



**BUREAU
VERITAS**



PRD N° 009B

Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC mutual Recognition Agreements

WELDING PROCEDURE QUALIFICATION RECORD

N° QP-ITA-23-00977 Rev.0

LEVEL

2

Manufacturer's WPQR no 05-2023

Manufacturer B.M.S. s.r.l. Building And Mechanical Solution SpA

Address Zona Industriale Macchiareddu 9° Strada 09010 Uta (CA)
Italy

Date of welding 30 May 2023

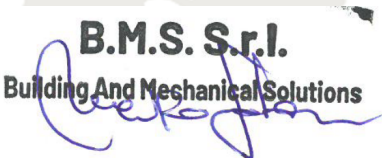
Reference standard UNI EN ISO 15614-1 Ed. 2019

Code/ Standard Supplem./Client Req PED 2014/68/EU

Certificate issued by / Authorized Inspector Mr. Giancarlo Erbi

BUREAU VERITAS ITALIA SpA

Certifies that test pieces were prepared, welded and tested satisfactorily in accordance with the requirements of the documents indicated above.
Permanent Joining Procedure Qualification Record respect the Essential Safety Requirements stated by PED Directive Appendix I- § 3.1.2. Test performed are equivalent to harmonized standard published in the Official journal of the European Union

EXAMINATION BODY	MANUFACTURER
Name, date and signature of authorized representant Mr. Giancarlo Erbi 17 Oct 2023 Stamp  	Name, date and signature of representant B.M.S. S.r.l. Building And Mechanical Solutions 

Revision No:

Reason of revision :

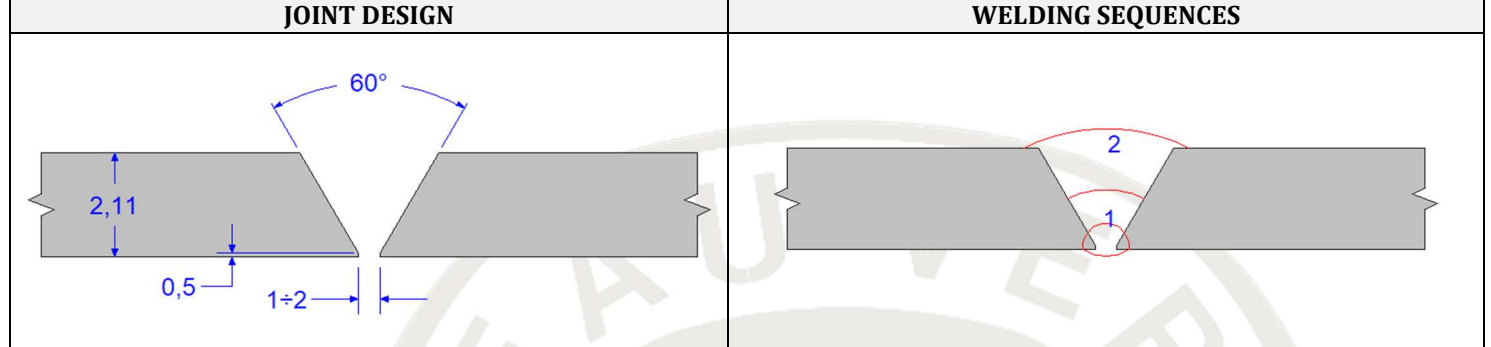
Other identification (if necessary)

: 23.SF.5436792.783 - R53441/23/GE/ge

Organization Name	B.M.S. s.r.l.		pWPS No.	05-2023
Mfr Procedure Qualification Record No.			Date	30.05.2023
Welders and/or welding operators :	Puddu Simone 7 (Pos. PC e PH)			
Welding Process(es)	A) 141	B)	C)	
Types (Manual, Autom., Partly Mechanized)	A) Manual	B)	C)	

WELDING PERFORMED WITNESSED BY :

PREPARATION			PARENT MATERIAL		
Joint type	Single bevel with root face and root gap		Parent material grade	A.312 Tp304 L	A.312 Tp304 L
Backing (only for BW)	Yes ☐	No ☒	Material Standard	ASME / ASTM	ASME / ASTM
Permanent backing Group	N.A.		Group / Subgroup	8.1	8.1
Gouging or grinding	N.A.		Thickness (mm)	2,11	2,11
Preparation and cleaning	Machining tool & brushing and degreasing		Outside diameter (mm)	26,7	26,7



Note	WELDING POSITION: PH & PC (EN ISO 6947)						Note	
Bevels	Angle	60°	Root gap	1±2 mm	Root face	0,5 mm	Tack weld	141
Buttering information (if performed)								

Buttering information (if performed)

FILLER METALS				HEAT		
	A)	B)		Preheat temperature	≥ 20	° C
Filler Metal trade make	RODACCIAI - RW 308LAWS	N.A.		Interpass temperature	≤ 250	° C
Filler Metal standard	EN ISO 14343-A: W 19 9 L AWS A5.9: ER 308L	N.A.		Postheat temp and time	N.A.	° C
Filler Metal designation	N.A.	N.A.				
F-No. (Only for level 1)	N.A.	N.A.		POST WELD HEAT TREATMENT		
A-No. (Only for level 1)	N.A.	N.A.		Holding temp.	N.A.	° C
Flux trade make	N.A.	N.A.		Holding time	N.A.	min.
Flux designation	N.A.	N.A.		Heating rate	N.A.	°C/h
Weld Metal deposit	2,11	N.A.		Cooling rate	N.A.	°C/h
Flux batch (recrushed slag)	N.A.	N.A.				
Tungsten electr. (type & Ø)	EN 6848: WTh20 - ø 2,4	N.A.		Other info	N.A.	
Other		N.A.				

GAS				TECHNIQUE		
	A)	B)		Weaving (max width of run)		
Shielding gas type %	Ar 99,99%	N.A.		Oscillation amplitude	N.A.	
Designation (EN ISO 14175)	I1	N.A.		Oscillat. frequ. - dwell time	N.A.	
flow rate l/min	10÷12	N.A.		Single or Multiple Electr.	Single	
Backing gas type %	Ar 99,99%	N.A.		Pulse welding details	N.A.	
Designation (EN ISO 14175)	I1	N.A.		Dist. cont. tube/work piece	N.A.	
flow rate l/min	10÷12	N.A.		Plasma welding details	N.A.	
Plasma gas type %	N.A.	N.A.		Torch angle °	N.A.	
Designation (EN ISO 14175)	N.A.	N.A.		Other		
flow rate l/min	N.A.	N.A.				

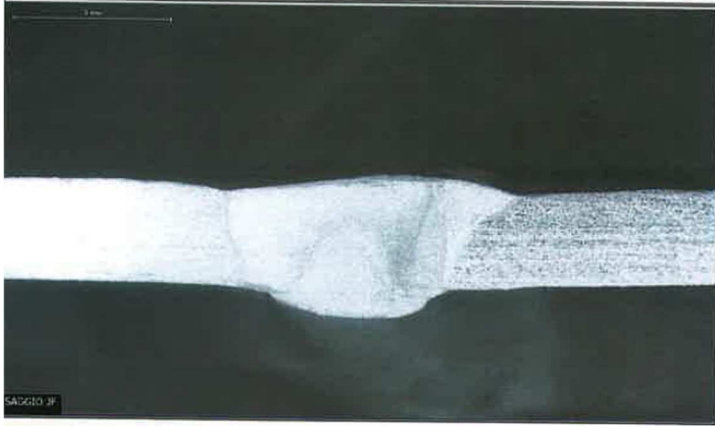
Run	Proc	Transfert Mode	Position	Filler metal (mm)	Current (A)			Voltage (V)		Curr. Type and polar	Thermal efficien. K	Wire speed (mm/s)	Welding speed (mm/s)	Heat input (J/mm)		Energy or power x arc time (J)	Weld bead lenght (mm)	Arc Energy * only for Wave form controlled (J/mm)
1	141	WELDING	PA	2,4	75	85		12	13	DC EN	N.A.	N.A.	0,867	0,374 ÷ 0,459		N.A.	N.A.	N.A.
2	141	WELDING	PA	2,4	75	85		12	13	DC EN	N.A.	N.A.	0,817	0,397 ÷ 0,487		N.A.	N.A.	N.A.

NON DESTRUCTIVE TEST			
	Carried out by	Result	Report No
Visual test	BUREAU VERITAS	Satisfactory	R53073_cp_23.SF.5436792.783 - WPQR 5
Penetrant test	Aru Manuel		PT_WPQR_5
Magnetoscopic test	N.A.		
Radiographic test	CONDOMETT	Satisfactory	RTC-N. 1103÷1106-23
Ultrasonic test	N.A.		
Other test	N.A.		

TRANVERSE TENSILE TEST in accordance with UNI EN ISO 4136:2012							Report No	AQC No. 23/415 E Pag.1 at 26.07.2023			
Test No	Direction	Position	Dimensions (mm)		Temp. °C	Rm (MPa)	Rp* (MPa)	A* (%)	Z* (%)	Fracture location	Results and remarks
			Thickness	Width		Required 515 min	Required Info	Required Info	Required Info		
JC-1	Transverse	T	2,28	6,09	Room	647				OUT WELD	
JC-2	Transverse	T	2,24	6,05	Room	598				OUT WELD	
Note											

BEND TEST in accordance with UNI EN ISO 5173:2012							Report No	AQC No. 23/415 E Pag.1 at 26.07.2023	
Test No	Direction	Specimen type			Dimensions (mm)		Former diameter	Angle	Results and remarks
	Transv-Long	Face	Root	Side	Thickness	Width	(mm)	°	
JC-1	T	X			2,11	16,0	12	180	CONFORMING
JC-2	T	X			2,11	16,0	12	180	CONFORMING
JC-3	T		X		2,11	16,0	12	180	CONFORMING
JC-4	T		X		2,11	16,0	12	180	CONFORMING
Note									

IMPACT TEST in accordance with UNI EN ISO 9016:2012							Report No									
Test No	Direction	Position	Location	Dimens. (mm)		Temp °C	Values J Acceptance 27J (21 ⁽²⁾)				Shear area %			Lateral expansion		
				Thk	W		I	II	III	Av.	I	II	III	I	II	III
Note																

MACROSCOPIC EXAMINATION In accordance with UNI EN ISO 17639:2013 Report No. AQC No. 23/415 E Pag.2 del 26.07.2023						MICROSCOPIC EXAMINATION In accordance with UNI EN ISO 17639:2013 Report No.					
 Location: Weld joint Etchant: Acidified Ferric Chloride Solution Size of magnification : 5x											
Note	Absence of cracks, cavities, inclusions, lack of fusion/penetration Result: Satisfactory					Note					

HARDNESS TEST In accordance with UNI EN ISO 9015-1:2011						Report No										
	Hardness type	HV10 – Position														
	Point	B.M. 1			H.A.Z.			W.M.			H.A.Z.			B.M. 2		
	Line 1															
Note	Maximum measured value : 190 HV10															

OTHER TESTS	Report No

CERTIFICATE ATTACHMENT	
1. Range of qualification (Level 2)	2. pWPS WPQR 5
3. Filler metal certificate RODACCIAI no. 156742 Batch No. 07139	4. Base metal certificate ARVIND No. Arvind/P/2020-2021/163 Heat no. 190601AA14
5. Visual Welding report: Bureau Veritas No. R53073_cp_23.SF.5436792.783 – WPQR 5 at 30.05.2023	6. Penetrant test report: Aru Manuel PT_WPQR_5 del at 31.05.2023
7. Radiographic test report: CONDOMETTE No. 1103÷1106-23 at 07.06.2023	8. Laboratory test report: AQC 23/415 E at 26.07.2023

NOTE - OBSERVATION

General for all process

Welding process(es)	141							
Degree of mechanization	Manual							
Type of joint and weld	141:BW (T & P) : ss nb, ss gb, ss mb, bs; T-butt joint (P): ss nb, ss gb, ss mb, bs; FW: P&T;							
Parent material group(s) and sub group(s) included permanent backing material	Group 11.1-11.1; 11.1-1.1; 1.1-1.1							
Parent Material Thickness (mm) without impact	BW	1,055	to	4,22	with		to	
Parent Material Thickness (mm) with impact	BW		to		with		to	
Parent Material Thickness (mm)	FW	1,477	to	4,22	with		to	
Parent Material Thickness (mm)	Branch	1,055	to	4,22	With	1,055	to	4,22
Deposited weld Metal Thk (mm) each process :	141 : up to 4,22							
Throat Thickness (mm) :	141 (no restriction)							
Outside Pipe Diameter (mm) :	≥ 13,35							
Single run / Multi run :	Multi run							
Angle of branch connection	≥ 60°							
Filler Material	141: Equivalent mechanical properties, same type of covering core or flux, same nominal composition and the same or lower hydrogen content							
Filler Material Size	No restriction if heat input is respected. No limitation if hardness not required							
Type of Welding Current	141 Direct Current Straight (DC EN)							
Heat Input (ISO/TR 18491)	Same used in procedure test							
Welding Positions :	All positions, except for PG / PJ and J-L045							
Preheat Temperature :	> 20°C							
Interpass Temperature :	< 150°C							
Post-Heating for hydrogen release :	The temperature and duration of post-heating for hydrogen release shall not be reduced. Post-heating shall not be omitted, but may be added.							
Post-Weld Heat Treatment	Yes	☐	No	☒	Addition or deletion not permitted			
Post-Weld Heat Treatment temp.	N.A.							
Other informations								

Process 12

Number of electrodes	N.A.
Flux make and designation (if impact required at < -20°C)	N.A.
Flux re-crushed slag if used	N.A.

Processes 111

FM trade name: (if impact required at < -20°C)	N.A.
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Processes 114

FM trade name : (if impact required at < -20°C)	N.A.
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Processes 13

Shielding Gas:	N.A.
Content of CO2	N.A.
Wire system (Single or multiple)	
Mode of Metal Transfer :	N.A.
Power source	☐ Waveform controlled ☐ Pulsed mode (without waveform controlled) ☐ Without pulsed and waveform
136 and 132 Filler Material trade name: (impact required at < -20°C)	Same

Process 14

Shielding Gas:	EN ISO 14175 I1
Content of He	N.A.
Filler metal used	N.A.

Process 15

Plasma gas composition	N.A.
Shielding gas composition	N.A.
Filler metal used	N.A.
Joint preparation (if impact test required)	N.A.

Process 311

Filler metal used	N.A.
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Backing Gas

Backing gas	N.A.
Backing gas main group (ISO 14175)	N.A.
Change backing gas (material groups 7 and 10)	N.A.
Deletion if production are made with mb > 5 mm	N.A.