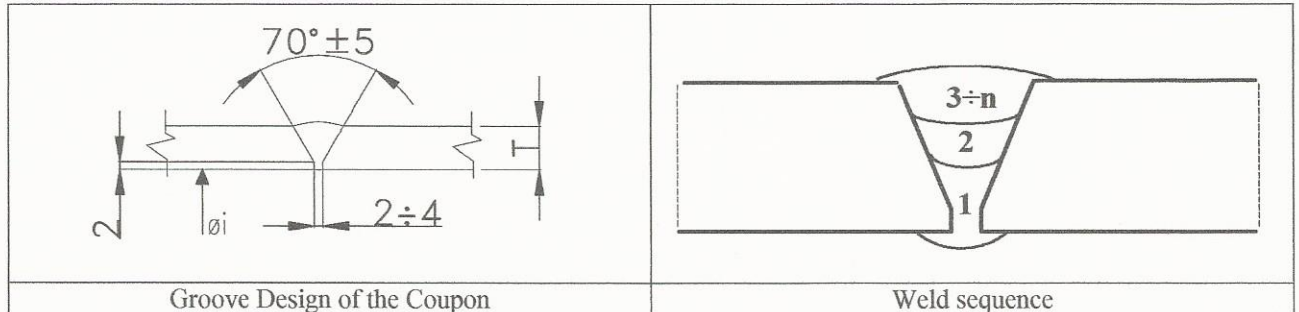


SER. IN. SERVIZI INDUSTRIALI	PROCEDURE QUALIFICATION RECORD	PQR.MA.005 p. 1/2
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Welding Process(es)	GTAW
Types	Manual
pWPS	WPS BW PQRMA005 Rev. 0

JOINTS (QW-402)



BASE METALS (QW-403)

Material specification	ASME SA 312 Tp 316L
to Material specification	ASME SA 312 Tp 316L
P no./Gr. no. 8/1	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 316L		
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 316L / 2,4	DC/SP	110	13	90	0.953	INERTROD 316L (OERLIKON)
2	GTAW	ER 316L / 2,4	DC/SP	110	13	100	0.858	INERTROD 316L (OERLIKON)

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) 005 - a	2,26	6,20	14,01	7,99	571	Ductile, base metal
QW-462.1(a) 005 - b	2,28	6,22	14,18	8,05	568	Ductile, base metal

Guided-bend test (QW-160)

Type and figure / Specimen	Bending angle	Result
QW-462.2 Root bend / (005 - c)	180°	Satisfactory
QW-462.2 Root bend / (005 - d)	180°	Satisfactory
QW-462.2 Face bend / (005 - e)	180°	Satisfactory
QW-462.2 Face bend / (005 - f)	180°	Satisfactory

Toughness tests (QW-170)

Specimen mm	Notch location	Notch type	Test temperature °C	Impact values Joules	Average values Joules
005 g/h/i	Parent metal	KV 2.5	-52°C	30-30-30	30
005 l/m/n	HAZ	KV 2.5	-52°C	24-26-26	25
005 o/p/q	Weld metal	KV 2.5	-52°C	18-22-22	21

Other tests

Type of test	Results	Certificates
Visual examination	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15bb
Penetrant test examination	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15bd
Radiographic examination	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15bc
Transverse tensile test	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15be
Impact test	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15bg
Transverse bend test	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15bf
Hardness test & Macroscopic	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15bh

Hardness test

Type	Zone	Results (max values)
HB	Parent metal	139-139-142
HB	HAZ	136-142-139
HB	Weld metal	161-158-154
HB	HAZ	139-138-140
HB	Parent metal	162-156-159

Sample: PQRMA005

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

Volturato 2016.08.03



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

SERIN.
di Esposito Luigi



SERIN SRL
EVOLUTION