



WELDING PROCEDURE SPECIFICATION

WPS - 3501-11B **REV. NO.:** 0 **DATE:** 10/12/2004 ****APPLICABILITY****
WELDING PROCESS/ES: FCAW **and** FCAW **ASME:** **AWS:** X
SUPPORTING PQR: Z-WS-8D-F Z-WS-8B-H Z-WS-8C-H **OTHER:**

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:	Mechanacal/thermal
Root Opening: 1/16"-1/8"	Backing:	Strap/ring/back gouge
Backgrind root: Second side root	Backing Mat.:	CS when used
Bkgrd Method: Grind/chip/arc gouge	GTAW Flux: N/A	Backing Retainer: N/A

FILLER METALS:	Class:	E-1xxT-1	and	-----
A No: 10 SFA Class: 5.29 and 5.29 F No: 6 and 6	Size:	.045 .062	---	---
Insert: N/A Insert Desc.: N/A	Weld Metal Thickness Range:			
Flux: Type: N/A Size: N/A	AWS:	0.062 thru 99.000		
Filler Metal Note: Flux core wire with CO2 gas shielding	ASME:	0.062 thru 8.000		

BASE MATERIALS:	P No. 11B	Gr No. All	to: P No. 11B	Gr No. All
Spec. Steel & Steel Alloys	Grade: All	to: Spec. Steel & Steel Alloys	Grade: All	
Qualified Pipe Dia Range: = : 2.5				
Qualified Thickness Range:	AWS:	0.187 thru 99.000	ASME:	0.187 thru 8.000

QUALIFIED POSITIONS:	All-plate	All-pipe	Vertical Progression:	V-UP
Preheat Min. Temp.:	70 °F	GAS: Shielding:	CO2	or -----
Interpass Max. Temp.:	500 °F	Gas Composition:	100 %	0 % 0 %
Preheat Maintinance:	70 °F	Gas Flow Rate cfh:	35	to 50
		Backing Gas/Comp:	N/A	0 %
PWHT: Time @ °F Temp.	N/A	Backing Gas Flow cfh:	0	to 0
Temp. Range:	N/A °F to N/A °F	Trailing Gas/Comp:	N/A	%

PREPARED BY: <u>KG Fellers</u> Signature on file at FWO-DECS	DATE: 10/12/2004
APPROVED BY: <u>Tobin oruch</u> Signature on file at FWO-DECS	DATE: 10/12/2004

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 230 to 280 Pulsing Cycle: N/A to N/A
 Volts 24 to 28 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: Chip/grind/file/wire brush
 Single Pass or Multi Pass: M Stringer or Weave bead (S/W): S/W Oscillation: N/A
 GMAW Gun Angle °: 5 to 15 Forehand or Backhand for GMAW (F/B): F/B
 GMAW/FCAW Tube to work distance: 1/2"-5/8"
 Maximum K/J Heat Input: N/A Travel speed: As reqd. Gas Cup Size: 5/8"-3/4"

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

PROCEDURE QUALIFIED FOR:

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

Comments:

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzel Angle	Other
1	FCAW	E-1xxT-1	.045	230 to 250	24 to 26	16 to 21	5 - 15	
2	FCAW	-----	.062	230 to 280	28 to 28	0 to 0		
3	FCAW	-----	---	280 to 350	28 to 32	0 to 0		
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.