFIED IDENTICAL TO
SA 333 Ed. 2023
U.S.

This MTC is digitally signed and sealed by ARTROM STEEL TUBES S.A. IT system. To check its authenticity and integrity, please scan the QR code to download the original electronic document from our site. If you already received an electronic copy from your supplier, please make sure that the file is digitally signed by ARTROM STEEL TUBES S.A. Falsification of this document is punishable under the legal provisions and entitles us to claim damages.

THIS IS FOR CERTIFY THAT THE MATERIAL HEREIN DESCRIBED HAS BEEN MANUFACTURED WITH THE ORDERED SPECIFICATION AND THAT INFORMATION IS CORRECT, THEY MEET THE SPECIFICATION'S REQUIREMENTS AND ARE RECORDS IN OUR COMPANY DOCUMENTS.

COES G.Q.	Ricezione data 04/09/2024	Sigla U.S.
	Verificato data 4/09/2024	Sigla U.S.

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Group

Customer	COES SRL				
PO. No.:	2263/24	Item:			
N. Pro.:				Date:	
C. Code:					
Cta's Job:	24OC0003184	Date:	09/07/2024	Heat No.:	R62283
Kg:	404	Mt.:	18,18	Pcs No.:	3

COD QC-3.1-ED.3 REV. 1/2023

ARTROM STEEL TUBES S.A.

Draganesti Str. 30, Slatina, jud. OLT, Romania 230119
Tel: +40 (249) 436862, 434640, 434641 Fax: +40 (249) 434330, 437288
E-mail: office.slatina@artrom.com www.artrom.com
EUID: ROONRC.J28/9/1991; J28/9/31.01.1991 VAT No. RO 1510210/1992
Subscribed and Paid Share Capital: 291.587.538,34 lei

No: E4576
Part 2
Annex:1; Page no.: 2/2

Test Results Mechanical Properties

TENSILE TEST (ASTM A370) - at room temperature - Test Specimen / Strip–longitudinal	Rp0.2 MPa	Rm MPa	Elongation %	Rp0.2/ Rm
Dimension – Specimen (mm): 1. 25.25 x 8.80 / 2. 25.35 x 8.80	1. 367	529	33	0.69
Section – Specimen (mm^2): 1. 224.34 / 2. 225.24				
Length – Specimen (Lo) (mm): 1. 50.8 / 2. 50.8	2. 372	526	32	0.71

CHIEF OF QC & TESTING OF THE METALLURGICAL TUBES PRODUCTS
Dipl. Eng. Silviu Barbulescu

MILL INSPECTOR
Eng. Constantin Lupu

THIS IS FOR CERTIFY THAT THE MATERIAL HEREIN DESCRIBED HAS BEEN MANUFACTURED WITH THE ORDERED SPECIFICATION AND THAT INFORMATION IS CORRECT, THEY MEET THE SPECIFICATION'S REQUIREMENTS AND ARE RECORDS IN OUR COMPANY DOCUMENTS.

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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
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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. 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
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*	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

24 2560

CERTIFICATO PROVE MATERIALI N.7143/24 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 11/09/2024
COMMESSA / Mill order / Comf. de commande / Komm 2415031
ORDINE / Order / Commande / Auftrag 2583/24
D.D.T. / Delivery note / Bulletin de livraison / Lieferschein 7.143

CODICE / Line code / Code / Kode	COLATA / Heat / Coulè / Schmelze	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
	5022523 √	venete	F.FLG.ASME B16.5 A/SA350LF2-1 BL √ 150 3" √ . RF √	20	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 %
0,161	0,977	0,014	0,002	0,230	0,084	0,170	0,033	0,001	0,299	0,004	0,000	0,001	0,029	0,011	0,379

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,006	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
526,0	340,0	34,0	69,0	158 158	10/10 KV -50°C 71 70 66 J	A	A	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
	265416 √	ABS	F.FLG.ASME B16.5 A/SA350LF2-1 BL √ 150 6" √ . RF √	30	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 %
0,183	1,190	0,011	0,003	0,170	0,070	0,070	0,020	0,003	0,120	0,002	0,006	0,006	0,020	0,007	0,413

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,001	0,000	0,000	0,000	0,001	0,004	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
499,0	323,0	33,0	69,1	147 152	10/10 KV -50°C 41 33 39 J	A	A	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
	278513 √	abs	F.FLG.ASME B16.5 A/SA350LF2-1 WN √ 150 3" √ S.XS RF √	50	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 %
0,181	1,080	0,012	0,002	0,240	0,170	0,120	0,030	0,003	0,160	0,002	0,000	0,003	0,030	0,009	0,420

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,001	0,000	0,000	0,000	0,001	0,004	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
500,0	320,0	55,0	65,0	148 148	10/10 KV -50°C 64 67 69 J	A	A	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
	33961 √	RIVA	F.FLG.ASME B16.5 A/SA350LF2-1 WN √ 150 4" √ S.XS RF √	60	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 %
0,180	0,920	0,009	0,004	0,210	0,170	0,060	0,001	0,008	0,170	0,001	0,009	0,001	0,025	0,009	0,380

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
518,0	332,0	35,0	62,0	152 152	10/10 KV -50°C 60 55 50 J	A	A	X	X

COES G.Q.
Ricezione data 11/09/2024 Sigla U.S.
Verificato data 13/09/2024 Sigla U.S.

COES SRL
VERIFIED IDENTICAL TO
SA 350 Ed. 2023
U.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 / 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.

-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 Barbieri		

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.7143/24

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 11/09/2024
COMMESSA / Mill order / Comf. de commande / Komm 2415031
ORDINE / Order / Commande / Auftrag 2583/24
D.D.T. / Delivery note / Bulletin de livraison / Lieferschein 7.143

CODICE Line code Code Kode	COLATA Heat Coulè Schmelze	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
	79257 √	RIVA	F.FLG.ASME B16.5 A/SA350LF2-1 BL √ 150 1" √ . RF √	80	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
0,180	0,880	0,011	0,010	0,190	0,140	0,080	0,020	0,022	0,190	0,001	0,011	0,017	0,022	0,010	0,380	
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 Durete Harte	Impact test Resilience Kerbschlagzähigkeit	1	2	3	4
518,0	322,0	34,0	62,0	157 159	10/10 KV -50°C 60 55 56 J	A	A	X	X

CODICE Line code Code Kode	COLATA Heat Coulè Schmelze	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
	295604 √	VENETE-265604	F.FLG.ASME B16.5 A/SA350LF2-1 WN √ 150 2" √ S.160 RF √	90	3

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
0,166	0,974	0,010	0,004	0,221	0,075	0,138	0,031	0,000	0,218	0,001	0,000	0,008	0,024	0,008	0,375	
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 Durete Harte	Impact test Resilience Kerbschlagzähigkeit	1	2	3	4
520,0	330,0	32,0	66,0	152 154	10/10 KV -50°C 56 55 61 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

(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 / 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.

- 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
Vivian Bonfanti		

24 2892

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

Document no.	7859
Date	16/09/2024
Page	1 / 1
Job order	7859
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

COPIA CONFORME ALL'ORIGINALE

	Item	Quantity	Heat id.
1	CURVA 2" SCH 160 90° LR WPL6	4,00	15L6556
3	TEE 2" SCH 160 WPL6	1,00	J6L8102
4	FONDELLO 4" XS WPL6	2,00	2C001
5	CURVA 1" SCH 160 90° LR WPL6	2,00	187C043
6	CURVA 1" XS 90° LR WPL6	7,00	20673514
7	CURVA 2" XS 90° LR WPL6	2,00	J0L7163
8	R.C. 2" x 1" XS WPL6	1,00	J2K8111
9	TEE 1" XS WPL6	7,00	02-J6L8102
10	TEE 2" XS WPL6	2,00	1095440
11	CURVA 8" STD 90° LR WPB/P265GH	12,00	527632
12	CURVA 5" STD 90° SR WPB/P265GH	12,00	031-843031
13	CURVA 5" STD 45° SR WPB/P265GH	12,00	454151
14	CURVA 6" STD 45° LR WPB/P265GH	8,00	509764

COES G.Q.	Ricezione data 18/09/2024	Sigla U.S.
	Verificato data 01/10/2024	Sigla U.S.

IL PRESENTE CERTIFICATO E' VALIDO PER
CLIENTE ..... COES .....
ORDINE N° ..... 2607/24 DEL .....
N° ..... C.S. ..... MT ..... KG .....
FERR. IND. BONACINA S.r.l. IL 23-09-2024

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

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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 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 Certificate
EN 10204-2004 3.1

Document no. 7859-P4
Purchaser 030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order 36

	Item	Quantity	Heat id.
4	FONDELLO 4" XS WPL6 √	2,00	2C001 √

Specification ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6 √
Method of Fabrication HOT FORMED BTW 780° - 980° C, COOLED IN STILL AIR
Heat Treatment NORMALIZED AT 920°C [1 MIN / MM; 30 MINUTES MINIMUM] AND COOLING IN STILL AIR
Type of construction SEAMLESS MANUFACTURED FROM PLATE (FULLY KILLED STEEL AND FINE GRAIN PRACTICE)
Manufacture standard ASME B16.9 - 2018 / ASME B16.25 - 2018 FIG.2A/3A (AS APPLICABLE)

COPIA CONFORME ALL'ORIGINALE

Ladle Analysis

C%	Mn%	Si%	P%	S%	Ni%	Cr%	Mo%	Cu%	V%	Al%	Ti%	Nb%	B%
0,180	0,980	0,260	0,015	0,005	0,010	0,020	0,001	0,001	0,001	0,029	0,0010	0,0001	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	330	512	30

Impact Test

Direction L **Test Temperature** -46 °C **Test Type** KV

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
7.5 X 10	0,6	Base Mat.	80	98	106	95

Hardness Test

Base Metal **Avg** 146 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)

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IRC SPA
FITTING CONNECTIONS
Quality Management System Certified Company

TÜV SÜD ISO 9001

Inspection Certificate
EN 10204-2004 3.1

Document no.	7859-P5
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

	Item	Quantity	Heat id.
5	CURVA 1" SCH 160 90° LR WPL6 √	2,00	187C043 √

Specification	ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6 √
Method of Fabrication	HOT FORMED BTW 780° - 980° C, COOLED IN STILL AIR
Heat Treatment	NORMALIZING AT 920°C [1 MIN / MM, 30 MINUTES MIN] AND COOLING IN STILL AIR
Type of construction	SEAMLESS MANUFACTURED FROM PIPE
Manufacture standard	ASME B16.9 - 2018 / ASME B16.25 - 2018 FIG.2A/3A (AS APPLICABLE)

COPIA CONFORME AI L'ORIGINALE

Ladle Analysis

C%	Mn%	Si%	P%	S%	Ni%	Cr%	Mo%	Cu%	V%	Nb%
0,180	0,670	0,250	0,017	0,007	0,065	0,068	0,030	0,041	0,009	0,0070

CE_{IIW} 0,32

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	308	479	32

Impact Test

Direction L Test Temperature -46 °C Test Type KV

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
5 X 10	0,4	Base Mat.	47	51	46	48

Hardness Test

Base Metal Avg 135 HBW
133 - 137

NACE MR0175/ISO15156-2:2015 A.2 / NACE MR0103/ISO17945:2015, 13.1 & 15
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FITTING CONNECTIONS
Quality Management System Certified Company

TÜV SÜD ISO 9001

Inspection Certificate
EN 10204-2004 3.1

Document no.	7859-P6
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

	Item	Quantity	Heat id.
6	CURVA 1" XS 90° LR WPL6 √	7,00	20673514 √

Specification	ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6 √
Method of Fabrication	HOT FORMED BTW 780° - 980° C, COOLED IN STILL AIR
Heat Treatment	NORMALIZED AT 920°C [1 MIN / MM; 30 MINUTES MINIMUM] AND COOLING IN STILL AIR
Type of construction	SEAMLESS MANUFACTURED FROM PIPE
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%	Nb%
0,130	0,950	0,220	0,011	0,004	0,130	0,150	0,020	0,120	0,020	0,0100

CE_{IIW} 0,34

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	319	504	33

Impact Test

Direction L Test Temperature -46 °C Test Type KV

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
2.5 X 10	0,2	Base Mat.	38	41	39	39

COPIA CONFORME
ALL'ORIGINALE

Hardness Test

Base Metal Avg 133 HBW
132 - 134

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.
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FITTING CONNECTIONS
Quality Management System Certified Company

TÜV SÜD ISO 9001

Inspection Certificate
EN 10204-2004 3.1

Document no.	7859-P7
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

	Item	Quantity	Heat id.
7	CURVA 2" XS 90° LR WPL6	2,00	J0L7163

Specification	ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6
Method of Fabrication	HOT FORMED BTW 780° - 980° C, COOLED IN STILL AIR
Heat Treatment	NORMALIZED AT 920°C [1 MIN / MM; 30 MINUTES MINIMUM] AND COOLING IN STILL 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%	Nb%
0,110	1,280	0,230	0,014	0,004	0,020	0,110	0,010	0,020	0	0

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	311	515	32

Impact Test

Direction L Test Temperature -46 °C Test Type KV

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
2.5 X 10	0,2	Base Mat.	37	39	37	38

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AL L'ORIGINALE

Hardness Test

Base Metal Avg 133 HBW

NACE MR0175/ISO15156-2:2015 A.2 / NACE MR0103/ISO17945:2015, 13.1 & 15
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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.	7859-P8
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

	Item	Quantity	Heat id.
8	R.C. 2" x 1" XS WPL6 √	1,00	J2K8111 √

Specification	ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6 √
Method of Fabrication	HOT FORMED BTW 780° - 980° C, COOLED IN STILL AIR
Heat Treatment	NORMALIZED AT 920°C [1 MIN / MM; 30 MINUTES MINIMUM] AND COOLING IN STILL 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%	Ti%	Nb%	B%
0,110	1,280	0,270	0,014	0,001	0,020	0,120	0,010	0,010	0	0,0100	0	0,0001

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	310	469	31

Impact Test

Direction L Test Temperature -46 °C Test Type KV

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
2.5 X 10	0,2	Base Mat.	39	35	37	37

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Hardness Test

Base Metal Avg 134 HBW
131 - 137

NACE MR0175/ISO15156-2:2015 A.2 / NACE MR0103/ISO17945:2015, 13.1 & 15 - Marking: Manufacturer / Size / Wall thickness / Material / Heat Id.
Visual and dimensional check with satisfactory result
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)

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FITTING CONNECTIONS
Quality Management System Certified Company

TÜV SÜD ISO 9001

Inspection Certificate
EN 10204-2004 3.1

Document no.	7859-P9
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

	Item	Quantity	Heat id.
9	TEE 1" XS WPL6	7,00	02-J6L8102

Specification	ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6
Method of Fabrication	TEE COLD FORMED, THEN HEAT TREATED AND MAGNETIC PARTICLE EXAMINATED ACCORDING ASTM E709
Heat Treatment	NORMALIZED AT 920°C [1 MIN / MM; 30 MINUTES MINIMUM] AND COOLING IN STILL 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%	Ti%	Nb%	B%
0,110	1,300	0,240	0,015	0,002	0,030	0,120	0,020	0,010	0	0,0100	0	0,0002

CE_{IIW} 0,36

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	337	487	43

Impact Test

Direction L Test Temperature -46 °C Test Type KV

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
2.5 X 10	0,2	Base Mat.	43	51	56	50

COPIA CONFORME
AL L'ORIGINALE

Hardness Test

Base Metal Avg 138 HBW

NACE MR0175/ISO15156-2:2015 A.2 / NACE MR0103/ISO17945:2015, 13.1 & 15
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IRC SPA
FITTING CONNECTIONS
Quality Management System Certified Company

TÜV SÜD ISO 9001

Inspection Certificate
EN 10204-2004 3.1

Document no.	7859-P10
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

	Item	Quantity	Heat id.
10	TEE 2" XS WPL6	2,00	1095440

Specification	ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6
Method of Fabrication	TEE COLD FORMED, THEN HEAT TREATED AND MAGNETIC PARTICLE EXAMINATED ACCORDING ASTM E709
Heat Treatment	NORMALIZED AT 920°C [1 MIN / MM; 30 MINUTES MINIMUM] AND COOLING IN STILL 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%	Nb%
0,160	1,090	0,260	0,017	0,005	0,020	0,020	0,010	0,010	0,020	0,010	0,0030

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	328	531	33

Impact Test

Direction L Test Temperature -46 °C Test Type ISO-V

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
2.5 X 10	0,2	Base Mat.	53	51	46	50

COPIA CONFORME AL L'ORIGINALE

Hardness Test

Base Metal Avg 135 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.
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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

DATA / Date - Date - Datum 12/09/2024
COMMESSA / Mill order / Comf. de commande / Komm 2415198
ORDINE / Order / Commande / Auftrag 2633/24
D.D.T. / Delivery note / Bulletin de livraison / Lieferschein 7.179

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
	34903 √	riva	F.FLG.ASME B16.5 A/SA350LF2-1 BL √ 150 4" √ . RF √	10	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 %
0,170	0,990	0,011	0,005	0,220	0,170	0,050	0,020	0,006	0,140	0,001	0,010	0,002	0,028	0,011	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 Kerbschkagzähigkeit	1	2	3	4
518,0	307,0	35,0	67,0	156 156	10/10 KV -50°C 51 55 59 J	A	A	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
	77435 √	RIVA	F.FLG.ASME B16.5 A/SA350LF2-1 WN √ 150 1" √ S.160 RF √	20	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 %
0,195	0,960	0,010	0,010	0,190	0,080	0,060	0,010	0,015	0,200	0,001	0,000	0,020	0,020	0,010	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 Kerbschkagzähigkeit	1	2	3	4
528,0	321,0	36,0	70,0	160 163	10/10 KV -50°C 72 77 65 J	A	A	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
	77780 √	RIVA	F.FLG.ASME B16.5 A/SA350LF2-1 WN √ 150 1" √ S.XS RF √	30	20

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 %
0,150	0,950	0,011	0,005	0,200	0,140	0,060	0,020	0,006	0,160	0,002	0,010	0,002	0,026	0,000	0,360

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %	%	%	%
0,000	0,002	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
521,0	319,0	35,0	66,0	158 158	10/10 KV -50°C 55 50 47 J	A	A	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
	75485 √	RIVA-75845	F.FLG.ASME B16.5 A/SA350LF2-1 WN √ 150 2" √ S.XS RF √	40	5

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 %
0,145	0,960	0,012	0,005	0,190	0,150	0,060	0,020	0,003	0,160	0,001	0,009	0,002	0,020	0,006	0,350

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
490,0	314,0	34,0	60,0	151 154	10/10 KV -50°C 60 57 58.5 J	A	A	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 105 Ed. 2023
V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 350 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.

(3) X - CERTIFICATO SECONDO ASME SA II ED.: 21 AD.:

(5) $CE = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$

COMMESSA / Mill order / Comf. de commande / Komm 2415198
ORDINE / Order / Commande / Auftrag 2633/24
D.D.T. / Delivery note / Bullettin de livraison / Lieferschein 7.179

CODICE Line code Code Kode	COLATA Heat Coulé Schmelze	CERTIFICATO ORIGINE Certificate of origin Certificat d'usine Werkszzugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description Norme / Matériél / Description Standard / Werkstoff / Gegenstand	POS.ORD. Item order Pos. de comm. Auftragstabe	QUANTITA Quantity Quantité Stuckzahl
	79257 ✓	RIVA	F.FLG.ASME B16.5 A/SA350LF2-1 BL ✓ 150 1" ✓ . RF ✓	50	10

P.5

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	0,880	0,011	0,010	0,190	0,140	0,080	0,020	0,022	0,190	0,001	0,011	0,017	0,022	0,010	0,380

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 Duretè Harte	Impact test Resilience Kerbschlagzähigkeit	(1)	(2)	(3)	(4)
518,0	322,0	34,0	62,0	157 159	10/10 KV -50°C 60 55 56 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

(1) PRODUZIONE ACCIAIO / Steel production / Production aciér / 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.

(3) X - CERTIFICATO SECONDO ASME SA II ED.: 21 AD.: ____

(5) $CE = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$

X NACE MR 01-75 ED.: 15

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, 09-10-24 **Our Ref.** DDT 3621 / OC 1787 **of** 09-10-24 **Your Ref.** 2675/24 03-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402793

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 10 - 167/24	40,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	835781	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

COES G.Q.	Ricezione data 09/10/2024	Sigla U.S.
	Verificato data 09/10/2024	Sigla U.S.

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.
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 3111

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, 09-10-24 **Our Ref.** DDT 3621 / OC 1787 **of** 09-10-24 **Your Ref.** 2675/24 03-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402793

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5739L7010030B	H.H. SCREW UNI 5739/ISO4017/DIN933 - A/SA320 L7 M 10 x 30 ZINC. PLATED 110 - 167/24	10,00	quenched and tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	623664	BB7052*

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	1026	860	19,2	57,3	312	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	0,820	0,240	0,010	0,0240	1,090	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: 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, 09-10-24 **Our Ref.** DDT 3621 / OC 1787 **of** 09-10-24 **Your Ref.** 2675/24 03-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402793

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPL7058105B	STUD BOLT ANSI B1.1 CL.2A - A/SA320 L7 D. 5/8" - 11UNC x 105 ZINC PLATED ✓ 100 - 167/24	20,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	835783	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

ORLANDI ACCIAI S. p. A.
25125 BRESCIA - Via A. Grandi 28 (Z.I.)
Tel. 030358591 1 r.a. - Fax 0303581888

Cap.Soc. € 516.400,00 inter.versato
Reg.imprese di BS N. 13995
R.E.A. di BS N.200747 - M BS004280
Codice Fiscale 01910310158
Partita Iva 00915440176
Cod. identif. CEE: IT 00915440176

www.orlandiacciai.it info@orlandiacciai.it

GRUPPO ORLANDI

ORLANDI ACCIAI S.P.A. FILIALE 33050 - GONARS (UD) Via Friuli 1

CERTIFICATO /CERTIFICATE N.	DEL /OF
24000530060	08/01/2024
SECONDO /ACCORDING TO UNI EN 10204 : 2005 (3.1)	

D.D.T. /CODE	DEL / OF	NR. Ordine
B000053	08/01/2024	OB2314382

Spett.le 023100
F.LLI ARDENGHI S.R.L.
VIA BETTY AMBIVERI, 25
24126 BERGAMO BG

Certificato conforme all'originale n° **531652** Archiviato presso la nostra sede

CODICE / CODE	PRODOTTO - DIMENSIONE - STATO FORNITURA/PRODUCT - SHAPE- DELIVERY STA	COLATA / HEAT	PESO / WEIGHT
043504001	LAM. S355J2 TONDO 40 EN10025-2	283258	31,00

ANALISI CHIMICA / CHEMICAL COMPOSITION %

C	Mn	Si	P	S	Cr	Ni	Mo	Cu	Sn
0,140	1,271	0,230	0,013	0,005	0,215	0,203	0,039	0,283	0,012
Al	V	Pb	B	Ti	Ca	Bi	Te	Nb	
0,029	0,029			0,009				0,012	

CARATTERISTICHE MECCANICHE / MECHANICAL TEST

TRATTAMENTO TERMICO / HEAT TREATMENT	Rm (N/mm2)	Re (N/mm2)	A (%)	Z (%)	Temp	KV	(j)	HB SU PRODOTTO
SU PRODOTTO / OF PRODUCT	536,00	382,00	29,00		-20°C	67 70	66	

TEMPRABILITA' JOMINY /JOMINI TEST

mm	1,5	3	5	7	9	11	13	15	20	25	30	35	40	45	50
HRC															

ALTRE PROVE / OTHER TESTS

MICROPUREZZA / MICROCLEARNESS	CONTROLLI NON DISTRUTTIVI / NON DESTRUCTIVE TEST
METODO / GRAIN SIZE	DIFETTI SUPERFICIALI / SURFACE DEFECT INSPECTION
	DIFETTI INTERNI / INTERNAL DEFECT INSPECTION
GRANO /GRAIN SIZE	**ANTIMESCOLAMENTO**

NOTE / REMARKS

VS.RIF.ORD. 2104 DEL 15/12/2023

COES G.Q.	Ricezione data 03/01/2024	Sigla V.S.
	Verificato data 15/1/2024	Sigla V.S.

SERVIZIO ASSICURAZIONE QUALITA'
Vittorio Angelini

24 3875

Group

Customer COES SRL
PO. No.: 3917/24 n comm 34/24+493/24 Item: Date:
N. Pro.:
C. Code:
Cta's Job: 24OC0005964 Date: 02/12/2024 Heat No.: 131320
Kg: 29 Mt.: 6,77 Pcs No.: 1

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 0000364390/2 Rev. 000

CLIENTE: CUSTOMER	COMMERCIALE TUBI ACCIAIO SPA	PEDIDO / PARTIDA: P.ORDER / ITEM	SM30095/OS0000085 5.
PRODUCTO: ARTICLE	TUBERÍA SIN SOLDADURA LAMINADA EN CALIENTE HOT FINISHED SEAMLESS TUBES	CLI. MATERIAL: CLIENT MATERIAL	00330635GS1B1
EXTREMOS: ENDS	LISOS A ESCUADRA SQUARE CUT PLAIN END	REF. FABRICA: WORK ORDER	300022812 000050
NORMA / GRADO: API. STANDARD AND GRADE	ASTM A333/A333M-18 /ASME II SA-333/SA-333M 2021 GR. 6 FINE GRAIN PRACTICE	PROTECCIÓN SUPERF: EXT. COATING	LACA EXTERIOR EXTERNALLY DRY LACQUERED
		DIMENSIONAL STD:	ANSI/ASME B36.10M
ESPEC. ADICIONALES: ADITIONAL SPECS	MPD-02-PS-GS REV. 2 NACE MR0175 2021/ISO15156 2020 NACE MR0103/ISO 17945 ED. 2015 ASME II.PART D.TABLE Y1 PED 2014/68/EU	PROCESO FUSION: MELTING PROCESS	HORNO ELECTRICO ACERO TOTALMENTE CALMADO ELECTRIC FURNACE / FULLY KILLED
FAB. DE PALANQUILLA: BILLETS MANUFACTURE	COLADA CONTINUA CONTINUOUS CASTING		
DIMENSIONES: DIMENSIONS	1" NB X SCH 160 X 5-7 M.		
MARCAS: MARKING	ESTAMPADO: DIE STAMPING	HN (HEAT)	
	PINTADO: STENCILLED	TUBOS ASTM/ASME A/SA 333 GR. 6 1 " NPS SCH 160 HFS LT -50 C SCH 160 HN (HEAT)	
	CODIGO COLOR COLOUR CODE		
EST. SUMINISTRO: SUPPLYING COND	NORMALIZADO. ENFRIADO AL AIRE / NORMALIZED. COOLED IN STILL AIR 910 °C 10 MIN		

DESCRIPCION SUMINISTRO / DESCRIPTION OF DELIVERY

ITEM FAB. TR ITEM	ITEM CLI. CLIENTS ITEM	LONG.INDIV (M) INDIVIDUAL LENGTH	COLADA CAST NR	Nº TUBOS QUANTITY	LONG. TOTAL (M) LENGTH	PESO(KG) WEIGHT
000050	5.	5,000 - 7,000	131320	140	942,360	4.015
TOTAL				140	942,360	4.015

Albaran/Delivery note/Lieferschein/ Bon de livraison 80402069

GOODS RECEIVED WITH PROPER QUALITY AND QUANTITY 26/1/24

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 02.01.2024

CONTROL DE CALIDAD DE TUBOS REUNIDOS GROUP
Mill: TUBOS
TUBOS REUNIDOS GROUP (QUALITY CONTROL)
Borja Eguzabal

COES G.Q. | Ricezione data 16/12/2024 | Sigla V.S. | Verificato data 16/12/2024 | Sigla V.S.

COES SRL VERIFIED IDENTICAL TO SA 333 Ed. 2023 V.S.

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Group

Customer	COES SRL		
PO. No.:	3917/24 n comm 34/24+493/24	Item:	
N. Pro.:			Date:
C. Code:			
Cta's Job:	24OC0005964	Date: 02/12/2024	Heat No.: 131320
Kg:	29	Mt.: 6,77	Pcs No.: 1

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 0000364390/2 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%	2.500,0 PSI 5 SEC.	O.K.
CORRIENTES INDUCIDAS/ EDDY CURRENTS	100%	ASTM E 309 N12.5/DRILL HOLE	O.K.
MAGNETISMO RESIDUAL/ RESIDUAL MAGNETISM		MAX 20,0 GAUSS	O.K.

ENSAYOS TECNOLÓGICOS Y METALÚRGICOS / TECHNOLOGICAL AND METALLURGICAL TEST

APLASTADO /FLATTENING: AC/ A/SA333 -OK

ANALISIS DE COLADA / CAST ANALYSYS

	C	Mn	Si	P	S	Cr	Ni	Mo	Cu	V	Al	Ti	Nb	B	C.E.
MIN.		0,29	0,10												
MAX.	0,18	1,30	0,30	0,025	0,0100	0,300		0,1200	0,4000	0,0500	0,0400	0,0200	0,0200	0,0005	0,42
131320	0,0930	1,06	0,22	0,007	0,0022	0,080	0,080	0,0400	0,2300	0,0050	0,0230	0,0020	0,0050	0,0005	0,32

ANALISIS DE PRODUCTO / PRODUCT ANALYSIS

	C	Mn	Si	P	S	Cr	Ni	Mo	Cu	V	Al	Ti	Nb	B	C.E.
MIN.		0,29	0,10												
MAX.	0,18	1,30	0,30	0,025	0,0100	0,300		0,1200	0,4000	0,0500	0,0400	0,0200	0,0200	0,0005	0,42
131320	0,0930	1,04	0,21	0,007	0,0010	0,080	0,080	0,0300	0,2300	0,0050	0,0230	0,0020	0,0020	0,0005	0,31
131320	0,0950	1,03	0,21	0,007	0,0012	0,080	0,080	0,0300	0,2300	0,0040	0,0210	0,0020	0,0010	0,0005	0,31

FORMULAS

	(01)	(02)
MIN.		
MAX	0,600	0,220
131320	0,349	0,170
131320	0,347	0,170

(01)
(02)

26/1/24

AMURRIO 02.01.2024

CONTROL DE CALIDAD DE TUBOS REUNIDOS GROUP
Mill: TUBOS
TUBOS REUNIDOS GROUP (QUALITY CONTROL)
Borja Eguzabal
P.C.N.

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Group

Customer	COES SRL		
PO. No.:	3917/24 n comm 34/24+493/24	Item:	
N. Pro.:			Date:
C. Code:			
Cta's Job:	24OC0005964	Date: 02/12/2024	Heat No.: 131320
Kg:	29	Mt.: 6,77	Pcs No.: 1

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 0000364390/2 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 (HB)			MEDIA MEAN	E / R
MIN.						240	415								
MAX.														200	0,85
131320	1	F	L	T	33,30 x 6,400	329	466	54			138	138	138	138	0,71
131320	2	F	L	T	33,40 x 6,300	333	472	48			140	142	140	141	0,71
131320	3	F	L	T	33,40 x 6,400	340	477	50			140	141	143	141	0,71

(1) : L = LONGITUDINAL // T = TRANSVERSAL
(2) : T = Full size tube // P = Strip specimen // C = Cylindrical // F = Flat specimen
(3) : yield point (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)		T° (ºC)	RESILIENCIA IMPACT TEST (J)			AVG (J)	AREA DUCTIL SHEAR AREA (%)
			10	10,00	-45	14 / 18				
			10	10,00	-50	32 / 41				
131320	1	L	10	5,00	-50	157	129	146	144	
131320	2	L	10	5,00	-51	136	150	140	142	

(1) : L = LONGITUDINAL // T = TRANSVERSAL

LA SOCIETÉ TUBOS REUNIDOS GROUP, S.L.U GARANTIT QUE TOUS LES PRODUITS OBJECT DE CETTE CERTIFICAT, SONT CONFORMES EN LEUR TOTALITÉ LES SPECIFICATIONS DE L'ARTICLE 15 DE L'ARRETE MINISTERIEL DU 24.03.1978 C'EST À DIRE:
C <= 0.25% ; P <= 0.05% ; S <= 0.05%
Rm <= 700 MPa. ; Rm (A-2) >= 10500
RE/Rm <= 0.9 ; A (5.65 sqr(So)) >= 16% LONG. ; A (5.65 sqr(So)) >= 14% TRANSV.

ANEXOS / ANNEX

FULLY KILLED
RADIATION FREE
MERCURY FREE
NO WELD REPAIR
FINE GRAIN STEEL
THE STEEL IS CALCIUM TREATED FOR MICROINCLUSION SHAPE CONTROL

ALL THE CARBON AND ALLOY STEEL PIPES SUPPLIED BY TUBOS REUNIDOS GROUP, TUBOS MILL HAVE BEEN FULLY MELTED IN OUR OWN STEEL-SHOP AND MANUFACTURED IN OUR OWN ROLLING FACILITIES IN SPAIN."

"T.R.G. HAS A QUALITY MANAGEMENT SYSTEM APPROVED BY LRQA IN AGREEMENT WITH POINT 4.3 ANNEX I OF THE PED 2014/68/EU"

26/1/24

AMURRIO 02.01.2024

CONTROL DE CALIDAD DE TUBOS REUNIDOS GROUP
Mill: TUBOS
TUBOS REUNIDOS GROUP (QUALITY CONTROL)
Borja Eguzabal
P.O.

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+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: CML58190	**REV. 0**	**SHEET 1 OF 74**

CUSTOMER:	ROSETTI MARINO S.P.A.
PROJECT:	HOLLANDSE KIST NOORD WIND PARK PROJECT
OBJECT:	VESSEL
SERIAL No.:	S240129-S240130
DRAWING:	CCO54050
COES JOB:	167/24

0	V. Girardello	C. Pilenga	01/10/2024	FIRST ISSUE
REV.	**ISSUED BY**	**CONTROLLED BY**	**DATE**	**DESCRIPTION**

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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 516 Gr.70	ARCELORMITTAL MEDITERANEE	730/0177224	730119028	23 2736
2	2	LIFTING LUG 140x100x15	SA 516 Gr.70	METINVEST TRAMETAL SPA	602932	KNAB53	24 2449
3	1	FLANGE W.N.3" Sch. 80 150# RF	SA 350 Gr. LF2 Cl.1	FAD SPA	7143/24	278513	24 2560
4	1	FLANGE BLIND B16.5 3" 150# RF	SA 350 Gr. LF2 Cl.1	FAD SPA	7143/24	5022523	24 2560
5	1	VIROLA Ø700 L=1080 THK=8	SA 516 Gr.70	METINVEST TRAMETAL SPA	615683	STAD83	24 2456
6	2	2:1 ELLIPTICAL HEAD Øe700	SA 516 Gr.70	SIFEA SRL	172124	RTAA21	24 2547
8	8	STUD-BOLT 3/4" UNC x 115	SA 320 Gr.L7	IPL SRL	2402550	299641	24 2649
9	16	NUT 3/4" UNC	SA 194 Gr.7	IPL SRL	2402468	598896	24 2460
12	8	NUT 5/8" UNC	SA 194 Gr.7	IPL SRL	2402468	68359	24 2460
14	4	STUD-BOLT 5/8" UNC x 105	SA 320 Gr.L7	IPL SRL	2402550	BF4049	24 2649
15	1	FLANGE BLIND B16.5 6" 150# RF	SA 350 Gr. LF2 Cl.1	FAD SPA	7143/24	265416	24 2560
16	1	FLANGE W.N.6" Sch. 160 150# RF	SA 350 Gr. LF2 Cl.1	METALFAR PRODOTTI INDUSTRIALI SPA	2024-C_MFF-02111	19/43358	24 2891
17	70,000 mm	PIPE SMLSS 6 Sch.160	SA 333 Gr. 6	TUBOS REUNIDOS GROUP SLU	0000363270	130892	24 2439
18	1	FLANGE W.N.1" Sch. XXS 150# RF	SA 350 Gr. LF2 Cl.1	METALFAR PRODOTTI INDUSTRIALI SPA	2024-C_MFF-02111	23/70335	24 2890
19	2	FLANGE W.N.4" Sch. 80 150# RF	SA 350 Gr. LF2 Cl.1	FAD SPA	7143/24	33961	24 2560
20	90,000 mm	PIPE SMLSS 4 Sch.80	SA 333 Gr. 6	ARTROM STEEL TUBES SA	E4576	R62283	24 2479
21	160,000 mm	PIPE SMLSS 3 Sch.80	SA 333 Gr. 6	TMK ARTROM SA	E11101	R58711	24 2477
22	2	HALF COUPLING 1/2" NPT-F 6000#	SA 350 Gr. LF2 Cl.1	TUROZZI F.LLI SRL	67589	L6974	24 2487
23	4	PLATE 130x130x10mm - 4 HOLES Ø14	SA 516 Gr.70	METINVEST TRAMETAL SPA	571948	KTAA63	24 2465
24	4	BENDING PLATE 80x8 L=1000	SA 516 Gr.70	METINVEST TRAMETAL SPA	524129	1TAX84	24 2450
25	65,000 mm	PIPE SMLSS 4 Sch.80	SA 333 Gr. 6	ARTROM STEEL TUBES SA	E4576	R62283	24 2479
27	4	PLATE 30 thk=10 HOLE Ø13	SA 516 Gr.70	METINVEST TRAMETAL SPA	571948	KTAA63	24 2465
28	115,000 mm	PIPE SMLSS 1 Sch.XXS	SA 333 Gr. 6	TUBOS REUNIDOS GROUP SLU	0000361075/1	129075	24 2220
30	16	SCREW - M12 x 35 - UNI 5739	SA 193 Gr.B7	IPL SRL	2403109	BJ3907	24 3618

INSPECTION CERTIFICATE — NF EN 10204-3.1/DIN 50049-3.1.B/ISO 10474

N° 730/0177224 — Page 2 / FIN

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 (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. contrôlé / Control rolling
TM : Laminage thermomécanique / Thermo-mechanical forming
N : Normalisé / Normalizing
D : Détensionné / Stress relieving
O : 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	A06	210287 A07	GH2ASAM004 000160 A08	SA516G70-SA20/S5 ASME_SA516M-15 HOT ROLLED COIL, AS ROLLED CONE02309M4310000 B01 B02	LTC : LN B04

Traitement de référence (1) Treatment of test samples: BL — 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 Thicknes	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
5239073	730119028	001	1	4,000	1500,00		24148	1	T	P	PRISM	BL	20	454	578	27,9												

COES G.Q. — Ricezione data 13/10/2023 — Sigla — Verificato data 13/10/2023 — Sigla

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 730119028	C71 0,165	C72 1,408	C73 0,015	C74 0,002	C75 0,208	C76 0,032	C77 0,0001	C78 0,026	C79 0,019	C80 0,004	C81 0,004	C82 0,008	C83 0,020	C84 0,015	C85 0,002	C86	C87	C88	C89	C90 0,029	C91 0,068	C92	C96	C97		

Emplacement/Location(2): 1 Tête / Head, 2 Pied / Bottom, 3 1/2 longueur / Length — C01 — X:Divers / Mix

(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

(5)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

23-2736

24 2220

COES S.R.L. P.O. 2217/24 (comm.687/23 + mag) TAL JOB N°424004085 OUR DDT N°402401642 OF 25/07/24
N° 1 MT 5,79 HEAT 129075 DIMENSIONS 33,4 x 9,09 ITEM 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 25/07/2024 Sigla U.S. | Verificato data 25/07/2024 Sigla U.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 U.S.

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 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

Approved by QUALITY1 on 02/02/23

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

COES S.R.L. P.O. 2570/24 (comm. 167/24) TAL JOB N°424004665 OUR DDT N°402401856 OF 06/09/24
N° 1 MT 8 HEAT 130892 DIMENSIONS 168,3 x 18,26

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 0000363270/2 Rev. 000

CLIENTE: CUSTOMER	T.A.L. S.p.A. TUBI ACCIAIO LOMBARDA CON SOCIO UNICO	PEDIDO / PARTIDA: P.ORDER / ITEM	OF230465 260.
PRODUCTO: ARTICLE	TUBERÍA SIN SOLDADURA LAMINADA EN CALIENTE HOT FINISHED SEAMLESS TUBES	REF. FABRICA: WORK ORDER	300022656 000260
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 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	168,30 X 18,26 MM. X 7-11,8 M.		
MARCAS: MARKING	ESTAMPADO: DIE STAMPING	HN (HEAT)	
	PINTADO: STENCILLED	TUBOS API SPEC 5L 5L-0011 (SELLO API) (MM/AA) 168,3 18,3 L360 / X52 PS L1 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 38 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
000260	260.	7,000 - 11,800	130892	10	79,630	5.462
TOTAL				10	79,630	5.462

Albaran/Delivery note/Lieferschein/ Bon de livraison: 80399138

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 333 Ed. 2023
U.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 08.09.2023

CONTROL DE CALIDAD DE TUBOS REUNIDOS GROUP
Mill: TUBOS
TUBOS REUNIDOS GROUP (QUALITY CONTROL)
Borja Eguzabal
P.O.:

Approved by D.MOLINARI on 13/10/23

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 0000363270/2 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**
130892	0,1260	1,29	0,25	0,007	0,0024	0,050	0,070	0,0800	0,1600	0,0630	0,0270	0,0020	0,0010	0,0001	**0,39**

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**
130892	0,1200	1,29	0,25	0,007	0,0010	0,050	0,070	0,0800	0,1600	0,0640	0,0260	0,0020	0,0010	0,0001	**0,39**
130892	0,1190	1,29	0,25	0,007	0,0014	0,050	0,070	0,0800	0,1600	0,0630	0,0250	0,0020	0,0010	0,0001	**0,39**

FORMULAS

	(01)	(02)	(03)
MIN.			
MAX.	0,140	0,600	0,090
130892	0,067	0,357	0,065
130892	0,066	0,356	0,064

(01) Nb + Ti + V
(02) Cr + Mo + Cu + Nb + V + Ti
(03) Nb + V

AMURRIO 08.09.2023

CONTROL DE CALIDAD DE TUBOS REUNIDOS GROUP
Mill: TUBOS
TUBOS REUNIDOS GROUP (QUALITY CONTROL)
Borja Eguizabal
P.O.:

Approved by D.MOLINARI on 13/10/23

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 0000363270/2 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
130892	204/184	F	L	P	24,70 x 19,100	362	512	49		79	79	80	79
130892	204/184*	F	L	P	25,00 x 19,000	368	513	49		78	79	79	79

(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
			10	10,00	-50	27 / 27				
130892	204/184	L	10	10,00	-50	287	151	284	241	95
130892	204/184*	T	10	10,00	-50	189	155	175	173	95

(1) : L = LONGITUDINAL // T = TRANSVERSAL

ANEXOS / ANNEX

FULLY KILLED
RADIATION FREE
MERCURY FREE
NO WELD REPAIR
FINE GRAIN WITH SIZE >=8 ACCORDING TO ASTM 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."

"ROLLING TEMPERATURE : 910°C".

AMURRIO 08.09.2023

CONTROL DE CALIDAD DE TUBOS REUNIDOS GROUP
Mill: TUBOS
TUBOS REUNIDOS GROUP (QUALITY CONTROL)

Borja Eguizabal

P.O.

Approved by D.MOLINARI on 13/10/23

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

24 2449

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

A03 N° Certificato / Certificate no.	Z02 Data / Date
602932	01/02/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32306036	345/LM
DDT	del / date
BOL 32401545	31/01/2024
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

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
2	KNAB530802A	1919728	15.00X2450X12000	3,46	784024	BO	N	GA132																	
5	KNAB451203A	1920279	18.00X3000X12000	5,09	783994	BO	N	GA104																	
6	KNAB510501A	1920294	20.00X3000X12000	5,65	783997	BO	N	GA107																	

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 2																					
Ordine Max 2		1,50			0,004						0,100						0,0005			0,43	
Ordine Min 5																					
Ordine Max 5		1,50			0,004						0,100						0,0005			0,43	
Ordine Min 6																					
Ordine Max 6		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																
KNAB45	0,15	1,45	0,20	0,010	0,004	0,010	0,010	0,010	<0.005	0,048	0,002	0,029	0,001	<0.005	0,0000	0,0090	0,0002	0,0000	0,39	0,40	0,23
KNAB51	0,15	1,46	0,20	0,010	0,004	0,010	0,010	0,020	0,010	0,043	0,002	0,029	0,002	<0.005	0,0000	0,0070	0,0002	0,0000	0,39	0,40	0,23
KNAB53	0,15	1,43	0,21	0,011	0,004	0,010	0,010	0,050	0,010	0,043	0,001	0,027	0,001	<0.005	0,0000	0,0060	0,0002	0,0000	0,39	0,40	0,23

COES G.Q.
Ricezione data 10/09/2024 Sigla U.S.
Verificato data 10/09/2024 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	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 5													L	-46		16	20											
ORDINE Min 6													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											
GA104	18,00	2	P	T	20		528		34,0	404	P	10,00	T	-20	P	137 144 161	147						HRC <	22				
GA104	18,00	2	P	T	300					289	C	10,00	T	-50	P	123 112 70	102											
GA104	18,00	2										10,00	L	-46	P	242 262 218	241											
GA107	20,00	2	P	T	20		511		38,2	410	P	10,00	T	-20	P	207 214 145	189						HRC <	22				
GA107	20,00	2	P	T	300					282	C	10,00	T	-50	P	101 80 88	90											
GA107	20,00	2										10,00	L	-46	P	209 212 239	220											
GA132	15,00	2	P	T	20		544		36,0	413	P	10,00	T	-20	P	189 200 150	180						HRC <	22				
GA132	15,00	2	P	T	300					297	C	10,00	T	-50	P	126 145 113	128											
GA132	15,00	2										10,00	L	-46	P	222 244 234	234											

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
5		EN 10029 CL.B	-0+100 MM	-0+200 MM	EN 10163/2 CL B2	EN 10029 CL. N
6		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 2450

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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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
524129 √	05/05/2021
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32101140	84/LM
DDT	**del / date**
BOL 32108284	04/05/2021
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 10/09/2024 Sigla U.S.
Verificato data 10/09/2024 Sigla U.S.

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 BEGINNING TEMPERATURE °C	TEMPERATURA INIZIO	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	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	HOLDING TIME	PERMANENZA (T) Min	RAFFREDDAMENTO COOLING
1	1TAX770704A	1697142	8.00X2000X12000	1,51	692809	BO	N	GG354																			
1	1TAX770704B	1697142	8.00X2000X12000	1,51	692809	BO	N	GG354																			
1	1TAX770705A	1697145	8.00X2000X12000	1,51	692810	BO	N	GG355																			
1	1TAX770705B	1697145	8.00X2000X12000	1,51	692810	BO	N	GG355																			
1	1TAX801004A	1697156	8.00X2000X12000	1,51	692811	BO	N	GG356																			
1	1TAX840705B	1698433	8.00X2000X12000	1,51	692816	BO	N	GG358																			
2	1TAX770408A	1698893	10.00X2000X12000	1,88	692818	BO	N	GG359																			
2	1TAX770408B	1698893	10.00X2000X12000	1,88	692818	BO	N	GG359																			
2	1TAX840701A	1698296	10.00X2000X12000	1,88	692815	BO	N	GG357																			
2	1TAX840701B	1698296	10.00X2000X12000	1,88	692815	BO	N	GG357																			
2	1TAX840701C	1698296	10.00X2000X12000	1,88	692815	BO	N	GG357																			

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	0,050					0,0005			0,43	
Ordine Min 2																					
Ordine Max 2		1,50			0,004						0,100	0,050					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	0,035	0,035																
1TAX77	0,15	1,42	0,18	0,020	0,003	0,050	0,020	0,050	<0.005	0,028	<0.005	0,002	<0.005	<0.005	0,0010	0,0080	<0.0005	0,0002	0,39	0,40	0,23
1TAX80	0,14	1,38	0,19	0,014	0,003	0,040	0,020	0,030	<0.005	0,030	<0.005	0,002	<0.005	<0.005	0,0010	0,0050	<0.0005	0,0002	0,37	0,38	0,22

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)
1TAX84 ✓	0,15	1,41	0,18	0,015	0,003	0,040	0,030	0,040	<0.005	0,024	<0.005	0,001	<0.005	<0.005	0,0010	0,0070	0,0003	0,0002	0,39	0,40	0,23

			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]	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 2													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										
GG354	8,00	2	P	T	20		520		33,5	371	P	7,50	T	-50	P	86 89 90	88						HRC <	22			
GG354	8,00	2										7,50	L	-46	P	140 158 148	149										
GG354	8,00	2										7,50	T	-20	P	130 124 120	124										
GG355	8,00	2	P	T	20		525		31,4	381	P	7,50	T	-50	P	97 73 71	80						HRC <	22			
GG355	8,00	2										7,50	L	-46	P	155 163 165	161										
GG355	8,00	2										7,50	T	-20	P	126 128 140	131										
GG356	8,00	2	P	T	20		515		32,6	395	P	7,50	T	-50	P	123 115 100	113						HRC <	22			
GG356	8,00	2	C	T	300					283	C	7,50	L	-46	P	187 187 199	191										
GG356	8,00	2										7,50	T	-20	P	135 144 151	143										
GG357	10,00	2	P	T	20		517		32,0	386	P	7,50	T	-50	P	93 101 113	102						HRC <	22			
GG357	10,00	2	P	T	300					279	C	7,50	L	-46	P	173 181 150	168										
GG357	10,00	2										7,50	T	-20	P	135 138 155	143										
GG358	8,00	2	P	T	20		517		32,2	404	P	7,50	T	-50	P	108 90 81	93						HRC <	22			
GG358	8,00	2										7,50	L	-46	P	179 184 173	179										
GG358	8,00	2										7,50	T	-20	P	132 146 138	138										
GG359	10,00	2	P	T	20		519		34,8	393	P	7,50	T	-50	P	80 78 92	83						HRC <	22			
GG359	10,00	2	P	T	300					287	C	7,50	L	-46	P	180 167 138	162										
GG359	10,00	2										7,50	T	-20	P	115 143 119	126										

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
2		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

STEEL VACUUM DEGASSED, CALCIUM TREATED

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. 2019. 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 2456

CERTIFICATO DI CONTROLLO 3.1 / INSPECTION CERTIFICATE 3.1 - EN 10204:2004

A04/A05

METINVEST
METINVEST TRAMETAL SPA

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

(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

ACCIAI DI QUALITA` S.P.A.

Via xx settembre 31/7
16121 GENOVA 16121 IT
GE ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
615683 ✓	18/06/2024
A08 N° Ordine Trametal / Works order	A07 N° Ordine cliente / Customer's order
32402057	Q131.1
DDT	del / date
BOL 32411578	17/06/2024
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

COES G.Q. — Ricezione data 04/09/2024 — Sigla U.S. — Verificato data 10/09/2024 — 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	TEMPERATURE TREATMENT TEMPERATURA TRATTAMENTO °C	HOLDING TIME PERMANENZA Min	VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	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
1	STAD830903B	1953979	8.00X2500X12000	1,88	796293	BO	N	GF334																	
~~2~~	~~STAD360401A~~	~~1954394~~	~~8.00X3000X12000~~	~~2,26~~	~~796315~~	~~BO~~	~~N~~	~~GF350~~																	
2	STAD360401B	1954394	8.00X3000X12000	2,26	796315	BO	N	GF350																	
2	STAD650404A	1954418	8.00X3000X12000	2,26	796319	BO	N	GF354																	
3	STAD600206B	1954341	10.00X2500X12000	2,36	796310	BO	N	GF347																	

acciai di qualità — Azienda con sistema di gestione certificata da IGQ secondo UNI EN ISO 9001:2015
Copia Conforme all'originale
Questo certificato vale solo per la/le lamiera/e indicata/e dalla/e freccia/e e/o evidenziata/e
Come da Vs Ordine numero 601 DEL 11/07/2024

C71/C92 COMPOSIZIONE CHIMICA DI COLATA / HEAT CHEMICAL ANALYSIS

RIF DDT ADQ VR/0/241590 - 12.07.2024

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 1																					
Ordine Max 1		1,50																			
Ordine Min 2																					
Ordine Max 2		1,50																			
Ordine Min 3																					
Ordine Max 3		1,50																			
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																
STAD36	0,15	1,38	0,18	0,017	0,004	0,010	0,010	0,020	<0.005	0,029	0,002	0,002	0,002	<0.005	0,0000	0,0034	0,0002	0,0000	0,38	0,39	0,23
STAD60	0,15	1,42	0,19	0,010	0,004	0,010	0,010	0,020	<0.005	0,038	0,002	0,003	0,002	<0.005	0,0000	0,0019	0,0002	0,0000	0,39	0,39	0,23
STAD65	0,16	1,41	0,20	0,013	0,004	0,020	0,010	0,030	<0.005	0,041	0,002	0,002	0,002	<0.005	0,0000	0,0029	0,0002	0,0000	0,40	0,40	0,24
STAD83 ✓	0,17	1,48	0,18	0,017	0,002	0,010	0,010	0,020	<0.005	0,025	0,002	0,002	0,002	<0.005	0,0000	0,0032	0,0002	0,0000	0,42	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	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 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															-46		16	20										
ORDINE Min 2															-46		16	20										
ORDINE Min 3															-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										
GF334	8,00	2	P	T	20		512		37,1	377	P	7,50	T	-20	P	136 167 145	149											
GF334	8,00	2										7,50	T	-50	P	98 92 95	95											
GF334	8,00	2										7,50	L	-46	P	141 157 154	151											
GF347	10,00	2	P	T	20		511		34,3	363	P	7,50	T	-20	P	125 136 142	134											
GF347	10,00	2										7,50	T	-50	P	105 105 100	103											
GF347	10,00	2										7,50	L	-46	P	180 175 173	176											
GF350	8,00	2	P	T	20		514		34,5	388	P	7,50	T	-20	P	115 129 148	130											
GF350	8,00	2										7,50	T	-50	P	77 81 126	94											
GF350	8,00	2										7,50	L	-46	P	168 163 182	171											
GF354	8,00	2	P	T	20		514		32,7	390	P	7,50	T	-20	P	137 99 171	136											
GF354	8,00	2										7,50	T	-50	P	80 81 76	79											
GF354	8,00	2										7,50	L	-46	P	117 124 153	131											

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
1		EN 10029 CL.B	EN 10029	EN 10029	EN 10163/2 CL B2	EN 10029 CL. N
2		EN 10029 CL.B	EN 10029	EN 10029	EN 10163/2 CL B2	EN 10029 CL. N
3		EN 10029 CL.B	EN 10029	EN 10029	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

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 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.
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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

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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.

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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.
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IPL S.r.l.
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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

24 2465

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
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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

SIDERURGICA LEONESSA S.R.L.

Via don. Milani 13-19
25020 FLERO 25020 IT
BS ITALIA

COES SRL
VERIFIED IDENTICAL TO
SA 516 Ed. 2023
U.S.

A03 N° Certificato / Certificate no.	Z02 Data / Date
571948 ✓	13/02/2023
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32204384	168-2022
DDT	del / date
BOL 32302408	10/02/2023
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 10/09/2024 Sigla U.S.
Verificato data 10/09/2024 Sigla U.S.

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 (A)	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT BEGINNING TEMPERATURE °C	TEMPERATURA INIZIO	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
1	KTAA610104A	1833576	8.00X2000X12000	1,51	751630	BO	N	GA548																	
2	KTAA630205A	1833589	10.00X2000X12000	1,88	751637	BO	N	GA554																	
2	KTAA630206A	1833615	10.00X2000X12000	1,88	751638	BO	N	GA555																	
2	KTAA630206B	1833615	10.00X2000X12000	1,88	751638	BO	N	GA555																	
20	KTAA610101C	1833816	10.00X2000X10000	1,57	751627	BO	N	GA545																	

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)
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																
KTAA61	0,15	1,38	0,21	0,010	0,004	0,010	0,010	0,010	<0.005	0,042	0,002	0,002	0,001	<0.005	0,0000	0,0040	0,0002	0,0000	0,38	0,38	0,23
KTAA63 ✓	0,16	1,36	0,18	0,011	0,004	0,010	0,010	0,010	<0.005	0,037	0,002	0,002	0,001	<0.005	0,0000	0,0050	0,0002	0,0000	0,39	0,39	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	ORIENTATION (3) DIREZIONE	TEMPERATURA [°C] TEST TEMPERATURE	YIELD STRENGTH ReH [Mpa]	TENSILE STRENGTH Rm [Mpa]	ReH/Rm	ELONGATION A5"	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% VALORE MEDIO Z% MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES
ORDINE Min 1													L	-46		27	0										
ORDINE Min 2													L	-46		27	0										

			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 A5"	PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	SHAPE OF TEST PIECE FORMA PROVINO (4)	LARGHEZZA [mm] WIDTH	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 20													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										
GA545	10,00	2	P	T	20		517		36,3	371	P	7,50	L	-46	P	190 199 217	202						HRC <	22			
GA545	10,00	2										7,50	T	-50	P	84 92 100	92										
GA548	8,00	2	P	T	20		512		35,5	358	P	7,50	L	-46	P	156 162 150	156						HRC <	22			
GA548	8,00	2										7,50	T	-50	P	81 72 96	83										
GA554	10,00	2	P	T	20		512		34,6	382	P	7,50	L	-46	P	168 187 161	172						HRC <	22			
GA554	10,00	2										7,50	T	-50	P	70 93 77	80										
GA555	10,00	2	P	T	20		513		33,4	371	P	7,50	L	-46	P	176 199 167	181						HRC <	22			
GA555	10,00	2										7,50	T	-50	P	89 92 71	84										

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.C	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
2		EN 10029 CL.C	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
20	aggiunta mail 17 01	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. 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**

CTA Group

Customer COES SRL
PO. No.: 2263/24
N. Pro.:
C. Code:
Cta's Job: 24OC0003184
Kg: 179

Item:

Date: 09/07/2024
Mt.: 11,81

24 2477

Date:

Heat No.: R58711
Pcs No.: 2

COD QC-3.1-Ed.2 REV 6/2017

Digitally signed by TMK-ARTROM S.A.
This document is certified to be electronically controlled and approved
Signature requested by Maria Carmen Ivancea
on 2024-07-11 08:51:09 +03:00
The original electronic document can be retrieved by scanning the QR code in the left.

TMK-ARTROM S.A.
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E-mail: office.slatina@tmk-artrom.eu www.tmk-artrom.eu
EUID: ROONRC.J28/9/1991; J28/9/31.01.1991
VAT No. RO 1510210/1992
Subscribed and Paid Share Capital: 291.587.538,34 lei

INSPECTION CERTIFICATE - EN 10204: 2004 / 3.1

No.: E11101 **Date: 30.06.2022**	**Manufacturer's mark :**	**Customer Order No.:** **LS-0000024**	**PL: 13622**

CUSTOMER: Commerciale Tubi Acciaio S.P.A.

Specifications: PED 2014/68/EU (Appendix 1, par. 4.3) + ASTM A333: 18; ASME A333-19; ASME B36.10M:18; ASME Section II part D, TAB.Y1; Spec. MPD-02-PS-GS REV. 1	**Dimensions: 88.9 x 7.62 x 5 500 to 6 100 mm** **Steel: Gr. 6**

Description: Hot rolled seamless steel pipes with bevelled ends ASME B16.25, clear lacquered; marking by painting at one end: TMK-ARTROM, standard/NACE MR, dimensions, steel grade, 15.27 Kg/m, LENGTH (m), 17.0 MPa/NDE, HF, SMLS, 3" XS SCH.80, LT-45, heat no., LOT, mill inspector no. 5, technical control sign; marking at one end: heat no.

Heat No.: R58711	LOT no.: 484802		Steel melt and rolled in ROMANIA
Quantity	Pcs	Length m	Weight kg
	24	142.01	2164

Ladle Chemical Analyse (%)

C	Mn	S	P	Si	Ni	Cr	Mo	Cu	Al	Nb	Ti	N	V	B	Ca
0.18	1.08	0.002	0.017	0.23	0.13	0.10	0.03	0.22	0.024	0.001	0.001	0.008	0.003	0.0005	0.002

V+Nb+Ti+Cu+Mo+Cr: 0.355 CEIIW=0.409

Product Chemical Analyse (%)

C	Mn	S	P	Si	Ni	Cr	Mo	Cu	Al	Nb	Ti	V	B	Ca
0.18	1.09	0.003	0.016	0.22	0.12	0.10	0.02	0.22	0.025	0.001	0.001	0.004	0.0005	0.002
0.18	1.09	0.002	0.015	0.21	0.13	0.11	0.03	0.22	0.024	0.001	0.001	0.002	0.0005	0.002

Mechanical Properties

Heat Treatment: normalised at 900°C, 14 min, cooled in still air Hydraulic test pressure (ASTM A999): 17.0 MPa for 5 sec.: OK Test Eddy Current Acc. ASTM E309 / ISO 10893-1: OK Flattening test (ASTM A999): OK Hot yield at 343°C: 282 MPa (strip longitudinal 6.30 x 7.75 = 48.87 mm²) Hot yield at 538°C: 196 MPa (strip longitudinal 6.30 x 7.60 = 47.93 mm²)	Charpy V-Notch (ASTM A370) KV/Longitudinal 5 x 10 [mm] 48 (36; 52; 57) J (-59°C) 52 (56; 41; 59) J (-54°C)	Melting process: electric arc furnace, fully killed Fine grain Hardness HBW: OD: 161 – 164 Hardness HRC max 22 (acc to NACE MR0175/ISO 15156-2; NACE MR0103/ISO 17945) Residual magnetism: max. 20 Gauss: OK

Visual inspection and dimensional check: OK
NO WELD REPAIR ON HEREBY CERTIFIED TUBES
The manufacturer of pipes is certified in acc. with ISO 9001: 2015, ISO 14001:2015 and ISO 45001:2018
THE PRODUCTS DELIVERED ARE CONTROLLED ON RADIOACTIVITY RESPECTIVELY ARE FREE FROM ADDITIONAL IONIC RADIATION AND MERCURY
The material "not contain intentional additions of elements such as lead, selenium, or sulphur to improve machinability"
Steel grade was treated with calcium for the shape control of micro inclusions.
La société TMK ARTROM S.A. garantit que tous le produits, object cu Certificat susdit, respectent en leur Totalité les Specifications de l'article 15 de l'Arrete Ministériel du 24 Mars 1978 modifié.
Cmax 0.25%, Pmax 0.05%, Smax 0.05%, Rm (N/mm2) max700, A(Lo=5.65√So) min.16% long, Rm(A-2) min 10500
E max0.9, A (Lo=5.65√So) min14%trans, RAmin 10500

Additional remarks: The requirements are fulfilled as per Annex 1 – Test results

CHIEF OF QC & TESTING OF THE METALLURGICAL TUBES PRODUCTS
Dipl. Eng. Silviu Barbulescu

MILL INSPECTOR
Eng. Constantin Lupu

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COES G.Q.	Ricezione data 04/09/2024	Sigla V.S.
	Verificato data 10/09/2024	Sigla V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 333 Ed. 2023
V.S.

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Group

Customer	**COES SRL**				
PO. No.:	**2263/24**	Item:			
N. Pro.:				Date:	
C. Code:					
Cta's Job:	**24OC0003184**	Date:	**09/07/2024**	Heat No.:	**R58711**
Kg:	**179**	Mt.:	**11,81**	Pcs No.:	**2**

COD QC-3.1-Ed.2 REV 6/2017

TMK ARTROM

TMK-ARTROM S.A.

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EUID: ROONRC.J28/9/1991; J28/9/31.01.1991
VAT No. RO 1510210/1992
Subscribed and Paid Share Capital: 291.587.538,34 lei

No: E11101
Part 2
Annex:1 ; Page no.: 1/1

Test Results Mechanical Properties

TENSILE TEST (ASTM A370) – at room temperature- Test Specimen / Strip–longitudinal	Rp0.2 MPa	Rm MPa	Elongation %	Rp0.2/ Rm
Dimension – Specimen (mm): 1. 19.5 x 7.75 / 2. 19.0 x 7.6	1. 406	537	33	0.76
Section – Specimen (mm^2): 1. 152.59 / 2. 145.73				
Length - Specimen (Lo) (mm): 1. 50.8 / 2. 50.8	2. 382	539	32	0.71

CHIEF OF QC & TESTING OF THE METALLURGICAL TUBES PRODUCTS
Dipl. Eng. Silviu Barbulescu

MILL INSPECTOR
Eng. Constantin Lupu

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CTA Group

Customer	COES SRL		
PO. No.:	2263/24	Item:	
N. Pro.:			Date:
C. Code:			
Cta's Job:	24OC0003184	Date: 09/07/2024	Heat No.: R62283
Kg:	404	Mt.: 18,18	Pcs No.: 3

COD QC-3.1-ED.3 REV. 1/2023

ARTROM STEEL TUBES S.A.

Draganesti Str. 30, Slatina, jud. OLT, Romania 230119
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EUID: ROONRC.J28/9/1991; J28/9/31.01.1991 VAT No. RO 1510210/199
Subscribed and Paid Share Capital: 291.587.538,34 lei

Digitally signed by ARTROM STEEL TUBES SA
This document is certified to be electronically controlled and approved.
Signature requested by Maria Carmen Ivancea on 2024-03-19 10:28:14.072+02:00
The original electronic document can pe retrieved by scanning the QR code in the left.

INSPECTION CERTIFICATE - EN 10204: 2004 (3.1)

No.: E4576 **Date: 12.03.2024** Page 1/2	**Manufacturer's mark:**	**Customer order no.:** **LS-0000003**	**PL: 11337**

CUSTOMER: Commerciale Tubi Acciaio S.P.A.

Specifications: ASTM A333: 18; ASME A333-21; ASME B36.10M:18; ASME Section II part A:21; ASME Section II part D, TAB.Y1-19; PED 2014/68/EU (Appendix 1, par. 4.3); Spec. MPD-02-PS-GS Rev. 1	**Dimensions: 114.3 x 8.56 x 5 500 to 6 100 mm** **Steel: Gr. 6**

Description: Hot rolled seamless steel pipes with bevelled ends ASME B16.25; clear lacquered; marking by painting at one end: ARTROM, standard, dimension, steel grade, 22.32 Kg/m, LENGTH (m), 19.0 MPa/NDE, HF, SMLS, 4" XS SCH.80, LT-45, heat no., LOT, mill inspector no. 5, technical control sign; marking at one end: heat no.

Heat no.: R62283	Lot no.: 542712		Steel melt and rolled in ROMANIA
Quantity	Pcs	Length m	Weight kg
	32	193.92	4330

Ladle Chemical Analyse (%)

C	Mn	S	P	Si	Ni	Cr	Mo	Cu	Al	Nb	Ti	N	V	B	Ca
0.19	1.07	0.004	0.014	0.21	0.09	0.08	0.02	0.22	0.023	0.001	0.001	0.009	0.002	0.0005	0.002

V+Nb+Ti+Cu+Mo+Cr: 0.324 CEIIW=0.409

Product Chemical Analyse (%)

C	Mn	S	P	Si	Ni	Cr	Mo	Cu	Al	Nb	Ti	V	B	Ca
0.19	1.09	0.007	0.013	0.21	0.08	0.08	0.02	0.21	0.023	0.001	0.002	0.002	0.0005	0.002
0.18	1.08	0.006	0.012	0.20	0.08	0.08	0.02	0.21	0.023	0.001	0.002	0.002	0.0005	0.002

CEIIW= 1. 0.411 / 2. 0.399

Mechanical Properties

Heat treatment: normalized at a temperature of 900°C, 14 min, cooled in still air Hydraulic test pressure (ASTM A999): 19.0 MPa for 5 sec.: OK Test Eddy Current acc. ASTM E309:2016/EN ISO 10893:1-2011/A1-2020: OK Flattening test (ASTM A999): OK	Charpy V–Notch (ASTM A370) KV/Longitudinal 6.67 x 10 [mm] 49 (47; 43; 56) J (-55°C) 54 (53; 58; 50) J (-50°C)	Melting process: electric arc furnace, fully killed Fine grain Hardness HBW: 150 – 153 Hardness HRC (acc. to NACE MR0175/ISO15156:2022 / NACE MR0103/ISO 17945:2015) Residual magnetism: max. 20 Gauss: OK

Hot yield strength at 343°C: 277 MPa (Strip longitudinal 5.10 x 8.80 = 44.90 mm²)
Hot yield strength at 538°C: 198 MPa (Strip longitudinal 5.40 x 8.75 = 47.27 mm²)

Visual inspection and dimensional check: OK
NO WELD REPAIR ON HEREBY CERTIFIED TUBES
The manufacturer of pipes is certified in acc. with ISO 9001: 2015, ISO 14001:2015 and ISO 45001:2018
THE PRODUCTS DELIVERED ARE CONTROLLED ON RADIOACTIVITY RESPECTIVELY ARE FREE FROM ADDITIONAL IONIC RADIATION AND MERCURY
The material "not contain intentional additions of elements such as lead, selenium, or sulphur to improve machinability"
Steel grade was treated with calcium for the shape control of micro inclusions.
La société ARTROM STEEL TUBES garantit que tous le produits, object cu Certificat susdit, respectent en leur Totalité les Specifications de l'article 15 de l'Arrete Ministériel du 24 Mars 1978 modifié. C max 0.25%, P max 0.05%, S max 0.05%, Rm (N/mm2) max700, A(Lo=5.65√So) min.16% long, Rm(A-2) min 10500, E max0.9, A (Lo=5.65√So) min14%trans, RA min 1050

Additional remarks: The requirements are fulfilled as per Annex 1 – Test results

Our tubes are rolled from steel with low carbon footprint, carefully melted in our own Romanian facilities only by recycling the ferrous scrap.

CHIEF OF QC & TESTING OF THE METALLURGICAL TUBES PRODUCTS
Dipl. Eng. Silviu Barbulescu

MILL INSPECTOR
Eng. Constantin Lupu

COES SRL
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U.S.

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	Verificato data 4/09/2024	Sigla U.S.

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Group

Customer	COES SRL				
PO. No.:	2263/24	Item:			
N. Pro.:				Date:	
C. Code:					
Cta's Job:	24OC0003184	Date:	09/07/2024	Heat No.:	R62283
Kg:	404	Mt.:	18,18	Pcs No.:	3

COD QC-3.1-ED.3 REV. 1/2023

ARTROM STEEL TUBES S.A.

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E-mail: office.slatina@artrom.com www.artrom.com
EUID: ROONRC.J28/9/1991; J28/9/31.01.1991 VAT No. RO 1510210/1992
Subscribed and Paid Share Capital: 291.587.538,34 lei

No: E4576
Part 2
Annex:1; Page no.: 2/2

Test Results Mechanical Properties

TENSILE TEST (ASTM A370) - at room temperature - Test Specimen / Strip–longitudinal	Rp0.2 MPa	Rm MPa	Elongation %	Rp0.2/ Rm
Dimension – Specimen (mm): 1. 25.25 x 8.80 / 2. 25.35 x 8.80	1. 367	529	33	0.69
Section – Specimen (mm^2): 1. 224.34 / 2. 225.24				
Length – Specimen (Lo) (mm): 1. 50.8 / 2. 50.8	2. 372	526	32	0.71

CHIEF OF QC & TESTING OF THE METALLURGICAL TUBES PRODUCTS
Dipl. Eng. Silviu Barbulescu

MILL INSPECTOR
Eng. Constantin Lupu

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ADDRESS Via Arno, 3
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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*				
2627 2680 2681 2703 ns.DdT 832	N. 67589	DEL / *Of* 11/09/2024		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. 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

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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*	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

S.I.F.E.A.

Società Italiana Fondi Bombati e Affini

Rapporto di collaudo - Inspection certificate - Abnahmeprufzeügnis

In accordo - According-Nach: UNI EN10204 3.1 Mod. 8.5-03

Numero Certificato: 172124 del 10/09/2024

Cliente: COES S.r.l.

Rif. Ordine: 2577/24 del 26/08/2024 **Rif. Commessa:** 167/24

Item.	Q.ty:	Tipo Prodotto Product type	Normativa di Riferimento Code	Vs. riferimento Codice articolo / Disegno
1	4	FONDO PSEUDOELLITTICO 2:1	ASME VIII Div.1 Ed.'23 UG-32(c), UG-79, UG-81	L4390

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	SBORDATURA Diametro Min. Min. Diameter	SBORDATURA Raggio Sbord. Knuc. Rad.	SBORDATURA Collarino Straight Flange
D.I. 684	2199	8	6,7	610	120	50	229				

Tipo Formatura Forming Type	Trattamento Termico Heat treatment type (1)	Diagramma nr. Heat treat. nr.
FORMATURA A FREDDO	STRESS RELIEVING HEAT TREATMENT AT 610°C	48/2024

Ns.Matricola Our Serial Number	Qualità Materiale Material Quality	Colata Heat	Placca Plate	Produttore Lamiera Plate' s Producer	Certificato Nr. Certificate Nr.	Data Date
	SA 516-70	STAD45	0205B	METINVEST TRAMETAL S.p.A. ITA (EU)	615207/-206/-205/-202/-200/-209/-210	13/06/2026
	SA 516-70	STAD45	0205B	METINVEST TRAMETAL S.p.A. ITA (EU)	615207/-206/-205/-202/-200/-209/-210	13/06/2026
	SA 516-70	RTAA21	0202B	METINVEST TRAMETAL S.p.A. ITA (EU)	612000/-0001/-1999/-1996/-2002/-2003	20/05/2024
	SA 516-70	RTAA21	0202B	METINVEST TRAMETAL S.p.A. ITA (EU)	612000/-0001/-1999/-1996/-2002/-2003	20/05/2024

COES G.Q.	Ricezione data 10/09/2024	Sigla U.S.
	Verificato data 13/09/2024	Sigla U.S.

24 2547

S.I.F.E.A.

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.

S.I.F.E.A.
Società Italiana Fondi Bombati e Affini

Via L. Da Vinci,3 35020
Legnaro - Padova - Italy
Tel. ++ 39 049 8830188
Fax ++ 39 049 641247

Web site: www.sifea.it
e-mail: info@sifea.it

Trattamento Termico n. 48/2024
Heat treatment nr.

del 02/09/2024
of

Cliente: / Costumer:

Il materiale sottoposto al trattamento termico è descritto nella distinta allegata:
Products treated are described in the attached list.

Descrizione del trattamento termico:
Heat treatment details:

Temperatura di Ingresso: ambiente
Load temperature: room temperature

Velocità salita: 150°C/h max da 300°C
Heating rate:

Permanenza: 60 minuti
Holding time:

Temperatura di trattamento: 610°C ±10°C
Treatment temperature:

Raffreddamento: 150°C/h max fino a 300°C
Cooling rate:

Termocoppie tipo Chromel-Allumen: (K)
Chromel-Alumen Thermocpouples (k)

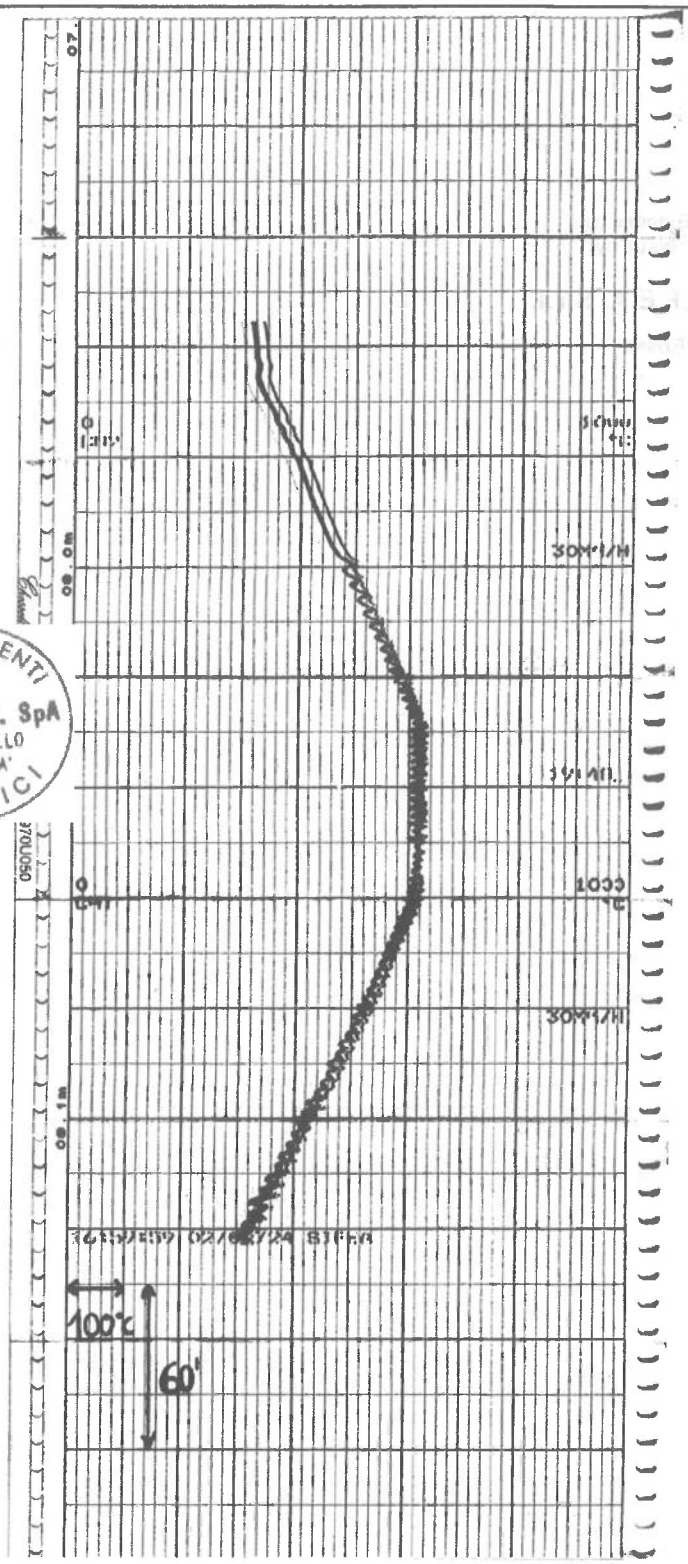
Registratore Eurotherm Chessel Mod. 4102
Eurotherm Chessel recorder Mod. 4102

Velocità carta 30 mm/h
Paper Speed 30 mm/h

Scala Carta 0° C - 1000°C
Paper scale 0° C - 1000°C

Diagramma ridotto 24%
Diagram reduced to 24%

TRATTAMENTI S.I.F.E.A. SpA CONTROLLO QUALITA' TERMICI



S.I.F.E.A.
Società Italiana Fondi Bombati e Affini

Via L. Da Vinci,3 35020
Legnaro - Padova - Italy
Tel. ++ 39 049 8830188
Fax ++ 39 049 641247

Web site: www.sifea.it
e-mail: info@sifea.it

Emesso da: Issue by:	Controllato da: Checked by:
S.I.F.E.A. S.r.l.	S.I.F.E.A. S.r.l.
Marco Rosso	Marco Rosso

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
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

A03 N° Certificato / Certificate no.	Z02 Data / Date
615207	13/06/2024
A08 N° Ordine Trametal / Works order	A07 N° Ordine cliente / Customer's order
32402128	104/LM
DDT	del / date
BOL 32411244	12/06/2024
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 STEELMAKING PROCESS PROCESSO ELAB. (A)	B04 DELIVERY CONDITION STATO FORNITURA LAMIERA (B)	C00 CAMPIONE SAMPLE	B05 HEAT TREATMENT TRATT. CAMPIONE (C)	C00 CAMPIONE PWHT SAMPLE	B05 PWHT BEGINNING TEMPERATURA INIZIO °C	HEATING RATE VELOCITA' RISCALDO C/h	TEMPERATURE TREATMENT TEMPERATURA TRATTAMENTO °C	HOLDING TIME PERMANENZA Min	COOLING RATE 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
1	STAD450205B	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																
1	STAD450205C	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																
4	STAD450201A	1954248	10.00X2000X12000	1,88	796530	BO	N	GF503																

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	
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	
STAD45	0,15	1,40	0,18	0,018	0,003	0,020	0,010	0,020	<0.005	0,033	0,001	0,002	0,002	<0.005	0,0000	0,0032	0,0001	0,0000	0,38	0,39	0,23

			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]	ReH YIELD STRENGTH [Mpa]	Rm TENSILE STRENGTH [Mpa]	ReH/Rm	A% ELONGATION	PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	FORMA PROVINO SHAPE OF TEST PIECE (4)	LARGHEZZA WIDTH [mm]	DIREZIONE ORIENTATION (3)	TEMPERATURA TEST TEMPERATURE [°C]	POSIZIONE LOCATION (2)	SINGOLI VALORI INDIVIDUAL VALUES [J]	MEDIA MEAN VALUE [J]	DIREZIONE ORIENTATION (3)	MANDRINO MANDREL [mm]	ANGOLO ANGLE [°]	ESITO RESULT (5)	POSIZIONE LOCATION (2)	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										
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 6.00 - 999.00													T	-20			30										
GF503	10,00	2	P	T	20	393	512	0,77	38,9		P	7,50	T	-50	P	72 76 81	76						HRC <	22			
GF503	10,00	2	P	T	300					260	C	7,50	L	-46	P	149 156 141	149										
GF503	10,00	2										7,50	T	-20	P	140 135 114	130										
GF507	8,00	2	P	T	20	397	517	0,77	40,2		P	7,50	T	-50	P	91 108 89	96						HRC <	22			
GF507	8,00	2	P	T	300					275	C	7,50	L	-46	P	158 182 138	159										
GF507	8,00	2										7,50	T	-20	P	141 120 123	128										

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

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

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**

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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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

A03 N° Certificato / Certificate no.	Z02 Data / Date
615206	13/06/2024
A08 N° Ordine Trametal / Works order	A07 N° Ordine cliente / Customer's order
32402128	104/LM
DDT	del / date
BOL 32411244	12/06/2024
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 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	STAD450205B	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																	
1	STAD450205C	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																	
4	STAD450201A	1954248	10.00X2000X12000	1,88	796530	BO	N	GF503																	

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	
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					
STAD45	0,15	1,40	0,18	0,018	0,003	0,020	0,010	0,020	<0.005	0,033	0,001	0,002	0,002	<0.005	0,0000	0,0032	0,0001	0,0000	0,38	0,39	0,23

			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 1													L	-46		16	20											
ORDINE Min 4													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 6.00 - 999.00													T	-20			27											
GF503	10,00	2	P	T	20	393	512	0,77	38,9		P	7,50	T	-50	P	72 76 81	76						HRC <	22				
GF503	10,00	2	P	T	300					260	C	7,50	L	-46	P	149 156 141	149											
GF503	10,00	2										7,50	T	-20	P	140 135 114	130											
GF507	8,00	2	P	T	20	397	517	0,77	40,2		P	7,50	T	-50	P	91 108 89	96						HRC <	22				
GF507	8,00	2	P	T	300					275	C	7,50	L	-46	P	158 182 138	159											
GF507	8,00	2										7,50	T	-20	P	141 120 123	128											

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

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
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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http://trametal.metinvestholding.com

A06 Cliente / Customer

COSIDER S.P.A.

Via giuseppe di vittorio 14
43014 MEDESANO 43014 IT
PR ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
615205	13/06/2024
A08 N° Ordine Trametal / Works order	A07 N° Ordine cliente / Customer's order
32402128	104/LM
DDT	del / date
BOL 32411244	12/06/2024
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	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 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	HEATING RATE VELOCITA' RISCALDO C/h	TEMPERATURE TREATMENT TEMPERATURA TRATTAMENTO °C	HOLDING TIME PERMANENZA Min	COOLING RATE 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
1	STAD450205B	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																
1	STAD450205C	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																
4	STAD450201A	1954248	10.00X2000X12000	1,88	796530	BO	N	GF503																

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 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	
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					
STAD45	0,15	1,40	0,18	0,018	0,003	0,020	0,010	0,020	<0.005	0,033	0,001	0,002	0,002	<0.005	0,0000	0,0032	0,0001	0,0000	0,38	0,39	0,23

			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 1													L	-46		16	20											
ORDINE Min 4													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 6.00 - 999.00													T	-20			27											
GF503	10,00	2	P	T	20	393	512	0,77	38,9		P	7,50	T	-50	P	72 76 81	76						HRC <	22				
GF503	10,00	2	P	T	300					260	C	7,50	L	-46	P	149 156 141	149											
GF503	10,00	2										7,50	T	-20	P	140 135 114	130											
GF507	8,00	2	P	T	20	397	517	0,77	40,2		P	7,50	T	-50	P	91 108 89	96						HRC <	22				
GF507	8,00	2	P	T	300					275	C	7,50	L	-46	P	158 182 138	159											
GF507	8,00	2										7,50	T	-20	P	141 120 123	128											

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

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
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

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http://trametal.metinvestholding.com

A06 Cliente / Customer

COSIDER S.P.A.

Via giuseppe di vittorio 14
43014 MEDESANO 43014 IT
PR ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
615202	13/06/2024
A08 N° Ordine Trametal / Works order	A07 N° Ordine cliente / Customer's order
32402128	104/LM
DDT	del / date
BOL 32411244	12/06/2024
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	P355NL1
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	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
1	STAD450205B	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																	
1	STAD450205C	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																	
4	STAD450201A	1954248	10.00X2000X12000	1,88	796530	BO	N	GF503																	

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 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	
P355NL1 Min 0.00 - 60.00		1,10								0,020											
P355NL1 Max 0.00 - 60.00	0,18	1,70	0,50	0,025	0,008	0,300	0,500	0,300	0,080		0,100	0,050	0,030			0,0120				0,43	
STAD45	0,15	1,40	0,18	0,018	0,003	0,020	0,010	0,020	<0.005	0,033	0,001	0,002	0,002	<0.005	0,0000	0,0032	0,0001	0,0000	0,38	0,39	0,23

			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 1													L	-46		16	20										
ORDINE Min 4													L	-46		16	20										
P355NL1 Min 0.00 - 16.00					20	355	490		22,0																		
P355NL1 Max 0.00 - 16.00					20		630																				
P355NL1 Min 6.00 - 999.00													T	-40			27										
GF503	10,00	2	P	T	20	393	512	0,77	38,9		P	7,50	T	-50	P	72 76 81	76						HRC <	22			
GF503	10,00	2	P	T	300					260	C	7,50	L	-46	P	149 156 141	149										
GF503	10,00	2										7,50	T	-20	P	140 135 114	130										
GF507	8,00	2	P	T	20	397	517	0,77	40,2		P	7,50	T	-50	P	91 108 89	96						HRC <	22			
GF507	8,00	2	P	T	300					275	C	7,50	L	-46	P	158 182 138	159										
GF507	8,00	2										7,50	T	-20	P	141 120 123	128										

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

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
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

A02

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

COSIDER S.P.A.

Via giuseppe di vittorio 14
43014 MEDESANO 43014 IT
PR ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
615200	13/06/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32402128	104/LM
DDT	del / date
BOL 32411244	12/06/2024
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	N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	HOLDING TIME (Q) Min PERMANENZA	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	HOLDING TIME (T) Min PERMANENZA	RAFFREDDAMENTO COOLING
1	STAD450205B	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																	
1	STAD450205C	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																	
4	STAD450201A	1954248	10.00X2000X12000	1,88	796530	BO	N	GF503																	

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	
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	
STAD45	0,15	1,40	0,18	0,018	0,003	0,020	0,010	0,020	<0.005	0,033	0,001	0,002	0,002	<0.005	0,0000	0,0032	0,0001	0,0000	0,38	0,39	0,23

			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	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 1													L	-46		16	20										
ORDINE Min 4													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 6.00 - 999.00													T	-50			27										
GF503	10,00	2	P	T	20	393	512	0,77	38,9		P	7,50	T	-50	P	72 76 81	76						HRC <	22			
GF503	10,00	2	P	T	300					260	C	7,50	L	-46	P	149 156 141	149										
GF503	10,00	2										7,50	T	-20	P	140 135 114	130										
GF507	8,00	2	P	T	20	397	517	0,77	40,2		P	7,50	T	-50	P	91 108 89	96						HRC <	22			
GF507	8,00	2	P	T	300					275	C	7,50	L	-46	P	158 182 138	159										
GF507	8,00	2										7,50	T	-20	P	141 120 123	128										

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

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
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

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

COSIDER S.P.A.

Via giuseppe di vittorio 14
43014 MEDESANO 43014 IT
PR ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
615209	13/06/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32402128	104/LM
DDT	del / date
BOL 32411244	12/06/2024
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 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
1	STAD450205B	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																	
1	STAD450205C	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																	
4	STAD450201A	1954248	10.00X2000X12000	1,88	796530	BO	N	GF503																	

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																
STAD45	0,15	1,40	0,18	0,018	0,003	0,020	0,010	0,020	<0.005	0,033	0,001	0,002	0,002	<0.005	0,0000	0,0032	0,0001	0,0000	0,38	0,39	0,23

			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 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										
GF503	10,00	2	P	T	20		512		38,9	381	P	7,50	T	-50	P	72 76 81	76						HRC <	22			
GF503	10,00	2	P	T	300					260	C	7,50	L	-46	P	149 156 141	149										
GF503	10,00	2										7,50	T	-20	P	140 135 114	130										
GF507	8,00	2	P	T	20		517		40,2	388	P	7,50	T	-50	P	91 108 89	96						HRC <	22			
GF507	8,00	2	P	T	300					275	C	7,50	L	-46	P	158 182 138	159										
GF507	8,00	2										7,50	T	-20	P	141 120 123	128										

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
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. 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

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

A03 N° Certificato / Certificate no.	Z02 Data / Date
615210	13/06/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32402128	104/LM
DDT	del / date
BOL 32411244	12/06/2024
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	B05 PWHT VELOCITA' RISCALDO C/h HEATING RATE	B05 PWHT TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	B05 PWHT PERMANENZA Min HOLDING TIME	B05 PWHT VELOCITA' RAFFREDDAMENTO °C/h COOLING RATE	B05 PWHT TEMPERATURA FINE °C END TEMPERATURE	B05 PWHT N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURA (Q) °C TEMPERATURE	B05 Q+T PERMANENZA (Q) Min HOLDING TIME	B05 Q+T RAFFREDDAMENTO COOLING	B05 Q+T TEMPERATURA (T) °C TEMPERATURE	B05 Q+T PERMANENZA (T) Min HOLDING TIME	B05 Q+T RAFFREDDAMENTO COOLING
1	STAD450205B	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																	
1	STAD450205C	1954462	8.00X2000X12000	1,51	796534	BO	N	GF507																	
4	STAD450201A	1954248	10.00X2000X12000	1,88	796530	BO	N	GF503																	

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																
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	
STAD45	0,15	1,40	0,18	0,018	0,003	0,020	0,010	0,020	<0.005	0,033	0,001	0,002	0,002	<0.005	0,0000	0,0032	0,0001	0,0000	0,38	0,39	0,23

			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	A% ELONGATION	PROOF/YIELD STRENGTH Rp 0.2 [Mpa]	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA WIDTH [mm]	DIREZIONE ORIENTATION (3)	TEMPERATURA TEST TEMPERATURE [°C]	POSIZIONE LOCATION (2)	SINGOLI VALORI INDIVIDUAL VALUES [J]	MEDIA MEAN VALUE [J]	DIREZIONE ORIENTATION (3)	MANDRINO MANDREL [mm]	ANGOLO ANGLE [°]	ESITO RESULT (5)	POSIZIONE LOCATION (2)	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										
ORDINE Min 1													L	-46		16	20										
ORDINE Min 4													L	-46		16	20										
GF503	10,00	2	P	T	20		512		38,9	381	P	7,50	T	-50	P	72 76 81	76						HRC <	22			
GF503	10,00	2	P	T	300					260	C	7,50	L	-46	P	149 156 141	149										
GF503	10,00	2										7,50	T	-20	P	140 135 114	130										
GF507	8,00	2	P	T	20		517		40,2	388	P	7,50	T	-50	P	91 108 89	96						HRC <	22			
GF507	8,00	2	P	T	300					275	C	7,50	L	-46	P	158 182 138	159										
GF507	8,00	2										7,50	T	-20	P	141 120 123	128										

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

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. 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**

COSIDER s.p.A.
Via Di Vittorio, 14 - MEDESANO (PR)
MATE 2204 VO A
BOLL 05072024
DEL
Copia conforme all'originale

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
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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

A03 N° Certificato / Certificate no.	A02 Data / Date
612000	20/05/2024
A08 N° Ordine Trametal / Works order	A07 N° Ordine cliente / Customer's order
32400604	22-2024
DDT	del / date
BOL 32409131	17/05/2024
Pratica / File no.	
del / date	

A06 Cliente / Customer

SIDERURGICA LEONESSA S.R.L.

Via don. Milani 13-19
25020 FLERO 25020 IT
BS ITALIA

8.0 2050 12100
P355NH
RTAA21.02.02.B
ns ddt 4146 del
12/07/2024
Vs.Rif.24/00624
DEL 28/06/24

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
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 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	RTAA210103A	1945914	8.00X2000X12000	1,51	793062	BO	N	GD620																	
2	RTAA210104B	1945920	8.00X2000X12000	1,51	793063	BO	N	GD621																	
2	RTAA210202B	1946006	8.00X2000X12000	1,51	793047	BO	N	GD609																	

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 2																					
Ordine Max 2		1,50										0,050									
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	
RTAA21	0,15	1,36	0,19	0,018	0,005	0,000	0,010	0,020	<0.005	0,030	<0.005	<0.010	0,001	<0.005	0,0000	0,0066	0,0005	0,0003	0,38	0,38	0,23

			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% VALORE MEDIO Z% MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES
ORDINE Min 2													L	-46		27	0										
P355NH Min 0.00 - 16.00					20	355	490		22,0																		

			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	ORIENTATION (3) DIREZIONE	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
P355NH Max 0.00 - 16.00					20		630																				
P355NH Min 6.00 - 999.00													T	-20			30										
GD609	8,00	2	P	T	20	392	514	0,76	32,3		P	7,50	L	-46	P	132 165 160	152						HRC <	22			
GD609	8,00	2										7,50	T	-50	P	75 74 70	73										
GD620	8,00	2	P	T	20	390	515	0,76	30,8		P	7,50	L	-46	P	160 174 171	168						HRC <	22			
GD620	8,00	2										7,50	T	-50	P	111 111 103	108										
GD621	8,00	2	P	T	20	385	514	0,75	30,0		P	7,50	L	-46	P	150 142 158	150						HRC <	22			
GD621	8,00	2										7,50	T	-50	P	65 69 60	65										

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

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	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

COPIA CONFORME ALL'ORIGINALE
Controllo Qualità
Siderurgica Leonessa s.r.l

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**

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
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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

SIDERURGICA LEONESSA S.R.L.

Via don. Milani 13-19
25020 FLERO 25020 IT
BS ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
612001	20/05/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32400604	22-2024
DDT	del / date
BOL 32409131	17/05/2024
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
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 INIZIO °C	VELOCITA' RISCALDO C/h	TEMPERATURE TREATMENT TEMPERATURA TRATTAMENTO °C	HOLDING TIME PERMANENZA Min	COOLING RATE 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
2	RTAA210103A	1945914	8.00X2000X12000	1,51	793062	BO	N	GD620																	
2	RTAA210104B	1945920	8.00X2000X12000	1,51	793063	BO	N	GD621																	
2	RTAA210202B	1946006	8.00X2000X12000	1,51	793047	BO	N	GD609																	

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										0,050									
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					
RTAA21	0,15	1,36	0,19	0,018	0,005	0,000	0,010	0,020	<0.005	0,030	<0.005	<0.010	0,001	<0.005	0,0000	0,0066	0,0005	0,0003	0,38	0,38	0,23

	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 2													L	-46		27	0										
P355GH Min 0.00 - 16.00					20	355	510		20,0																		

			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 DIREZIONE (3)	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	ORIENTATION DIREZIONE (3)	TEMPERATURA [°C] TEST TEMPERATURE	LOCATION POSIZIONE (2)	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	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
P355GH Max 0.00 - 16.00					20		650																				
P355GH Min 6.00 - 999.00													T	-20			27										
GD609	8,00	2	P	T	20	392	514	0,76	32,3		P	7,50	L	-46	P	132 165 160	152						HRC <	22			
GD609	8,00	2										7,50	T	-50	P	75 74 70	73										
GD620	8,00	2	P	T	20	390	515	0,76	30,8		P	7,50	L	-46	P	160 174 171	168						HRC <	22			
GD620	8,00	2										7,50	T	-50	P	111 111 103	108										
GD621	8,00	2	P	T	20	385	514	0,75	30,0		P	7,50	L	-46	P	150 142 158	150						HRC <	22			
GD621	8,00	2										7,50	T	-50	P	65 69 60	65										

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

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	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

COPIA CONFORME ALL'ORIGINALE
Controllo Qualità
Siderurgica Leonessa s.r.l

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**

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

SIDERURGICA LEONESSA S.R.L.

Via don. Milani 13-19
25020 FLERO 25020 IT
BS ITALIA

A03 N° Certificato / Certificate no.	Z02 Data / Date
611999	20/05/2024
A08 N° Ordine Trametal / Works order	A07 N° Ordine cliente / Customer's order
32400604	22-2024
DDT	del / date
BOL 32409131	17/05/2024
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	P355NL1
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 BEGINNING TEMPERATURA INIZIO °C	B05 PWHT HEATING RATE VELOCITA' RISCALDO C/h	B05 PWHT TEMPERATURE TREATMENT TEMPERATURA TRATTAMENTO °C	B05 PWHT HOLDING TIME PERMANENZA Min	B05 PWHT COOLING RATE VELOCITA' RAFFREDDAMENTO °C/h	B05 PWHT END TEMPERATURE TEMPERATURA FINE °C	B05 PWHT N° CICLI / CYCLES	C00 CAMPIONE Q+T SAMPLE	B05 Q+T TEMPERATURE TEMPERATURA (Q) °C	B05 Q+T HOLDING TIME PERMANENZA (Q) Min	B05 Q+T COOLING RAFFREDDAMENTO	B05 Q+T TEMPERATURE TEMPERATURA (T) °C	B05 Q+T HOLDING TIME PERMANENZA (T) Min	B05 Q+T COOLING RAFFREDDAMENTO
2	RTAA210103A	1945914	8.00X2000X12000	1,51	793062	BO	N	GD620																
2	RTAA210104B	1945920	8.00X2000X12000	1,51	793063	BO	N	GD621																
2	RTAA210202B	1946006	8.00X2000X12000	1,51	793047	BO	N	GD609																

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 2																					
Ordine Max 2		1,50										0,050									
P355NL1 Min 0.00 - 60.00		1,10								0,020											
P355NL1 Max 0.00 - 60.00	0,18	1,70	0,50	0,025	0,008	0,300	0,500	0,300	0,080		0,100	0,050	0,030			0,0120				0,43	
RTAA21	0,15	1,36	0,19	0,018	0,005	0,000	0,010	0,020	<0.005	0,030	<0.005	<0.010	0,001	<0.005	0,0000	0,0066	0,0005	0,0003	0,38	0,38	0,23

	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	TEST TEMPERATURE [°C]	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	-46		27	0										
P355NL1 Min 0.00 - 16.00					20	355	490		22,0																		

			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]	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 WIDTH [mm]	DIREZIONE ORIENTATION (3)	TEMPERATURA TEST TEMPERATURE [°C]	POSIZIONE LOCATION (2)	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE ORIENTATION (3)	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
P355NL1 Max 0.00 - 16.00					20		630																				
P355NL1 Min 6.00 - 999.00													T	-40			27										
GD609	8,00	2	P	T	20	392	514	0,76	32,3		P	7,50	L	-46	P	132 165 160	152						HRC <	22			
GD609	8,00	2										7,50	T	-50	P	75 74 70	73										
GD620	8,00	2	P	T	20	390	515	0,76	30,8		P	7,50	L	-46	P	160 174 171	168						HRC <	22			
GD620	8,00	2										7,50	T	-50	P	111 111 103	108										
GD621	8,00	2	P	T	20	385	514	0,75	30,0		P	7,50	L	-46	P	150 142 158	150						HRC <	22			
GD621	8,00	2										7,50	T	-50	P	65 69 60	65										

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

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	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

COPIA CONFORME ALL'ORIGINALE
Controllo Qualità
Siderurgica Leonessa s.r.l

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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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
611996	20/05/2024
A08 N° Ordine Trametal / Works order	A07 N° Ordine cliente / Customer's order
32400604	22-2024
DDT	del / date
BOL 32409131	17/05/2024
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 STEELMAKING PROCESS	B04 PROCESSO ELAB. (A) DELIVERY CONDITION	C00 CAMPIONE SAMPLE	B05 TRATT. CAMPIONE (C) HEAT TREATMENT	C00 CAMPIONE PWHT SAMPLE	B05 PWHT BEGINNING TEMPERATURA INIZIO °C	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURA TRATTAMENTO °C TEMPERATURE TREATMENT	HOLDING TIME PERMANENZA Min	COOLING RATE VELOCITA' RAFFREDDAMENTO °C/h	END TEMPERATURE TEMPERATURA FINE °C	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
2	RTAA210103A	1945914	8.00X2000X12000	1,51	793062	BO	N	GD620																
2	RTAA210104B	1945920	8.00X2000X12000	1,51	793063	BO	N	GD621																
2	RTAA210202B	1946006	8.00X2000X12000	1,51	793047	BO	N	GD609																

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 2																					
Ordine Max 2		1,50										0,050									
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	
RTAA21	0,15	1,36	0,19	0,018	0,005	0,000	0,010	0,020	<0.005	0,030	<0.005	<0.010	0,001	<0.005	0,0000	0,0066	0,0005	0,0003	0,38	0,38	0,23

	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 (4)	LARGHEZZA WIDTH [mm]	DIREZIONE ORIENTATION (3)	TEST TEMPERATURE TEMPERATURA [°C]	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE ORIENTATION (3)	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 2													L	-46		27	0										
P355NL2 Min 0.00 - 16.00					20	355	490		22,0																		

			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]	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 WIDTH [mm]	DIREZIONE ORIENTATION (3)	TEMPERATURA TEST TEMPERATURE [°C]	POSIZIONE LOCATION (2)	SINGOLI VALORI INDIVIDUAL VALUES [J]	MEDIA MEAN VALUE [J]	DIREZIONE ORIENTATION (3)	MANDRINO MANDREL [mm]	ANGOLO ANGLE [°]	ESITO RESULT (5)	POSIZIONE LOCATION (2)	METODO TEST METHOD	SINGOLI VALORI INDIVIDUAL VALUES	MEDIA MEAN VALUE	Z% SINGOLI VALORI Z% INDIVIDUAL VALUES	Z% VALORE MEDIO Z% MEAN VALUE
P355NL2 Max 0.00 - 16.00					20		630																				
P355NL2 Min 6.00 - 999.00													T	-50			27										
GD609	8,00	2	P	T	20	392	514	0,76	32,3		P	7,50	L	-46	P	132 165 160	152						HRC <	22			
GD609	8,00	2										7,50	T	-50	P	75 74 70	73										
GD620	8,00	2	P	T	20	390	515	0,76	30,8		P	7,50	L	-46	P	160 174 171	168						HRC <	22			
GD620	8,00	2										7,50	T	-50	P	111 111 103	108										
GD621	8,00	2	P	T	20	385	514	0,75	30,0		P	7,50	L	-46	P	150 142 158	150						HRC <	22			
GD621	8,00	2										7,50	T	-50	P	65 69 60	65										

C10

UNI EN ISO 6892-1:2020 / UNI EN ISO 148-1:2016

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	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

COPIA CONFORME ALL'ORIGINALE
Controllo Qualità
Siderurgica Leonessa s.r.l

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**

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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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
612002	20/05/2024
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32400604	22-2024
DDT	del / date
BOL 32409131	17/05/2024
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 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 TEMPERATURE °C	TEMPERATURA INIZIO °C	VELOCITA' RISCALDO C/h HEATING RATE	TEMPERATURE TREATMENT TEMPERATURA TRATTAMENTO °C	HOLDING TIME PERMANENZA Min	COOLING RATE 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
2	RTAA210103A	1945914	8.00X2000X12000	1,51	793062	BO	N	GD620																	
2	RTAA210104B	1945920	8.00X2000X12000	1,51	793063	BO	N	GD621																	
2	RTAA210202B	1946006	8.00X2000X12000	1,51	793047	BO	N	GD609																	

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 2																					
Ordine Max 2		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																
RTAA21	0,15	1,36	0,19	0,018	0,005	0,000	0,010	0,020	<0.005	0,030	<0.005	<0.010	0,001	<0.005	0,0000	0,0066	0,0005	0,0003	0,38	0,38	0,23

	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 2													L	-46		27	0										
SA51670LTV Min 0.00 - 20.00					20		485		17,0	260																	

			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)	TEST TEMPERATURA 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)	WIDTH LARGHEZZA [mm]	ORIENTATION DIREZIONE (3)	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
SA51670LTV Max 0.00 - 20.00					20		620																				
SA51670LTV Min 0.00 - 25.00													L	-46			20										
GD609	8,00	2	P	T	20		514		32,3	388	P	7,50	L	-46	P	132 165 160	152						HRC <	22			
GD609	8,00	2										7,50	T	-50	P	75 74 70	73										
GD620	8,00	2	P	T	20		515		30,8	381	P	7,50	L	-46	P	160 174 171	168						HRC <	22			
GD620	8,00	2										7,50	T	-50	P	111 111 103	108										
GD621	8,00	2	P	T	20		514		30,0	380	P	7,50	L	-46	P	150 142 158	150						HRC <	22			
GD621	8,00	2										7,50	T	-50	P	65 69 60	65										

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
2	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

COPIA CONFORME ALL'ORIGINALE
Controllo Qualità
Siderurgica Leonessa s.r.l

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

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.: 612003

Z02 Data / Date: 20/05/2024

A08 N° Ordine Trametal / Works order: 32400604

A07 N° Ordine cliente / Customer's order: 22-2024

DDT: BOL 32409131

del / date: 17/05/2024

Pratica / File no.:

del / date:

A06 Cliente / Customer

SIDERURGICA LEONESSA S.R.L.

Via don. Milani 13-19
25020 FLERO 25020 IT
BS 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	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 TEMPERATURE	PERMANENZA (Q) Min HOLDING TIME	RAFFREDDAMENTO COOLING	TEMPERATURA (T) °C TEMPERATURE	PERMANENZA (T) Min HOLDING TIME	RAFFREDDAMENTO COOLING
2	RTAA210103A	1945914	8.00X2000X12000	1,51	793062	BO	N	GD620																	
2	RTAA210104B	1945920	8.00X2000X12000	1,51	793063	BO	N	GD621																	
2	RTAA210202B	1946006	8.00X2000X12000	1,51	793047	BO	N	GD609																	

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)
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																
Ordine Min 2																					
Ordine Max 2		1,50										0,050									
RTAA21	0,15	1,36	0,19	0,018	0,005	0,000	0,010	0,020	<0.005	0,030	<0.005	<0.010	0,001	<0.005	0,0000	0,0066	0,0005	0,0003	0,38	0,38	0,23

			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		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]	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 WIDTH [mm]	DIREZIONE ORIENTATION (3)	TEMPERATURA TEST TEMPERATURE [°C]	POSIZIONE LOCATION (2)	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	DIREZIONE ORIENTATION (3)	MANDRINO MANDREL [mm]	ANGOLO ANGLE [°]	ESITO RESULT (5)	POSIZIONE LOCATION (2)	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																				

			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]	ReH [Mpa] YIELD STRENGTH	TENSILE STRENGTH Rm [Mpa]	ReH/Rm	A% ELONGATION	Rp 0.2 [Mpa] PROOF/YIELD STRENGTH	FORMA PROVINO (4) SHAPE OF TEST PIECE	LARGHEZZA WIDTH [mm]	DIREZIONE ORIENTATION (3)	TEMPERATURA TEST TEMPERATURE [°C]	POSIZIONE LOCATION (2)	SINGOLI VALORI INDIVIDUAL VALUES [J]	MEDIA MEAN VALUE [J]	DIREZIONE ORIENTATION (3)	MANDRINO MANDREL [mm]	ANGOLO ANGLE [°]	ESITO RESULT (5)	POSIZIONE LOCATION (2)	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 - 25.00													L	-46			20										
ORDINE Min 2													L	-46		27	0										
GD609	8,00	2	P	T	20		514		32,3	388	P	7,50	L	-46	P	132 165 160	152						HRC <	22			
GD609	8,00	2										7,50	T	-50	P	75 74 70	73										
GD620	8,00	2	P	T	20		515		30,8	381	P	7,50	L	-46	P	160 174 171	168						HRC <	22			
GD620	8,00	2										7,50	T	-50	P	111 111 103	108										
GD621	8,00	2	P	T	20		514		30,0	380	P	7,50	L	-46	P	150 142 158	150						HRC <	22			
GD621	8,00	2										7,50	T	-50	P	65 69 60	65										

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

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 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

COPIA CONFORME ALL'ORIGINALE
Controllo Qualità
Siderurgica Leonessa s.r.l

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°*	172124FP/1/1	Pos. n° *Item No*	001÷004	Nome *Name*	COES S.r.l.	Ordine n° *P.O. No.*	2577/24	Ref. / Job	167/24
								Article	L4390

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 ÷ 004	lamiera / sheet metal SA516-70 Sp. / Thk. 8 mm	SA516−70MTLTV STAD45 0205B	STAD45	0205B	METINVEST TRAMETAL S.p.A. ITA (EU)	615207/-206/-205/-202/-200/-209/-210	13/06/2026

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 ÷ 004	172124FP/1/1/001 ÷ 172124FP/1/1/004		SIFEA SA516-70 STAD45 0205B SIFEA	FONDO PSEUDOELLITTICO 2:1 ELLIPSOIDAL HEAD 2:1				

Località - *Location*	Data - *Date*	Incaricato – *Person in charge*
Legnaro (PD)	**28/08/2024**	S.I.F.E.A. S.R.L. CONTROLLO QUALITÀ **Nicola Fierro**

24 2560

CERTIFICATO PROVE MATERIALI N.7143/24 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 11/09/2024
COMMESSA / Mill order / Comf. de commande / Komm 2415031
ORDINE / Order / Commande / Auftrag 2583/24
D.D.T. / Delivery note / Bulletin de livraison / Lieferschein 7.143

CODICE / Line code / Code / Kode	COLATA / Heat / Coulè / Schmelze	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
	5022523 √	venete	F.FLG.ASME B16.5 A/SA350LF2-1 BL √ 150 3" √ . RF √	20	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 %
0,161	0,977	0,014	0,002	0,230	0,084	0,170	0,033	0,001	0,299	0,004	0,000	0,001	0,029	0,011	0,379

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,000	0,000	0,000	0,000	0,000	0,006	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
526,0	340,0	34,0	69,0	158 158	10/10 KV -50°C 71 70 66 J	A	A	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
	265416 √	ABS	F.FLG.ASME B16.5 A/SA350LF2-1 BL √ 150 6" √ . RF √	30	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 %
0,183	1,190	0,011	0,003	0,170	0,070	0,070	0,020	0,003	0,120	0,002	0,006	0,006	0,020	0,007	0,413

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,001	0,000	0,000	0,000	0,001	0,004	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
499,0	323,0	33,0	69,1	147 152	10/10 KV -50°C 41 33 39 J	A	A	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
	278513 √	abs	F.FLG.ASME B16.5 A/SA350LF2-1 WN √ 150 3" √ S.XS RF √	50	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 %
0,181	1,080	0,012	0,002	0,240	0,170	0,120	0,030	0,003	0,160	0,002	0,000	0,003	0,030	0,009	0,420

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %
0,000	0,001	0,000	0,000	0,000	0,001	0,004	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
500,0	320,0	55,0	65,0	148 148	10/10 KV -50°C 64 67 69 J	A	A	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
	33961 √	RIVA	F.FLG.ASME B16.5 A/SA350LF2-1 WN √ 150 4" √ S.XS RF √	60	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 %
0,180	0,920	0,009	0,004	0,210	0,170	0,060	0,001	0,008	0,170	0,001	0,009	0,001	0,025	0,009	0,380

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
518,0	332,0	35,0	62,0	152 152	10/10 KV -50°C 60 55 50 J	A	A	X	X

COES G.Q.
Ricezione data 11/09/2024 Sigla U.S.
Verificato data 13/09/2024 Sigla U.S.

COES SRL
VERIFIED IDENTICAL TO
SA 350 Ed. 2023
U.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 / 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.

-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 Barbieri		

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.7143/24

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 11/09/2024
COMMESSA / Mill order / Comf. de commande / Komm 2415031
ORDINE / Order / Commande / Auftrag 2583/24
D.D.T. / Delivery note / Bulletin de livraison / Lieferschein 7.143

CODICE Line code Code Kode	COLATA Heat Coulè Schmelze	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
	79257 √	RIVA	F.FLG.ASME B16.5 A/SA350LF2-1 BL √ 150 1" √ . RF √	80	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
0,180	0,880	0,011	0,010	0,190	0,140	0,080	0,020	0,022	0,190	0,001	0,011	0,017	0,022	0,010	0,380	
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 Durete Harte	Impact test Resilience Kerbschlagzähigkeit	1	2	3	4
518,0	322,0	34,0	62,0	157 159	10/10 KV -50°C 60 55 56 J	A	A	X	X

CODICE Line code Code Kode	COLATA Heat Coulè Schmelze	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
	295604 √	VENETE-265604	F.FLG.ASME B16.5 A/SA350LF2-1 WN √ 150 2" √ S.160 RF √	90	3

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
0,166	0,974	0,010	0,004	0,221	0,075	0,138	0,031	0,000	0,218	0,001	0,000	0,008	0,024	0,008	0,375	
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 Durete Harte	Impact test Resilience Kerbschlagzähigkeit	1	2	3	4
520,0	330,0	32,0	66,0	152 154	10/10 KV -50°C 56 55 61 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

(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 / 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.

- 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
Vivian 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, 18-09-24 **Our Ref.** DDT 3290 / OC 1731 **of** 18-09-24 **Your Ref.** 2569/24 08-08-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402550

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPL7034115B	STUD BOLT ANSI B1.1 CL.2A - A/SA320 L7 D. 3/4" - 10UNC x 115 ZINC. PLATED 50 - 167/24	20,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	835266	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

COES G.Q. | Ricezione data 18/09/2024 Sigla U.S. | Verificato data 18/09/2024 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 2649

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 3290 / OC 1731 **of** 18-09-24 **Your Ref.** 2569/24 08-08-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402550

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPL7058105B	STUD BOLT ANSI B1.1 CL.2A - A/SA320 L7 D. 5/8" - 11UNC x 105 ZINC PLATED ✓	10,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	835268	BF4049** ✓

60 - 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	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

24 2890

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-02111 | Data / Dated 16.09.2024 Z02

FERRAMENTA INDUSTRIALE BONACINA SRL A06
VIALE EUROPA, 2G - FRAZ. CURNASCO
24048 TREVIOLO BG IT

Ordine / PO	55	A07
Item	006	A07
DDT / Delivery note	2024-3E301-0002054	A10
Packing List	2024-3E401-0002068	A11
Fattura / Invoice	2024-3E401-0002068	A12
Ns. rif. / Our ref.	2024-3E201-0001345-0006	A08

Cod. colata / Heat Code B07	Nr. colata / Heat Nr B07	Quantità / Quantity B08	Descrizione / Description B01 - (B09 - B11)
	23/70335	2,00	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

COPIA CONFORME
AL L'ORIGINALE

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	0,230	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		RESILIENZA / IMPACT TEST					
HBW C31	Tipo/Type C40	Provetta / Test Specimen C41	°C C03	1-Joule C42	2-Joule C42	3-Joule C42	Media/Average C43
160,0 ; 163,0	KV	10x10x55 mm	-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 B08	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.

IL PRESENTE CERTIFICATO È VALIDO PER
CLIENTE CAES
ORDINE N° 2585/24 DEL
N° 2 MT KG
FERR. IND. BONACINA S.r.l. Il 23-09-2024

	Ricezione data	Sigla
COES	18/09/2024	U.S.
G.Q.	Verificato data 01/10/2024	Sigla U.S.

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

24 2891

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-02111 | **Data / Dated** 16.09.2024 Z02

FERRAMENTA INDUSTRIALE BONACINA SRL A06		**Ordine / PO**	55 A07
VIALE EUROPA, 2G - FRAZ. CURNASCO		**Item**	007 A07
24048 TREVIOLO BG IT		**DDT / Delivery note**	2024-3E301-0002054 A10
		Packing List	2024-3E401-0002068 A11
		Fattura / Invoice	2024-3E401-0002068 A12
		Ns. rif. / Our ref.	2024-3E201-0001345-0007 A08

Cod. colata / Heat Code B07	Nr. colata / Heat Nr B07	Quantità / Quantity B08	Descrizione / Description B01 - (B09 - B11)
	19/43358	2,00	W/N 150 RF 6" 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

COPIA CONFORME ALL'ORIGINALE

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	0,195	0,220	1,060	0,007	0,010	0,120	0,050	0,010	0,018	0,120	0,002	0,001	0,008
PRODUCT ANALYSIS	0,193	0,229	1,044	0,009	0,014	0,128	0,044	0,014	0,019	0,123	0,005	0,003	0,006
	Al	B	Ca						CE LF	CE SF	F1	F2	PREN
LADLE ANALYSIS	0,026	0,0001	0,002						0,409	0,372	0,302	0,130	--
PRODUCT ANALYSIS	0,031	0,0000	0,002						0,408	0,367	0,314	0,142	--

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 C10 Test specimen		Forma C10 Shape	°C C03	Snervamento>0,2% C11 Yield Strength>0,2%	Snervamento>1,0% C11 Yield Strength>1,0%	Rottura C12 Tensile	Allungamento C13 Elongation	Contrazione C14 Reduction of area
Sez/Sect mm2	Gauge L.mm	1=O - 2=□		MPa	MPa	MPa	%	%
126,60	50,80	1	20	340,0	--	524,0	38,0	69,0

DUREZZA / HARDNESS C30		RESILIENZA / IMPACT TEST					
HBW C31	Tipo/Type C40	Provetta / Test Specimen C41	°C C03	1-Joule C42	2-Joule C42	3-Joule C42	Media/Average C43
147,0 ; 149,0	KV	10x10 mm	-46	56	49	68	57,7

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. B06 / Marking in acc. to	ANSI/MSS SP-25-2018	Vis. & Dim. D01	SATISFACTORY	Origine B18 / Origin of Steel	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.

IL PRESENTE CERTIFICATO E' VALIDO PER
CLIENTE COES
ORDINE N° 2585/24 DEL
N° 2 MT KG
FERR. IND. BONACINA S.r.l. IL 23-09-2024

COES	Ricezione data 18/09/2024	Sigla V.S.
G.Q.	Verificato data 01/10/2024	Sigla V.S.

UFFICIO CONTROLLO QUALITA' A05 / QUALITY CONTROL DEPARTMENT	ENTE UFFICIALE DI COLLAUDO Z03 / INSPECTION AUTHORITY	MARCHIO PRODUZIONE A04 / MANUFACTURER'S SYMBOL
D. Gaffuri		MFF

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, 08-11-24 **Our Ref.** DDT 4032 / OC 2016 **of** 08-11-24 **Your Ref.** 3045/24 27-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2403109 ✓

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
57P9B7034200B	H.H. SCREW ANSI B18.2.1 - A/SA193 B7 D. 3/4"-10UNC x 2" ZINC PLATED ✓ 140 - 343/24	28,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	837336	246012 ✓

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	1035,6	825,8	21,4	55,0	315

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	0,430	0,840	0,240	0,010	0,0110	1,000	0,203	0,023

COES G.Q.	Ricezione data	Sigla
	08/11/2024	U.S.
	Verificato data	Sigla
	08/11/2024	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 3613

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, 08-11-24 **Our Ref.** DDT 4032 / OC 2016 **of** 08-11-24 **Your Ref.** 3045/24 27-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2403109

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPB7034090B	STUDBOLT ANSI B1.1 CL.2A - A/SA193 B7 - D. 3/4" - 10UNC x 90 ZINC.PLATED √	180,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2	836768	√ 299652
	70 - 343/24			TYPE III		

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	1018,2	818,8	20,0	59,4	309

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	0,411	0,833	0,286	0,009	0,0060	1,027	0,212	0,020

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)

TÜV NORD Italia S.r.l. ISO 9001

Customer: COES S.R.L.
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 08-11-24 **Our Ref.** DDT 4032 / OC 2016 **of** 08-11-24 **Your Ref.** 3045/24 27-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2403109

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPB7058120B	STUDBOLT ANSI B1.1 CL.2A - A/SA193 B7 - D. 5/8" - 11UNC x 120 ZINC.PLATED 80 - 343/24	200,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	836770	300899
TERPB7058135B	STUDBOLT ANSI B1.1 CL.2A - A/SA193 B7 - D. 5/8" - 11UNC x 135 ZINC PLATED 90 - 343/24	60,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	836771	300899
TERPB7058170B	STUDBOLT ANSI B1.1 CL.2A - A/SA193 B7 - D. 5/8" - 11UNC x 170 ZINC.PLATED 100 - 343/24	60,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	836772	300899
TERPB7058090B	STUDBOLT ANSI B1.1 CL.2A - A/SA193 B7 - D. 5/8" - 11UNC x 90 ZINC.PLATED 130 - 343/24	1.000,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	836775	300899

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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BULLONERIA - TIRANTERIA
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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, 08-11-24 **Our Ref.** DDT 4032 / OC 2016 **of** 08-11-24 **Your Ref.** 3045/24 27-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2403109

ITEM	QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.

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	973,5	745,2	23,6	56,8	292

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	0,407	0,822	0,290	0,014	0,0030	1,024	0,202	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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21040 UBOLDO (VA)

TÜV NORD Italia S.r.l. ISO 9001

Customer: **COES S.R.L.**
VIA PONTIDA, 265
24040 STEZZANO (BG)

Date, 08-11-24 **Our Ref.** DDT 4032 / OC 2016 **of** 08-11-24 **Your Ref.** 3045/24 27-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2403109

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
55872H058P00B	HEAVY HEX NUT TAB.10 ANSI B18.2.2 - A/SA194 2H D. 5/8" - 11UNC ZINC.PLATED ✓ 30 - 343/24	3.000,00	quenched tempered @ 580°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	799915	46704 ✓

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	285-285-282	260-261-263	OK @ 177,093 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	0,44	0,72	0,24	0,014	0,026

remarks: Mechanical values see IRCM certificate n. 2066/2024. Chemical values and Macroetch test, at delivery condition, are quoted by the relevant steel work certificate. Nuts hardness test after 24 HRS tempering at 540°C. According to: ASME II part. A ed. 2023. Macroetch test according to ASTM E381 result: S1; R2; C2. 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.

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IPL S.r.l.
BULLONERIA - TIRANTERIA
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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, 08-11-24 **Our Ref.** DDT 4032 / OC 2016 **of** 08-11-24 **Your Ref.** 3045/24 27-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2403109

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5739B7012035B	H.H. SCREW UNI 5739/DIN933 - A/SA193 B7 M 12 x 35 ZINC.PLATED ✓ 170 - 343/24	80,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	836761	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

+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: CML58191	**REV. 0**	**SHEET 1 OF 32**

CUSTOMER:	ROSETTI MARINO S.P.A.
PROJECT:	HOLLANDSE KIST NOORD WIND PARK PROJECT
OBJECT:	PIPING
SERIAL No.:	//
DRAWING:	CCO54058
COES JOB:	167/24

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: CCO54058			LINE: L4580		PAGE 2 OF 8		
POS	**QTY**	**DESCRIPTION**	**MATERIAL**	**MFR**	**CERT**	**HEAT**	**REF.COES**
2	1	ELBOW L.R. 90° 1" Sch. 80	SA420 WPL6	IRC SPA	7859	20673514	24 2892
3	3	FLANGE W.N.1" Sch. 80 150# RF	SA 350 Gr. LF2 Cl.1	FAD SPA	7179/24	77780	24 2940
4	1	TEE1" Sch.80	SA420 WPL6	IRC SPA	7859	02-J6L8102	24 2892
7	219.800 mm	PIPE SMLSS 1 Sch.80	SA 333 Gr. 6	INTERPIPE NIKO TUBE	24A2938	1234196	24 2470
8	855.500 mm	TUBING1/2" x 1,65	SA 213	CHANDAN STEEL LTD	CSL/2024-25/QC/0438	CH-22126	24 2689
9	659.000 mm	TUBING1/2" x 1,65	SA 213	CHANDAN STEEL LTD	CSL/2024-25/QC/0438	CH-22126	24 2689
10	200.000 mm	PIPE SMLSS 1/2 Sch.40	SA 333 Gr. 6	LIBERTY OSTRAVA AS	67077/22/RR	45390YN	24 1147
11	2	WELDOLET DN 1" x 1/2" Sch.80	SA 350 Gr. LF2 Cl.1	VIAR SPA	DV 242354	81620	24 2849

DRAWING: CCO54058			LINE: L4581		PAGE 3 OF 8		
POS	**QTY**	**DESCRIPTION**	**MATERIAL**	**MFR**	**CERT**	**HEAT**	**REF.COES**
2	100.000 mm	PIPE SMLSS1/2 Sch.40	SA 333 Gr. 6	LIBERTY OSTRAVA AS	67077/22/RR	45390YN	24 1147
3	4	FLANGE W.N.1" Sch.80150# RF	SA 350 Gr. LF2 Cl.1	FAD SPA	7179/24	77780	24 2940
4	2	TEE 1" Sch.80	SA420 WPL6	IRC SPA	7859	02-J6L8102	24 2892
5	141.600 mm	PIPE SMLSS1 Sch.80	SA 333 Gr. 6	INTERPIPE NIKO TUBE	24A2938	1234196	24 2470
6	119.800 mm	PIPE SMLSS1 Sch.80	SA 333 Gr. 6	INTERPIPE NIKO TUBE	24A2938	1234196	24 2470
7	119.800 mm	PIPE SMLSS1 Sch.80	SA 333 Gr. 6	INTERPIPE NIKO TUBE	24A2938	1234196	24 2470
8	1	WELDOLET ON 1" x 1/2" Sch.80	SA 350 Gr. LF2 Cl.1	VIAR SPA	DV 242354	81620	24 2849
12	3	ELBOWL.R. 90° 1" Sch. 80	SA420 WPL6	IRC SPA	7859	20673514	24 2892

COES S.R.L. P.O.1146/24 (comm. 617/23) TAL JOB N°424001877
N° 1 MT 6,1 HEAT 45390YN DIMENSIONS 21,3 x 2,77 ITEM 20 - art. F8764

COES SRL
VERIFIED IDENTICAL TO
SA 333 Ed. 2023
U.S.

COES G.Q.	Ricezione data 08/04/2024	Sigla U.S.
	Verificato data 08/04/2024	Sigla U.S.

LIBERTY

A02 **Inspection certificate "3.1" (EN 10 204)**

A03 Document No.: **67077/22/RR** √

A07	Customer's Order (P.O.) No./Item No.: **OF220018**	A08	Manufacturer's Works Order No.: **49069/0/22**
A11	Supplier's Order No.: **3151018564**	A10	Advice - Note No.: **8150086143**
B08, B12/13	Quantity delivered: pcs / bdls: **657**; mtrs / feet: **4016,923**; B13 Actual mass kgs / lbs: **5122**	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: **21,3 X 2,77mm (1/2" SCH40)** √		
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-21,
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 hot finished. (860-945°C). **TS02 Rev.6 for T.A.L.+ LO deviation**

Marking: Manufacturer's mark, mill inspector's stamp

LIBERTY OSTRAVA (1)

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
√ **45390YN**	H	**0,16**	**1,25**	**0,203**	**0,014**	**0,007**	**0,09**	**0,09**	**0,05**	**0,033**	**0,006**	**0,039**	**0,002**	**<0,003**	**0,40**
	P	0,16	1,25	0,203	0,014	0,007	0,09	0,09	0,05	0,031	0,007	0,038	0,002	<0,001	0,40
	P	0,16	1,23	0,200	0,014	0,007	0,09	0,09	0,05	0,031	0,007	0,038	0,002	<0,001	0,40

Z99

B07 Heat No. C00 Specimen No.	MPa C11 Yield Point	MPa C12 Tensile Strength	% (2") C13 Elongation	C40-43 Impact test (KCV2) Ø	min	HRB C30-32 Hardness
C04 Requirements: **L360/X52 Grade 6**	**min. 360 min. 240**	**min. 460 min. 415**	**min. 21,0 min. 30,0**			**max. 99**
	Full size specimen					
45390YN	**411**	**563**	**30,3**			**79 83**
	459	**561**	**30,1**			
	418	**570**	**30,5**			
	401	**557**	**30,3**			
	409	**561**	**35,0**			
	425	**563**	**33,3**			
	409	**555**	**30,3**			

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			**eddy - current** acc. to ASTM E309 - **satisfactory**	X

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 * $\sqrt{S0}$**)

Z99 X continues on page 2/2

Z01 All pipes conform to the above mentioned standards and ordering requirements and agreements.

Z02 Date of issue **11.5.2022/KA**

A01 Liberty Ostrava a.s.
A05 QA Department
Vratimovská 689/117
719 00 Ostrava-Kunčice
Czech Republic

Tel.:++420 595683644
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

E.z. 2574/16/15/P

Approved by MBRONZINI on 13/05/22

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

LIBERTY

A02 **Inspection certificate "3.1" (EN 10 204)**

A03 Document No: **67077/22/RR** Page: **2/2**

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.
Impact strength is guaranteed 27J min. at -52°C without testing due to the small pipe size.

C71-92 Heat (H) and product (P) chemical analyses (%)

B07 Heat No.	C	MN	SI	P	S	CU	NI	CR	AI	MO	V	TI	NB	CEQ

B07 Test results: Heat No.	C00 Specimen No.	C11 Yield Point MPa	C12 Tensile Strength MPa	C13 Elongation %	C40-43 Impact Test		C30-32 Hardness

Z02 Date of issue **11.5.2022/ka**

Tel.:++420 595683644

A01 Liberty Ostrava a.s.
A05 QA Department
Vratimovská 689/117
719 00 Ostrava-Kunčice
Czech Republic

LIBERTY
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 13/05/22

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

REGD. OFFICE :
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Opp. Usmanpura Garden, Ashram Road,
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Tel. : 0091-79-2754 0720 / 2754 0721
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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 2417

TD100437284
Azienda : TLP Pozzo d'Adda

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° CC/PU	VPT/MTC/24/2410			Date / Datum / Date	14.05.2024
Work Order No., Werks Nummer N°	EU23Y-00141	Customer Order No. Kunden Bestellnummer N°	OS-0000012 Dtd: 23.02.2024	Country of Origin Ursprungsland Pays d'origin	India Indien nde
Customer / Besteller / Client	-				
Product / Produkt / Produit	Stainless seamless tubes cold finished / Nahtlose Edelstahlrohre kaltgefertigt / Tubes inoxydable sans soudure,laf				OD
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				HSNcode Zolltarifnummer 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	73041100

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 Rohrendn
				Qty. (Nos.) Stück/pièces	Mtr.	Weight (mt) Gewicht/poids	
---	00330455XD682	33.40mm x 4.55mm / 1" x SCH 80S	6-7m	96	619.08	3.916	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
VIRAJ PROFILES PRIVATE LIMITED	72221192	83.5mm	TP 316/316L	E8071	86.00mm OD X 8.00mm WT X 2.0-2.7m R/L	33.40mm x 4.55mm x 6-7m 1" x SCH 80S x 6-7m	73041101

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.	---
E8071	H	0.022	0.37	1.61	0.035	0.004	16.80	10.02	2.03	0.081	---
	P	0.021	0.35	1.60	0.035	0.003	16.81	10.05	2.09	0.080	---
	P	0.022	0.36	1.62	0.036	0.004	16.82	10.09	2.12	0.082	---

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 Aufweitversuch Evasement EN ISO 8493	Hardness Härteprüfung dureté (A370,ISO 6508-1)	Intergranular corrosion Interkristaline Korrosion	Ultrasonic Ultraschall Ultrason	Eddy Current Wirbelstrom	PMI Verschlungstest	Hydro Wasserabdrucktest (A999/EN 10216-5)		Visual & Dimensional Inspection Dimensions & Masskontrole Contrôle visuel & dimensionel
MPa	Rp0.2 %	Rp1.0 %	50mm G.L.			[EN ISO 3651-2, Method A]	(E213/EN ISO 10893-10)	[EN ISO10893-1]		Test Pressure (psi(g))	Holding Time (Sec.)	
(515-690 MPa)	(205 MPa Min.)	(240 MPa Min.)	40% Min.- FS		(90 HRB Max.)	Practice 'E' (ASTM A 262)		(E426/A450 /A999)				
638.74	299.63	328.75	63.0	Passed	71-73 HRB	Passed	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/SCH... X ...m R/L - EN10216-5 - 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 & TUP01 REV. 1

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/NZ/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.

The materials are free from mercury and radioactive contamination

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 ébauches).

VENUS PIPES AND TUBES LIMITED
Gujarat
WORK INSPECTOR

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
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CIN No. U74140GJ2015PLC082306

F/QA/39 REV. 03

COES G.Q.	Ricezione date 06/09/2024	Sigla U.S.
	Verificato data 06/09/2024	Sigla U.S.

Tubo S/S ASTM A 312 316/316L 33,40 x 4,55 Client Order: 2629/24 Your Code: Your Item: Your Job:
HEAT EB071 OUR ORDER: 2024 SC 79065/ 100 QTY: NR 1,00 MT 6,12 KG 20,00

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

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F/QA/39 REV. 02

Venus Pipes and Tubes Limited (Formerly known as Venus Pipes and Tubes Pvt Ltd)
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+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

Group

Customer **COES SRL**
PO. No.: **2263/24** Item:
N. Pro.:
C. Code:
Cta's Job: **24OC0003184** Date: **09/07/2024**
Kg: **77** Mt.: **24,15**

24 2470

Date:

Heat No.: **1234196**
Pcs No.: **4**

Продукція виготовлена в умовах сертифікованих систем менеджменту якості, навколишнього середовища та безпеки./The products were manufactured in controlled conditions of certified quality, environment and safety management system

(A01)
ТОВ "ІНТЕРПАЙП НІКО ТЬЮБ" Україна,
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Tel./fax +38(0566)639-379

ІНСПЕКЦІЙНИЙ СЕРТИФІКАТ
INSPECTION CERTIFICATE (A02)
EN 10204-2004(3.1)

No : 24A2938
Аркуш / Page 1
Аркушів / Pages 4
Дата / Data 15.01.2024 (A03)

Вантажоодержувач/ Consignee (A06.1) Commerciale Tubi Acciaio S.p.a. Viale Lidice,40, 10095 Grugliasco (TO), ITALY	Контракт №/ Contract # (A07) COC23/2234
	Заводське замовлення/Production order # (A08) 23-010401
Країна/ Country (A06.1) Italy	№ замовлення клієнта/ Customers ref # (A09) PO#SM30121/OS0000108
Транспортний засіб/ Vehicle № BK3700BA/BK5369XT	

(B01,B02,B03) Стан постачання / Dellivery condition	Труби сталеві безшовні гарячекатані для трубопроводів/Seamless steel hot-rolled pipes for pipelines
	ASTM A333/A333M-2018/ ASME SA333/SA333M-2019/ ANSI/NACE MR0175-2021/ISO 15156-2:2020/ ANSI/NACE MR0103/ISO 17945:2015 ✓
	6
	Труби обрізані під прямим кутом./Pipes are cut off under a right angle. ✓
	Кінці труб оснащені пластиковими протекторами./The ends of pipes are equipped by plastic protectors.
	Труби покриті лаком./Pipes are coated with varnish.

Додаткова інформація/Additional information
Твердість відповідає вимогам NACE MR0175/ISO 15156-2:2015/NACE MR0103/ISO 17945:2015 - max 22HRC (100HRB)./Hardness meets the requirements NACE MR0175/ISO 15156-2:2015/NACE MR0103/ISO 17945:2015 - max 22HRC (100HRB).
Виробник труб гарантує роботу удару на основі статистичних даних (18J min/KV -45°C) результатів випробувань на повнорозмірних зразках./The manufacturer of pipes guaranties impact value on the basis of statistical data (18J min/KV -45°C) considering full-size sample testing results.

Термообробка/Heat treatment
Труби виготовлені шляхом гарячої деформації і нормалізовані при температурі 845... 945 град., охолодження на повітрі./Pipes produced by Hot Forming followed by normalizing at the temperature 845 deg C to 945 deg C cooled at air.

№ поз. Item No	(B07.4) Номер пакунка Bundle#	(B07.3) Номери труб Pipe#	(B07.1) Номер плавки Heat# ✓	(B07.2) Номер партії Inspection Lot#	(B08) Зовнішній діаметр OD ✓ мм mm	(B09) Товщина стінки WT ✓ мм mm	(B010) Довжина Length м m	(B11) Загальна довжина Total length м m	(B08) штуки pieces	(B13) Фактична вага Actual weight брутто gross кг kg	нетто net кг kg
1	24-12-00407	101-200	1234196	303	33.4	4.55	6.00-6.10	603,85	100	1935	1925
2	24-12-00409	301-346	1234196	309	33.4	4.55	6.00-6.10	277,71	46	882	872
				NPS 1	Sch 80 XS	РАЗОМ/TOTAL		881,56	146	2817	2797

ПАКУНКІВ/BUNDLES 2

COES G.Q.	Ricezione data 04/09/2024	Sigla U.S.
	Verificato data 10/09/2024	Sigla U.S.

COES SRL
VERIFIED IDENTICAL TO
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Group

Customer **COES SRL**
PO. No.: **2263/24** Item:
N. Pro.: Date:
C. Code:
Cta's Job: **24OC0003184** Date: **09/07/2024** Heat No.: **1234196**
Kg: **77** Mt.: **24,15** Pcs No.: **4**

INTERPIPE

Продукція виготовлена в умовах сертифікованих систем менеджменту якості, навколишнього середовища та безпеки./The products were manufactured in controlled conditions of certified quality, environment and safety management system

(A01)
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ІНСПЕКЦІЙНИЙ СЕРТИФІКАТ
INSPECTION CERTIFICATE (A02)
EN 10204-2004/3.1

No : 24A2938 (A03)
Аркуш / Page 2
Аркушів / Pages 4
Дата / Data 15.01.2024

(C71) **Хімічний склад по сертифікатним даним на заготівку в % /Heat analysis acc.to the billet manufacturer certificate %**

(B07.1) Номер плавки Heat #	C x100	Mn x100	Si x100	S x1000	P x1000	Cr x100	Ni x100	Cu x100	Mo x1000	Ti x1000	V x1000	Nb x1000	Al x1000
min	-	-	-	-	-	-	-	-	-	-	-	-	-
max	-	-	-	-	-	-	-	-	-	-	-	-	-
1234196	17.1	98.7	21.9	4	10	8.1	11.5	19.9	11	4	3	2	28

НД на заготівку/Normative documentation for billets	ТУ №18-2023
Завод виробник/Plant - manufacturer	"Дніпросталь"/"MP"DNEPROSTEEL"LLC
(C70)	Сталь вироблена методом плавління в електродуговій печі з подальшим безперервним розливом. Сталь повністю розкислена та дрібнозерниста. Сталь розкислена алюмінієм. Заготовка виготовлена з чавуну та сталі на ТОВ «МЗ Дніпросталь» (ЄДРПОУ номер 33718431) за адресою: Україна, м. Дніпро, вул. Дніпросталівська 4/ The steel is produced by melting in an electric arc furnace followed by continuous casting. The steel is fully killed and fine-grained. The steel is killed with aluminium. The billet is made of cast iron and steel at "MP"DNEPROSTEEL"LLC (USREOU number 33718431) at the following address: 4, Dneprostalivska Str., Dnipro, Ukraine.
(C93-C99)	Не містить жодних матеріалів або компонентів, що походять з Росії, Білорусі, окупованих територій України (Крим, Донецька, Луганська, Херсонська, Запорізька області), Ірану, Сирії, Північної Кореї чи будь-якої іншої санкційної юрисдикції. Митний код: заготовка, одержана безперервним литтям, кругла, з нелегованої сталі, з масовою часткою вуглецю менш як 0,25 % - 720719/ Does not contain any materials or components originating from Russia, Belarus, the occupied territories of Ukraine (Crimea, Donetsk, Luhansk, Kherson, Zaporizhzhia regions), Iran, Syria, North Korea or any other sanctioned jurisdiction. Customs code: The billets produced by continuous casting, round, of unalloyed steel with a mass fraction of carbon less than 0.25% – 720719

(C72) **Результати контролю хімічного складу метала труб/Results of chemical analysis of pipes**

(B07.1) Номер плавки Heat #	Номер партії Lot#	(C00.1) Зразок Test piece	C x100	Mn x100	Si x100	S x1000	P x1000	Cr x100	Ni x100	Cu x100	Mo x1000	Ti x1000	V x1000	Nb x1000	Al x1000
min			-	-	-	-	-	-	-	-	-	-	-	-	-
max			-	-	-	-	-	-	-	-	-	-	-	-	-
1234196		1	17	96	20	5	8	8	10	19	10	3	1	1	31
		2	16	95	20	5	7	8	10	19	10	3	1	1	31

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Customer **COES SRL**
PO. No.: **2263/24** Item:
N. Pro.: Date:
C. Code:
Cta's Job: **24OC0003184** Date: **09/07/2024** Heat No.: **1234196**
Kg: **77** Mt.: **24,15** Pcs No.: **4**

Продукція виготовлена в умовах сертифікованих систем менеджменту якості, навколишнього середовища та безпеки./The products were manufactured in controlled conditions of certified quality, environment and safety management system

(A01)
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ІНСПЕКЦІЙНИЙ СЕРТИФІКАТ
INSPECTION CERTIFICATE (A02)
EN 10204-2004/3.1

No : 24A2938 (A03)
Аркуш / Page 3
Аркушів / Pages 4
Дата / Data 15.01.2024

Результати випробувань труб - Test results for pipes

Випробування на розтягнення/ Tensile test ASTM A370

(B07.1) Номер плавки Heat#	(B07.2) Номер партії Lot#	(C12) Межа міцності Tensile strength Rm	(C12) Межа міцності Tensile strength t= Rm	(C11) Межа плинності t0,5 Yield strength t0,5	(C11) Межа плинності t0,5 Yield strength t0,5 t=	(C13) Відносне подовження Elongation 50	(C13) Відносне подовження Elongation 50 t=	(C15) Відносне звуження Relative narrowing	(C15) Відносне звуження Relative narrowing t=	(C14) Ставлення Rt/Rm Ratio Rt/Rm	(C02) Орієнтація зразків Spesimens orientation*	(C10.1) Ширина смугового зразка Width of stip specimen	(C10.2) Діаметр циліндричного зразка Diameter of cylindrical specimen	(C10.1) Базова довжина зразка Gauge length
		МПа	МПа	МПа	МПа	%	%	%	%			мм/mm	мм/mm	мм/mm
min		415	-	240	-	24,0	-	-	-	-				
max		-	-	-	-	-	-	-	-	-				
1234196	303	575	-	390	-	30,0	-	-	-	-	L	19		50
1234196	303	575	-	395	-	31,0	-	-	-	-	L	19		50
1234196	303	580	-	400	-	32,0	-	-	-	-	L	19		50
1234196	303	580	-	400	-	32,0	-	-	-	-	L	19		50
1234196	303	580	-	395	-	33,0	-	-	-	-	L	19		50
1234196	303	570	-	395	-	33,0	-	-	-	-	L	19		50
1234196	303	580	-	405	-	30,0	-	-	-	-	L	19		50
1234196	303	575	-	395	-	33,0	-	-	-	-	L	19		50
1234196	303	565	-	390	-	33,0	-	-	-	-	L	19		50
1234196	303	570	-	390	-	32,0	-	-	-	-	L	19		50
1234196	309	570	-	395	-	30,0	-	-	-	-	L	19		50
1234196	309	560	-	385	-	29,0	-	-	-	-	L	19		50
1234196	309	570	-	395	-	32,0	-	-	-	-	L	19		50
1234196	309	560	-	385	-	32,0	-	-	-	-	L	19		50
1234196	309	560	-	385	-	30,0	-	-	-	-	L	19		50
1234196	309	560	-	380	-	32,0	-	-	-	-	L	19		50
1234196	309	555	-	385	-	31,0	-	-	-	-	L	19		50
1234196	309	555	-	390	-	30,0	-	-	-	-	L	19		50
1234196	309	560	-	385	-	31,0	-	-	-	-	L	19		50
1234196	309	565	-	390	-	33,0	-	-	-	-	L	19		50
1234196	309	565	-	390	-	32,0	-	-	-	-	L	19		50
1234196	309	565	-	395	-	33,0	-	-	-	-	L	19		50
1234196	309	555	-	380	-	31,0	-	-	-	-	L	19		50
1234196	309	565	-	395	-	30,0	-	-	-	-	L	19		50
1234196	309	560	-	390	-	29,0	-	-	-	-	L	19		50
1234196	309	555	-	385	-	32,0	-	-	-	-	L	19		50
1234196	309	565	-	400	-	31,0	-	-	-	-	L	19		50
1234196	309	555	-	385	-	33,0	-	-	-	-	L	19		50
1234196	309	565	-	390	-	30,0	-	-	-	-	L	19		50
1234196	309	565	-	395	-	30,0	-	-	-	-	L	19		50

* L - Поздовжній зразок / Longitudinal specimen; T - Поперечний зразок / transverse specimen

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Group

Customer **COES SRL**
PO. No.: **2263/24** Item:
N. Pro.: Date:
C. Code:
Cta's Job: **24OC0003184** Date: **09/07/2024** Heat No.: **1234196**
Kg: **77** Mt.: **24,15** Pcs No.: **4**

Продукція виготовлена в умовах сертифікованих систем менеджменту якості, навколишнього середовища та безпеки./The products were manufactured in controlled conditions of certified quality, environment and safety management system

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ІНСПЕКЦІЙНИЙ СЕРТИФІКАТ
INSPECTION CERTIFICATE (A02)
EN 10204-2004/3.1

No : 24A2938 (A03)
Аркуш / Page 4
Аркушів / Pages 4
Дата / Data 15.01.2024

(C30) **Твердість / Hardness test temperature +20°C**

(B07.1) Номер плавки / Heat #	(B07.2) Номер партії / Lot #	HRB (C31.1) 1	HRB (C31.1) 2	HRB (C31.1) 3	HRB (C32.1) ср.знач./av.	HRC (C31.2)	HB (C31.3) 1	HB (C31.3) 2	HB (C31.3) 3	HB (C31.3) ср.знач./av.	HV (C31.4) 1	HV (C31.4) 2	HV (C31.4) 3	HV (C31.4) 4	HV (C32.4) ср.знач./av.
min		-	-	-	-	-	-	-	-	-	-	-	-	-	-
max		100	100	100	100	22	-	-	-	-	-	-	-	-	-
1234196	303	86	87	85	86	<22	-	-	-	-	-	-	-	-	-
1234196	309	86	86	85	86	<22	-	-	-	-	-	-	-	-	-

(C50,D55)
Інші види контролю / Other tests

Вид випробування/ Type of test	Параметри/ Criteria		Результати контролю/ Test results
Сплющування/ Flattening tes	Труби пройшли випробування на сплющування./Pipes passed flattening test.	100%	Задовільно / Satisfactory
Випробування гідравлічним тиском/ Hydrostatic tes	17,0MPa/5sec.	100%	Задовільно / Satisfactory
Неруйнівний контроль тіла труби/ Non-dectructive inspection full length bod	Метод контролю:/Method:/Вихретоковий контроль:/Eddy current inspection:/Наскрізний отвір діаметром 1.4 мм./Drilled hole with diameter 1.4 mm.	100%	Задовільно / Satisfactory
Візуальний контроль/ Visual inspectio	Вироби піддавалися візуальному огляду і контролю розмірів. / Visual and dimensional test is satisfactory.	100%	Задовільно / Satisfactory
Контроль геометричних параметрів/ Dimensional inspectio	За стандартом./As per Standard.	100%	Задовільно / Satisfactory

(A04,B06)
Маркування фарбою/ Marking paint
{Логотип полный} ASTM A333/A333M/ASME SA333/SA333M/ANSI/NACE MR0175/ISO 15156-2/ANSI/NACE MR0103/ISO 17945 33,4 4,55 6 HF SMLS {HEAT} 17,0MPA {длина трубы в метрах до двух десятичных знаков} {Вес трубы в кг} NPS 1 SCH 80 XS PO#SM30121/OS0000108 {Номер трубы} {месяц год} {Тип покрытия}

(Z01)
Труби виготовлені і випробувані відповідно до вимог ASTM A333/A333M-2018/ ASME SA333/SA333M-2019/ ANSI/NACE MR0175-2021/ISO 15156-2:2020/ ANSI/NACE MR0103/ISO 17945:2015 і замовлення / Pipes were produced and inspected according to requirements of ASTM A333/A333M-2018/ ASME SA333/SA333M-2019/ ANSI/NACE MR0175-2021/ISO 15156-2:2020/ ANSI/NACE MR0103/ISO 17945:2015 and order's requirements

(A05,Z02,Z03)

Дата/Data	
15.01.2024	Підпис особи, відповідальної за видачу сертифікату /Signature of Certificate ispector Васюк Я.В./Vasyuk Ya.V.
INTERPIPE E5	

Вказівка в дужках відповідає кодам згідно EN 10168 /Indication in parentheses correspond to sttributes according to EN 10168.

(Z05)
Ваші пропозиції щодо поліпшення продукції просимо надсилати на ел.адресу / Please send Your proposals for improving the product by e-mail or fax or by phone info@ nstp.interpipe.biz www.interpipe.biz Phone: +380 566-630-133 Fax: +380 566-639-379. e-mail: info@ua.interpipe.biz Phone: +38 (056)74-74-066 Fax: +38(056)770-20-01 Цей інспекційний сертифікат стосується лише перерахованої в ньому продукції. Неприпустимо внесення змін або інше неправомірне використання сертифіката. /This inspection certificateis only for the listed products. Modification or unauthorized use of the certificate is strictly prohibited. Violations can be considered as forgery and is subject to prosecution

Сертификат №24A2938 выдан взамен сертификата №24A398 от 15.01.2024 / Certificate No 24A2938 was issued to replace certificate No 24A398 dated 15.01.2024

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CTA Group

Customer COES SRL
PO. No.: 2263/24
N. Pro.:
C. Code:
Cta's Job: 24OC0003184
Kg: 2030

Item:

Date: 09/07/2024
Mt.: 269,28

24 2475

Date:

Heat No.: R58853
Pcs No.: 24

COD QC-3.1-Ed.2 REV 6/2017

Digitally signed by TMK-ARTROM S.A.
This document is certified to be electronically controlled and approved
Signature requested by Maria Carmen Ioanicu
on 2024-09-22 15:25:40 EET+03:00
The original electronic document can be retrieved by scanning the QR code in the left

TMK-ARTROM S.A.
Drăgănești Str. 30, Slatina, jud. OLT, Romania 230119
Tel: +40 (249) 436862, 434640, 434641
Fax: +40 (249) 434330, 437288
E-mail: office.slatina@tmk-artrom.eu www.tmk-artrom.eu
EUID: ROONRC.J28/9/1991; J28/9/31.01.1991
VAT No. RO 1510210/1992
Subscribed and Paid Share Capital: 291.587.538,34 lei

INSPECTION CERTIFICATE - EN 10204: 2004 / 3.1

No.: E10065 Date: 15.06.2022	Manufacturer's mark :	Customer Order No.: LS-0000024	PL: 13241
CUSTOMER: Commerciale Tubi Acciaio S.P.A.			
Specifications: PED 2014/68/EU (Appendix 1, par. 4.3) + ASTM A333: 18; ASME A333-19; ASME B36.10M:18; ASME Section II part D, TAB.Y1; Spec. MPD-02-PS-GS REV. 1		Dimensions: 60.3 x 5.54 x 10 000 to 11 800 mm Steel: Gr. 6	
Description: Hot rolled seamless steel pipes with bevelled ends ASME B16.25, clear lacquered; marking by painting at one end: TMK-ARTROM, standard/NACE MR, dimensions, steel grade, 7.48 Kg/m, LENGTH (m), 17.0 MPa/NDE, HF, SMLS, 2" XS SCH. 80, LT-45, heat no., LOT, mill inspector no. 5, technical control sign; marking at one end: heat no.			

Heat No.: R58853	LOT no.: 485412		Steel melt and rolled in ROMANIA
Quantity	Pcs	Length m	Weight kg
	216	2423,52	18062

Ladle Chemical Analyse (%)

C	Mn	S	P	Si	Ni	Cr	Mo	Cu	Al	Nb	Ti	N	V	B	Ca
0.18	1.08	0.001	0.014	0.22	0.10	0.05	0.02	0.30	0.021	0.001	0.001	0.009	0.002	.0005	0.002

V+Nb+Ti+Cu+Mo+Cr: 0.374 CEmw=0.401

Product Chemical Analyse (%)

C	Mn	S	P	Si	Ni	Cr	Mo	Cu	Al	Nb	Ti	V	B	Ca
0.18	1.07	0.001	0.015	0.22	0.10	0.05	0.02	0.31	0.024	0.001	0.001	0.001	0.0005	0.002
0.17	1.08	0.001	0.014	0.22	0.09	0.05	0.02	0.31	0.024	0.001	0.001	0.001	0.0005	0.002

Mechanical Properties

Heat treatment: normalized with temperature between 880°C - 940°C and cooled in still air, 10 min Hydraulic test pressure (ASTM A999): 17.0 MPa for 5 sec.: OK Test Eddy Current Acc. ASTM E309 / ISO 10893-1: OK Flattening test (ASTM A999): OK Hot yield at 343°C: 286 MPa (strip longitudinal 5.45 x 5.70 = 31.12 mm²) Hot yield at 538°C: 201 MPa (strip longitudinal 5.45 x 5.50 = 30.02 mm²)	Charpy V-Notch (ASTM A370) KV/Longitudinal 3.33 x 10[mm] 15 (13; 18; 15) J (-60°C) 17 (15; 17; 18) J (-59°C) KVe/Longitudinal 10 x 10[mm] 46 (39; 54; 45) J (-60°C) 50 (45; 51; 54) J (-59°C)	Melting process: electric arc furnace, fully killed Fine grain Hardness HRB: OD: 82 – 83 Hardness HRC max 22 (acc to NACE MR0175/ISO 15156-2; NACE MR0103/ISO 17945) Residual magnetism: max. 20 Gauss: OK

Visual inspection and dimensional check: OK
NO WELD REPAIR ON HEREBY CERTIFIED TUBES
The manufacturer of pipes is certified in acc. with ISO 9001: 2015, ISO 14001:2015 and ISO 45001:2018
THE PRODUCTS DELIVERED ARE CONTROLLED ON RADIOACTIVITY RESPECTIVELY ARE FREE FROM ADDITIONAL IONIC RADIATION AND MERCURY
The material "not contain intentional additions of elements such as lead, selenium, or sulphur to improve machinability"
Steel grade was treated with calcium for the shape control of micro inclusions.
La société TMK ARTROM S.A. garantit que tous le produits, object cu Certificat susdit, respectent en leur Totalité les Specifications de l'article 15 de l'Arrete Ministériel du 24 Mars 1978 modifié.
Cmax 0.25%, Pmax 0.05%, Smax 0.05%, Rm (N/mm2) max700, A(Lo=5.65√So) min.16% long, Rm(A-2) min 10500
E max0.9, A (Lo=5.65√So) min14%trans, RAmin 10500

Additional remarks: The requirements are fulfilled as per Annex 1 – Test results

CHIEF OF QC & TESTING OF THE METALLURGICAL TUBES PRODUCTS
LEITER DER QC & PRÜFUNG DER PRODUKTE VON METALLURGISCHEN ROHREN
Dipl. Eng. Silviu Barbulescu

MILL INSPECTOR
Eng. Constantin Lupu

COES G.Q.
Ricezione data 04/09/2024 Sigla U.S.
Verificato data 10/09/2024 Sigla U.S.

COES SRL
VERIFIED IDENTICAL TO
SA 333 Ed. 2023
U.S.

This MTC is digitally signed and sealed by TMK-ARTROM S.A. IT system. The document is valid without handwritten signatures. To check its authenticity and integrity, please scan the QR code to download the original electronic document from our site. If you already received an electronic copy from your supplier, please make sure that the file is digitally signed by TMK- ARTROM S.A. Falsification of this document is punishable under the legal provisions and entitles us to claim damages.

THIS IS FOR CERTIFY THAT THE MATERIAL HEREIN DESCRIBED HAS BEEN MANUFACTURED WITH THE ORDERED SPECIFICATION AND THAT INFORMATION IS CORRECT, THEY MEET THE SPECIFICATION'S REQUIREMENTS AND ARE RECORDS IN OUR COMPANY DOCUMENTS.

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Group

Customer	COES SRL				
PO. No.:	2263/24	Item:			
N. Pro.:				Date:	
C. Code:					
Cta's Job:	24OC0003184	Date:	09/07/2024	Heat No.:	R58853
Kg:	2030	Mt.:	269,28	Pcs No.:	24

COD QC-3.1-Ed.2 REV 6/2017

TMK-ARTROM S.A.

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E-mail: office.slatina@tmk-artrom.eu www.tmk-artrom.eu
EUID: ROONRC.J28/9/1991, J28/9/31.01.1991
VAT No. RO 1510210/1992
Subscribed and Paid Share Capital: 291.567.538,34 lei

No: E10065
Part 2
Annex:1 ; Page no.: 1/1

Test Results Mechanical Properties

TENSILE TEST (ASTM A370) – at room temperature- Test Specimen / Strip-longitudinal		Rp0.2 MPa	Rm MPa	Elongation %	Rp0.2/ Rm
Dimension – Specimen (mm): 1. 19.45 x 5.8 / 2. 19.0 x 5.75 / 3. 19.05 x 5.8 / 4. 19.15 x 5.8 / 5. 19.15 x 5.85 / 6. 18.95 x 5.45 / 7. 19.0 x 5.85 / 8. 19.45 x 5.75 / 9. 19.05 x 5.5 / 10. 19.45 x 5.5 / 11. 19.0 x 5.6	1.	376	549	32	0.68
	2.	402	542	33	0.74
	3.	398	529	32	0.75
	4.	406	556	31	0.73
	5.	387	544	32	0.71
Section – Specimen (mm^2): 1. 115.23 / 2. 111.48 / 3. 112.77 / 4. 113.38 / 5. 114.36 / 6. 105.35 / 7. 113.43 / 8. 114.23 / 9. 106.91 / 10. 109.24 / 11. 108.56	6.	406	529	32	0.77
	7.	382	537	31	0.71
	8.	401	544	31	0.74
	9.	389	541	32	0.72
Length - Specimen (Lo) (mm): 1. 50.8 / 2. 50.8 / 3. 50.8 / 4. 50.8 / 5. 50.8 / 6. 50.8 / 7. 50.8 / 8. 50.8 / 9. 50.8 / 10. 50.8 / 11. 50.8	10.	396	537	33	0.74
	11.	391	548	31	0.71

CHIEF OF QC & TESTING OF THE METALLURGICAL TUBES PRODUCTS
LEITER DER QC & PRÜFUNG DER PRODUKTE VON METALLURGISCHEN ROHREN
Dipl. Eng. Silviu Barbulescu

MILL INSPECTOR
Eng. Constantin Lupu

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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*				
2627 2680 2681 2703 ns.DdT 832	N. 67589	DEL / *Of* 11/09/2024		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. 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
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*	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

CHANDAN MANNESMANN

CHANDAN STEEL LIMITED

DIN EN ISO 9001:2015 & Certificate Registration No. : 04 100 011022, Valid Until : 23.05.2025

CHANDAN MANNESMANN

INSPECTION CERTIFICATE (EN 10204 / 3.1)

CUSTOMER : TAD LONG PRODUCTS Spa
P.O. NO. : 216656
PO. Date : 17.04.2024
PRODUCT : COLD FINISHED SEAMLESS AUSTENITIC STAINLESS STEEL TUBES
SPECIFICATION : ASTM A 213-23, ASME SA 213 OF SEC II PART A, ED.2023, ASTM A269-2022, EN 10216-5 TC1 ED.2021, NACE MR 0175/ ISO 15156 ED.2021, MR0103 ED.2015 & DIMENSION AS PER EN ISO 1127 D4/T3.
GRADE : TP 316/316L / 1.4401/1.4404
REF. : As per QAP NO. : QAP/SMLS/004/24-25 Rev.01 , Date: 24/05/2024 PO SPECIFICATION: TLP04 REV.00
MANUFACTURING PROCESS OF STEEL :- ELECTRIC MELTING/A.O.D. REFINING /FULLY KILLED CONTINUOUS CASTING.

T.C. NO. : CSL/2024-25/QC/0438
T.C. DATE : 21.07.2024
W.O. NO. : ESC/24-25/0004
W.O. DATE : 19.04.2024

INVOICE NO : EXP/24-25/00530
INVOICE DATE : 21.07.2024

UNIT : SEAMLESS TUBE DIVISION
Plot 142, New G.I.D.C. Expansion,
Umbergaon, Dist.-Valsad,
Gujarat - 396 171, INDIA.
Tel. No. +91 260 3089 850
Fax No. +91 260 3089 872
quality.smls@chandansteel.net
exports.smls@chandansteel.net

PO Item No	SIZE					HEAT NO.	QUANTITY		HYDROSTATIC TEST PRESSURE (Psi)	FLR	DET	FLT	PMI TEST	ECT	VDI	END FINISH	DELIVERY CONDITION
	OD		THICKNESS		LENGTH		PCS	TOTAL									
	IN MM	NPS	IN MM	SCH	IN MM												
430	12.70	-	1.65	-	6000	CH-22126	426	2556.000	1100	S.A.	S.A.	S.A.	S.A.	S.A.	S.A.	P.E.	CFA

PO Item No	HEAT NO.		CHEMICAL COMPOSITION %												
			C	Mn	P	S	Si	Cr	Ni	Mo	N_2	-	-	-	-
	REQ. (MAX.)		0.030	2.00	0.040	0.015	1.00	18.00	13.00	2.50	0.100	-	-	-	-
	REQ. (MIN.)		-	-	-	-	-	16.50	10.00	2.00	-	-	-	-	-
430	CH-22126	H	0.021	1.60	0.039	0.008	0.42	16.57	10.00	2.02	0.070	-	-	-	-
	CH-22126	P	0.023	1.65	0.037	0.007	0.45	16.60	10.07	2.04	0.068	-	-	-	-

MECHANICAL PROPERTIES

PO Item No	Y.S. (Rp0.2%) (N/mm2)	Y.S. (Rp1.0%) (N/mm2)	T.S. (N/mm2)	ELONG. % Min (G.L.= 5.65 √ A)	ELONG. % Min (G.L. = 50mm)	HARDNESS IN HRB	WIDTH OF G.L. (mm)	DIRECTION OF SPEC	Type of Specimen	IMPACT TEST (at RT) (in KV,) 1	2	3	Avg.	METALLURGICAL TESTS MICRO STRUCTURE / GRAIN SIZE
Req. Max	-	-	690	-	-	80	-	-	-					-
Req. Min	205	240	515	40	35	-	-	-	-					-
430	294.01	316.45	606.19	55.25	56.55	74 - 77	-	Long	FULL SIZE	-	-	-	-	-
	272.17	296.78	602.37	56.99	58.39	74 - 75	-	Long	FULL SIZE	-	-	-	-	
	285.06	307.63	601.62	56.04	57.30	72 - 78	-	Long	FULL SIZE	-	-	-	-	
	299.46	326.22	606.82	55.00	56.36	72 - 75	-	Long	FULL SIZE	-	-	-	-	
	293.23	316.77	626.33	55.08	56.36	74 - 76	-	Long	FULL SIZE	-	-	-	-	
	277.60	300.71	615.61	56.26	57.45	73 - 75	-	Long	FULL SIZE	-	-	-	-	
	291.04	316.45	606.60	56.77	58.32	74 - 76	-	Long	FULL SIZE	-	-	-	-	
	295.57	318.17	607.87	55.34	56.84	72 - 77	-	Long	FULL SIZE	-	-	-	-	
	282.23	305.53	626.38	55.54	56.73	74 - 76	-	Long	FULL SIZE	-	-	-	-	
	276.22	301.01	623.83	56.43	57.96	73 - 76	-	Long	FULL SIZE	-	-	-	-	

HEAT TREATMENT : Bright Annealed at 1060 °C ± 20°C temperature followed by rapid air cooling.

REMARKS
1 : 100% Hydrostatic Test carried out by CSL- Found Acceptable.
2 : 100% Eddy Current Test carried out as per EN 10893-1 by CSL - Found Acceptable.
3 : 100% Visual & Dimension Checked by CSL - Found Acceptable.
4 : 100% PMI Checked by CSL - Found Acceptable
5 : IGC Test as per ASTM A262 Practice "E" & EN ISO 3651-2 Method -"A" done by CSL - Found Acceptable
6 : Product analysis carried out by CSL - Found Acceptable.
7 : Mechanical Test (Tensile Test, Flattening Test, Flaring Test, Drift Expanding and Hardness Test as per NACE MR0175/ISO15156-3) done by CSL - Found Acceptable
8 : 100% Marking done by CSL - Found Acceptable
9 : Passivation carried out as per ASTM A 380 - Found Acceptable
10 : Material is free from radio-active & mercury contamination
11 : Reference Material According to PED 2014/68/EU
12 Land of Melting India (Chandan steel Limited)
13 "Material on this invoice does not contain steel products originating in Russia mentioned in Annex XVII to the (EU) Regulation No 833/2014 and further amendment"

MARKING (BY INKJET M/C) : APPROVED ACC. TO PED (2014/68/EU) BY CERTIFICATION BODY FOR PRESSURE EQUIPMENT OF TUV NORD SYSTEMS (NOTIFIED BODY, REG. NO. 0045).
CHANDAN MANNESMANN S.S. SMLS COLD FINISHED TUBE (CFA) ASTM A213/ ASME SA213 ASTM A269 EN 10216-5 TC-1 GRADE --- ----- MM OD X --- MM THK (AVG.) X ----- MM LONG HEAT NO. ------P.O.NO.216656(VSJ)

It is hereby certified that the above results are true and correct in every details and are meeting the requirements of specification & purchase order

LEGENDS: H = HEAT ANALYSIS, P = PRODUCT ANALYSIS, S.A. = SATISFACTORY, N.A. = NOT APPLICABLE, LONG.= LONGITUDINAL, FLR-FLARING TEST, FLT-FLATENING TEST, ECT- EDDY CURRENT TEST, VDI-VISUAL & DIMENSIONAL INSPECTION, G.L.= GAUGE LENGTH, P.E.-PLAIN END, B.E.-BEVEL END, CFD- COLD FINISHED DESCALED, RED. SPEC- REDUCED SPECIEMEN, DET-DRIFT EXPANDING TEST

Format. No.: F860 QC 51 / Rev.0 / Date of Issue: 11/01/2018

CHANDAN STEEL LIMITED V.S.J. WORKS INSPECTOR

FOR, CHANDAN STEEL LIMITED (Q.A.D.)
Mr. Jaydip Rathod - Sr. Engineer
FOR, CHANDAN STEEL LIMITED (Q.A.D.)
Mr. Vaibhav Joshi - DGM QA/QC

CHANDAN STEEL LIMITED QA SEAMLESS TUBE DIVISION

TD100442095

COES G.Q.	Ricezione data 20/09/2024	Sigla V.S.
	Verificato data 20/09/2024	Sigla V.S.

Tubo S/S A. 213/269 316/316L IN 12,70x 1,65 Client Order: 2830/24 Your Code: Your Item: 110/D1577 Your Job:
HEAT CH-22126 OUR ORDER: 2024 SC 79476/ 800 QTY: NR 40,00 MT 240,00 KG 110,00

T.L.P. spa Copia conforme all'originale DDT: 2024 BC 3861 1300 DATE: 20/09/24
24 2689

viar S.p.A.
FORGIATURA MARCORA

COMPANY WITH MANAGEMENT SYSTEM CERTIFIED BY DNV ISO 9001 - ISO 14001 ISO 45001

COMPANY WITH QUALITY SYSTEM CERTIFIED BY DNV ISO/TS 29001

Ufficio e stabilimento / Offices & Plant
VIA DEL SALICCIO, 11/A
21040 SUMIRAGO (VA) - ITALY
Phone +39 0331 271011
Fax +39 0331 908669
http://www.viar.it - E-Mail: info@viar.it

Cert.N°: DV 242354 √
Data/Date: 19/09/2024

CERTIFICATO DI COLLAUDO / INSPECTION CERTIFICATE

UNI EN 10204 (3.1)
SHEET 4 / 4

Cliente / Customer: **MATERIND SRL**
Via Umberto 1° , 36
24050 - BARIANO - BG
IT - Italia

Our job N°. IT 241250 Del 04/09/2024
Ordine / Order N°. OF/STD/2404479
Del / Of 04/09/2024

Pos. Item	Q.tà Q.ty	Descrizione Description	Classe materiale	Cod.Cliente Client code number	Colata n° Heat number	Cod.colata Heat code	Cert.originale Mill certif.	Acciaieria Steel plant	Tratt.Termico Heat Treatment
4	4	VIAR WELD 1" X 1/2" STD SA/A350 LF2 CL.1 √	SA/A350 LF2 CL.1 √		81620 √		33415	ACCIAIERIE VENETE SPA	Normalization

ANALISI CHIMICA / CHEMICAL COMPOSITION

Colata n° Heat n°	C %	Mn %	Si %	P %	S %	Cr %	Ni %	Mo %	Cu %	V %	Nb/Cb %	Sn %	Al %	Ca %	N %	Pb %	Ti %	W %	Fe %	Co %	B %	Ta %	Zr %	Zn %	Sb %	As %	H %	O %
81620	0,1740	1,1300	0,2320	0,0100	0,0130	0,1050	0,1310	0,0420	0,2430	0,0040	0,0030	0,0190	0,0290													0,0180		

Ceq %	PCM %	PREN %	Xbar ppm %	Jfact %	CCfact %	Creq %	Al/N %
0,42							

CARATTERISTICHE MECCANICHE / MECHANICAL PROPERTIES

Colata n° Heat n°	YS.0.2% [MPa]	YS.0.5% [MPa]	TS [MPa]	El %	RA %	YS/TS %	Prove di resilienza -46 [°C] 20/27 / [J] Single Value [J]			Ave [J]	Shear Area [%]			Lat.Exp. [mm]			Durezza HB					Hydro Test	
81620	413,00		584,00	27,50	67,80		86,00	101,00	109,00	98,67							173	176					

ACCORDING TO ASME B31.1/B31.3/B16.11/B16.25/B1.20.1/MSS-SP97-ED.2019
NORMALIZATION AT 920°C. FOLLOWED BY CALM AIR COOLING - MATERIAL FULLY KILLED & FINE GRAIN PRACTICE - NACE MR -0175 / ISO 15156 (latest edition) - NACE MR0103-2016
ACCORDING TO ASME SECTION II part.A ED. 2021 - VISUAL AND DIMENSIONAL CHECKING: SATISFACTORY

COES G.Q.	Ricezione data 27/09/2024	Sigla V.S.
	Verificato data 27/09/2024	Sigla V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 350 Ed. 2023
V.S.

ENTE COLLAUD. / Inspection Agency

VIAR S.P.A. C.C. PAOLO FORNARA

Cliente:531211 COES S.R.L.
Quantità: 4,000
DDT BL/VEN/7195 27/09/2024
Riferimento ordine cliente:. ORD. 2686/24 DEL 4/
Articolo: . WELD-OLET LF2 1/2"X1" STD
N di colata:81620-4
CERTIFICATO CONFORME ALL'ORIGINALE TRUE COPY

MATERIND
0363-958244

24 2892

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

Document no.	7859
Date	16/09/2024
Page	1 / 1
Job order	7859
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

COPIA CONFORME ALL'ORIGINALE

	Item	Quantity	Heat id.
1	CURVA 2" SCH 160 90° LR WPL6	4,00	15L6556
3	TEE 2" SCH 160 WPL6	1,00	J6L8102
4	FONDELLO 4" XS WPL6	2,00	2C001
5	CURVA 1" SCH 160 90° LR WPL6	2,00	187C043
6	CURVA 1" XS 90° LR WPL6	7,00	20673514
7	CURVA 2" XS 90° LR WPL6	2,00	J0L7163
8	R.C. 2" x 1" XS WPL6	1,00	J2K8111
9	TEE 1" XS WPL6	7,00	02-J6L8102
10	TEE 2" XS WPL6	2,00	1095440
11	CURVA 8" STD 90° LR WPB/P265GH	12,00	527632
12	CURVA 5" STD 90° SR WPB/P265GH	12,00	031-843031
13	CURVA 5" STD 45° SR WPB/P265GH	12,00	454151
14	CURVA 6" STD 45° LR WPB/P265GH	8,00	509764

COES G.Q.	Ricezione data 18/09/2024	Sigla U.S.
	Verificato data 01/10/2024	Sigla U.S.

IL PRESENTE CERTIFICATO E' VALIDO PER
CLIENTE ..... COES .....
ORDINE N° ..... 2607/24 DEL .....
N° ..... C.S. ..... MT ..... KG .....
FERR. IND. BONACINA S.r.l. IL 23-09-2024

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 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 Certificate
EN 10204-2004 3.1

Document no. 7859-P4
Purchaser 030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order 36

	Item	Quantity	Heat id.
4	FONDELLO 4" XS WPL6 √	2,00	2C001 √

Specification ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6 √
Method of Fabrication HOT FORMED BTW 780° - 980° C, COOLED IN STILL AIR
Heat Treatment NORMALIZED AT 920°C [1 MIN / MM; 30 MINUTES MINIMUM] AND COOLING IN STILL AIR
Type of construction SEAMLESS MANUFACTURED FROM PLATE (FULLY KILLED STEEL AND FINE GRAIN PRACTICE)
Manufacture standard ASME B16.9 - 2018 / ASME B16.25 - 2018 FIG.2A/3A (AS APPLICABLE)

COPIA CONFORME ALL'ORIGINALE

Ladle Analysis

C%	Mn%	Si%	P%	S%	Ni%	Cr%	Mo%	Cu%	V%	Al%	Ti%	Nb%	B%
0,180	0,980	0,260	0,015	0,005	0,010	0,020	0,001	0,001	0,001	0,029	0,0010	0,0001	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	330	512	30

Impact Test

Direction L **Test Temperature** -46 °C **Test Type** KV

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
7.5 X 10	0,6	Base Mat.	80	98	106	95

Hardness Test

Base Metal **Avg** 146 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	Official Designated Inspector	Purchaser Authorized Inspector

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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:
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FITTING CONNECTIONS
Quality Management System Certified Company

TÜV SÜD ISO 9001

Inspection Certificate
EN 10204-2004 3.1

Document no.	7859-P5
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

	Item	Quantity	Heat id.
5	CURVA 1" SCH 160 90° LR WPL6 √	2,00	187C043 √

Specification	ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6 √
Method of Fabrication	HOT FORMED BTW 780° - 980° C, COOLED IN STILL AIR
Heat Treatment	NORMALIZING AT 920°C [1 MIN / MM, 30 MINUTES MIN] AND COOLING IN STILL AIR
Type of construction	SEAMLESS MANUFACTURED FROM PIPE
Manufacture standard	ASME B16.9 - 2018 / ASME B16.25 - 2018 FIG.2A/3A (AS APPLICABLE)

COPIA CONFORME AI L'ORIGINALE

Ladle Analysis

C%	Mn%	Si%	P%	S%	Ni%	Cr%	Mo%	Cu%	V%	Nb%
0,180	0,670	0,250	0,017	0,007	0,065	0,068	0,030	0,041	0,009	0,0070

CE_{IIW} 0,32

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	308	479	32

Impact Test

Direction L Test Temperature -46 °C Test Type KV

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
5 X 10	0,4	Base Mat.	47	51	46	48

Hardness Test

Base Metal Avg 135 HBW
133 - 137

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)

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IRC SPA
FITTING CONNECTIONS
Quality Management System Certified Company

TÜV SÜD ISO 9001

Inspection Certificate
EN 10204-2004 3.1

Document no.	7859-P6
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

	Item	Quantity	Heat id.
6	CURVA 1" XS 90° LR WPL6 √	7,00	20673514 √

Specification	ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6 √
Method of Fabrication	HOT FORMED BTW 780° - 980° C, COOLED IN STILL AIR
Heat Treatment	NORMALIZED AT 920°C [1 MIN / MM; 30 MINUTES MINIMUM] AND COOLING IN STILL AIR
Type of construction	SEAMLESS MANUFACTURED FROM PIPE
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%	Nb%
0,130	0,950	0,220	0,011	0,004	0,130	0,150	0,020	0,120	0,020	0,0100

CE_{IIW} 0,34

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	319	504	33

Impact Test

Direction L Test Temperature -46 °C Test Type KV

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
2.5 X 10	0,2	Base Mat.	38	41	39	39

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Hardness Test

Base Metal Avg 133 HBW
132 - 134

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.
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FITTING CONNECTIONS
Quality Management System Certified Company

TÜV SÜD ISO 9001

Inspection Certificate
EN 10204-2004 3.1

Document no.	7859-P7
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

	Item	Quantity	Heat id.
7	CURVA 2" XS 90° LR WPL6	2,00	J0L7163

Specification	ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6
Method of Fabrication	HOT FORMED BTW 780° - 980° C, COOLED IN STILL AIR
Heat Treatment	NORMALIZED AT 920°C [1 MIN / MM; 30 MINUTES MINIMUM] AND COOLING IN STILL 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%	Nb%
0,110	1,280	0,230	0,014	0,004	0,020	0,110	0,010	0,020	0	0

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	311	515	32

Impact Test

Direction L Test Temperature -46 °C Test Type KV

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
2.5 X 10	0,2	Base Mat.	37	39	37	38

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AL L'ORIGINALE

Hardness Test

Base Metal Avg 133 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.
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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.	7859-P8
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

	Item	Quantity	Heat id.
8	R.C. 2" x 1" XS WPL6 √	1,00	J2K8111 √

Specification	ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6 √
Method of Fabrication	HOT FORMED BTW 780° - 980° C, COOLED IN STILL AIR
Heat Treatment	NORMALIZED AT 920°C [1 MIN / MM; 30 MINUTES MINIMUM] AND COOLING IN STILL 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%	Ti%	Nb%	B%
0,110	1,280	0,270	0,014	0,001	0,020	0,120	0,010	0,010	0	0,0100	0	0,0001

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	310	469	31

Impact Test

Direction L Test Temperature -46 °C Test Type KV

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
2.5 X 10	0,2	Base Mat.	39	35	37	37

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Hardness Test

Base Metal Avg 134 HBW
131 - 137

NACE MR0175/ISO15156-2:2015 A.2 / NACE MR0103/ISO17945:2015, 13.1 & 15 - Marking: Manufacturer / Size / Wall thickness / Material / Heat Id.
Visual and dimensional check with satisfactory result
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)

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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 Certificate
EN 10204-2004 3.1

Document no.	7859-P9
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

	Item	Quantity	Heat id.
9	TEE 1" XS WPL6	7,00	02-J6L8102

Specification	ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6
Method of Fabrication	TEE COLD FORMED, THEN HEAT TREATED AND MAGNETIC PARTICLE EXAMINATED ACCORDING ASTM E709
Heat Treatment	NORMALIZED AT 920°C [1 MIN / MM; 30 MINUTES MINIMUM] AND COOLING IN STILL 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%	Ti%	Nb%	B%
0,110	1,300	0,240	0,015	0,002	0,030	0,120	0,020	0,010	0	0,0100	0	0,0002

CE_{IIW} 0,36

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	337	487	43

Impact Test

Direction L Test Temperature -46 °C Test Type KV

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
2.5 X 10	0,2	Base Mat.	43	51	56	50

COPIA CONFORME
AL L'ORIGINALE

Hardness Test

Base Metal Avg 138 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.
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TÜV SÜD ISO 9001

Inspection Certificate
EN 10204-2004 3.1

Document no.	7859-P10
Purchaser	030206006018 - FERRAMENTA INDUSTRIALE BONACINA SRL
Order	36

	Item	Quantity	Heat id.
10	TEE 2" XS WPL6	2,00	1095440

Specification	ASTM A 420/A 420M-20 / ASME SA-420/SA-420M-21 WPL6
Method of Fabrication	TEE COLD FORMED, THEN HEAT TREATED AND MAGNETIC PARTICLE EXAMINATED ACCORDING ASTM E709
Heat Treatment	NORMALIZED AT 920°C [1 MIN / MM; 30 MINUTES MINIMUM] AND COOLING IN STILL 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%	Nb%
0,160	1,090	0,260	0,017	0,005	0,020	0,020	0,010	0,010	0,020	0,010	0,0030

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	328	531	33

Impact Test

Direction L Test Temperature -46 °C Test Type ISO-V

Size (mm)	Section (cm2)		Impact Value (J) (1)	(2)	(3)	Avg
2.5 X 10	0,2	Base Mat.	53	51	46	50

COPIA CONFORME AL L'ORIGINALE

Hardness Test

Base Metal Avg 135 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.
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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

DATA / Date - Date - Datum 12/09/2024
COMMESSA / Mill order / Comf. de commande / Komm 2415198
ORDINE / Order / Commande / Auftrag 2633/24
D.D.T. / Delivery note / Bulletin de livraison / Lieferschein 7.179

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
	34903 √	riva	F.FLG.ASME B16.5 A/SA350LF2-1 BL √ 150 4" √ . RF √	10	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 %
0,170	0,990	0,011	0,005	0,220	0,170	0,050	0,020	0,006	0,140	0,001	0,010	0,002	0,028	0,011	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 Kerbschkagzähigkeit	1	2	3	4
518,0	307,0	35,0	67,0	156 156	10/10 KV -50°C 51 55 59 J	A	A	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
	77435 √	RIVA	F.FLG.ASME B16.5 A/SA350LF2-1 WN √ 150 1" √ S.160 RF √	20	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 %
0,195	0,960	0,010	0,010	0,190	0,080	0,060	0,010	0,015	0,200	0,001	0,000	0,020	0,020	0,010	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 Kerbschkagzähigkeit	1	2	3	4
528,0	321,0	36,0	70,0	160 163	10/10 KV -50°C 72 77 65 J	A	A	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
	77780 √	RIVA	F.FLG.ASME B16.5 A/SA350LF2-1 WN √ 150 1" √ S.XS RF √	30	20

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 %
0,150	0,950	0,011	0,005	0,200	0,140	0,060	0,020	0,006	0,160	0,002	0,010	0,002	0,026	0,000	0,360

B %	Ca %	H2 %	O2 %	W %	Sb %	As %	Fe %	Co %	PRE %	%	%	%
0,000	0,002	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
521,0	319,0	35,0	66,0	158 158	10/10 KV -50°C 55 50 47 J	A	A	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
	75485 √	RIVA-75845	F.FLG.ASME B16.5 A/SA350LF2-1 WN √ 150 2" √ S.XS RF √	40	5

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 %
0,145	0,960	0,012	0,005	0,190	0,150	0,060	0,020	0,003	0,160	0,001	0,009	0,002	0,020	0,006	0,350

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
490,0	314,0	34,0	60,0	151 154	10/10 KV -50°C 60 57 58.5 J	A	A	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 105 Ed. 2023
V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 350 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.

(3) X - CERTIFICATO SECONDO ASME SA II ED.: 21 AD.:

(5) $CE = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$

COMMESSA / Mill order / Comf. de commande / Komm 2415198
ORDINE / Order / Commande / Auftrag 2633/24
D.D.T. / Delivery note / Bullettin de livraison / Lieferschein 7.179

CODICE Line code Code Kode	COLATA Heat Coulé Schmelze	CERTIFICATO ORIGINE Certificate of origin Certificat d'usine Werkszzugniss	NORMA / MAT. / DESCRIZIONE Standard / Material / Description Norme / Matériél / Description Standard / Werkstoff / Gegenstand	POS.ORD. Item order Pos. de comm. Auftragstabe	QUANTITA Quantity Quantité Stuckzahl
	79257 ✓	RIVA	F.FLG.ASME B16.5 A/SA350LF2-1 BL ✓ 150 1" ✓ . RF ✓	50	10

P.5

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	0,880	0,011	0,010	0,190	0,140	0,080	0,020	0,022	0,190	0,001	0,011	0,017	0,022	0,010	0,380

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 Duretè Harte	Impact test Resilience Kerbschlagzähigkeit	(1)	(2)	(3)	(4)
518,0	322,0	34,0	62,0	157 159	10/10 KV -50°C 60 55 56 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

(1) PRODUZIONE ACCIAIO / Steel production / Production aciér / 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.

(3) X - CERTIFICATO SECONDO ASME SA II ED.: 21 AD.: ____

(5) $CE = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$

X NACE MR 01-75 ED.: 15

24 3048

VIRAJ PROFILES PRIVATE LIMITED (formerly, Viraj Profiles Limited)(Forgings Div)
Survey No-140/1 & G-75 MIDC, Tarapur Ind.Area, Boisar, Dist.Palghar,Maharashtra-401506,INDIA
Email-vflqc@viraj.com,web.www.viraj.com(A01)

(A02) INSPECTION CERTIFICATE & MILL TEST REPORT - EN 10204 3.1

(A06)CUSTOMER : INTERTUBI VIA ORZINUOVI, 57 - 25125 BRESCIA ITALY Italy	Manufacturer's Symbol (A04)	(A03)MTR NO.	12/240022532/76 / Rev - 00
		INVOICE NUMBER	910037061
		(Z02) DATE	02.07.2024
		MATERIAL SPEC.	ASTM A182/A182M-23/ASME SA182/SA182M-23
			ASME SECT.II PART A-2023
		(B02) GRADE	F316/316L
		DIMENSIONAL SPEC.	ASME B16.5-2020

(B01) : STAINLESS STEEL FORGED FLANGES | (B04) DELIVERY CONDITION : HOT FORGED AND FULLY MACHINED

ISO 9001:2015-TUV NORD REG.No-04100031210/05 EXPIRY DATE: 22.07.2024 & APPROVED ACCORDING TO AD 2000 MERKBLATT W0 & CERTIFIED ACCORDING TO PED (2014/68/EU) BY CERTIFICATION BODY FOR PRESSURE EQUIPMENT OF TUV NORD SYSTEMS (NOTIFIED BODY REGISTRATION NO. -0045)

(A07)ORDER NO: OA24000239	(A08)Sales Order No. 100034696/000080	(A09)Article No:FAB15064

(B09-B11)ITEM DESCRIPTION	(B08)QUANTITY(PCS)	(B07)HEAT NUMBER
4" BLRF 150# .	16	J3340356

(C71-C92) CHEMICAL ANALYSIS

ELEMENT	%C	%Mn	%Si	%S	%P	%Cr	%Ni	%Mo	%Ti	%N
MIN						16.00	10.00	2.00		
MAX	0.030	2.00	1.00	0.030	0.045	18.00	14.00	3.00		0.1000
HEAT	0.019	1.00	0.39	0.002	0.026	16.50	10.07	2.05		0.0500

MECHANICAL PROPERTIES

Test Specification ASTM - A370

(C01) Sample location : Mid thickness-forging	(C03) Test Temp : RT	(C02) Test Direction : Tr	(C10) Sample Shape Round		ASTM E10	

Test Values	(C12) Tensile Strength	(C11) Yield Strength		(C13)	Reduction of Area	(C32) Hardness	(C40) Charpy V-Notch 10x10x55mm Values At +20°C (Joules)			
		Rp=0.2%	Rp = 1%	Elongation%			(C42) Single values			(C43)
	MPA	MPA	MPA	LO=4D	%	BHN	1	2	3	AVG
Req.	515 MIN	205 MIN		30 MIN	50 MIN	237 MAX				
T	597.30	287.16	333.28	59.60	72.96	154	214	190	192	199

Other applicable Specifications :: NACE MR 0175-2021/ISO 15156-2020 NACE MR 0103-2015 & MATERIAL CONFORMS TO W2/W9/W10

Melting Process : Electrical induction furnace & Argon Oxygen decarburization(IRS) Concast

Heat Treatment	: Solution Annealed at 1080°C and water Quenched
Dimensional Inspection	: Conform with the specification (100% inspected)
Surfacequality	: Satisfactory
PMI Test	: No objection (100% tested with mobile spectro)
Corrosion Test	: Passed IGC test in accordance with ASTM A262 Practice E
Micro Observation	: No carbide precipitation observed on grain boundaries
Radioactitivity Test	: We here by certify that all the material is free from radioactive contamination
Mercury Contamination	: Free from mercury contamination

IL PRESENTE DOCUMENTO È VALIDO PER
CLIENTE COES
ORDINE 2630/24
N° 2
2-10-24

CONFORME ORIGINALE

we certify that the above material has been inspected and tested and complies with the order/contract and is of Indian origin
HS Code : 73072100 The material is manufactured /melted in Viraj Profiles Private Limited Steel Mill and is of Indian Origin. Material does not contain steel products originating in Russia mentioned The Russia (Sanctions (EU Exit) (Amendment) Regulations 2023 Regulation 46IA and 46IB and Annex XVII to the (EU) Regulation No 833/ 2014 and further amendment.

VF 1

(Z03)Inspector's Stamp

COES G.Q.	Ricezione data 28/09/2024	Sigla U.S.
	Verificato data 04/10/2024	Sigla U.S.

VIJAY KUMAR PILLAI (GM, QAD)

VIRAJ PROFILES LTD. QUALITY ASSURANCE

24 3050

VIRAJ PROFILES PRIVATE LIMITED (formerly, Viraj Profiles Limited)(Forgings Div)
Survey No-140/1 & G-75 MIDC, Tarapur Ind.Area, Boisar, Dist.Palghar,Maharashtra-401506,INDIA
Email-vflqc@viraj.com,web.www.viraj.com(A01)

(A02) INSPECTION CERTIFICATE & MILL TEST REPORT - EN 10204 3.1

(A06)CUSTOMER : INTERTUBI VIA ORZINUOVI, 57 - 25125 BRESCIA ITALY Italy	Manufacturer's Symbol (A04)	(A03)MTR NO.	12/240009797/73 / Rev - 00.
		INVOICE NUMBER	910033567
		(Z02) DATE	29.03.2024
		MATERIAL SPEC.	ASTM A182/A182M-23/ASME SA182/SA182M-23
			ASME SECT.II PART A-2023
		(B02) GRADE	F316/316L
		DIMENSIONAL SPEC.	ASME B16.5-2020

(B01) : STAINLESS STEEL FORGED FLANGES | (B04) DELIVERY CONDITION : HOT FORGED AND FULLY MACHINED

ISO 9001:2015-TUV NORD REG.No-04100031210/05 EXPIRY DATE: 22.07.2024 & APPROVED ACCORDING TO AD 2000 MERKBLATT W0 & CERTIFIED ACCORDING TO PED (2014/68/EU) BY CERTIFICATION BODY FOR PRESSURE EQUIPMENT OF TUV NORD SYSTEMS (NOTIFIED BODY REGISTRATION NO. -0045)

(A07)ORDER NO: OA24000063	(A08)Sales Order No. 100032360/000960	(A09)Article No:FAWN1508061

(B09-B11)ITEM DESCRIPTION	(B08)QUANTITY(PCS)	(B07)HEAT NUMBER
1" WNRF 150# S80S	42	DL364

(C71-C92) CHEMICAL ANALYSIS

ELEMENT	%C	%Mn	%Si	%S	%P	%Cr	%Ni	%Mo	%Ti	%N
MIN						16.00	10.00	2.00		
MAX	0.030	2.00	1.00	0.030	0.045	18.00	14.00	3.00		0.1000
HEAT	0.022	1.61	0.35	0.026	0.040	17.10	10.07	2.04	0.001	0.0640

MECHANICAL PROPERTIES

Test Specification ASTM - A370

(C01) Sample location : Mid thickness-forging	(C03) Test Temp : RT	(C02) Test Direction : Tr	(C10) Sample Shape Round		ASTM E10	

Test Values	(C12) Tensile Strength	(C11) Yield Strength		(C13)	Reduction of Area	(C32) Hardness	(C40) Charpy V-Notch 10x10x55mm Values At +20°C (Joules)			
		Rp=0.2%	Rp = 1%	Elongation%			(C42) Single values			(C43)
	MPA	MPA	MPA	LO=4D	%	BHN	1	2	3	AVG
Req.	515 MIN	205 MIN		30 MIN	50 MIN	237 MAX				
T	560.44	263.53	301.34	59.00	70.40	154	166	172	188	175

Other applicable Specifications :: NACE MR 0175-2021/ISO 15156-2020 NACE MR 0103-2015 & MATERIAL CONFORMS TO W2/W9/W10

Melting Process : Electrical induction furnace & Argon Oxygen decarburization(IRS) Concast

Heat Treatment	: Solution Annealed at 1080°C and water Quenched
Dimensional Inspection	: Conform with the specification (100% inspected)
Surfacequality	: Satisfactory
PMI Test	: No objection (100% tested with mobile spectro)
Corrosion Test	: Passed IGC test in accordance with ASTM A262 Practice E
Micro Observation	: No carbide precipitation observed on grain boundaries
Radioactitivity Test	: We here by certify that all the material is free from radioactive contamination
Mercury Contamination	: Free from mercury contamination

CONFORME ORIGINALE

IL PRESENTE CERTIFICATO E' VALIDO PER
CLIENTE COES
ORDINE 2630/24
N° 12
PER
IL 2-10-24

HS Code: 73072100 The material is manufactured /melted in Viraj Profiles Private Limited Steel Mill and is of Indian Origin. Material does not contain steel products originating in Russia mentioned The Russia (Sanctions (EU Exit) (Amendment) Regulations 2023 Regulation 46IA and 46IB and Annex XVII to the (EU) Regulation No 833/2014 and further amendment.

VF 1

(Z03)Inspector's Stamp

COES G.Q.
Ricezione data 28/09/2024 Sigla V.S.
Verificato data 04/10/2024 Sigla V.S.

VIJAY KUMAR PILLAI (GM, QAD)

VIRAJ PROFILES LTD QUALITY ASSURANCE

COES G.Q.	Ricezione data 28/09/2024	Sigla U.S.
	Verificato data 04/10/2024	Sigla U.S.

24 3051

JNDIA®

浙江志达管业有限公司

Zhejiang Jndia Pipeline Industry Co.,Ltd

电话tel: +86-577-85826161 传真fax: +86-577-85826565 电子信箱Email: Sales@jndia.com.cn

中国浙江省温州经济技术开发区金海园区滨海六道366号

No.366,Avenue 6,Binhai, Jinhai Industrial Park, Economy& Technology Developing Zone, Wenzhou, 325025, Zhejiang Province, China

COPIA CONFORME ALL'ORIGINALE

产品质量证明书

Mill Test Certificate

压力管道元件 TS Cert. No.:TS2733G94-2028

ISO 9001:2015: 50095-2009-AQ-RGC-RvA

PED 2014/68/EU Cer: 0045/202/WZ/2456/23

AD 2000-Merkblatt W0 Cert. No.: TN/AD2000-W0/2456/23

编号No.:JNDIA/R08-29

证书 Certificate: EN10204 3.1 证书号 Certificate No.:JNDIA2024-GW293-31 ✓ 页次 Page 31 of 40

客 户 Client:Raccortubi S.p.A

订单号PO No.:00000092 ✓

产品描述 Description:STAINLESS STEEL PIPE FITTING

材质 Material:ASME SA403-2023/ASTM A403-2022 WP316/316L

热处理Heat Treatment:Solution annealed & water quenched(1050℃)/20Min

生产标准 Manufacturing Standard:ASME B16.9-ed.2018/B16.25-ed.2017

产品交货情况 Product Delivery:

序号 NO.	品名Description	规格Specification	材质 Material	数量 Quantity(PCS)	炉号 Heat No.	备注Remarks
22	ELBOWS 90° LR ✓	1" SCH.80/S ✓	WP316/316L-S ✓	1000	NY230503AT07	

检测结果（标准要求已符合，见如下表格)Inspection Results(The Requirements are fulfilled as listed in Annex)

A.化学成分 Chemical Composition: [%]

炉号Heat No.		C ≤0.030	Si ≤1.00	Mn ≤2.00	P ≤0.045	S ≤0.030	Cr 16.0-18.0	Ni 10.0-14.0	Nb	N		Mo 2.0-3.0
22	NY230503AT07	0.020	0.338	0.85	0.031	0.0012	16.28	10.02				2.02

B.机械性能 Mechanical Property:

炉号 Heat No.		屈服强度Yield Strength(MPa) ≥205	拉伸强度 Tensile Strength(MPa) ≥515	延伸率 Elongation(%) ≥28	硬度 Hardness (HRC) ≤22	断面收缩率 Reduction of Area(Z%)	冲击试验 Charpy Impact(AK)
		$R_p0.2$	R_m	A50			
22	NY230503AT07	328	591	54	<20/<20/<20	/	/

C.检测及相关数据验证 Inspection and Related Data Verify

尺寸检查 Dimensional Check	SATISFACTORY	晶间腐蚀 Corrosion Test ASTM A262 Practice E	SATISFACTORY
表面检查 Surface Visual Inspection	SATISFACTORY		
光谱分析 100%PMI	SATISFACTORY		

D.备注Remarks:

Cold formed;
Material pickled and passivated ;Material according to NACE MR0175/ISO15156.
HS CODE:730723 Country of origin:China
No materials of Russian origin, as mentioned in Annex XVII to the EU Regulation no. 833/2014 and further amendments, have been used in the whole production cycle.

ZHEJIANG JNDIA PIPELINE INDUSTRY CO., LTD. 浙江志达管业有限公司 质检专用章 QUALITY INSPECTION SPECIAL SEAL

IL PRESENTE CERTIFICATO E' VALIDO PER CLIENTE

制单人：戴睿芸 审 核： 日期： 2024-04-20

Prepared by: Dai RY Reviewed by Date

ORDINE N° 263/24 DEL

N° 5 MT KG

Stamp

COES SRL
VERIFIED IDENTICAL TO
SA 403 Ed. 2023
U.S.

stomer: FERRAMENTA INDUSTRIALE PERR. IND. BONACINA S.r.l. IL 03-10-24 Order: 39 - 41 - Item n.: 2 - Our ref.: OCVEIT202400004168

scription: CURVE 90° LR 1" SCH.80/S SEAMLESS

Heat num. or Pcs. marking: NY230503AT07 - Qty:5.00 Protocol: CTCERC202400008805 * CERTIFIED TRUE COPY

24 3052

BENKAN

THAI BENKAN CO.,LTD.
58 Moo 13 Soi Suksawat 70, Bangkru Phrapadaeng, Samutprakarn 10130. THAILAND
Telephone : 66 (0) 2463 0074. 66 (0) 463 6235-7

MATERIAL INSPECTION CERTIFICATE

To EN10204 3.1/ISO 10474 3.1B

Purchaser Name : RACCORTUBI S.p.A.
TBC PO No. : WS-627 **Customer PO No. :** 00000044 S
Benkan No. : **JOB No. :**

D/M/Y 16/05/2024 **Certificate No. :** T202418003828 **Rev. No. :** 0

Specification for Product	ASTM A403/A403M-22b/ASME SA403/SA403M-23 NACE MR0175-2021/ISO 15156-3 : 2020 & MR0103/ISO 17945 : 2015(R2023)	**MFG No.**	67FSWJ150	**Seamless or Weld**	SEAMLESS	**Pipe/Plate**	PIPE
		Product Description	T WP316S/316LS 1 S80S			**Quantity**	225
		Customer Item No.	39				
Specification for Inspection	ASME B16.9-2018						
Starting Material	**Heat No.** 22J756	**Forming Method**	COLD FORMED				
		Heat treatment	SOLUTION ANNEALING : 1060 C X 30 MINUTES W.Q.				

% Chemical content	C x100	Si x100	Mn x100	P x1000	S x1000	Ni x100	Cr x100	Mo x100
Required Maximum	3.0	100	200	45	30	1400	1800	300
Required Minimum						1000	1600	200
Heat Analysis	2.1	40	109	33	0	1007	1664	207

No Russian materials were used during the whole production cycle.

IL PRESENTE CERTIFICATO E' VALIDO PER
CLIENTE .... COES
ORDINE N° 263/24 DEL ....
N° 4 .... MT .... KG ....
FERR. IND. BONACINA S.r.l. IL 03-10-2024

ORIGINAL

Tension test Gauge length 50 mm.
TP Direction : Longitudinal

MPa	Req.Min.	Req.Max.	Actual results
Yield Strength	205		294
Tensile Strength	515		635
% Elongation	28		62

Hardness test

HBW	Min	Max
	Req Max.	237
Fitting	143	147

Visual Examination	Good
Dimensional Inspection	Good
100 % PMI :	Good

Supplementary Note :
Material comply to the spec. RTX_A403 R.3
The fittings are in accordance with the PED 2014/68/EU
Pickled & passivated acc.to ASTM A380
Intergranular Corrosion test to ASTM A262 Practice E.

We hereby certify that the product described herein has been manufactured in accordance with the specifications concerned and also with the purchaser's requirements and that the test results shown herein are correct.

Akemitsu Kondo
Quality Assurance Manager
Thai Benkan Co.,Ltd.

Form No. TZ-6ZV/0

COES G.Q.	Ricezione data 28/09/2024	Sigla U.S.
	Verificato data 04/10/2024	Sigla U.S.

COPIA CONFORME AL L'ORIGINALE

stomer: FERRAMENTA INDUSTRIALE
scription: TEE UG. 1" SCH.80/S SEAMLESS
Order: 39 - 41 - Item n.: 3 - Our ref.: OCVEIT202400004168
Heat num. or Pcs. marking: 67FSWJ150 - Qty:4.00
Protocol: CTCERC202400008805 * CERTIFIED TRUE COPY

+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: CML58202	**REV. 0**	**SHEET 1 OF 102**

CUSTOMER:	ROSETTI MARINO S.P.A.
PROJECT:	HOLLANDSE KIST NOORD WIND PARK PROJECT
OBJECT:	N2 RECEIVER
SERIAL No.:	S240120
DRAWING:	CCO52842
COES JOB:	167/24

0	V. Girardello	C. Pilenga	01/10/2024	FIRST ISSUE
REV.	**ISSUED BY**	**CONTROLLED BY**	**DATE**	**DESCRIPTION**

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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 oe2000 Thk. 15 L=l500 (Manhole 16" side}	SA 516 Gr.70	METINVEST TRAMETAL SPA	585474	6TAA92	24 2244
2	1	SHELL0e2000Thk.15L=l500	SA 516 Gr.70	MARCEGAGLIA PLATES	16024282884	2377340	24 2245
3	2	ELL. HEAD eìl970 Thk. 15mm (Thk. 12.75mm min.}	SA 516 Gr.70	SIFEA SRL	170149	RTAA56	24 2111
4	4	PLATE 400x400 thk=40 N" 6 HOLES 035	SA 516 Gr.70	MARCEGAGLIA PLATES	51NL110723_C	SB61491	24 2206
5	5160,000 mm	PROFILE HEB 200 L=1290	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.16" Sch.40150# RF	SA 350 Gr. LF2 Cl.I	FAD SPA	7318/24	264199	24 2942
8	1	PAD 0e=510 0i=410 thk=15for Man Hole	SA 516 Gr.70	MARCEGAGLIA PLATES	16024339564	2377407	24 2340
9	1	SHELL oe407 Thk. 15 L=110	SA 516 Gr.70	MARCEGAGLIA PLATES	16024339564	2377407	24 2340
10	2	PAD 0e=320 0i=220 thk=15 for Trunnion	SA 516 Gr.70	MARCEGAGLIA PLATES	16024339564	2377407	24 2340
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	2	FLANGE W.N.I" Sch. XXS 150# RF	SA 350 Gr. LF2 Cl.1	METALFAR PRODOTTI INDUSTRIALI SPA	2024-C_MFF-02111	23/70335	24 2890
14	80,000 mm	PIPE SMLSS 2 Sch.160	SA 333 Gr. 6	ZELEZIARNE PODBREZOVA	13219/01/2024	40870	24 2199
15	80.000 mm	PIPE SMLSS 1 Sch.XXS	SA 333 Gr. 6	TUBOS REUNIDOS GROUP SLU	0000361075/1	129075	24 2220
16	2	COUPLING 112" NPT-F 6000#	SA 350 Gr. LF2 Cl.1	OMSA SRL	001950	SS3	24 1710
18	1	FLANGE 8LIND B16.5 16" 150# RF	SA 350 Gr. LF2 Cl.1	FIL-PEMTO SPA	CER-4492/24	214728	24 2217
20	32	NUT1"UNC	SA 194 Gr.7	IPL SRL	2502548	129388	24 2652
21	16	ST\JD-BOLT 1" UNC x 155	SA 320 Gr.L7	IPL SRL	2402469	296675	24 2458
22	1	ELBOW LR. 90" 1" Sch. XXS	SA 420 WPL6	IRC SPA	6674	F6J23-610619	24 2311
23	502,528 mm	PIPE SMLSS 1 Sch.XXS	SA 333 Gr. 6	TUBOS REUNIDOS GROUP SLU	0000361075/1	129075	24 2220
24	73,000 mm	PIPE SMLSS 1 Sch.XXS	SA 333 Gr. 6	TUBOS REUNIDOS GROUP SLU	0000361075/1	129075	24 2220
25	200,000 mm	PLATE 50 x 6 L=132.5 mm	SA 516 Gr.70	METINVEST TRAMETAL SPA	601191	KTAB75	24 2170
26	I	PLATE 200x55 thk=18 (DAVIT 16' 150#)	SA 516 Gr.70	MARCEGAGLIA PLATES	16021197247	2010434	24 2173
27	I	ROD 0e=100 0i=74 Thk=12	SA 516 Gr.70	METINVEST TRAMETAL SPA	603511	STAD26	24 2169
28	256,000 mm	PIPE SMLSS 2 1/2 Sch.40 L=256	SA 333 Gr. 6	ZELEZIARNE PODBREZOVA	48223/1/2023	33447	24 2201
29	2	PLATE 50x70 Thk. 15 mm FOR DAVIT 16"	SA 516 Gr.70	METINVEST TRAMETAL SPA	589518	STAD09	24 2171
30	1	LIFTING EYE M22x260	SA 350 Gr. Lf2 Cl.1	IPL SRL	2402999	255812	24 3403
32	3	NUT M22 UNI 5587	SA 194 Gr.7	IPL SRL	2402671	85925	24 2862
33	1	BENDING PIPE SMLSS 2" SCH. 40 L=920 (DAVIT 16" 150#)	SA 333 Gr. 6	TENARIS	02-23-27689	733823	24 2472
34	1	ROD 0e=100 0i=61 Thk=l2	SA 516 Gr.70	METINVEST TRAMETAL SPA	603511	STAD26	24 2169
35	1	DISK 0e=48 thk•6	SA 516 Gr 70	METINVEST TRAMETAL SPA	601191	KTAB75	24 2170
36	1	DISK 0e=48 01=12 thk=6	SA 516 Gr.70	METINVEST TRAMETAL SPA	601191	KTAB75	24 2170
37	1	SUPPORT NAMEPLATE 140x120 Thk4mm	SA 516 Gr.70	ARCELORMITTAL MEDITERANEE	730/0177224	730119028	23 2736
38	1	FLANGE W.N.2" Sch.160150# RF	SA 350 Gr. LF2 Cl.1	METALFAR PRODOTTI INDUSTRIALI SPA	2024-C_MFF-01849	23/70486	24 2228
39	1	SCREW -M22 x 100 - UNI 5739	SA 320 Gr.L7	IPL SRL	2402668	38454	242861
40	1	LIFTING LUG A=250 E=l50 HOLE 060 THK=20	SA 516 Gr.70	METINVEST TRAMETAL SPA	609144	YNAA39	24 2172
41	1	EARTHING LUG 70 x 50 Thk6	SA 516 Gr.70	ARCELORMITTAL MEDITERRANEE	730/0333930	730426013	24 2462

INSPECTION CERTIFICATE — NF EN 10204-3.1/DIN 50049-3.1.B/ISO 10474

N° 730/0177224 — Page 2 / FIN

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 (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. contrôlé / Control rolling
TM : Laminage thermomécanique / Thermo-mechanical forming
N : Normalisé / Normalizing
D : Détensionné / Stress relieving
O : 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	A06	210287 A07	GH2ASAM004 000160 A08	SA516G70-SA20/S5 ASME_SA516M-15 HOT ROLLED COIL, AS ROLLED CONE02309M4310000 B01 B02	LTC : LN B04

Traitement de référence (1) Treatment of test samples: BL — 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 Thicknes	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
5239073	730119028	001	1	4,000	1500,00		24148	1	T	P	PRISM	BL	20	454	578	27,9												

COES G.Q. — Ricezione data 13/10/2023 — Sigla — Verificato data 13/10/2023 — Sigla

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 730119028	C71 0,165	C72 1,408	C73 0,015	C74 0,002	C75 0,208	C76 0,032	C77 0,0001	C78 0,026	C79 0,019	C80 0,004	C81 0,004	C82 0,008	C83 0,020	C84 0,015	C85 0,002	C86	C87	C88	C89	C90 0,029	C91 0,068	C92	C96	C97		

Emplacement/Location(2): 1 Tête / Head, 2 Pied / Bottom, 3 1/2 longueur / Length — C01 — X:Divers / Mix

(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

(5)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

23-2736

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
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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
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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

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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

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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
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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

(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 (Q) COOLING	RAFFREDDAMENTO	TEMPERATURA (T) °C TEMPERATURE	HOLDING TIME (T) Min	PERMANENZA (T) 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	
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
Registered office: Via XII Ottobre 1, 5° piano - 16121 Genova, Italy
Phone +39 010 5762911 - Fax +39 010 5762990
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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
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

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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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

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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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

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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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.	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
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.: 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
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

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	COOLING RAFFREDDAMENTO	TEMPERATURA (T) °C TEMPERATURE	HOLDING TIME PERMANENZA (T) Min	COOLING RAFFREDDAMENTO
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 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

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
13219/01/2024

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
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 S.COZZANI on 18/03/24

ŽELEZIARNE® PODBREZOVÁ

Inšpekčný certifikát
Inspection certificate
Certificato di collaudo
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/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
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 S.COZZANI on 18/03/24

ŽELEZIARNE® PODBREZOVÁ

Inšpekčný certifikát
Inspection certificate
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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	

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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

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

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
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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

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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**

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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

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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
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 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
Phone: +421 48 645 3031, Fax: +421 48 645 3032, www.steeltube.sk
CIN: 31 562 141, VAT No: SK2020458704
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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 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

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
BL : Brut de laminage / As rolled
LN : Laminage normalisant / Normalisation 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 / 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 2220

COES S.R.L. P.O. 2217/24 (comm.687/23 + mag) TAL JOB N°424004085 OUR DDT N°402401642 OF 25/07/24
N° 1 MT 5,79 HEAT 129075 DIMENSIONS 33,4 x 9,09 ITEM 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 25/07/2024 Sigla U.S. | Verificato data 25/07/2024 Sigla U.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 U.S.

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 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

Approved by QUALITY1 on 02/02/23

TAL SPA - THIS DOCUMENT IS REPRODUCED BY A COMPUTERIZED SYSTEM AND IS CONFORM TO THE ORIGINAL

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 2244

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

COES SRL
VERIFIED IDENTICAL TO
SA 516 Ed. 2023
U.S.

A03 N° Certificato / Certificate no.	Z02 Data / Date
585474	28/06/2023
A08 N° Ordine Trametal / Works order	**A07 N° Ordine cliente / Customer's order**
32302773	98-2023
DDT	del / date
BOL 32312359	27/06/2023
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
Norma / Specification	ASME

COES G.Q.
Ricezione data 11/07/2024 Sigla U.S.
Verificato data 29/07/2024 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
4	6TAA922503A	1872928	12.00X2000X12000	2,26	765466	BO	N	GH253																	
7	6TAA920305B	1873127	15.00X2000X12000	2,83	765446	BO	N	GH243																	
8	6TAA922604A	1873014	15.00X2450X12000	3,46	765463	BO	N	GH250																	
8	6TAA922604B	1873014	15.00X2450X12000	3,46	765463	BO	N	GH250																	

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 4																					
Ordine Max 4		1,50										0,050									
Ordine Min 7																					
Ordine Max 7		1,50										0,050									
Ordine Min 8																					
Ordine Max 8		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																
6TAA92	0,16	1,50	0,18	0,018	0,005	0,020	0,020	0,040	0,010	0,031	0,001	0,001	0,002	<0.005	0,0000	0,0048	0,0002	0,0002	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	ORIENTATION DIREZIONE (3)	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	ORIENTATION DIREZIONE (3)	TEMPERATURA [°C] TEST TEMPERATURE	POSIZIONE (2) LOCATION	SINGOLI VALORI [J] INDIVIDUAL VALUES	MEDIA [J] MEAN VALUE	ORIENTATION DIREZIONE (3)	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 4													L	-46		27	0										
ORDINE Min 7													L	-46		27	0										
ORDINE Min 8													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										
GH243	15,00	2	P	T	20		516		34,1	380	P	10,00	L	-46	P	225 192 200	206						HRC <	22			
GH243	15,00	2										10,00	T	-50	P	81 76 92	83										
GH250	15,00	2	P	T	20		519		33,5	380	P	10,00	L	-46	P	173 198 223	198						HRC <	22			
GH250	15,00	2										10,00	T	-50	P	77 85 113	92										
GH253	12,00	2	P	T	20		517		35,9	379	P	10,00	L	-46	P	159 187 203	183						HRC <	22			
GH253	12,00	2										10,00	T	-50	P	67 74 80	74										

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
4		EN 10029 CL.C	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
7		EN 10029 CL.C	-0+100 MM	-0+200 MM	EN 10163/2 CL B3	EN 10029 CL. N
8		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

COPIA CONFORME ALL'ORIGINALE
Controllo Qualità
Siderurgica Leonessa s.r.l

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**

MARCEGAGLIA PLATES

Marcegaglia
46040 Via Bresciani, 16-Gazoldo degli Ippoliti Mantova-It
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 SIGN | Number/Numero 16024282884 | Creato il 19/04/2024

Product: Hot Rolled Heavy Plates
NormaCollaudoLamieraTreno: ASME-SA516-23
Steel grade:: GR-70N

Customer/Cliente
SIDERURGICA LEONESSA S.R.L.
VIA DON MILANI 13/19
25020 FLERO IT

Code: 0000016639

Del. Address/Destinatario Merci
SIDERURGICA LEONESSA S.R.L.
VIA DON MILANI 13/19
25020 FLERO IT

Delivery/N° Consegna 8920506751
Of/Del 19/04/2024
Delivery note nr/N° doc. di trasp. 1060005216

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
15,00 X 2000,00 X 12000,00 GR-70N

Surface Quality: EN10163-2 CL B3
Flatness: rif EN 10029 cl. S
Thickness tolerance: EN10029 CLASSE C

Delivery Condition: NORMALIZED IN FURNACE
Steel Making Process: BO= Basic oxigen

Order Nr/ordine **1191736601/60**
Materiale Cliente

Client Order/Ordine cliente **59-2024**
Client Date/data cliente **4/03/2024**

Item	Batch/N° Partita	Heat/Colata	Quantity/Q.tà KG	Quantity/Q.tà PZZ
1	24E9005828	2377340	2880	1
2	24E9005833	2377320	2880	1

Remarks/Note:
Manufacturer has a Quality-Assurance System with specific assessment for materials 2014/68/EU - ANNEX I -SECTION 4.3 Certified by TÜV AUSTRIA
ASME SA516 BPVC.II.A - Ed.2023 / Markings: acc. to SA20 Par. 12.1.7 & 13.1 "LTV" SA516"MT"
Nb content on heat analysis up to 0,05%, acc. to A/SA20 Table 1 opt. E
A/SA20 Supplementary Requirements S5: Charpy V-Notch Impact Test
Heat treatment : temperature 910 +/- 10°C, soaking time: 30 min/inc , cooling in still air
Fully 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	0.025	0.3	0.4	0.4		0.12	0.05	0.02	0.03	0.012		
24E9005828	.160	1.472	.185	.0030	.0140	.016	.006	.008	.038	.0010	.029	.001	.0020	.0040	.0000	.41
24E9005833	.158	1.473	.237	.0020	.0110	.015	.007	.009	.039	.0010	.032	.001	.0020	.0040	.0000	.41

Batch/N° Partita	Forma	(1)	(2)	(3)	Tst [°C]	Rm [N/mmq]	Rp 0.2 [N/mmq]	E-2in (%)	(1b	(2b	(3b	(4b)	T [°C]	Kv1 [J]	Kv2 [J]	Kv3 [J]	Kv^a [J]	HB	TESTN
					20	485	260	21					-50						
					20	620													
24E9005828	P	1	P	T	20	511	370	32.0	1	P	T	10.0	-50	163	135	168	155	154	24-4983N
24E9005833	P	1	P	T	20	530	380	30.0	1	P	T	10.0	-50	55	68	75	66	160	24-4970N

COES G.Q.
Ricezione data 11/07/2024 Sigla V.S.
Verificato data 29/07/2024 Sigla 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

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
- We hereby declare that the above mentioned material have been rolled in Italy, thus of European Community origin

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.(4)Spessore provino

DescrizioneMarchi

COPIA CONFORME ALL'ORIGINALE
Controllo Qualità
Siderurgica Leonessa s.r.l

24 2245

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

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 16024339564 Creato il 16/05/2024

Product: Hot Rolled Heavy Plates
NormaCollaudoLamieraTreno: ASME-SA516-23
Steel grade:: GR-70N

Customer/Cliente
SIDERURGICA LEONESSA S.R.L.
VIA DON MILANI 13/19
25020 FLERO IT

Code: 0000016639

Del. Address/Destinatario Merci
SIDERURGICA LEONESSA S.R.L.
VIA DON MILANI 13/19
25020 FLERO IT

Delivery/N° Consegna 8920532900
Of/Del 16/05/2024
Delivery note nr/N° doc. di trasp. 1060006344

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
15,00 X 2500,00 X 12000,00 GR-70N

Surface Quality: EN10163-2 CL B3
Flatness: rif EN 10029 cl. S
Thickness tolerance: EN10029 CLASSE C

Delivery Condition: NORMALIZED IN FURNACE
Steel Making Process: BO= Basic oxigen

Order Nr/ordine **1191740496/40**
Client Order/Ordine cliente **66-2024**
Materiale Cliente
Client Date/data cliente **12/03/2024**

Item	Batch/N° Partita	Heat/Colata	Quantity/Q.tà KG	Quantity/Q.tà PZZ
1	24EG003994	2377407	3600	1

Remarks/Note:
Manufacturer has a Quality-Assurance System with specific assessment for materials 2014/68/EU - ANNEX I -SECTION 4.3 Certified by TÜV AUSTRIA
ASME SA516 BPVC.II.A - Ed.2023 / Markings: acc. to SA20 Par. 12.1.7 & 13.1 "LTV" SA516"MT"
Nb content on heat analysis up to 0,05%, acc. to A/SA20 Table 1 opt. E
A/SA20 Supplementary Requirements S5: Charpy V-Notch Impact Test
Heat treatment : temperature 910 +/- 10°C, soaking time: 30 min/inc , cooling in still air
Fully 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	0.025	0.3	0.4	0.4		0.12	0.05	0.02	0.03	0.012		
24EG003994	.161	1.481	.215	.0030	.0110	.024	.013	.020	.046	.0010	.028	.001	.0020	.0040	.0000	.42

Batch/N° Partita	Forma	(1)	(2)	(3)	Tst [°C]	Rm [N/mmq]	Rp 0.2 [N/mmq]	E-2in (%)	(1b	(2b	(3b	(4b	T [°C]	Kv1 [J]	Kv2 [J]	Kv3 [J]	Kv² [J]	HB	TESTN
					20	485	260	21					-50						
					20	620													
24EG003994	P	1	P	T	20	538	392	30.0	1	P	T	10.0	-50	75	79	116	90	163	24-6008N

COPIA CONFORME ALL'ORIGINALE
Controllo Qualità
Siderurgica Leonessa s.r.l

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°

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;(4)Spessore provino

DescrizioneMarchi

COES G.Q.
Ricezione data 02/08/2024 Sigla U.S.
Verificato data 08/08/2024 Sigla U.S.

- 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
- We hereby declare that the above mentioned material have been rolled in Italy, thus of European Community origin

24 2340

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

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.
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

INSPECTION CERTIFICATE NF EN 10204-3.1/DIN 50049-3.1.B/ISO 10474

N° 730/0333930 ✓ Page 2 / FIN

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
BL : Brut de laminage / As rolled
LN : Laminage normalisant / Normalisation 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
M : 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
RECEPTION USINE A05	SIDERURGICA ASTICO SPA VIA ASTICO 44 I-36030 FARA VICENTINO ITALIE A06	240004/115 A07	GH40SID012 000115 A08	SA516G70-SA20/S5 ASME_SA516M-15 ✓ HOT ROLLED COIL, AS ROLLED B01 B02

Etat de livraison / Delivery condition (1): 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	C062	C10		C03	C11	C12	C13	<-C14-C29		C60-C69->		C01		C40	C02	C08	C62	<-	--C42--	->	C43
5768015	730426013 ✓	001	1	6,000	1500,00		20796	1	T	P	PRISM	BL	20	469	598	23,6					1	N	KV	T	- 51	P	74	75	78	76

COES SRL
VERIFIED IDENTICAL TO
SA 516 Ed 2023
U.S.

COES G.Q.
Ricezione data 10/09/2024 Sigla U.S.
Verificato data 10/09/2024 Sigla U.S.

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
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		730426013	0,168	1,447	0,018	0,001	0,223	0,029	0,0003	0,020	0,009	0,005	0,006	0,010	0,008	0,015	0,001					0,025	0,041						

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 21/05/24
Agent / Receiving Agent
F. SIXDENIERS
Z02

142

24 24462

Tenaris

INSPECTION CERTIFICATE
CERTIFICAT DE INSPECTIE
(UNI EN 10204 3.1 / ISO 10474 3.1)

Number / Numar:	Page / Pagina:
02-23-27689	1 / 10

Date / Data: November 06, 2023

Silcotub S.A. Plant
93, Mihai Viteazul Blvd.
458131 Zalău, Sălaj
România
Tel: + 40 260 620720
Fax: + 40 260 661581

Customer / Client: **COMMERCIALE TUBI ACCIAIO SPA**		Customer's Order Item / Comanda clientului - Item: **SM30072**	Customer's Reference / Referinta clientului: .	Manufacturer's Works Order N° / Comanda de vanzare: **2223023/008**
Manufacture Process / Proces de fabricatie: **NORMALIZED** **NORMALIZATE**	Product Type / Tip de produs: **See note nr.1** **vezi nota nr.1**			Surface / Suprafata: **See note nr.2** **vezi nota nr.2**
Standard or Specification / Norma sau specificatie: **See note nr.3** **vezi nota nr.3**		Steel Grade / Grad de otel: **STEEL GR 6 ASTM A 333 AND ASME SA 333 NDE** **OTEL GR 6 ASTM A 333 AND ASME SA 333 NDE**		Ends / Capete: **See note nr.4** **vezi nota nr.4**
Dimensions / Dimensiuni: **ø2.375" O.D. x .154" W.T.** **ø60.30mm O.D. x 3.91mm W.T.**	Schedule / Program: **40** .	Length / Lungime: **32.808 ft ÷ 38.714 ft** **10000 mm ÷ 11800 mm**	Quantity / Cantitate: **384Pcs/buc.** **14259'00 ft** **51859,2 lb** **4346.15 mt** **23523 kg**	Nominal Weight / Greutate nominala: **3.65 lb/ft** **5.43 Kg/m**

DELIVERY NOTES / NOTE DE LIVRARE

Delivery Notes / Note de livrare	Delivery Notes / Note de livrare
Job Number / Nr. Comanda interna: 0031368106 / 000350	Town / Oras: 10095 GRUGLIASCO.
Shipping Note / Aviz de expeditie: 0105483991 - 06/11/2023	Country / Tara: Italy
Address / Adresa: VIALE LIDICE, 40	

TENSILE TEST / TEST DE TRACTIUNE

Heat N° / Sarja N°	Sample N° / Proba N°	Lot N° / Lot N°	Specimen condition / Conditie epruveta				Specimen dimensions / Dimensiuni epruvetelor		Test temp / Temp de incercare	Y.S. OffSet 0.2% Min: 240.00 Max: --	U.T.S. Req. Min: 415.00 Max: --	Y.S./U.T.S Req. Max. 0.85	Elongation / Alungire			
			Ls	Sc	Type / Tip	Ori	Size / Dimensiune	Area / Sectiune					Lo		Min.	Obt.
							mm	mm2	°C	MPa	MPa		cal.	mm	%	%
733823	C3861/AA	6	B	AM	Ss	L	12.85 x 3.95	51.20	+20	294.00	430.00	0.68	2"	50.0	22.4%	33.5%
733823	C3862/AA	6	B	AM	Ss	L	12.80 x 3.85	49.70	+20	305.00	453.00	0.67	2"	50.0	22.4%	34.0%
733823	C3863/AA	6	B	AM	Ss	L	12.70 x 3.98	51.00	+20	296.00	441.00	0.67	2"	50.0	22.4%	34.0%
733823	C3864/AA	6	B	AM	Ss	L	12.78 x 4.12	53.10	+20	303.00	437.00	0.69	2"	50.0	22.4%	34.0%
733823	C3865/AA	6	B	AM	Ss	L	12.65 x 4.10	52.30	+20	298.00	443.00	0.67	2"	50.0	22.4%	34.5%
733823	C3866/AA	6	B	AM	Ss	L	12.80 x 3.85	49.70	+20	308.00	453.00	0.68	2"	50.0	22.4%	31.0%
733823	C3867/AA	6	B	AM	Ss	L	12.75 x 3.68	47.30	+20	326.00	474.00	0.69	2"	50.0	22.4%	33.5%
733823	C3868/AA	6	B	AM	Ss	L	12.75 x 3.88	49.90	+20	301.00	447.00	0.67	2"	50.0	22.4%	33.0%
733823	C3869/AA	6	B	AM	Ss	L	12.60 x 4.05	51.50	+20	297.00	444.00	0.67	2"	50.0	22.4%	31.0%
733823	C3870/AA	6	B	AM	Ss	L	12.62 x 3.88	49.40	+20	295.00	436.00	0.68	2"	50.0	22.4%	35.5%
733823	C3871/AA	6	B	AM	Ss	L	12.68 x 3.90	49.90	+20	304.00	452.00	0.67	2"	50.0	22.4%	33.5%
733823	C3872/AA	6	B	AM	Ss	L	12.65 x 4.10	52.30	+20	304.00	446.00	0.68	2"	50.0	22.4%	36.0%

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COES G.Q.

Ricezione data	Sigla
04/09/2024	V.S.
Verificato data	Sigla
10/09/2024	V.S.

COES SRL
VERIFIED IDENTICAL TO
SA 333 Ed. 2023
V.S.

CTA Group - This document is reproduced by a computerized system and is conforming to the original - page 1 of 10

Customer: COES SRL
PO. No.: 2263/24
N. Pro.:
C. Code:
Cta's Job: 24OC0003184
Kg: 307

Item:
Date: 09/07/2024
Mt.: 56,85

Date:
Heat No.: 733823
Pcs No.: 5

24 24 72

Tenaris

INSPECTION CERTIFICATE
CERTIFICAT DE INSPECTIE
(UNI EN 10204 3.1 / ISO 10474 3.1)

Number / Numar: **02-23-27689** | Page / Pagina: **2 / 10**

Date / Data: **November 06, 2023**

Silcotub S.A. Plant
93, Mihai Viteazul Blvd.
458131 Zalău, Sălaj
România
Tel: + 40 260 620720
Fax: + 40 260 661581

Customer / Client: **COMMERCIALE TUBI ACCIAIO SPA**	Customer's Order Item / Comanda clientului - Item: **SM30072**	Customer's Reference / Referinta clientului: -	Manufacturer's Works Order N° / Comanda de vanzare: **2223023/008**
Manufacture Process / Proces de fabricatie: **NORMALIZED** **NORMALIZATE**	Product Type / Tip de produs: **See note nr.1** **vezi nota nr.1**		Surface / Suprafata: **See note nr.2** **vezi nota nr.2**
Standard or Specification / Norma sau specificatie: **See note nr.3** **vezi nota nr.3**		Steel Grade / Grad de otel: **STEEL GR 6 ASTM A 333 AND ASME SA 333 NDE** **OTEL GR 6 ASTM A 333 AND ASME SA 333 NDE**	Ends / Capete: **See note nr.4** **vezi nota nr.4**
Dimensions / Dimensiuni: **ø2.375" O.D. x .154" W.T.** **ø60.30mm O.D. x 3.91mm W.T.**	Schedule / Program: **40** **.**	Length / Lungime: **32.808 ft ÷ 38.714 ft** **10000 mm ÷ 11800 mm**	Quantity / Cantitate: **384Pcs/buc.** **14259'00 ft** **51859,2 lb** **4346.15 mt** **23523 kg**	Nominal Weight / Greutate nominala: **3.65 lb/ft** **5.43 Kg/m**

TENSILE TEST / TEST DE TRACTIUNE

Heat N° / Sarja N°	Sample N° / Proba N°	Lot N° / Lot N°	Specimen condition / Conditie epruveta				Specimen dimensions / Dimensiuni epruvetelor		Test temp / Temp de incercare	Y.S. OffSet 0.2% Min: 240.00 Max: --	U.T.S. Req. Min: 415.00 Max: --	Y.S./U.T.S Req. Max. 0.85	Elongation / Alungire			
			Ls	Sc	Type / Tip	Ori	Size / Dimensiune	Area / Sectiune					Lo		Min.	Obt.
							mm	mm2	°C	MPa	MPa		cal.	mm	%	%
733823	C3873/AA	6	B	AM	Ss	L	12.65 x 3.75	47.80	+20	309.00	452.00	0.68	2"	50.0	22.4%	32.5%
733823	C3874/AA	6	B	AM	Ss	L	12.80 x 4.08	52.70	+20	304.00	453.00	0.67	2"	50.0	22.4%	32.0%
733823	C3875/AA	6	B	AM	Ss	L	12.82 x 4.05	52.40	+20	295.00	432.00	0.68	2"	50.0	22.4%	33.0%
733823	C3876/AA	6	B	AM	Ss	L	12.65 x 3.90	49.80	+20	308.00	438.00	0.70	2"	50.0	22.4%	33.5%
733823	C3877/AA	6	B	AM	Ss	L	12.70 x 3.88	49.70	+20	303.00	452.00	0.67	2"	50.0	22.4%	33.0%
733823	C3878/AA	6	B	AM	Ss	L	12.75 x 3.85	49.50	+20	301.00	440.00	0.68	2"	50.0	22.4%	34.0%
733823	C3879/AA	6	B	AM	Ss	L	12.70 x 3.85	49.30	+20	322.00	473.00	0.68	2"	50.0	22.4%	31.5%
733823	C3880/AA	6	B	AM	Ss	L	12.82 x 3.95	51.10	+20	308.00	445.00	0.69	2"	50.0	22.4%	35.0%
733823	C3881/AA	6	B	AM	Ss	L	12.78 x 3.92	50.50	+20	297.00	434.00	0.68	2"	50.0	22.4%	32.0%
733823	C3882/AA	6	B	AM	Ss	L	12.75 x 3.85	49.50	+20	300.00	446.00	0.67	2"	50.0	22.4%	34.0%
733823	C3883/AA	6	B	AM	Ss	L	12.72 x 4.10	52.60	+20	298.00	446.00	0.67	2"	50.0	22.4%	33.5%

AM: As manufactured / Ca fabricat
B: Body / Corp
L: Longitudinal / Longitudinal
Lo: Initial length / Lungime initiala
Ls: Location of sample / Locatia probei
Max: Maximum / Maxim
Min: Minimum / Minim
Obt: Obtained / Obtinut
Ori: Orientation / Orientare
Req. Max: Required maximum / Cerinta maxima
Req: Required / Cerinta
Sc: Specimen condition / Starea epruvetei
Ss: Strip specimen / Rectangular
U.T.S: Ultimate Tensile Strength / Rezistenta la rupere
Y.S: Yield Strength / Rezistenta la curgere

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Group

Customer COES SRL
PO. No.: 2263/24
N. Pro.:
C. Code:
Cta's Job: 24OC0003184
Kg: 307

Item:
Date: 09/07/2024
Mt.: 56,85

Date:
Heat No.: 733823
Pcs No.: 5

Tenaris

INSPECTION CERTIFICATE
CERTIFICAT DE INSPECTIE
(UNI EN 10204 3.1 / ISO 10474 3.1)

Number / Numar: **02-23-27689** | Page / Pagina: **3 / 10**

Date / Data: **November 06, 2023**

Silcotub S.A. Plant:
93, Mihai Viteazul Blvd.
458131 Zalău, Sălaj
România
Tel: + 40 260 620720
Fax: + 40 260 661581

Customer / Client: **COMMERCIALE TUBI ACCIAIO SPA**

Customer's Order Item / Comanda clientului - Item: **SM30072**

Customer's Reference / Referinta clientului: .

Manufacturer's Works Order N° / Comanda de vanzare: **2223023/008**

Manufacture Process / Proces de fabricatie:
NORMALIZED
NORMALIZATE

Product Type / Tip de produs:
See note nr.1
vezi nota nr.1

Surface / Suprafata:
See note nr.2
vezi nota nr.2

Standard or Specification / Norma sau specificatie:
See note nr.3
vezi nota nr.3

Steel Grade / Grad de otel:
STEEL GR 6 ASTM A 333 AND ASME SA 333 NDE
OTEL GR 6 ASTM A 333 AND ASME SA 333 NDE

Ends / Capete:
See note nr.4
vezi nota nr.4

Dimensions / Dimensiuni:
ø2.375" O.D. x .154" W.T.
ø60.30mm O.D. x 3.91mm W.T.

Schedule / Program:
40
.

Length / Lungime:
32.808 ft ÷ 38.714 ft
10000 mm ÷ 11800 mm

Quantity / Cantitate: **384Pcs/buc.**
14259'00 ft **51859,2 lb**
4346.15 mt **23523 kg**

Nominal Weight / Greutate nominala:
3.65 lb/ft
5.43 Kg/m

CHEMICAL COMPOSITION / COMPOZITIE CHIMICA

				Composition % / Compozitie %																	
				X 100									X 1000						X 10000		
				C	Mn	Si	Ni	Cr	Mo	Cu	Ce LF	F1	P	S	Al	Ti	Nb	V	N	B	Ca
			H Max	18	130	30	40	30	12	40	42	60	25	10	40	20	20	50	120	5	60
			Min	–	–	10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Heat N° / Sarja N°	Sample N° / Proba N°	Lot N° / Lot N°	P Max	18	130	30	40	30	12	40	42	60	25	10	40	20	20	50	120	5	60
			Min	–	–	10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
733823			H	8	103	21	13	10	4	18	30	32.6	12	3	25	2	1	3	80	2	12
733823	C3861/AA	6	P	8	103	22	13	11	4	18	30	33.8	12	3	26	2	2	4	46	2	16
733823	C3862/AA	6	P	9	104	22	13	11	4	18	31	33.8	12	3	25	2	2	4	40	2	16

Ce LF: C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15
F1: (V +Nb+Ti+Cu+Mo+Cr)

H: Heat / Sarja
Max: Maximum / Maxim

Min: Minimum / Minim
P: Product / Produs

SUPERFICIAL HARDNESS / DURITATE SUPERFICIALA

Heat N° / Sarja N°	Sample N° / Proba N°	Lot N° / Lot N°	Ls	Sc	External / Exterior Scale / Scala: HRB Req. Min: – Req. Max: 93.0		
733823	C3861/AA	6	B	AM	72.0	69.0	69.0

Heat N° / Sarja N°	Sample N° / Proba N°	Lot N° / Lot N°	Ls	Sc	External / Exterior Scale / Scala: HRB Req. Min: – Req. Max: 93.0		
733823	C3862/AA	6	B	AM	70.0	70.0	70.0

AM: As manufactured / Ca fabricat
B: Body / Corp
Ls: Location of sample / Locatia probei
Sc: Specimen condition / Starea epruvetei

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Customer: COES SRL
PO. No.: 2263/24
N. Pro.:
C. Code:
Cta's Job: 24OC0003184
Kg: 307

Item:
Date: 09/07/2024
Mt.: 56,85

Date:
Heat No.: 733823
Pcs No.: 5

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Tenaris

INSPECTION CERTIFICATE
CERTIFICAT DE INSPECTIE
(UNI EN 10204 3.1 / ISO 10474 3.1)

Number / Numar:	Page / Pagina:
02-23-27689	4 / 10
Date / Data: November 06, 2023	

Silcotub S.A. Plant
93, Mihai Viteazul Blvd.
455131 Zalău, Sălaj
România
Tel: + 40 260 620720
Fax: + 40 260 661581

Customer / Client: **COMMERCIALE TUBI ACCIAIO SPA**	Customer's Order Item / Comanda clientului - Item: **SM30072**	Customer's Reference / Referinta clientului: .	Manufacturer's Works Order N° / Comanda de vanzare: **2223023/008**
Manufacture Process / Proces de fabricatie: **NORMALIZED** **NORMALIZATE**	Product Type / Tip de produs: **See note nr.1** **vezi nota nr.1**		Surface / Suprafata: **See note nr.2** **vezi nota nr.2**
Standard or Specification / Norma sau specificatie: **See note nr.3** **vezi nota nr.3**		Steel Grade / Grad de otel: **STEEL GR 6 ASTM A 333 AND ASME SA 333 NDE** **OTEL GR 6 ASTM A 333 AND ASME SA 333 NDE**	Ends / Capete: **See note nr.4** **vezi nota nr.4**
Dimensions / Dimensiuni: **ø2.375" O.D. x .154" W.T.** **ø60.30mm O.D. x 3.91mm W.T.**	Schedule / Program: **40** .	Length / Lungime: **32.808 ft ÷ 38.714 ft** **10000 mm ÷ 11800 mm**	Quantity / Cantitate: **384Pcs/buc.** **14259'00 ft** **51859,2 lb** **4346.15 mt** **23523 kg**	Nominal Weight / Greutate nominala: **3.65 lb/ft** **5.43 Kg/m**

THROUGH WALL HARDNESS / DURITATE PE GROSIME DE PERETE

Required values / Cerinta			Individuals / Individuale			Average / Media			Hardness type/Tip de duritate:vickers			
			Min: –	Max: 200	Var: –	Min: –	Max: –	Var: –				
Heat N° / Sarja N°	Sample N° / Proba N°	Lot N° / Lot N°	Specimen condition						Quad.	Scale / Scara	OD / Dist. (mm)	MW / Avg.
			Ls			Sc						
733823	C3861/AA	6	B			AM			1	HV10	-	130

AM: As manufactured / Ca fabricat
Avg: Average / Media
B: Body / Corp
Dist: Distance from outer diameter / Distantia de la diametrul exterior
Ls: Location of sample / Locatia probei
Max: Maximum / Maxim
Min: Minimum / Minim
MW: Middle wall / Mijloc
OD: Outside Diameter / Diametrul exterior
Quad: Quadrant / Cadran
Sc: Specimen condition / Starea epruvetei
Var: Variation / Variatie

IMPACT TEST / TEST DE INCOVOIERE

Type/Tip: **ISOV**				Orientation/Orientare: **L**			Unit / Unitate de masura: **JOULE**				
Position/Pozitie:				Temp: **- 50**		Unit/UM: **°C**	Ind.Min.Req: **8**		Req.Min.Avg: **10**		
Heat N° / Sarja N°	Sample N° / Proba N°	Zone / Zona	Lot N° / Lot N°	Ls	Sc	Size / Dimensiune mm	Results / Rezultate 1	2	3	Avg.	
733823	C3861/AA	outside	6	B	AM	10 x 2.50	26.0	25.0	25.0	25.0	

AM: As manufactured / Ca fabricat
Avg: Average / Media
B: Body / Corp
Ind. Min. Req: Individual Minimum Required / Cerinta minima individuala
L: Longitudinal / Longitudinal
Ls: Location of sample / Locatia probei
Req. Min. Avg: Required minimum average / Cerinta pentru valoarea medie minima
Sc: Specimen condition / Starea epruvetei
Temp: Temperature / Temperatura

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Customer: COES SRL
PO. No.: 2263/24
N. Pro.:
C. Code:
Cta's Job: 24OC0003184
Kg: 307

Item:
Date: 09/07/2024
Mt.: 56,85

Date:
Heat No.: 733823
Pcs No.: 5

Group

Tenaris

INSPECTION CERTIFICATE
CERTIFICAT DE INSPECTIE
(UNI EN 10204 3.1 / ISO 10474 3.1)

Number / Numar: **02-23-27689** | Page / Pagina: **5 / 10**

Date / Data: **November 06, 2023**

Silcotub S.A. Plant
93, Mihai Viteazul Blvd.
450131 Zalău, Sălaj
România
Tel: + 40 260 620720
Fax: + 40 260 661581

Customer / Client: **COMMERCIALE TUBI ACCIAIO SPA**	Customer's Order Item / Comanda clientului - Item: **SM30072**	Customer's Reference / Referinta clientului: .	Manufacturer's Works Order N° / Comanda de vanzare: **2223023/008**
Manufacture Process / Proces de fabricatie: **NORMALIZED** **NORMALIZATE**	Product Type / Tip de produs: **See note nr.1** **vezi nota nr.1**		Surface / Suprafata: **See note nr.2** **vezi nota nr.2**
Standard or Specification / Norma sau specificatie: **See note nr.3** **vezi nota nr.3**		Steel Grade / Grad de otel: **STEEL GR 6 ASTM A 333 AND ASME SA 333 NDE** **OTEL GR 6 ASTM A 333 AND ASME SA 333 NDE**	Ends / Capete: **See note nr.4** **vezi nota nr.4**
Dimensions / Dimensiuni: **ø2.375" O.D. x .154" W.T.** **ø60.30mm O.D. x 3.91mm W.T.**	Schedule / Program: **40** .	Length / Lungime: **32.808 ft ÷ 38.714 ft** **10000 mm ÷ 11800 mm**	Quantity / Cantitate: **384Pcs/buc.** **14259'00 ft** **51859,2 lb** **4346.15 mt** **23523 kg**	Nominal Weight / Greutate nominala: **3.65 lb/ft** **5.43 Kg/m**

IMPACT TEST / TEST DE INCOVOIERE

Type/Tip: **KCV** | Orientation/Orientare: **L** | Unit / Unitate de masura: **JOULE**

Position/Pozitie: | Temp: **- 47** Unit/UM: **°C** | Ind.Min.Req: **5** Req.Min.Avg: **6**

Heat N° / Sarja N°	Sample N° / Proba N°	Zone / Zona	Lot N° / Lot N°	Ls	Sc	Size / Dimensiune mm	Results / Rezultate 1	2	3	Avg.
733823	C3862/AA	outside	6	B	AM	10 x 3.30	43.0	49.0	49.0	47.0

AM: As manufactured / Ca fabricat
Avg: Average / Media
B: Body / Corp
Ind. Min. Req: Individual Minimum Required / Cerinta minima individuala
L: Longitudinal / Longitudinal
Ls: Location of sample / Locatia probei
Req. Min. Avg: Required minimum average / Cerinta pentru valoarea medie minima
Sc: Specimen condition / Starea epruvetei
Temp: Temperature / Temperatura

FLATTENING TEST / APLATISARE

Standard / Norma:

Heat N° / Sarja N°	Lot N° / Lot N°	Sample N° / Proba N°	Zone / Zona	Sc	Test Frequency / Frecventa incercarii	Result / Rezultat
733823	6	C3861/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3862/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3863/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3864/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3865/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3866/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3867/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3868/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3869/AA	E1	AM	5% of the lot	Good / Conform

Standard / Norma:

Heat N° / Sarja N°	Lot N° / Lot N°	Sample N° / Proba N°	Zone / Zona	Sc	Test Frequency / Frecventa incercarii	Result / Rezultat
733823	6	C3870/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3871/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3872/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3873/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3874/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3875/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3876/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3877/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3878/AA	E1	AM	5% of the lot	Good / Conform

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PO. No.: 2263/24
N. Pro.:
C. Code:
Cta's Job: 24OC0003184
Kg: 307

Item:
Date: 09/07/2024
Mt.: 56,85

Date:
Heat No.: 733823
Pcs No.: 5

Group

Tenaris

INSPECTION CERTIFICATE
CERTIFICAT DE INSPECTIE
(UNI EN 10204 3.1 / ISO 10474 3.1)

Number / Numar:	Page / Pagina:
02-23-27689	6 / 10

Date / Data: **November 06, 2023**

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Tel: + 40 260 620720
Fax: + 40 260 651581

Customer / Client: **COMMERCIALE TUBI ACCIAIO SPA**	Customer's Order Item / Comanda clientului - Item: **SM30072**	Customer's Reference / Referinta clientului: .	Manufacturer's Works Order N° / Comanda de vanzare: **2223023/008**
Manufacture Process / Proces de fabricatie: **NORMALIZED** **NORMALIZATE**	Product Type / Tip de produs: **See note nr.1** **vezi nota nr.1**		Surface / Suprafata: **See note nr.2** **vezi nota nr.2**
Standard or Specification / Norma sau specificatie: **See note nr.3** **vezi nota nr.3**		Steel Grade / Grad de otel: **STEEL GR 6 ASTM A 333 AND ASME SA 333 NDE** **OTEL GR 6 ASTM A 333 AND ASME SA 333 NDE**	Ends / Capete: **See note nr.4** **vezi nota nr.4**
Dimensions / Dimensiuni: **ø2.375" O.D. x .154" W.T.** **ø60.30mm O.D. x 3.91mm W.T.**	Schedule / Program: **40** .	Length / Lungime: **32.808 ft ÷ 38.714 ft** **10000 mm ÷ 11800 mm**	Quantity / Cantitate: **384Pcs/buc.** **14259'00 ft** **51859,2 lb** **4346.15 mt** **23523 kg**	Nominal Weight / Greutate nominala: **3.65 lb/ft** **5.43 Kg/m**

FLATTENING TEST / APLATISARE

Standard / Norma:

Heat N° / Sarja N°	Lot N° / Lot N°	Sample N° / Proba N°	Zone / Zona	Sc	Test Frequency / Frecventa incercarii	Result / Rezultat
733823	6	C3879/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3880/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3881/AA	E1	AM	5% of the lot	Good / Conform

Standard / Norma:

Heat N° / Sarja N°	Lot N° / Lot N°	Sample N° / Proba N°	Zone / Zona	Sc	Test Frequency / Frecventa incercarii	Result / Rezultat
733823	6	C3882/AA	E1	AM	5% of the lot	Good / Conform
733823	6	C3883/AA	E1	AM	5% of the lot	Good / Conform

AM: As manufactured / Ca fabricat E1 / E2: Ends of Sampling / Capatul testat Sc: Specimen condition / Starea epruvetei

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Customer COES SRL
PO. No.: 2263/24
N. Pro.:
C. Code:
Cta's Job: 24OC0003184
Kg: 307

Item:

Date: 09/07/2024
Mt.: 56,85

Date:

Heat No.: 733823
Pcs No.: 5

Group

Customer COES SRL
PO. No.: 2263/24
N. Pro.:
C. Code:
Cta's Job: 24OC0003184
Kg: 307

Item:

Date: 09/07/2024
Mt.: 56,85

Date:

Heat No.: 733823
Pcs No.: 5

Tenaris

INSPECTION CERTIFICATE
CERTIFICAT DE INSPECTIE
(UNI EN 10204 3.1 / ISO 10474 3.1)

Number / Numar: 02-23-27689
Date / Data: November 06, 2023

Page / Pagina: 7 / 10

Siderca S.A. Plant
93, Nicolae Vitoszur Blvd.
458131 Zalau, Salaj
Romania
Tel: + 40 260 628720
Fax: + 40 259 661581

Customer / Client: COMMERCIALE TUBI ACCIAIO SPA	Customer's Order Item / Comanda clientului - Item: SM30072	Customer's Reference / Referinta clientului: .	Manufacturer's Works Order N° / Comanda de varzare: 2223023/008
Manufacture Process / Proces de fabricatie: NORMALIZED NORMALIZATE	Product Type / Tip de produs: See note nr.1 vezi nota nr.1		Surface / Suprafata: See note nr.2 vezi nota nr.2
Standard or Specification / Norma sau specificatie: See note nr.3 vezi nota nr.3		Steel Grade / Grad de otel: STEEL GR 6 ASTM A 333 AND ASME SA 333 NDE OTEL GR 6 ASTM A 333 AND ASME SA 333 NDE	Ends / Capete: See note nr.4 vezi nota nr.4
Dimensions / Dimensiuni: ø2.375" O.D. x .154" W.T. ø60.30mm O.D. x 3.91mm W.T.	Schedule / Program: 40 .	Length / Lungime: 32.808 ft ÷ 38.714 ft 10000 mm ÷ 11800 mm	Quantity / Cantitate: 384Pcs/buc. 14259'00 ft 51859.2 lb 4346.15 mt 23523 kg	Nominal Weight / Greutate nominala: 3.85 lb/ft 5.43 Kg/m

HYDROSTATIC TEST / PROBA HIDROSTATICA

Pressure / Presiune		Time / Timp	Results / Rezultat
nit / Unitate de masu	Value / Valoare	Seconds / Secunde	
MPa	17	5	Satisfactory / Conform

SUPPLEMENTARY INFORMATION / INFORMATIE SUPLIMENTARA

STANDARD EDITIONS
EDITIILE NORMELOR

Standard:ASTM A 333/333M Year:2018
Standard:ASME SA 333/333M Year:2021
Standard:ASME B&PV CODE SECTION II Year:2021
Standard:ANSI/NACE MR0175-2021/ISO 15156-1:2020
Standard:ANSI/NACE MR0103-2015 (R2023) ISO 17945 Year:2015

Norma:ASTM A 333/333M An:2018
Norma:ASME SA 333/333M An:2021
Norma:ASME B&PV CODE SECTION II An:2021
Norma:ANSI/NACE MR0175-2021/ISO 15156-1:2020
Norma:ANSI/NACE MR0103-2015 (R2023) ISO 17945 An:2015

PRODUCT DESCRIPTION NOTES
NOTE DESCRIERE PRODUS

Note 1 is the full description of the 'Product type'
SEAMLESS HOT FINISHED TUBES FOR LOW TEMPERATURE SERVICES (WITH SUPPLEMENTARY REQUIREMENTS)
Note 2 is the full description of the 'Surface'
INTERNALLY BARE, EXTERNALLY VARNISHED WITH BLACK LACQUER ,
Note 3 is the full description of the 'Standard or specification'
NORM ASTM A 333 M,ASME SA333M, MPD-O2-PS-GS R.4, NACE MR0175/ISO15156/MR0103, PED & TEMPL.
CTA-MED-6 REV.3

Nota 1 si descrierea completa a 'Tip de produs'
TEVI FT, TEMPERATURI JOASE IMBINATE LA CALD (CU CERINTE SUPLIMENTARE FATA DE STANDARD)
Nota 2 si descrierea completa a 'Suprafata'
INTERIOR NEPROTEJATE , EXTERIOR LACUITE CU LAC NEGRU
Nota 3 si descrierea completa a 'Norma sau specificatia'
NORMA ASTM A 333 M,ASME SA333M, MPD-O2-PS-GS R.4, NACE MR0175/ISO15156/MR0103, PED & TEMPL.
CTA-MED-6 REV.3

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Tenaris

INSPECTION CERTIFICATE
CERTIFICAT DE INSPECTIE
(UNI EN 10204 3.1 / ISO 10474 3.1)

Number / Numar:	Page / Pagina:
02-23-27689	8 / 10

Date / Data: **November 06, 2023**

Silcotub S.A. Plant
93, Mihai Viteazul Blvd.
458131 Zalău, Sălaj
România
Tel: + 40 260 620720
Fax: + 40 260 661581

Customer / Client: **COMMERCIALE TUBI ACCIAIO SPA**		Customer's Order Item / Comanda clientului - Item: **SM30072**	Customer's Reference / Referinta clientului: .	Manufacturer's Works Order N° / Comanda de vanzare: **2223023/008**
Manufacture Process / Proces de fabricatie: **NORMALIZED** **NORMALIZATE**	Product Type / Tip de produs: **See note nr.1** **vezi nota nr.1**			Surface / Suprafata: **See note nr.2** **vezi nota nr.2**
Standard or Specification / Norma sau specificatie: **See note nr.3** **vezi nota nr.3**		Steel Grade / Grad de otel: **STEEL GR 6 ASTM A 333 AND ASME SA 333 NDE** **OTEL GR 6 ASTM A 333 AND ASME SA 333 NDE**		Ends / Capete: **See note nr.4** **vezi nota nr.4**
Dimensions / Dimensiuni: **ø2.375" O.D. x .154" W.T.** **ø60.30mm O.D. x 3.91mm W.T.**	Schedule / Program: **40** .	Length / Lungime: **32.808 ft ÷ 38.714 ft** **10000 mm ÷ 11800 mm**	Quantity / Cantitate: **384Pcs/buc.** **14259'00 ft** **51859,2 lb** **4346.15 mt** **23523 kg**	Nominal Weight / Greutate nominala: **3.65 lb/ft** **5.43 Kg/m**

SUPPLEMENTARY INFORMATION / INFORMATIE SUPLIMENTARA

PRODUCT DESCRIPTION NOTES
NOTE DESCRIERE PRODUS

Note 4 is the full description of the 'Ends'	Nota 4 si descrierea completa a 'Capete'
BEVELLED AS PER ASME B 16.25 , AT 37.5 DEGREES, DRAWING N. AJ 2430-4, DWG00130	CAPETE SANFRENATE CONFORM ASME B 16.25 AT 37.5 DEGREES, DESEN N. AJ 2430-4 - DWG00130

Supplementary Information
Informatie Suplimentara

Heat	Pz	Mt	Kg	Sarja	Pz	Mt	Kg
733823-006	384	4346,15	23523	733823-006	384	4346,15	23523

Supplementary Information
Informatie Suplimentara

NONDESTRUCTIVE TEST EMI ML ACC. TO ASTM E570 FULL LENGTH	CONTROL NEDISTRUCTIV EMI ML CONFORM ASTM E570 FULL LENGTH INSPECT
INSPECTION FOR Trans OD Long ID Long OD DEFECTS:	ION PENTRU DEFECTE Trans OD Long ID Long OD : FARA OBIECTII
WITHOUT OBJECTIONS	ADANCIME DE DEFECT EMI Trans OD - 0,39mm Long ID - 0,40mm
EMI NOTCH DEPTH Trans OD - 0,39mm Long ID - 0,40mm	Long OD - 0,39mm
Long OD - 0,39mm	MATERIAL CONFORM ASME SECTIUNEA II PART.D TABEL Y1
MATERIAL ACC. TO ASME SECTION II PART.D TABELLA Y1	MATERIAL CONFORM ASME SECTIUNEA II PART.A
MATERIAL ACC. TO ASME SECTION II PART A	MATERIAL CONFORM NACE MR 01-75/ISO 15156
MATERIAL ACC. TO NACE MR 01-75/ISO 15156	MATERIAL CONFORM NACE MR 01-03/ ISO 17945
MATERIAL ACC. TO NACE MR 01-03/ ISO 17945	MATERIAL CONFORM PED 2014/68/EU
MATERIAL ACCORDING TO PED 2014/68/EU	The material is free from mercury and radioctive
The material is free from mercury and radioctive	contamination
contamination	TRATAMENT TERMIC: NORMALIZARE LA 920 °C, TIMP DE MENTINER 10 MIN.;
HEAT TREATMENT: NORMALIZED AT 920°C, SOAKING TIME 10 MIN.	MEDIU DE RACIRE: AER
COOLING MEDIUM: AIR	DUPA OPERATIA DE CONTROL, MATERIALUL NU PREZINTA UN

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Customer COES SRL
PO. No.: 2263/24
N. Pro.:
C. Code:
Cita's Job: 24OC0003184
Kg: 307

Item:
Date: 09/07/2024
Mt.: 56,85

Date:
Heat No.: 733823
Pcs No.: 5

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Tenaris

INSPECTION CERTIFICATE
CERTIFICAT DE INSPECTIE
(UNI EN 10204 3.1 / ISO 10474 3.1)

Number / Numar: **02-23-27689** | Page / Pagina: **9 / 10**

Date / Data: **November 06, 2023**

Silcotub S.A. Plant:
93, Mihai Viteazul Blvd.
450131 Zalău, Sălaj
România
Tel: + 40 260 620720
Fax: + 40 260 661581

Customer / Client: **COMMERCIALE TUBI ACCIAIO SPA**		Customer's Order Item / Comanda clientului - Item: **SM30072**	Customer's Reference / Referinta clientului: .	Manufacturer's Works Order N° / Comanda de vanzare: **2223023/008**
Manufacture Process / Proces de fabricatie: **NORMALIZED NORMALIZATE**	Product Type / Tip de produs: **See note nr.1 vezi nota nr.1**			Surface / Suprafata: **See note nr.2 vezi nota nr.2**
Standard or Specification / Norma sau specificatie: **See note nr.3 vezi nota nr.3**		Steel Grade / Grad de otel: **STEEL GR 6 ASTM A 333 AND ASME SA 333 NDE OTEL GR 6 ASTM A 333 AND ASME SA 333 NDE**		Ends / Capete: **See note nr.4 vezi nota nr.4**
Dimensions / Dimensiuni: **ø2.375" O.D. x .154" W.T. ø60.30mm O.D. x 3.91mm W.T.**	Schedule / Program: **40** .	Length / Lungime: **32.808 ft ÷ 38.714 ft 10000 mm ÷ 11800 mm**	Quantity / Cantitate: **384Pcs/buc.** **14259'00 ft** **51859,2 lb** **4346.15 mt** **23523 kg**	Nominal Weight / Greutate nominala: **3.65 lb/ft 5.43 Kg/m**

SUPPLEMENTARY INFORMATION / INFORMATIE SUPLIMENTARA

Supplementary Information	Informatie Suplimentara
AFTER INSPECTION OPERATION, THE MATERIAL HAS NOT A RESIDUAL MAGNETISM GREATER THAN 020 GAUSS. "The steel is calcium treated for microinclusions shape control The materialhas not a rezidual magnetism greater than 20 gauss" SEAMLESS HOT FINISHED PIPES VISUAL AND DIMENSIONAL CONTROL HAS BEEN CARRIED OUT WITH SATISFACTORY RESULT STEEL IS FULLY KILLED AND PRODUCED BY ELECTRIC FURNACE TO A FINE GRAIN PRACTICE THE PRODUCT SUPPLIED IS IN COMPLIANCE WITH THE REQUIREMENTS OF THE ORDER. Tenaris IT identification number for MTC: 59b,r|>	MAGNETISM REZIDUAL MAI MARE DE 020 GAUSS. "The steel is calcium treated for microinclusions shape control The material has not a rezidual magnetism greater than 20 gauss" TEVI FARA SUDURA LAMINATE LA CALD CONTROLUL VIZUAL DIMENSIONAL S-A REALIZAT CU REZULTATE SATISFACATOARE OTELUL ESTE PRODUS IN CUPTOR ELECTRIC COMPLET CALMAT CONFORM UNEI PRACTICI DE OBTINERE A UNUI GRAUNTE FIN PRODUSUL LIVRAT ESTE IN CONFORMITATE CU CERINTELE COMENZII Tenaris IT numărul de identificare pentru MTC: 59b,r|>

MARKING / MARCAJ

Marking	Marcaj
STENCILING _T ASTM/ASME A/SA 333 Grade 6 60.30x 3.91 SCH.40 SMLS HF LT-50C 17.0 MPA/NDE _HEAT _MM _MADE LEGEND _T = TENARIS Logo _MM = Pipe/Tube Length in millimeters	PICTURA _T ASTM/ASME A/SA 333 Grade 6 60.30x 3.91 SCH.40 SMLS HF LT-50C 17.0 MPA/NDE _HEAT _MM _MADE LEGENDĂ _T = logo TENARIS _MM = Lungimea tubului în milimetri

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Group CTA

Customer COES SRL
PO. No.: 2263/24
N. Pro.:
C. Code:
Cta's Job: 24OC0003184
Kg: 307

Item:

Date: 09/07/2024
Mt.: 56,85

Date:

Heat No.: 733823
Pcs No.: 5

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Group

Customer COES SRL
PO. No.: 2263/24
N. Pro.:
C. Code:
Cta's Job: 24OC0003184
Kg: 307

Item:

Date: 09/07/2024
Mt.: 56,85

Date:

Heat No.: 733823
Pcs No.: 5

Tenaris

INSPECTION CERTIFICATE
CERTIFICAT DE INSPECTIE
(UNI EN 10204 3.1 / ISO 10474 3.1)

Number / Numar: 02-23-27689
Page / Pagina: 10 / 10
Date / Data: November 06, 2023

Silcotub S.A. Plant
93, Mihai Viteazul Blvd.
450131 Zalău, Sălaj
România
Tel: + 40 260 628720
Fax: + 40 260 661581

Customer / Client: COMMERCIALE TUBI ACCIAIO SPA	Customer's Order Item / Comanda clientului - Item: SM30072	Customer's Reference / Referinta clientului:	Manufacturer's Works Order N° / Comanda de vanzare: 2223023/008
Manufacture Process / Proces de fabricatie: NORMALIZED NORMALIZATE	Product Type / Tip de produs: See note nr.1 vezi nota nr.1		Surface / Suprafata: See note nr.2 vezi nota nr.2
Standard or Specification / Norma sau specificatie: See note nr.3 vezi nota nr.3		Steel Grade / Grad de otel: STEEL GR 6 ASTM A 333 AND ASME SA 333 NDE OTEL GR 6 ASTM A 333 AND ASME SA 333 NDE	Ends / Capete: See note nr.4 vezi nota nr.4
Dimensions / Dimensiuni: ø2.375" O.D. x .154" W.T. ø60.30mm O.D. x 3.91mm W.T.	Schedule / Program: 40 .	Length / Lungime: 32.808 ft ÷ 38.714 ft 10000 mm ÷ 11800 mm	Quantity / Cantitate: 384Pcs/buc. 14259'00 ft 51859,2 lb 4346.15 mt 23523 kg	Nominal Weight / Greutate nominala: 3.65 lb/ft 5.43 Kg/m

MARKING / MARCAJ

Marking
Marcaj

PUNCHING
HEAT

POANSONARE
HEAT

The product certified herein has been manufactured, sampled, tested and inspected in accordance with the stated specifications and has been found to meet the requirements.
This certificate is not a declaration of origin nor may it be used as a declaration of origin.

Produsul certificat aici a fost fabricat, esantionat, testat si inspectat in conformitate cu specificatiile mentionate si s-a determinat ca indeplineste cerintele.
Acest certificat nu este o declaratie de origine si nici nu poate fi utilizat ca si o declaratie de origine.

CUSTOMER - THIRD PARTY

INSPECTION COMPANY
FIRMA TERTA DE INSPECTII

TENARIS QUALITY DEPARTMENT SIGNATURE

QUALITY CERTIFICATION DEPT.
DEPARTAMENT CERTIFICARE CALITATE
PUSCAS Daniela

QUALITY SENIOR DIRECTOR
DIRECTOR SENIOR CALITATE
CUBLESAN Rares

This certificate is issued by a computerized system and it is valid with electronic signature. On the original certificate the trade-mark green colored "Tenaris" is stamped. In case the owner of the original certificate would release a copy of it, he must attest its conformity to the original one taking upon himself the responsibility for any unlawful or not allowed uses. Any alteration and/or falsification will be subjected to the law.

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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 3287 / OC 1588 **of** 18-09-24 **Your Ref.** 2342/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402548

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 10 - 687/23	40,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	834362	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 18/09/2024	Sigla V.S.
	Verificato data 18/09/2024	Sigla V.S.

remarks: chemical and mechanical values, at delivery condition, are quoted by the relevant steel work certificate. VISUAL AND DIMENSIONAL TEST SATISFACTORY 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 2652

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 3287 / OC 1588 **of** 18-09-24 **Your Ref.** 2342/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402548

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
TERPL7100185B	STUD BOLT ANSI B1.1 CL.2A - A/SA320 L7 D. 1" - 8UNC x 185 (7.1/4") ZINC PLATED 50 - 687/23	20,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	834335	296675

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)

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 3287 / OC 1588 **of** 18-09-24 **Your Ref.** 2342/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402548

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 √ 110 - 687/23	20,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	835267	BF4049 * √
TERPL7058110B	STUD BOLT ANSI B1.1 CL.2A - A/SA320 L7 D. 5/8" - 11UNC x 110 ZINC PLATED √ 120 - 687/23	10,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	834342	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

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 3287 / OC 1588 **of** 18-09-24 **Your Ref.** 2342/24 17-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402548

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 ✓ *110 - 687/23*	35,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	834341	BF4049** ✓
TERPL7058100B	STUD BOLT ANSI B1.1 CL.2A - A/SA320 L7 D. 5/8" - 11UNC x 100 ZINC. PLATED ✓ *110 - 687/23*	25,00	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.

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BULLONERIA - TIRANTERIA
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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 3463 / OC 1486 **of** 30-09-24 **Your Ref.** 2220/24 05-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402668

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 82 - 687/23	5,00	quenched tempered	ASTM B633 Fe/Zn 8 SC2 TYPE III	833987	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 V.S.
	Verificato data 30/09/2024	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

24 2861

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, 30-09-24 **Our Ref.** DDT 3463 / OC 1486 **of** 30-09-24 **Your Ref.** 2220/24 05-07-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402668

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
5587G7022000B	HEX NUT UNI 5587/H=D - A/SA194 G7 M 22 ZINC. PLATED √	15,00	quenched tempered @ 600°C	ASTM B633 Fe/Zn 8 SC2 TYPE III	833984	√ 85925 *

52 - 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	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

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.

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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 2890

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-02111 | Data / Dated 16.09.2024 Z02

FERRAMENTA INDUSTRIALE BONACINA SRL A06
VIALE EUROPA, 2G - FRAZ. CURNASCO
24048 TREVIOLO BG IT

Ordine / PO	55	A07
Item	006	A07
DDT / Delivery note	2024-3E301-0002054	A10
Packing List	2024-3E401-0002068	A11
Fattura / Invoice	2024-3E401-0002068	A12
Ns. rif. / Our ref.	2024-3E201-0001345-0006	A08

Cod. colata / Heat Code B07	Nr. colata / Heat Nr B07	Quantità / Quantity B08	Descrizione / Description B01 - (B09 - B11)
	23/70335	2,00	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

COPIA CONFORME
AL L'ORIGINALE

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	0,230	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		RESILIENZA / IMPACT TEST					
HBW C31	Tipo/Type C40	Provetta / Test Specimen C41	°C C03	1-Joule C42	2-Joule C42	3-Joule C42	Media/Average C43
160,0 ; 163,0	KV	10x10x55 mm	-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 B08	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.

IL PRESENTE CERTIFICATO È VALIDO PER
CLIENTE CAES
ORDINE N° 2585/24 DEL
N° 2 MT KG
FERR. IND. BONACINA S.r.l. Il 23-09-2024

	Ricezione data	Sigla
COES	18/09/2024	U.S.
G.Q.	Verificato data 01/10/2024	Sigla U.S.

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

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		

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 3859 / OC 1787 **of** 25-10-24 **Your Ref.** 2675/24 03-09-24

CERTIFICATE UNI EN 10204 - 3.1 N.2402999

ITEM		QUANTITY	HEAT TREATMENT	PROTECTION	LOT nr.	HEAT nr.
DIS.60L4375	EYEBOLT DWG. L4375 - SA350 LF2 M 22 x 260 THREADED 200	1,00	quenched and tempered		835785	255812

150 - 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

COES G.Q. — Ricezione data 25/10/2024 Sigla V.S. — Verificato data 28/10/2024 Sigla V.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	0,164	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

24 3403

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

EN 10204 3.1 Manufacturer's Conformance, Test Report and CMTR

EMERSON SRL ROMANIA
Regulator Technologies Inc
4 Emerson Street Cluj-Napoca
TEL. +40-364 731 403
FAX +40-374-132-833

Date: 21-Aug-24

CUSTOMER CLIENT NAME	COES SRL	**CUSTOMER PO No.**	2028_24	**PROJECT NAME**	-
SALES ORDER No.	39414765	**FACTORY ORDER No.**	38504319	**PROJECT No.**	-
ITEM / LINE	1	**TAG No.**	**64-CV-051**	**SERIAL No.**	R062737062
PRODUCT TYPE	MR98H	**SIZE DIMENSION**	1"	**END CONNECTION**	150RF

ORDER REQUIREMENTS

PRODUCT NUMBER	PRODUCT SPECIFICATION
M98H-3048-2347838	RGS12E406

PART SUMMARY

PART NAME	PART NUMBER	MATERIAL SPECIFICATION	MATERIAL DESIGNATION	HEAT NUMBER	CMTR ATTACHED
VALVE BODY	ERAA01804A0	ASME SA216	WCC	LM493	YES

HYDROTEST

PART NAME	PART NUMBER	MATERIAL	HEAT No.	PRESSURE	DURATION	RESULT
VALVE BODY	ERAA01804A0	WCC	LM493	31 bar	3 Minutes	PASS

FUNCTIONAL TESTS

VISUAL INSPECTION	SHUTOFF/ LOCKUP	EXTERNAL LEAK	SET POINT	TEST DATE	OPERATOR	RESULTS
OK	OK	OK	7.5 bar	21-Aug-24	OP59	PASS

NOTES:

Inspection Document Type:	EN 10204 3.1

We certify the above part(s) was made from the material referenced in the attached CMTR.
Hydrotest was completed per RGS4L401 and complies to ANSI/FCI 4-1/EN334/EN14382.
Inspection and testing were completed on each unit in accordance to the above product specification.
These products are in compliance with the requirements of the order.

Site Representative:	VANTA DARIUS 	Witness Inspection:	

Hi-CON Technocast Pvt. Ltd.

Reg. Office Unit - II :
Plot No. G-1321, GIDC Metoda, B/h. Kadvani Forge, Metoda Kalavad Road
Dist. Rajkot - 360 021. Gujarat - INDIA,
GSTIN : 24AABCH3792C1ZV, **CIN :** U27104GJ2003PTC042466

Phone : +91-2827-287901 / 287903
Fax : +91-2827-287902
Email : info@hicontechnocast.com
Web : www.hicontechnocast.com

F QC 07/01

INSPECTION CERTIFICATE

EN 10204 - 3.1

TC No. : 1632/23-24/03
TC Date : 30/09/2023

M/s. **EMERSON SRL (ROMANIA)** NAPOCA	OA No. : E2419/23-24 OA Date : 26/09/2023	PO No. : 4161002123-145-18-6 PO Date : 25/09/2023	DC No. : 1632/23-24 DC Date : 30/09/2023

Material Specification : **ASME SA 216/SA 216M Gr. WCB/WCC - 21 (RMS20B101 Rev.AB)**

SPECTRO CHEMICAL ANALYSIS

Heat No.	C %	Si %	Mn %	P %	S %	Cr %	Mo %	Ni %	V %	Cu %	Al %	Fe %	C.E. %
Min.												Bal.	
Max.	0.250	0.600	1.200	0.040	0.045	0.500	0.200	0.500	0.030	0.300	0.080	Bal.	0.430
JX-429	0.189	0.518	0.755	0.023	0.006	0.071	0.004	0.039	0.003	0.009	0.004	98.379	0.334
KR-798	0.185	0.463	0.877	0.017	0.004	0.116	0.008	0.033	0.014	0.008	0.015	98.260	0.362
KV-037	0.184	0.391	0.766	0.015	0.006	0.076	0.002	0.021	0.002	0.005	0.002	98.530	0.329
LM-493	0.185	0.347	0.722	0.016	0.006	0.105	0.004	0.033	0.003	0.010	0.010	98.559	0.331

MECHANICAL PROPERTIES

Heat No.	HTB Code	TS MPa	YS MPa By 0.2%	YS MPA BY 1%	Elgn. %	R.A. %	Hardness HBW	Impact Test At °C Charpy V Averag J				LATERAL EXP. (mm.)				Impact Test At °C Charpy V Averag J				LATERAL EXP. (mm.)			
Min.		485	275	--	22.00	35.00	--	Size : mm								Size : mm							
Max.		655	--	--	--	--	237	1	2	3	Avg	1	2	3	Avg	1	2	3	Avg	1	2	3	Avg
JX-429	KHT1/1010	525	302	--	32.96	64.14	141-144	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
KR-798	LHT9/0081	538	298	--	32.96	63.87	135-139	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
KV-037	L/HT9/0314	532	312	--	26.76	59.52	132-137	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LM-493	L/HT9/0572	594	298	--	30.08	60.44	134-140	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

We hereby certify that the Items mentioned above confirms to PO Specification : ASME SA 216/SA 216M Gr. WCB/WCC - 21 (RMS20B101 Rev.AB)

Condition of Supply : Normalizing : Heated at 900° C minimum for 1 Hour / inch thickness and Air Cooled.
Approved according to AD 2000 - Merkblatt W0 and certified according to PED (2014/68/EU) Annex - 1 Sec. 4.3 TUV NORD systems (Notified Body Reg. No. : 0045)
Casting Process : Melting by Induction Furnace
Visual Inspection : According to MSS-SP-55 - 2011 Example "a" Type (II TO XII)
Dispose of Packing Material in Accordance with Applicable local /regional/national/international regulations

DISPATCH DETAIL

Heat No.	Die No.	Description	PO Sr. No.	Qty.
JX-429	6581	BODY ~ MR98H; 3/4 IN NPT (CS)(ERCA01383A6)	1	1
KR-798	6581	BODY ~ MR98H; 3/4 IN NPT (CS)(ERCA01383A6)	1	4
KV-037	6581	BODY ~ MR98H; 3/4 IN NPT (CS)(ERCA01383A6)	1	13
LM-493	6581	BODY ~ MR98H; 3/4 IN NPT (CS)(ERCA01383A6)	1	41

Confirm No Radioactive contamination in above Material.
Note :
Castings Conform to as per NACE MR 0103 -2016 & NACE MR 0175 / ISO 15156 - 2020.
Certified that the products shipped is free from Radioactive element or contamination
Dimension Inspection Meeting According to The Drawing Requirement

EMERSON S.R.L.
MIHAI UNGUREANU
Quality Technician
~~Witnessed~~ Revised ~~True Copy~~
09.01.2024

Reports Encl.	Prepared By		Approved By
Inspection.	Chirag Mungra (Sr. QA/QC Engineer)	Hi-CON Technocast Pvt. Ltd. Unit-II Metoda	Chhaya Baliya (Manger QA/QC) (Work Inspector)

SEP Declaration

Pressure Equipment Directive 2014/68/EU

EMERSON S.R.L.
Pressure Management
No. 4, Emerson Street, 400641
Cluj-Napoca, Romania

Fisher Controls International Inc. declares this product conforms to Pressure Equipment Directive (PED) 2014/68/EU Article 4 section 3 and was designed and manufactured in accordance with sound engineering practice (SEP). Per Article 4 section 3, this "SEP" product must not bear the CE marking.

SEP-Bescheinigung

Fisher Controls International bescheinigt hiermit, dass dieses Produkt der Druckgerät-Richtline (PED) 2014/68/EU, Artikel 4, Abschnitt 3 entspricht und unter Einhaltung von sicheren Konstruktionsverfahren (SEP) entwickelt und hergestellt wurde. Gemäß Artikel 4, Abschnitt 3 darf dieses "SEP"-Produkt nicht die CE-Markierung tragen.

Déclaration SEP

Fisher Controls International Inc. certifie que ce produit est conforme à la directive sur le matériel pressurisé (Pressure Equipment Directive, PED), 2014/68/EU article 4, section 3 et a été conçu et fabriqué en application des techniques correctes (sound engineering practice, SEP). Aux termes de l'article 4, section 3, ce produit « SEP » n'a pas à porter l'estampille CE.

Dichiarazione relativa alla corretta prassi costruttiva

La Fisher Controls International Inc. dichiara che questo prodotto è conforme a quanto previsto dall'articolo 4, comma 3, della Direttiva 2014/68/EU in materia di attrezzature a pressione ed è stato progettato e fabbricato secondo la corretta prassi costruttiva. In base all'articolo 4, comma 3, questo prodotto non reca la marcatura CE.

Declaración de SEP

Fisher Controls International Inc. declara que este producto cumple con la Directriz para Equipos bajo Presión (PED) 2014/68/EU, Artículo 4, sección 3, y ha sido diseñado y fabricado según prácticas seguras de ingeniería (SEP). Según lo establecido en el Artículo 4, sección 3, este producto "SEP" no deberá portar el distintivo CE.

Declaração SEP

A Fisher Controls International Inc. declara que este produto obedece às normas da secção 4 do Artigo 3 da Pressure Equipment Directive (PED) 2014/68/EU, e foi concebido e fabricado de acordo com SEP (sound engineering practice - SEP). De acordo com a secção 4 do Artigo 3, este produto "SEP" não pode ter a marca CE.

SEP Declaration

Fisher Controls International Inc. försäkrar att denna produkt överensstämmer med tryckutrustningsdirektiv (PED) 2014/68/EU, artikel 4, avsnitt 3 och har utförts och tillverkats i enlighet med god ingenjörsnpraxis (SEP). Enligt artikel 4, avsnitt 3 får denna produkt inte markeras med CE.

SEP-lausunto

Fisher Controls International Inc. ilmoittaa, että tämä tuote on painelaitedirektiivin (PED) 2014/68/EU artiklan 4 pykälän 3 mukainen, ja että tuote on suunniteltu ja valmistettu äänitekniikkakäytännön (SEP) mukaisesti. Artiklan 4 pykälän 3 mukaan tässä SEP-tuotteessa ei saa olla CE-merkintää.

EP-verklaring

Fisher Controls International Inc. verklaart dat dit product voldoet aan de Richtlijn Drukapparatuur (PED) 2014/68/EU Artikel 4, lid 3 en ontworpen en geproduceerd is volgens regels van goed vakmanschap (SEP). Ingevolge Artikel 4, lid 3 mag dit "SEP"-product de CE-markering niet voeren.

SEP-erklæring

Fisher Controls International Inc. erklærer at dette produktet oppfyller kravene fastsatt i direktivet om trykkutstyr, 2014/68/EU, paragraf 4, avsnitt 3 og at det ble konstruert og produsert i samsvar med god fagteknisk skikk (SEP, eller Sound Engineering Practice). Ifølge paragraf 4, avsnitt 3, kreves det ikke at dette "SEP"-produktet er CE-merket.

SEP Erklæring

Fisher Controls International Inc. erklærer, at dette produkt er i overensstemmelse med direktiv 2014/68/EU, Trykbærende udstyr, artikel 4 afsnit 3, og er udformet og produceret i henhold til praksis om lydteknik (SEP). Ifølge artikel 4, afsnit 3 må dette "SEP" produkt ikke bære mærket CE.

Δήλωση SEP

Η Fisher Controls International Inc. δηλώνει ότι το προϊόν αυτό είναι σύμφωνο με την Οδηγία Εξοπλισμού Πίεσης (Pressure Equipment Directive) (PED) 2014/68/EU Άρθρο 4 τμήμα 3 και ότι μελετήθηκε και κατασκευάσθηκε σύμφωνα με σωστή εφαρμογή των κανόνων της τεχνικής (SEP). Κατά το Άρθρο 4 τμήμα 3, αυτό το προϊόν "SEP" δεν πρέπει να φέρει το σήμα CE.

EMERSON
Process Management

FINAL BOOK

Valpres Sales order: **2100139835**

Valpres Job Number: **24063**

Purchase Order: **2296/24**

Item: **2**

TAG Number:
BLPH-MV-801

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: 2

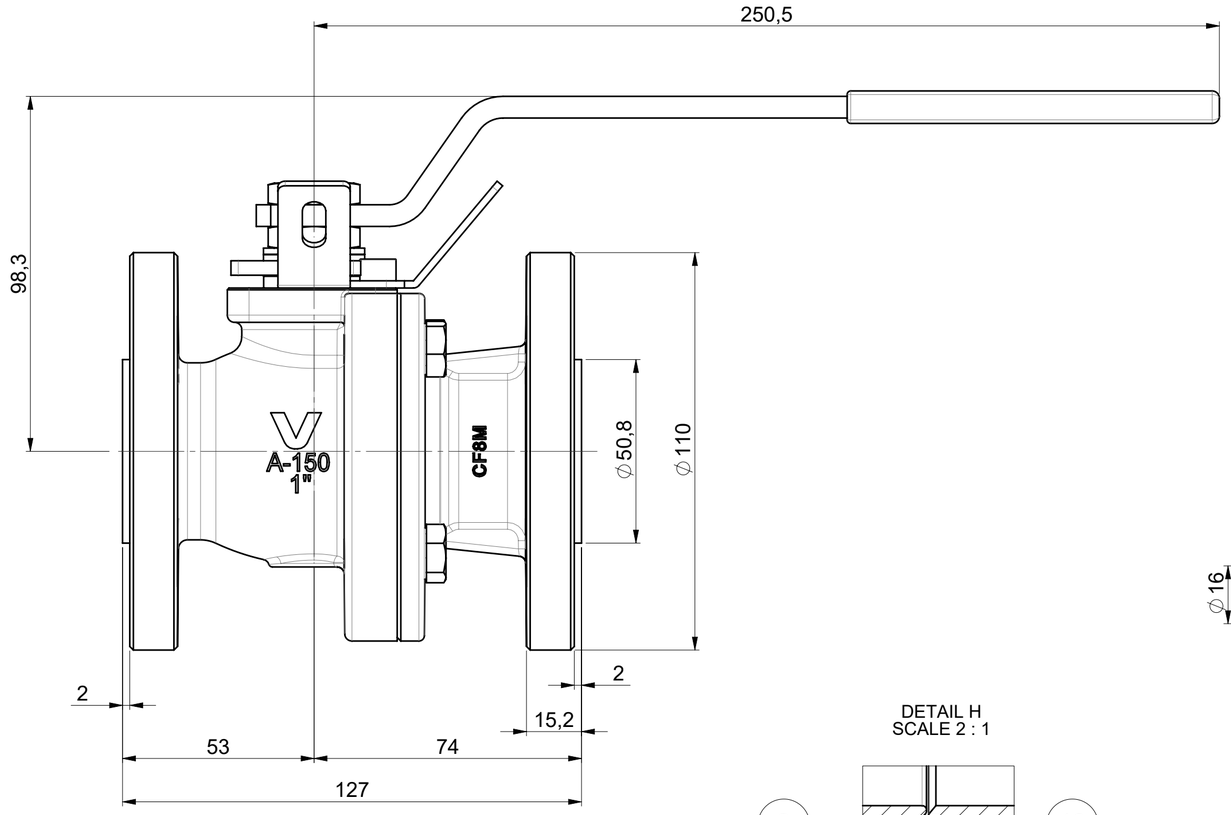
FINAL BOOK Rev. 0

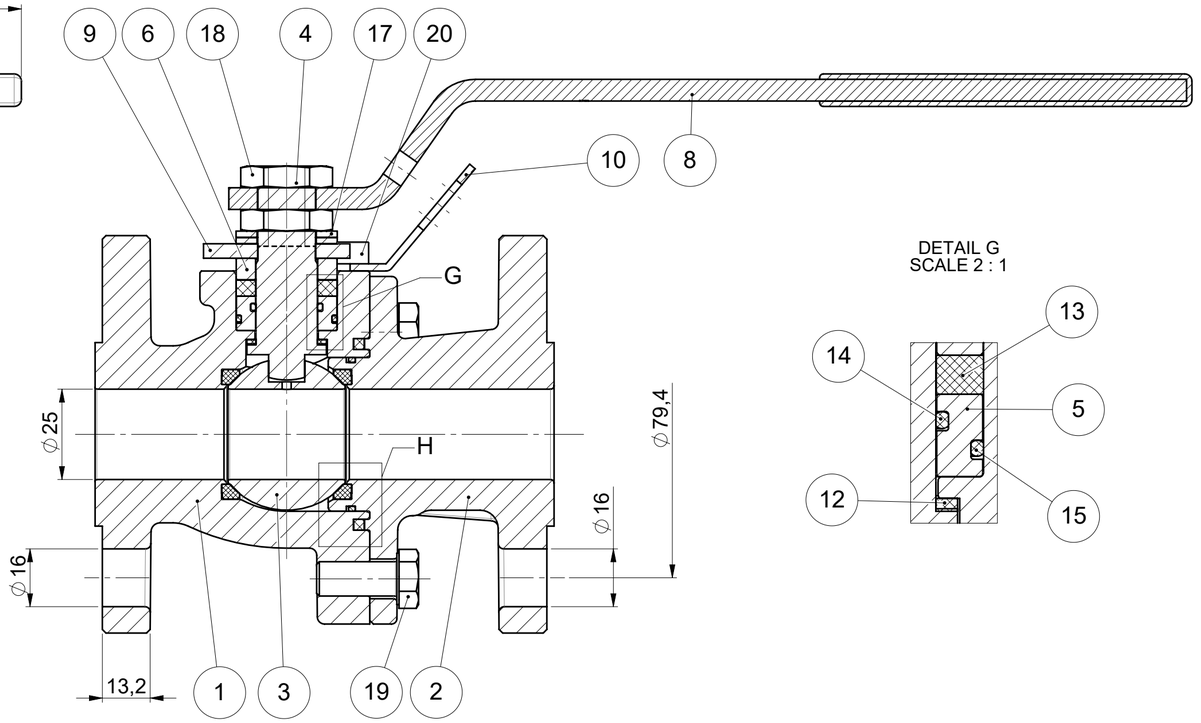
Valve Type: 1x Floating Ball valve Side Entry Bolted Body 2-pcs
1" 150#
VALPRES TYPE: 68J01606

Index

1) As Built Drawing page 1
2) Material Certificate EN 10204 3.1 n. EXP815/22-23/21– BODY page 2
3) Material Certificate EN 10204 3.1 n. EXP815/22-23/117 – CLOSURE page 3
4) Material Certificate EN 10204 3.1 n. 2018018697 – BALL page 4
5) Material Certificate EN 10204 3.1 n. BT-37159 – STEM page 13
6) Valpres Final Inspection Certificate page 14
7) Declaration of Compliance with the Order page 16

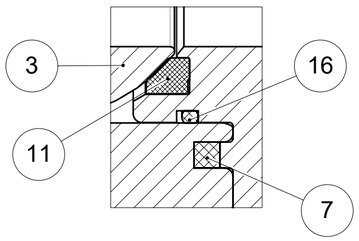
VALPRES QC REVIEW





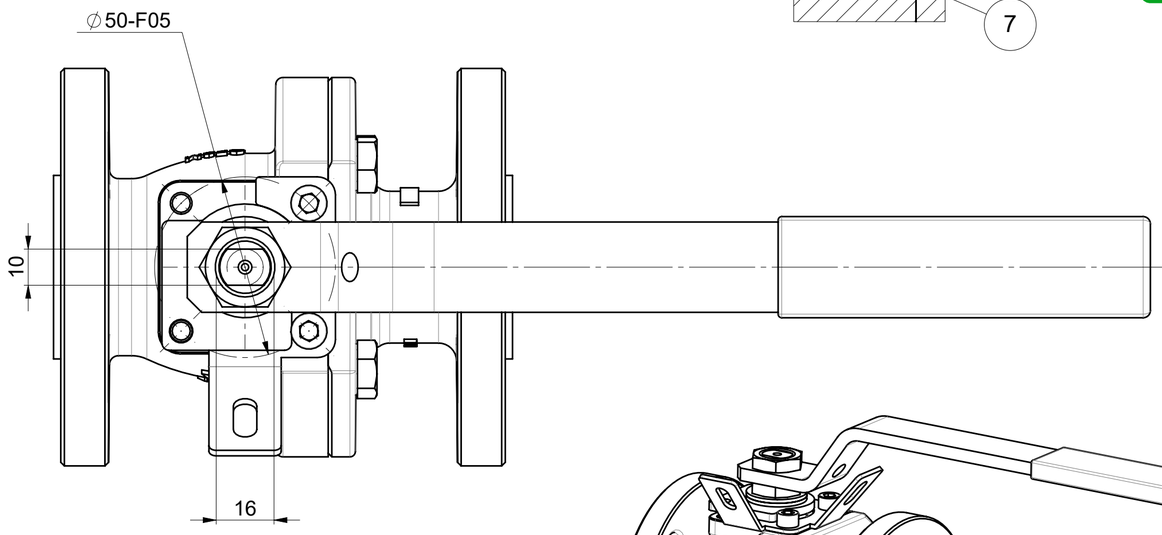
DETAIL G
SCALE 2 : 1

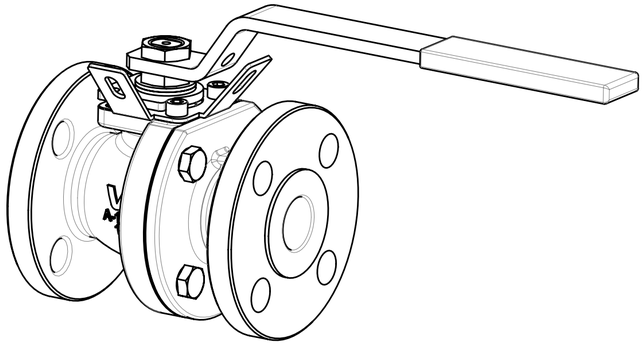
DETAIL H
SCALE 2 : 1



AS BUILT

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 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	AISI 316	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	AISI 304	2
18	DADO / NUT	A2-70	2
19	VITE / SCREW	A193 B8M Cl.2	4
20	VITE / SCREW	A2-70	2





Valpres Code	Valpres Item	DS N°
68J01606	2	BA01C01RF

REV	DATE	DRAFT	APPR.	DESCRIPTION	IN PLACE OF

SIZE	SCALE	DATE	ENGINEER SIGNATURE	ENGINEERING GROUP LEADER SIGNATURE	WEIGHT (Kg)
A2	1:1.2	04-09-2024	Zanetti Paride	Agorni Alessandra	4.869

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 BAL VALVE** **68J016 (FLOTTANTE)** **1"-DN25**
ANSI150 API608 **FTF - ASME B16.10** **ASME B16.5 RF**

PROJECT REFERENCE
COD Commessa 24063 REV TAV 01

DRAWING NUMBER
COD **68J01606** REV A TAV 01

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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,

VALPRES

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 : EXP815/22-23/21 Invoice No : EXP815/22-23 O.A No : E1440/22-23 P.O No : 4500027431	Date: 14/03/2023 Date: 14/03/2023 Date: 10/02/2023 Date: 01/02/2023

SPECIFICATION : ASTM A 351-2018E1 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
CA002.	0.025	1.010	0.670	0.005	0.025	18.879	10.135	2.310
CG001.	0.025	0.989	0.724	0.009	0.021	18.890	10.010	2.201

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
CA002.	270.05		543.15	44.92	-	165	132	138	134	135	-	-	-	-
CG001.	253.56		515.41	45.12	-	162	140	136	132	136	-	-	-	-

DESPATCH DETAILS

HEAT No	DIE No	S.No.	Pos	ITEM DESCRIPTION	PART No	DRAWING No	DESP. QTY
CA002.	VP033VM	121	1210	1" DN25 SPLIT BODY ANSI 150	00106010047	MOD0010615 REV. E	1
CG001.	VP033VM	121	1210	1" DN25 SPLIT BODY ANSI 150	00106010047	MOD0010615 REV. E	1

We hereby certify that items mentioned above confirms to : ASTM A 351-2018E1 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

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,

VALPRES

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 : EXP815/22-23/117 Invoice No : EXP815/22-23 O.A No : E1440/22-23 P.O No : 4500027431	Date: 14/03/2023 Date: 14/03/2023 Date: 10/02/2023 Date: 01/02/2023

SPECIFICATION : ASTM A 351-2018E1 Gr.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
CA002.	0.025	1.010	0.670	0.005	0.025	18.879	10.135	2.310

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
CA002.	270.05		543.15	44.92	-	165	132	138	134	135	-	-	-	-

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DESPATCH DETAILS

HEAT No	DIE No	S.No.	Pos	ITEM DESCRIPTION	PART No	DRAWING No	DESP. QTY
CA002.	VP034NM	122	1220	1"DN25 SPLIT CAP ANSI 150	00206010035	MOD0020613 REV. E	2

We hereby certify that items mentioned above confirms to : ASTM A 351-2018E1 Gr.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

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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								

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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

VALPRES QC REVIEW

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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

AQM srl
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Internet: http://www.aqm.it e-mail: segreteria@aqm.it

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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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

Nome modulo base: 0-supplemento rev. 5 del 12-2018

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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.

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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)	

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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°*	**180002180-03/053**	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*

VALPRES QC REVIEW

DELTAR®
ENP and VACUUM - CODEPOSITION TECHNOLOGIES
Via F.lli Rosselli 10 20068 Peschiera Borromeo (MI)
Tel. +39.02.55305457 - Fax +39.02.55305883
www.deltar.it - info@deltar.it

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*

VALPRES QC REVIEW

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	2

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-002
TIPO VALVOLA / VALVE TYPE	68J01606
OGG. ISPEZIONATI / INSPECTED OBJECTS	1
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)
	-	-	-	-	**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**		-		-	
STRUMENTI / INSTRUMENTS	Banco prova / Test bench: ITALCONTROL vertical 13-870 – Mod. MTS3-100A Gauges: MM0127/1 – MM2126/1 – MM0090/1									

Summary table of the tested valves:

OBJ.	SERIAL NUMBER	TAG
1	68J01606/01	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	2

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-002
TIPO VALVOLA / VALVE TYPE	68J01606
OGG. ISPEZIONATI / INSPECTED OBJECTS	1
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	-	-	-	-

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	-	-	-	-	-	-	-	-

TEST RESULT:	**SATISFACTORY**

ASSICURAZIONE QUALITA' / QUALITY ASSURANCE	ISPETTORE CLIENTE / CUSTOMER INSPECTOR	ISPETTORE PARTE TERZA / THIRD PART INSPECTOR
Firma / Sign	Firma / Sign	Firma / Sign
VALPRES QC PASSED		
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

FINAL BOOK

Valpres Sales order: **2100139835**

Valpres Job Number: **24063**

Purchase Order: **2296/24**

Item: **4**

TAG Numbers:
64-XV-055, 64-XV-056
64-XV-057, 64-XV-058
64-XV-059

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: 4

FINAL BOOK Rev. 0

Valve Type: 5x Floating Ball valve Side Entry Bolted Body 2-pcs

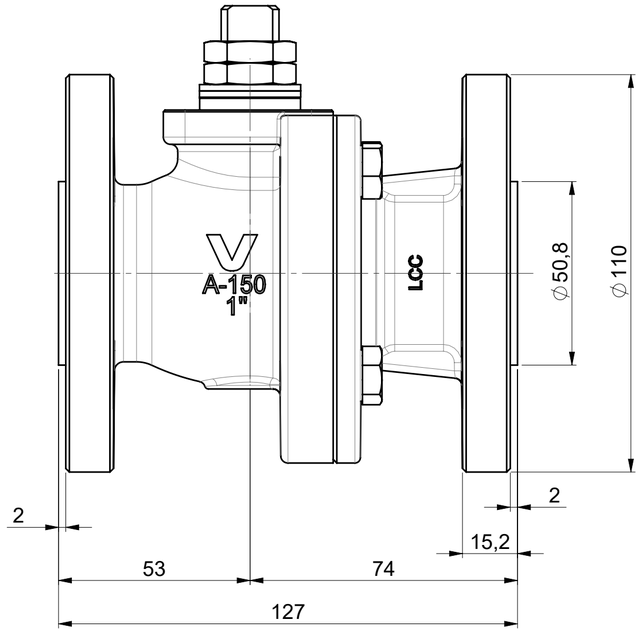
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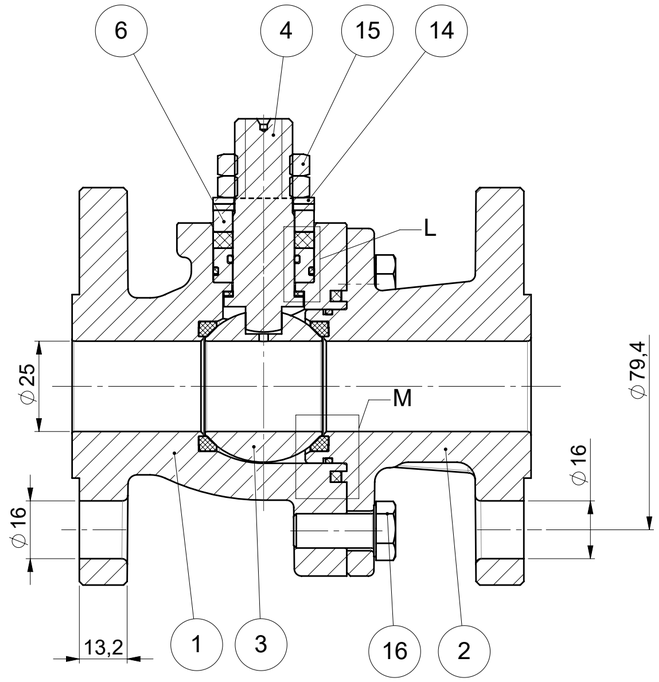
VALPRES TYPE: 8PV0050406

Index

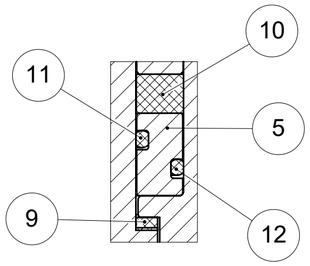
1) As Built Drawing page 1
2) Material Certificate EN 10204 3.1 n. EXP067/19-20/3– BODY page 3
3) Material Certificate EN 10204 3.1 n. EXP067/19-20/22 – CLOSURE page 4
4) Material Certificate EN 10204 3.1 n. 2018018697 – BALL page 5
5) Material Certificate EN 10204 3.1 n. BT-37159 – STEM page 14
6) Valpres Final Inspection Certificate page 15
7) Valpres Functional acceptance test report page 17
8) ATEX Declaration page 19
9) Declaration of Compliance with the Order page 20

VALPRES QC REVIEW

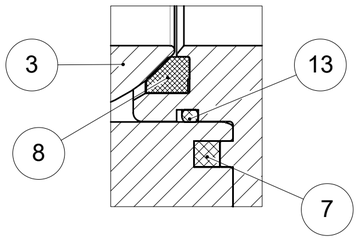


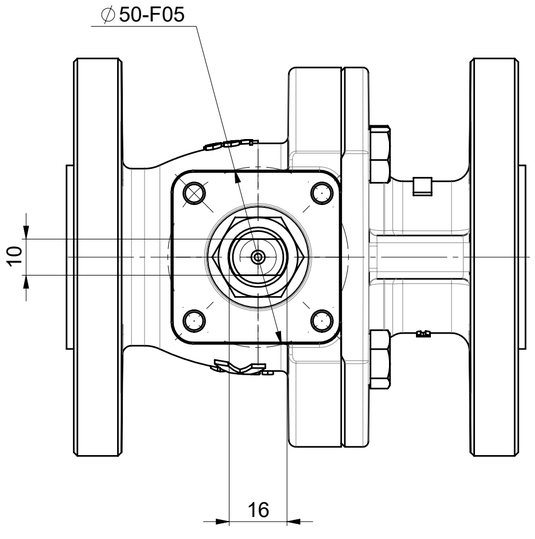


DETTAGLIO L
SCALA 2 : 1



DETTAGLIO M
SCALA 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	GUARNIZIONE SFERA / BALL SEAT	RPTFE	2
9	GUARNIZIONE ANTIATTRITO / ANTIFRICTION RING	RPTFE	1
10	GUARNIZIONE ASTA / STEM SEAT	GRAPHITE	1
11	O-RING	FKM	1
12	O-RING	FKM	1
13	O-RING	FKM	1
14	MOLLA A TAZZA / SPRING WASHER	51CrV4	2
15	DADO / NUT	6S+Z/P	2
16	VITE / SCREW	A320 L7+Z/P 5µm	4

REV	DATE	DRAFT	APPR.	DESCRIPTION	IN PLACE OF
					68F02906SL

SIZE A2 | SCALE 1:1.2 | DATE 05-09-2024 | ENGINEER SIGNATURE Zanetti Paride | ENGINEERING GROUP LEADER SIGNATURE Agorni Alessandra | WEIGHT (Kg) 4.384

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

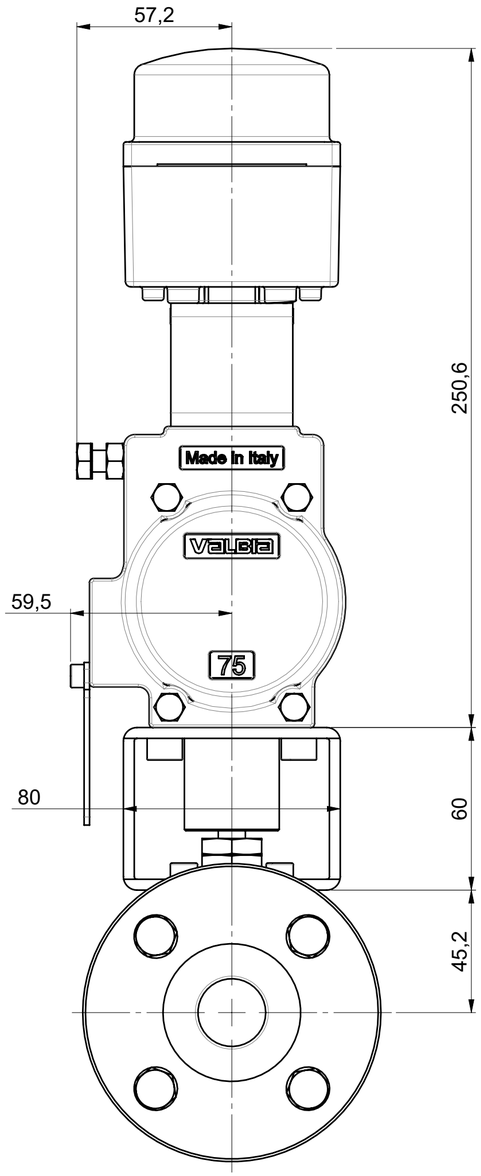
MATERIAL | TREATMENT

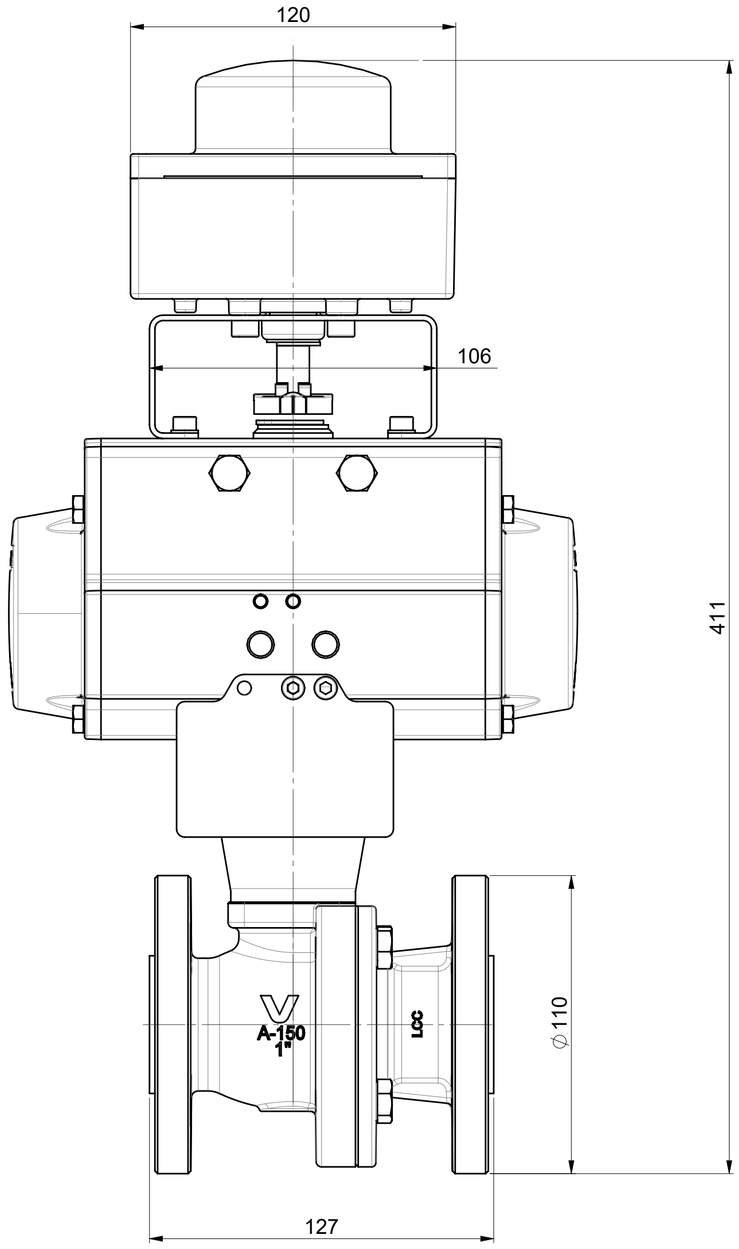
NAME **SPLIT BODY BALL VALVE** **68F029 (FLOTTANTE)** **1"-DN25**
ANSI150 API608 **FTF - ASME B16.10** **ASME B16.5 RF**

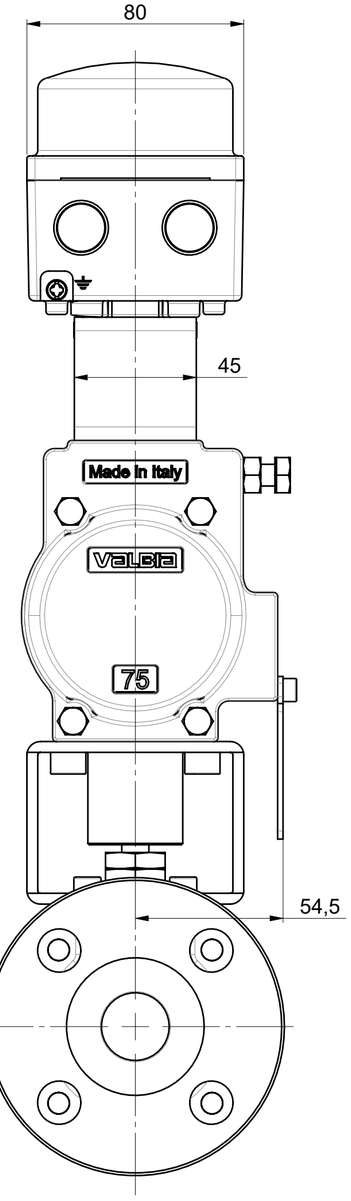
PROJECT REFERENCE: COD Commessa 24063 | REV | TAV 01

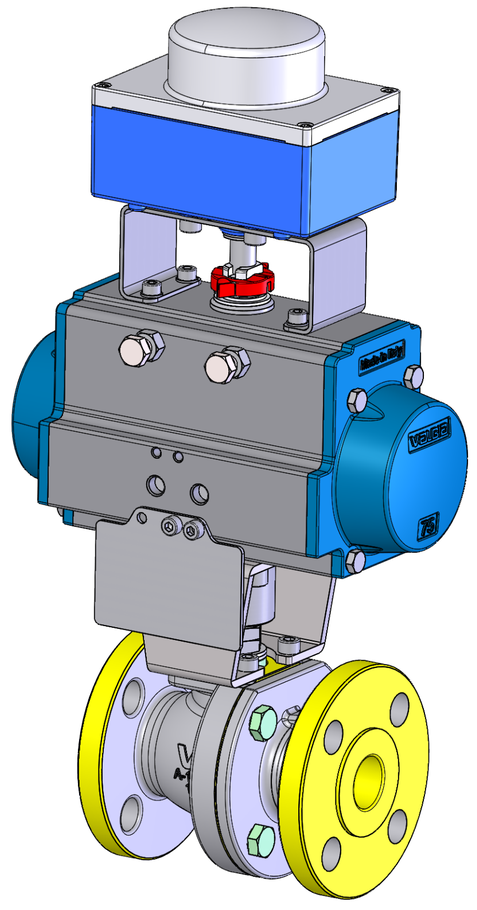
DRAWING NUMBER: COD **68F02906SL** | REV A | TAV 01

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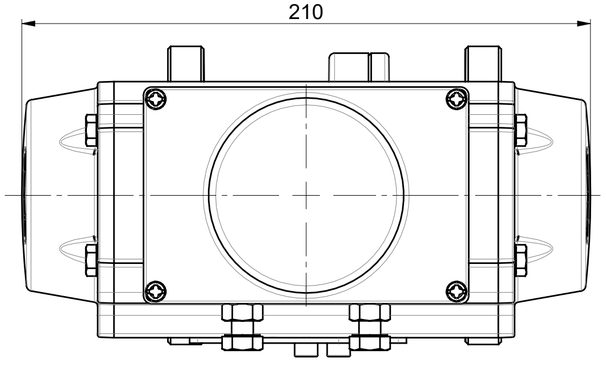






AS BUILT

FAIL POSITION VALVE CLOSE



Valpres Code	Valpres Item	DS N°	Weigth (Kg)
68F02906	4	BS01B01RF	9.2

REV	DATE	DRAFT	APPR.	DESCRIPTION	IN PLACE OF
					8PV0050406

SIZE	SCALE	DATE	ENGINEER SIGNATURE	ENGINEERING GROUP LEADER SIGNATURE	WEIGHT (Kg)
A2	1:1.6	05-09-2024	Zanetti Paride	Agorni Alessandra	

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+ACTUATOR-CL 68F029 (FLOTTANTE) 1"-DN25
ANSI150 API608 FTF - ASME B16.10 ASME B16.5 RF

VALPRES | BONOMI GROUP

PROJECT REFERENCE: COD Commessa 24063 | REV | TAV 01

DRAWING NUMBER: COD 8PV0050406 | 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 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 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

VALPRES QC REVIEW

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CAP. SOC. 115.000.000 EUR INT. VERS.
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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								

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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

VALPRES QC REVIEW

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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

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Internet: http://www.aqm.it e-mail: segreteria@aqm.it

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

Nome modulo base: 0-supplemento rev. 5 del 12-2018

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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.

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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)	

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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*

VALPRES QC REVIEW

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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*

VALPRES QC REVIEW

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	4

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-004
TIPO VALVOLA / VALVE TYPE	68F02906SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	5
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	8PV0050406/01	n/a
2	8PV0050406/02	n/a
3	8PV0050406/03	n/a
4	8PV0050406/04	n/a
5	8PV0050406/05	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	4

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-004
TIPO VALVOLA / VALVE TYPE	68F02906SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	5
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	-	-

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	-	-	-	-	-	-	-	-

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

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	4

N° CERTIFICATO / CERTIFICATE No.	24063-FAT-002
TIPO VALVOLA / VALVE TYPE	68F02906SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	5
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	1"
RATING	150
DIBA	8PV0050406

ACTUATOR DATA	
OPERATING SYSTEM	**Pneumatic actuator - Spring return**
MODEL TYPE	**""VALBIA SR75-04-CL""**
COMPONENT CODE	**8P0325AV75**

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	**≤ 5**	**sec**
MAX ALLOWABLE OPENING TIME	**≤ 5**	**sec**

MEASURING INSTRUMENTS
Chronometers

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	4

N° CERTIFICATO / CERTIFICATE No.	24063-FAT-002
TIPO VALVOLA / VALVE TYPE	68F02906SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	5
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	1"
RATING	150
DIBA	8PV0050406

Summary table of the tested valves:

OBJ.	VALVE SERIAL NUMBER	VALVE TAG
1	8PV0050406/01	n/a
2	8PV0050406/02	n/a
3	8PV0050406/03	n/a
4	8PV0050406/04	n/a
5	8PV0050406/05	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	-	1	-	1
2	-	0	-	6	-	1	-	1
3	-	0	-	6	-	1	-	1
4	-	0	-	6	-	1	-	1
5	-	0	-	6	-	1	-	1

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: **5**

TAG Numbers:
64-XV-051, 64-XV-052
64-XV-053, 64-XV-054

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: 5

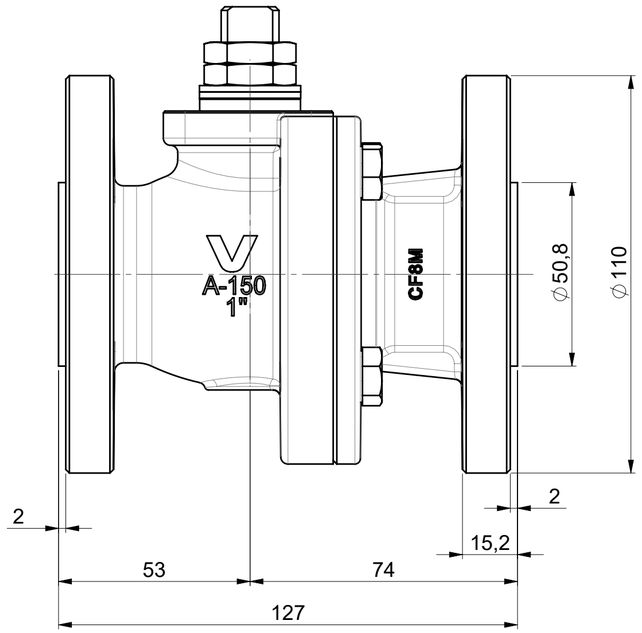
FINAL BOOK Rev. 0

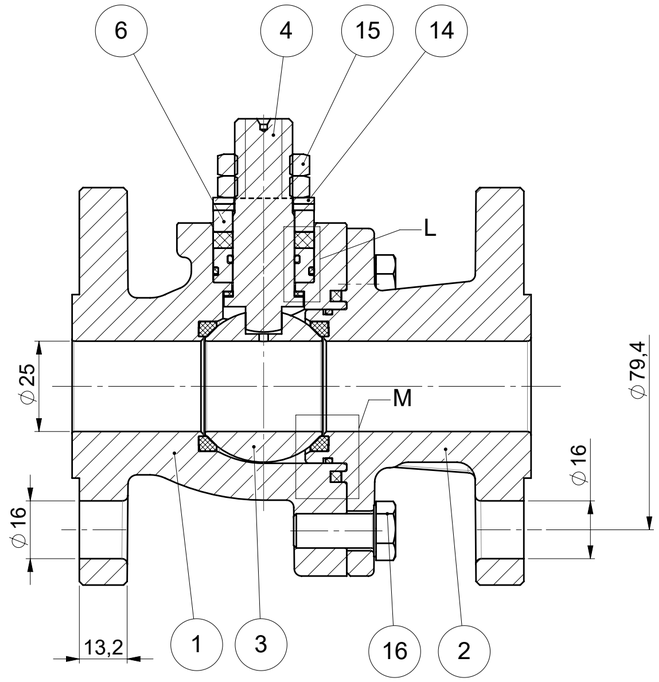
Valve Type: 4x Floating Ball valve Side Entry Bolted Body 2-pcs
1" 150#
VALPRES TYPE: 8PV0050306

Index

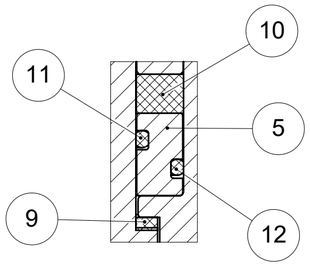
1) As Built Drawing page 1
2) Material Certificate EN 10204 3.1 n. EXP815/22-23/21– BODY page 3
3) Material Certificate EN 10204 3.1 n. EXP815/22-23/117 – CLOSURE page 4
4) Material Certificate EN 10204 3.1 n. 2018018697 – BALL page 5
5) Material Certificate EN 10204 3.1 n. BT-37159 – STEM page 14
6) Valpres Final Inspection Certificate page 15
7) Valpres Functional acceptance test report page 17
8) ATEX Declaration page 19
9) Declaration of Compliance with the Order page 20

VALPRES QC REVIEW

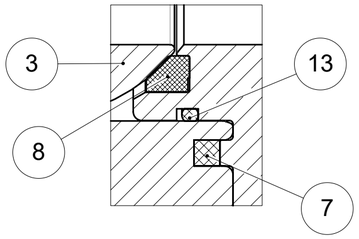


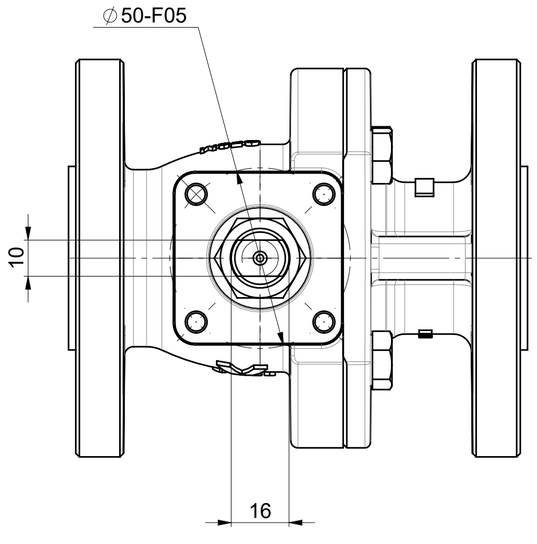


DETTAGLIO L
SCALA 2 : 1



DETTAGLIO M
SCALA 2 : 1





AS BUILT

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 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	GUARNIZIONE SFERA / BALL SEAT	RPTFE	2
9	GUARNIZIONE ANTIATTRITO / ANTIFRICTION RING	RPTFE	1
10	GUARNIZIONE ASTA / STEM SEAT	GRAPHITE	1
11	O-RING	FKM	1
12	O-RING	FKM	1
13	O-RING	FKM	1
14	MOLLA A TAZZA / SPRING WASHER	AISI 304	2
15	DADO / NUT	A2-70	2
16	VITE / SCREW	A193 B8 Cl.2	4

REV	DATE	DRAFT	APPR.	DESCRIPTION	IN PLACE OF

SIZE A2 | SCALE 1:1.2 | DATE 05-09-2024 | ENGINEER SIGNATURE Zanetti Paride | ENGINEERING GROUP LEADER SIGNATURE Agorni Alessandra | WEIGHT (Kg) 4.384

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

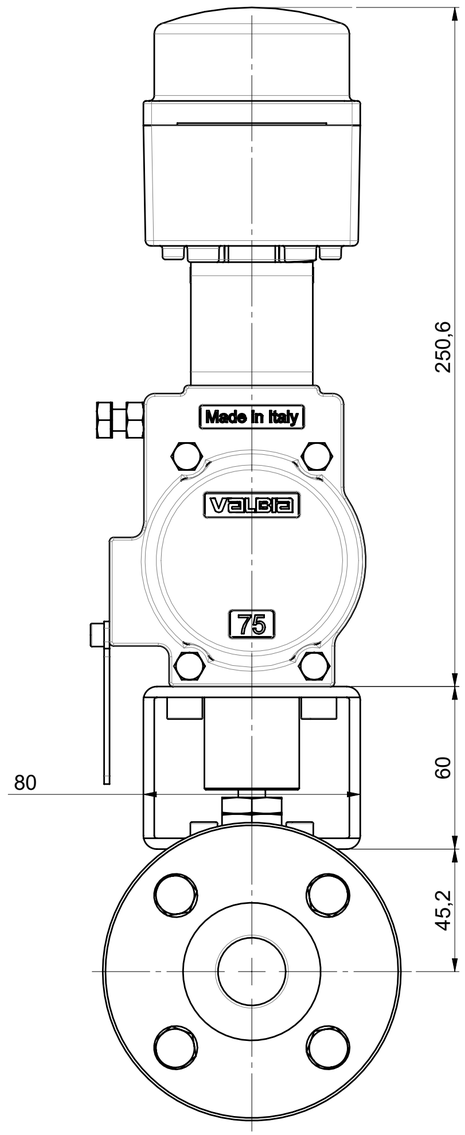
MATERIAL | TREATMENT

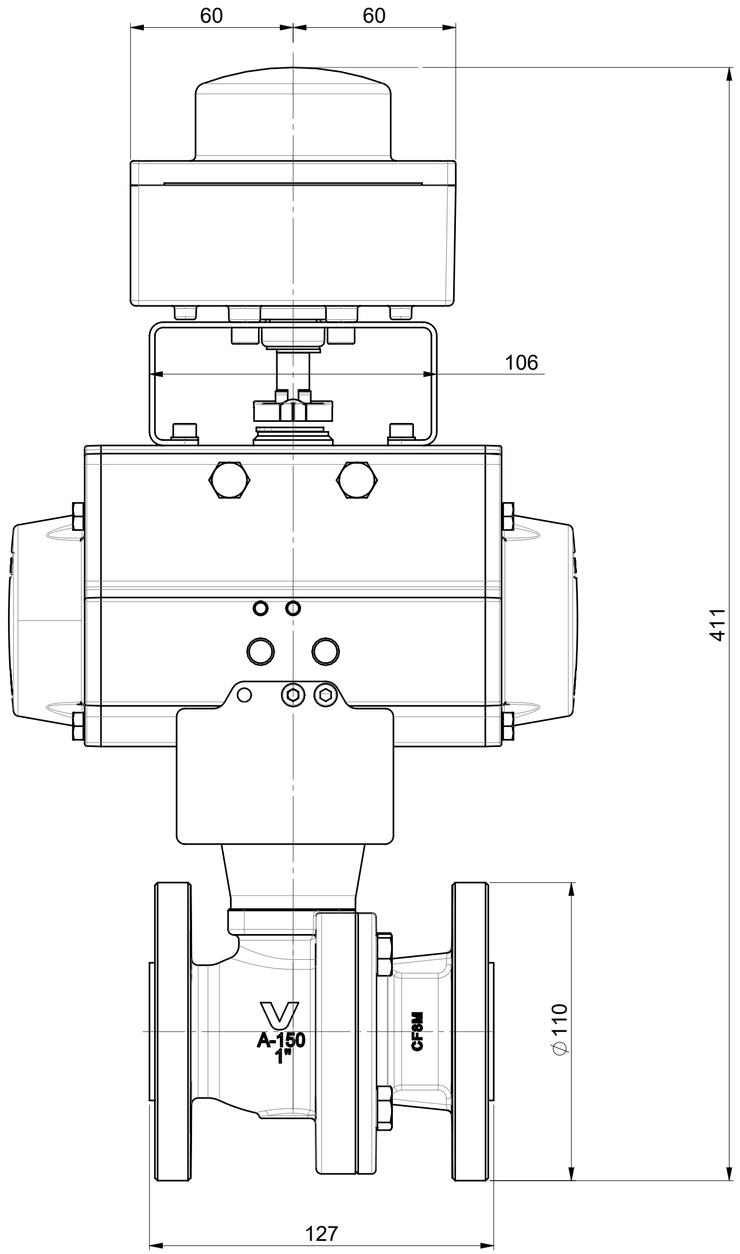
NAME **SPLIT BODY BAL VALVE** **68J016 (FLOTTANTE)** **1"-DN25**
ANSI150 API608 **FTF - ASME B16.10** **ASME B16.5 RF**

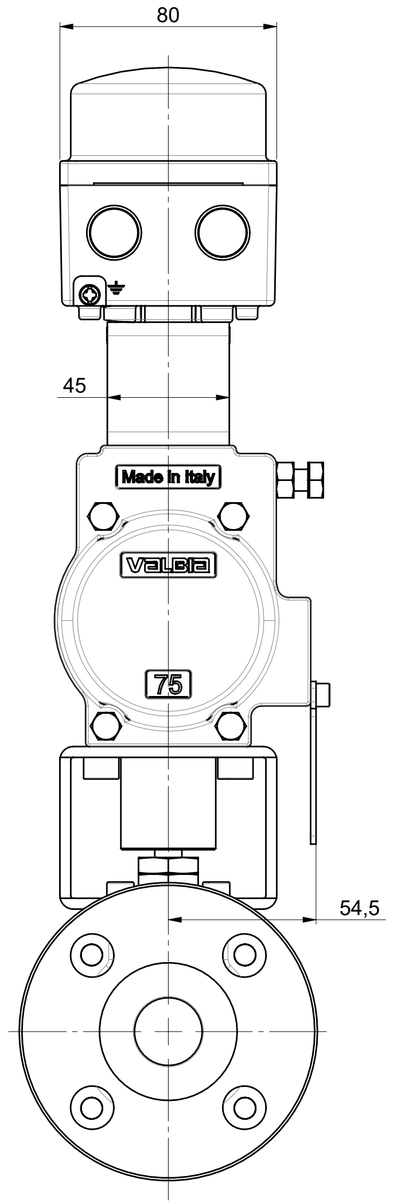
PROJECT REFERENCE
COD Commessa 24063 | REV | TAV 01

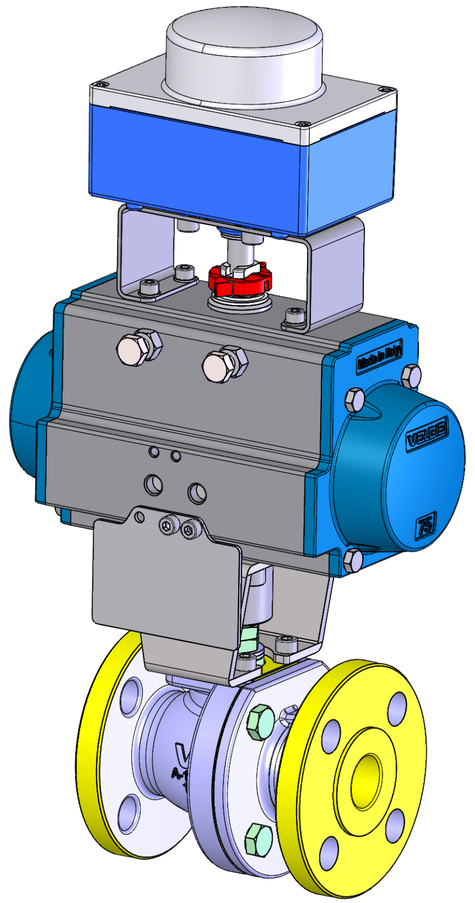
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COD **68J01606SL** REV A | TAV 01

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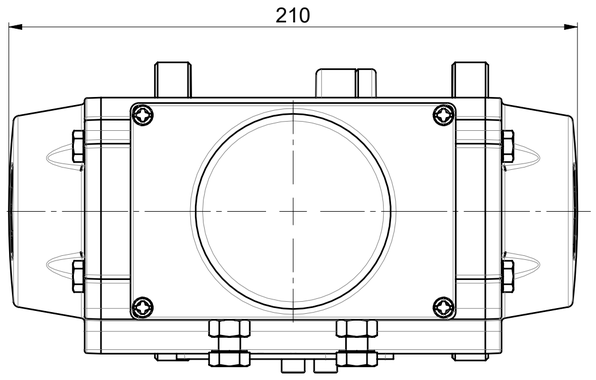






FAIL POSITION VALVE CLOSE

AS BUILT



Valpres Code	Valpres Item	DS N°	Weigth (Kg)
8PV0050306	5	BA01C01RF	9.21

REV	DATE	DRAFT	APPR.	DESCRIPTION	IN PLACE OF

SIZE A2 | SCALE 1:1.6 | DATE 05-09-2024 | 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+ACTUATOR 68J016 (FLOTTANTE) 1"-DN25
ANSI150 API608 FTF - ASME B16.10 ASME B16.5 RF

VALPRES | BONOMI GROUP

PROJECT REFERENCE: COD Commessa 24063 | REV | TAV 01

DRAWING NUMBER: COD 8PV0050306 | REV A | TAV 01

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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,

VALPRES

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 : EXP815/22-23/21 Invoice No : EXP815/22-23 O.A No : E1440/22-23 P.O No : 4500027431	Date: 14/03/2023 Date: 14/03/2023 Date: 10/02/2023 Date: 01/02/2023

SPECIFICATION : ASTM A 351-2018E1 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
CA002.	0.025	1.010	0.670	0.005	0.025	18.879	10.135	2.310
CG001.	0.025	0.989	0.724	0.009	0.021	18.890	10.010	2.201

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
CA002.	270.05		543.15	44.92	-	165	132	138	134	135	-	-	-	-
CG001.	253.56		515.41	45.12	-	162	140	136	132	136	-	-	-	-

DESPATCH DETAILS

HEAT No	DIE No	S.No.	Pos	ITEM DESCRIPTION	PART No	DRAWING No	DESP. QTY
CA002.	VP033VM	121	1210	1" DN25 SPLIT BODY ANSI 150	00106010047	MOD0010615 REV. E	1
CG001.	VP033VM	121	1210	1" DN25 SPLIT BODY ANSI 150	00106010047	MOD0010615 REV. E	1

We hereby certify that items mentioned above confirms to : ASTM A 351-2018E1 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

RAJAN TECHNO CAST PVT LTD.

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Tel:+91-2827-252160,,Fax:+91-2827-252562,e-mail:info@rajantechcast.com,

VALPRES

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 : EXP815/22-23/117 Invoice No : EXP815/22-23 O.A No : E1440/22-23 P.O No : 4500027431	Date: 14/03/2023 Date: 14/03/2023 Date: 10/02/2023 Date: 01/02/2023

SPECIFICATION : ASTM A 351-2018E1 Gr.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
CA002.	0.025	1.010	0.670	0.005	0.025	18.879	10.135	2.310

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
CA002.	270.05		543.15	44.92	-	165	132	138	134	135	-	-	-	-

VALPRES QC PASSED

DESPATCH DETAILS

HEAT No	DIE No	S.No.	Pos	ITEM DESCRIPTION	PART No	DRAWING No	DESP. QTY
CA002.	VP034NM	122	1220	1"DN25 SPLIT CAP ANSI 150	00206010035	MOD0020613 REV. E	2

We hereby certify that items mentioned above confirms to : ASTM A 351-2018E1 Gr.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

AN ISO-9001-2015 COMPANY

*Latest Revision applicable as on date .

VALPRES QC REVIEW

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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

VALPRES QC REVIEW

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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

VALPRES QC REVIEW

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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

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Internet: http://www.aqm.it e-mail: segreteria@aqm.it

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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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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VALPRES QC PASSED

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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

Nome modulo base: 0-supplemento rev. 5 del 12-2018

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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

DELTAR®
ENP and VACUUM - CODEPOSITION TECHNOLOGIES
Via F.lli Rosselli 10 20068 Peschiera Borromeo (MI)
Tel. +39.02.55305457 - Fax +39.02.55305883
www.deltar.it - info@deltar.it

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*

VALPRES QC REVIEW

ENP and VACUUM - CODEPOSITION TECHNOLOGIES
Via F.lli Rosselli 10 20068 Peschiera Borromeo (MI)
Tel. +39.02.55305457 - Fax +39.02.55305883
www.deltar.it - info@deltar.it

CERTIFICATO CONTROLLO QUALITA'

QUALITY CONTROL CERTIFICATE

EN 10204 3.1

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*

VALPRES QC REVIEW

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	5

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-005
TIPO VALVOLA / VALVE TYPE	68J01606SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	4
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	8PV0050306/01	n/a
2	8PV0050306/02	n/a
3	8PV0050306/03	n/a
4	8PV0050306/04	n/a

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	5

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-005
TIPO VALVOLA / VALVE TYPE	68J01606SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	4
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	29	0	-	-
2	29	0	-	-
3	29	0	-	-
4	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	-	-	-	-	-	-	-	-

TEST RESULT:	**SATISFACTORY**

ASSICURAZIONE QUALITA' / QUALITY ASSURANCE	ISPETTORE CLIENTE / CUSTOMER INSPECTOR	ISPETTORE PARTE TERZA / THIRD PART INSPECTOR
Firma / Sign VALPRES QC PASSED Data / Date 05/09/2024	Firma / Sign Data / Date	Firma / Sign Data / Date

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	5

N° CERTIFICATO / CERTIFICATE No.	24063-FAT-003
TIPO VALVOLA / VALVE TYPE	68J01606SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	4
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	1"
RATING	150
DIBA	8PV0050306

ACTUATOR DATA	
OPERATING SYSTEM	**Pneumatic actuator - Spring return**
MODEL TYPE	**""VALBIA SR75-04-CL""**
COMPONENT CODE	**8P0325AV75**

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	**≤ 5**	**sec**
MAX ALLOWABLE OPENING TIME	**≤ 5**	**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	5

N° CERTIFICATO / CERTIFICATE No.	24063-FAT-003
TIPO VALVOLA / VALVE TYPE	68J01606SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	4
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	1"
RATING	150
DIBA	8PV0050306

Summary table of the tested valves:

OBJ.	VALVE SERIAL NUMBER	VALVE TAG
1	8PV0050306/01	n/a
2	8PV0050306/02	n/a
3	8PV0050306/03	n/a
4	8PV0050306/04	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	-	1	-	1
2	-	0	-	6	-	1	-	1
3	-	0	-	6	-	1	-	1
4	-	0	-	6	-	1	-	1

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: **6**

TAG Numbers:
64-XV-060, 64-XV-061

0	07/04/2025	First Issued	L. Toso RQP	A. Disha RGC
Rev:	**Date:**	Description:	**Emitted by:**	**Approved by:**

VALPRES S.r.l. – Via A. Gitti, 11 – P.O. Box 40 – 25060 Marcheno V. T. (Brescia) – Italia
Tel. +39 030 89 69 311 – Fax +39 030 89 60 239 – www.valpres.it – E mail: valpres@bonomi.it
Reg. Imprese BS 00551900178 – R.E.A. BS 0199998 – N° Meccan. BS 005758 – Capitale Sociale € 3.600.000,00 i.v.
Codice Fiscale 00551900178 – Partita Iva 00570120980

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: 6

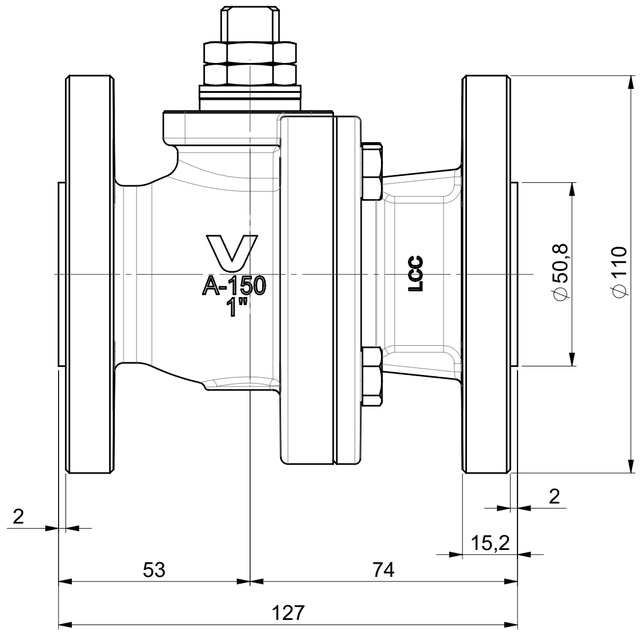
FINAL BOOK Rev. 0

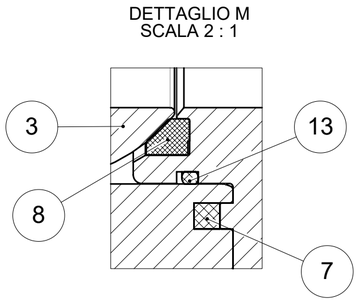
Valve Type: 2x Floating Ball valve Side Entry Bolted Body 2-pcs
1" 150#
VALPRES TYPE: 8PV0050606

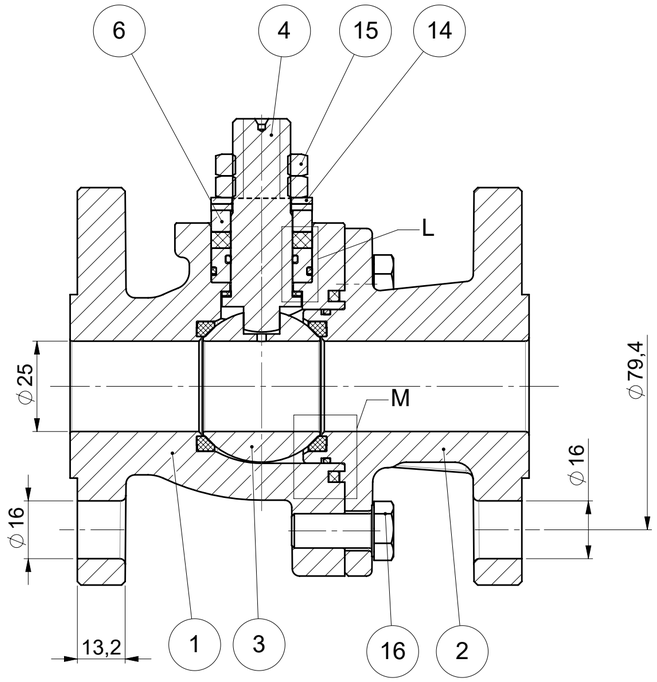
Index

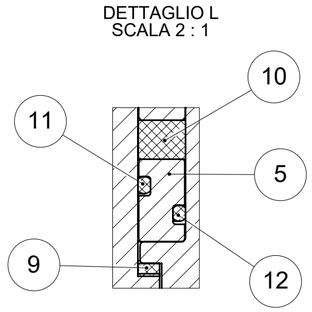
1) As Built Drawing page 1
2) Material Certificate EN 10204 3.1 n. EXP067/19-20/3– BODY page 3
3) Material Certificate EN 10204 3.1 n. EXP067/19-20/22 – CLOSURE page 4
4) Material Certificate EN 10204 3.1 n. 2018018697 – BALL page 5
5) Material Certificate EN 10204 3.1 n. BT-37159 – STEM page 14
6) Valpres Final Inspection Certificate page 15
7) Valpres Functional acceptance test report page 17
8) ATEX Declaration page 19
9) Declaration of Compliance with the Order page 20

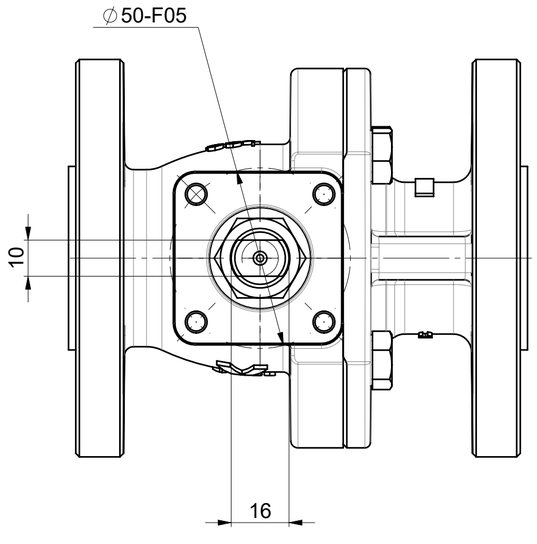
VALPRES QC REVIEW











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	GUARNIZIONE SFERA / BALL SEAT	RPTFE	2
9	GUARNIZIONE ANTIATTRITO / ANTIFRICTION RING	RPTFE	1
10	GUARNIZIONE ASTA / STEM SEAT	GRAPHITE	1
11	O-RING	FKM	1
12	O-RING	FKM	1
13	O-RING	FKM	1
14	MOLLA A TAZZA / SPRING WASHER	51CrV4	2
15	DADO / NUT	6S+Z/P	2
16	VITE / SCREW	A320 L7+Z/P 5µm	4

REV	DATE	DRAFT	APPR.	DESCRIPTION	IN PLACE OF
					68F02906SL

SIZE A2 | SCALE 1:1.2 | DATE 05-09-2024 | ENGINEER SIGNATURE Zanetti Paride | ENGINEERING GROUP LEADER SIGNATURE Agorni Alessandra | WEIGHT (Kg) 4.384

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

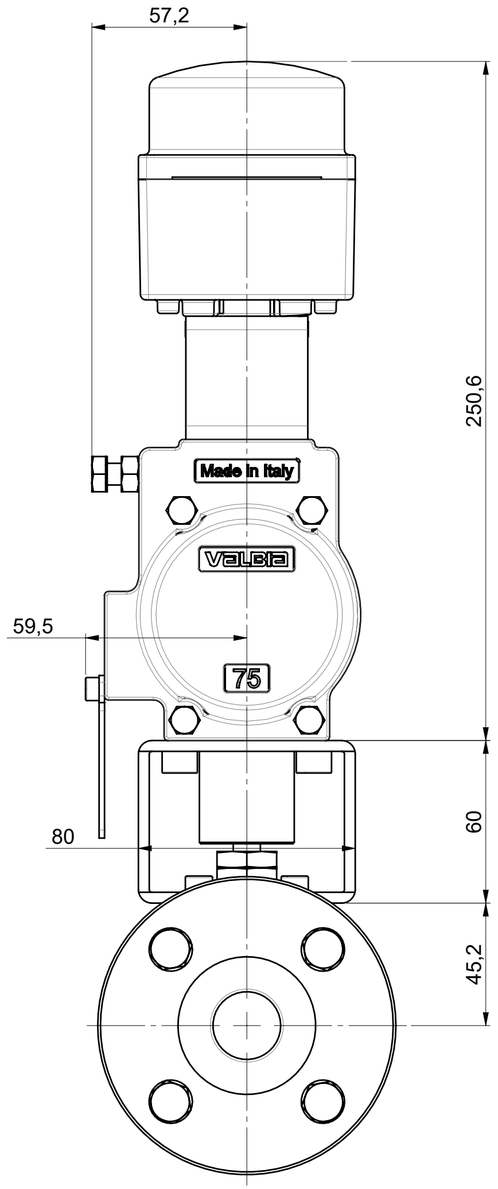
MATERIAL | TREATMENT

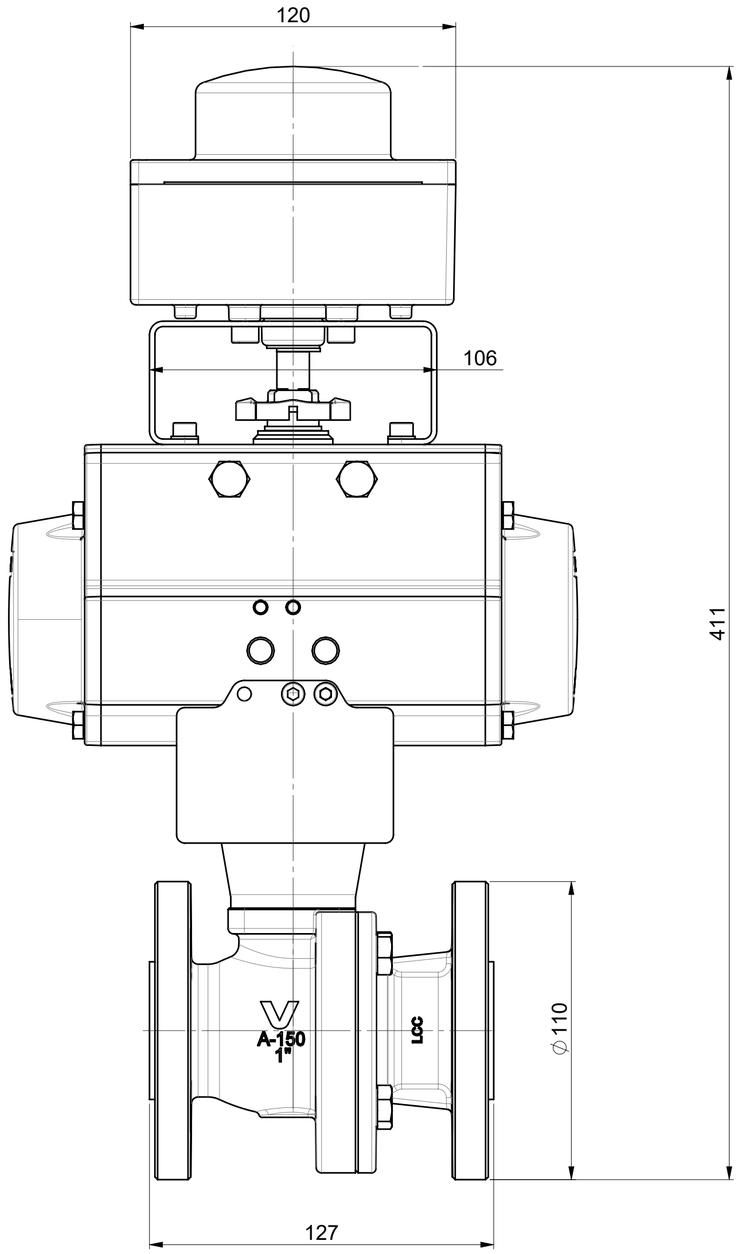
NAME **SPLIT BODY BALL VALVE** **68F029 (FLOTTANTE)** **1"-DN25**
ANSI150 API608 **FTF - ASME B16.10** **ASME B16.5 RF**

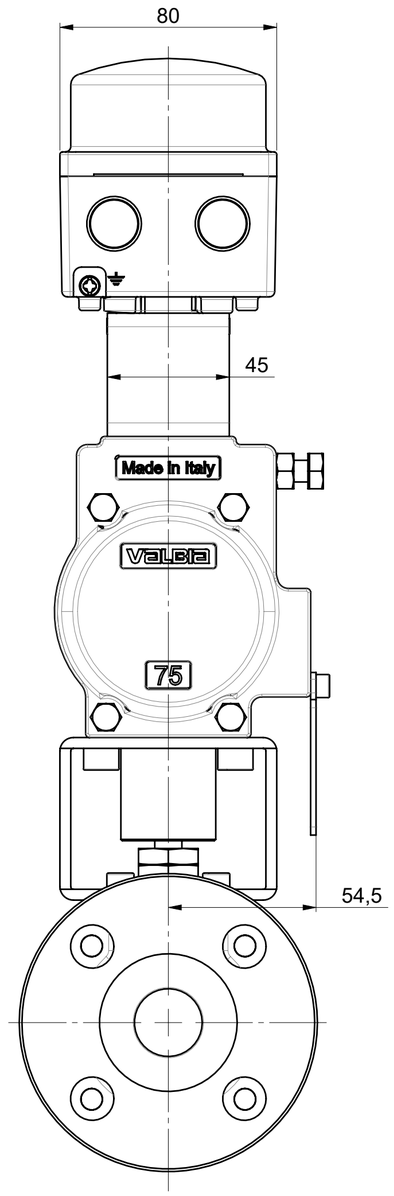
PROJECT REFERENCE: COD Commessa 24063 | REV | TAV 01

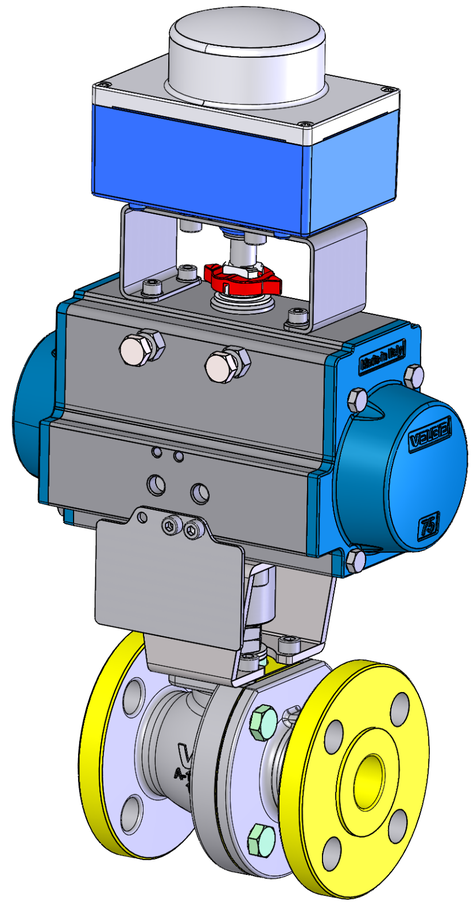
DRAWING NUMBER: COD **68F02906SL** | REV A | TAV 01

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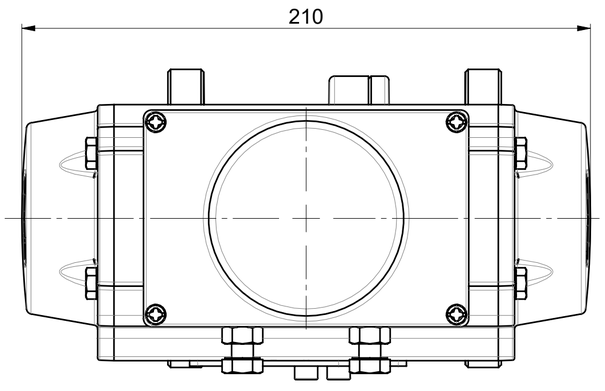






FAIL POSITION VALVE OPEN

AS BUILT



Valpres Code	Valpres Item	DS N°	Weigth (Kg)
8PV0050606	6	BS01B01RF	9.2

REV	DATE	DRAFT	APPR.	DESCRIPTION	IN PLACE OF
					8PV0050606

SIZE	SCALE	DATE	ENGINEER SIGNATURE	ENGINEERING GROUP LEADER SIGNATURE	WEIGHT (Kg)
A2	1:1.6	05-09-2024	Zanetti Paride	Agorni Alessandra	

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+ACTUATOR-OP 68F029 (FLOTTANTE) 1"-DN25 ANSI150 API608 FTF - ASME B16.10 ASME B16.5 RF**

VALPRES

BONOMI GROUP

PROJECT REFERENCE: COD Commessa 24063 REV TAV 01

DRAWING NUMBER: COD **8PV0050606** 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 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 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

VALPRES QC REVIEW

COGNE ACCIAI SPECIALI S.p.a.
ITALY - 11100 AOSTA - VIA PARAVERA, 16
TEL. +39.0165.3021 - FAX +39.0165.302296
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

VALPRES QC REVIEW

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

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

VALPRES QC REVIEW

COGNE ACCIAI SPECIALI S.p.a.
ITALY - 11100 AOSTA - VIA PARAVERA, 16
TEL +39.0165.3021 - FAX +39.0165.302296
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.

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

AQM srl
Via Edison 18 - 25050 Provaglio d'Iseo (BS)
Tel. 030/9291711 - Fax 030/9291777
Punto norme e CEI 030/9291700
Cap.Soc. € 3.600.000,00 i.v. C.F./P IVA Reg. Impr. BS
01746710175 - Iscrizione R.E.A. BS n° 265091
Internet: http://www.aqm.it e-mail: segreteria@aqm.it

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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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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VALPRES QC PASSED

AQM srl
Via Edison 18 - 25050 Provaglio d'Iseo (BS)
Tel. 030/9291711 - Fax 030/9291777
Punto norme e CEI 030/9291700
Cap.Soc. € 3.600.000,00 i.v. C.F./P IVA Reg. Impr. BS
01746710175 - Iscrizione R.E.A. BS n° 265091
Internet: http://www.aqm.it e-mail: segreteria@aqm.it

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*	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

AQM srl
Via Edison 18 - 25050 Provaglio d'Iseo (BS)
Tel. 030/9291711 - Fax 030/9291777
Punto norme e CEI 030/9291700
Cap.Soc. € 3.600.000,00 i.v. C.F./P IVA Reg. Impr. BS
01746710175 - Iscrizione R.E.A. BS n° 265091
Internet: http://www.aqm.it e-mail: segreteria@aqm.it

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*	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

AQM srl
Via Edison 18 - 25050 Provaglio d'Iseo (BS)
Tel. 030/9291711 - Fax 030/9291777
Punto norme e CEI 030/9291700
Cap.Soc. € 3.600.000,00 i.v. C.F./P IVA Reg. Impr. BS
01746710175 - Iscrizione R.E.A. BS n° 265091
Internet: http://www.aqm.it e-mail: segreteria@aqm.it

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*	20 di/*of* 20

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

DELTAR®
ENP and VACUUM - CODEPOSITION TECHNOLOGIES
Via F.lli Rosselli 10 20068 Peschiera Borromeo (MI)
Tel. +39.02.55305457 - Fax +39.02.55305883
www.deltar.it - info@deltar.it

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*

VALPRES QC REVIEW

DELTAR®
ENP and VACUUM - CODEPOSITION TECHNOLOGIES
Via F.lli Rosselli 10 20068 Peschiera Borromeo (MI)
Tel. +39.02.55305457 - Fax +39.02.55305883
www.deltar.it - info@deltar.it

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*

VALPRES QC REVIEW

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	6

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-006
TIPO VALVOLA / VALVE TYPE	68F02906SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	2
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	8PV0050606/01	n/a
2	8PV0050606/02	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	6

N° CERTIFICATO / CERTIFICATE No.	24063-FIC-006
TIPO VALVOLA / VALVE TYPE	68F02906SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	2
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	-	-

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	-	-	-	-	-	-	-	-

TEST RESULT:	**SATISFACTORY**

ASSICURAZIONE QUALITA' / QUALITY ASSURANCE	ISPETTORE CLIENTE / CUSTOMER INSPECTOR	ISPETTORE PARTE TERZA / THIRD PART INSPECTOR
Firma / Sign	Firma / Sign	Firma / Sign
VALPRES QC PASSED		
Data / Date 06/09/2024	Data / Date	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	6

N° CERTIFICATO / CERTIFICATE No.	24063-FAT-004
TIPO VALVOLA / VALVE TYPE	68F02906SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	2
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	1"
RATING	150
DIBA	8PV0050606

ACTUATOR DATA

OPERATING SYSTEM	**Pneumatic actuator - Spring return**
MODEL TYPE	**"VALBIA SR75-04-OP"**
COMPONENT CODE	**8P0325AZ75**

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	**≤ 5**	**sec**
MAX ALLOWABLE OPENING TIME	**≤ 5**	**sec**

MEASURING INSTRUMENTS

Chronometers

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	6

N° CERTIFICATO / CERTIFICATE No.	24063-FAT-004
TIPO VALVOLA / VALVE TYPE	68F02906SL
OGG. ISPEZIONATI / INSPECTED OBJECTS	2
TAG N° CLIENTE / CUSTOMER TAG. No.	see below
DN (mm / ")	1"
RATING	150
DIBA	8PV0050606

Summary table of the tested valves:

OBJ.	VALVE SERIAL NUMBER	VALVE TAG
1	8PV0050606/01	n/a
2	8PV0050606/02	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	-	1	-	1
2	-	0	-	6	-	1	-	1

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-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

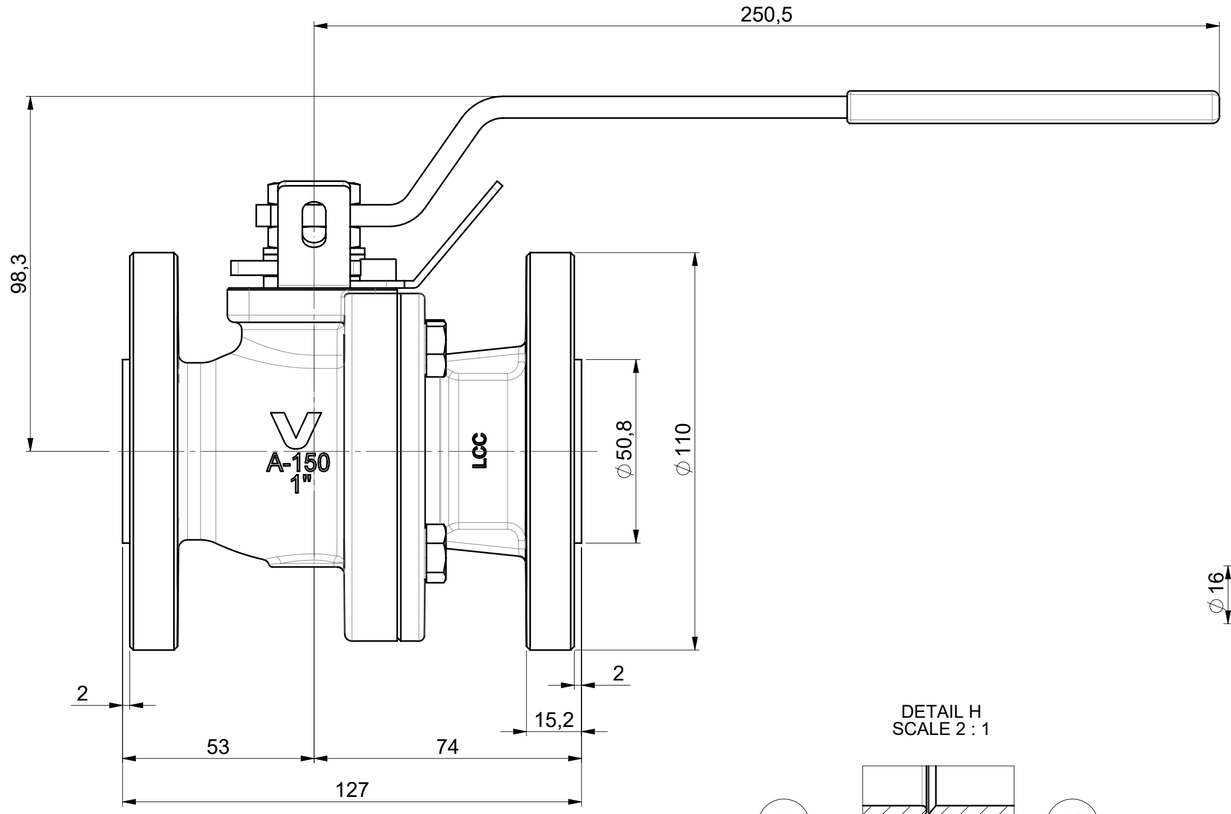
FINAL BOOK Rev. 0

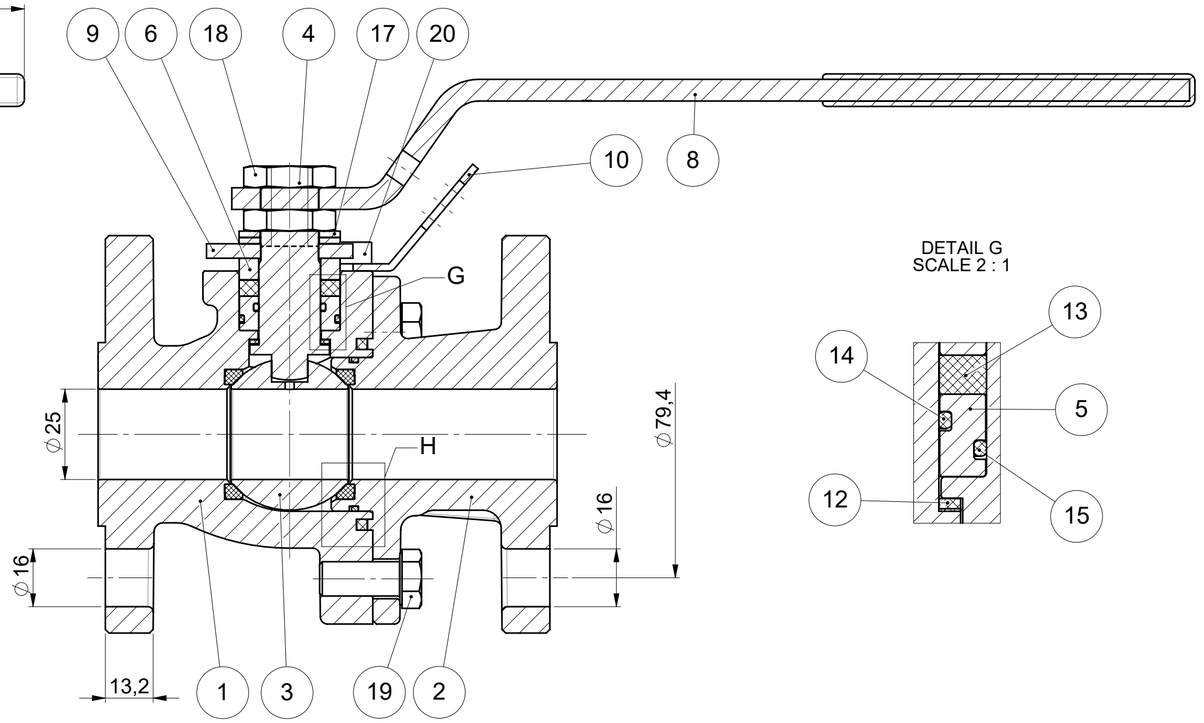
Valve Type: 9x Floating Ball valve Side Entry Bolted Body 2-pcs
1" 150#
VALPRES TYPE: 68 02906

Index

1) As Built Drawing page 1
2) Material Certificate EN 10204 3.1 n. EXP067/19-20/3– BODY page 3
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4) Material Certificate EN 10204 3.1 n. 2018018697 – BALL page 5
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6) Valpres Final Inspection Certificate page 15
7) Valpres Functional acceptance test report page 17
8) Declaration of Compliance with the Order page 19

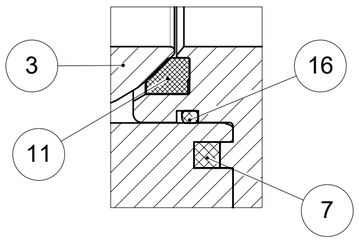
VALPRES QC REVIEW



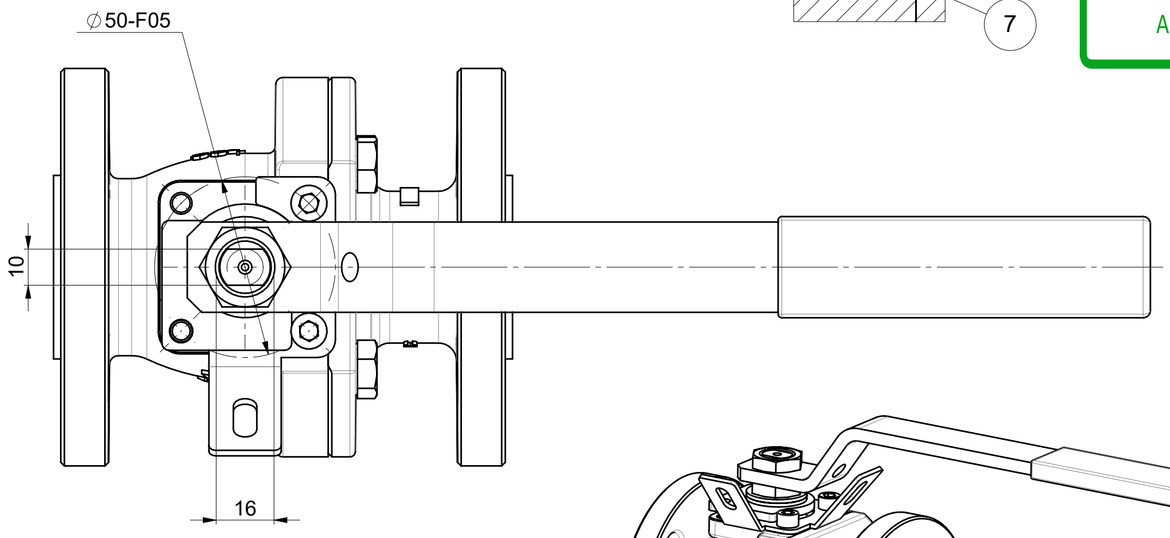


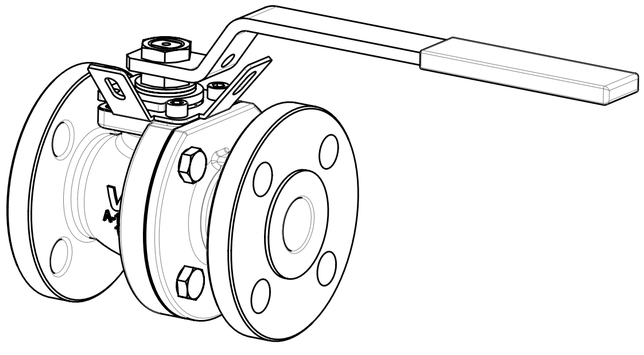
DETAIL G
SCALE 2 : 1

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.
ITALY - 11100 AOSTA - VIA PARAVERA, 16
TEL. +39.0165.3021 - FAX +39.0165.302296
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

COGNE ACCIAI SPECIALI S.p.a.
ITALY - 11100 AOSTA - VIA PARAVERA, 16
TEL. +39.0165.3021 - FAX +39.0165.302296
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

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

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.

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
Via Edison 18 - 25050 Provaglio d'Iseo (BS)
Tel. 030/9291711 - Fax 030/9291777
Punto norme e CEI 030/9291700
Cap.Soc. € 3.600.000,00 i.v. C.F./P IVA Reg. Impr. BS
01746710175 - Iscrizione R.E.A. BS n° 265091
Internet: http://www.aqm.it e-mail: segreteria@aqm.it

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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VALPRES QC PASSED

AQM srl
Via Edison 18 - 25050 Provaglio d'Iseo (BS)
Tel. 030/9291711 - Fax 030/9291777
Punto norme e CEI 030/9291700
Cap.Soc. € 3.600.000,00 i.v. C.F./P IVA Reg. Impr. BS
01746710175 - Iscrizione R.E.A. BS n° 265091
Internet: http://www.aqm.it e-mail: segreteria@aqm.it

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*	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

AQM srl
Via Edison 18 - 25050 Provaglio d'Iseo (BS)
Tel. 030/9291711 - Fax 030/9291777
Punto norme e CEI 030/9291700
Cap.Soc. € 3.600.000,00 i.v. C.F./P IVA Reg. Impr. BS
01746710175 - Iscrizione R.E.A. BS n° 265091
Internet: http://www.aqm.it e-mail: segreteria@aqm.it

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*	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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Via Edison 18 - 25050 Provaglio d'Iseo (BS)
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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*	20 di/*of* 20

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

DELTAR®
ENP and VACUUM - CODEPOSITION TECHNOLOGIES
Via F.lli Rosselli 10 20068 Peschiera Borromeo (MI)
Tel. +39.02.55305457 - Fax +39.02.55305883
www.deltar.it - info@deltar.it

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*

DELTAR®
ENP and VACUUM - CODEPOSITION TECHNOLOGIES
Via F.lli Rosselli 10 20068 Peschiera Borromeo (MI)
Tel. +39.02.55305457 - Fax +39.02.55305883
www.deltar.it - info@deltar.it

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

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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

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

HEAD OFFICE AND PLANT
Via G.Mazzini, 6
24060 S.Paolo D'Argon (BG) - ITALY
Tel +39.035.4255211
Internet: www.lvf.it - E-mail: info@lvf.it

LVF S.p.A. - Cod.Fisc. e P.IVA 03076750169 - Cap. Soc. € 8.532.000,00 i.v.
Registro Imprese BG 03076750169 - R.E.A. 347477 - VAT Reg. Nr: IT 03076750169
Soggetta all'attività di direzione e coordinamento da parte della società ALLBEL PARTECIPAZIONI SRL Reg.Imp. BG n° 04656210160

INSPECTION CERTIFICATE according to
[X] UNI EN 10204:2005 - 3.1 [ ]

CERTIFICATE N° **C 240905-001/01**

REVISION **00**

TEST PROCEDURE & SPECIFICATION

[ ] API 6D	[ ] EN 12266-1	[ ]
[X] API 598	[ ] MSS SP.55	[ ]
[X] ASME B 16.34	[X] MSS SP.61	[ ]

CUSTOMER
SARVAL S.R.L.

VIA G. MAZZINI 6
24060 SAN PAOLO D'ARGON (BG)

OUR JOB N°	POSITION	Q.TY
240905	**001**	**2**

YOUR P.O. N° : **2078/24**

PRJ: **COES S.R.L.**

ITEM : **20**

SARVAL JOB 240278 - DDT 240480

DESCRIPTION
PISTON CHECK VALVE BC FB FL 1" 150 LBS RFS

LF2/F6*

1B 305 IN. R.2 SM.F.+SPRING

LVF Ref. Number : **240905/001**

TEST PRESSURES(BAR)

HYDROSTATIC			PNEUM.
BODY & BACKSEAT	STUFFING BOX	SEAT	SEAT
30	**-**	**22**	**-**

TEST RESULT : SATISFACTORY

MAX PRESSURE AT ROOM TEMP.

TEMPERATURE	PRESSURE MAX.(BAR)
ROOM	**19,60**

VISUAL AND DIMENSIONAL TEST RESULT : SATISFACTORY

NOTES:
TEST PROCEDURE: API 598 11th
DURATION TIME: API 598 11th
ACCEPTANCE CRITERIA: API 598 11th

* HARD FACING OVERLAY: AWS R Co Cr A (STELLITE GR. 6)

COMPONENT / **CHEMICAL ANALYSIS**

PART NAME	MATERIAL	C	Mn	Si	S	P	Cr	Mo	Ni	Ti	Cu	Fe	Material Traceability List
		Al	Co	N	V	Nb	Sn	CE	Nb+Ta	Pre	Zn	Zr	
		W	B	H	O	Pb	Pd	Mg					

MECHANICAL PROPERTIES, IMPACT TESTS

HEAT CODE	HEAT NR	TENSILE N/mm2	Yield N/mm2	ELONGATION %	RED. OF AREA %	1 JOULE	2 JOULE	3 JOULE	TEST. TEMP.	AVG. HARDNESS			
BOLTS	*A320 L7*	0,420	0,810	0,180	0,012	0,007	1,030	0,220					117854
	E01233459	939,00	832,00	19,00	69,00					296 HBW			
BONNET	*A350 LF2 Cl. 1*	0,185	0,940	0,170	0,010	0,012	0,130	0,010	0,070	0,021	0,200		097094
		0,028			0,017	0,001	0,011	0,391					
			0,000										
B-VVX	*17/76621*	523,00	358,00	34,60	65,00	36,70	33,80	39,40	-50°C (L)	160 HBW			
PISTON	*A479 Tp.410*	0,135	0,780	0,340	0,025	0,021	12,600		0,300				116666
	434578	605,00	390,00	35,00	70,00					183 HBW			
SEAT	*A479 Tp.410*	0,135	0,780	0,340	0,025	0,021	12,600		0,300				116666
	434578	605,00	390,00	35,00	70,00					183 HBW			
BODY	*A350 LF2 Cl. 1*	0,172	0,950	0,240	0,002	0,009	0,200	0,030	0,070	0,002	0,170		113250
		0,025	0,007	0,006	0,004	0,002	0,008	0,393		0,401			
			<0,001										
B-1NH	*277628*	511,00	348,00	36,50	79,00	167,60	164,90	193,80	-50°C (L)	156,7 HBW			

We declare that this product has been manufactured in accordance with the 'Sound Engineering Practice' as per European Directive 2014/68/EU - PED Article 4.3.

Valve's components mentioned has been manufactured, heat treated and tested in accordance with specification.

The reported values are in accordance with the original mill certificates.

	THIRD AUTHORITY	CLIENT INSPECTION DEPT.	INSPECTION DEPT.
	DATE	DATE	DATE 29/07/2024

SARVAL S.r.l. Quality Control Dept.

LVF S.p.A. 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 #**: 24CLPC0044337 **Model #**: 2051CG4A02A1KS5E1M5D4T1Q4Q8HR7	
Permanent Tag Information 64-PIT-051	**Wire-on Tag Information**

Attached Models

0305RC22B11L4

Heat / Assembly #	Heat / Assembly # Description
377135	Manifold Body
7510671	Isolator
YVEV05B	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

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

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

皓森精铸 HAUSEN PRECISION

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)20240371 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
YVCV25A	2024/3/26	0.023	0.657	0.019	0.038	1.121	9.907	18.937	2.241	1.348	OK
YVCV25B	2024/3/26	0.021	0.625	0.018	0.037	1.129	9.722	19.046	2.186	1.371	OK
YVCV25C	2024/3/26	0.022	0.631	0.019	0.037	1.177	9.816	18.935	2.232	1.353	OK
YVCV25D	2024/3/26	0.020	0.642	0.019	0.038	1.166	9.769	18.819	2.241	1.358	OK
YVCV25E	2024/3/26	0.022	0.682	0.019	0.038	1.140	9.842	18.833	2.226	1.350	OK
YVCV25F	2024/3/26	0.021	0.707	0.019	0.037	1.160	9.683	18.678	2.295	1.367	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
YVCV25A-F	2024/3/28	534.0	282.0	53.0	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： 2024-03-28

QC Supervisor (Name & Sig.): Zhang Xiangfeng Date： 2024-03-28

西安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**: 1
Device Information	
Device Type: Coplanar Pressure Transmitter **Serial #**: 24CLPC0044338 **Model #**: 2051CG4A02A1KS5E1M5D4T1Q4Q8HR7	
Permanent Tag Information	**Wire-on Tag Information**
64-PIT-052	

Attached Models

0305RC22B11L4

Heat / Assembly #	Heat / Assembly # Description
377135	Manifold Body
7510671	Isolator
YVDV03E	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

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

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)20240503 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
YVDV03A	2024/4/29	0.022	0.577	0.019	0.038	1.057	9.835	19.313	2.229	1.379	OK
YVDV03B	2024/4/29	0.022	0.605	0.018	0.038	1.124	9.714	19.262	2.193	1.384	OK
YVDV03C	2024/4/29	0.021	0.612	0.017	0.036	1.146	9.779	19.377	2.207	1.390	OK
YVDV03D	2024/4/29	0.024	0.619	0.019	0.039	1.137	9.743	19.208	2.220	1.374	OK
YVDV03E	2024/4/29	0.023	0.606	0.016	0.034	1.105	9.644	19.246	2.219	1.391	OK
YVDV03F	2024/4/29	0.028	0.600	0.023	0.039	1.067	9.824	19.116	2.304	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 σb(≥485Mpa) 抗拉强度	Yield Strength σs(≥205Mpa) 屈服强度	Elongation σ(≥30%) 延伸率	Hardness (HRB≤85) 硬度
YVDV03A-F	2024/5/3	499.0	267.0	46.0	79.5

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： 2024-05-03

QC Supervisor (Name & Sig.): Zhang Xiangfeng Date： 2024-05-03

西安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**: 1
Device Information **Device Type**: Coplanar Pressure Transmitter **Serial #**: 24CLPC0044339 **Model #**: 2051CG4A02A1KS5E1M5D4T1Q4Q8HR7	
Permanent Tag Information 64-PIT-053	**Wire-on Tag Information**

Attached Models

0305RC22B11L4

Heat / Assembly #	Heat / Assembly # Description
377135	Manifold Body
7510671	Isolator
YVEV13A	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)20240605 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
YVEV13A	2024/6/3	0.023	0.571	0.020	0.036	1.024	9.730	18.781	2.201	1.345	OK
YVEV13B	2024/6/3	0.024	0.632	0.020	0.037	1.095	9.744	18.837	2.175	1.345	OK
YVEV13C	2024/6/3	0.024	0.630	0.022	0.037	1.077	9.648	19.110	2.236	1.383	OK
YVEV13D	2024/6/3	0.024	0.603	0.023	0.039	1.068	9.825	19.257	2.194	1.369	OK
YVEV13E	2024/6/3	0.024	0.645	0.024	0.035	1.080	9.663	18.897	2.376	1.382	OK
YVEV13F	2024/6/3	0.027	0.642	0.020	0.036	1.067	9.647	19.027	2.190	1.364	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
YVEV13A-F	2024/6/6	534.0	273.0	47.0	81.5

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： 2024-06-06

QC Supervisor (Name & Sig.): Zhang Xiangfeng Date： 2024-06-06

西安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**: 1
Device Information **Device Type**: Coplanar Pressure Transmitter **Serial #**: 24CLPC0044340 **Model #**: 2051CG4A02A1KS5E1M5D4T1Q4Q8HR7	
Permanent Tag Information 64-PIT-057	**Wire-on Tag Information**

Attached Models

0305RC22B11L4

Heat / Assembly #	Heat / Assembly # Description
377135	Manifold Body
7510671	Isolator
YVEV05B	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

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

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
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Bahnhofplatz 12
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Deutschland

Inspection document Page: 2
DIN EN 10204/3.1

No.	WZ0324-00162	**of**	06.03.2024

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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

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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

皓森精铸 HAUSEN PRECISION

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)20240371 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
YVCV25A	2024/3/26	0.023	0.657	0.019	0.038	1.121	9.907	18.937	2.241	1.348	OK
YVCV25B	2024/3/26	0.021	0.625	0.018	0.037	1.129	9.722	19.046	2.186	1.371	OK
YVCV25C	2024/3/26	0.022	0.631	0.019	0.037	1.177	9.816	18.935	2.232	1.353	OK
YVCV25D	2024/3/26	0.020	0.642	0.019	0.038	1.166	9.769	18.819	2.241	1.358	OK
YVCV25E	2024/3/26	0.022	0.682	0.019	0.038	1.140	9.842	18.833	2.226	1.350	OK
YVCV25F	2024/3/26	0.021	0.707	0.019	0.037	1.160	9.683	18.678	2.295	1.367	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
YVCV25A-F	2024/3/28	534.0	282.0	53.0	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： 2024-03-28

QC Supervisor (Name & Sig.): Zhang Xiangfeng Date： 2024-03-28

西安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**: 1
Device Information **Device Type**: Coplanar Pressure Transmitter **Serial #**: 24CLPC0044341 **Model #**: 2051CG4A02A1KS5E1M5D4T1Q4Q8HR7	
Permanent Tag Information 64-PIT-059	**Wire-on Tag Information**

Attached Models

0305RC22B11L4

Heat / Assembly #	Heat / Assembly # Description
377135	Manifold Body
7510671	Isolator
YVEV06A	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.

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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

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Shipment No. KL24-00164 **Ref.-No.** 020445

Symbol of Manufacturers	Surveyor of inspection	CE-sign 0045
E W	WEE	CE 0045

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AB24-K2001	10	14404 Flat 63,50 x 31,75 mm 2 1/2" X 1 1/4"	20058 Kg

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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
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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

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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

皓森精铸 HAUSEN PRECISION

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)20240610 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
YVEV06A	2024/5/29	0.029	0.707	0.022	0.037	1.124	9.754	19.462	2.302	1.396	OK
YVEV06B	2024/5/29	0.025	0.635	0.021	0.038	1.090	9.947	19.024	2.326	1.352	OK
YVEV06C	2024/5/29	0.028	0.630	0.021	0.038	1.132	9.945	19.181	2.229	1.342	OK
YVEV06D	2024/5/29	0.024	0.653	0.020	0.038	1.058	9.651	19.275	2.392	1.415	OK
YVEV06E	2024/5/29	0.027	0.665	0.022	0.038	1.105	9.715	19.279	2.322	1.391	OK
YVEV06F	2024/5/29	0.023	0.620	0.022	0.037	1.132	9.775	19.404	2.309	1.399	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
YVEV06A-F	2024/6/11	551.0	284.0	54.5	82.0

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： 2024-06-11

QC Supervisor (Name & Sig.): Zhang Xiangfeng Date： 2024-06-11

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 #**: 24CLPC0044344 **Model #**: 2051CD3A02A1KS5E1M5D4T1Q4Q8HR7	
Permanent Tag Information	**Wire-on Tag Information**
64-PDIT-056	

Attached Models

0305RC52B11L4

Heat / Assembly #	Heat / Assembly # Description
07K2A86-01-01	Isolator
377135	Manifold Body
YVDV43C	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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GmbH & Co. KG
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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

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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
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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

皓森精铸 HAUSEN PRECISION

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)20240530 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
YVDV43A	2024/5/17	0.024	0.541	0.019	0.040	1.071	9.975	19.102	2.135	1.329	OK
YVDV43B	2024/5/17	0.024	0.601	0.018	0.039	1.073	9.870	18.985	2.178	1.342	OK
YVDV43C	2024/5/17	0.025	0.581	0.018	0.040	1.035	9.865	18.987	2.172	1.338	OK
YVDV43D	2024/5/17	0.025	0.570	0.017	0.040	1.036	9.880	19.030	2.153	1.337	OK
YVDV43E	2024/5/17	0.023	0.613	0.020	0.039	1.075	9.911	19.072	2.195	1.350	OK
YVDV43F	2024/5/17	0.021	0.649	0.016	0.033	1.144	9.409	18.620	2.288	1.385	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
YVDV43A-F	2024/5/25	526.0	275.0	53.0	81.5

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： 2024-05-25

QC Supervisor (Name & Sig.): Zhang Xiangfeng Date： 2024-05-25

西安皓森精铸股份有限公司 检验专用章

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

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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.

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

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
Via Portalta, 265
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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Tel. 035/2050611

For acceptance

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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

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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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%**

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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

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P.I.C.F. 02520570166
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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	PL C3000499	B	COES/RM		02/12/2024
2.	-		A-64000	RM Comm.	THE SOLENOID 64-XV-054 DOES NOT WORK. TO BE INVESTIGATE	PL C3000500	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	PL C3000501	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**	PL C3000502	B	COES		02/12/2024
5.	-		A-64000	RM Comm.	HARDWIRED & PROFINET SIGNALS STILL TO BE TESTED	PL C3000503	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	PL C3000504	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	PL C3000505	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	PL C3000506	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	PL C3000507	A	COES		02/12/2024

CLOSED

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	PL C30000508 *	B	COES		02/12/2024
12.			A-64000	RM Comm.	ALL THE ALARMS AND SET POINT OF NITROGEN GENERATION PACKAGE TO BE TESTED	PL C30000509		COES/RM		02/12/2024
13.			A-64000	S.Linari	TO BE UPDATED DWG N. 1724000437-MAG-DG-00009 – CORRECT RAL 9002	PL C30000510	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**	PL C30000511	A	COES		02/12/2024
15.			A-64000	S.Linari	CONTINUITY AND MEGGER TEST REPORTS ARE MISSING. TO BE PROVIDE	PL C30000512	B	COES		02/12/2024
16.			A-64000	S.Linari	MISSING LEAKAGE TEST REPORTS. To be repeated on site up to rated package pressure	PL C30000513	B	COES		02/12/2024
17.			A-64000	S.Linari	MISSING TAG PLATE ON PSV 64-053 / PSV -64-054	PL C30000514		COES		02/12/2024

Raised by
Contractor / Subcontractor: _____

Checked by
Contractor QA/QC: _____

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COMPANY: _____

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29/10/24

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24040 STEZZANO (BG)
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29/10/24

For acceptance

* see attached all Punch list closed

ROSETTI MARINO SpA
Stefano Linari
Quality Control Dept.

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000514

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task

1.4 Discipline Mechanical

1.2 Item A-64000 Nitrogen Package

1.3 Subsystem 64-00 Nitrogen Generator Package (U-64000)

2 - OBSERVATION

MISSING TAG PLATE ON PSV 64-053 / PSV-64-054

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 COES

Date 2025-03-25

Signature

5 - CLEARANCE CHECK

Name Stefano Linari

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6- CLEARANCE APPROVAL

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ROSETTI MARINO CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000514

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1.4 Discipline Mechanical

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Name COES

Date 2025-03-25

Signature

5 - CLEARANCE CHECK

Name Stefano Linari

Date 2025-03-25

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

ROSETTI MARINO
CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000514

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task

1.4 Discipline Mechanical

1.2 Item A-64000 Nitrogen Package

1.3 Subsystem 64-00 Nitrogen Generator Package (U-64000)

2 - OBSERVATION

MISSING TAG PLATE ON PSV 64-053 / PSV-64-054

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 COES

Date 2025-03-25

Signature

5 - CLEARANCE CHECK

Name Stefano Linari

Date 2025-03-25

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

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CONTINUITY AND INSULATION RESISTANCE 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**
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.)

COES SRL
W R

ROSETTI MARINO CROSSWIND

PUNCH ITEM ENTRY / CLEARANCE FORM

C30000514

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task

1.4 Discipline Mechanical

1.2 Item A-64000 Nitrogen Package

1.3 Subsystem 64-00 Nitrogen Generator Package (U-64000)

2 - OBSERVATION

MISSING TAG PLATE ON PSV 64-053 / PSV-64-054

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 COES

Date 2025-03-25

Signature

5 - CLEARANCE CHECK

Name Stefano Linari

Date 2025-03-25

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

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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

C30000514

PROVERLIS

1 -ELEMENT IDENTIFICATION

1.1 Task		1.4 Discipline	Mechanical
1.2 Item	A-64000		Nitrogen Package
1.3 Subsystem	64-00		Nitrogen Generator Package (U-64000)

2 - OBSERVATION

MISSING TAG PLATE ON PSV 64-053 / PSV-64-054

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 COES

Date 2025-03-25

Signature

5 - CLEARANCE CHECK

Name Stefano Linari

Date 2025-03-25

Signature

6- CLEARANCE APPROVAL

Name

Date

Signature

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DICHIARAZIONE DI CONFORMITÀ UE
Allegato IV D.E. 2014/68/UE
Doc. CDC-CPN52854

PROGETTO, COSTRUZIONE E COLLAUDO CONFORME ALLA DIRETTIVA 2014/68/UE

CATEGORIA IV Modulo G

CLIENTE:	ROSETTI MARINO S.P.A.
COMMESSA COES:	167/24
ATTREZZATURA A PRESSIONE:	NITRON GENERATOR PACKAGE
MATRICOLA N°:	I240008
DISEGNO DI INSIEME	CGA52854
ANNO DI COSTRUZIONE:	2024

DATI DI PROGETTO					
Fluido	N2		Pressione di progetto	PS	0/12 barg
Temperatura minima di esercizio	Tmin	-20°C	Temperatura massima di esercizio	Tmax	80 °C

COMPONENTI INCLUSI NELL'INSIEME				
COMPONENTE	MATRICOLA / IDENTIFICATIVO	PRESSIONE DI PROGETTO	TEMPERATURA DI PROGETTO	CONFORMITA'
Filtro	S240131	0/12 barg	-29/80 °C	2014/68/UE Cat. I
Filtro	S240132	0/12 barg	-29/80 °C	2014/68/UE Cat. I
Tower vessel	S240129	0/12 barg	-29/80 °C	2014/68/UE Cat. IV
Tower vessel	S240130	0/12 barg	-29/80 °C	2014/68/UE Cat. IV
Tubazioni		0/12 barg	-29/80 °C	2014/68/UE Art. 4.3

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ACCESSORI DI SICUREZZA			
ACCESSORIO	MATRICOLA	PRESSIONE DI TARATURA	CONFORMITA'
PSV	24481819	12 barg	2014/68/UE Cat. IV Modulo H1
PSV	24481820	12 barg	2014/68/UE Cat. IV Modulo H1

ORGANISMO NOTIFICATO	
PROCEDURA DI CONFORMITÀ UTILIZZATA	G
NUMERO DI CERTIFICATO DI CONFORMITÀ	0425 PED 007485-00
ORGANISMO NOTIFICATO	ICIM SpA - Piazza Don Enrico Mapelli 75, 20099 Sesto San Giovanni (MI)
NUMERO DI IDENTIFICAZIONE	0425

ALTRE DIRETTIVE COMUNITARIE APPLICATE	
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
07/01/2025

Il legale rappresentante

COES SRL
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TÜVNORD
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Dichiarazione di Conformità ai sensi della Direttiva 2014/68/UE - PED

Documento n°	CDC-CCO52842	rev.	0

ATTREZZATURA A PRESSIONE	Tipo Attrezzatura a Pressione:
	Serbatoio N2

Disegno costruttivo di riferimento n°:	CCO52482	rev.	0

Numero di fabbrica:	S240120				
Categoria di rischio ai sensi Direttiva PED:	IV		Procedura di Valutazione della Conformità ai sensi Direttiva PED:	Modulo G	
Pressione minima ammissibile PS_{min}	0	barg	Pressione massima ammissibile PS_{max}	12	barg
Temperatura minima ammissibile TS_{min}	-29	°C	Temperatura massima ammissibile TS_{max}	80	°C
Volume (L), *o* Diametro (DN)	11000	l	Pressione di Prova in Pressione PT	17.2	barg
Fluido	N2		Stato fisico:	Gas	
Data di collaudo (fabbricazione):	24/09/2024				

Nome, numero ed indirizzo dell'Organismo Notificato o Ispettorato degli Utilizzatori che ha effettuato il controllo	ICIM SpA – CE 0425 – Piazza Don E. Mapelli, 75 20099 Sesto San Giovanni (MI) - Italia
Numero e data del Certificato/Attestato di Conformità rilasciato dall'Organismo Notificato o dall'Ispettorato degli Utilizzatori	
Altre Direttive Europee applicate:	-
Principali specifiche tecniche di riferimento:	ASME VIII Div.1 Ed. 2021; PED 2014/68/EU EN ISO 15614-1 / EN ISO 9606-1

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.

Data:	19/09/2025	Nome e Cognome del Fabbricante (Delegato) *Firma*:	Massimo Cattaneo COES SRL Via Pontida, 265 24040 STEZZANO (BG) P. I.V.A. C.F. 02529570166 Tel. 035/2050511

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CERTIFICATE OF CONFORMITY WITH THE ORDER

CUSTOMER:	ROSETTI MARINO
PURCHASE ORDER:	1724000437
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project
SERIAL NUMBER:	I240008
SUPPLY:	NITROGEN GENERATION PACKAGE
TAG:	U-64000
COES JOB:	167/24

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			

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	17/02/25

e Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE
SYSTEM/PACKAGE FUNCTIONAL DESCRIPTION

Document Number: 1724000437-MAC-SP-00003

Document Class: 3

Rev.	Date	Description	Prepared	Reviewed	Approved
05	03/02/2025	Issue for Information (IFI)	GT	SG	TM
04	02/01/2025	Issue for Information (IFI)	GT	SG	TM
03	22/10/2024	Issue for Information (IFI)	GT	SG	TM
02	04/09/2024	Issue for Information (IFI)	GT	SG	TM
01	08/07/2024	Issue for Information (IFI)	GT	SG	TM
00	23/05/2024	Issue for Information (IFI)	GT	SG	TM

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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)
04	Issue for Information (IFI)
05	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.

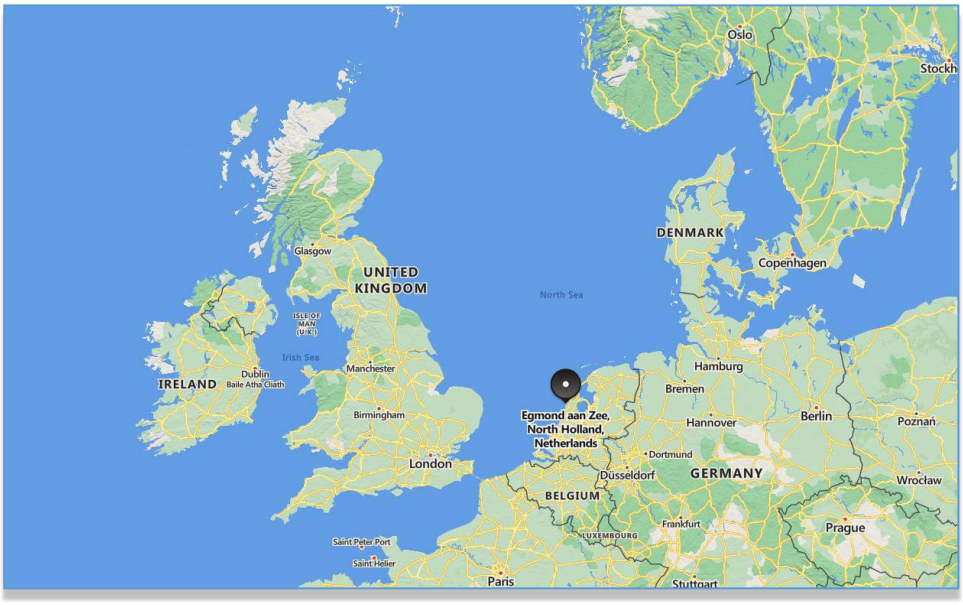


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



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.

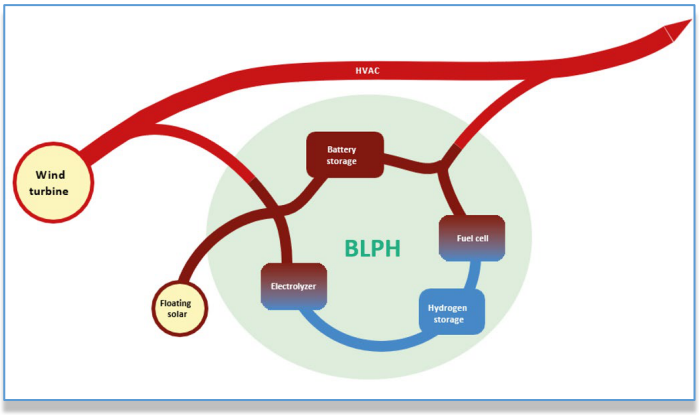


Figure 3 – BLPH Concept

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
1724000437-PR-PID-00018	PACKAGE P&ID
1724000437-MAC-DS-00011	EQUIPMENT DATA SHEETS INCLUDING PSA, ETC.
1724000437-IN-LIS-00016	INSTRUMENT LIST WITH SET POINTS/CONTROL/ALARM/SHUTDOWN
1724000437-MAC-MAN-00029	INSTALLATION, OPERATING AND MAINTENANCE MANUAL (INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)

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
PSA	Pressure Swing Adsorption
LCP	Local Control Panel
PLC	Programmable Logic Controllers
UCP	User Control Panel
SIS	Safety Instrumented System
L Alarm	Low Alarm
H Alarm	High Alarm

Table 2 - Definitions and Abbreviations

3 FUNCTIONAL DESCRIPTION

3.1 DESCRIPTION OF THE NITROGEN GENERATOR PACKAGE A-64000

The nitrogen generation package is composed by a dual tower nitrogen generator C-64001A/C-64001B, no.1 nitrogen receiver V-64001, no.2 after filters S-64001A/S-64001B.

Dry air enters the system and it is conveyed to generator towers. The Pressure Swing Adsorption (PSA) technology exploits the activated molecular sieve's capacity of adsorbing oxygen to produce nitrogen. Atmosphere is mainly composed by nitrogen and oxygen. PSA generator adsorbs oxygen (but not nitrogen) when the active material is in high pressure conditions. Therefore, if a flow of dry air enters the PSA pressurized vessel, at the outlet flange the percentage of oxygen is drastically reduced resulting in an increased quantity of nitrogen. The regeneration of the material is simply obtained by depressurization: at 0 barg the oxygen is not more trapped.

The oxygen analyzer installed dowstream the PSA generator monitor the purity of the gas: in case of low purity, the off-spec gas is automatically vented to atmosphere by mean of an on-off valve, while in case of proper purity the produced gas arrives into the nitrogen receiver that acts as a buffer tank.

At the skid outlet a post-filter group (one filter operating, the second on in stand-by) is installed to remove the dust from the nitrogen.

3.2 NITROGEN GENERATOR PACKAGE A-64000 MAIN DATA

POSITION	PRESSURE (operating / design)	FLOW RATE	TEMPERATURE (operating / design)	PROCESS DATA
DRY AIR INLET	9 / 12 barg	150 Nm^3/h	40 / 80°C	Dew point ≤ -40°C
NITROGEN OUTLET	8 / 12 barg	60 Nm^3/h	40 / 80°C	PURITY ≥ 97%

3.3 DESCRIPTION OF THE PSA NITROGEN GENERATOR OPERATING CYCLE

Tower C-64001A is in the generation phase, while tower C-64001B is regenerating.

Inlet air enters the adsorption tower C-64001A through the 64-XV-051 inlet pneumatic valve, it passes through carbon molecular sieve bed where oxygen is trapped. Oxygen is then removed and nitrogen is released through the 64-XV-056 outlet valve.

The regenerating tower C-64001B is depressurized to atmospheric pressure, opening the discharge valve 64-XV-054, to strip oxygen from carbon molecular sieve.

After the complete regeneration of tower C-64001B, the discharge valve 64-XV-054 is closed, inlet and outlet valves 64-XV-051 and 64-XV-056 are closed, while equalizing valve 64-XV-055 is opened to let both towers reach the same pressure, in order to avoid possible shocks of the active bed during the subsequent change-over phase.

Both towers C-64001A and C-64001B are equipped with pressure transmitter to monitor the pressure. In case of high/low alarm, refer to the installation, operating and maintenance manual for the following actions to be taken by the operator.

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3.4 DIFFERENTIAL PRESSURE TRANSMITTER LOOP

The nitrogen generator package A-64000 is provided with no.2 after filter.

Differential pressure transmitters 64-PDIT-056 is provided to measure the pressure drop across the on-line filter.

In case of high pressure drop, the after-filter in stand-by condition shall be put on-line and the filteriing element of the after-filter which was in operating condition when the alarm condition has been reached shall be replaced with a new one.

Instrument tag	Alarm set value
64-PDIT-056	0.5 bar

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), by means of actuated valves 64-XV-060 and 64-XV-061.

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3.5 OXYGEN ANALYZER LOOP

The PSA nitrogen generator system is provided with no.1 oxygen analyzer 64-AT-051 on the outlet nitrogen line, which has an active role in the logic of the package.

If measured oxygen concentration is higher than the set value, an alarm condition is generated to inform the operator (general alarm lamp on local control panel 64-LP-001 and in addition the alarm is sent to onshore via modbus communication to alert remotly the operator); automatically the valve 64-XV-058 is closed and the valve 64-XV-059 is open, to vent the out of spec nitrogen to the atmosphere.

Instrument tag	Alarm set value
64-AT-051	3%

3.6 ANALYTICAL DESCRIPTION OF THE OPERATING CYCLE PHASES

PHASE	TOWER C-64001A	TOWER C-64001B	DURATION
1	Generation	Depressurization (Regeneration)	50 sec
2	Equalization	Equalization	10 sec
3	Depressurization (Regeneration)	Generation	50 sec
4	Equalization	Equalization	10 sec

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3.7 ACTUATED VALVES CONTROL LOOP

During the different operating phases, every valve is in a stated position: if PLC detects that real position of one valve does not comply with requested position, the sequence is interrupted, with all valves frozen in the current position, and an alarm condition is generated to inform the operator (general alarm lamp on local control panel 64-LP-001 and in addition the alarm is sent to onshore via modbus communication to alert remotly the operator).

Possible situations for alarm activation are:

- failure of solenoid valve, which does not allow instrument air flow to pneumatic actuated valve
- failure of solenoid valve, which wrongly sends instrument air flow to pneumatic actuated valve
- failure of pneumatic actuated valve
- failure of PLC
- missed signal from PLC
- failure of limit switches.

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3.8 DESCRIPTION OF LOGIC SEQUENCE

PHASE 1: TOWER C-64001A GENERATION - TOWER C-64001B DEPRESSURIZATION

Solenoid valves			Pneumatic valves	
Tag	**Status**		**Tag**	**Status**
64-XY-051	Energized		64-XV-051	Open
64-XY-052	Not energized		64-XV-052	Closed
64-XY-053	Not energized		64-XV-053	Closed
64-XY-054	Energized		64-XV-054	Open
64-XY-055	Not energized		64-XV-055	Closed
64-XY-056	Energized		64-XV-056	Open
64-XY-057	Not energized		64-XV-057	Closed

PHASE 2: TOWER C-64001A EQUALIZATION - TOWER C-64001B EQUALIZATION

Solenoid valves			Pneumatic valves	
Tag	**Status**		**Tag**	**Status**
64-XY-051	Not energized		64-XV-051	Closed
64-XY-052	Not energized		64-XV-052	Closed
64-XY-053	Not energized		64-XV-053	Closed
64-XY-054	Not energized		64-XV-054	Closed
64-XY-055	Energized		64-XV-055	Open
64-XY-056	Not energized		64-XV-056	Closed
64-XY-057	Not energized		64-XV-057	Closed

PHASE 3: TOWER C-64001A DEPRESSURIZATION - TOWER C-64001B GENERATION

Solenoid valves			Pneumatic valves	
Tag	**Status**		**Tag**	**Status**
64-XY-051	Not energized		64-XV-051	Closed
64-XY-052	Energized		64-XV-052	Open
64-XY-053	Energized		64-XV-053	Open
64-XY-054	Not energized		64-XV-054	Closed
64-XY-055	Not energized		64-XV-055	Closed
64-XY-056	Not energized		64-XV-056	Closed
64-XY-057	Energized		64-XV-057	Open

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PHASE 4: TOWER C-64001A EQUALIZATION - TOWER C-64001B EQUALIZATION

Solenoid valves			Pneumatic valves	
Tag	**Status**		**Tag**	**Status**
64-XY-051	Not energized		64-XV-051	Closed
64-XY-052	Not energized		64-XV-052	Closed
64-XY-053	Not energized		64-XV-053	Closed
64-XY-054	Not energized		64-XV-054	Closed
64-XY-055	Energized		64-XV-055	Open
64-XY-056	Not energized		64-XV-056	Closed
64-XY-057	Not energized		64-XV-057	Closed

Remarks:

- The local control panel 64-LP-001 is equipped with a local/remote selector (software type) to have the possibility to remotly start/stop the package.
- The safety instrumented system (SIS) will send the shutdown command 64-XS-001 to nitrogen UCP 64-LP-001 in case of emergency condition. The nitrogen package will act the shutdown sequence. Refer to the installation, operating and maintenance manual for the following actions to be taken by the operator.
- In case of Critical Faults the signal 64-XA-003 will be sent from UCP to safety system SIS. This signal is a cumulative of all critical fault inside the Nitrogen package. The SIS will send the command 64-XS-001 as soon as it will receive the signal 64-XA-003. Refer to the installation, operating and maintenance manual for the following actions to be taken by the operator.
- The package is equipped with a pressure transmitter 64-PT-057 installed downstream the after-filter group: in case of low pressure alarm, refer to installation, operating and maintenance manual for the following actions to be taken by the operator.
- The nitrogen receiver is equipped with a pressure transmitter 64-PT-059: in case of low pressure alarm, refer to installation, operating and maintenance manual for the following actions to be taken by the operator.
- Pressure transmitter 64-PT 052
    - L Alarm SET <8 barg. Active only during PHASE 1: delay10s.
    - H Alarm SET >0.5barg. Active only during PHASE 3: delay 30s.
- Pressure transmitter 64-PT 053
    - L Alarm SET <8 barg. Active only during PHASE 3: delay10s.
    - H Alarm SET >0.5barg. Active only during PHASE 1: delay 30s.

  Both alarms generate a dedicated alarm via Profinet (retentive alarm) and switch on the "General alarm" lamp on LCP.

Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE A-64000

SPARE PARTS LIST (2 YEARS AND COMMISSIONING & START-UP)

Document Number: 1724000437-COM-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
Giuseppe Cavallo	12/02/25

Document Class: 2

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Rev.	Date	Description	Prepared	Reviewed	Approved

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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.

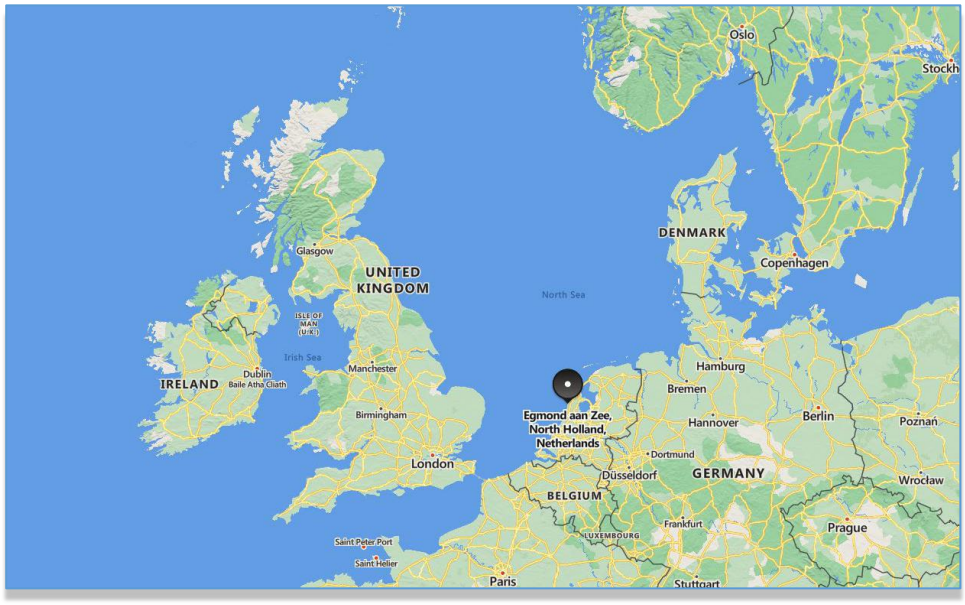


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map



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.

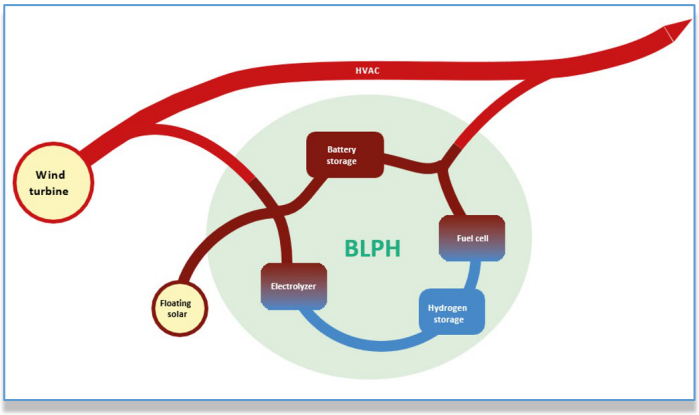


Figure 3 – BLPH Concept

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
1724000437-PR-PID-00018	PACKAGE P&ID
1724000437-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
1724000437-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-64000	1724000437-MAC-DD-00008	AISI 316 + GRAPHITE	1" ANSI 150	4 PCS	C3052
				AISI 316 + GRAPHITE	2" ANSI 150	1 PC	C2416
				AISI 316 + GRAPHITE	4" ANSI 150	1 PC	D0788
Set of spares for valves	Complete package	64-XV-051, 052, 053, 054, 055, 056, 057, 058, 059, 060, 061	1724000437-PR-PID-00018	PTFE	1" ANSI 150	11 PCS	L7087

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4 2-YEARS SPARE PARTS

Description	Valid for	Equipment TAG	Reference drawing	Material	Dimensions	Supplied quantity	Coes code
Set of filter elements & gaskets	Outlet filters	S-64001A S-64001B	1724000437-PR-PID-00018	MICROFIBER	Ø55 x 250mm	4 PCS	16761
				AISI 316 + GRAPHITE	4" ANSI 150	1 PC	C2416
Set of gaskets	N2 receiver	V-64001	1724000437-MAC-DD-00006	AISI 316 + GRAPHITE	16" ANSI 150	2 PCS	F8428
				AISI 316 + GRAPHITE	1" ANSI 150	4 PCS	C3052
				AISI 316 + GRAPHITE	2" ANSI 150	6 PCS	C2416
Set of spares for valves	Complete package	64-XV-051, 052, 053, 054, 055, 056, 057, 058, 059, 060, 061	1724000437-PR-PID-00018	PTFE	1" ANSI 150	22 PCS	L7087

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Base Load Power Hub (BLPH)

NITROGEN GENERATION PACKAGE A-64000
INSTALLATION, OPERATING AND MAINTENANCE MANUAL
(INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
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Sign	Date
Giuseppe Cavallo	21/05/2025

1724000437-MAC-MAN-00029

cument Class: 3

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Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

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01	Issue for Information (IFI)
02	Issue for Information (IFI)

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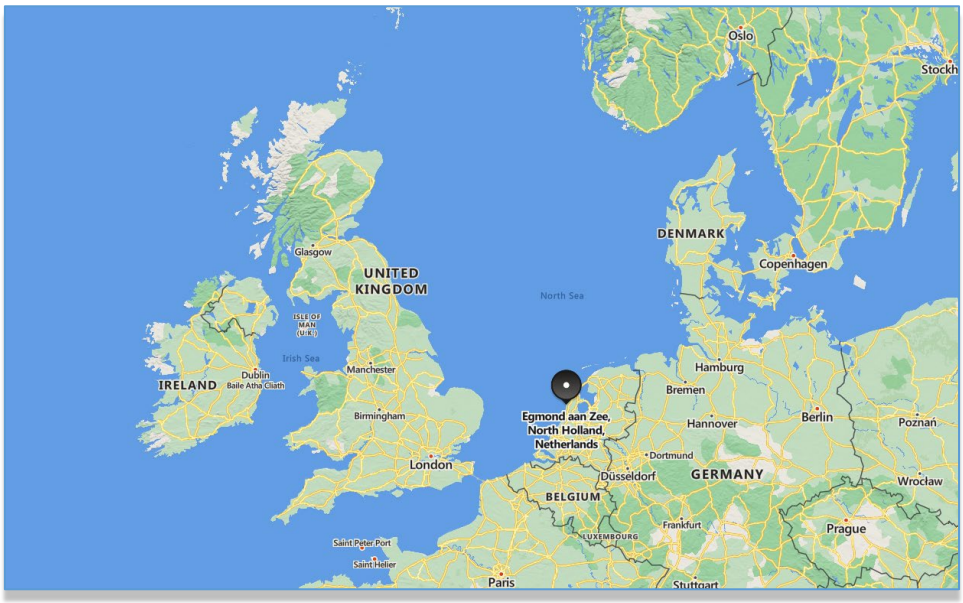


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

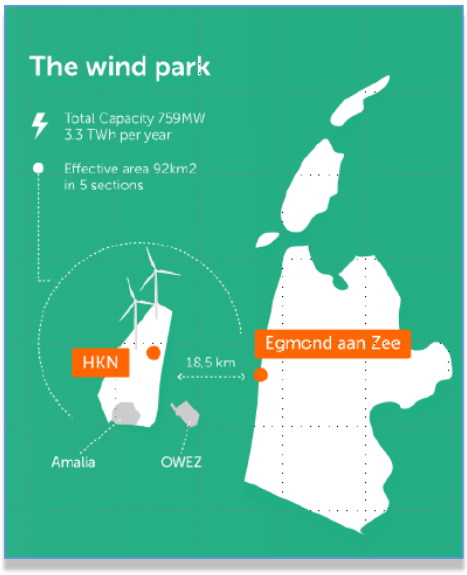


Figure 2 - Wind Park Details

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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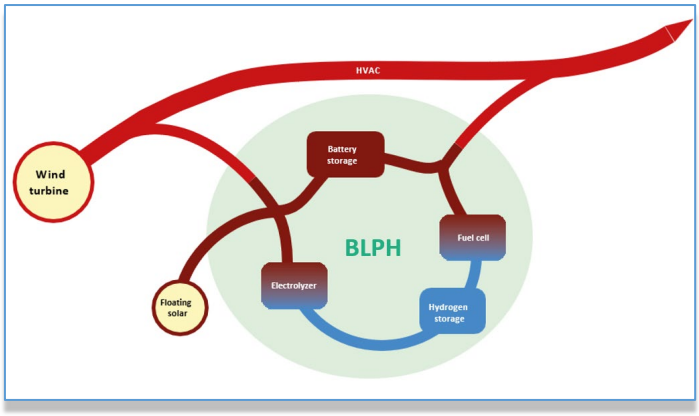


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2 DOCUMENT SCOPE

This document identifies activities to be carried out for the correct operation of the Nitrogen Generaiton Package.

2.1 REFERENCES

Doc. No.	Description
1724000437-PR-PID-00018	PACKAGE P&ID
1724000437-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
1724000437-MAC-DG-00009	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 Nitrogen Generation package, 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.

4 PROCEDURE FOR ERECTION AND INSTALLATION OF THE EQUIPMENT

4.1 Remove the packing.

4.2 The Nitrogen Generation package is supplied fully installed: no loose components are foreseen.

4.3 Lift the skid baseplate, using an adequate lifting device. Skid baseplate shall be lift by means of lifting lugs welded on the skid baseframe, and placed in its final position, on a properly sized structure, taking care to avoid damages to any installed equipment.
N2 generation 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 N2 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 according to the Wiring Diagram, document no. 1724000437-MAC-DG-00009.
Power and signal cables (including earthing connection) should be connected by others to the Local Control Panel according to the previous mentioned wiring diagram, document no. 1724000437-MAC-DG-00009.

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

4.8 Recommendation for storage are included in document 1724000437-QC-PRO-00030.

4.9 Instrument air package terminal points shall be connected as shown in P&ID, document no. 1724000437-PR-PID-00018

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5 PROCEDURE FOR PRE-COMMISSIONING

After the installation on site and the complete assembling of the unit, before starting the equipment, pre-commissioning activity can be achieved, as per following steps.

NOTE

PRE-COMMISSIONING ACTIVITIES CAN BE CARRIED OUT BY CUSTOMER PERSONNEL ON SITE, BUT THE PRESENCE OF COES TECHNICIANS IS ADVISABLE

1. Check that all drain and vent pipes are not obstructed. Clean them, if necessary.
2. Check that all tubing is properly connected and tighten compression fittings, if necessary.
3. Check that all interconnecting flanges are correctly tightened.
4. Check all installed component, with particular care to instruments, to verify that they have not been damaged during the installation.
5. Verify that PSA vessels are properly filled with the adsorbent material.
6. Check that air diffusers are correctly installed into PSA vessels nozzles.
7. Check that inlet and outlet air piping are correctly connected to the nitrogen generation package.
8. Check that vent and drain piping (if any) are correctly connected to the nitrogen generation package.
9. Check that all instruments, solenoid valves and limit switches are properly connected and wired to the local control panel.
10. Check that the position of the filters manual isolation valves is according to the pakcage P&ID, document no. 1724000437-PR-PID-00018
11. Package installation according to the package P&ID, document no. 1724000437-PR-PID-00018.
12. Check that instrument interception valves and manifolds are in proper position.
13. Check that instrument air supply valve is open and that instrument air can be correctly supplied to solenoid valves.
14. Check that the internal of local control panel is clean from sand or dust and that no dew is detected.
15. Check that all terminals inside local control panel are correctly wired according to wiring diagram, document no. 1724000437-MAC-DG-00009.
16. Check that earthing connections of instruments, components and package are properly wired.

6 PROCEDURE FOR COMMISSIONING

After the installation on site and the complete assembling of the unit, before starting the equipment, commissioning activity can be achieved, as per following steps.

NOTE

COMMISSIONING ACTIVITIES CAN BE CARRIED OUT BY CUSTOMER PERSONNEL ON SITE, BUT THE PRESENCE OF COES TECHNICIANS IS ADVISABLE

1. Check from DCS that the feedback from electric limit switches installed on pneumatic actuated valves is in compliance with valves failure position.
2. Check from DCS that all the transmitters installed of the nitrogen generation package are correctly wired and the measured values are coherent with the actual conditions.
3. Pressurize the nitrogen generation package up to 2 barg with dry air through inlet terminal point and verify that no leakages at flanged connections are detected. During pressurization for leak check, all actuated valves must stay in their fail position, while all manual valves must be open, except the valves downstream after-filters, which must be closed.
4. Slowly pressurize the nitrogen generation package to normal operating pressure with dry air through inlet terminal, without process nitrogen flow, and verify that no leakages at flanged connections are detected. During pressurization for leak check, all actuated valves must stay in their fail position, while all manual valves must be open, except the valves downstream after-filters, which must be closed.

WARNING

IT IS NOT ALLOWED TO PROCEED WITH MANUAL OPEN/CLOSE OF ACTUATED VALVES IF THE SYSTEM IS TOTALLY OR PARTIALLY PRESSURIZED, BECAUSE OF POTENTIAL DAMAGES TO ADSORBENT MATERIAL AND POSSIBLE SOURCE OF HIGH NOISE LEVEL.

7 NITROGEN GENERATOR

7.1 SAFETY PRESCRIPTIONS

WARNING

ACCIDENTAL NITROGEN BREATHING CAN CAUSE LOW OXYGEN LEVELS IN THE BLOOD AND MAY LEAD TO UNCONSCIOUSNESS AND TO DEATH IN ONLY A FEW BREATHS, WITHOUT ANY SYMPTOM. ALL NITROGEN VENTS MUST ALWAYS BE ROUTED TO SAFE LOCATION.

I. Use the package properly, within rated pressure and temperature limits stated on name plate.

II. Before servicing any valve, fitting or component it is mandatory to depressurize the package completely and to disconnect power supply by means of a manual circuit breaker on feeding line (by others), except for spare equipment items.

III. To insulate the supply voltage, an adequate insulating switch must be fitted on the feeding line.

IV. Nitrogen generator package can work only in ventilated safe area.

V. Assembly and disassembly of any valve, fitting or component of nitrogen generation package must be performed by experienced technicians only.

VI. While PSA is working do not allow unauthorized person near the package, never place any kind of object on PSA, never remove any component.

VII. Never obstruct safety valves exhaust.

7.2 PSA NITROGEN GENERATORS THEORY OF OPERATION

Nitrogen production from air using PSA technology is based on the capability of a special adsorbent, named Carbon Molecular Sieve (CMS), to adsorb oxygen at an higher rate than nitrogen or other gases. If air is send through a CMS bed and is kept in contact with CMS only for short period the difference in adsorption rate will result in a significant removal of oxygen from air and will allow to collect high purity nitrogen from outlet side.

After this period the CMS will start to significantly adsorb also nitrogen and therefore it will no more remove oxygen from air; therefore it is necessary to stop flow through adsorbent bed before reaching this point and regenerate the bed.

Bed regeneration is accomplished by depressurisation to atmospheric pressure; in order to obtain a continuous production of high purity nitrogen two adsorbers, that operate cyclically and alternatively between adsorption and regeneration and a nitrogen buffer drum is provided.

Production capacity and purity are dependant on feed flow-rate, pressure, temperature, and on selected cycle; high pressure and low temperature may result in higher purity and higher product capacity, temperature higher than design or feed pressure lower than design will have a negative impact on product specification, with consequent out of spec nitrogen.

The operating cycle is automatic and is controlled by a PLC.

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7.3 DESCRIPTION OF MAIN COMPONENTS

7.3.1 Nitrogen generator

The nitrogen generator package is provided with no.2 towers PSA type nitrogen generator, C-64001A and C-6400B.

Normally, one tower is in the production phase, while the other tower is regenerating.

Dry air enters the generator and is conveyed to production tower by inlet 2-way valve 64-XV-051 or 64-XV-052, it flows on the active bed, releasing oxygen, and exits from outlet 2-way valve 64-XV-056 or 64-XV-057.

The regenerating tower is depressurized to atmospheric pressure, opening 2-way discharge valve 64-XV-053 or 64-XV-054, to release oxygen through discharge valve and silencer.

A small percentage of nitrogen is drawn downstream the production tower through 2-way valve 64-XV-055 and it is expanded at atmospheric pressure inside regenerating tower.

This nitrogen flow runs through the tower in a counter-current direction, it attracts the residual oxygen present on the active bed and is then vented to atmosphere through discharge valve and silencer.

Afterwards, discharge valve, inlet valve and outlet valve are closed and both vessels are brought to the same pressure through 2-way valve 64-XV-055, for the subsequent change-over phase.

The generator is provided with internal connection for instrument air through valve BLPH-MV-802.

The manual valves installed in the nitrogen generation package are provided with locking devices: they shall be kept in Open or Close position as shown in the package P&ID, document no. 1724000437-PR-PID-00018.

WARNINGS

INSTRUMENT AIR CIRCUIT MUST BE PROPERLY PRESSURIZED
BEFORE SWITCHING THE GENERATOR ON

THE CONTROL PLC CAN'T KNOW THE POSITION OF MANUAL ISOLATION VALVES INSTALLED ON THE PROCESS LINE. ALWAYS CHEK THEIR POSITION TO ASSURE THAT THERE IS THE FLOW OF AIR THROUGH WHEN THE GENERATOR IS SWITCHED ON

7.3.2 AFTER-FILTERS

The nitrogen generator package is provided with no.2 after-filters, item S-64001A/B, installed in parallel configuration.
The package can operate with only one filtering line in operation, but it is possible to use both filters at the same time.
Each filter is provided with a manual drain valve.
The filtering group is provided with a differential pressure transmitter, item 64-PDIT-056: it is advisable to replace the cartridges of the filters when measured pressure drop reaches 0.5 bar.

WARNINGS

REPLACE CARTRIDGE WHEN MEASURED PRESSURE DROP REACHES 0.5 bar,
TO AVOID THE COLLAPSE OF THE CARTRIDGE

INSTALLED CARTRIDGES ARE NOT CLEANABLE TYPE. ALWAYS REPLACE THEM WHEN EXHAUST

7.3.3 MAIN DATA

The nitrogen generator package is designed for the following performances:

- Outlet N2 purity: 97%
- Outlet N2 package flowrate: 50 Nm^3/h
- Outlet N2 package pressure: 8.1 barg

with the inlet conditions as follows:

- Inlet dry air flowrate: 125 Nm^3/h
- Inlet dry air pressure: 9 barg

7.4 OPERATING INSTRUCTIONS AND INFORMATION

7.4.1 Start-up

WARNINGS

INSTRUMENT AIR CIRCUIT MUST BE PROPERLY PRESSURIZED
BEFORE SWITCHING THE GENERATOR ON

Local start-up

a) Place the switch on nitrogen generation package local control panel in "Local" position and verify that lamps 64-XL-001 and 64-XL-002 are switched on

b) Verify that instrument air is available for pneumatic actuated valves, according to commissioning procedure.

c) Press the START push-button 64-HS-001 on local control panel to start the generator: the PLC will start its operation and the different electric components will get enabled as described in the functional description. Verify that PSA RUNNING lamp 64-XL-003 is switched on.

d) Make sure the generator operating cycle is properly carried out and that no alarm condition is highlighted.

e) After the correct start-up, until the measured oxygen level is greater than design value, the nitrogen flow is automatically vented to atmosphere.

f) When the measured oxygen level is lower than set value, the nitrogen flow is automatically provided to the users.

Remote start-up

a) Place the switch on local control panel on ''REMOTE' position and verify the LOCAL/REMOTE STATUS PROFIBUS signal.

b) Give the REMOTE START impulsive command to start the generator: the PLC will start its operation and the different electric components will get enabled. Verify that PSA RUNNING lamp is switched on.

c) Make sure the generator operating cycle is properly carried out and that no alarm condition is highlighted.

d) After the correct start-up, until the measured oxygen level is greater than design value, the nitrogen flow is automatically vented to atmosphere.

e) When the measured oxygen level is lower than set value, the nitrogen flow is automatically provided to the users.

7.4.2 Stop

WARNING

WHEN THE GENERATOR IS STOPPED, THERE IS NO FLOW OF NITROGEN TO USERS

Local stop

a) Press the STOP push-button 64-HS-002 on local control panel to stop the generator. Verify that PSA RUNNING lamp 64-XL-003 is switched off.

b) Cut power supply to the local control panel and verify that lamps 64-XL-001 and 64-XL-002 are switched off.

Remote stop

a) Valid only if the switch on local control panel is on "REMOTE" position.

b) Give the REMOTE STOP impulsive command to stop the PSA operating cycle. Verify that PSA RUNNING lamp 64-XL-003 is switched off.

c) Cut power supply to the local control panel and verify that lamps 64-XL-001 and 64-XL-002 are switched off.

7.5 MAINTENANCE

WARNINGS

DEPRESSURIZE THE PSA COMPLETELY BEFORE SERVICING ANY VALVE, FITTING OR COMPONENT UNDER PRESSURE.

NO MAINTENANCE ACTIVITIES ARE ALLOWED ON ELECTRICAL LIVE CONNECTIONS

REMARKS

A CORRECT MAINTENANCE PROGRAM IS NECESSARY TO ASSURE PROPER WORKING OF NITROGEN GENERATORS: GUARANTEED CONDITIONS ARE SUBORDINATED TO EXECUTION OF MAINTENANCE OPERATIONS.

7.5.1 Six-monthly

1. Replace the cartridge of the after-filters.

Put on line the stand-by filter opening the upstream manual/automated valves and downstream manual valves and isolate the filter to be maintained closing the upstream and downstream manual valves

Depressurize the filter to be maintained opening the manual drain valve and open it to replace the cartridge

2. In order to guarantee the achievement of the process performances, it is recommended to check the level of the carbon molecular sieve in both towers of the nitrogen generators and fill it, if necessary, as per following steps.

- switch the unit off and depressurize the system, then open the DN150 filling nozzle fitted on top head of generator towers
- verify the level of carbon molecular sieve, which should completely fill the nozzle
- add the necessary carbon molecular sieve to completely fill the nozzle, if necessary
- close the blind flange of the DN150 filling nozzle, replacing the gasket, if necessary

Check of carbon molecular sieve to be performed according to the Material Safety Data Sheet (attached) and the equipment datasheet, document no. 1724000437-MAC-DS-00011.

WARNING

IT IS MANDATORY TO OPERATE THE NITROGEN GENERATOR WITH BOTH TOWERS COMPLETELY FILLED WITH CARBON MOLECULAR SIEVE

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7.5.2 Yearly activities

Proceed to the full servicing of process valves, as per following steps:

- switch the unit off and depressurize the system, then dismount all the pneumatic actuated valves
- replace the gaskets of the pneumatic actuated valves, as per dedicated manual
- check the status of the balls of pneumatic actuated valves: replace them as per dedicated manual, if necessary.

Coes recomend yearly carbon molecular sieve replacement, in any case carbon molecular sieve became unavoidable when the design Nitrogen purity (3%) cannot be longer met, as per following steps:

- switch the unit off and depressurize the system, than open the DN150 filling nozzle fitted on top head of generator towers
- open the DN80 emptying nozzle fitted on bottom head of generator towers
- discharge all the carbon molecular sieve contained in the generator towers
- open the DN100 nozzle fitted on bottom head of generator towers and remove the lower piping
- check the internal diffuser fitter between the lower piping and the generator towers: replace the stainless steel mesh if necessary
- install the lower piping and close the DN100 nozzle fitted on bottom head of generator towers replacing the gasket, if necessary
- open the DN100 nozzle fitted on shell of generator towers and remove the upper piping
- check the internal diffuser fitter on the upper piping: replace the stainless steel mesh if necessary
- install the upper piping and close the DN100 nozzle fitted on shell of generator towers replacing the gasket, if necessary
- add the necessary carbon molecular sieve to completely fill the towers, up to the DN150 filling nozzle fitted on top head of generator towers
- close the blind flange of the DN150 filling nozzle, replacing the gasket, if necessary
- switch the unit on and pressurize the system, then let the nitrogen generator work for 30 minutes
- switch the unit off and depressurize the system, then open the DN150 filling nozzle fitted on top head of generator towers
- verify the level of carbon molecular sieve, which should completely fill the nozzle

- add the necessary carbon molecular sieve to completely fill the nozzle
- close the blind flange of the DN150 filling nozzle, replacing the gasket, if necessary

WARNING

IT IS MANDATORY TO OPERATE THE NITROGEN GENERATOR WITH BOTH TOWERS COMPLETELY FILLED WITH CARBON MOLECULAR SIEVE

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7.6 TROUBLESHOOTING

WARNINGS

DEPRESSURIZE THE NITROGEN GENERATION PACKAGE COMPLETELY

BEFORE SERVICING ANY VALVE, FITTING OR COMPONENT UNDER PRESSURE.

NO MAINTENANCE ACTIVITIES ARE ALLOWED ON ELECTRICAL LIVE CONNECTIONS

	PROBLEM	POSSIBLE CAUSE	SUGGESTD SOLUTION
1	High oxygen content of nitrogen	Inlet air water content is higher than expected	Check the correct operation of nitrogen generation package
		Operating parameters out of design range	Adjust user nitrogen consumption to avoid too low pressure and/or too high flow through the generator
		Active material has not been correctly regenerated	Proceed with the regeneration of carbon molecular sieve, keeping the manual valves upstream after-filters closed
		Regeneration phase is not completely achieved	Verify that during operation of generator, there is a suitable flow of air vented through the silencer. No instrument is available to check the vent flow, therefore a manual inspection is recommended.
		Active material is damaged	Replace carbon molecular sieve in both generator towers
		Active material is exhaust	Replace carbon molecular sieve in both generator towers
		Generator by-pass is open	Close by-pass valve (if installed by others)
		Failure on generator operating cycle	Check the correct operation of actuated valves

	PROBLEM	POSSIBLE CAUSE	SUGGESTD SOLUTION
2	Failure of actuated valve	No instrument air pressure to pneumatic actuator	Open instrument air root valves
		Failure of solenoid valve	Replace solenoid valve
		Failure of limit switch	Adjust or replace limit switch
		Failure of pneumatic actuator	Check the pneumatic actuator, service it and replace it, if necessary
		Failure of valve	Check the valve, service it and replace it, if necessary

	PROBLEM	POSSIBLE CAUSE	SUGGESTD SOLUTION
3	Low pressure on nitrogen	Too high flow of instrument air or nitrogen to users	Adjust user nitrogen consumption
		Too low air flow from compressor	See dedicated manual
		Too high air consumption for regeneration of dryer installed upstream nitrogen generator package	Adjust dryer phases times
		Too high pressure drop across dryer installed upstream nitrogen generator package	Change desiccant material in instrument air dryer package
		Too high pressure drop across after-filters	Replace the after-filters cartridge

	PROBLEM	POSSIBLE CAUSE	SUGGESTD SOLUTION
4	High pressure drop across after-filters	Too high nitrogen flow across filter	Adjust user nitrogen consumption to avoid too high flow
		Too low nitrogen pressure at filter inlet	Adjust user nitrogen consumption to avoid too low pressure
		Cartridge saturated with dust	Replace the cartridge

	PROBLEM	POSSIBLE CAUSE	SUGGESTD SOLUTION
5	Dust content in nitrogen	Dust created by generator during normal operation	Replace the after-filters cartridge
		Active material is damaged	Replace carbon molecular sieve in both generator towers

REMARKS

TO AVOID POSSIBLE DAMAGES AND INCORRECT OPERATION OF THE DRYING UNIT,

USE ONLY ORIGINAL COES SPARE PARTS

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Information Sheet

SECTION 1. Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Chemical Name:	**Carbon Molecular Sieve**
Commercial Name:	**CMS-260**
EC number	**231-153-3**
CAS number	**7440-44-0**

1.2. Relevant identified uses of the substance or mixture and uses advised against

Intended use **Adsorbent material for gasses purification**

1.3. Details of the supplier of the safety data sheet

Name	**Coes S.r.l.**
Full address	**Via Pontida 265**
District and Country	**24040 Stezzano (BG) - italy**
	+39 0352050511
	coes@coessrl.com

1.4. Emergency telephone number

For urgent inquiries refer to **+39 0352050511**

SECTION 2. Hazards identification

2.1. Classification of the substance or mixture

The product is not classified as hazardous pursuant to the provisions set forth in EC Regulation 1272/2008 (CLP) (and subsequent amendments and supplements).
Hazard classification and indication:

2.2. Label elements

Hazard pictograms: --

Signal words: --

Hazard statements:

--

Precautionary statements:

--

This product is not subject to hazard labeling pursuant to EC Regulation 1272/2008 (CLP) and subsequent amendments and supplements.

2.3. Other hazards

The substance does not have persistence, bioaccumulation and toxicity (PBT) properties and is not very persistent and very bioaccumulative. (vPvB).

The substance does not have endocrine disrupting properties.

Contact with eyes: May cause irritation.
Skin contact: May cause irritation.
Inhalation: May cause irritation to the respiratory tract. Repeated exposure could cause lung damage.
Ingestion: May cause gastrointestinal symptoms.

SECTION 3. Composition/information on ingredients

3.1. Substances

Contains:

Identification	Conc. %	Classification (EC) 1272/2008 (CLP)
CARBON		
CAS 7440-44-0	100	
EC 231-153-3		
INDEX		

The full wording of hazard (H) phrases is given in section 16 of the sheet.

3.2. Mixtures

Information not relevant

SECTION 4. First aid measures

4.1. Description of first aid measures

Eye Contact: Immediately flush with plenty of water for several minutes; ensure to flush under the eyelids. If symptom of irritation persist, seek medical attention.
Skin Contact: Wash with plenty of water and soap. If symptom of irritation persist, seek medical attention.
Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Seek medical attention immediately.
Ingestion: Wash with plenty of water. If gastrointestinal symptoms develop seek medical attention.

4.2. Most important symptoms and effects, both acute and delayed

No episodes of damage to health ascribable to the product have been reported.

4.3. Indication of any immediate medical attention and special treatment needed

Information not available

SECTION 5. Firefighting measures

5.1. Extinguishing media

SUITABLE EXTINGUISHING EQUIPMENT
The extinguishing equipment should be of the conventional kind: carbon dioxide, foam, powder and water spray.
UNSUITABLE EXTINGUISHING EQUIPMENT
None in particular.

5.2. Special hazards arising from the substance or mixture

HAZARDS CAUSED BY EXPOSURE IN THE EVENT OF FIRE
Do not breathe combustion products.

5.3. Advice for firefighters

GENERAL INFORMATION
Use jets of water to cool the containers to prevent product decomposition and the development of substances potentially hazardous for health. Always wear full fire prevention gear. Collect extinguishing water to prevent it from draining into the sewer system. Dispose of contaminated water used for extinction and the remains of the fire according to applicable regulations.
SPECIAL PROTECTIVE EQUIPMENT FOR FIRE-FIGHTERS
Normal fire fighting clothing i.e. fire kit (BS EN 469), gloves (BS EN 659) and boots (HO specification A29 and A30) in combination with self-contained open circuit positive pressure compressed air breathing apparatus (BS EN 137).

SECTION 6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Use breathing equipment if fumes or powders are released into the air. These indications apply for both processing staff and those involved in emergency procedures.

6.2. Environmental precautions

The product must not penetrate into the sewer system or come into contact with surface water or ground water.

6.3. Methods and material for containment and cleaning up

Confine using earth or inert material. Collect as much material as possible and eliminate the rest using jets of water. Contaminated material should be disposed of in compliance with the provisions set forth in point 13.

6.4. Reference to other sections

Any information on personal protection and disposal is given in sections 8 and 13.

SECTION 7. Handling and storage

7.1. Precautions for safe handling

Before handling the product, consult all the other sections of this material safety data sheet. Avoid leakage of the product into the environment. Do not eat, drink or smoke during use.

7.2. Conditions for safe storage, including any incompatibilities

Keep the product in clearly labelled containers. Keep containers away from any incompatible materials, see section 10 for details.

7.3. Specific end use(s)

Information not available

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

Regulatory References:

POL	Polska	Rozporządzenie ministra rozwoju, pracy i technologii z dnia 18 lutego 2021 r. Zmieniające rozporządzenie w sprawie najwyższych dopuszczalnych stężeń i natężeń czynników szkodliwych dla zdrowia w środowisku pracy
GBR	United Kingdom	EH40/2005 Workplace exposure limits (Fourth Edition 2020)

CARBON

Threshold Limit Value

Type	Country	TWA/8h		STEL/15min		Remarks / Observations
		mg/m3	ppm	mg/m3	ppm	
NDS/NDSCh	POL	6				INHAL
WEL	GBR	10				INHAL
WEL	GBR	4				RESP

Legend:

(C) = CEILING ; INHAL = Inhalable Fraction ; RESP = Respirable Fraction ; THORA = Thoracic Fraction.

8.2. Exposure controls

Comply with the safety measures usually applied when handling chemical substances.

HAND PROTECTION
Use protective gloves made of butilic/nitrilic rubber (min. > 0.11 mm; penetration time: > 480 min) (EN 374).

SKIN PROTECTION
None required.

EYE PROTECTION
Use safety glasses with lateral (EN 166).

RESPIRATORY PROTECTION
In case of dust dispersion o higher recommended exposure limits, wear mask with filter P2 (EN 143).

ENVIRONMENTAL EXPOSURE CONTROLS
The emissions generated by manufacturing processes, including those generated by ventilation equipment, should be checked to ensure compliance with environmental standards.

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Properties	Value	Information
Appearance	particulate solid	
Colour	black	
Odour	odourless	
Melting point / freezing point	Not available	
Initial boiling point	Not applicable	
Flammability	Not available	
Lower explosive limit	Not available	
Upper explosive limit	Not available	
Flash point	Not applicable	
Auto-ignition temperature	Not available	
pH	6-9	
Kinematic viscosity	Not available	
Solubility	insoluble in water	
Partition coefficient: n-octanol/water	Not available	
Vapour pressure	Not available	
Density and/or relative density	1,70	
Relative vapour density	Not available	
Particle characteristics	Not available	

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Information not available

9.2.2. Other safety characteristics

Information not available

SECTION 10. Stability and reactivity

10.1. Reactivity

There are no particular risks of reaction with other substances in normal conditions of use.

10.2. Chemical stability

The product is stable in normal conditions of use and storage.

10.3. Possibility of hazardous reactions

No hazardous reactions are foreseeable in normal conditions of use and storage.

10.4. Conditions to avoid

None in particular. However the usual precautions used for chemical products should be respected.

10.5. Incompatible materials

Information not available

10.6. Hazardous decomposition products

Information not available

SECTION 11. Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Metabolism, toxicokinetics, mechanism of action and other information

Information not available

Information on likely routes of exposure

Information not available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Information not available

Interactive effects

Information not available

ACUTE TOXICITY

Does not meet the classification criteria for this hazard class

Oral (rat) LD50 > 2000 mg/kg

SKIN CORROSION / IRRITATION

Does not meet the classification criteria for this hazard class

SERIOUS EYE DAMAGE / IRRITATION

Does not meet the classification criteria for this hazard class

RESPIRATORY OR SKIN SENSITISATION

Does not meet the classification criteria for this hazard class

Respiratory sensitization

Information not available

Skin sensitization

Information not available

GERM CELL MUTAGENICITY

Does not meet the classification criteria for this hazard class

CARCINOGENICITY

Does not meet the classification criteria for this hazard class

REPRODUCTIVE TOXICITY

Does not meet the classification criteria for this hazard class

Adverse effects on sexual function and fertility

Information not available

Adverse effects on development of the offspring

Information not available

Effects on or via lactation

Information not available

STOT - SINGLE EXPOSURE

Does not meet the classification criteria for this hazard class

Target organs

Information not available

Route of exposure

Information not available

STOT - REPEATED EXPOSURE

Does not meet the classification criteria for this hazard class

Target organs

Information not available

Route of exposure

Information not available

ASPIRATION HAZARD

Does not meet the classification criteria for this hazard class

11.2. Information on other hazards

Based on the available data, the substance is not listed in the main European lists of potential or suspected endocrine disruptors with human health effects under evaluation.

SECTION 12. Ecological information

Use this product according to good working practices. Avoid littering. Inform the competent authorities, should the product reach waterways or contaminate soil or vegetation.

12.1. Toxicity

Information not available

12.2. Persistence and degradability

CARBON

Solubility in water 0,1 - 100 mg/l

Degradability: information not available

12.3. Bioaccumulative potential

Information not available

12.4. Mobility in soil

Information not available

12.5. Results of PBT and vPvB assessment

The substance does not have persistence, bioaccumulation and toxicity (PBT) properties and is not very persistent and very bioaccumulative. (vPvB).

12.6. Endocrine disrupting properties

Based on the available data, the substance is not listed in the main European lists of potential or suspected endocrine disruptors with environmental effects under evaluation.

12.7. Other adverse effects

Information not available

SECTION 13. Disposal considerations

13.1. Waste treatment methods

Reuse, when possible. Neat product residues should be considered special non-hazardous waste.
Disposal must be performed through an authorised waste management firm, in compliance with national and local regulations.
Solid residues may be suitable for disposal in an authorised landfill site.
CONTAMINATED PACKAGING
Contaminated packaging must be recovered or disposed of in compliance with national waste management regulations.

SECTION 14. Transport information

The product is not dangerous under current provisions of the Code of International Carriage of Dangerous Goods by Road (ADR) and by Rail (RID), of the International Maritime Dangerous Goods Code (IMDG), and of the International Air Transport Association (IATA) regulations.

14.1. UN number or ID number

Not applicable

14.2. UN proper shipping name

Not applicable

14.3. Transport hazard class(es)

Not applicable

14.4. Packing group

Not applicable

14.5. Environmental hazards

Not applicable

14.6. Special precautions for user

Not applicable

14.7. Maritime transport in bulk according to IMO instruments

Information not relevant

SECTION 15. Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Seveso Category - Directive 2012/18/EU: None

Restrictions relating to the product or contained substances pursuant to Annex XVII to EC Regulation 1907/2006

Contained substance

Point	75

Regulation (EU) 2019/1148 - on the marketing and use of explosives precursors

Not applicable

Substances in Candidate List (Art. 59 REACH)

On the basis of available data, the product does not contain any SVHC in percentage ≥ than 0,1%.

Substances subject to authorisation (Annex XIV REACH)

None

Substances subject to exportation reporting pursuant to Regulation (EU) 649/2012:

None

Substances subject to the Rotterdam Convention:

None

Substances subject to the Stockholm Convention:

None

Healthcare controls

Information not available

German regulation on the classification of substances hazardous to water (AwSV, vom 18. April 2017)

WGK Nwg: Not hazardous to waters

Substance listed in Annex 2

15.2. Chemical safety assessment

Has not been performed / is not yet available a
chemical safety assessment for the substance.

SECTION 16. Other information

LEGEND:
- ADR: European Agreement concerning the carriage of Dangerous goods by Road
- ATE: Acute Toxicity Estimate
- CAS: Chemical Abstract Service Number
- CE50: Effective concentration (required to induce a 50% effect)
- CE: Identifier in ESIS (European archive of existing substances)
- CLP: Regulation (EC) 1272/2008
- DNEL: Derived No Effect Level
- EmS: Emergency Schedule
- GHS: Globally Harmonized System of classification and labeling of chemicals
- IATA DGR: International Air Transport Association Dangerous Goods Regulation
- IC50: Immobilization Concentration 50%
- IMDG: International Maritime Code for dangerous goods
- IMO: International Maritime Organization
- INDEX: Identifier in Annex VI of CLP
- LC50: Lethal Concentration 50%
- LD50: Lethal dose 50%
- OEL: Occupational Exposure Level
- PBT: Persistent bioaccumulative and toxic as REACH Regulation
- PEC: Predicted environmental Concentration
- PEL: Predicted exposure level
- PNEC: Predicted no effect concentration
- REACH: Regulation (EC) 1907/2006
- RID: Regulation concerning the international transport of dangerous goods by train
- TLV: Threshold Limit Value

- TLV CEILING: Concentration that should not be exceeded during any time of occupational exposure.
- TWA: Time-weighted average exposure limit
- TWA STEL: Short-term exposure limit
- VOC: Volatile organic Compounds
- vPvB: Very Persistent and very Bioaccumulative as for REACH Regulation
- WGK: Water hazard classes (German).

GENERAL BIBLIOGRAPHY

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- Handling Chemical Safety
- INRS - Fiche Toxicologique (toxicological sheet)
- Patty - Industrial Hygiene and Toxicology
- N.I. Sax - Dangerous properties of Industrial Materials-7, 1989 Edition
- IFA GESTIS website
- ECHA website
- Database of SDS models for chemicals - Ministry of Health and ISS (Istituto Superiore di Sanità) - Italy

Note for users:
The information contained in the present sheet are based on our own knowledge on the date of the last version. Users must verify the suitability and thoroughness of provided information according to each specific use of the product.
This document must not be regarded as a guarantee on any specific product property.
The use of this product is not subject to our direct control; therefore, users must, under their own responsibility, comply with the current health and safety laws and regulations. The producer is relieved from any liability arising from improper uses.
Provide appointed staff with adequate training on how to use chemical products.
CALCULATION METHODS FOR CLASSIFICATION
Chemical and physical hazards: Product classification derives from criteria established by the CLP Regulation, Annex I, Part 2. The data for evaluation of chemical-physical properties are reported in section 9.
Health hazards: Product classification is based on calculation methods as per Annex I of CLP, Part 3, unless determined otherwise in Section 11.
Environmental hazards: Product classification is based on calculation methods as per Annex I of CLP, Part 4, unless determined otherwise in Section 12.