



WELDING PROCEDURE SPECIFICATION

WPS: 3503-xxxx-11B

REV. NO.: 0

DATE: 10/29/2004

APPLICABILITY

WELDING PROCESS: FCAW

CODE: ASME IX and AWS

OTHER:

SUPPORTING PQR: P-WPS-2-FC-4-1G Z-WS-2-FC Z-2-1-FC-5-1

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: Groove/fillet**Class:** Full & Partial Penetration & Fillets**See GWS 1-06 and WFP's for joint details.****Preparation:** Mechanical/thermal**Root Opening:** 3/32 - 1/4**Backing:** Strip/plate/ring**Backgrind Root:** Second side root**Backing Mat.:** CS/mild steel**Bkgrd Method:** Grind/arc gouge/chip/file**GTAW Flux:** N/A**Backing Retainer:** N/A**FILLER METALS:****Class:** E9xTx-x and N/A**A No:** 12**SFA Class:** 5.29 and N/A**F No:** 6 and N/A **Size:** .062 0000 0000 0000**Insert:** N/A**Insert Type:** N/A**Weld Metal Thickness Ranges:****Flux:** Type: N/A**Size:** N/A**AWS Root Pass:****Filler Material Note:** Permitted electrodes E-90T1-K2, E-91-K2, E90T5-K2**AWS Balance:** 0.187 thru 3**ASME Root Pass:****ASME Balance:** 0.187 thru 3**BASE MATERIAL:****P No:** 11B**Gr No.:** All**to P No.:** 11B**Gr No.:** All**Spec.:** A-517 AS- Plate**Grade:** All**to Spec.:** A-517 AS- Plate**Grade:** All**Qualified Pipe Dia. Range:** >=**AWS:****ASME:** 24**Qualified Thickness Range:****AWS:** 0.187 thru 3**ASME:** 0.187 thru 3**QUALIFIED POSITIONS:****AWS:** Plate-1G**ASME:** Fillet-1F&2F**Vert. Prog.:** N/A**Preheat Min. Temp.:** 70**GAS: Shielding:** Argon**or**

CO2

Interpass Max. Temp.: 500 °F**Gas Composition:** 75 / 25 / 0 %

/ / %

Preheat Maintenance: 70 °F**Gas Flow Rate cfh:** 25 to 40**PWHT: Time @ °F Temp.:** N/A**Backing Gas/Comp:** N/A

N/A %

Temperature Range: N/A °F to N/A °F**Backing Gas Flow cfh:** 0 to 0**Trailing Gas/Comp:** N/A**WELDING CHARACTERISTICS:****Current:** DCEP and N/A**Tungsten Type:** N/A**Transfer Mode:** Spray**Ranges:** Amps: 300**Tungsten Dia.:****Pulsing Cycle:** N/A to N/A

Volts: 27

Background Current: N/A**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: Semi-automatic**Cleaning Method:** Chip/grind/arc gouge**Single or Multi Pass:** M**Stringer or Weave Bead (S/W):** S**Oscillation:** N/A**GMAW Gun Angle:** 5 ° to 15 °**Forehand or Backhand for GMAW:** FH/BH**No Pass > 1/2":****GMAW/FCAW Tube to Work Distance (in):** 1/2"-3/4"**Maximum K/J Heat Input:** 40-50 KJ/in**Travel Speed:** *As reqd.**Gas Cup Size:** 5/8 - 3/4**PROCEDURE QUALIFIED FOR:****Charpy "V" Notch:** N/A**Nil-Ductile Transition Temperature:** N/A**Dynamic Tear:** Y

Comments: 1)*Material thickness =3/4"=225° F min. 2) No pass/bead thicker than 1/2" 3) Welding of D.T. materials limited to HSLA 80 series.
4) Pipe position limited to 1G rolled with backing ring only. 5) Joule heat input =40- =50 K in. range

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzle Angle	Other
1	FCAW	E9xTx-x	.062	300 to 350	27 to 31	9 to 15	5 to 15	
2		N/A	0000	0 to 0	0 to 0	0 to 0		
3		N/A	0000	0 to 0	0 to 0			
4		N/A	0000					

REM. * Weld layers are representative only - actual number of 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 possession and use of LANL procedures and qualifications.

APPROVAL: Signatures on file at ES-FE

DATE: 10/29/2004