



WELDING PROCEDURE SPECIFICATION

WPS: 1000-xxxx-1/4140

REV. NO.: 1

DATE: 1/7/2005

APPLICABILITY

WELDING PROCESS: SMAW and SMAW

CODE: ASME IX

OTHER: N/A

SUPPORTING PQR: 100-1/4140

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 - 1/8**Backing:** With/without single sided**Backgrind Root:** On double welded joints**Backing Mat.:** CS strap/ring when used**Bkgd Method:** Grind/chip**GTAW Flux:** N/A**Backing Retainer:** N/A**FILLER METALS:****Class:** E9018 and E9018**A No:** 4**SFA Class:** 5.5 and 5.5**F No:** 4 and 4 **Size:** 3/32 1/8 5/32 3/16**Insert:** N/A**Insert Type:** N/A**Weld Metal Thickness Ranges:****Flux:** Type: N/A**Size:** N/A**AWS Root Pass:** 0 thru 0**Filler Material Note:** E-8018M electrodes are an acceptable substitute for E-9018. No bead or pass shall be greater than 1/2" in thickness.**AWS Balance:** 0 thru 0**ASME Root Pass:** 0.062 thru 0.75**ASME Balance:** 0.062 thru 0.75**BASE MATERIAL:**

Spec.: A-516 CS- Plate	P No: 1	Gr No.: 1	to P No.: N/A	Gr No.: 0
Qualified Pipe Dia. Range: >=	Grade: 60	to Spec.: AISI 4140 AS- Pipe, plate, bar & sheet		Grade: 0
Qualified Thickness Range:	AWS: 0	ASME: 2.5		
	AWS: 0 thru 0	ASME: 0.062 thru 0.75		

QUALIFIED POSITIONS:**AWS:** N/A**ASME:** All**Vert. Prog.:** V/Up

Preheat Min. Temp.: 350	GAS: Shielding: N/A	or	N/A
Interpass Max. Temp.: 500 °F	Gas Composition: 0 / 0 / 0 %		0 / 0 / 0 %
Preheat Maintenance: 350 °F	Gas Flow Rate cfh: 0 to 0		0 to 0
PWHT: Time @ °F Temp.: 0	Backing Gas/Comp: None		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 DCEP	Tungsten Type: N/A	Transfer Mode: N/A
Ranges:	Tungsten Dia.:	Pulsing Cycle: 0 to 0
Amps: 70		Background Current: 0
Volts:		Braze Temp °F: N/A to N/A
Fuel Gas: N/A	Flame: 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
GMAW Gun Angle: 0 ° to 0 °	Oscillation: N/A
No Pass > 1/2":	Forehand or Backhand for GMAW: N/A
Maximum K/J Heat Input: N/A KJ/in	GMAW/FCAW Tube to Work Distance (in): N/A
	Travel Speed: Variable
	Gas Cup Size: N/A

PROCEDURE QUALIFIED FOR:**Charpy "V" Notch:** N/A**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	SMAW	E9018	3/32	70 to 95		0 to 0	0 to 0	
2	SMAW	E9018	1/8	125 to 160		0 to 0		
3	SMAW	E9018	5/32	140 to 205		0 to 0		
4	SMAW	E9018	3/16	170 to 240		0 to 0		

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: 1/7/2005