

WELDING PROCEDURE QUALIFICATION RECORD (WPQR)
LEVEL 2
 N. 20VE00912PW2/A

Manufacturer **EROS TOGNI METALCOSTRUZIONI SA - Cresciano (SVIZZERA)**

WPQR No. **02R-20** Dated **01/12/2020**

Manufacturer's welding procedure (WPS) No. **02-20** Dated **16/09/2020**

RANGE OF QUALIFICATION

Welding process **135** Type **Partly mechanized**

Joint type **Plates and Pipes FW**

Single/Multiple pass **Multiple** (**Hardness properties applied**)

Parent material group(s) **1-1** ISO/TR 15608; ISO/TR20172; ISO/TR 20173; ISO/TR20174
 with a specified minimum yield strength \leq **355 MPa**

Parent material thickness (mm) **Butt Joint = N.A.** Fillet Joint $t_1 \geq$ **5** $t_2 \geq$ **5**

Throat thickness (mm) **No restriction**

Weld deposit thickness (mm) **N.A.**

Outside pipe diameter (mm) **Over 500**

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

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

Filler metal designation **Solid wire EN ISO 14341-A - G46 5 M21 4Si1**

Shielding gas **82%Ar+18%CO₂ (ISO 14175 M21) CO₂ max deviation±20%;**

Backing gas (ISO 14175) **N.A.**

Type of welding current **DCEP** Heat Input kJ/cm **Min 4,3**

Welding position **PB** Transfer Mode **Spray Globular**

Preheat min. (°C) **None** (if ISO/TR 17671-2 requirements are fulfilled) Interpass temp. Max. (°C) **300**

Postheat min. (°C) **N.A.** Time (minutes) **N.A.**

Post weld heat treatment / Ageing **None** Time (minutes) **N.A.**

Other information **-**

Welder's/Operator's name **AGUSTONI PASCAL** Stamp No. **AP**


Welding test conducted by **EROS TOGNI METALCOSTRUZIONI SA**

Mechanical test conducted by **SSM S.R.L.** Laboratory test No. **1398/C Rev.00 20 dated 01/12/2020;**
237L-20-MA Rev.0, 237L-20-DU Rev.0 dated 01/12/2020;

At presence of RINA Surveyor **Domenico Zema**

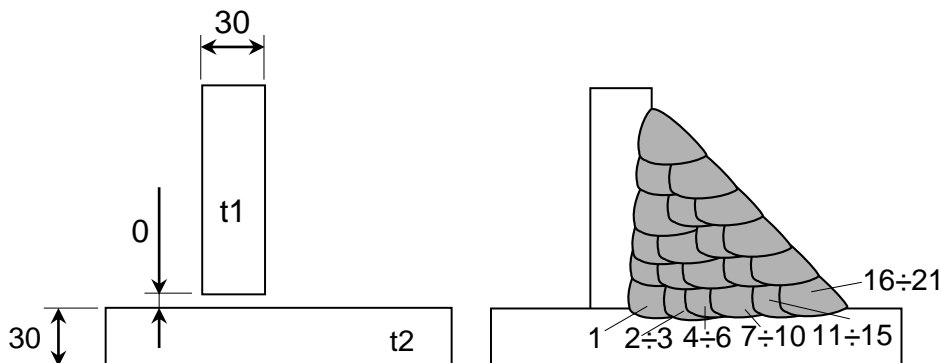
We confirm that statements in this record are correct and that the test welds were prepared, welded and tested and have fulfilled the requirements in accordance with **UNI EN ISO 15614-1: 2019** Standard

Issued at: Genova on **01/12/2020**



RINA Services S.p.A.
 PED No. Bo. 0474

JOINT DETAILS AND WELDING SEQUENCES									
FILLET WELD; MULTIPASS									
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	135	1,2	300	30,5	DCEP	35,0	12,5	Spray Arc	-
2 to 3	135	1,2	300	30,5	DCEP	45,0	9,8	Spray Arc	-
4 to 6	135	1,2	300	30,5	DCEP	45,0	9,8	Spray Arc	-
7 to 10	135	1,2	300	30,5	DCEP	50,0	8,8	Spray Arc	-
11 to 15	135	1,2	300	30,5	DCEP	55,0	8,0	Spray Arc	-
16 to 21	135	1,2	250	26,0	DCEP	55,0	5,7	Spray Arc	-



PARENT MATERIAL	
Material specification	EN 10025-2
Type or grade	S355J2C+N
Group(s)/Subgroup(s) No. (ISO/TR 15608; ISO/TR20172; ISO/TR 20173; ISO/TR20174)	t1, t2: 1.2
Thickness (mm)	t1 = t2 = 30,0
Diameter (mm)	N.A.
Branch connection angle	N.A.
Other	-
Throat thickness (mm)	20,0

WELDING CONSUMABLES	
Process	135
Trade name(s)	SIDERGAS S7
Specification	EN ISO 14341-A
Classification / designation	G46 5 M21 4Si1
Size (mm)	1,2
Deposited metal thickness	
Groove (mm)	N.A.
Throat (mm)	20,0
Flux trade name	N.A.
Consumable insert	None
Other	-

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GAS			
	Gas	Mixture	Flow rate (l/min.)
Shielding	-	82%Ar + 18%CO2	15
Trailing	N.A.	-	-
Backing	N.A.	-	-

POSITION	
Welding position	PB
Other	-

PREHEAT		POSTWELD HEAT TREATMENT	
Preheat temperature	15°C	Temperature	None Time N.A.
Interpass temperature	250°C	Method	N.A.
Postheat temperature	N.A. Time N.A.	Other	-

ELECTRICAL CHARACTERISTICS			
Current	DCEP		
Ampere (range)	See table	Volts (Range)	See table
Mode of metal transfer	Spray arc		
Tungsten electrode size and type	N.A.		
Pulse welding details	N.A.		
Plasmawelding details	N.A.		
Waveform control mode	N.A.		
Waveform controlled welding machine	N.A.		
Power source	N.A.		
Welding mode	Pulse <input type="checkbox"/>	Non pulse	<input checked="" type="checkbox"/>
Other	-		

TECHNIQUE	
Travel speed (range)	See table
String or weave bead	String and weave Maximum width of run N.A.
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	16 mm
Distance contact tube/worpiece (*)	N.A.
Multiple or single pass	Multiple
Multiple or single electrodes	Single
Torch angle (*)	N.A.
Other	(*) for fully mechanized/automatic only -

HARDNESS TEST		
Location	Type/load	Maximum value
Parent metal(s)	HV10	178
H.A.Z.(s)	HV10	277
Weld metal	HV10	237

OTHER TEST

MACROGRAPHIC EXAMINATION **Acceptable**
MICROGRAPHIC EXAMINATION **Not required**

NON DESTRUCTIVE EXAMINATION

VISUAL EXAMINATION **Acceptable**
RADIOGRAPHIC EXAMINATION **Not required**
PENETRANT TEST **Not required**
MAGNETIC PARTICLE **Acceptable**
ULTRASONIC TEST **Not required**

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