Los Alamos NATIONAL LABORATORY

WELDING PROCEDURE SPECIFICATION

WPS: 9000CD100-8 **REV. NO.:** 2 **DATE:** 6/21/2019 ****APPLICABILITY****
WELDING PROCESS: STUD **CODE:** ASME IX **and** AWS D1.6 **OTHER:** Mast. Spec. 11 5311.10 & 12
SUPPORTING PQR: 9000CD100-8-.25 9000cd100-8-.3125 9000cd100-8-.375 9000cd100-8-.25fh

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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: Stud **Class:** Capacitor Discharge Stud
See GWS 1-06 and WFP's for joint details. **Preparation:** Grind or wire brush
Root Opening: N/A **Backing:** N/A
Backgrind Root: N/A **Backing Mat.:** N/A
Bkgrd Method: N/A **GTAW Flux:** N/A **Backing Retainer:** N/A

FILLER METALS: **Class:** SS 3xx-Stud **and** SS 3xx-Stud
A No: 8 **SFA Class:** N/A **and** N/A **F No:** N/A **and** N/A **Size:** 1/4 5/16 3/8"
Insert: No **Insert Type:** N/A **Weld Metal Thickness Ranges:**
Flux: **Type:** N/A **Size:** N/A **AWS Root Pass:**
Filler Material Note: Male and Female Studs **AWS Balance:** 0 **thru** 0
ASME Root Pass:
ASME Balance: 0 **thru** 0

BASE MATERIAL:

	P No: 8	**Gr No.:** N/A	**to P No.:** 8	**Gr No.:** N/A
Spec.: SS- 3xx-x Stud	**Grade:** All	**to Spec.:** A-240 SS- Plate sheet & strip		**Grade:** All
Qualified Pipe Dia. Range: >=	**AWS:**	**ASME:**		
Qualified Thickness Range:	**AWS:** 0.0625 **thru** 0.75	**ASME:** 0.04 **thru** 0.75		

QUALIFIED POSITIONS: **AWS:** 1S, 2S, 4S **ASME:** 1S, 2S, 4S **Vert. Prog.:** N/A

Preheat Min. Temp.:	50	**GAS: Shielding:** N/A	**or**	N/A
Interpass Max. Temp.:	150 **°F**	**Gas Composition:** N/A / N/A / N/A %		/ / %
Preheat Maintenance:	100 **°F**	**Gas Flow Rate cfh:** 0 **to** 0		
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		N/A **%**

WELDING CHARACTERISTICS:

Current:	DCEN **and** N/A	**Tungsten Type:** N/A		**Transfer Mode:** Cap. Discharge	
Ranges:	**Amps:**	**Tungsten Dia.:** N/A **to** N/A		**Pulsing Cycle:** 0 **to** 0	
	Volts: 118			**Background Current:** 0	
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:	N/A	**Cleaning Method:** Grind/wire brush/file		
Single or Multi Pass:	N/A	**Stringer or Weave Bead (S/W):** N/A	**Oscillation:** N/A	
GMAW Gun Angle:		**Forehand or Backhand for GMAW:** N/A		
No Pass > 1/2":	N/A	**GMAW/FCAW Tube to Work Distance (in):** N/A		
Maximum K/J Heat Input:		**Travel Speed:**	**Gas Cup Size:** N/A	

PROCEDURE QUALIFIED FOR:
Charpy "V" Notch: N/A **Nil-Ductile Transition Temperature:** N/A **Dynamic Tear:** N/A

Comments: This procedure is for Midwest Fasteners CD100 power supply and CD-2p weld gun equipped with a changeable spring for welding 1/4" or 5/16" studs. The power supply "Tap" shall be in the Low position.
There are three (3) adjustments for this equipment. For 1/4" use 1. Spring selection, use black. 2. "Tap" selection use LOW. and Voltage is per above.
For 5/16" studs the three adjustments are 1. Spring selection, use black. 2. "Tap" selection use HIGH. and Voltage is per above.
For 3/8" studs the three adjustments are 1. Spring selection, use black. 2. "Tap" selection use LOW. and Voltage is per above, 3/8" is qualified in 1S position only. For the 1/4" Slimline head uses the same settings as the 1/4" standard head.

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzle Angle	Other
1	STUD	SS 3xx-Stud	1/4		118 **to** 125			
2		SS 3xx-Stud	5/16		120 **to** 140			
3		SS 3xx-Stud	3/8"		140 **to** 160			
4		SS 3xx-Stud						

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 posession and use of LANL procedures and qualifications.

APPROVAL: Signatures on file at ES-FE **DATE:** 11/16/2011