

WELDING PROCEDURE QUALIFICATION RECORD (WPQR)



N. 07DG01012PO1/A

Manufacturer **BRUTTI ENRICO & C. snc – Jesi (AN)**

WPQR No. **01/08**

Dated **29/07/2008**

Manufacturer's welding procedure (WPS) No. **01/08**

Dated **11/06/2008**

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 (subgroups 1.1 and 1.2 only) CEN ISO/TR 15608**
with a specified minimum yield strength ≤ 355 Mpa
Parent material thickness (mm) **Butt Joint = 3 to 20** Fillet Joint $t_1 = 5$ to **12** $t_2 = 5$ to **12**
Throat thickness (mm) **No restriction**
Weld deposit thickness (mm) **3 to 20**
Outside diameter (mm) **Over 150**
Filler metal type **Solid wire EN 440 G4 Si1**
Shielding gas (EN 439) **M21 with max. CO₂ % = 8,8** Backing gas (EN 439) **With and without**
Type of welding current **DCEP** Heat input Kj/cm **7,0 to 18,7**
Welding position **PA**
Preheat min. (°C) **20** Interpass temp. Max. (°C) **250**
Post weld heat treatment / Ageing **None**
Other information **-**

Welders name **Vasconi Fabio**

Stamp No. **VF**

Welding test conducted by **BRUTTI ENRICO & C. snc – Jesi (AN)**

Mechanical test conducted by **CONTROL snc - Ravenna (RA)** Laboratory test No. **152**

At presence of RINA Surveyor **G. Cortini**

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: 2005** Standard

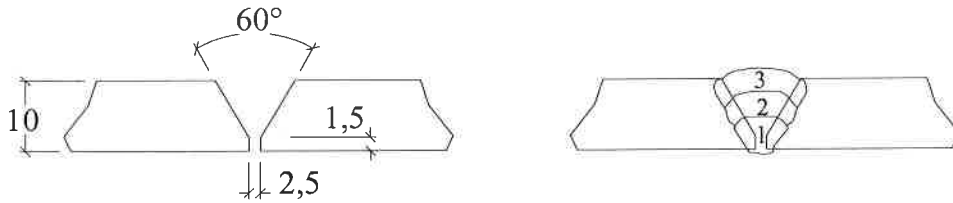
Issued at: **GENOVA**

on **4 August 2008**



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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
1	135	1,0	G4Si1	165	19	20	9,4	-
2	135	1,0	G4Si1	230	24	35	9,4	-
3	135	1,0	G4Si1	230	24	22	15,0	-



PARENT MATERIAL

Material specification	EN 10025		
Type or grade	S355 J0		
Group(s)/Subgroup(s) No. (CEN ISO/TR 15608)	1.2		
Thickness (mm)	10	Throat thickness (mm)	N.A.
Diameter (mm)	N.A.		
Branch connection angle	N.A.		
Other	-		

WELDING CONSUMABLES

Process	135
Trade name(s)	PITTARC G9
Specification	EN 440
Classification / designation	G4Si1
Size (mm)	1,0
Deposited metal thickness	
Groove	10 mm
Throat	N.A.
Flux trade name	N.A.
Consumable insert	None
Other	-

GAS			
	Gas	Mixture	Flow rate (l/min.)
Shielding	-	92% Ar + 8% CO2	17
Trailing	-	-	-
Backing	-	-	-

POSITION	
Welding position	PA
Other	-

PREHEAT		POSTWELD HEAT TREATMENT	
Preheat temperature	20 °C	Temperature	None
Interpass temperature	250 °C	Time	N.A.
Other	-	Other	-

ELECTRICAL CHARACTERISTICS			
Current	DCEP		
Ampere (range)	See table	Volts (Range)	See table
Mode of metal transfer	Short arc (root pass only) and spray arc		
Tungsten electrode size and type	N.A.		
Other	-		

TECHNIQUE	
Travel speed (range)	See table
String or weave bead	String
Oscillation (*)	N.A.
Method of groove/edge preparation	Grinding
Interpass cleaning	Brushing
Method of back gouging	N.A.
Orifice or gas cup size	19 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
TWT1a	25,2	9,8	247,0	124400	504	Ductile failure out of weld
TWT1b	25,1	9,7	243,5	123700	508	Ductile failure out of weld

BEND TEST		
Type	No.	Result
ROOT TRANSVERSE	2 OFF	Acceptable
FACE TRANSVERSE	2 OFF	Acceptable

IMPACT TEST				
Full size specimens 10x10 mm				
Spec No.	Notch location	Notch type	Test Temp. (°C)	Impact values (J)
VWT _{0/2}	WELD	ISO-V	0	165-184-156
VHT _{2/2}	H.A.Z.	ISO-V	0	174-199-224

HARDNESS TEST		
Location	Type/load	Maximum value
Parent metal(s)	HV10	168
H.A.Z.(s)	HV10	187
Weld metal	HV10	202

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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