## API WELDING PROCEDURE SPECIFICATION

**WPS:** API 1000-3  
**REV. NO.:** 0  
**PROCESS:** SMAW  
**DATE:** 9/9/2004

### API-1104 QUALIFIED RANGES

<table>
<thead>
<tr>
<th>Diameter:</th>
<th>2.375” o.d. - 12.75” o.d.</th>
<th>Filler Metal Group:</th>
<th>API Group 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness:</td>
<td>Less than 0.188”</td>
<td>Joint Type:</td>
<td>Butt/fillet/socket</td>
</tr>
<tr>
<td>Material:</td>
<td>Yield less than or equal to 42 kpi</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Positions:

| Fixed: | X | Rolled: | N/A | Progression: | Down |

**NOTE:** This WPS shall be used in conjunction with the applicable sections of the Los Alamos National Laboratories Welding Standards Manual (GSW).

### Weld Joint:

- **Type:** Butt  
- **Class:** Full Penetration

### Joint Description:

- Open Butt single V - welded from one side

### Sketch Number:

See pg. 2 for typical sketch and bead sequence

### Filler Materials:

- **API Group No.:** 1  
- **AWS Class:** E-6010  
- **SFA Class:** 5.1  
- **F No.:** 3  
- **Sizes (s):** 3/32” 1/8”

### Base Materials:

- **Spec:** ASTM A 53 or A 106 A/B  
- **Thickness Welded:** Less than 0.188”  
- **Pipe Diameter:** 2.375” o.d. - 12.75” o.d.  
- **ASME P No.:** 1  
- **Group:** 1  
- **Pos.:** Fixed: X  
- **Rolled: N/A**  
- **PWHT:** N/A  
- **Temperature Range ° F:** N/A

**NOTE:** See time between passes.

### Electrical Characteristics:

- **Current:** DC  
- **Polarity:** EP  
- **Ranges:** See pg. 2  
- **Amps:** See pg. 2  
- **Transfer Mode:** N/A  
- **WFS/IPM:** N/A  
- **Volts:** See pg. 2  
- **Travel/IPM:** See pg. 2  
- **Electrode size and Type:** See pg. 2

### Max. Time Between Passes:

5 minutes between root pass and second pass. 2 hrs for all subsequent beads or passes.
WPS No.: API 1000-3  Rev. No.: 0  Date: 9/9/2004

WELDING TECHNIQUE:

Line-Up Clamp: Full encirclement line-up clamp shall be used: line-up clamp shall be left until 50% of root bead is complete.

Stringer or Weave Bead: (S) Y (W) Y Single Pass N/A Multi Pass Y

Cleaning and/or Grinding: Stiff wire brush or power grinder. Grind tacks & stringer bead to a smooth contour.

PROCEDURE QUALIFIED FOR: Charpy V Notch N/A NDTT N/A D.T. N/A

Maximum K/J Heat Input: N/A

JOINT SKETCH AND BEAD NUMBER AND SEQUENCE

37.5° Bevel

t - thickness varies

0- 3/32” land

1/16 – 3/32” root gap

NOTE: Weld layers are representative only — actual number of passes and layer sequence may vary due to variation in joint design, thickness and fit-up.

TYPICAL WELDING PARAMETERS

<table>
<thead>
<tr>
<th>Pass Number</th>
<th>Filler/ Electrode</th>
<th>Size</th>
<th>Amps</th>
<th>Volts</th>
<th>Travel Speed in/min.</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E-6010</td>
<td>3/32</td>
<td>55-70</td>
<td>22-26</td>
<td>7-11</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>E-6010</td>
<td>1/8</td>
<td>60-90</td>
<td>22-26</td>
<td>9-13</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>5</td>
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</tr>
<tr>
<td>6</td>
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<td></td>
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</tr>
<tr>
<td>7</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

PREPARED BY: Kelly L. Bingham  DATE: 9/9/2004

Signature on File

APPROVED BY: Tobin Oruch  DATE: 9/9/2004

Signature on File
# PROCEDURE QUALIFICATION TEST REPORT

## TEST PARAMETERS

- **Point Type:** Open Butt Single V Full Penetration
- **Thickness:** 0.154” wall
- **Material:** ASTM A-106 gr B
- **Position:** 5G Fixed
- **Preheat:** 70°F
- **Progression:** Down
- **Max Time Between Passes:** 5 Minutes
- **Filler:** 3/32” & 1/8” E-6010 (6P+)
- **Diameter:** 2.375” o.d.
- **Current:** DCEP
- **Amps:** 55-90
- **Volts:** 18-24
- **Travel Speed:** 7-13

## GUIDED BEND TESTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Type</th>
<th>Result</th>
<th>No.</th>
<th>Type</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Root</td>
<td>Acc. No indications</td>
<td>5.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Root</td>
<td>Acc. Two indication</td>
<td>6.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>N/A</td>
<td>N/A</td>
<td>7.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>N/A</td>
<td>N/A</td>
<td>8.</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

## TENSILE TESTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Specimen Type</th>
<th>Area Sq. in</th>
<th>Applied Load</th>
<th>Ultimate Tensile</th>
<th>Character of failure and location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## NICK-BREAK TESTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Type</th>
<th>Remarks on Nick-Break tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Figure 5</td>
<td>Acc. Break is clean.</td>
</tr>
<tr>
<td>2.</td>
<td>Figure 5</td>
<td>Acc. One minor pore.</td>
</tr>
<tr>
<td>3.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

We certify that the statements herein are correct and that the tests were conducted in accordance with API-1104.

**Tests Conducted By:** Merel Johnson  
**Welders Name:** William McIntosh  
**Z No.:** 086261  
**Stamp:** PF009  
**Date:** 09/30/92  
**Signature on File**