



**API WELDING PROCEDURE SPECIFICATION**

**WPS:** API 1000-1      **REV. NO.:** 0      **PROCESS:** SMAW      **DATE:** 9/9/2004

**API-1104 QUALIFIED RANGES**

**Diameter:** 2.375" od. thru 12.75" o.d.      **Filler Metal Group:** API Group 1

**Thickness:** .187" thru .750"      **Joint Type:** Butt/fillet/socket

**Material:** Yield less or equal to than 42 KPI

**Positions:**      **Fixed:**       **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 (GWS)

**WELD JOINT:**      **Type:** Butt      **Class:** Full Penetration

**Joint Description:** Open Butt single V- welded from one side only.

**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):**

1/8	5/32	5/32	
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**Number of Beads:** See pg. 2 for typical number and 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:** .187" - .750"      **to** .187" - .750"

**Pipe Diameter:** 2.375" o.d. thru 12.75" o.d. pipe      **to Pipe Diameter** Less than 12.75" o.d.

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

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

**Progression:** Down      **Temperature Range ° F:** N/A

**PREHEAT:**      **Minimum Temp ° F:** 70      **GAS: Shielding:** N/A      **Backing:** N/A

**NOTE:**      See time between passes.      **Composition:** N/A

**INTERPASS TEMP.:** N/A      **Flow Rate:**      **CFH** N/A

**ELECTRICAL CHARACTERISTICS:**

**Current:** DC      **Polarity:** EP      **Ranges Amps:** See pg. 2

**Transfer Mode:** N/A      **WFS/IPM:** N/A      **Volts:** See pg. 2

**Electrode size and Type** See pg. 2      **Travel/IPM** See pg. 2

**MAX. TIME BETWEEN PASSES:** 5 minutes between root pass and second pass. 2hrs. for all subsequent beads or passes.

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**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

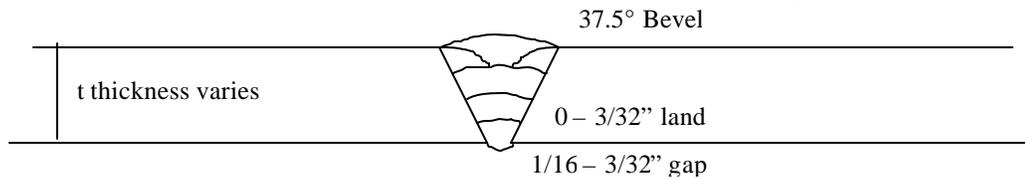
**Stringer or Weave Bead:** (S) Y (W) Y **Single Pass** N/A **Multi Pass** Y

**Cleaning and/or Grinding:** Stiff wire brush or power grinder

**PROCEDURE QUALIFIED FOR:** Charpy V Notch  NDTT  D.T.

**Maximum K/J Heat Input:** N/A

**JOINT SKETCH AND BEAD NUMBER AND SEQUENCE**



**NOTE:** Weld layers are representative only <sup>3</sup>/<sub>4</sub> actual number of passes and layer sequence may vary due to variation in joint design, thickness and fit-up.

**TYPICAL WELDING PARAMETERS**

Pass Number	Filler/ Electrode	Size	Amps	Volts	Travel Speed in/min.	Other
1	E-6010	1/8	70 -100	22 - 26	9 – 12"	
2	E-6010	1/8	100 -120	22 - 26	9 – 13	
3	E-6010	5/32	125 –132	22 - 26	9 – 13	
4	E-6010	5/32	125 –132	22 - 26	9 – 13	
5	E-6010	5/32	125 –132	22 - 26	9 – 13	
6	E-6010	5/32	125 –132	22 - 26	9 – 13	
7	E-6010	5/32	125 –132	22 - 26	9 – 13	
8	E-6010	5/32	125 –132	22 - 26	9 – 13	

**PREPARED BY:** Kelly L. Bingham **DATE:** 9/9/2004  
Signature on file

**APPROVED BY:** Tobin Oruch **DATE:** 9/9/2004  
Signature on file

## API WELDING SPECIFICATION PROCEDURE

## TEST PARAMETERS

**Point Type:** Full penetration Butt      **Diameter:** 6.625 o.d.  
**Thickness:** .432 wall      **Filler:** 1/8 & 5/32 E-6010  
**Material:** ASTM A-106 gr B      **Preheat:** 70° F  
**Position:** 6G Fixed      **Current:** DCEP      **Amps:** 70-125  
**Progression:** Down      **Volts:** 22-26

## GUIDED BEND TESTS

No.	Type	Result	No.	Type	Result
1.	Face	Acc. No indications	5.	N/A	
2.	Root	Acc. One indication	6.	N/A	
3.	Face	Acc. No indications	7.	N/A	
4.	Root	Acc. No indications	8.	N/A	

## TENSILE TESTS

No.	Specimen Type	Area Sq./ in	Applied Load	Ultimate Tensile	Character of failure and location
1.	Figure 4	.402	37231 lbs.	92,614 psi	Heat effected zone base
2.	Figure 4	.389	34521 lbs.	88,742 psi	Heat effected zone base
3.	N/A				
4.	N/A				

## NICK-BREAK TESTS

No.	Type	Remarks on Nick-Break tests
1.	Figure 5	Acc. Break is clean.
2.	Figure 5	Acc. One minor indication.
3.	N/A	
4.	N/A	

Welders Name: Merel JohnsonZ No.: 05881Stamp: PF005Tests Conducted By: Kelly Bingham

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

Authorized By: Kelly BinghamDate: 09/30/92

Signature on File