



## WELDING PROCEDURE SPECIFICATION

WPS - 3010-2X	REV. NO.: 0	DATE: 10/6/2004	**APPLICABILITY**
WELDING PROCESS/ES: GMAW and GMAW		ASME: X	AWS: X
SUPPORTING PQR: P-WS-119-2	P-WS-119-1	Z-WS-7E	OTHER: (4)**
Z-WS-7	Z-WS-7C	Z-WS-7D	Z-1-GMP-23

**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: Groove/fillet	Class: Full/partial penetration
See GWS 1-06 for joint details	Preparation: Mechanical/thermal-plasma
Root Opening: 1/16" - 1/8"	Backing: Gas
Backgrind root: N/A	Backing Mat.: Al when used
Bkgrd Method: N/A	GTAW Flux: N/A      Backing Retainer: N/A

<b>FILLER METALS:</b>	Class: E-xxxx and ER-xxxx
A No: N/A    SFA Class: 5.3 and 5.10    F No: 2x and 2x	Size: .035    .045    .062
Insert: N/A    Insert Desc.: N/A	<b>Weld Metal Thickness Range:</b>
Flux: Type: N/A      Size: N/A	AWS: 0.030 thru 99.000
Filler Metal Note: SFA 5.3 electrodes limited to E1100, E3003 & E4043	ASME: 0.030 thru 2.000

<b>BASE MATERIALS:</b>	P No. 2X	Gr No. N/A	to: P No. 2X	Gr No. N/A	
Spec. Aluminum	Grade: All	to: Spec. Aluminum	Grade: All		
Qualified Pipe Dia Range: = : 2.5					
Qualified Thickness Range:	AWS: 0.030 thru 99.000	ASME: 0.030 thru 2.000			

<b>QUALIFIED POSITIONS:</b>	All-pipe	All-plate	<b>Vertical Progression:</b>	V-UP
Preheat Min. Temp.: *70 °F	GAS: Shielding: Argon or -----			
Interpass Max. Temp.: 500 °F	Gas Composition: 100 % 0 % 0 %			
Preheat Maintenance: *70 °F	Gas Flow Rate cfh: 25 to 50			
	Backing Gas/Comp: Argon 100 %			
PWHT: Time @ °F Temp. N/A	Backing Gas Flow cfh: 3 to 8			
Temp. Range: N/A °F to N/A °F	Trailing Gas/Comp: N/A %			

**PREPARED BY:** KG Fellers      **DATE:** 10/6/2004  
Signature on file at FWO-DECS

**APPROVED BY:** Tobin oruch      **DATE:** 10/6/2004  
Signature on file at FWO-DECS

**Note: For SC/SS/ML-1/ML-2 work, this WPS requires independent review.**

**WELDING CHARACTERISTICS:**

Current: DCEP and --- Tungsten type: N/A Transfer Mode: Spray  
 Ranges: Amps 80 to 250 Pulsing Cycle: N/A to N/A  
 Volts 17 to 34 Background Current: N/A  
 Fuel Gas: N/A Flame: N/A Braze temp. °F N/A to N/A

**WELDING TECHNIQUE:** For cleaning, grinding, and inspection criteria refer to Volume 2, Welding Fabrication Procedures

Technique: Semi-auto Cleaning Method: Grind/wire brush/file  
 Single Pass or Multi Pass: M Stringer or Weave bead (S/W): S/W Oscillation: N/A  
 GMAW Gun Angle °: 0 to 15 Forehand or Backhand for GMAW (F/B): FH  
 GMAW/FCAW Tube to work distance: 3/8"-1/2"  
 Maximum K/J Heat Input: N/A Travel speed: As required Gas Cup Size: 1/2"-3/4"

No single pass shall deposit greater than 1/2" thickness of material.

**PROCEDURE QUALIFIED FOR:**

Charpy "V" Notch: N/A Nil-Ductil Transition Temperature: N/A Dynamic Tear: N/A

**Comments:** (1) \*200 °F min. for materials =.75" in thickness. (2) AWS pipe dia. Limited to = 4.0"OD and Sch. # = = 80. (3) ASME pipe dia. limited to = 2.5"OD and Sch. # = = 160. (4)\*\*ANSI/AISC/AWWA

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzel Angle	Other
1	GMAW	E-xxxx	.035	80 to 100	17 to 24	10 to 15	0 - 15	
2	GMAW	ER-xxxx	.045	150 to 250	26 to 34	12 to 24		
3	GMAW	ER-xxxx	.062	0 to 0	0 to 0	12 to 24		
4								
5								
6								
7								
8								

**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.