WELDING PROCEDURE QUALIFICATION RECORD (WPQR)

LEVEL 2

N. **2017NAPO538/4**

Manufacturer **UNITEk (ANGRI-SALERNO)**

WPQR No. **U01/2017** Dated 29.01.2017

Manufacturer's welding procedure (WPS) No. **U01/2017** Dated **29.12.2017**

RANGE OF QUALIFICATION

Welding process **141** Type **Manual**

Joint type **Pipes and branch connections with angle over 60° BW ssnb-ssmb-bs/FW 141**

Single/Multiple pass **Multiple 141** (**Impact properties not applied**)

Parent material group(s) **1.2** ISO/TR 15608; ISO/TR20172; ISO/TR 20173; ISO/TR20174 with a specified minimum yield strength ≤ 360 Mpa

Parent material thickness (mm) Butt Joint = **3 to 7.36** Fillet Joint t_1 **= 3 to 7.36** t_2 **= 3 to 7.36**

Throat thickness (mm) **no restrictions**

Weld deposit thickness (mm) **3 to 7,36**

Outside pipe diameter (mm) **≥21,08**

Filler metal make **Solid rod** Nr. of wires for process 12: **N.A.**

Flux make **N.A.** Flux Designation: **N.A.**

Filler metal designation **Solid rod EN ISO 636-A W424W3Si1**

Shielding gas (ISO 14175) **I1** Backing gas (ISO 14175) **I, N, R**

Type of welding current **DCEN** **Heat Input** Kj/cm **No Restrictions**

Welding position **All, vertical down excluded** Transfer Mode -

Preheat min. (°C) **10** (if ISO/TR 17671-2 requirements are fulfilled) Interpass temp. Max. (°C) -

Interpass temp. Max. (°C) **180** Postheat min. (°C) - Time (minutes) -

Post weld heat treatment / Ageing **N.A.** Time (minutes) -

Other information -

Welder's/Operator's name **VENERUSO MATTIA** Stamp No. **VM**

Welding test conducted by **UNITEk (ANGRI-SALERNO)**

Mechanical test conducted by **A.Q.C. LABORATORY** Laboratory test No. **18/004 A,B,C**

At presence of RINA Surveyor **MARCO BUONOCORE**

We confirm that statements in this record are correct and that the test welds were prepared, welded and tested and have fulfilled the requirements in accordance with **UNI EN ISO 15614-1: 2017** Standard

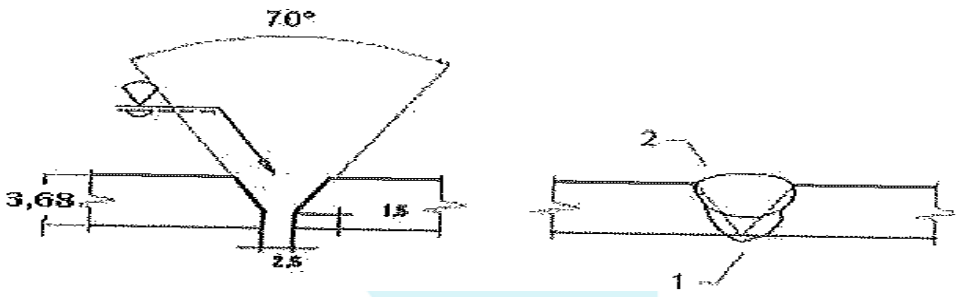
Issued at: Genova on 27/04/2018

RINA Services S.p.A.

Certificate No.

RECORD OF WELD TEST

JOINT DETAILS AND WELDING SEQUENCES									
PIPE TO PIPE SINGLE-V BUTT JOINT,ONE SIDE WITHOUT BACkING									
Pass No.	Process	Filler metal diam. (mm)	Amps	Volt	Type of Current/ Polarity	Travel speed (cm/min)	Heat input (kJ/cm)	Metal Transfer mode	Other
1	**141**	**2.4**	**65**	**12**	**DCEN**	**5**	**5.6**	**N.A.**	
2	**141**	**2.4**	**95**	**15**	**DCEN**	**5**	**10.2**	**N.A.**	



PARENT MATERIAL

Material specification	**API 5L-13**		
Type or grade	**Gr.B/X42PSL1/P265STR2**		
Group(s)/Subgroup(s) No. (ISO/TR 15608; ISO/TR20172; ISO/TR 20173; ISO/TR20174)	**1.1**		
Thickness (mm)	**3.68**	Throat thickness (mm)	**-**
Diameter (mm)	**42.16**		
Branch connection angle	**N.A.**		
Other	**-**		

WELDING CONSUMABLES

Process	**141**
Trade name(s)	**CARBOROD 1A**
Specification	**EN ISO 636 A :2008**
Classification / designation	**W 42 4 W 3Si1**
Size (mm)	**2.4**
Deposited metal thickness	**N.A.**
Groove	**3,68 mm**
Throat	**N.A.**
Flux trade name	**N.A.**
Consumable insert	**N.A.**
Other	**-**

Certificate No.

GAS			
	Gas	Mixture	Flow rate (l/min.)
Shielding	**Ar 99%**		**9**
Trailing			
Backing	**Ar 99%**		**7**

POSITION

Welding position **HL045**

Other -

PREHEAT			POSTWELD HEAT TREATMENT		
Preheat temperature	**10 °C**		Temperature	**N.A.**	Time -
Interpass temperature	**180°C**		Method	-	
Postheat temperature	**N.A.**	Time -	Other	-	

ELECTRICAL CHARACTERISTICS

Current **DCEN**

Ampere (range) **See table** Volts (Range) **See table**

Mode of metal transfer **N.A.**

Tungsten electrode size and type **1.6 mm ; EN ISO 6848 W 20**

Pulse welding details **N.A.**

Plasmawelding details **N.A.**

Waveform controlled welding machine - Waveform control mode -

Power source **LINCOLN INVERTER 270SX** Welding mode Pulse □ Non pulse ☑

Other

TECHNIQUE

Travel speed (range) **See table**

String or weave bead **STRING** Maximum width of run -

Oscillation (*) **N.A.** (Amplitude/Frequency/Dwell time)

Method of groove/edge preparation **Machining/Grinding**

Interpass cleaning **Grinding/Brushing**

Method of back gouging **N.A.**

Orifice or gas cup size **8 mm**

Distance contact tube/worpiece (*) **3-5 mm**

Multiple or single pass **MULTIPLE**

Multiple or single electrodes **SINGLE**

Torch angle (*) **N.A.**

Other (*) for fully mechanized/robotic only

TRANSVERSE TENSILE TEST (A.Q.C. REPORT 18/004 C. PAGE 1/2)						
Spec. (No.)	Width (mm)	Thickness (mm)	Area (mm^2)	Total load (N)	R_m. (N/mm^2)	Fracture location
DA-1	**6.32**	**3.11**	**19.65**	**10.500**	**534**	**Ductile fracture out of weld**
DA-2	**5.95**	**3.19**	**18.98**	**10300**	**542**	**Ductile fracture out of weld**

BEND TEST (A.Q.C. REPORT 18/004 C, PAGE 1/2)			
Type	No.	Bend Angle	Result
FACE TRANSVERSE (TFBB)	**2 OFF**	**180°**	**Acceptable**
ROOT TRANSVERSE (TRBB)	**2 OFF**	**180°**	**Acceptable**

OTHER TEST

MACROGRAPHIC EXAMINATION **Acceptable**

MICROGRAPHIC EXAMINATION **Not required**

NON DESTRUCTIVE EXAMINATION

VISUAL EXAMINATION **Acceptable**

RADIOGRAPHIC EXAMINATION **Acceptable**

PENETRANT TEST **Acceptable**

MAGNETIC PARTICLE **Not required**

ULTRASONIC TEST **Not required**

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