API WELDING PROCEDURE SPECIFICATION


API-1104 QUALIFIED RANGES

Diameter: Less than 2.375” o.d.          Filler Metal Group: API Group 6

Thickness: Less than 0.188” nom.          Joint Type: Butt/fillet/socket

Material: Yield less than or equal to 42 kpi

Positions: Fixed: X  Rolled: N/A  Progression: Up

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

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.: 6          AWS Class: RG-60

SFA Class: 5.2  F No.: 6  Sizes (s): 1/8”

Number of Beads: See pg. 2 for typical number of beads.

BASE MATERIALS: Spec: ASTM A 53 or A 106 A/B to Spec: ASTM A 53 or A 106 A/B

Thickness Welded: Less than 0.188” to Less than 0.188”

Pipe Diameter: Less than 2.375” o.d. to Pipe Diameter: Less than 2.375” o.d.

ASME P No.: 1  Group: 1  to  P No.: 1  Group: 1

POSITIONS: Fixed: X  Rolled: N/A  PWHT: Time @ ° F Temp.: N/A

Progression: Up  Temperature Range ° F: N/A

PREHEAT: Minimum Temp ° F: 70 deg.  GAS: Fuel: Oxy-Acty  Backing: N/A

INTERPASS TEMP. ° F: N/A.  Flame Type: Neutral

Tip Size: #2  Psi: 4 - 6

ELECTRICAL CHARACTERISTICS:

Current: N/A  Polarity: N/A  Ranges  Amps: N/A

Transfer Mode: N/A  WFS/IPM: N/A  Volts: N/A

Electrode size and Type: N/A  Travel/IPM: See pg. 2

MAX. TIME BETWEEN PASSES: 5 minutes between root pass and second pass.
**WELDING TECHNIQUE:**

**Line-Up Clamp:** Optional, if line-up clamp is used, it will be left in placed until 50% of the root bead is complete.

**Stringer or Weave Bead:**
- (S) Y
- (W) N/A

**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**

[Joint sketch diagram]

*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>
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<tbody>
<tr>
<td>1</td>
<td>RG-60</td>
<td>1/8</td>
<td>N/A</td>
<td>N/A</td>
<td>3-7</td>
<td>Tip size # 2</td>
</tr>
<tr>
<td>2</td>
<td>RG-60</td>
<td>1/8</td>
<td>N/A</td>
<td>N/A</td>
<td>3-7</td>
<td>Tip size # 2</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
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<td>8</td>
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**PREPARED BY:** Kelly Bingham  
Signature on file  
**DATE:** 9/9/2004

**APPROVED BY:** Tobin Oruch  
Signature on file  
**DATE:** 9/9/2004
### PROCEDURE QUALIFICATION TEST REPORT

#### TEST PARAMETERS

- **Point Type:** Open Butt Single V Full Penetration  
  - **Diameter:** 1.90” o.d.  
  - **Two Coupons Tested**
- **Thickness:** 0.145” wall  
  - **Filler:** 1/8” RG-60
- **Material:** ASTM A 106 gr B  
  - **Preheat:** 70 °F
- **Position:** 5G Fixed  
  - **Fuel:** Oxy-Acty.
- **Progression:** Up  
  - **Tip:** 2
- **Time Between Passes:** 5 Minutes  
  - **Travel Speed:** 3-7

#### GUIDED BEND TESTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Type</th>
<th>Result</th>
<th>No.</th>
<th>Type</th>
<th>Result</th>
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</thead>
<tbody>
<tr>
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<td>Acc. No indications</td>
<td>5.</td>
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<tr>
<td>2.</td>
<td>Root</td>
<td>Acc. No indications</td>
<td>6.</td>
<td>N/A</td>
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</tr>
<tr>
<td>3.</td>
<td>N/A</td>
<td></td>
<td>7.</td>
<td>N/A</td>
<td></td>
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<tr>
<td>4.</td>
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#### TENSILE TESTS

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<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>
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<tbody>
<tr>
<td>1.</td>
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<tr>
<td>2.</td>
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<tr>
<td>3.</td>
<td>N/A</td>
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</tr>
<tr>
<td>4.</td>
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#### NICK-BREAK TESTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Type</th>
<th>Remarks on Nick-Break tests</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Figure 5</td>
<td>Break is clean.</td>
</tr>
<tr>
<td>2.</td>
<td>Figure 5</td>
<td>Break is clean.</td>
</tr>
<tr>
<td>3.</td>
<td>N/A</td>
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</tr>
<tr>
<td>4.</td>
<td>N/A</td>
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Welders Name: William Mcintosh  
Tests Conducted By: Max Goforth  
Z No.: 086261  
Stamp: PF009  
Date: 09/30/92

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

Authorized By: Kelly Bingham  
Signature on File