

QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATIONS (WPS)
 (See QW-200.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name TESCORP By Russell Creed
 Welding Procedure Specification No. TM-5S Date 4/18/2012 Supporting PQR No.(s) 1
 Revision No. 0 Date _____

Welding Process(es) (1) GMAW, (2) FCAW Type(s) (1) Semi Auto, (2) Semi Auto
(Automatic, Manual, Machine, or Semi-Automatic)

JOINTS (QW-402)

Joint Design Single Vee & Corner Joint
 Root Spacing 1/16" - 3/16"
 Backing: Yes _____ No X
 Backing Material (Type) _____
(Refer to both backing and retainers)

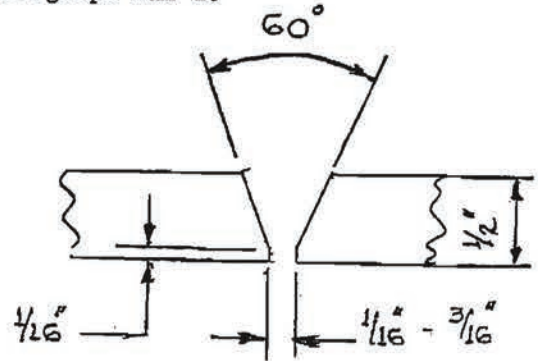
- Metal Nonfusing Metal
 Nonmetallic Other

Sketches, Production Drawings, Weld Symbols, or Written Description should show the general arrangement of the parts to be welded. Where applicable, the details of weld groove may be specified.

[At the option of the manufacturer, sketches may be attached to illustrate joint design, weld layers, and bead sequence (e.g., for notch toughness procedures, for multiple process procedures, etc.)]

Details

Joint Alignment Per Sect. VIII Div. 1 Paragraph UHT-20



***BASE METALS (QW-403)**

P-No. 8 Group No. 1 to P-No. 8 Group No. 1
 OR

Specification and type/grade or UNS Number _____
 to Specification and type/grade or UNS Number _____
 OR

Chem. Analysis and Mech. Prop. N/A
 to Chem. Analysis and Mech. Prop. N/A

Thickness Range:
 Base Metal: Groove 3/16" to 1" Fillet All
 Maximum Pass Thickness $\leq 1/2$ in. (13 mm) (Yes) X (No) _____
 Other _____

***FILLER METALS (QW-404)**

	1 GMAW	2 FCAW
Spec. No. (SFA)	(1) 5.22	(2) 5.22
AWS No. (Class)	(1) E-316LTO-1&4	(2) E316LTO-1&4
F-No.	(1) 5	(2) 6
A-No.	(1) 1	(2) 1
Size of Filler Metals	(1) .035"	(2) .045"
Filler Metal Product Form		
Supplemental Filler Metal	NONE	NONE
Weld Metal		
Thickness Range:		
Groove	(1) .20"	(2) .60"
Fillet	(1) All	(2) All
Electrode-Flux (Class)	N/A	(2) 5.22
Flux Type		
Flux Trade Name	N/A	KOBELCO
Consumable Insert	N/A	N/A
Other		

*Each base metal-filler metal combination should be recorded individually.

POSITIONS (QW-405)
 Position(s) of Groove 1G
 Welding Progression: Up _____ Down _____
 Position(s) of Fillet _____
 Other _____

POSTWELD HEAT TREATMENT (QW-407)
 Temperature Range NONE
 Time Range _____
 Other _____

PREHEAT (QW-406)
 Preheat Temperature, Minimum 70° F
 Interpass Temperature, Maximum 500° F Max
 Preheat Maintenance none
 Other _____
 (Continuous or special heating, where applicable, should be recorded)

GAS (QW-408)

	Percent Composition		
	Gas(es)	(Mixture)	Flow Rate
Shielding	<u>Argon CO₂</u>	<u>75AR 25 CO₂</u>	<u>25-35 CFh</u>
Trailing	_____	_____	_____
Backing	_____	_____	_____
Other	_____	_____	_____

ELECTRICAL CHARACTERISTICS (QW-409)

Weld Pass(es)	Process	Filler Metal		Current Type and Polarity	Amps (Range)	Wire Feed Speed (Range)	Energy or Power (Range)	Volts (Range)	Travel Speed (Range)	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, etc.)
		Classification	Diameter							
1	GMAW	ER316Si	.035"	REV	90-300	130-385			15-25	4-15 IPM
2-8	FCAW	E316LTO1&4	.045"	REV	100-250	130-385			20-35	4-15 IPM

Amps and volts, or power or energy range, should be recorded for each electrode size, position, and thickness, etc.

Pulsing Current DC Heat Input (max.) 130-300

Tungsten Electrode Size and Type None
(Pure Tungsten, 2% Thoriated, etc.)

Mode of Metal Transfer for GMAW (FCAW) Short Circuiting ARC (SPRAY)
(Spray Arc, Short Circuiting Arc, etc.)

Other _____

TECHNIQUE (QW-410)
 String or Weave Bead String/Weave
 Orifice, Nozzle, or Gas Cup Size 3/8" - 5/8"
 Initial and Interpass Cleaning (Brushing, Grinding, etc.) Brush or Grind as required

Method of Back Gouging N/A
 Oscillation N/A
 Contact Tube to Work Distance .25"-.75"
 Multiple or Single Pass (Per Side) Multiple
 Multiple or Single Electrodes Single
 Electrode Spacing _____
 Peening No Peening
 Other _____

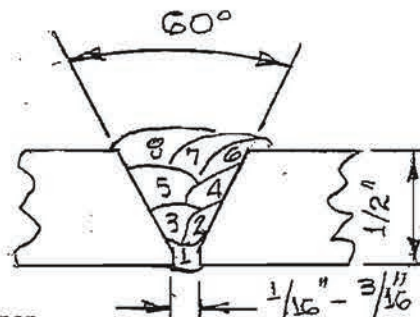
(10)

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORDS (PQR)
(See QW-200.2, Section IX, ASME Boiler and Pressure Vessel Code)
Record Actual Variables Used to Weld Test Coupon

Company Name TESCORP
 Procedure Qualification Record No. 1 Date 4/18/2012
 WPS No. TM-5S
 Welding Process(es) (1) GMAW, (2) FCAW
 Types (Manual, Automatic, Semi-Automatic) Semi-Automatic

JOINTS (QW-402)

Pass	Amps	Volts	Size	Travel Speed
1	215	17	.035"	10-14
2	242	25.6	.045"	10-14
3	242	25.6	.045"	10-14
4	242	25.6	.045"	10-14
8	242	25.6	.045"	10-14
6	242	25.6	.045"	10-14
7	242	25.6	.045"	10-14
8	242	25.6	.045"	10-14



Groove Design of Test Coupon

(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal and process used.)

BASE METALS (QW-403)
 Material Spec. SA240-316L
 Type/Grade, or UNS Number 316L
 P-No. 1 Group No. _____ to P-No. 1 Group No. _____
 Thickness of Test Coupon .50"
 Diameter of Test Coupon N/A
 Maximum Pass Thickness _____
 Other _____

POSTWELD HEAT TREATMENT (QW-407)
 Temperature N/A
 Time _____
 Other _____

FILLER METALS (QW-404)	1	2
SFA Specification	<u>5.22</u>	<u>5.22</u>
AWS Classification	<u>ER316Si/ER3i6LSi</u>	<u>E316LTO-1&4</u>
Filler Metal F-No.	<u>6</u>	<u>6</u>
Weld Metal Analysis A-No.	<u>1</u>	<u>1</u>
Size of Filler Metal	<u>.035"</u>	<u>.045"</u>
Filler Metal Product Form	_____	_____
Supplemental Filler Metal	_____	_____
Electrode Flux Classification	_____	_____
Flux Type	_____	_____
Flux Trade Name	_____	_____
Weld Metal Thickness	<u>.20"</u>	<u>.30"</u>
Other	_____	_____

GAS (QW-408)

	Percent Composition		
	Gas(es)	(Mixture)	Flow Rate
Shielding	<u>Argon/CO₂</u>	<u>75AR25CO₂</u>	<u>35CFH</u>
Trailing	_____	_____	_____
Backing	_____	_____	_____
Other	_____	_____	_____

ELECTRICAL CHARACTERISTICS (QW-409)
 Current DC
 Polarity Reverse
 Amps. See Above Volts _____
 Tungsten Electrode Size N/A
 Mode of Metal Transfer for GMAW (FCAW) SHORT CIRCUIT (SPRAY)
 Heat Input _____
 Other _____

POSITION (QW-405)
 Position of Groove 1G
 Weld Progression (Uphill, Downhill) _____
 Other _____

TECHNIQUE (QW-410)
 Travel Speed See Above
 String or Weave Bead String/Weave
 Oscillation N/A
 Multipass or Single Pass (Per Side) Multiple
 Single or Multiple Electrodes Single
 Other _____

PREHEAT (QW-406)
 Preheat Temperature 70°F
 Interpass Temperature 500°F
 Other N/A

QW-483 (Back)

Tensile Test (QW-150)

PQR No. 1

Specimen No.	Width	Thickness	Area	Ultimate Total Load	Ultimate Unit Stress, (psi or MPa)	Type of Failure and Location
1	.754	.460	.3468	29951	86400	Ductile Base Metal
2	.754	.450	.3393	29469	86900	Ductile Base Metal

Guided-Bend Tests (QW-160)

Type and Figure No.	Result
Transverse Side Bends QW-462.2	No Defects Greater Than 1/8"

Toughness Tests (QW-170)

Specimen No.	Notch Location	Specimen Size	Test Temperature	Impact Values			Drop Weight Break (Y/N)
				ft-lb or J	% Shear	Mils (in.) or mm	

Comments _____

Fillet-Weld Test (QW-180)

Result — Satisfactory: Yes _____ No _____ Penetration into Parent Metal: Yes _____ No _____

Macro — Results _____

Other Tests

Type of Test _____

Deposit Analysis _____

Other _____

Welder's Name Johnny Stout Clock No. _____ Stamp No. "J"

Tests Conducted by Sherry Laboratories Laboratory Test No. B12040615

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Boiler and Pressure Vessel Code.

Manufacturer or Contractor TESCORP

Date 4/18/2012 Certified by Russell R. Cued

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code.)