QW-482 suggested format for welding procedure specifications (WPS)
(see QW-200.1, Section IX, ASME Boiler and Pressure Vessel Code)

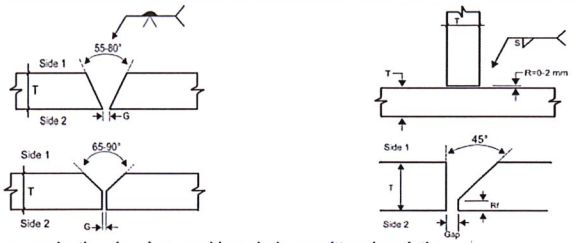
Company Name: Seaspan SHIPYARDS	Seaspan Vancouver Shipyards Co. Ltd. Seaspan Vancouver Drydock Co. Ltd. Seaspan Victoria Shipyards Co. Ltd.	By: SKC ENGINEERING WELDING • MATERIALS • MECHANICAL • INSPECTION • TESTING SKC ENGINEERING 19165 94th AVENUE, SURREY, BC, V4N 3S4 P (604) 882 1889 • F (604) 882 1811 • www.skcsu.com
Acceptance Standard:	DNVGL-RU-SHIP-Pt.2 Ch.4 and ASME BPVC Section IX	

Welding Procedure Specification No.:	DNVGL-Pipe-05-01 (CuNi TIG TIG)	Revision:	3
Supporting PQR No.(s):	DNVGL-Pipe-05-01 (CuNi TIG TIG) - Rev 1	Issue Date:	29-Jul-19
Welding Process(es)	GTAW	WO:	W13830-D2
Type(s):	Manual		

JOINTS (QW-402)

Joint design	Refer Details	Root Spacing:*	1/32 in - 1/8 in
Backing	With	Retainers (+/-)	No Retainers

☐ Metal ☐ Nonfusing Metal
☐ Non-metallic ■ Other — Gas Purging



Sketches, production drawings, weld symbols or written description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

Details

Groove Weld Joint Design & Fillets
All Multi Runs and Multi Layers CJP welded from one side (open root) or from both sides with back gouge to sound metal or welded from one side with backing.
All position except 3G down
Single or Double V groove
Butt, T, K, Y Complete/ Partial Joint Penetration
Branch connections shall be qualified separately
This procedure is applicable for welding from one side with backing (gas purging) and from both sides with/ without mechanical gouging
This procedure is also applicable for other double side and single side welded preparation. Also this procedure covers single bevel joint design.
For welds with backing use Root Spacing = 1/8 in - 3/16 in.

BASE METALS (QW-403)

P no.	34	Group no.	-	to P no.	34	Group no.	-
or							
Specification type and grade							
to Specification type and grade							
or							
Chem. Analysis and Mech. Properties							
to Chem. Analysis and Mech. Properties							

Thickness Range			
Base Metal Groove	1/8 in (3 mm) to 19/64 in (7.6 mm)	Fillet (throat):	1/8 in (3 mm) to 19/64 in (7.6 mm)
Pipe Diameter Groove	All	Fillet:	All
T Limits Impact	N/A		

FILLER METALS (QW-404)

Welding Process	GTAW
Filler Metal F No.	F34
Filler Weld metal analysis A No.	ERCuNi
SFA Specification	5.7
Filler Metal Classification	ERCuNi
Filler Metal Size	3/32, 1/8 in
Consumable Inserts	None
Filler Metal Product Form	Solid rod
Deposit Weld Metal thickness (t)	
Groove	7.6 mm (Max)
Fillet	7.6 mm (Max)
Flux (addition/deletion)	None
Filler (addition/deletion)	None
Other	

QW-482 (BACK)

WPS no. DNVGL-Pipe-05-01 (CuNi TIG TIG) **Rev. 3**

POSITIONS (QW-405)	
Position(s) of Groove	All
Welding Progression:	Up
Position(s) of Fillet	All

POSTWELD HEAT TREATMENT (QW-407)			
PWHT	None		
Temperature	N/A	Time	N/A
T Limits	N/A		

PREHEAT (QW-406)	
Preheat Temp. Min.	Ambient (15°C)
Interpass Temp. Max	60°C
Preheat Maintenance	As Above
(continuous or special heating where applicable	N/A
should be recorded)	

GAS (QW-408)			
	Gas(es)	Percent Composition (Mixture)	Flow rate(cfph)
GTAW			
Shielding	Argon	100% Argon	20-35
Trailing	None		
Backing	Argon	100% Argon	15-25

ELECTRICAL CHARACTERISTICS (QW-409)			
Max Heat Input (kJ/in)	See below		
Current AC or DC	See below	Polarity	See below
Amps (range)	See below	Volts (range)	See below
Pulsing I	N/A		
Tungsten Electrode	1/8" EWTh-2 (2% Thoriated)		
Other			

TECHNIQUE (QW-410)	
Welding Process	GTAW
String or weave bead	Stringer
Orifice or gas cup size	8 mm
Method cleaning	Brushing, grinding
Method of back gouging	Grinding
Oscillation	None
Multiple or single pass (per side)	Multipass, as required
Single or multi electrode	Single
Closed to out chamber	N/A
Electrode spacing	N/A
Manual or automatic	Manual
Peening	None
Use of thermal processes	None
Other	

Layers /Passes	Process	Filler Metal Classification	Filler Metal Diameter in (mm)	Type Polarity	Amps	Volts	ATS (ipm)	HI (kJ/in)
Root / Hot	GTAW	ERCuNi	3/32, 1/8 (2.4, 3.2)	DC SP(EN)	90-140	11-15	2-6	37-61
Fill & Cap	GTAW	ERCuNi	3/32, 1/8 (2.4, 3.2)	DC SP(EN)	90-140	11-15	2-6	37-61

Welding Notes:

Base metal shall be in clean condition. Dirt of any kind must be removed along with residual oil and grease.
Avoid sources of the elements that can cause cracking or microfissuring in the weld (like crayon, paint identification, temperature indication markers, and other contaminants).
Any change in wire brand name/designation is permitted as long as AWS/ISO consumable classification remains the same as PQR.

Manufacturer : **Seaspan Vancouver Shipyards**

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — Dr. M. J. SMITH # 43744

2019-07-29

Prepared by: **Mathew Smith P.Eng.**

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