



WELDING PROCEDURE SPECIFICATION

WPS: 2010/1000-xxxx-1

REV. NO.: 1

DATE: 7/20/2005

APPLICABILITY

WELDING PROCESS: GTAW and SMAW

CODE: ASME IX and AWS

OTHER:

SUPPORTING PQR: Z-WS-3(X-X) Z-WS-4(X-X) P-WS-233 P-WS-227-1

P-WS-227-2 1-2-GTSM-1-1 P-WS-171-1

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/Fillet**Class:** Full & Partial Penetration & Fillets**See GWS 1-06 and WFP's for joint details.****Preparation:** Thermal/Mechanical**Root Opening:** 1/16 - 3/16**Backing:** Strap, ring or back weld**Backgrind Root:** On double sided joints**Backing Mat.:** CS strap/ring when used**Bkgrd Method:** Grind or arc gouge**GTAW Flux:** N/A**Backing Retainer:** N/A**FILLER METALS:****Class:** ER70S-X and E7018**A No:** 1**SFA Class:** 5.18 and 5.1**F No:** 6 and 4**Size:** 1/16 3/32 1/8 5/32**Insert:** N/A**Insert Type:** N/A**Weld Metal Thickness Ranges:****Flux:** Type: N/A**Size:** N/A**AWS Root Pass:** 0.035 thru 0.436**AWS Balance:** 0.035 thru 1.5**ASME Root Pass:** 0.035 thru 0.436**ASME Balance:** 0.035 thru 1.5**Filler Material Note:** For SMAW no pass shall be >1/2"**BASE MATERIAL:****Spec.:** CS- Pipe, plate, sheet & shapes**P No:** 1**Gr No.:** All**to P No.:** 1**Gr No.:** All**Grade:** All**to Spec.:** CS- Pipe, plate, sheet & shapes**Grade:** All**Qualified Pipe Dia. Range:** >=**AWS:** 24**ASME:** 2.5**Qualified Thickness Range:****AWS:** 0.035 thru 1.5**ASME:** 0.035 thru 1.5**QUALIFIED POSITIONS:****AWS:** All**ASME:** All**Vert. Prog.:** V/Up**Preheat Min. Temp.:** 70**GAS: Shielding:** Argon or**Interpass Max. Temp.:** 500 °F**Gas Composition:** 100 / 0 / 0 % 0 / 0 / %**Preheat Maintenance:** 70 °F**Gas Flow Rate cfh:** 10 to 25 0 to 0**PWHT: Time @ °F Temp.:** 0**Backing Gas/Comp:** N/A 0 %**Temperature Range:** N/A °F to N/A °F**Backing Gas Flow cfh:** 0 to 0**Trailing Gas/Comp:** N/A 0 %**WELDING CHARACTERISTICS:****Current:** DCEP and DCEN**Tungsten Type:** EWTh-2**Transfer Mode:** N/A**Ranges:** Amps: 35**Tungsten Dia.:****Pulsing Cycle:** 0 to 0**Volts:****Background Current:** 0**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: Manual**Cleaning Method:** Wire Brush, File, Grind, Chip**Single or Multi Pass:** M**Stringer or Weave Bead (S/W):** S/W**Oscillation:** N/A**GMAW Gun Angle:** 0° to 0°**Forehand or Backhand for GMAW:** N/A**No Pass > 1/2":****GMAW/FCAW Tube to Work Distance (in):** 0**Maximum K/J Heat Input:** 0 KJ/in**Travel Speed:** Variable**Gas Cup Size:** #3 - 6**PROCEDURE QUALIFIED FOR:****Charpy "V" Notch:** N/A**Nil-Ductile Transition Temperature:** N/A**Dynamic Tear:** N/A

Comments: Various PQR's with base material ranging from .035 (20 Gage) to .750 plate and 6" Sch. 80 (.432) pipe constitute the basis of this multi-process WPS.

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzle Angle	Other
1	GTAW	ER70S-X	1/16	35 to 95			0 to 0	
2	SMAW	E7018	3/32	70 to 95				
3	SMAW	E7018	1/8	125 to 160				
4	SMAW	E7018	5/32	140 to 205				

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: 7/20/2005