

Welding Process (es): **Shielded Metal Arc Welding (SMAW)**
 Type (s): **Manual**

FILLER METALS (QW-404)

AWS Classification (Electrode-Flux Class for SAW) **E7018-W**
 SFA Specification **SFA 5.5**
 Filler Metal F-No. **4**
 Weld Metal Analysis A-No.
 Size of Filler Metals mm (in)
 Trade name of Filler Metal **Hobart**
 Max. Welding Pass Thickness mm (in)
 Deposited Weld Metal Thickness mm (in)
 Weld Deposit Chemistry
 Flux Trade Name
 Other information:

POSITIONS (QW-405)

Position of Groove **2G**
 Welding Progression

PREHEAT (QW-406)

Preheat Temperature °C (°F) **60 deg.F 1 1/4\" & under**
 Interpass Temperature °C (°F) **N/A**

GAS (QW-408)

Shielding Gas Type (Mixture) **n/a**
 Flow Rate lt/min. (cfh)
 Trailing Gas Type (Mixture) **n/a**
 Flow Rate lt/min. (cfh)
 Gas Backing (Mixture) **n/a**
 Flow Rate lt/min. (cfh)

ELECTRICAL CHARACTERISTICS (QW-409)

Details may be shown on Table of Sheet 1 of 3

Current/ Polarity **DC -**
 Amps (Range) **70-275**
 Volts (Range) **20-25**
 Wire Feed Speed (Range) mm/min (in/min)
 Travel Speed (Range) mm/min (in/min)
 Mode of Metal Transfer for GMAW
 Tungsten Electrode Size mm (in)
 Tungsten Type

TECHNIQUE (QW-410)

String or Weave Bead **Stringer**
 Multiple or Single Electrodes **Single Electrode**
 Multiple or Single Pass (per side) **Multiple**
 Orifice or Gas Cup Size
 Contact Tube to Work Distance mm (in)
 Initial and Interpass Cleaning **Grind & Wirebrush**
 Method of Back Gouging
 Oscillation
 Peening **None**
 Other information:

POSTWELD HEAT TREATMENT (QW-407)

Holding Temperature Range °C (°F): **Holding Time Range:**
 Heating Rate °C/hr (°F/hr): **Method:**
 Cooling Rate °C/hr (°F/hr): **Method:**

PQR Heat Treatment (ASME Code's Guideline):

PREHEAT:

ASME Section VIII-Division 1; Preheating from Appendix R

- (a) 175 F (80 C) for material which has both a specified maximum carbon content in excess of 0.30% and a thickness at the joint in excess of 1 in. (25 mm);
- (b) 50 F (10 C) for all other materials of P-No. 1 group.

POSTWELD HEAT TREATMENT:

ASME Section VIII-Division 1; Requirements for PWHT of Table UCS-56

Min. Holding Temperature; 1,100 F (595 C)

Min. Holding Time for Weld Thickness (Nominal):

Up to 2 in. (50 mm); 1 hr/in. (2 min/mm), 15 min Min.

Over 2 in. (50 mm); 2 hr plus 15 min for each additional inch over 2 in. (50 mm)

Heating and Cooling rate: Max. 400 F (220 C) per hr divided by the maximum thickness of material in inches at the weld, but no more than 400 F (220 C)/hr; Min. 100 F (55 C)/hr

For Mandatory & Non-Mandatory thickness conditions of PWHT, See Note (2) of Table UCS-56

For PWHT at lower temperatures for longer periods of time, See Note (1) of Table UCS-56

PQR Qualified Range (ASME Code's Guideline):

Qualified Positions: All Positions (Groove, Fillet)-Plate or Pipe, unless specifically required otherwise by the welding variables. The welding process and electrodes must be suitable for use in the positions permitted by the WPS. (ASME Section IX, QW-250)

Qualified Thicknesses (Groove, Fillet): 3/16 in. (5 mm) Min., 2T Max. (Plate or Pipe)

(For GMAW-Short Circuit Process with T less than 1/2 in. (13 mm): 3/16 in. (5 mm) Min., 1.1T Max.)

T: Thickness of Test Plate or Pipe Wall in PQR (ASME Section IX, Table QW-451.1)

WPS Base Metal P-Number Allowed by PQR: Any metals of the same P- or S-No. in PQR (ASME Section IX, QW-424)

Qualified WPS Filler Metal Allowed by PQR: Only Filler Metal categories with the same F-number and same A-number tested in PQR. For Non-impacted test applications only, AWS classification or SFA specification with the same F-number and the same A-number and the same minimum tensile strength and the same nominal chemical composition can be used in WPS. Any electrode diameter sizes can be used in WPS, as it is not an essential variable for most process and conditions. (ASME Section IX, QW-250)

Qualified Weld Metal Deposit (Groove, Fillet): 2t Max. when t is less than 3/4 in. (19 mm) (Plate or Pipe)

Qualified Weld Metal Deposit (Groove, Fillet): 2T Max. when t is equal or larger than 3/4 in. (19 mm)

T: Thickness of Test Plate or Pipe Wall in PQR (ASME Section IX, Table QW-451.1)

t: Thickness of Weld Metal Deposit

TENSILE TEST (QW-150)

Specimen No.	Width mm (in)	Thickness mm (in)	Area mm x mm (in x in)	Ultimate Total Load, Kg (lb)	Ultimate Unit Stress, MPa (psi)	Type of Failure and Location
#1	.746	1.220	0.910	57,800	63,500	Parent Metal
#2	.746	1.214	0.905	59,750	66,000	Parent Metal

GUIDED-BEND TESTS (QW-160)

Type and Figure No.	Results	Remarks
Side Bend	Satisfactory	
Side Bend	Satisfactory	
Side Bend	Satisfactory	
Side Bend	Satisfactory	

TOUGHNESS TESTS (QW-170)

Specimen No.	Notch Location	Specimen Size mm x mm (in x in)	Test Temperature °C (°F)	Impact Values	Lateral Exp.		Drop Weight Break: Yes/ No
				Joule J (ft-lb)	% Shear	mm/mm	

Comments (Notch type, etc.):

Other Tests (Notes):

Radiographic-ultrasonic examination:

RT report no: Result:
UT report no: Result:

FILLET-WELD TEST RESULTS (QW-180)

Result-Satisfactory:
Penetration into Parent Metal:
Macro-Results:

Welder's name: Owen Layman
Name of Laboratory: Leigh Testing Laboratories, Inc.

Clock No.: Stamp No.: J

Tests conducted by: Leigh Testing Laboratories, Inc. Laboratory Tests Number: L-934

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 Code.

Additional Notes:

Manufacturer or Contractor's Welding Engineer:

Name: Larie Garling
Signature:
Title: Welding Engineer
Date: 09/29/2009

Authorized by:

Name: Philp VanDeuren
Signature:
Title: Manager
Date: 09/25/2009