RINA

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO

SGQ N° 002 A SSI N° 001 G
SGA N° 002 D DAP N° 001 H
PRD N° 002 B PRS N° 066 C
SCR N° 003 F LAB N° 0832

Signatory of EA, IAF and ILAC Mutual Recognition Agreements

WELDING PROCEDURE QUALIFICATION RECORD (WPQR)

N. 15VE00038PO1/A

Manufacturer **FACIPIERI S.R.L. - Gambellara (VI)**

WPQR No. **01-02P/2015** Dated **27/02/2015**

Manufacturer's welding procedure (WPS) No. **01P/2015 ; 02P/2015** Dated **02/02/2015**

RANGE OF APPROVAL

Welding process	**135**	Type	**Partly mechanized**
Joint type	**Plates and Pipes BW ssnb-ssmb-bs/FW**		
Single/Multiple pass	**Multiple**		
Parent material group(s)	**1-1**	ISO/TR 15608	
	with a specified minimum yield strength ≤ 355 MPa		
Parent material thickness (mm)	Butt Joint = **3 to 24**	Fillet Joint t_1 = **6 to 24**	t_2 = **6 to 24**
Throat thickness (mm)	**No restriction**		
Weld deposit thickness (mm)	**3 to 24**		
Outside diameter (mm)	**Over 150 PA - PB - PC ; over 500 all other qualified positions**		
Filler metal type	**Solid wire EN ISO 14341-A: G 42 4 M21 3Si1**		
Shielding gas (ISO 14175)	**M21 with max. CO2 % = 22**	Backing gas (ISO 14175)	**With and without**
Type of welding current	**DCEP**	Heat input kJ/cm	**4,8 to 16,3**
Welding position	**All, vertical down excluded**		
Preheat min. (°C)	**20**	Interpass temp. Max. (°C)	**200**
Post weld heat treatment / Ageing	**None**		
Other information	-		

Welders name **Rapiki Bledar** Stamp No. **RB**

Welding test conducted by **FACIPIERI S.R.L. - Gambellara (VI)**

Mechanical test conducted by **SSM s.r.l. - Bolzaneto (GE)** Laboratory test No. **485 ; 104B-15-MD 105B-15-MD**

At presence of RINA Surveyor **L. Mantovan**

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 15614-1: 2012** Standard.

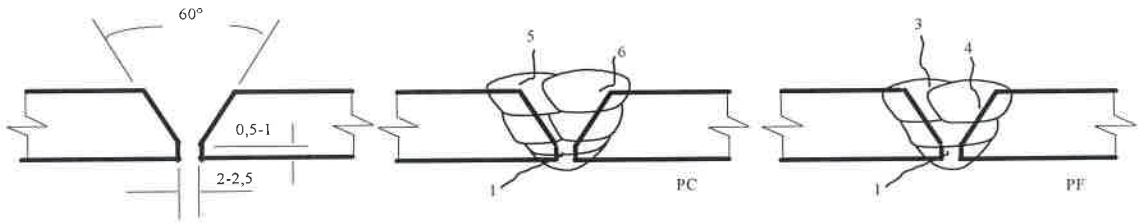
Issued at: Genova on **27/02/2015**

RINA Services S.p.A.

JOINT DETAILS AND WELDING SEQUENCES

PLATE TO PLATE SINGLE-V BUTT JOINT; ONE SIDE WELDING WITHOUT BACKING

Pass No.	Process	Filler metal diam. (mm)	Filler metal classification	Amps	Volt	Travel speed (cm/min)	Heat input (kJ/cm)	Other
WELDING POSITION: PC								
1	135	1,0	G 42 4 M21 3Si1	123	21,5	12	10,6	-
2	135	1,0	G 42 4 M21 3Si1	125	23	16	8,6	-
3	135	1,0	G 42 4 M21 3Si1	130	24	15,5	9,7	-
4	135	1,0	G 42 4 M21 3Si1	155	24,5	28	6,5	-
5-6	135	1,0	G 42 4 M21 3Si1	140	24	18,5	8,7	-
WELDING POSITION: PF								
1	135	1,0	G 42 4 M21 3Si1	102,5	19,5	7,4	13,0	-
2	135	1,0	G 42 4 M21 3Si1	165	24,5	18,5	10,5	-
3	135	1,0	G 42 4 M21 3Si1	165	25,0	23	8,6	-
4	135	1,0	G 42 4 M21 3Si1	165	24,5	23	8,4	-



PARENT MATERIAL

Material specification	**EN 10025-2**		
Type or grade	**S355 J2+N**		
Group(s)/Subgroup(s) No. (ISO/TR 15608)	**1.2**		
Thickness (mm)	**12**	Throat thickness (mm)	**N.A.**
Diameter (mm)	**N.A.**		
Branch connection angle	**N.A.**		
Other	-		

WELDING CONSUMABLES

Process	**135**
Trade name(s)	**FILCORD C**
Specification	**EN ISO 14341-A**
Classification / designation	**G 42 4 M21 3Si1**
Size (mm)	**1,0**
Deposited metal thickness	
Groove	**12 mm**
Throat	**N.A.**
Flux trade name	**N.A.**
Consumable insert	**N.A.**
Other	-

GAS

	Gas	Mixture	Flow rate (l/min.)
Shielding	-	**Ar 80% + CO2 20%**	**16**
Trailing	-	-	-
Backing	-	-	-

POSITION

Welding position **PC and PF**

Other -

PREHEAT

Preheat temperature **20 °C**

Interpass temperature **Max. 200 °C**

Other -

POSTWELD HEAT TREATMENT

Temperature **None**

Time **N.A.**

Other -

ELECTRICAL CHARACTERISTICS

Current **DCEP**

Ampere (range) **See table**

Volts (Range) **See table**

Mode of metal transfer **PF, PC: Pulsed arc**

Tungsten electrode size and type **N.A.**

Other -

TECHNIQUE

Travel speed (range) **See table**

String or weave bead **String (PC); Weave (PF)**

Oscillation (*) **N.A.**

Method of groove/edge preparation **Grinding**

Interpass cleaning **Grinding/Brushing**

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

Orifice or gas cup size **18 mm**

Stand off distance (*) **N.A.**

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
TT1	**24,96**	**11,52**	**287,53**	**167054**	**581**	**Ductile failure out of weld**
TT2	**24,94**	**11,60**	**289,30**	**168662**	**583**	**Ductile failure out of weld**

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

IMPACT TEST

Full size specimens 10 x 10 mm

Spec No.	Notch location	Notch type	Test Temp. (°C)	Impact values (J)
VWT $_{0/1,5}$	**WELD**	**ISO-V**	**-20**	**57 - 59 - 55**
VHT $_{1,5/1,5}$	**H.A.Z.**	**ISO-V**	**-20**	**185 - 190 - 206**

HARDNESS TEST		
Location	Type/load	Maximum value
Parent metal(s)	**HV10**	**198**
H.A.Z.(s)	**HV10**	**241**
Weld metal	**HV10**	**214**

all destructive test have been carried out on the test sample welded in PF, except for HV10 hardness carried out on the test sample welded in PC

OTHER TEST

MACROGRAPHIC EXAMINATION	**Acceptable (PF-PC)**
MICROGRAPHIC EXAMINATION	**Not required**

NON DESTRUCTIVE EXAMINATION

VISUAL EXAMINATION	**Acceptable (PF-PC)**
RADIOGRAPHIC EXAMINATION	**Acceptable (PF-PC)**
PENETRANT TEST	**Not required**
MAGNETIC PARTICLE	**Acceptable (PF-PC)**
ULTRASONIC TEST	**Not required**

Issued at: Genova on **27/02/2015**

RINA Services S.p.A.