WELDING PROCEDURE
SPECIFICATION


WELDING PROCESS: GTAW-P-A  and

ASME: X  AWS:  OTHER:

SUPPORTING PQR: FCS-4 Wire 75-25

**APPLICABILITY**

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: Square Butt  Class: Full Penetration

See GWS 1-06 and WFP's for joint details  Preparation: Faced square and cleaned

Root Opening: N/A  Backing:

Backgrind root: N/A  Backing Mat.: Gas

Bkgrd Method: N/A  GTAW Flux: N/A  Backing Retainer: N/A

FILLER METALS:

A No: 8  SFA Class: 5.9 and N/A  F No: 6 and N/A  Size: 0.03

Insert: N/A  Insert Desc.: N/A

Flux: Type: N/A  Size: N/A  Weld Metal Thickness Ranges:

AWS Root Pass: thru  ASME Root Pass: 0.062 thru 0.150

AWS Balance: thru  ASME Balance: 0.062 thru 0.150

BASE MATERIAL

Spec. ASTM A312 Type 316L  Grade: 0

Qualified Pipe Dia. Range: ≥ AWS:  ASME: All

Qualified Thickness Range: N/A  thru 0.150

QUALIFIED POSITIONS: AWS:  ASME: All  Vert. Prog.: N/A

Preheat Min. Temp.: 50 °F  GAS: Shielding: Helium/Argon or

Interpass Max. Temp.: N/A °F  Gas Composition: 75 / 25 / % / %

Preheat Maintenance: N/A °F  Gas Flow Rate cfh: 25 to 45 to

PWHT: Time @ °F Temp. N/A  Backing Gas/Comp: Helium 100 %

Temp. Range: N/A °F  Backing Gas Flow cfh: 1 to 1
to N/A °F  Trailing Gas/Comp: N/A

APPROVAL: Signatures on file at ENG  DATE: 4/22/2010
WPS NO: 2015-FOSC-8-A1

WELDING CHARACTERISTICS:

<table>
<thead>
<tr>
<th>Current: DCEN and</th>
<th>Transfer Mode: N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranges: Amps 50 to 150</td>
<td>Pulsing Cycle: 1.2 to</td>
</tr>
<tr>
<td>Volts 11 to 13</td>
<td>Background Current: 40%</td>
</tr>
</tbody>
</table>

| Fuel Gas: N/A | Flame: N/A | Braze temp. 9°F N/A to N/A |

WELDING TECHNIQUE: For fabrication specific requirements such as fittup, cleaning, grinding, PWHT and inspection criteria refer to Volume 2, Welding Fabrication Procedures

| Technique: Automatic part rotated | Cleaning Method: Wipe with solvent |
| Single Pass or Multi Pass: S | Stringer or Weave bead (S/W): S or S Oscillation: N |
| GMAW Gun Angle °: to | Forehand or Backhand for GMAW (F/B): N/A |
| No Pass >1/2": True | GMAW/FCAW Tube to work distance: N/A |
| Maximum K/J Heat Input: N/A | Travel speed: 6 ipm Gas Cup Size: N/A |

PROCEDURE QUALIFIED FOR:

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

Comment: This WPS was qualified for Pu Oxide Storage containers in a Glovebox.

1) All welding is performed in a Helium atmosphere inside a glove-box.

WELDING TECHNIQUE:

<table>
<thead>
<tr>
<th>Weld Layer</th>
<th>Manual Process</th>
<th>Filler Metals</th>
<th>Size</th>
<th>Amp Range</th>
<th>Volt Range</th>
<th>Travel/ipm</th>
<th>Nozzle Angle</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GTAW-P-A</td>
<td>ER316L</td>
<td>0.03</td>
<td>50 to 150</td>
<td>11 to 13</td>
<td>4 to 6</td>
<td>to</td>
<td>to</td>
</tr>
<tr>
<td>2</td>
<td>N/A</td>
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<td>to</td>
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<td>to</td>
<td>to</td>
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<tr>
<td>3</td>
<td>N/A</td>
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<td>4</td>
<td>N/A</td>
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</table>

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 reason of Subcontractor's and their employees possession and use of LANL procedures and qualifications.