

LANL Logo

WELDING PROCEDURE SPECIFICATION

WPS: 3002-xxxx-HY80/HSLA-100

REV. NO.: 2

DATE: 8/18/2016

APPLICABILITY

WELDING PROCESS: GMAW and GMAW

CODE: ASME IX and AWS D1.1

OTHER:

SUPPORTING PQR: 3002-HY80/HS100-P 3002-xxxx-HSLA100-45

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: 1/8 - 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 Type: N/A

Weld Metal Thickness Ranges:

Flux: Type: N/A

Size: N/A

AWS Root Pass: .0625 thru .0190

Filler Material Note: Also meets Mil-100S-1

AWS Balance: 0.125 thru 99.99

ASME Root Pass: 0.062 thru 0.190

ASME Balance: 0.062 thru 8.00

BASE MATERIAL:

Spec.: HY 80

P No: N/A

Gr No.:

to P No.: N/A

Gr No.:

Qualified Pipe Dia. Range: >=

Grade:

to Spec.: HSLA 100

Grade:

Qualified Thickness Range:

AWS: 24

ASME: 0.5

AWS: 0.125 thru 99.99

ASME: 0.187 thru 8

QUALIFIED POSITIONS:

AWS: 1G

ASME: 1G, 2G

Vert. Prog.: N/A

Preheat Min. Temp.: 225

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 %

Temperature Range: N/A °F to N/A °F

Backing Gas Flow cfh:

Trailing Gas/Comp: N/A

0 %

WELDING CHARACTERISTICS:

Current: DCEP and DCEP

Tungsten Type: N/A

Transfer Mode: Spray

Ranges: Amps: 260 to 403

Tungsten Dia.: N/A to N/A

Pulsing Cycle:

Volts: 22 to 32

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 fitup, cleaning, grinding, PWHT and inspection criteria, refer to Volume 2, Welding Fabrication Procedures.

Technique: Semi-Automatic

Cleaning Method: Wire brush, grind, machine

Single or Multi Pass: M

Stringer or Weave Bead (S/W): S or S

Oscillation: N/A

GMAW Gun Angle: 0° to 15°

Forehand or Backhand for GMAW: Forehand

No Pass > 1/2": True

GMAW/FCAW Tube to Work Distance (in): 0.625 - 0.75

Maximum K/J Heat Input: = 75 KJ/in

Travel Speed: 5 to 12 IPM

Gas Cup Size: 3/4

PROCEDURE QUALIFIED FOR:**Charpy "V" Notch:** Yes**Nil-Ductile Transition Temperature:** No**Dynamic Tear:** Yes**Comments:** Note 1.) DT qualified with avg. 610 ftlbs @ 0° F. Note 2.) Charpy Impact qualified with avg. 107 ftlbs @ -60°F

Rev 2 Added more impact data from PQR run for Welder Qual

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzle Angle	Other
1	GMAW	ER100S-1	.062	260 to 290	22 to 25	5 to 7	0 to 15	
2	GMAW	ER100S-1	.062	280 to 310	24 to 27	6 to 8		
3	GMAW	ER100S-1	.062	300 to 330	26 to 29	7 to 9		
4	GMAW	ER100S-1	.062	310 to 340	28 to 30	8 to 10		

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 possession and use of LANL procedures and qualifications.

APPROVAL: Signatures on file at ES-DE**DATE:** 8/18/2016