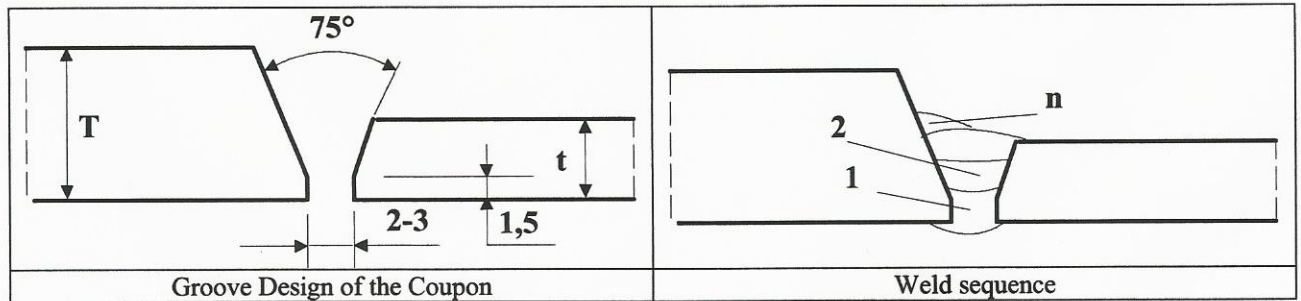


Welding Process(es)	GTAW +SMAW
Types	Manual
pWPS	WPS_BW_PQRMA017 Rev. 0

JOINTS (QW-402)



BASE METALS (QW-403)

Material specification (T)	ASME SA 516 Gr. 70
to Material specification (t)	ASME SA 516 Gr. 60
P no./Gr. no. 1/2 (T)	to P no./Gr. no. 1/1 (t)
Thk of test coupon (T)	38 mm
Thk of test coupon (t)	8 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	SMAW	
SFA Spec.	A 5.28	A 5.5	
AWS Class.	ER 80S-Ni1	E 7018-G *	
F no.	6	4	
A no.	10	10	
Size, mm	2	2,5	
Weld thk, mm	t= 2,5 mm	t= 5,5 mm	
GTAW: Solid rod			
* Chemical analysis per SFA 5.5 E 7018C3L			

GAS (QW-408)

	Gas(es)	% Mixture	Flow rate
Shielding	Ar*	N.A.	12 L/min.
Trailing	N.A.	--	--
Backing	N.A.	--	--

*Purity: 99,96%

ELECTRICAL CHARACTERISTICS (QW-409)

See Weld data record

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

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

POSITION (QW-405)

Position of groove	1G
Progression	N.A.
Other	-

PREHEAT (QW-406)

Preheat temperature	Room temp. (10°C)
Interpass temp. max	200°C
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 80S-Ni1 / 2	DC/SP	110	14	70	1.320	CARBOROD Ni1 (OERLIKON)
2÷4	SMAW	E 7018-G / 2,5	DC/EP	120	22	140	1.131	TENAX 76S (OERLIKON)

SER. IN. SERVIZI INDUSTRIALI	PROCEDURE QUALIFICATION RECORD	PQR.MA.017 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) 2A - a	7,44	19,25	143,22	69,03	482	Ductile, base metal
QW-462.1(a) 2A - b	7,38	19,23	141,92	68,26	481	Ductile, base metal

Guided-bend test (QW-160)

Type and figure / Specimen	Bending angle	Result
QW-462.2 Face bend / (2A - c)	180°	Satisfactory
QW-462.2 Face bend / (2A - d)	180°	Satisfactory
QW-462.2 Root bend / (2A - e)	180°	Satisfactory
QW-462.2 Root bend / (2A - f)	180°	Satisfactory

Toughness tests (QW-170)

Specimen mm	Notch location	Notch type	Test temperature °C	Impact values Joules	Average values Joules
2A	PM (SA 516 Gr. 60)	KV 7.5	-52°C	38-38-48	41
	HAZ (SA 516 Gr. 60)	KV 7.5	-52°C	38-44-46	42
	WM	KV 7.5	-52°C	72-46-66	61
	HAZ (SA 516 Gr. 70)	KV 7.5	-52°C	50-48-42	46
	PM (SA 516 Gr. 70)	KV 7.5	-52°C	32-30-30	30

Other tests

Type of test	Results	Certificates
Visual examination	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15dr
Penetrant test examination	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15dt
Radiographic examination	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15ds
Trasverse tensile test	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15du
Impact test	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15dz
Trasverse bend test	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15dv
Hardness test & Macro	Acceptable	STEEL SERVICE S.a.s. Cert. 092SLD15ea

Hardness test

Type	Zone	Results (max values)
HB	Parent metal (Line 1) / (Line 2) / (Line 3)	166-162-165 / 168-167-169 / 168-170-171
HB	HAZ (Line 1) / (Line 2) / (Line 3)	175-177-171 / 172-175-176 / 171-177-170
HB	Weld metal (Line 1) / (Line 2) / (Line 3)	166-163-165 / 160-161-161 / 166-167-169
HB	HAZ (Line 1) / (Line 2) / (Line 3)	164-168-169 / 165-167-166 / 162-165-165
HB	Parent metal (Line 1) / (Line 2) / (Line 3)	163-160-164 / 160-162-162 / 161-164-163

Sample: PQRMA017

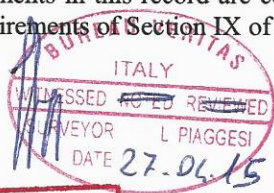
Welders' name	ESPOSITO LUIGI	Clock no. -	Stamp no. EL
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Tests conducted by: STEEL SERVICE S.a.s.	Laboratory test no. -
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We certify that the statements in this record are correct and that the test coupons 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

SER. IN.
di Esposito Luigi

SER. IN. SRL
EVOLUTION

