

# Procedure Qualification Record (PQR)

**Code: AWS D1.1**

**Company Name:** www.WPSAmerica.com

**Address:** info@WPSAmerica.com, 1 (877) WPS-WELD

**PQR No.:**

DEMO-PQR

**Welding Process:**

SMAW

**Process Type:**

Manual

**Position:**

Flat

**WPS No.:**

DEMO-WPS

**Base Metal Part I (Material Spec., type or grade):**

ASTM A 516 Grade 60

**Base Metal Part II (Material Spec., type or grade):**

ASTM A 516 Grade 60

**Thickness and Diameter (Pipe): mm (in)**

Thickness of Test Coupon: 60 mm (2.36 in.), Plates

Diameter of Test Coupon: N/A

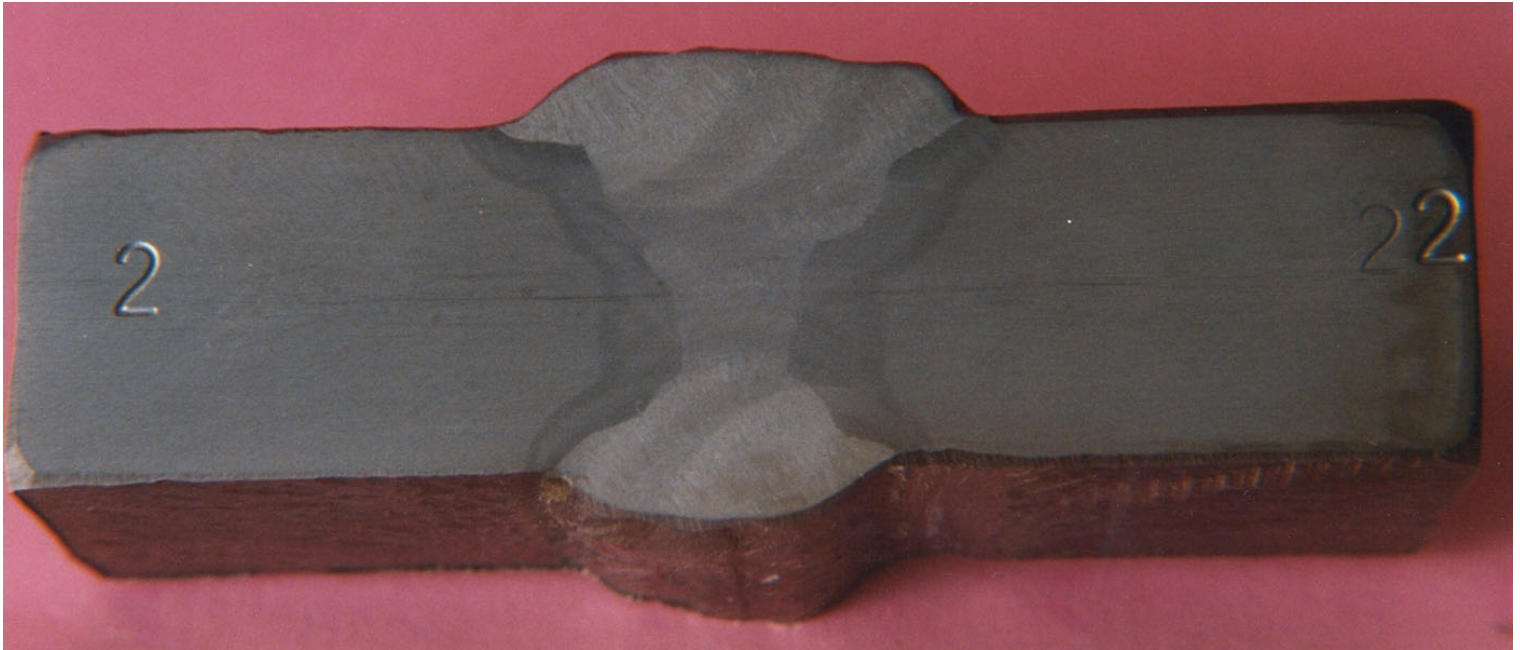
**Filler Metals:**

**AWS Classification/AWS Specification:**

E7018

A5.1

**Joint Details/Sketch:**



**Joint Design Used: mm (in)**

**Root Opening G:** 0 to 1/8 in.

**Root Face RF :** 3 mm (1/8 in.)

**Groove Angle:** 60 ° (both sides)

**Radius (J-U):** N/A

**Weld Type:**

Complete Joint Penetration Groove Weld

**Joint Type:**

Butt Joint

**Backing Option:**

Back-gouge to sound metal

**Backing Material:**

N/A

**Back Gouging Method:**

Mechanical (Grinding)

**Electrical Characteristics:**

**Current Type/Polarity:** DCEP  
**Transfer Mode (GMAW):** N/A  
**Tungsten Electrode (GTAW):**  
 Type: N/A  
 Size: mm (in) N/A

**Shielding:**

**Gas Composition (Flux for SAW):** N/A  
**Gas Flow Rate: lt/min. (CFH)** N/A  
**Gas Cup Size:** N/A

**Welding Procedure**

Weld Layers	Pass No.	Process	Filler Metal Classification	Filler Metal Diameter mm (in)	Current Amps	Current Type & Polarity	Wire Feed Speed (in/min)	Volts	Travel Speed (in/min)	Remarks [Heat Input] J/mm (J/in)
1 to 2	1 to 3	SMAW	E7018	4.0 mm (5/32)	160-200	DCEP	N/A	24-26	5-10 (in/min)	Root Pass
2 to n	4 to n	SMAW	E7018	4.8 mm (3/16)	220-250	DCEP	N/A	24-26	5-10 (in/min)	Fill and Cap
Side 2										Backgouged
1 to n	1 to n	SMAW	E7018	4.8 mm (3/16)	220-250	DCEP	N/A	24-26	5-10 (in/min)	Fill and Cap

**Technique:**

**Stringer or Weave Bead:** *Stringer and Weave Bead*      **Contact Tube to Work Distance:** N/A  
**Initial/Interpass Cleaning:** *Wire Brush, Grinding*      **Peening:** *Not Required*  
**Number of Electrodes:** *Single*  
**Electrodes Spacing:** *Longitudinal: N/A      Lateral: N/A      Angle: N/A*

**Heat Treatment:**

**Preheat Temp. Min °C (°F):** 150 °C      **Interpass Temp. Min/Max °C (°F):** 150 °C  
**Postweld Heat Treatment: Temp. °C (°F):** 600 to 620 °C      **Time:** 1 Hour per in.

**Additional Notes:**

See Postweld Heat Treatment (PWHT) Specification No. PWHT-SMAW-01

**Manufacturer/ Contractor**  
**Welding Engineer :**

**Name:** *Jim Clark*  
**Title:** *Welding Engineer*  
**Date:** *12,12,2005*

**Authorized by:**

**Name:** *John Smith*  
**Title:** *QA Manager*  
**Date:** *12,13, 2005*

## Heat Treatment (AWS Code's Guideline):

### PREHEAT TABLE:

AWS D1.1, Table 3.2 Prequalified Minimum Preheat and Interpass Temperature °F (°C):

Thickness 3 to 20 mm (1/8 to 3/4 in.) incl.: 32°F (0°C)

Over 20 thru 38 mm (3/4 to 1-1/2 in.) incl.: 50°F (10°C)

Over 38 thru 65 mm (1-1/2 to 2-1/2 in.) incl.: 150°F (65°C)

Over 65 mm (2-1/2 in.): 225°F (110°C)

For SMAW process, above preheat data is with low hydrogen electrodes.

When the base metal temperature is below 32°F (0°C), preheated to a minimum of 70°F (20°C)

Preheat and interpass temperature shall be sufficient to prevent cold cracking.

Guideline on Alternative Methods for Determining Preheat/Interpass: See Annex XI of AWS D1.1

### POSTWELD HEAT TREATMENT:

PWHT requirements shall be based on Welding Procedure Specification (WPS).

AWS D1.1, 5.8 Stress-Relief Heat Treatment: Where required by the contract drawings or specifications, welded assemblies shall be stress relieved by heat treating.

(See AWS D1.1, 5.8.1, Requirements for stress-relief treatment;

Table 5.2, Minimum Holding Time; Table 5.3, Alternate Stress-Relief Heat Treatment)

See AWS D1.1, 5.8.3, Steels Not Recommended for PWHT

## PQR Qualified Range (AWS Code's Guideline):

Qualified Position: **F (CJP/PJP Groove, Fillet) on Plate, Pipe, Box Tube (Table 4.1 AWS D1.1)**

Qualified Thicknesses (CJP Groove): **1/8 in. (3 mm) Min., Unlimited**

**Plus any size of fillet or PJP groove weld for any thicknesses or diameter (Table 4.2 AWS D1.1)**

WPS Base Metal Group Allowed by PQR: **Any Steels in Group I to Any Steels in Group (I) of Table 3.1 of AWS D1.1 (Table 4.8 AWS D1.1)**

Qualified WPS Filler Metal Allowed by PQR: **For SMAW process, only same electrode type (change from low hydrogen to non-low hydrogen is not allowed) and same flux-electrode classification for SAW process.**

**Also same (or lower) strength electrode tested in PQR for SMAW, GMAW and FCAW processes. [No increase in diameter from size tested in PQR is allowed, except that (an increase on electrode size of only 1/32**

**in. (0.8 mm) in SMAW) and increase up to 1/16 in. (1.6 mm) in GTAW (is acceptable for use in WPS.) For GMAW, only same electrode diameter size tested in PQR is allowed in WPS (Table 4.5 AWS D1.1).]**

## Test Results

## TENSILE TEST

Specimen No.	Width mm (in)	Thickness mm (in)	Area sq. mm (in)	Ultimate Tensile Load kg (lb)	Ultimate Unit Stress MPa (psi)	Character of Failure and Location
TA1	25,1	30	753	36212 Kg	471 (MPa)	Ductile out Weld
TA2	25,1	30	753	36712 Kg	477 (Mpa)	Ductile out Weld
TB1	25	30	750	35712 Kg	466 (MPa)	Ductile out Weld
TB2	25,1	30	753	35612 Kg	463 (MPa)	Ductile out Weld

## GUIDED BEND TEST

Specimen No.	Type of Bend	Results	Remarks
T1	Side bend	Satisfactory	Ductile
T2	Side bend	Satisfactory	Ductile
T3	Side bend	Satisfactory	Ductile
T4	Side bend	Satisfactory	Ductile

## VISUAL INSPECTION:

Appearance: Good appearance

Undercut: No

Piping porosity: No

Convexity: Acceptable

Test Date: 11,11, 2005

Witnessed By: Jim Clark

## Other Tests (Notes):

## Radiographic-ultrasonic examination:

RT report no: 1230-RT

Result: O.K.

UT report no: 2310-UT

Result: O.K.

## FILLET WELD TEST RESULTS:

Max. size single pass:  
MacrotechMin. size multiple pass:  
Macrotech

1: N/A

1: N/A

2: \_

2: \_

3: \_

3: \_

## All-weld-metal tension test:

Tensile strength, MPa (psi): N/A

Yield point/strength, MPa (psi): \_

Elongation in 2 in.,%: \_

Laboratory test no.: \_

Welder's name: Welder Guy

Clock No.: 123-12-1234

Stamp No.: JS-02

Tests conducted by: Quality Weld Lab, Inc.

Laboratory Tests Number: TN-46547

Per: WPSAmerica.com

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Section 4 of AWS D1.1, (Year:2004) Structural Welding Code Steel.

Signed (Manufacturer):

Name:

John Smith

Title:

QA Manager

Date:

12,12,2005