



# WELDING PROCEDURE SPECIFICATION

WPS: 2010/3003-xxxx-1

REV. NO.: 1

DATE: 8/28/2006

\*\*APPLICABILITY\*\*

WELDING PROCESS: GTAW and GMAW-SC

CODE: ASME IX

OTHER:

SUPPORTING PQR: P-WS-192-1 P-WS-190-1

**JOINT:** This WPS shall be used in conjunction with the General Welding Standards (GWS) and Welding Fabrication Procedure (WFP) sections and criteria for joint details, repairs, NDE, inspection, etc.

Weld Joint Type: Butt/Groove/fillet

Class: Full &amp; Partial Penetration &amp; Fillets

See GWS 1-06 and WFP's for joint details.

Preparation: Mechanical/thermal

Root Opening: 1/16 - 3/32

Backing: Strap/ring when used

Backgrind Root: N/A

Backing Mat.: CS when used

Bkgrd Method: N/A

GTAW Flux: N/A

Backing Retainer: N/A

**FILLER METALS:**

Class: ER-70S-x and ER70S-x

A No: 1

SFA Class: 5.18 and 5.18

F No: 6 and 6

Size: 3/32 1/8 .035 .035

Insert: N/A

Insert Type: N/A

Weld Metal Thickness Ranges:

Flux: Type: N/A

Size: N/A

AWS Root Pass:

Filler Material Note: GMAW-SC wire limited to 0.035" dia.

AWS Balance:

ASME Root Pass: 0.187 thru 0.375

ASME Balance: 0.187 thru 1.72

**BASE MATERIAL:**

Spec.: = .030 C CS- Pipe, plate, sheet &amp; strip

P No: 1

Gr No.: 1&amp;2

to P No.: 1

Gr No.: 1&amp;2

Qualified Pipe Dia. Range: &gt;=

Grade: All

to Spec.: = .030 C CS- Pipe, plate, sheet &amp; strip

Grade: All

Qualified Thickness Range:

AWS: 0

ASME: 0.5

AWS:

ASME: 0.187 thru 1.72

**QUALIFIED POSITIONS:**

AWS: All

ASME: All

Vert. Prog.: Vert. uP

Preheat Min. Temp.: 70

GAS: Shielding: GTAW-Argon

or GMAW-Ar/CO2

Interpass Max. Temp.: 500 °F

Gas Composition: 100 / 0 / 0 %

75 / 25 / %

Preheat Maintenance: 70 °F

Gas Flow Rate cfh: 10 to 25

20 to 35

PWHT: Time @ °F Temp.: 1

Backing Gas/Comp: Argon

100 %

Temperature Range: 1100 °F to N/A °F

Backing Gas Flow cfh: 3 to 8

Trailing Gas/Comp: N/A

0 %

**WELDING CHARACTERISTICS:**

Current: DCEN and DCEP

Tungsten Type: EWTh-2

Transfer Mode: Short Circuit

Ranges: Amps: 35 to 154

Tungsten Dia.: 1/16 to 1/8

Pulsing Cycle: N/A to N/A

Volts: 9 to 24

Background Current: N/A

Fuel Gas: N/A

Flame: N/A

Braze Temp °F: N/A to N/A

**WELDING TECHNIQUE:** For fabrication specific requirements such as fitup, cleaning, grinding, PWHT and inspection criteria, refer to Volume 2, Welding Fabrication Procedures.

Technique: Semi-Automatic

Cleaning Method: Grind/wire brush/file

Single or Multi Pass: M

Stringer or Weave Bead (S/W): S or W

Oscillation: N/A

GMAW Gun Angle: 5 ° to 15 °

Forehand or Backhand for GMAW: Forehand

No Pass &gt; 1/2": True

GMAW/FCAW Tube to Work Distance (in): 3/8" to 1/2"

Maximum K/J Heat Input: N/A KJ/in

Travel Speed: Variable

Gas Cup Size: 1/2 - 5/8

**PROCEDURE QUALIFIED FOR:**

Charpy "V" Notch: Yes

Nil-Ductile Transition Temperature: N/A

Dynamic Tear: N/A

**Comments:** No comments.

---

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzle Angle	Other
1	GTAW	ER-70S-x	3/32	35 to 118	9 to 17	3 to 6	5 to 15	
2	GMAW-SC	ER70S-x	1/8	112 to 120	19 to 21	4 to 7		
3	GMAW-SC	ER70S-x	.035	118 to 126	20 to 22	5 to 8		
4	GMAW-SC	ER70S-x	.035	125 to 140	21 to 23	7 to 9		

**REM. \* Weld layers are representative only - actual number pf passes and layer sequence may vary.**

**ML-1/2 projects or jobs must determine if the supporting documentation for this WPS complies with quality requirements of the project/job.**

**Use of LANL Welding Procedures and Welder Qualifications for non-LANL work shall be at the sole risk and responsibility of the Subcontractor, and the Subcontractor shall indemnify and save LANL and the Government harmless from any and all claims, demands, actions or causes of action, and for any expense or loss by the reason of Subcontractor's and their employees posession and use of LANL procedures and qualifications.**

**APPROVAL:** Signatures on file at ES-FE

**DATE:** 8/28/2006