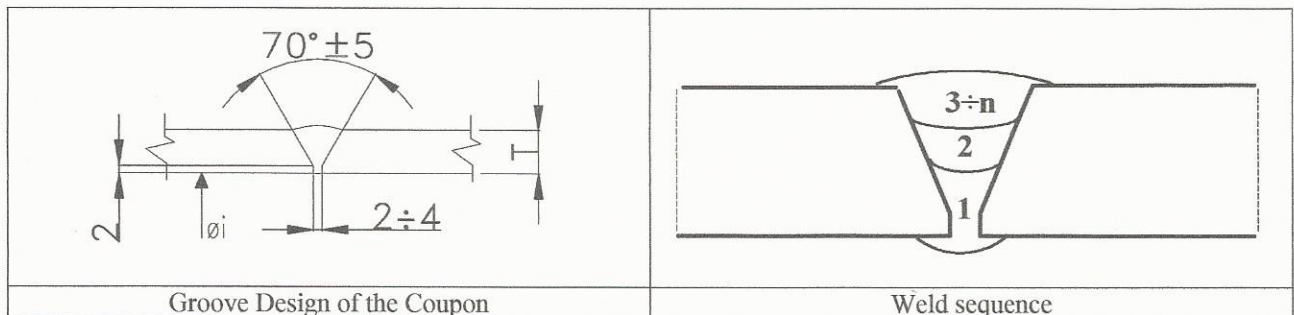


SER. IN. SERVIZI INDUSTRIALI	PROCEDURE QUALIFICATION RECORD	PQR.MA.004 p. 1/2
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Welding Process(es)	GTAW
Types	Manual
pWPS	WPS_BW_PQRMA004 Rev. 0

JOINTS (QW-402)



BASE METALS (QW-403)

Material specification	ASME SA 333 Gr. 6
to Material specification	ASME SA 312 Tp 316L
P no./Gr. no. 1/1	to P no./Gr. no. 8/1
Thk of test coupon	T=2,77 mm
Dia. of test coupon	O.D. 21,34 mm
Other	-

POSTWELD HEAT TREATMENT (QW-407)

<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> None
Temperature	-
Holding time	-
Heating/cooling rate	-
Other: --	

FILLER METALS (QW-404)

Process	GTAW		
SFA Spec.	A 5.9		
AWS Class.	ER 309L		
F no.	6		
A no.	8		
Size, mm	2,4		
Weld thk, mm	t= 3 mm		
GTAW: Solid rod			

GAS (QW-408)

	Gas(es)	% Mixture	Flow rate
Shielding	Ar*	N.A.	8 L/min.
Trailing	N.A.	--	--
Backing	Ar*	N.A.	15 L/min.

*Purity: 99,96%

ELECTRICAL CHARACTERISTICS (QW-409)

See Weld data record

POSITION (QW-405)

Position of groove	6G
Progression	Uphill
Other	-

TECHNIQUE (QW-410)

Travel speed	See Weld data record
<input checked="" type="checkbox"/> String bead	<input type="checkbox"/> Weave bead
<input type="checkbox"/> Single pass	<input checked="" type="checkbox"/> Multipass

PREHEAT (QW-406)

Preheat temperature	Room temp. (10°C)
Interpass temp. max	175°C
Other	-

<input type="checkbox"/> Single electr.	<input type="checkbox"/> Multiple elect.	<input checked="" type="checkbox"/> N.A.
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Other: -

Weld data record

Layer	Process	Filler metal: class./dia. mm	Current Type/Pol.	Current A	Voltage V	Speed mm/min	Heat Input kJ/mm	Trade mark of consumables
1	GTAW	ER 309L / 2,4	DC/SP	110	13	90	0,953	INERTROD 309L (OERLIKON)
2	GTAW	ER 309L / 2,4	DC/SP	110	13	100	0,858	INERTROD 309L (OERLIKON)

SER. IN. SERVIZI INDUSTRIALI	PROCEDURE QUALIFICATION RECORD	PQR.MA.004 p. 2/2
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Tensile test (QW-150)

Specimen	Width mm	Thickness mm	Area mm ²	Total load kN	Unit stress N/mm ²	Type of fracture & location
QW-462.1(a) 004 - a	6,21	2,10	13,04	6,89	529	Ductile, base metal side SA 333 Gr. 6
QW-462.1(a) 004 - b	6,23	2,12	13,21	7,00	530	Ductile, base metal side SA 333 Gr. 6

Guided-bend test (QW-160)

Type and figure / Specimen	Bending angle	Result
QW-462.2 Root bend / (004 - c)	180°	Satisfactory
QW-462.2 Root bend / (004 - d)	180°	Satisfactory
QW-462.2 Face bend / (004 - e)	180°	Satisfactory
QW-462.2 Face bend / (004 - f)	180°	Satisfactory

Toughness tests (QW-170)

Specimen mm	Notch location	Notch type	Test temperature °C	Impact values Joules	Average values Joules
004 g/h/i	Parent metal (Side SA 333 Gr. 6)	KV 2.5	-52°C	24-24-20	23
004 l/m/n	HAZ (Side SA 333 Gr. 6)	KV 2.5	-52°C	10-12-10	11
004 o/p/q	Weld metal	KV 2.5	-52°C	14-14-14	14
004 r/s/t	HAZ (Side SA 312 Tp316L)	KV 2.5	-52°C	12-12-12	12
004 u/v/z	Parent metal (Side SA 312 Tp316L)	KV 2.5	-52°C	30-24-28	27

Other tests

Type of test	Results	Certificates
Visual examination	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15ai
Penetrant test examination	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15am
Radiographic examination	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15al
Trasverse tensile test	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15an
Impact test	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15ap
Trasverse bend test	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15ao
Hardness test & Macroscopic	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15aq

Hardness test

Type	Zone	Results (max values)
HB	Parent metal (side SA 333 Gr. 6)	185-183-188
HB	HAZ	188-192-196
HB	Weld metal	219-215-215
HB	HAZ	149-139-148
HB	Parent metal (side SA 312 Tp316L)	159-156-158

Sample: PQRMA004

Welders' name	ESPOSITO LUIGI	Clock no. -	Stamp no. EL
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Tests conducted by: STEEL SERVICE S.a.s.	Laboratory test no. -
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We certify that the statements in this record are correct and that the test coupons were prepared, welded and tested in accordance with the requirements of Section IX of the ASME BOILER AND PRESSURE VESSEL and 97/23/EC PED DIRECTIVE.

Date 2015.04.27



Manufacturer
SER. IN. SERVIZI INDUSTRIALI
by Operation Manager (Esposito Luigi)
Volturato a società Serin S.r.l. Evolution

SER. IN.
di Esposito Luigi



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