DNV·GL

seaspan SHIPYARDS

Seaspan Vancouver Shipyards Co. Ltd.
Seaspan Victoria Shipyards Co. Ltd.
Seaspan Vancouver Drydock Co. Ltd.

WPS No:
DNVGL-Pipe-04-02
Revision No:
0

WELDING PROCEDURE SPECIFICATION (WPS)

General information ☐ pWPS

Manufacturer: **Seaspan Vancouver Shipyards Co. Ltd.**

Manufacturer address: **50 Pemberton Ave., North Vancouver, B.C. V7P 2R2**

Welding procedure qualification test records: **PQR DNVGL-Pipe-04-02**

Welding process (ISO 4063):	**141-GTAW Manual**	Number of electrodes:	**1**	Tungsten electrode designation and Ø:	**EWTh-2 3.2 mm**
Welding position(s) (ISO/ASME): **All ex. 3G down**		Joint type:	**Plate, Pipe and socket Butt, T, K, Y CJP, PJP Groove, Fillet weld**	Stringer/weave	**Stringer and slight weave**
Welding layer:	**Multi-layer One/ Two side**	Backing: Gas flow rate:	**With (Straight Argon) 5-10 lit/min**	Method of preparation:	**Plasma / Oxy fuel cut**
Min. preheating tempertaure:	**Ambient**	Max. interpass temperature:	**73 °C**	PWHT details:	**None**

Material specification

Base material 1 group:	**ASTM A312 Gr. 316L and all P-No 8, Group No. 1 materials**	Base material 2 group:	**ASTM A312 Gr. 316L and all P-No 8, Group No. 1 materials**
Delivery condition(s):	**AR Hot Rolled Plate and Annealed Seamless pipe**	Delivery condition(s):	**AR Hot Rolled Plate and Annealed Seamless pipe**
Thickness range Butt: Fillet Troat: Leg size:	 **3 – 8 mm** **3 – 8 mm** **4.2 – 11.3 mm**	Thickness range Butt: Fillet Throat: Leg size:	 **3 – 8 mm** **3 – 8 mm** **4.2 – 11.3 mm**
Outside diameter range:	**≥ 25 mm**	Outside diameter range:	**≥ 25 mm**

Welding consumables

No.	Filler metal and flux				Shielding gas		Nozzle diameter (ID)	DNV GL grade(s)
	Type	Manufacturer	Brand Name/ Designation	ISO or AWS classification	Type	Purity		
1	**Bare Rod**	**Exocor**	**Executive 316L**	**AWS A5.9 ER316L**	**Straight Argon**	**100%**	**8 mm**	**-**

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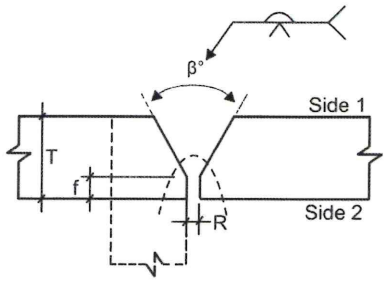
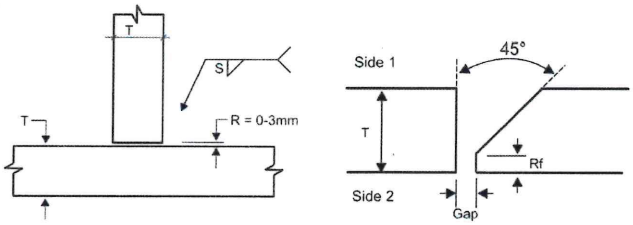
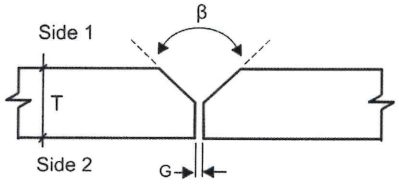
Joint preparation (sketch) and welding details

Joint design	Welding sequences
 Thickness T = 3 - 8 mm Groove angle (β) = 70 - 90° Root face Rf= 0 - 3 mm Butt Root gap G = 2 – 3 mm Fillet Root gap G = 0 - 3 mm All position except 3G down Single or Double Vee groove/ Bevel T, K, Y Complete/ Partial Joint Penetration   Note: * Branch connections shall be qualified separately * This procedure is applicable for welding from one side with backing (gas purging) and both side with grinding * Only Stainless wire brush and grinding disk to be used. * Grind weld joint preparation edges and adjacent surfaces to bright metal prior to welding to remove all traces of paint, primer, scale, rust, moisture and any other contaminants. Wire brush, grinding to be used for interpass cleaning. * Any change in wire brand name/designation is permitted as long as AWS/ISO consumable classification remains the same as PQR.	For multiple welding process qualification, the deposited weld metal thickness shall be recorded for each filler metal and process used. Multi Runs/ Multi layers As required

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Run[1]	Process[2]	C[3]	Ø[4] (mm)	Gas flow (l/min)	Current (A)	Voltage (V)	C&P[5]	v[6] (in/min)	s[7] (in/min)	F/B[8]	HI[9] (kJ/cm)
Root & Hot	**141-GTAW**	**1**	**2.4**	**16 - 20**	**62 – 100**	**8.5 – 14**	**DC-**	**1.21 – 1.64**	**N/A**	**F/B**	**9.33 – 15.56**
Fill & Cap	**141-GTAW**	**1**	**2.4 & 3.2**	**16 - 20**	**68 – 100**	**9 – 15**	**DC-**	**2.07 – 2.80**	**N/A**	**F/B**	**6.67 – 11.11**

(1) Root, fill or cap. (2) Ref. ISO4063. (3) Welding consumable, see previous table. (4) Filler metal diameter. (5) Current and polarity, /P for pulse welding. Details to be specified below. (6) Travel speed. (7) Wire feed speed. (8) Forehand "F" or backhand "B" progression. (9) Heat input not compensated for process efficiency (arc energy).

Note:
* The values for the Current (A) and Voltage (V) are -15%, +25% and Travel speed (V) is ±15% based on the PQR DNVGL-Pipe-04-02.
* Range of the Heat Inputs are ± 25% based on the actual values in the PQR DNVGL-Pipe-04-02.
* Selection of Current (A), Voltage (V) and Travel speed (V) shall be in compliance with approved range of heat input provided above.

Further information

Shop primer for fillet weld					
Manufacturer:	**N/A**	Brand name:	**N/A**	Max. dry film thickness:	**N/A µm**

Place: **Vancouver, BC, Canada**
Date : **October-01-2019**

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. TALEIE 43951

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Seaspan Vancouver Shipyards Co. Ltd

Place: **Vancouver, BC, Canada**
Date : **October-01-2019**

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for **Yuksel Ozdemir**

Surveyor - DNV GL Maritime Vancouver