



WELDING PROCEDURE SPECIFICATION

WPS - 3002-xxxx-HY80 **REV. NO.:** 1 **DATE:** 4/27/2009 ****APPLICABILITY****
WELDING PROCESS: GMAW **and** GMAW **ASME:** X **AWS:** X **OTHER:**
SUPPORTING PQR: 3002-HY80-P

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
See GWS 1-06 and WFP's for joint details	Preparation:	Thermal/Mechanical
Root Opening: 1/8 - 1/2	Backing:	Metal
Backgrind root: Required on double sided welds	Backing Mat.:	Mild Steel
Bkgrd Method: Arc, Grind or Machine	GTAW Flux: N/A	Backing Retainer: N/A

FILLER METALS:	Class:	ER100S-1 and ER100S-1
A No: 10 SFA Class: 5.28 and 5.28 F No: 6 and 6	Size:	.062 .062 .062 .062
Insert: N/A Insert Desc.: N/A	Weld Metal Thickness Ranges:	
Flux: Type: N/A Size: N/A	AWS Root Pass:	0.0625 thru 0.190
Filler Metal Note: Also meets Mil-100S-1	AWS Balance:	0.0625 thru 99.99
	ASME Root Pass:	0.062 thru 0.190
	ASME Balance:	0.062 thru 8.00

BASE MATERIAL	P/S No. N/A	Gr No.	to: P/S No. N/A	Gr No.
Spec. Mil-HY80	Grade:	to: Spec. Mil-HY80	Grade:	
Qualified Pipe Dia. Range: ≥ AWS:	24	ASME: 0.5		
Qualified Thickness Range: AWS:	0.125 thru	99.990	ASME: 0.187 thru	8.000

QUALIFIED POSITIONS: **AWS:** 1G **ASME:** 1G, 2G **Vert. Prog.:** N/A

Preheat Min. Temp.: 225 °F	GAS: Shielding: Argon/O2	or	Argon/O2
Interpass Max. Temp.: 275 °F	Gas Composition: 98 / 2 / %		98 / 2 / %
Preheat Maintenance: 225 °F	Gas Flow Rate cfh: 40 to 75		40 to 75
PWHT: Time @ °F Temp. N/A	Backing Gas/Comp: N/A		N/A %
Temp. Range: N/A °F	Backing Gas Flow cfh: to		
to N/A °F	Trailing Gas/Comp: N/A		0 %

WELDING CHARACTERISTICS:

Current: DCEP and DCEP	Tungsten Type: N/A	Transfer Mode: Spray
Ranges: Amps 270 to 435	Tungsten Dia.: N/A	Pulsing Cycle: to
Volts 24 to 33		Background Current:
Fuel Gas: N/A	Flame: N/A	Braze temp. °F N/A to N/A

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

Technique: Semi-Automatic	Cleaning Method: Wire brush, grind, machine
Single Pass or Multi Pass: M	Stringer or Weave bead (S/W): S or S Oscillation: N
GMAW Gun Angle °: 10 to 15	Forehand or Backhand for GMAW (F/B): Forehand
No Pass >1/2": True	GMAW/FCAW Tube to work distance (in) : 0.625 - 0.75
Maximum K/J Heat Input: 60K KJ/in	Travel speed: 6 to 16 IPM Gas Cup Size: 0.750

PROCEDURE QUALIFIED FOR:

Charpy "V" Notch: Yes **Nil-Ductile Transition Temperature:** No **Dynamic Tear:** Yes

Comments: Note 1.) DT qualified with avg. 502 ftlbs @ 0° F. Note 2.) Charpy Impact qualified with avg. 113 ftlbs @ -60°F

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzle Angle	Other
1	GMAW	ER100S-1	.062	270 to 310	24 to 26	6 to 9	10 to 15	
2	GMAW	ER100S-1	.062	300 to 330	25 to 27	8 to 10		
3	GMAW	ER100S-1	.062	340 to 360	26 to 28	8 to 10		
4	GMAW	ER100S-1	.062	360 to 380	27 to 30	11 to 14		
5								
6								

REM. * Weld layers are representative only - actual number of passes and layer sequence may vary due to variations in joint design, thickness and fitup.

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 reason of Subcontractor's and their employees possession and use of LANL procedures and qualifications.

PREPARED BY:	_____	_____
	Kelly Bingham	DATE:
REVIEWED BY:	_____	_____
	Richard Bingham	DATE:
QA REVIEWED BY	_____	_____
	John Ruud	DATE:
APPROVAL:	_____	_____
	Tobin Oruch	DATE: