WELDING PROCEDURE
SPECIFICATION

**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.

WPS - 2007-FOSC-8-A1
REV. NO.: 0
DATE: 4/22/2010

WELDING PROCESS: GTAW-P-A and
SUPPORTING PQR: FCS-4 Wire Helium

ASME: X
AWS: OTHER:

Weld Joint Type: Square Butt
Preparation: Faced square and cleaned
Root Opening: N/A
Gas: Backing:
Backgrind root: N/A
Gas: Backing Mat.
Bkgrd Method: N/A
GTAW Flux: N/A
Backing Retainer: N/A

A No: 8
SFA Class: 5.9 and N/A
F No: 6 and N/A
Size: .035

Weld Metal Thickness Ranges:
AWS Root Pass: thru
ASME Root Pass: 0.062 thru 0.150
ASME Balance: 0.062 thru 0.150

BASE MATERIAL
Spec. ASTM A312 Type 316L
Grade: to: Spec. ASTM A312 Type 316L
Quality Pipe Dia. Range: ≥
AWS: ASME: 0
Quality Thickness Range: AWS: thru ASME: 0.062 thru 0.150

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

Preheat Min. Temp.: 50 °F
GAS: Shielding: Helium or
Interpass Max. Temp.: N/A °F
Gas Composition: 100 / / % / / %
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
N/A °F
Trailing Gas/Comp: N/A 0 %

APPROVAL: Signatures on file at ENG
DATE: 4/22/2010
WPS NO: 2007-FOSC-8-A1

WELDING CHARACTERISTICS:

Current: DCEN and Transfer Mode: N/A
Ranges: Amps 50 to 150 Tungsten Type: EWT-H-2 Tungsten Dia.: 0.093
Volts 11 to 15 Pulsing Cycle: 1.2 to
Fuel Gas: N/A Background Current: 40%
Flame: N/A Braze temp. °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 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

Comments: 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.

<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>.035</td>
<td>50 to 140</td>
<td>11 to 15</td>
<td>4 to 6</td>
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<td>to</td>
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<tr>
<td>2</td>
<td>N/A</td>
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<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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</tbody>
</table>

REM. * Weld layers are representative only - actual number of passes and layer sequence may vary.

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 posession and use of LANL procedures and qualifications.