

WELDING PROCEDURE QUALIFICATION RECORD (WPQR)

N. 18VE0048PO1\A

Manufacturer **ITAQUA Srl - Trieste (TS)**

WPQR No. **01\2018**

Dated **13/09/2018**

Manufacturer's welding procedure (WPS) No. **01\2018**

Dated **22/01/2018**

RANGE OF APPROVAL

Welding process **131** Type **Partly mechanized**

Joint type **Plates and Pipes BW ssmb-bs/FW**

Single/Multiple pass **Multiple**

Parent material group(s) **23.1 to 23.1; all subgroups in group 22 and their combination** ISO/TR 15608

Parent material thickness (mm) Butt Joint = **3 to 30** Fillet Joint $t_1 = \mathbf{3\ to\ 30}$ $t_2 = \mathbf{3\ to\ 30}$

Throat thickness (mm) **No restriction**

Weld deposit thickness (mm) **3 to 30**

Outside diameter (mm) **Over 150 (PA-PB-PC); Over 500 (other positions)(*)**

Filler metal **Solid wire UNI EN ISO 18273 AlMg4,5 S Al5183 UNI EN 1011-4 group 5**

Shielding gas (ISO 14175) **II** Backing gas (ISO 14175) **None**

Type of welding current **Pulsed EP** Heat input KJ/cm **No restriction**

Welding position **All positions except for PG and J-L045**

Preheat min. (°C) **+50** Interpass temp. Max. (°C) **+200**

Post weld heat treatment / Ageing **None**

Other information **(*) Over 500 mm, when Rina Rules apply.**

Welders name **Cisic Ivica**

Stamp No. **CI**

Welding test conducted by **ITAQUA Srl - Trieste (TS)**

Mechanical test conducted by **CTR Srl - Limena (PD)**

Laboratory test No. **181182 dated 13/09/2018**

At presence of RINA Surveyor **P. Danesin**

We certify that statements in this certificate are correct and that the test welds were prepared, welded and tested in accordance with the requirements of **UNI EN ISO 15614-2: 2006** Standard.
 Requirements of **RINA Rules for the Classification of Ships** are also met.

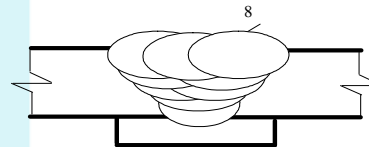
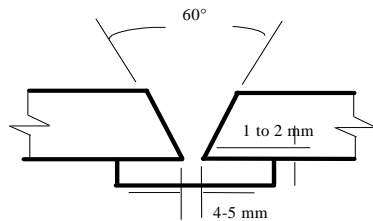
Issued at: Genova

on 13 September 2018



RINA Services S.p.A.

JOINT DETAILS AND WELDING SEQUENCES								
PLATE TO PLATE SINGLE-V BUTT JOINT; ONE SIDE WELDING WITH BACKING								
Pass No.	Process	Filler metal diam. (mm)	Filler metal classification	Amps	Volt	Travel speed (cm/min)	Heat input (kJ/cm)	Other
1	131	1,2	AlMg4,5 S Al5183	190	24,4	36,9	6,1	-
2	131	1,2	AlMg4,5 S Al5183	200	26,4	30,7	8,3	-
3-4	131	1,2	AlMg4,5 S Al5183	235	26,5	44,2	6,8	-
5-8	131	1,2	AlMg4,5 S Al5183	230	26,5	50,6	5,8	-



PARENT MATERIAL	
Material specification	EN 573
Type or grade	Legra 6082 T6
Group(s)/Subgroup(s) No. (ISO/TR 15608)	t ₁ = 23.1; t ₂ = 23.1
Thickness (mm)	t ₁ = 15; t ₂ = 15
Diameter (mm)	N.A.
Branch connection angle	N.A.
Other	With base material Gr. 23.1 Thk 15 mm
Throat thickness (mm)	N.A.

WELDING CONSUMABLES	
Process	131
Trade name(s)	SAFRA S AL5183
Specification	UNI EN ISO 18273
Classification / designation	Al Mg 4,5Mn0,7 A
UNI EN 1011-4 grouping	5
Size (mm)	1,2
Deposited metal thickness	
Groove	15 mm
Throat	N.A.
Flux trade name	N.A.
Consumable insert	N.A.
Other	-

GAS			
	Gas	Mixture	Flow rate (l/min.)
Shielding	Ar 99,99%		17
Trailing			
Backing			

POSITION	
Welding position	PA
Other	-

PREHEAT		POSTWELD HEAT TREATMENT	
Preheat temperature	Min +50°C	Temperature	None
Interpass temperature	Max + 200°C	Time	-
Other	-	Other	-

ELECTRICAL CHARACTERISTICS			
Current	Pulsed EP		
Ampere (range)	See table	Volts (Range)	See table
Mode of metal transfer	Pulsed EP		
Tungsten electrode size and type	N.A.		
Other	-		

TECHNIQUE	
Travel speed (range)	See table
String or weave bead	String
Oscillation (*)	None
Method of groove/edge preparation	Machining/Grinding
Interpass cleaning	Grinding/Brushing
Method of back gouging	N.A.
Orifice or gas cup size	18 mm
Stand off distance (*)	15-20 mm
Multiple or single pass	Multiple
Multiple or single electrodes	Single
Torch angle (*)	N.A.
Other (*)	for fully mechanized/robotic only

TRANSVERSE TENSILE TEST						
Spec. (No.)	Width (mm)	Thickness (mm)	Area (mm ²)	Total load (N)	R _m (N/mm ²)	Fracture location
3813-1	25,00	14,65	366,3	-	230	Ductile failure in HAZ
3813-2	25,01	14,64	366,2	-	235	Ductile failure in HAZ

BEND TEST		
Type	No.	Result
SIDE TRANSVERSE SBB	4 OFF	Acceptable

OTHER TEST

MACROGRAPHIC EXAMINATION **Acceptable**

MICROGRAPHIC EXAMINATION **Acceptable**

NON DESTRUCTIVE EXAMINATION

VISUAL EXAMINATION **Acceptable**

RADIOGRAPHIC EXAMINATION **Acceptable**

PENETRANT TEST **Acceptable**

MAGNETIC PARTICLE **Not required**

ULTRASONIC TEST **Not required**

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