# Base Load Power Hub (BLPH)

## Weld Procedure Specifications (WPS), Weld Procedure Qualification Report (WPQR), Welding Map and Welders Qualifications - E&I SHELTERS

Document Number: 1724000049-WEL-RE-00003

Document Class: 2

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|---|---|---|---|---|---|
| 03 | 30/05/2024 | Accepted for Construction (AFC) | AD | SK | CA |
| 02 | 22/04/2024 | Accepted for Construction (AFC) | AD | SK | CA |
| 01 | 26/03/2024 | Issue for Review (IFR) | AD | SK | CA |
| 0 | 19/02/2024 | Issue for Review (IFR) | AD | SK | CA |
| Rev. | Date | Description | Prepared | Reviewed | Approved |

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## Revision / Change Log

| Rev. | Description |
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| 0 | Issue for Review (IFR) |
| 01 | Issue for Review (IFR) |
| 02 | Accepted for Construction (AFC) |
| 03 | Accepted for Construction (AFC) |
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## HOLDS LIST

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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.

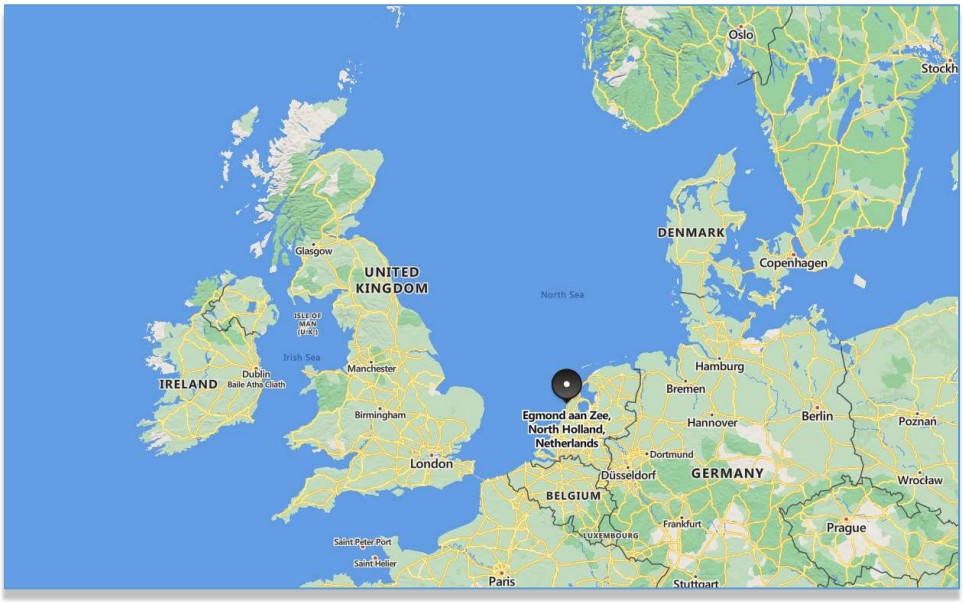



*Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map*

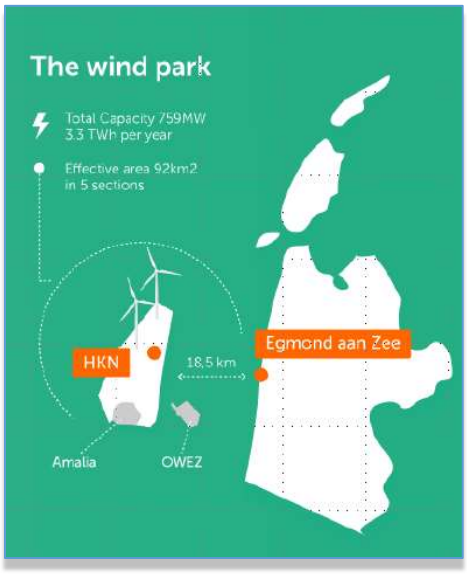



*Figure 2 - Wind Park Details*

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.

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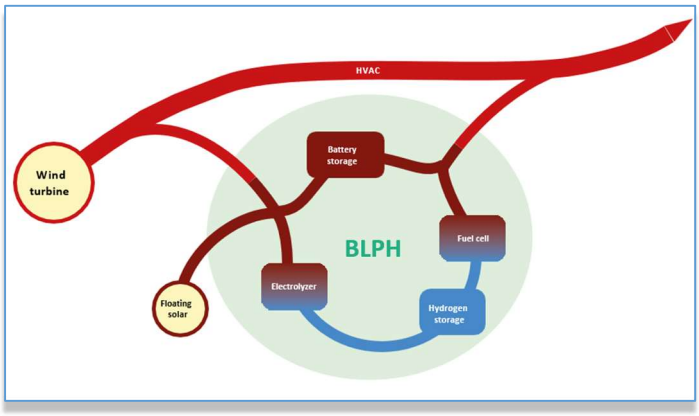



*Figure 3 – BLPH Concept*

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

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

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# 2 DOCUMENT SCOPE

The scope of this document is to provide the criteria and the operating ways to verify the quality of the welding in the shelter.The purpose is to give objective evidence that all design and specification requirements related to welding are correctly understood, accounted for, verified and recorded.

## 2.1 REFERENCES

| Doc. No. | Discription |
|---|---|
| 123A90-DDL-AR-MR-10026 | Material Requisition for AC UPS fitted with UPS system Equipment Room B-300 |
| 123A90-DDL-AR-MR-10019 | Material Requisition for I&T Equipment Room B-400 |
| 123A90-DDL-AR-MR-10012 | Material Requisition for LV (400V) Switchroom |
| 123A90-DDL-AR-MR-10005 | Material Requisition for HV-MV (66kV-6.6kV) Switchroom B-100 |
| AWS D1.1 ED 2020 | Structural Welding Code - Steel |
| EEMUA 197 | Specitication for the fabrication of NON PRIMARY structural |

*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 |
| CA | Certification Agency |
| DS | Surveyor |
| EXP | Expediting dept. |
| LOG | Logistic Dept. |
| NDE | Non Destructive Examination |
| PQR | Procedure Qualification Record |
| QC | Quality Control Dept. |

| | |
|---|---|
| QCI | Quality Control Inspector |
| SC | Sub-contractor |
| WI | Welding Inspector |
| WLD | Welding Dept. |
| WQR | Welder Qualification Record |
| WPS | Welding Procedure Specification |

*Table 2 - Definitions and Abbreviations*

# 3 SUMMARY

3.1 PQR

3.2 WELDERS WPQS

3.3 PRODUCTION WPS

3.4 WELDING IDENTIFICATION MAP

3.5 DRAWINGS

## 3.1 PQR (According AWS D1.1 also EEMUA 197-EEMUA 158)

| ALEX SISTEMI SPA | PROCEDURE QUALIFICATION RECORD<br>PQR according AWS D1.1/D1.1-2020<br>Annex M – FORM M-1 (Front) | PQR N°<br>RS 07<br>Rev. 0<br>WPS N°<br>RS 07 | Sheet<br>1 of 2<br>Date:<br>22/02/2022 |
|---|---|---|---|

| Base Metals | Specification | Type or Grade | AWS Group N. | Thickness (mm) | Size (NPS) | Schedule | Diameter (mm) |
|---|---|---|---|---|---|---|---|
| Base Material | EN 10025-2 | S355J2+N | N.A. | 6 | | | |
| Welded To | EN 10025-2 | S355J2+N | N.A. | 6 | | | |
| Backing Material | | | | | | | |
| Other | | | | | | | |

| JOINT DETAILS | |
|---|---|
| Groove Type | Fillet weld |
| Groove Angle | 0 |
| Root Opening | |
| Root Face | |
| Backgouging | |
| Method | |

JOINT DETAILS (sketch)



| POST WELD HEAT TREATMENT | |
|---|---|
| Temperature | N.A. |
| Time and Temperature | N.A. |
| Other | |

| PROCEDURE | | | | | | |
|---|---|---|---|---|---|---|
| Weld Layer (s) | 1 | All | | | | |
| Weld Pass (es) | 1 | 1 to 3 | | | | |
| **Process** | GMAW | GMAW | | | | |
| Type (*semiautomatic, Mechanized, etc.*) | Semi-automatic | Semi-automatic | | | | |
| **Position** | 4F | 4F | | | | |
| Vertical Progression | N.A. | N.A. | | | | |
| **Filler Metal (AWS Spec.)** | A5.18 | A5.18 | | | | |
| AWS Classification | ER70S-6 | ER70S-6 | | | | |
| Diameter | 1.2 | 1.2 | | | | |
| Manufacturer / Trade Name | ELB-SG2 | ELB-SG2 | | | | |
| **Shielding Gas** Composition | Ar: 80% CO2: 20% | Ar: 80% CO2: 20% | | | | |
| Flow Rate (L/min) | 14÷16 | 14÷16 | | | | |
| Nozzle Size | - | - | | | | |
| **Preheat Temperature** | 10 °C | 10 °C | | | | |
| Interpass Temperature | N.A. | ≤ 200°C | | | | |
| **Electrical Characteristics** | | | | | | |
| Current Type and Polarity | DC Reverse | DC Reverse | | | | |
| Transfer Mode (GMAW) | Pulsed arc | Pulsed arc | | | | |
| Power Source Type (*cc, cv, etc.*) | cc | cc | | | | |
| Amps | 150÷160 | 240÷260 | | | | |
| Volts | 26÷27 | 26÷27 | | | | |
| Wire Feed Speed (m/min.) | - | - | | | | |
| Travel Speed (mm/min.) | 180 | 190÷210 | | | | |
| Maximum Heat Input (KJ/mm) | 1,30÷1,44 | 1,97÷2,00 | | | | |
| **Technique** | | | | | | |
| Stringer or Weave | String | String | | | | |
| Multi or Single pass (*per side*) | Single | Multi | | | | |
| Oscillation (*Mechanized/Automatic*) | - | - | | | | |
| Traverse Length | - | - | | | | |
| Traverse Speed | - | - | | | | |
| Dwell Time | - | - | | | | |
| Number of Electrodes | 1 | 1 | | | | |
| Contact Tube to work Distance (mm) | 12-15 mm | 12-15 mm | | | | |
| Peening | No | No | | | | |
| Interpass Cleaning | Brushing and grinding | Brushing and grinding | | | | |
| Other | - | - | | | | |

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| ALEX SISTEMI SPA | PROCEDURE QUALIFICATION RECORD<br>PQR according AWS D1.1/D1.1-2020<br>Annex M – FORM M-1 (Back)<br>Test Results. | PQR N°<br>RS 07<br>Rev. 0<br>WPS N°<br>RS 07 | Sheet<br>2 of 2<br>Date:<br>22/02/2022 |
|---|---|---|---|

| ✓ | Type of Tests | Clause/Figure(s) Reference | Acceptance Criteria | Results | Remarks |
|---|---|---|---|---|---|
| ☑ | Visual Inspection | 6.10.1 | 6.10.1.2 | Satisfactory | Report n° SND/0126/22 |
| ☐ | Radiographic Examination | 6.10.2.1 | 6.10.2.2 | | |
| ☐ | Ultrasonic Testing | 6.10.2.1 | 6.10.2.2 | | |
| ☐ | 2 Transverse Root Bends | 6.10.3.1 | 6.10.3.3 | | |
| ☐ | 2 Transverse Face Bends | 6.10.3.1 | 6.10.3.3 | | |
| ☐ | 2 Longitudinal Root Bends | 6.10.3.2 | 6.10.3.3 | | |
| ☐ | 2 Longitudinal Face Bends | 6.10.3.2 | 6.10.3.3 | | |
| ☐ | 2 Side Bends | 6.10.3.1 | 6.10.3.3 | | |
| ☐ | 4 Side Bends | 6.10.3.1 | 6.10.3.3 | | |
| ☐ | 2 Tensile Test | 6.10.3.4 | 6.10.3.5 | | |
| ☑ | 3 Macroetch | 6.10.4 | 6.10.4.1 | Satisfactory | Max fillet single pass: 4,5 mm<br>Min fillet multi pass: 7 mm |
| ☐ | 4 Macroetch | 6.10.4 | 6.10.4.1 | | |
| ☐ | CVN Tests | 6 Part D | 6 Part D | | |
| ☑ | Other test: Penetrant Test | / | / | For Info | Report n° SND/0127/22 |

| TENSILE TEST DETAILS | | | | | | |
|---|---|---|---|---|---|---|
| Specimen Number | Width (mm) | Thickness (mm) | Area ($mm^2$) | Ultimate Tensile Load (N) | Ultimate Unit Stress (MPa) | Type of Failure and Location |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| TOUGHNESS TEST DETAILS | | | | | | | |
|---|---|---|---|---|---|---|---|
| Specimen Number | Notch Location | Specimen Size (mm) | Test Temperature °C | Absorbed Energy (J) | Percent Shear | Lateral Expansion | Average |
| | | | | | | | |
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| CERTIFICATION | | |
|---|---|---|
| Welder's Name | ID Number | Stamp Number |
| DANIELE BAROLI | | DB |
| | | |

| Tests Conducted By | |
|---|---|
| Laboratory | OMECO |
| Test Number | SAM/0056/22 |
| File Number | |

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Clause 4 of AWS D1.1/D1.1M, (2020) Structural Welding Code—Steel.

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GAUDENZIO OLDANI
WELDING COORDINATOR
O.B.O. ALEX SISTEMI

| Title | |
|---|---|
| Q.C. Manager | |
| Name | Signature |
| Daniele Sfenopo | |
| Date | |
| 22/02/2022 | |

ALEX SISTEMI spa

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Via Madonna delle Rose, 56
Tel. 035581016 (r.a.) - Fax 035580153


**RAPPORTO DI PROVA / *TEST REPORT***
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**Numero:** *Number:* SND/0126/22 del *date* 14/02/2022
**Rif. OMECO:** *OMECO Ref.:* 0067/22 Pag. 1 di 2 *Page 1 of 2*
**Rif. CLIENTE:** *CUSTOMER Ref.:* ORD.220077 - 13/01/2022 Comm. X057-21X

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20010 OSSONA MI

Dati forniti dal Cliente / *Data supplied by the Customer:*

**Campione:** *Sample:* GIUNTO SALDATO AD ANGOLO (F.W.) TIPO LAMIERA Sp. 6 mm DICHIARATO IN EN 10025-2:2019 S355J2 PER QUALIFICA DEL PROCEDIMENTO DI SALDATURA E DEL SALDATORE (AWS D1.1/D1.1M:2020)
*WELDED TEST COUPON (F.W.) PLATE Thk 6 mm DECLARED AS EN 10025-2:2019 S355J2 FOR WELDING PROCEDURE AND PERFORMANCE QUALIFICATION (AWS D1.1/D1.1M:2020)*

| **Identificazione:** *Identification:* | **PQR** | **Nome Saldatore** *Welder's name* | **Processo** *Process* | **Posizione** *Position* |
|---|---|---|---|---|
| 1 – DB | RS 07 | DANIELE BAROLI | GMAW | 4F |

**Data ricevimento:** *Date of receipt:* 17/01/2022

**Norme di prova:** *Test standards:* AWS D1.1/D1.1M:2020 Part C 8.9

**Procedure di prova:** *Test Procedures:* ---

**Accettabilità:** *Acceptance standard:* AWS D1.1/D1.1M:2020 Part C Table 8.1

**Materiale:** (Dati forniti dal Cliente) *Material: (data supplied by the Customer)* EN 10025-2:2019 S355J2

**Zona esaminata:** *Area inspected:* Saldatura *Weld*
**Stato superficiale:** *Surface condition:* Saldato *as welded*

**Estensione del controllo:** *Examination coverage:* 100%

**Modalità di preparazione/pulizia:** *Preparing/Polishment modalities:* ---
**Qualifica del procedimento remoto:** *Remote procedure validation:* ---

**Metodo:** *Methods:* Diretto *Direct*
**Tipo d'illuminazione:** *Illumination type:* Luce artificiale *Artificial light*

**Apparecchiature:** *Equipment:* Calibro per saldature (SND-0974) ; Lampada a luce bianca (SND-0672)
*Weld gauge (SND-0974) ; White light lamp (SND-0672)*

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ING. MARCO CASARIL
RESPONSABILE DEL LABORATORIO
TECHNICAL MANAGER

FIRMATO DIGITALMENTE
DIGITALLY SIGNED

**Operatore:** *Operator:* I.SATTOLO Lev. II

**Data esecuzione:** *Date of execution:* 07/02/2022
**Presso:** *At:* Lab. OMECO - Monza

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**LEGENDA DIFETTOSITA': *LEGENDA*:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sd | Senza difetti apparenti<br>*No apparent defect* | 100 | Cricca<br>*Crack* | 104 | Cricca di cratere<br>*Crater crack* | | |
| 2017 | Pori superficiali<br>*Surface pores* | 2025 | Cavità di cratere terminale<br>*End crater pipe* | 401 | Mancanza di fusione<br>*Lack of fusion* | 4021 | Penetrazione al vertice incompleta<br>*Incomplete root penetration* |
| 502 | Sovrammetallo eccessivo<br>*Excess weld metal* | 503 | Convessità eccessiva<br>*Excessive convexity* | 504 | Eccesso di penetrazione *Excess penetration* | 505 | Raccordo difettoso<br>*Incorrect weld toe* |
| 506 | Traboccamento<br>*Overlap* | 509 | Avvallamento<br>*Sagging* | 5011<br>5012<br>5013 | Incisioni<br>*Undercuts / grooves* | 510 | Sfondamento<br>*Burn through* |
| 511 | Riempimento incompleto<br>*Incompletely filled groove* | 512 | Asimmetria eccessiva<br>*Excessive asymmetry* | 515 | Insellamento al vertice<br>*Root concavity* | 516 | Porosità/spugnosità al vertice (fioritura)<br>*Root porosity* |
| 517 | Ripresa difettosa<br>*Poor restart* | 5213 | Altezza di gola insufficiente<br>*Insufficient/ throat thickness* | 5214 | Altezza di gola eccessiva<br>*Excessive throat thickness* | 601 | Colpo d'arco<br>*Stray arc* |
| 602 | Spruzzo<br>*Spatter* | 610 | Discolorazione<br>*Discolouration* | | | | |

AC = Accettabile / *Acceptable* NA = Non Accettabile / *Not Acceptable*

| Identificazione *Identification* | Sd | 100 | 104 | 2017 | 2025 | 401 | 4021 | 502 | 503 | 504 | 505 | 506 | 509 | 5011 5012 5013 | 510 | 511 | 512 | 515 | 516 | 517 | 5213 | 5214 | 601 | 602 | 610 | Valutazione *Evaluation* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***1 - DB*** | X | | | | | | | | | | | | | | | | | | | | | | | | | AC |

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***PENETRANT TESTING***

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**Campione:** GIUNTO SALDATO AD ANGOLO (F.W.) TIPO LAMIERA Sp. 6 mm DICHIARATO IN EN 10025-2:2019 S355J2 PER QUALIFICA DEL PROCEDIMENTO DI SALDATURA E DEL SALDATORE (AWS D1.1/D1.1M:2020)
***Sample:*** *WELDED TEST COUPON (F.W.) PLATE Thk 6 mm DECLARED AS EN 10025-2:2019 S355J2 FOR WELDING PROCEDURE AND PERFORMANCE QUALIFICATION (AWS D1.1/D1.1M:2020)*

| **Identificazione:** / ***Identification:*** | **PQR** | **Nome Saldatore** / ***Welder's name*** | **Processo** / ***Process*** | **Posizione** / ***Position*** |
|---|---|---|---|---|
| 1 – DB | RS 07 | DANIELE BAROLI | GMAW | 4F |

**Data ricevimento:** / ***Date of receipt:*** 17/01/2022

**Norme di prova:** / *Test standards:* AWS D1.1/D1.1M:2020 Part D 8.14

**Procedure di prova:** / *Test Procedures:* ---

**Accettabilità:** / *Acceptance standard:* AWS D1.1/D1.1M:2020 Part C 8.10

**Materiale:** (Dati forniti dal Cliente) / *Material: (data supplied by the Customer)* EN 10025-2:2019 S355J2

**Zona esaminata:** / *Area inspected:* Saldatura / *Weld*
**Stato superficiale:** / *Surface condition:* Saldato / *Welded*
**Estensione del controllo:** / *Examination coverage:* 100%
**Temperatura della superficie:** / *Surface temperature:* 20°C
**Metodo:** / *Inspection method:* A contrasto di colore - lavabile con acqua / *Colour contrast - water washable*
**Illuminazione tipo:** / *Type illumination:* Luce artificiale / *Artificial ligth*
**Apparecchiature:** / *Equipments:* Termometro (SND-0638) – Lampada a luce Bianca (SND-0672) / *Thermometer (SND-0638)- White light lamp (SND-0672)*

ALEX SISTEMI spa

BUREAU VERITAS ITALIA WELDING 18
IT FILE:
DATA:
WITNESSED ☐ REVIEW ☒

**ING. MARCO CASARIL**
**RESPONSABILE DEL LABORATORIO**
**TECHNICAL MANAGER**

**FIRMATO DIGITALMENTE**
**DIGITALLY SIGNED**

**Operatore:** / ***Operator:*** I.SATTOLO Lev. II
**Data esecuzione:** / ***Date of execution:*** 07/02/2022
**Presso:** / ***At:*** Lab. OMECO-Monza

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*This document concerns only the sample submitted to the test. The sampling operations were performed by the Customer. The test results refers to the sample as received.The Laboratory is not responsible for the data supplied by the Customer*
Tempo di conservazione dei campioni dalla data di emissione del documento: 30 gg.
*The samples have to be kept, after the issue of the document): 30 days*
Tempo di conservazione delle registrazioni tecniche: 10 anni / *Technical recordings are kept:10 years*


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Tel. 0399418049 - Fax 0399418051

I-24061 ALBANO S. ALESSANDRO (BG)
Via Madonna delle Rose, 56
Tel. 035581016 (r.a.) - Fax 035580153


| RAPPORTO DI PROVA / *TEST REPORT*<br>ESAME CON LIQUIDI PENETRANTI<br>*PENETRANT TESTING* | | | | Rif. OMECO: 0067/22<br>*OMECO Ref.:* | Pag. 2 di 2<br>*Page 2 of 2* |
|---|---|---|---|---|---|
| **Numero:**<br>***Number:*** | SND/0127/22 | del<br>*date* | 11/02/2022 | **Rif. CLIENTE:**<br>***CUSTOMER Ref.:*** | ORD.220077 - 13/01/2022<br>Comm. X057-21X |

| | | | | | |
|---|---|---|---|---|---|
| **Fornitore:**<br>*Manufacturer:* | NDT ITALIANA | | | | |
| **Pulitore iniziale:**<br>*Pre-cleaner:* | BC1 | **Bagno n°**<br>*Batch n°* | B190717s | **Tempo di asciugatura:**<br>*Drying time:* | 5' |
| **Penetrante:**<br>*Penetrant:* | K71B2p | **Bagno n°**<br>*Batch n°* | 171002Ps | **Tempo di penetrazione:**<br>*Penetration time:* | 20' |
| **Asportatore:**<br>*Remover:* | Acqua<br>*Water* | **Bagno n°**<br>*Batch n°* | --- | **Tempo di asciugatura:**<br>*Drying time:* | 5' |
| **Rivelatore:**<br>*Developer:* | D112A | **Bagno n°**<br>*Batch n°* | 190725W150s | **Tempo di rivelazione:**<br>*Developing time:* | 10' |
| **Pulizia dopo il controllo:**<br>*Post cleaning:* | --- | | | | |

**Risultati:** Nessuna indicazione da registrare
***Test results:*** *No relevant indications were noticed*

**Valutazione:** ACCETTABILE
***Evaluation:*** *ACCEPTABLE*

*Fine documento / Document end*

BUREAU VERITAS ITALIA WELDING 18
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DATA:
WITNESSED ☐ REVIEW ☑

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**RAPPORTO DI PROVA**
***TEST REPORT***

**Numero:** SAM/0056/22 del 15/02/2022
***Number:*** *date*
**Rif. OMECO:** 0067/22 Pag. 1 di 3
***OMECO Ref.:*** *Page 1 of 3*
**Rif. CLIENTE:** ORD.220077 - 13/01/2022
***CUSTOMER Ref.:*** Comm. X057-21X

**ALEX-SISTEMI S.P.A.**
VIA EMILIA, 10
20010 OSSONA MI

Dati forniti dal Cliente / *Data supplied by the Customer:*

**Campione:** GIUNTO SALDATO AD ANGOLO (F.W.) TIPO LAMIERA Sp. 6 mm DICHIARATO IN EN 10025-2:2019 S355J2 PER QUALIFICA DEL PROCEDIMENTO DI SALDATURA E DEL SALDATORE (AWS D1.1/D1.1M:2020)
***Sample:*** *WELDED TEST COUPON (F.W.) PLATE Thk 6 mm DECLARED AS EN 10025-2:2019 S355J2 FOR WELDING PROCEDURE AND PERFORMANCE QUALIFICATION (AWS D1.1/D1.1M:2020)*

| **Identificazione:** ***Identification:*** | **PQR** | **Nome Saldatore** ***Welder's name*** | **Processo** ***Process*** | **Posizione** ***Position*** |
|---|---|---|---|---|
| 1 – DB | RS 07 | DANIELE BAROLI | GMAW | 4F |

**Data ricevimento:** 17/01/2022
***Date of receipt:***

ALEXSISTEMI spa

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**ING. MARCO CASARIL**
**RESPONSABILE DEL LABORATORIO**
**TECHNICAL MANAGER**

**FIRMATO DIGITALMENTE**
**DIGITALLY SIGNED**

**Data esecuzione:** 15/02/2022 **Presso:** Lab. OMECO-Monza
***Date of execution:*** ***At:***

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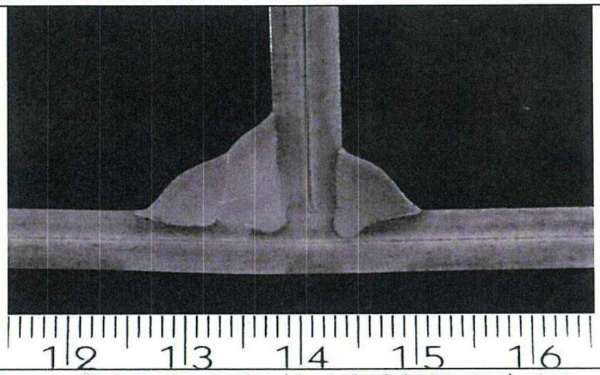
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| RAPPORTO DI PROVA<br>*TEST REPORT* | Rif. OMECO: 0067/22 Pag. 2 di 3<br>*OMECO Ref.:* *Page 2 of 3* |
|---|---|
| **Numero:** SAM/0056/22 del 15/02/2022<br>***Number:*** *date:* | **Rif. CLIENTE:** Comm. X057-21X<br>***CUSTOMER Ref.:*** |

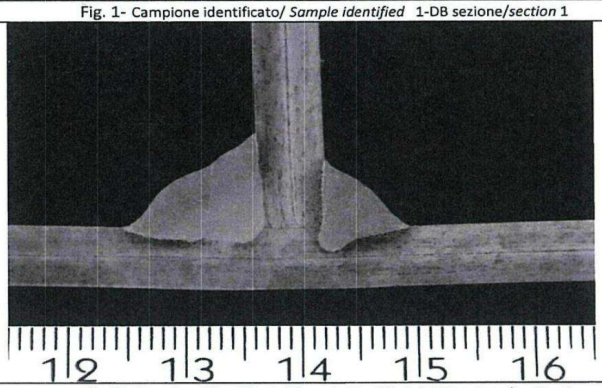
**ESAME MACROSCOPICO**
*MACROSCOPIC EXAMINATION*

| | | | |
|---|---|---|---|
| Metodo di Prova: *Test Method:* | ASTM E340-15 | Attacco: *Etching:* | Nitac 10% |
| Campione N°: *Specimen N°:* | 1-DB | Posizione: *Position:* | Trasversale alla saldatura *Trasversal of the weld* |




Assenza di difetti di origine metallurgica
Absence of metallurgical defects

Fig. 1- Campione identificato/ *Sample identified* 1-DB sezione/*section* 1 | 1 DIV=1 mm | X 2.0




Assenza di difetti di origine metallurgica
Absence of metallurgical defects

Fig. 2- Campione identificato/ *Sample identified* 1-DB sezione/*section* 2 | 1 DIV=1 mm | X 2.0

| | | |
|---|---|---|
| Nota: *Note:* | None | |
| Apparecchiatura: *Equipment:* | SAM-0281 | Macchina fotografica – Camera |
| Tecnico: *Technician:* | P.Inzani | |

ALEXSISTEMI spa

BUREAU VERITAS ITALIA WELDING 18
IT FILE:
DATA:
WITNESSED ☒ REVIEW ☐


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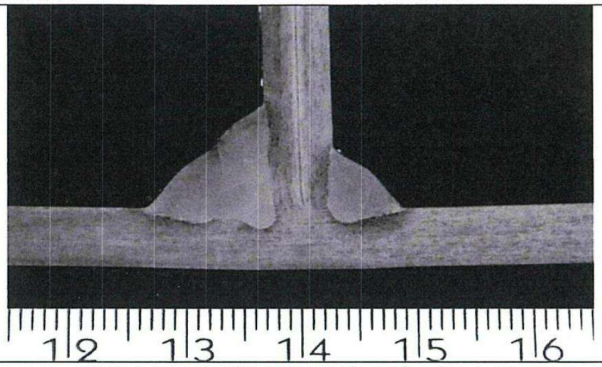
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| RAPPORTO DI PROVA<br>*TEST REPORT* | **Rif. OMECO:** 0067/22 Pag. 3 di 3<br>***OMECO Ref.:*** *Page 3 of 3* |
|---|---|
| **Numero:** SAM/0056/22 del 15/02/2022<br>***Number:*** *date:* | **Rif. CLIENTE:** Comm. X057-21X<br>***CUSTOMER Ref.:*** |

**ESAME MACROSCOPICO**
*MACROSCOPIC EXAMINATION*

| | | | |
|---|---|---|---|
| Metodo di Prova:<br>*Test Method:* | **ASTM E340-15** | Attacco:<br>*Etching:* | Nitac 10% |
| Campione N°:<br>*Specimen N°:* | 1-DB | Posizione:<br>*Position:* | Trasversale alla saldatura<br>*Trasversal of the weld* |




Assenza di difetti di origine metallurgica
Absence of metallurgical defects

Fig. 3- Campione identificato/ *Sample identified* 1-DB sezione/*section* 3 | 1 DIV=1 mm | X 2.0

| | |
|---|---|
| Nota:<br>*Note:* | None |
| Apparecchiatura:<br>*Equipment:* | SAM-0281 Macchina fotografica – Camera |
| Tecnico:<br>*Technician:* | P.Inzani |

*Fine documento / Document end*

BUREAU VERITAS ITALIA WELDING 18
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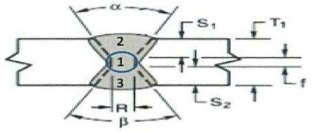

PSQ-014/1 Rev.5

| ALEX SISTEMI SPA | PROCEDURE QUALIFICATION RECORD<br>PQR according AWS D1.1/D1.1-2020<br>Annex M – FORM M-1 (Front) | PQR N° RS 08 | Sheet 1 of 2 |
|---|---|---|---|
| | | Rev. 0 | Date: |
| | | WPS N° RS 08 | 22/02/2022 |

| Base Metals | Specification | Type or Grade | AWS Group N. | Thickness (mm) | Size (NPS) | Schedule | Diameter (mm) |
|---|---|---|---|---|---|---|---|
| Base Material | EN 10025-2 | S355J2+N | N.A. | 6 | | | |
| Welded To | EN 10025-2 | S355J2+N | N.A. | 6 | | | |
| Backing Material | | | | | | | |
| Other | | | | | | | |

| JOINT DETAILS | |
|---|---|
| Groove Type | Butt Joint Complete Penetration |
| Groove Angle | 60° |
| Root Opening | 2,5 |
| Root Face | 1,0 |
| Backgouging | Yes |
| Method | Gringing to sound metal |

JOINT DETAILS (sketch)




| POST WELD HEAT TREATMENT | |
|---|---|
| Temperature | N.A. |
| Time and Temperature | N.A. |
| Other | |

| PROCEDURE | | | | | | |
|---|---|---|---|---|---|---|
| Weld Layer (s) | 3 | | | | | |
| Weld Pass (es) | 3 | | | | | |
| **Process** | GMAW | | | | | |
| Type (*semiautomatic, Mechanized, etc.*) | Semi-automatic | | | | | |
| **Position** | 1G | | | | | |
| Vertical Progression | N.A. | | | | | |
| **Filler Metal (AWS Spec.)** | A5.18 | | | | | |
| AWS Classification | ER70S-6 | | | | | |
| Diameter | 1.2 | | | | | |
| Manufacturer / Trade Name | ELB-SG2 | | | | | |
| **Shielding Gas** Composition | Ar: 80% CO2: 20% | | | | | |
| Flow Rate (L/min) | 14÷16 | | | | | |
| Nozzle Size | - | | | | | |
| **Preheat Temperature** | 10 °C | | | | | |
| Interpass Temperature | ≤ 200°C | | | | | |
| **Electrical Characteristics** | | | | | | |
| Current Type and Polarity | DC Reverse | | | | | |
| Transfer Mode (GMAW) | Pulsed | | | | | |
| Power Source Type (*cc, cv, etc.*) | cc | | | | | |
| Amps | 110 ÷ 120 | | | | | |
| Volts | 22÷23 | | | | | |
| Wire Feed Speed (m/min.) | - | | | | | |
| Travel Speed (mm/min.) | 240 ÷ 270 | | | | | |
| Maximum Heat Input (KJ/mm) | 0.60 ÷ 0.61 | | | | | |
| **Technique** | | | | | | |
| Stringer or Weave | String | | | | | |
| Multi or Single pass (*per side*) | Multi | | | | | |
| Oscillation (*Mechanized/Automatic*) | - | | | | | |
| Traverse Length | - | | | | | |
| Traverse Speed | - | | | | | |
| Dwell Time | - | | | | | |
| Number of Electrodes | 1 | | | | | |
| Contact Tube to work Distance (mm) | 12-15 mm | | | | | |
| Peening | No | | | | | |
| Interpass Cleaning | Brushing and grinding | | | | | |
| Other | - | | | | | |

BUREAU VERITAS ITALIA WELDING 18
IT FILE
DATE
WITNESSED ☒ REVIEW ☐

| ALEX SISTEMI SPA | **PROCEDURE QUALIFICATION RECORD**<br>PQR according AWS D1.1/D1.1-2020<br>Annex M – FORM M-1 (Back)<br>Test Results. | PQR N° RS 08 | Sheet 2 of 2 |
|---|---|---|---|
| | | Rev. 0 | Date: |
| | | WPS N° RS 08 | 22/02/2022 |

| ✓ | Type of Tests | Clause/Figure(s) Reference | Acceptance Criteria | Results | Remarks |
|---|---|---|---|---|---|
| ☑ | Visual Inspection | 6.10.1 | 6.10.1.1 | Satisfactory | Report n° SND/0128/22 |
| ☑ | Radiographic Examination | 6.10.2.1 | 6.10.2.2 | Satisfactory | Report n° SND/0129/22 |
| ☐ | Ultrasonic Testing | 6.10.2.1 | 6.10.2.2 | | |
| ☑ | 2 Transverse Root Bends | 6.10.3.3 | 6.10.3.3 | Satisfactory | Report n° SPT/0133/22 |
| ☑ | 2 Transverse Face Bends | 6.10.3.3 | 6.10.3.3 | Satisfactory | Report n° SPT/0133/22 |
| ☐ | 2 Longitudinal Root Bends | 6.10.3.3 | 6.10.3.3 | | |
| ☐ | 2 Longitudinal Face Bends | 6.10.3.3 | 6.10.3.3 | | |
| ☐ | 2 Side Bends | 6.10.3.3 | 6.10.3.3 | | |
| ☐ | 4 Side Bends | 6.10.3.3 | 6.10.3.3 | | |
| ☑ | 2 Tensile Test | 6.10.3.5 | 6.10.3.5 | Satisfactory | Report n° SPT/0133/22 |
| ☐ | 3 Macroetch | 6.10.4.1 | 6.10.4.1 | | |
| ☐ | 4 Macroetch | 6.10.4.1 | 6.10.4.1 | | |
| ☐ | CVN Tests | 6 Part D | 6 Part D | | |
| ☑ | Other test: Penetrant Test | / | / | For Info | Report n° SND/0129/22 |
| ☑ | Other test: Macroetch | / | / | Good Fusion | Report n° SAM/0057/22 |

TENSILE TEST DETAILS

| Specimen Number | Width (mm) | Thickness (mm) | Area (mm²) | Ultimate Tensile Load (N) | Ultimate Unit Stress (MPa) | Type of Failure and Location |
|---|---|---|---|---|---|---|
| 125597 | 19,79 | 5,62 | 111,1 | 57497 | 517 | Ductile fracture – Base material |
| 125598 | 19,76 | 5,70 | 112,6 | 56123 | 498 | Ductile fracture – Base material |
| | | | | | | |
| | | | | | | |

TOUGHNESS TEST DETAILS

| Specimen Number | Notch Location | Specimen Size (mm) | Test Temperature °C | Absorbed Energy (J) | Percent Shear | Lateral Expansion | Average |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
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| CERTIFICATION | | |
|---|---|---|
| Welder's Name | ID Number | Stamp Number |
| SATTI WASEEQ AHMED | | SW |
| | | |

| Tests Conducted By | |
|---|---|
| Laboratory | OMECO |
| Test Number | SPT/0133/22 |
| File Number | |

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Clause 4 of AWS D1.1/D1.1M, (2020) Structural Welding Code—Steel.

BUREAU VERITAS ITALIA WELDING 18
IT FILE
DATE
WITNESSED ☒ REVIEW ☐

| Title | |
|---|---|
| Q.C. Manager | |
| Name | Signature |
| Daniele Sfenopo | ALEXSISTEMI spa |
| Date | |
| 22/02/2022 | |

ALEXSISTEMI spa
GAUDENZIO
WELDING COORDINATOR
O.B.O. ALEX SISTEMI

OMECO
CENTRO RICERCA, PROVE MATERIALI, TARATURE

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**RAPPORTO DI PROVA / *TEST REPORT***
**ESAME VISIVO / *VISUAL TESTING***

**Numero:** *Number:* SND/0128/22 del *date* 14/02/2022
**Rif. OMECO:** *OMECO Ref.:* 0067/22 Pag. 1 di 2 *Page 1 of 2*
**Rif. CLIENTE:** *CUSTOMER Ref.:* ORD.220076 - 13/01/2022 Comm. X068-21X

**ALEX-SISTEMI S.P.A.**
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20010 OSSONA MI

Dati forniti dal Cliente / *Data supplied by the Customer:*

**Campione:** *Sample:* GIUNTO SALDATO TESTA A TESTA (B.W.) TIPO LAMIERA Sp. 6 mm DICHIARATO IN EN 10025-2:2019 S355J2 PER QUALIFICA DEL PROCEDIMENTO DI SALDATURA E DEL SALDATORE (AWS D1.1/D1.1M:2020)
*WELDED TEST COUPON (B.W.) TYPE PLATE Thk 6 mm DECLARED AS EN 10025-2:2019 S355J2 FOR WELDING PROCEDURE AND PERFORMANCE QUALIFICATION (AWS D1.1/D1.1M:2020)*

| **Identificazione:** *Identification:* | **PQR** | **Nome Saldatore** *Welder's name* | **Processo** *Process* | **Posizione** *Position* |
|---|---|---|---|---|
| 2 – SW | RS 08 | SATTI WASEEQ AHMED | GMAW | 1G |

**Data ricevimento:** *Date of receipt:* 17/01/2022

**Norme di prova:** *Test standards:* AWS D1.1/D1.1M:2020 Part C 8.9

**Procedure di prova:** *Test Procedures:* ---

**Accettabilità:** *Acceptance standard:* AWS D1.1/D1.1M:2020 Part C Table 8.1

**Materiale:** (Dati forniti dal Cliente) *Material: (data supplied by the Customer)* EN 10025-2:2019 S355J2

**Zona esaminata:** *Area inspected:* Saldatura *Weld*
**Stato superficiale:** *Surface condition:* Saldato *as welded*

**Estensione del controllo:** *Examination coverage:* 100%

**Modalità di preparazione/pulizia:** *Preparing/Polishment modalities:* ---
**Qualifica del procedimento remoto:** *Remote procedure validation:* ---

**Metodo:** *Methods:* Diretto *Direct*
**Tipo d'illuminazione:** *Illumination type:* Luce artificiale *Artificial light*

**Apparecchiature:** *Equipment:* Calibro per saldature (SND-0974) ; Lampada a luce bianca (SND-0672)
*Weld gauge (SND-0974) ; White light lamp (SND-0672)*

BUREAU VERITAS ITALIA WELDING 18
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ALEX SISTEMI spa

**ING. MARCO CASARIL**
**RESPONSABILE DEL LABORATORIO**
**TECHNICAL MANAGER**

**FIRMATO DIGITALMENTE**
**DIGITALLY SIGNED**

**Operatore:** *Operator:* I.SATTOLO Lev. II

**Data esecuzione:** *Date of execution:* 07/02/2022
**Presso:** *At:* Lab. OMECO - Monza

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I-24061 ALBANO S. ALESSANDRO (BG)
Via Madonna delle Rose, 56
Tel. 035581016 (r.a.) - Fax 035580153


| RAPPORTO DI PROVA / *TEST REPORT*<br>ESAME VISIVO / *VISUAL TESTING* | | | | Rif. OMECO: 0067/22<br>*OMECO Ref.:* | Pag. 2 di 2<br>*Page 2 of 2* |
|---|---|---|---|---|---|
| **Numero:**<br>***Number:*** | SND/0128/22 | del<br>*date* | 11/02/2022 | **Rif. CLIENTE:**<br>***CUSTOMER Ref.:*** | ORD.220077 - 13/01/2022<br>Comm. X057-21X |

**LEGENDA DIFETTOSITA': *LEGENDA:***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sd | Senza difetti apparenti<br>*No apparent defect* | 100 | Cricca<br>*Crack* | 104 | Cricca di cratere<br>*Crater crack* | | |
| 2017 | Pori superficiali<br>*Surface pores* | 2025 | Cavità di cratere terminale<br>*End crater pipe* | 401 | Mancanza di fusione<br>*Lack of fusion* | 4021 | Penetrazione al vertice incompleta<br>*Incomplete root penetration* |
| 502 | Sovrammetallo eccessivo<br>*Excess weld metal* | 503 | Convessità eccessiva<br>*Excessive convexity* | 504 | Eccesso di penetrazione *Excess penetration* | 505 | Raccordo difettoso<br>*Incorrect weld toe* |
| 506 | Traboccamento<br>*Overlap* | 509 | Avvallamento<br>*Sagging* | 5011<br>5012<br>5013 | Incisioni<br>*Undercuts / grooves* | 510 | Sfondamento<br>*Burn through* |
| 511 | Riempimento incompleto<br>*Incompletely filled groove* | 512 | Asimmetria eccessiva<br>*Excessive asymmetry* | 515 | Insellamento al vertice<br>*Root concavity* | 516 | Porosità/spugnosità al vertice (fioritura)<br>*Root porosity* |
| 517 | Ripresa difettosa<br>*Poor restart* | 5213 | Altezza di gola insufficiente<br>*Insufficient/ throat thickness* | 5214 | Altezza di gola eccessiva<br>*Excessive throat thickness* | 601 | Colpo d'arco<br>*Stray arc* |
| 602 | Spruzzo<br>*Spatter* | 610 | Discolorazione<br>*Discolouration* | | | | |

AC = Accettabile / *Acceptable* NA = Non Accettabile / *Not Acceptable*

| Identificazione *Identification* | Sd | 100 | 104 | 2017 | 2025 | 401 | 4021 | 502 | 503 | 504 | 505 | 506 | 509 | 5011 5012 5013 | 510 | 511 | 512 | 515 | 516 | 517 | 5213 | 5214 | 601 | 602 | 610 | Valutazione *Evaluation* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***2 - SW*** | X | | | | | | | | | | | | | | | | | | | | | | | | | AC |

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**RAPPORTO DI PROVA / *TEST REPORT***
**CONTROLLO RADIOGRAFICO**
***RADIOGRAPHIC TESTING***

**Numero:** / ***Number:*** SND/0129/22 del / *date* 14/02/2022
**Rif. OMECO:** / ***OMECO Ref.:*** 0067/22 Pag. 1 di 2 / *Page 1 of 2*
**Rif. CLIENTE:** / ***CUSTOMER Ref.:*** ORD.220076 - 13/01/2022 Comm. X068-21X

**ALEX-SISTEMI S.P.A.**
VIA EMILIA, 10
20010 OSSONA MI

Dati forniti dal Cliente / *Data supplied by the Customer:*

**Campione:** / ***Sample:*** GIUNTO SALDATO TESTA A TESTA (B.W.) TIPO LAMIERA Sp. 6 mm DICHIARATO IN EN 10025-2:2019 S355J2 PER QUALIFICA DEL PROCEDIMENTO DI SALDATURA E DEL SALDATORE (AWS D1.1/D1.1M:2020) / *WELDED TEST COUPON (B.W.) PLATE Thk 6 mm DECLARED AS EN 10025-2:2019 S355J2 FOR WELDING PROCEDURE AND PERFORMANCE QUALIFICATION (AWS D1.1/D1.1M:2020)*

| Identificazione: / *Identification:* | PQR | Nome Saldatore / *Welder's name* | Processo / *Process* | Posizione / *Position* |
|---|---|---|---|---|
| 2 – SW | RS 08 | SATTI WASEEQ AHMED | GMAW | 1G |

**Data ricevimento:** / ***Date of receipt:*** 17/01/2022
**Norme di prova:** / *Test standards:* AWS D1.1/D1.1M : 2020 Part E 8.16
**Procedure di prova:** / *Test Procedures:* ---
**Accettabilità:** / *Acceptance standard:* AWS D1.1/D1.1M : 2020 Part C 8.12

**Materiale:** (Dati forniti dal Cliente) / *Material: (data supplied by the Customer)* EN 10025-2:2019 S355J2

**Zona esaminata:** / *Area inspected:* Saldatura / *Weld*
**Estensione dell'esame:** / *Examination coverage:* 100%
**Spessore nominale:** / *Nominal Thickness:* 6 mm
**Stato superficiale:** / *Surface condition:* Saldato / *Welded*
**Processo di saldatura:** / *Welding process:* GMAW
**Spessore metallo d'apporto:** / *Weld metal thickness:* 7 mm

**Apparecchiatura:** / *Source:* Seifert Eresco 42MF4 (SND-0881)
**Dimensione max macchia focale (mm) :** / *Source Size max (mm) :* 3.0
**Tipo di radiazioni:** / *Radiation energy:* Raggi X / *X Ray*
**Attività (Gbq):** / *Activity (GBq):* ---

**Pellicole:** / *Films:* Agfa Gevaert D4 (10x48) FW
**Schermi:** / *Screens:* Pb
**Anteriore (mm):** / *Front (mm):* 0.027
**Trattamento:** / *Processing:* Automatico / *Automatic*
**Posteriore (mm):** / *Back (mm):* 0.027

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**ING. MARCO CASARIL**
**RESPONSABILE DEL LABORATORIO**
**TECHNICAL MANAGER**

**FIRMATO DIGITALMENTE**
**DIGITALLY SIGNED**

**Operatore:** / ***Operator:*** M.ROSESTOLATO Lev. II
**Data esecuzione:** / ***Date of execution:*** 07/02/2022
**Presso:** / ***At:*** Lab. OMECO - Monza

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**RAPPORTO DI PROVA / *TEST REPORT***
**CONTROLLO RADIOGRAFICO**
***RADIOGRAPHIC TESTING***

**Numero:** ***Number:*** SND/0129/22 del *date* 11/02/2022

**Rif. OMECO:** ***OMECO Ref.:*** 0067/22 — Pag. 2 di 2 / *Page 2 of 2*

**Rif. CLIENTE:** ***CUSTOMER Ref.:*** ORD.220077 - 13/01/2022 Comm. X057-21X

| Tecnica esposizione *Radiographic technique* | | Penetrametro *Penetrameter* | | D (1) | d (2) | SDF (3) | Ug | Parametri *Parameters* | | Tempo Esp. *Exposure time* | Densità (4) *Films density* | | Sensibilità *Sensitivity* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tipo ripresa *Technique* | Film *Films* | Tipo *Type* ASTM | Lato *Side* | | | | | Tensione *Voltage* | Corrente *Current* | | | | Richiesto *Required* | Ottenuto *Obtained* |
| | | | | mm | mm | mm | mm | kV | mA | min. | min. | max | Filo N. *Wire N.* | |
| Fig. 1 | *Singolo Single* | 1A6 | Sorgente *Source* | 694 | 6 | 700 | 0.07 | 120 | 7.5 | 2' 00" | 2.2 | 2.8 | 5 | 5 |

(1) Distanza minima sorgente/oggetto
*(1) Minimum source-to-object distance*
(2) Massima distanza dalla superficie dell'oggetto (lato sorgente) al film alla minima distanza sorgente-oggetto
*(2) Maximum distance from source side of object to the film at minimum source-object distance*
(3) Distanza fuoco-film
*(3) Source-film distance*
(4) Densità misurata su film singolo
*(4) Films density measured on single film*

***LEGENDA:***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sd** | Senza difetti apparenti *No apparent defect* | **100** | Cricca *Crack* | **2011 2012 2013** | Porosità *Gas porosity* | **2015 2016** | Cavità allungate, Tarli *Elongated cavity, Worm-hole* |
| **202** | Cavità di ritiro *Shrinkage cavity* | **301** | Inclusioni di scoria *Slag inclusions* | **3041** | Inclusioni di Tungsteno *Tungsten inclusion* | **401** | Mancanza di fusione *Lack of fusion* |
| **402** | Mancanza di penetrazione *Lack of penetration* | **501** | Incisioni *Undercut* | **504** | Eccessiva penetrazione *Excessive penetration* | **511** | Riempimento incompleto *Incompletely filled groove* |
| **515** | Insellamento al vertice *Root concavity* | **601** | Colpi d'arco *Arc strike* | **Fd** | Difetti film *Film defects* | | |

AC = Accettabile / *Acceptable* NA = Non Accettabile / *Not Acceptable*

*Marcature in piombo lato sorgente, riportate in modo permanente sul campione a cura della Committente*
*Permanent marking of the film references (lead references, side film) at Customer charge*

| Contras. films *Film Ref.* | Ripresa *Technique* | Sd | 100 | 2011 - 2012 2013 | 2015 - 2016 | 202 | 301 | 3041 | 401 | 402 | 501 | 504 | 511 | 515 | 601 | Fd | | Valutazione *Evaluation* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***2 - SW*** | | | | | | | | | | | | | | | | | | |
| *1 – 2* | Fig. 1 | | | X | | | | | | | | | | | | | | AC |

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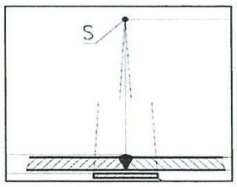



Fig. 1

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**RAPPORTO DI PROVA**
***TEST REPORT***

**Numero:** SPT/0133/22 del 14/02/2022
***Number:*** *date*
**Rif. OMECO:** 0067/22 Pag. 1 di 2
***OMECO Ref.:*** *Page 1 of 2*
**Rif. CLIENTE:** ORD.220076 - 13/01/2022
***CUSTOMER Ref.:*** Comm. X068-21X

**ALEX-SISTEMI S.P.A.**
VIA EMILIA, 10
20010 OSSONA MI

Dati forniti dal Cliente / *Data supplied by the Customer:*

**Campione:** GIUNTO SALDATO TESTA A TESTA (B.W.) TIPO LAMIERA Sp. 6 mm DICHIARATO IN EN 10025-2:2019 S355J2 PER QUALIFICA DEL PROCEDIMENTO DI SALDATURA E DEL SALDATORE (AWS D1.1/D1.1M:2020)
***Sample:*** *WELDED TEST COUPON (B.W.) PLATE Thk 6 mm DECLARED AS EN 10025-2:2019 S355J2 FOR WELDING PROCEDURE AND PERFORMANCE QUALIFICATION (AWS D1.1/D1.1M:2020)*

| **Identificazione:** ***Identification:*** | **PQR** | **Nome Saldatore** ***Welder's name*** | **Processo** ***Process*** | **Posizione** ***Position*** |
|---|---|---|---|---|
| 2 – SW | RS 08 | SATTI WASEEQ AHMED | GMAW | 1G |

**Data ricevimento:** 17/01/2022
***Date of receipt:***

**PROVA DI TRAZIONE TRASVERSALE ALLA SALDATURA**
***TRANSVERSAL-WELD TENSILE TESTING***
***AWS D1.1/D1.1M:2020***

| Identif. N. *Identif. N.* | Dimens. Provetta *Specimen dimens.* (mm) | Area Sezione *Cross Section* (mm²) | Temperatura *Temperature* (°C) | Carico di rottura *Tensile Strength* | | Posizione di rottura e tipo *Break Position and type* |
|---|---|---|---|---|---|---|
| | | | | Totale / *Total* (N) | Rm (N/mm²) | |
| | | | | | ≥ 470 | |
| 2 – SW | 5.62 x 19.79 | 111.2 | +20 | 57497 | 517 | M.B. - Duttile *B.M. - Ductile* |
| 2 - SW | 5.70 x 19.76 | 112.6 | +20 | 56123 | 498 | M.B. - Duttile *B.M. - Ductile* |

**Apparecchiature:** ***Equipments:***
Macchina prove materiali identificata / *Universal machine identified* SPT-0010
Calibro identificato / Caliper identified SPT-0335

**Tecnico/i:** ***Technician/s:*** L. BAI

BUREAU VERITAS ITALIA WELDING 18
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**ING. MARCO CASARIL**
**RESPONSABILE DEL LABORATORIO**
**TECHNICAL MANAGER**

**FIRMATO DIGITALMENTE**
**DIGITALLY SIGNED**
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**Data esecuzione:** 14/02/2022 **Presso:** Lab. OMECO - Monza
***Date of execution:*** ***At:***

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|---|---|
| **Numero:** SPT/0133/22 del 14/02/2022<br>***Number:*** *date:* | **Rif. CLIENTE:** Comm. X068-21X<br>***CUSTOMER Ref.:*** |

| | PROVA DI PIEGA<br>*BEND TEST*<br>*AWS D1.1/D1.1M:2020* | | | | | | |
|---|---|---|---|---|---|---|---|
| Identif. N.<br>*Identif. N.* | Dimensione provino<br>*Specimen dimensions (mm)* | Ø Mandrino<br>*Ø Former (mm)* | Distanza tra i rulli<br>*Distance between rollers (mm)* | Angolo<br>*Curvature (α°)* | Senso di piegamento<br>*Bend Test* | Risultati<br>*Results* | Valutazione<br>*Evaluation AWS D1.1/D1.1M:2020* |
| 2 – SW | 40 x Sp<br>40 *x Thk* | 24 | 39 | 180 | DIRITTO<br>*FACE* | Nessuna indicazione da registrare<br>*No relevant indications were noticed* | CONFORME<br>*SATISFACTORY* |
| 2 - SW | 40 x Sp<br>40 *x Thk* | 24 | 39 | 180 | DIRITTO<br>*FACE* | Nessuna indicazione da registrare<br>*No relevant indications were noticed* | CONFORME<br>*SATISFACTORY* |
| 2 – SW | 40 x Sp<br>40 *x Thk* | 24 | 39 | 180 | ROVESCIO<br>*ROOT* | Nessuna indicazione da registrare<br>*No relevant indications were noticed* | CONFORME<br>*SATISFACTORY* |
| 2 - SW | 40 x Sp<br>40 *x Thk* | 24 | 39 | 180 | ROVESCIO<br>*ROOT* | Nessuna indicazione da registrare<br>*No relevant indications were noticed* | CONFORME<br>*SATISFACTORY* |

| | | |
|---|---|---|
| **Apparecchiature:**<br>***Equipments:*** | Macchina prove materiali identificata<br>*Universal machine identified* | SPT-0007 |
| | Calibro identificato<br>Caliper identified | SPT-0335 |
| **Tecnico/i:**<br>***Technician/s:*** | L. BAI | |

*Fine documento / Document end*

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Tel. 0399418049 - Fax 0399418051

I-24061 ALBANO S. ALESSANDRO (BG)
Via Madonna delle Rose, 56
Tel. 035581016 (r.a.) - Fax 035580153


**RAPPORTO DI PROVA**
***TEST REPORT***

**Numero:** *Number:* SAM/0057/22 del *date* 15/02/2022
**Rif. OMECO:** *OMECO Ref.:* 0067/22 Pag. 1 di 2 *Page 1 of 2*
**Rif. CLIENTE:** *CUSTOMER Ref.:* ORD.220076 - 13/01/2022 Comm. X068-21X

**ALEX-SISTEMI S.P.A.**
VIA EMILIA, 10
20010 OSSONA MI

Dati forniti dal Cliente / *Data supplied by the Customer:*

**Campione:** GIUNTO SALDATO TESTA A TESTA (B.W.) TIPO LAMIERA Sp. 6 mm DICHIARATO IN EN 10025-2:2019 S355J2 PER QUALIFICA DEL PROCEDIMENTO DI SALDATURA E DEL SALDATORE (AWS D1.1/D1.1M:2020)
***Sample:*** *WELDED TEST COUPON (B.W.) PLATE Thk 6 mm DECLARED AS EN 10025-2:2019 S355J2 FOR WELDING PROCEDURE AND PERFORMANCE QUALIFICATION (AWS D1.1/D1.1M:2020)*

| **Identificazione:** *Identification:* | PQR | **Nome Saldatore** *Welder's name* | **Processo** *Process* | **Posizione** *Position* |
|---|---|---|---|---|
| 2 – SW | RS 08 | SATTI WASEEQ AHMED | GMAW | 1G |

**Data ricevimento:** *Date of receipt:* 17/01/2022

BUREAU VERITAS ITALIA WELDING 18
IT FILE:
DATA:
WITNESSED ☒ REVIEW ☐

**ING. MARCO CASARIL**
**RESPONSABILE DEL LABORATORIO**
**TECHNICAL MANAGER**

**FIRMATO DIGITALMENTE**
**DIGITALLY SIGNED**
ALEX SISTEMI SRL

**Data esecuzione:** *Date of execution:* 15/02/2022 **Presso:** *At:* Lab. OMECO-Monza

Questo documento riguarda solo il campione sottoposto a prova. Il campionamento è stato effettuato a cura del Cliente. I risultati si riferiscono al campione così come ricevuto. Il Laboratorio non è responsabile dei dati forniti dal Cliente.
*This document concerns only the sample submitted to the test. The sampling operations were performed by the Customer. The test results refers to the sample as received.The Laboratory is not responsible for the data supplied by the Customer*

Tempo di conservazione dei campioni dalla data di emissione del documento: 30 gg.
*The samples have to be kept, after the issue of the document): 30 days*
Tempo di conservazione delle registrazioni tecniche: 10 anni / *Technical recordings are kept:10 years*


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PSQ-014/1 Rev.5

OMECO
CENTRO RICERCA, PROVE MATERIALI, TARATURE

**Sede Centrale, Amministrativa e Laboratori:**
**Headquarter and Laboratories:**
I-20900 MONZA (MB) - Via Monviso, 56
Tel. 039748983 (r.a.) - Fax 039736433
www.omecosrl.it - E-mail: direzione@omecosrl.it - omeco@pec.omecosrl.eu

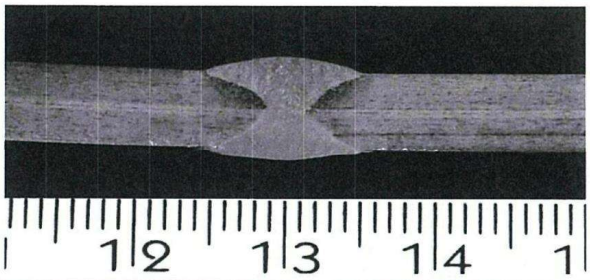
**Sedi distaccate e Laboratori:**
**Branches:**
I-20835 MUGGIÒ (MB)
Via Milano, 4
Tel. 0399418049 - Fax 0399418051

I-24061 ALBANO S. ALESSANDRO (BG)
Via Madonna delle Rose, 56
Tel. 035581016 (r.a.) - Fax 035580153


| RAPPORTO DI PROVA<br>*TEST REPORT* | Rif. OMECO: 0067/22 Pag. 2 di 2<br>*OMECO Ref.:* *Page 2 of 2* |
|---|---|
| **Numero:** SAM/0057/22 del 15/02/2022<br>***Number:*** *date:* | **Rif. CLIENTE:** Comm. X068-21X<br>***CUSTOMER Ref.:*** |

**ESAME MACROSCOPICO**
*MACROSCOPIC EXAMINATION*

| | | | |
|---|---|---|---|
| Metodo di Prova:<br>*Test Method:* | **ASTM E340-15** | Attacco:<br>*Etching:* | Nitac 10% |
| Campione N°:<br>*Specimen N°:* | 2-SW | Posizione:<br>*Position:* | Trasversale alla saldatura<br>*Trasversal of the weld* |




Assenza di difetti di origine metallurgica
Absence of metallurgical defects

Fig. 1- Campione identificato/ *Sample identified* 2-SW | 1 DIV=1 mm | X 2.6

| | | |
|---|---|---|
| Nota:<br>*Note:* | None | |
| Apparecchiatura:<br>*Equipment:* | SAM-0281 | Macchina fotografica – Camera |
| Tecnico:<br>*Technician:* | P.Inzani | |

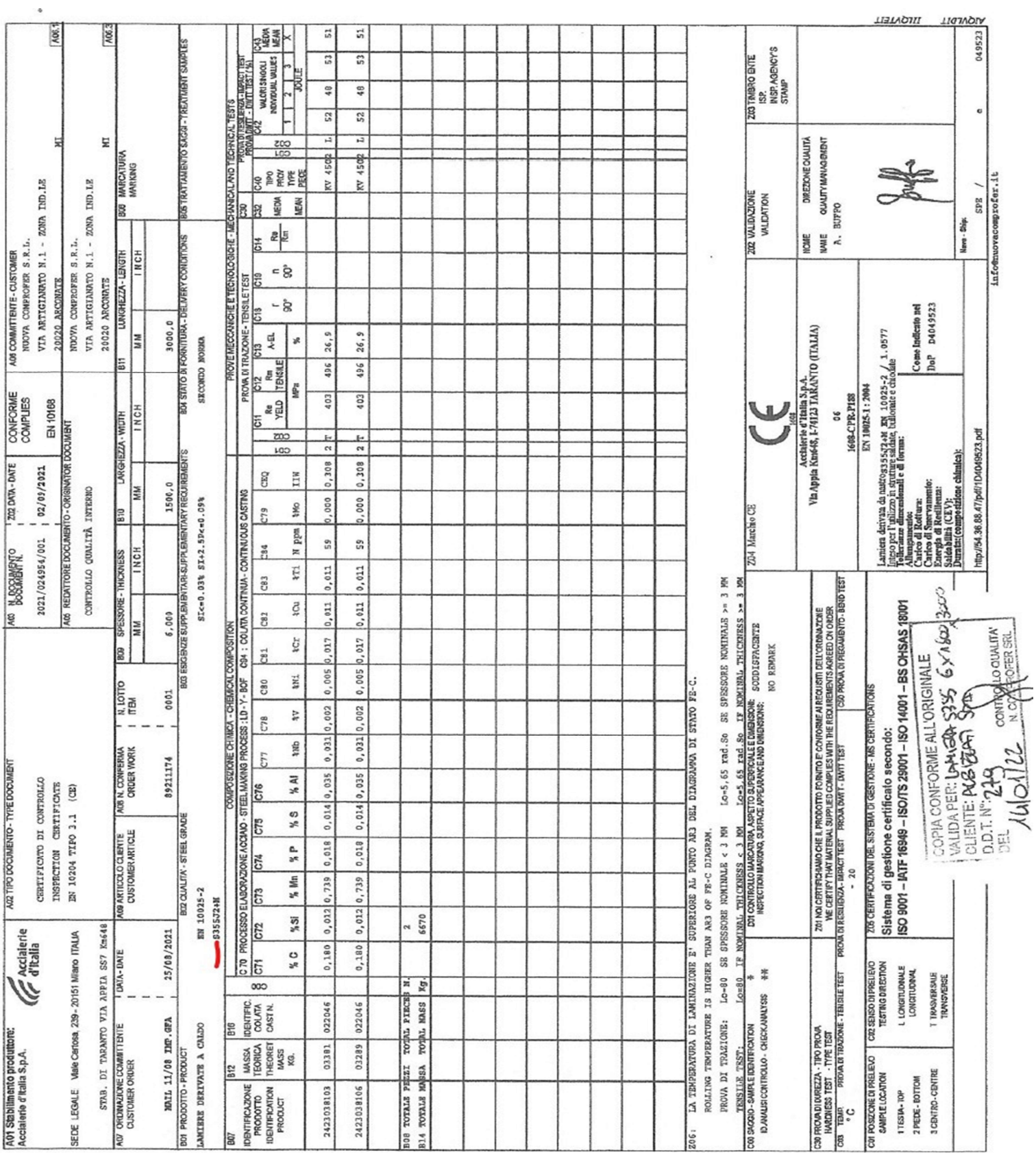
*Fine documento / Document end*

BUREAU VERITAS ITALIA WELDING 18
IT FILE:
DATA:
WITNESSED ☒ REVIEW ☐

ALEXSISTEMI spa


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PSQ-014/1 Rev.5


A01 Stabilimento produttore: Acciaierie d'Italia S.p.A.
Acciaierie d'Italia
A02 TIPO DOCUMENTO - TYPE DOCUMENT
CERTIFICATO DI CONTROLLO
INSPECTION CERTIFICATE
EN 10204 TIPO 3.1 (CE)
A03 N. DOCUMENTO DOCUMENT N.
2021/024954/001
202 DATA - DATE
02/09/2021
CONFORME COMPLIES
EN 10168
A05 COMMITTENTE - CUSTOMER
NUOVA COMPROPER S.R.L.
VIA ARTIGIANATO N.1 - ZONA IND.LE
20020 ARCONATE MI
A06 REDATTORE DOCUMENTO - ORIGINATOR DOCUMENT
CONTROLLO QUALITÀ INTERNO
A07 ORDINAZIONE COMMITTENTE CUSTOMER ORDER
MAIL 11/08 INF.OFA
A08 ARTICOLO CLIENTE CUSTOMER ARTICLE
A09 N. CONFERMA ORDER WORK
89211174
N. LOTTO ITEM
0001
B09 SPESSORE - THICKNESS
6,000
B10 LARGHEZZA - WIDTH
1506,0
B11 LUNGHEZZA - LENGTH
3000,0
B08 MARCATURA MARKING
B01 PRODOTTO - PRODUCT
LAMIERE DERIVATE A CALDO
B02 QUALITA' - STEEL GRADE
EN 10025-2
S355J2+N
B05 ESIGENZE SUPPLEMENTARI - SUPPLEMENTARY REQUIREMENTS
S1c=0.03% S1+2.5Pc=0.09%
B04 STATO DI FORNITURA - DELIVERY CONDITIONS
SECONDO NORMA
B06 TRATTAMENTO SAGGI - TREATMENT SAMPLES
B07 IDENTIFICAZIONE PRODOTTO IDENTIFICATION PRODUCT
B12 MASSA TEORICA THEORET MASS KG.
B10 IDENTIFIC. COLATA CAST N.
C70 PROCESSO ELABORAZIONE ACCIAIO - STEEL MAKING PROCESS : LD-Y-BOF
C94 : COLATA CONTINUA - CONTINUOUS CASTING
COMPOSIZIONE CHIMICA - CHEMICAL COMPOSITION
PROVE MECCANICHE E TECNOLOGICHE - MECHANICAL AND TECHNICAL TESTS
PROVA DI TRAZIONE - TENSILE TEST
PROVA DI RESILIENZA - IMPACT TEST (*)
2423038103 03381 022046 0,180 0,012 0,739 0,018 0,014 0,035 0,031 0,002 0,005 0,017 0,011 0,011 59 0,000 0,308 2 T 403 496 26,9 KV 45Q2 L 52 48 53 51
2423038106 03289 022046 0,180 0,012 0,739 0,018 0,014 0,035 0,031 0,002 0,005 0,017 0,011 0,011 59 0,000 0,308 2 T 403 496 26,9 KV 45Q2 L 52 48 53 51
B08 TOTALE PEZZI TOTAL PIECES N. 2
B14 TOTALE MASSA TOTAL MASS Kg. 6670
Z06: LA TEMPERATURA DI LAMINAZIONE E' SUPERIORE AL PUNTO AR3 DEL DIAGRAMMA DI STATO FE-C.
ROLLING TEMPERATURE IS HIGHER THAN AR3 OF FE-C DIAGRAM.
PROVA DI TRAZIONE: Lo=80 SE SPESSORE NOMINALE < 3 MM Lo=5,65 rad.So SE SPESSORE NOMINALE >= 3 MM
TENSILE TEST: Lo=80 IF NOMINAL THICKNESS < 3 MM Lo=5,65 rad.So IF NOMINAL THICKNESS >= 3 MM
C00 SAGGIO - SAMPLE IDENTIFICATION * D3 CONTROLLO MARCATURA, ASPETTO SUPERFICIALE E DIMENSIONI: SODDISFACENTE
D. ANALISI CONTROLLO - CHECK ANALYSIS ** INSPECTION MARKING, SURFACE APPEARANCE AND DIMENSIONS: NO REMARK
Z04 Marchio CE
Z02 VALIDAZIONE VALIDATION
Z03 TIMBRO ENTE ISP. INSP. AGENCY'S STAMP
Acciaierie d'Italia S.p.A.
Via Appia Km648, I-74123 TARANTO (ITALIA)
06
1698-CPR-P188
EN 10025-1 : 2004
Lamiera derivata da nastro S355J2+N EN 10025-2 / 1.0577
Idoneo per l'utilizzo in strutture saldate, bullonate e chiodate
Tolleranze dimensionali e di forma:
Allungamento:
Carico di Rottura:
Carico di Snervamento:
Energia di Resilienza:
Saldabilità (CEV):
Durata: (composizione chimica):
Come indicato nel DoP D4049523
NOME DIREZIONE QUALITÀ
NAME QUALITY MANAGEMENT
A. BUFFO
Note - Ship.
SP2 / e 049523
http://84.36.88.47/pdf/1D/0495523.pdf
Z05 CERTIFICAZIONI DEL SISTEMA DI GESTIONE - MS CERTIFICATIONS
Sistema di gestione certificato secondo:
ISO 9001 – IATF 16949 – ISO/TS 29001 – ISO 14001 – BS OHSAS 18001
Z01 NOI CERTIFICHIAMO CHE IL PRODOTTO FORNITO E' CONFORME AI REQUISITI DELL'ORDINAZIONE
WE CERTIFY THAT MATERIAL SUPPLIED COMPLIES WITH THE REQUIREMENTS AGREED ON ORDER
C03 TEMP. °C PROVA DI TRAZIONE - TENSILE TEST PROVA DI RESILIENZA - IMPACT TEST PROVA DWTT - DWTT TEST - 20 C00 PROVA DI PIEGAMENTO - BEND TEST
C00 POSIZIONE DI PRELIEVO SAMPLE LOCATION 1 TESTA - TOP 2 PIEDE - BOTTOM 3 CENTRO - CENTRE
C02 SENSO DI PRELIEVO TESTING DIRECTION L LONGITUDINALE LONGITUDINAL T TRASVERSALE TRANSVERSE
C00 PROVA DI DUREZZA - TIPO PROVA HARDNESS TEST - TYPE TEST
COPIA CONFORME ALL'ORIGINALE
VALIDA PER: LAMIERA S355 6 x 1500 x 3000
CLIENTE: ROSETTI SPA
D.D.T. N°: 249 DEL 31/08/22
CONTROLLO QUALITA' N. CATALFOFER SRL
Infofenuovacomprofer.it

elbor Welding Wire

## CERTIFICATO DI COLLAUDO/ CERTIFICAT D'ANALYSE/ TEST CERTIFICATE/ WERKZEUGNIS

| CERTIFICATE N°/CERTIFICATO N° 1003045537 | Luogo/ Issuing place: Montefredane | Data/ Date: 30/11/2021 |
|---|---|---|

**CLIENTE/ CUSTOMER:**
DATAWELDING SRL
VIA MARCONI 5
20080 VERMEZZO MI

**CONSEGNA/DELIVERY:**
IDEM

**NS. RIFERIMENTO N° /OUR DOC REF.**
Fattura 1452 del 29/11/2021

**ORDINE N°/ PURCHASE ORDER N°**
21/00355+21/00356+21/00459+21/00618

**COLATA N°/BATCH N°**
122611

| QUALITA'/GRADE | NOME DEL PRODOTTO/ TRADEMARK: | DESCRIZIONE MATERIALE/MATERIAL DESCRIPTION: |
|---|---|---|
| SG2 | ELB-SG2 | Diam.: 1.20 mm<br>Quantity: 7560 KG<br>Type: S300/15 KG |

**NORMA/ STANDARD:** EN ISO 14341-A- G42 3 M G3Si1/G 8 2 C G3Si1
**Specifica/Specification:** AWS A 5.18-05/ER70S-6

**ANALISI CHIMICA DI COLATA** (Conforme a/ Complice with: EN 10204 3.1)
Chemical Composition/ Analyse de coulée/ Drahtanalyse

| C | Si | Mn | P | S | Cu | Cr | Ni | Mo |
|---|---|---|---|---|---|---|---|---|
| 0,08 | 0,836 | 1,44 | 0,013 | 0,014 | 0,04 | 0,03 | 0,014 | 0,001 |
| **Al** | **N** | **Ti** | **V** | **Zr** | **As** | **Ti+Zr** | | |
| 0,003 | 0,0067 | 0,01 | 0,003 | 0,0034 | 0,002 | 0,01 | | |

**CARATTERISTICHE MECCANICHE (Conforme a/ Complice with: EN 10204 2.2)**
Mechanical properties condition as welded, shielding-gas M21/Propriétés mécaniques / Mechanische Werte, ungeglücht, Schutz-gas M21

| Snervamento/ Yield strenght (N/mm²) | Resistenza alla trazione/Tensile strenght (N/mm²) | Allungamento Elongation (A5%) | Resilienza/Resilience Impact strenght | |
|---|---|---|---|---|
| | | | TEMP (°C) | Charpy KV (J) |
| ≥ 420 | 500-640 | 22 | -30 | ≥ 47 |

**CARATTERISTICHE MECCANICHE (Conforme a/ Complice with: EN 10204 2.2)**
Mechanical properties condition as welded, shielding-gas $Co_2$/ Propriétés mécaniques /Mechanische Werte, ungeglücht, Schutz-gas $Co_2$

| Snervamento/ Yield strenght (N/mm²) | Resistenza alla trazione/Tensile strenght (N/mm²) | Allungamento Elongation (A5%) | Resilienza/Resilience Impact strenght | |
|---|---|---|---|---|
| | | | TEMP (°C) | Charpy KV (J) |
| ≥ 380 | 470-600 | 22 | -20 | ≥ 47 |

CE 0035- CPR-C607

QUALITY DPT.

Certificato generato da un sistema informativo valido senza firma
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**NOTE:**
Si certifica che questo materiale è stato prodotto, imballato, etichettato e sottoposto al controllo di qualità nel pieno rispetto degli standard e delle specifiche di riferimento. Prodotto fornito nell'ambito di un sistema per la Qualità certificato, conformemente alla norma EN ISO 9001.

It is hereby certify that this product has been manufactured, including packaging/labelling and quality control in full compliance with referred Standards and Specifications. Product supplied under a QA Programme fulfilling the EN ISO 9001 standard.

MOD. P4- 13 REV. 0

## 3.2 WELDERS WPQS

| ALEX SISTEMI SPA | WELDER, WELDING OPERATOR PERFORMANCE QUALIFICATION TEST RECORD<br>Annex J – FORM J-4 | Sheet<br>1 of 1 |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Name | SATTI WASEEQ AHMED | Optional Photo ID | Test Date | 20/01/2022 | Rev. |
| ID Number | - | | Record No. | RS 08-SW | 0 |
| Stamp No. | SW | | Std. Test No. | - | |
| Company | ALEX SISTEMI SPA | | WPS No. | RS 08 | 0 |
| Division | | | Qualified To | AWS D1.1 Ed. 2020 | |

| Base Metals | Specification | Type or Grade | AWS Group N. | Thickness (mm) | Size (NPS) | Schedule | Diameter (mm) |
|---|---|---|---|---|---|---|---|
| Base Material | EN 10025-2 | S355J2+N | Unlisted steel | 6 | | | |
| Welded To | EN 10025-2 | S355J2+N | Unlisted steel | 6 | | | |

| VARIABLES | Actual Values | | RANGE QUALIFIED |
|---|---|---|---|
| Type of Weld Joint | Butt Joint Complete Penetration | | Groove, Fillet, Plug, and Slot Welds (T-, Y-, K-Groove PJP only) |
| Base Metal | Unlisted steel to Unlisted steel | | Same combination |

| | Groove | Fillet | | Groove | Fillet |
|---|---|---|---|---|---|
| Plate thickness | 6 mm | | | 3 to 12 | ≥ 3 |
| Pipe thickness | | | | ≥ 3 | Unlimited |
| Pipe diameter | | | | ≥ 600 | Unlimited |

| Welding Process | GMAW | | GMAW |
|---|---|---|---|
| Type *(manual, Semiautomatic, Mechanized, Automatic)* | Semiautomatic | | Semiautomatic, Mechanized, Automatic |
| Backing | With | | With |
| **Filler Metal (AWS Specification)** | A5.18 | | A5.xx |
| AWS Classification | ER70S-6 | | All |
| F-Number | - | | - |
| **Position** | 1G | | |
| Groove – Plate & Pipe ≥ 24" | | | F |
| Groove – Pipe < 24" | | | |
| Fillet – Plate & Pipe ≥ 24" | | | F, H |
| Fillet - Pipe < 24" | | | F, H |
| Progression | N.A. | | N.A. |
| GMAW Transfer Mode | Pulsed Arc | | Spray, Pulsed, Globular |
| Gas / Flux Type | A5.32 SG-AC20 | | A5.xx Approved |

| TEST RESULTS | | | |
|---|---|---|---|
| Type of Test | Acceptance Criteria | Results | Remarks |
| Visual Examination | 6.10.1.1 | Acceptable | – |
| N°1 Transverse Root Bends | 6.10.3.3 | Acceptable | – |
| N° Transverse Face Bends | 6.10.3.3 | Acceptable | – |

## 3.3 WPQR

| CERTIFICATION | |
|---|---|
| Test Conducted by | |
| Laboratory | OMECO |
| Test Number | Report n° SPT/0133/22 |
| File Number | - |

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Clause 4 of AWS D1.1/D1.1M (2020) Structural Welding Code—Steel.

| Manufacturer or Contractor | Authorized By | Date |
|---|---|---|
| ALEX SISTEMI spa | BUREAU VERITAS ITALIA WELDING 18<br>IT FILE<br>DATE<br>WITNESSED ☒ REVIEW ☐ | 22/02/2022 |

| ALEX SISTEMI SPA | WELDER, WELDING OPERATOR PERFORMANCE QUALIFICATION TEST RECORD<br>Annex J – FORM J-4 | Sheet<br>1 of 1 |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Name | DANIELE BAROLI | Optional Photo ID | Test Date | 20/01/2022 | Rev. |
| ID Number | - | | Record No. | RS 08-DB | 0 |
| Stamp No. | DB | | Std. Test No. | - | |
| Company | ALEX SISTEMI SPA | | WPS No. | RS 08 | 0 |
| Division | | | Qualified To | AWS D1.1 Ed. 2020 | |

| Base Metals | Specification | Type or Grade | AWS Group N. | Thickness (mm) | Size (NPS) | Schedule | Diameter (mm) |
|---|---|---|---|---|---|---|---|
| Base Material | EN 10025-2 | S355J2+N | Unlisted steel | 6 | | | |
| Welded To | EN 10025-2 | S355J2+N | Unlisted steel | 6 | | | |

| VARIABLES | Actual Values | | RANGE QUALIFIED |
|---|---|---|---|
| Type of Weld Joint | Butt Joint Complete Penetration | | Groove, Fillet, Plug, and Slot Welds (T-, Y-, K-Groove PJP only) |
| Base Metal | Unlisted steel to Unlisted steel | | Same combination |

| | Groove | Fillet | | Groove | Fillet |
|---|---|---|---|---|---|
| Plate thickness | 6 mm | | | 3 to 12 | ≥ 3 |
| Pipe thickness | | | | ≥ 3 | Unlimited |
| Pipe diameter | | | | ≥ 600 | Unlimited |

| | | | |
|---|---|---|---|
| **Welding Process** | GMAW | | GMAW |
| Type *(manual, Semiautomatic, Mechanized, Automatic)* | Semiautomatic | | Semiautomatic, Mechanized, Automatic |
| Backing | With | | With |
| **Filler Metal (AWS Specification)** | A5.18 | | A5.xx |
| AWS Classification | ER70S-6 | | All |
| F-Number | - | | - |
| **Position** | 1G | | |
| Groove – Plate & Pipe ≥ 24" | | | F |
| Groove – Pipe < 24" | | | |
| Fillet – Plate & Pipe ≥ 24" | | | F, H |
| Fillet - Pipe < 24" | | | F, H |
| Progression | N.A. | | N.A. |
| GMAW Transfer Mode | Pulsed Arc | | Spray, Pulsed, Globular |
| Gas / Flux Type | A5.32 SG-AC20 | | A5.xx Approved |

| TEST RESULTS | | | |
|---|---|---|---|
| Type of Test | Acceptance Criteria | Results | Remarks |
| Visual Examination | 6.10.1.1 | Acceptable | – |
| N°1 Transverse Root Bends | 6.10.3.3 | Acceptable | – |
| N° Transverse Face Bends | 6.10.3.3 | Acceptable | – |

| CERTIFICATION | |
|---|---|
| Test Conducted by | |
| Laboratory | OMECO |
| Test Number | |
| File Number | - |

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Clause 4 of AWS D1.1/D1.1M (2020) Structural Welding Code—Steel.

| Manufacturer or Contractor | Authorized By | Date |
|---|---|---|
| ALEX SISTEMI spa | BUREAU VERITAS ITALIA WELDING 18<br>IT FILE<br>DATE<br>WITNESSED ☒ REVIEW ☐ | 22/02/2022 |

## *WELDING WORK HISTORY 2022 & 2023*

| Std | WPS | PQR# | Process | Material1 | Gr. | thk/Ø Wi | Material2 | Gr. | thk/Ø Wi | WPQ AZ | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AWS D1.1 | D-11-GMAW-275-T-L1-GF-1 | R S01 | GMAW | EN 10025 S 275 JR | Gr. 1 | 6mm | EN 10025 S 275 JR | Gr. 1 | 6mm | S12-CS | S12-CS | S12-CS | | | S12-CS | S12-CS | S12-CS | | | S12-CS | | |
| AWS D1.1 | D-11-GMAW-275-T-L1-GF | R S02 | GMAW | EN 10025 S 275 JR | Gr. 1 | 12mm | EN 10025 S 275 JR | Gr. 1 | 12mm | S12-CS | S12-CS | S12-CS | | | S12-CS | | | | | | S12-CS | S12-CS |
| AWS D1.1 | D-11-GMAW-275-B-U4b-GF | R S03 | GMAW | EN 10025 S 275 JR | Gr. 1 | 20mm | EN 10025 S 275 JR | Gr. 1 | 20mm | S12-CS | S12-CS | S12-CS | | | S12-CS | | | | | | S12-CS | S12-CS |
| AWS D1.1 | 04/13 | R 04/13 | GTAW+GMAW | EN 10028-3 P 355 NL2 | Gr. 1 | 12mm | EN 10028-3 P 355 NL2 | Gr. 1 | 12mm | S12-CS | S12-CS | S12-CS | | S12-CS | | | | | | S12-CS | | |
| AWS D1.1 | 05/13 | R 05/13 | GMAW | EN 10025-2 S 355 J2G3 | Gr. 1 | 10mm | EN 10025-2 S 355 J2G3 | Gr. 1 | 10mm | S04-RR | S04-RR | S04-RR | | S04-RR | | | | | | S04-RR | | |
| AWS D1.1 | 06/13 | R 06/13 | GTAW+GMAW | EN 10028-3 P 355 NL2 | Gr. 1 | 25mm | EN 10028-3 P 355 NL2 | Gr. 1 | 25mm | S12-CS | S12-CS | S12-CS | | S12-CS | | | | | | S12-CS | | |

Welding Operator — Welding Coordinator

BD: BAROLI DANIELE — OG: OLDANI GAUDENZIO

SWA: SATTI WASSEEQ AHMED

ALEXSISTEMI

2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024


| Std | WPS | PQR# | Process | Material1 | Gr. | thk/Ø Wi | Material2 | Gr. | thk/Ø Wi | WPQ AZ | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AWS D1.1 | D-11-GMAW-275-T-L1-GF-1 | R S01 | GMAW | EN 10025 S 275 JR | Gr. 1 | 6mm | EN 10025 S 275 JR | Gr. 1 | 6mm | S12-CS | S12-CS | S12-CS | | | S12-CS | S12-CS | S12-CS | | | S12-CS | | |
| AWS D1.1 | D-11-GMAW-275-T-L1-GF | R S02 | GMAW | EN 10025 S 275 JR | Gr. 1 | 12mm | EN 10025 S 275 JR | Gr. 1 | 12mm | S12-CS | S12-CS | S12-CS | | | S12-CS | | | | | | S12-CS | S12-CS |
| AWS D1.1 | D-11-GMAW-275-B-U4b-GF | R S03 | GMAW | EN 10025 S 275 JR | Gr. 1 | 20mm | EN 10025 S 275 JR | Gr. 1 | 20mm | S12-CS | S12-CS | S12-CS | | | S12-CS | | | | | | S12-CS | S12-CS |
| AWS D1.1 | 04/13 | R 04/13 | GTAW+GMAW | EN 10028-3 P 355 NL2 | Gr. 1 | 12mm | EN 10028-3 P 355 NL2 | Gr. 1 | 12mm | S12-CS | S12-CS | S12-CS | | S12-CS | | | | | | S12-CS | | |
| AWS D1.1 | 05/13 | R 05/13 | GMAW | EN 10025-2 S 355 J2G3 | Gr. 1 | 10mm | EN 10025-2 S 355 J2G3 | Gr. 1 | 10mm | S04-RR | S04-RR | S04-RR | | S04-RR | | | | | | S04-RR | | |
| AWS D1.1 | 06/13 | R 06/13 | GTAW+GMAW | EN 10028-3 P 355 NL2 | Gr. 1 | 25mm | EN 10028-3 P 355 NL2 | Gr. 1 | 25mm | S12-CS | S12-CS | S12-CS | | S12-CS | | | | | | S12-CS | | |

Welding Operator — Welding Coordinator

BD: BAROLI DANIELE — OG: OLDANI GAUDENZIO

SWA: SATTI WASSEEQ AHMED

ALEXSISTEMI

2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024

## 3.3 PRODUCTION WPS (According AWS D1.1 also EEMUA 197)

ALEXSISTEMI spa

**WELDING PROCEDURE SPECIFICATION**
WPS according AWS D1.1/D1.1-2020 / EEMUA 197
Annex M – FORM M-2

| WPS N° | Sheet |
|---|---|
| GMAW-S355J2-1 | 1 |
| Rev. 0 | Date: |
| Supporting PQR N° RS 07 | 14/03/2022 |

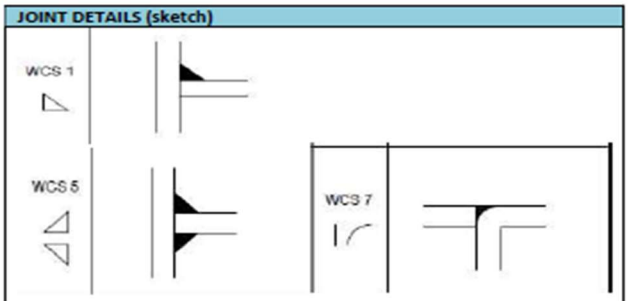
| Base Metals | Specification | Type or Grade | AWS Group N. |
|---|---|---|---|
| Base Material | EN 10025-2 | S355J2+N | N.A. |
| Welded To | EN 10025-2 | S355J2+N | N.A. |
| Backing Material | - | - | - |
| Other | | | |

| Base Metal Thickness (mm) | As Welded | With PWHT |
|---|---|---|
| CJP Groove Welds | - | - |
| CJP Groove w/CVN | - | - |
| PJP Groove Welds | - | - |
| Fillet Welds | 3 – 12 mm | - |
| Diameter (mm) | none | - |

| JOINT DETAILS | |
|---|---|
| Groove Type | Fillet weld |
| Groove Angle | N.A. |
| Root Opening (mm) | N.A. |
| Root Face (mm) | N.A. |
| Back gouging | N.A. |
| Method | N.A. |

| POST WELD HEAT TREATMENT | |
|---|---|
| Temperature | N.A. |
| Time and Temperature | N.A. |
| Other | N.A. |
| | |
| | |

JOINT DETAILS (sketch)




ALEXSISTEMI spa

| PROCEDURE | | | | | |
|---|---|---|---|---|---|
| Weld Layer (s) | 1 to n | | | | |
| Weld Pass (es) | 1 to n | | | | |
| Process | GMAW | | | | |
| Type (*semiautomatic, Mechanized, etc.*) | Semi Automatic | | | | |
| Position | 1F | | | | |
| Vertical Progression | N.A. | | | | |
| Filler Metal (AWS Spec.) | A5.18 | | | | |
| AWS Classification | ER70S-6 | | | | |
| Diameter (mm) | 1.2 | | | | |
| Manufacturer / Trade Name | ELB-SG2 | | | | |
| Shielding Gas Composition | Ar: 80% CO2: 20% | | | | |
| Flow Rate (L/min) | 14÷16 | | | | |
| Nozzle Size (MM) | - | | | | |
| Preheat Temperature | 10 °C | | | | |
| Interpass Temperature | ≤ 200 °C | | | | |
| **Electrical Characteristics** | | | | | |
| Current Type and Polarity | DC Reverse | | | | |
| Transfer Mode (GMAW) | Pulsed arc | | | | |
| Power Source Type (*cc, cv, etc.*) | Cc | | | | |
| Amps | 160÷190 | | | | |
| Volts | 25÷28 | | | | |
| Wire Feed Speed (m/min.) | - | | | | |
| Travel Speed (mm/min.) | 180 | | | | |
| Maximum Heat Input (KJ/mm) | 1.33÷1.77 | | | | |
| **Technique** | | | | | |
| Stringer or Weave | String | | | | |
| Multi or Single pass (*per side*) | Multi | | | | |
| Oscillation (*Mechanized/Automatic*) | - | | | | |
| Traverse Length | - | | | | |
| Traverse Speed | - | | | | |
| Dwell Time | - | | | | |
| Number of Electrodes | 1 | | | | |
| Contact Tube to work Distance (mm) | 12-15 mm | | | | |
| Peening | No | | | | |
| Interpass Cleaning | Brushing and grinding | | | | |
| Other | - | | | | |

ALEXSISTEMI spa

# WELDING PROCEDURE SPECIFICATION

WPS according AWS D1.1/D1.1-2020/EEMUA 197 Annex M – FORM M-2

| WPS N° | Sheet |
|---|---|
| GMAW-S355J2-2 | 1 |
| Rev. 0 | Date: |
| Supporting PQR N° RS 08 | 14/03/2022 |

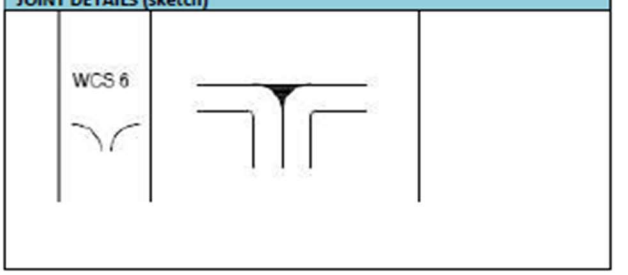
| Base Metals | Specification | Type or Grade | AWS Group N. |
|---|---|---|---|
| Base Material | EN 10025-2 | S355J2+N | N.A. |
| Welded To | EN 10025-2 | S355J2+N | N.A. |
| Backing Material | - | - | - |
| Other | | | |

| Base Metal Thickness (mm) | As Welded | With PWHT |
|---|---|---|
| CJP Groove Welds | - | - |
| CJP Groove w/CVN | - | - |
| PJP Groove Welds | 3 – 12 mm | - |
| Fillet Welds | - | - |
| Diameter (mm) | none | - |

| JOINT DETAILS | |
|---|---|
| Groove Type | Butt Joint Partial Penetration |
| Groove Angle | 45° |
| Root Opening (mm) | N.A. |
| Root Face (mm) | N.A. |
| Back gouging | N.A. |
| Method | N.A. |

| POST WELD HEAT TREATMENT | |
|---|---|
| Temperature | N.A. |
| Time and Temperature | N.A. |
| Other | N.A. |
| | |

JOINT DETAILS (sketch)




| PROCEDURE | | | | | |
|---|---|---|---|---|---|
| Weld Layer (s) | 1 to n | | | | |
| Weld Pass (es) | 1 to n | | | | |
| **Process** | GMAW | | | | |
| Type (*semiautomatic, Mechanized, etc.*) | Semi Automatic | | | | |
| **Position** | 1G | | | | |
| Vertical Progression | N.A. | | | | |
| **Filler Metal (AWS Spec.)** | A5.18 | | | | |
| AWS Classification | ER70S-6 | | | | |
| Diameter (mm) | 1.2 | | | | |
| Manufacturer / Trade Name | ELB-SG2 | | | | |
| **Shielding Gas Composition** | Ar: 80% CO2: 20% | | | | |
| Flow Rate (L/min) | 14÷16 | | | | |
| Nozzle Size (MM) | - | | | | |
| **Preheat Temperature** | 10 °C | | | | |
| Interpass Temperature | ≤ 200 °C | | | | |
| **Electrical Characteristics** | | | | | |
| Current Type and Polarity | DC Reverse | | | | |
| Transfer Mode (GMAW) | Pulsed | | | | |
| Power Source Type (*cc, cv, etc.*) | Cc | | | | |
| Amps | 110÷130 | | | | |
| Volts | 21÷24 | | | | |
| Wire Feed Speed (m/min.) | - | | | | |
| Travel Speed (mm/min.) | 240÷270 | | | | |
| Maximum Heat Input (KJ/mm) | 0.57÷0.69 | | | | |
| **Technique** | | | | | |
| Stringer or Weave | String | | | | |
| Multi or Single pass (*per side*) | Multi | | | | |
| Oscillation (*Mechanized/Automatic*) | - | | | | |
| Traverse Length | - | | | | |
| Traverse Speed | - | | | | |
| Dwell Time | - | | | | |
| Number of Electrodes | 1 | | | | |
| Contact Tube to work Distance (mm) | 12-15 mm | | | | |
| Peening | No | | | | |
| Interpass Cleaning | Brushing and grinding | | | | |
| Other | - | | | | |

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# WELDING PROCEDURE SPECIFICATION

WPS according AWS D1.1/D1.1-2020/EEMUA 197
Annex M – FORM M-2

| WPS N° | Sheet |
|---|---|
| GMAW-S355J2-3 | 1 |
| Rev. 0 | Date: |
| Supporting PQR N° RS 08 | 14/03/2022 |

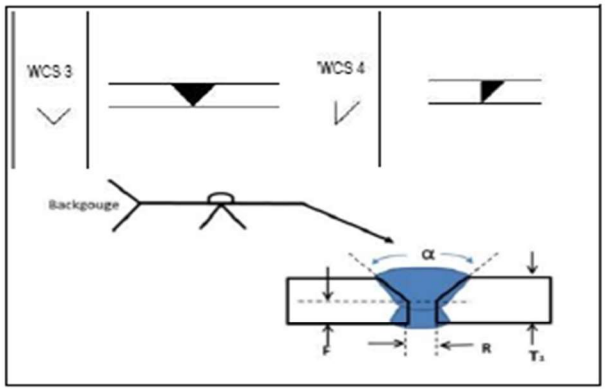
| Base Metals | Specification | Type or Grade | AWS Group N. |
|---|---|---|---|
| Base Material | EN 10025-2 | S355J2+N | N.A. |
| Welded To | EN 10025-2 | S355J2+N | N.A. |
| Backing Material | - | - | - |
| Other | | | |

| Base Metal Thickness (mm) | As Welded | With PWHT |
|---|---|---|
| CJP Groove Welds | 3 – 12 mm | - |
| CJP Groove w/CVN | - | - |
| PJP Groove Welds | - | - |
| Fillet Welds | - | - |
| Diameter (mm) | none | - |

| JOINT DETAILS | |
|---|---|
| Groove Type | Butt Joint Complete Penetration |
| Groove Angle | 45° |
| Root Opening (mm) | 2,5 |
| Root Face (mm) | 1,0 |
| Back gouging | N.A. |
| Method | N.A. |

| POST WELD HEAT TREATMENT | |
|---|---|
| Temperature | N.A. |
| Time and Temperature | N.A. |
| Other | N.A. |
| | |
| | |

JOINT DETAILS (sketch)




| PROCEDURE | | | | | |
|---|---|---|---|---|---|
| Weld Layer (s) | 1 to n | | | | |
| Weld Pass (es) | 1 to n | | | | |
| Process | GMAW | | | | |
| Type (*semiautomatic, Mechanized, etc.*) | Semi Automatic | | | | |
| Position | 1G | | | | |
| Vertical Progression | N.A. | | | | |
| Filler Metal (AWS Spec.) | A5.18 | | | | |
| AWS Classification | ER70S-6 | | | | |
| Diameter (mm) | 1.2 | | | | |
| Manufacturer / Trade Name | ELB-SG2 | | | | |
| Shielding Gas Composition | Ar: 80% CO2: 20% | | | | |
| Flow Rate (L/min) | 14÷16 | | | | |
| Nozzle Size (MM) | - | | | | |
| Preheat Temperature | 10 °C | | | | |
| Interpass Temperature | ≤ 200 °C | | | | |
| **Electrical Characteristics** | | | | | |
| Current Type and Polarity | DC Reverse | | | | |
| Transfer Mode (GMAW) | Pulsed | | | | |
| Power Source Type (*cc, cv, etc.*) | Cc | | | | |
| Amps | 110÷130 | | | | |
| Volts | 21÷24 | | | | |
| Wire Feed Speed (m/min.) | - | | | | |
| Travel Speed (mm/min.) | 240÷270 | | | | |
| Maximum Heat Input (KJ/mm) | 0.57÷0.69 | | | | |
| **Technique** | | | | | |
| Stringer or Weave | String | | | | |
| Multi or Single pass (*per side*) | Multi | | | | |
| Oscillation (*Mechanized/Automatic*) | - | | | | |
| Traverse Length | - | | | | |
| Traverse Speed | - | | | | |
| Dwell Time | - | | | | |
| Number of Electrodes | 1 | | | | |
| Contact Tube to work Distance (mm) | 12-15 mm | | | | |
| Peening | No | | | | |
| Interpass Cleaning | Brushing and grinding | | | | |
| Other | - | | | | |

| ALEXSISTEMI | WELDING PROCEDURE SPECIFICATION<br>WPS according AWS D1.1/D1.1-2020/EEMUA 197<br>Annex M – FORM M-2 | WPS N°<br>GMAW-S355J2-4<br>Rev. 0<br>Supporting PQR N°<br>RS 08 | Sheet<br>1<br>Date:<br>14/03/2022 |
|---|---|---|---|

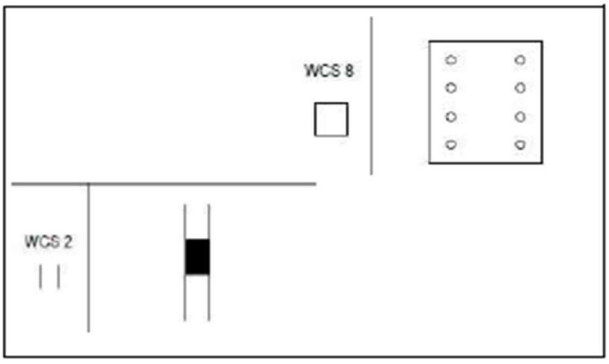
| Base Metals | Specification | Type or Grade | AWS Group N. |
|---|---|---|---|
| Base Material | EN 10025-2 | S355J2+N | N.A. |
| Welded To | EN 10025-2 | S355J2+N | N.A. |
| Backing Material | - | - | - |
| Other | | | |

| Base Metal Thickness (mm) | As Welded | With PWHT |
|---|---|---|
| CJP Groove Welds | - | - |
| CJP Groove w/CVN | - | - |
| PJP Groove Welds | 3 – 12 mm | - |
| Fillet Welds | - | - |
| Diameter (mm) | none | - |

| JOINT DETAILS | |
|---|---|
| Groove Type | Butt Joint Partial Penetration |
| Groove Angle | 0° |
| Root Opening (mm) | N.A. |
| Root Face (mm) | N.A. |
| Back gouging | N.A. |
| Method | N.A. |

| POST WELD HEAT TREATMENT | |
|---|---|
| Temperature | N.A. |
| Time and Temperature | N.A. |
| Other | N.A. |
| | |
| | |

JOINT DETAILS (sketch)




| PROCEDURE | | | | | |
|---|---|---|---|---|---|
| Weld Layer (s) | 1 to n | | | | |
| Weld Pass (es) | 1 to n | | | | |
| Process | GMAW | | | | |
| Type (*semiautomatic, Mechanized, etc.*) | Semi Automatic | | | | |
| Position | 1G | | | | |
| Vertical Progression | N.A. | | | | |
| Filler Metal (AWS Spec.) | A5.18 | | | | |
| AWS Classification | ER70S-6 | | | | |
| Diameter (mm) | 1.2 | | | | |
| Manufacturer / Trade Name | ELB-SG2 | | | | |
| Shielding Gas Composition | Ar: 80% CO2: 20% | | | | |
| Flow Rate (L/min) | 14÷16 | | | | |
| Nozzle Size (MM) | - | | | | |
| Preheat Temperature | 10 °C | | | | |
| Interpass Temperature | ≤ 200 °C | | | | |
| **Electrical Characteristics** | | | | | |
| Current Type and Polarity | DC Reverse | | | | |
| Transfer Mode (GMAW) | Pulsed | | | | |
| Power Source Type (*cc, cv, etc.*) | Cc | | | | |
| Amps | 110÷130 | | | | |
| Volts | 21÷24 | | | | |
| Wire Feed Speed (m/min.) | - | | | | |
| Travel Speed (mm/min.) | 240÷270 | | | | |
| Maximum Heat Input (KJ/mm) | 0.57÷0.69 | | | | |
| **Technique** | | | | | |
| Stringer or Weave | String | | | | |
| Multi or Single pass (*per side*) | Multi | | | | |
| Oscillation (*Mechanized/Automatic*) | - | | | | |
| Traverse Length | - | | | | |
| Traverse Speed | - | | | | |
| Dwell Time | - | | | | |
| Number of Electrodes | 1 | | | | |
| Contact Tube to work Distance (mm) | 12-15 mm | | | | |
| Peening | No | | | | |
| Interpass Cleaning | Brushing and grinding | | | | |
| Other | - | | | | |

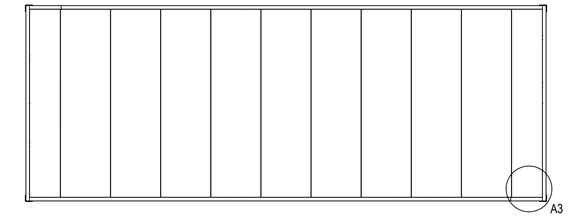
## 3.4 WELDING IDENTIFICATION MAP

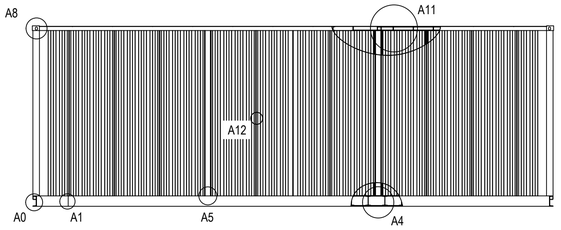
***REFERENCE DRAWINGS***

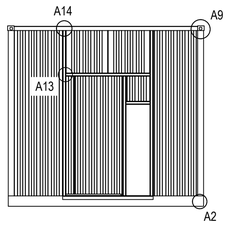
| | |
|---|---|
| **General Arrangement** | *X176_GA_00 Rev.0* |
| **Welding Map** | *176-A_WELDING MAP Rev.0* |
| ***K559-2254-MT-SPE-001*** | ***Structural Fabrication Specification*** |
| *EEMUA 158* | *Construction Specification for Fixed Offshore Structures* |
| *EEMUA 197* | *Specification for the fabrication of non-primary structural steelwork for offshore installations* |
| *ISO 19901-3* | *Petroleum and Natural Gas Industrie Specific Requirements for Offshore Structures-Topsides Structure* |

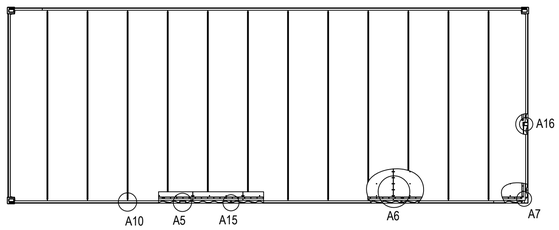
| Mark WPS | Weld Type | Production WPS | PQR | Welders Id |
|---|---|---|---|---|
| WCS 5 | **Fillet Weld** | GMAW-S355J2-1 | RS 07 | DB / SW |
| WCS 1 | **Fillet Weld** | GMAW-S355J2-1 | RS 07 | DB / SW |
| WCS 7 | **Fillet Weld** | GMAW-S355J2-1 | RS 07 | DB / SW |
| WCS 3 | **Groove Weld CJP** | GMAW-S355J2-3 | RS 08 | DB / SW |
| WCS 2 | **Groove Weld PJP** | GMAW-S355J2-4 | RS 08 | DB / SW |
| WCS 6 | **Groove Weld PJP** | GMAW-S355J2-2 | RS 08 | DB / SW |
| WCS 4 | **Groove Weld CJP** | GMAW-S355J2-3 | RS 08 | DB / SW |
| WCS 8 | **Groove Weld PJP** | GMAW-S355J2-4 | RS 08 | DB / SW |

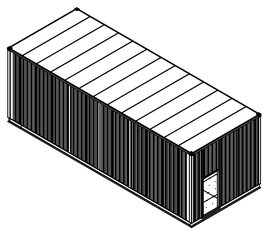
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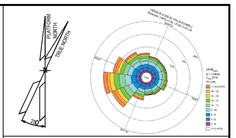





NOTES

WELDING DETAIL

| DETAIL N° | SKETCH | DETAIL N° | SKETCH |
|---|---|---|---|
| WCS 1 | t 1 = S355J0<br>t 2 = S355J0 THK : 1.5 ÷ 10 | WCS 2 | t 1 = S355J0<br>t 2 = S355J0 THK : 1.5 ÷ 6 |
| WCS 3 | t 1 = S355J0<br>t 2 = S355J0 THK : 4 ÷ 20 | WCS 4 | t 1 = S355J0<br>t 2 = S355J0 THK : 4 ÷ 25 |
| WCS 5 | t 1 = S355J0<br>t 2 = S355J0 THK : 1.5 ÷ 10 | WCS 6 | t 1 = S355J0<br>t 2 = S355J0 THK : 1.5 ÷ 10 |
| WCS 7 | t 1 = S355J0<br>t 2 = S355J0 THK : 1.5 ÷ 10 | WCS 8 | D1 = S355J0 THK : 1.5 ÷ 10 |

ALEXSISTEMI srl

| REV. | DATE | DRN | CHKD | APPD | DESCRIPTION |
|---|---|---|---|---|---|
| 0 | 26/02/24 | M.G. | M.R. | C.A. | ISSUE FOR REVIEW |

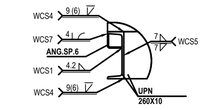
CROSSWIND | ROSETTI MARINO

TITLE : X176-A
WELDING MAP

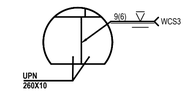
CONTRACT NO./TITLE CONTRACT_NO. 1724000049 | SCALE

DRAWN M.G. | CHECKED M.R. | APPROVED C.A. | DATE 26/02/24

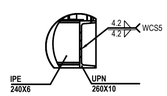
A1 | DRAWING NO. | SHEET 1:2 | REV. 00



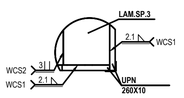

DETAIL A0
SCALE 1 : 10



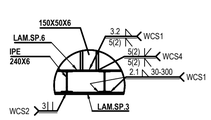

DETAIL A1
SCALE 1 : 10



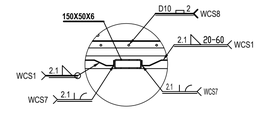

DETAIL A2
SCALE 1 : 10



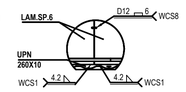

DETAIL A3
SCALE 1 : 30



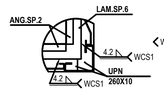

DETAIL A4
SCALE 1 : 20



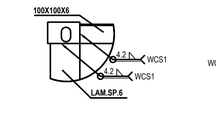

DETAIL A5
SCALE 1 : 10



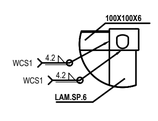

DETAIL A6
SCALE 1 : 25



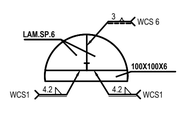

DETAIL A7
SCALE 1 : 10



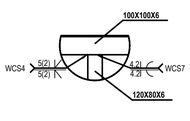

DETAIL A8
SCALE 1 : 10



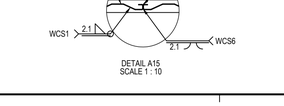

DETAIL A9
SCALE 1 : 10




DETAIL A10
SCALE 1 : 10




DETAIL A14
SCALE 1 : 10




DETAIL A11
SCALE 1 : 15




DETAIL A16
SCALE 1 : 10



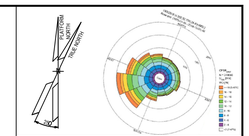

DETAIL A12
SCALE 1 : 10




DETAIL A13
SCALE 1 : 10




DETAIL A15
SCALE 1 : 10




NOTES

WELDING DETAIL

| DETAIL N° | SKETCH | DETAIL N° | SKETCH |
|---|---|---|---|
| WCS 1 | t 1 = S355J0<br>t 2 = S355J0 THK : 1.5 ÷ 10 | WCS 2 | t 1 = S355J0<br>t 2 = S355J0 THK : 1.5 ÷ 6 |
| WCS 3 | t 1 = S355J0<br>t 2 = S355J0 THK : 4 ÷ 20 | WCS 4 | t 1 = S355J0<br>t 2 = S355J0 THK : 4 ÷ 25 |
| WCS 5 | t 1 = S355J0<br>t 2 = S355J0 THK : 1.5 ÷ 10 | WCS 6 | t 1 = S355J0<br>t 2 = S355J0 THK : 1.5 ÷ 10 |
| WCS 7 | t 1 = S355J0<br>t 2 = S355J0 THK : 1.5 ÷ 10 | WCS 8 | D1 = S355J0 THK : 1.5 ÷ 10 |

ALEXSISTEMI srl

| REV. | DATE | DRN | CHKD | APPD | DESCRIPTION |
|---|---|---|---|---|---|
| 0 | 26/02/24 | M.G. | M.R. | C.A. | ISSUE FOR REVIEW |

CROSSWIND | ROSETTI MARINO

TITLE : X176-A
WELDING MAP

CONTRACT NO./TITLE CONTRACT_NO. 1724000049 | SCALE

DRAWN M.G. | CHECKED M.R. | APPROVED C.A. | DATE 26/02/24

A1 | DRAWING NO. | SHEET 2:2 | REV. 00