Los Alamos
NATIONAL LABORATORY

API WELDING PROCEDURE SPECIFICATION

WPS: API 1000-13 **REV. NO.:** 0 **PROCESS:** SMAW **DATE:** 10/11/2005

API-1104 QUALIFIED RANGES

Diameter: 2.375" od. thru 12.75" od. **Filler Metal Group:** API Group 3

Thickness: .154" thru .750" **Joint Type:** Sleeve/fillet/butt full penetration

Material: Yield less than 42 Kpi

Position's: **Fixed:** All **Rolled:** **Progression:** V/Up & 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:** Sleeve/fillet/butt ~371/2° **Class:** Full & Partial Penetration

Joint Description: Sleeve weld for In-service hot-tap (per 1104 App. B) (Mueller stop/plug fitting)

Sketch Number: See pg. 2 for typical sketch and bead sequence.

FILLER MATERIALS: **API Group No.:** 3 **AWS Class:** E-6010 & E-7018

SFA Class: 5.1/5.5 **F No.:** 3/4 **Sizes (s):** 1/8 | 5/32 | 5/32 |

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

BASE MATERIALS: **Spec:** ASTM A-53 or A-106 Gr. B **to** **Spec:** ASTM A-53 or A-106 Gr. B

Thickness Welded: .154" - .750" **to** .154" - .750"

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

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

POSITIONS: **Fixed:** All positions ☐ **PWHT:** **Time @ ° F Temp.:** N/A

Progression: V/Up/Dn (E-7018 & E-6010) **Temperature Range ° F:** N/A

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

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

INTERPASS TEMP.: ≥~70°F **Flow Rate:** **CFH** N/A

ELECTRICAL CHARACTERISTICS:

Current: DC **Polarity:** EP **Ranges** **Amps:** 65 - 140

Transfer Mode: N/A **WFS/IPM:** N/A **Volts:** 22 - 30

Electrode size and Type 3/32 – 1//8 – 5/32 E70xx –E-6010 **Travel/IPM** 5 - 13

MAX. TIME BETWEEN PASSES: 5 minutes between root pass and second (hot) pass.

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WELDING TECHNIQUE:

Line-Up Clamp: Fit-up dogs – removed after tack welding by grinding.

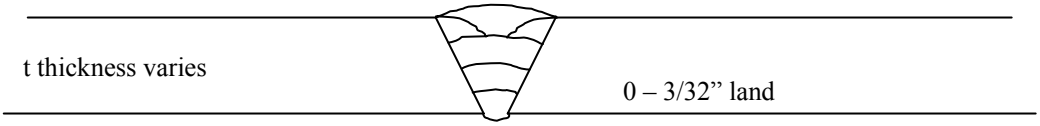
Stringer or Weave Bead: (S) S **(W)** _____ **Single Pass** _____ **Multi Pass** M

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

PROCEDURE QUALIFIED FOR: **Charpy V Notch** N/A **NDTT** N/A **DT** **N/A**

Maximum K/J Heat Input: N/A

JOINT SKETCH AND BEAD NUMBER AND SEQUENCE



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

Pass Number	Filler/ Electrode	Size	Amps	Volts	Travel Speed	Other
1	E-6010	1/8	70 -115	24 - 29	5 – 10"	
2	E-6010	5/32	80 -130	24 - 30	6 – 12	
3	E-7018	3/32	125 – 135	24 - 30	6 – 10	
4	E-7018	1/8	125 – 150	24 - 30	6 – 13	
5	E-7018	5/32	125 – 180	26 - 32	8 – 13	
6	Rem. >>>>>>	>>>>>	>>>>>	>>>>>	>>>>>	
7	Rem. >>>>>>	>>>>>	>>>>>	>>>>>	>>>>>	
8	Rem. >>>>>>	>>>>>	>>>>>	>>>>>	>>>>>	

PREPARED BY: KG Fellers **DATE:** 10/03/2005
Signature on file

APPROVED BY: Tobin Oruch **DATE:** 10/25/2005
Signature on file

QA REVIEW BY: Larry Souza **DATE:** 10/26/2005
Signature on file

API WELDING SPECIFICATION PROCEDURE

TEST PARAMETERS

Joint Type:	Full Pene. Butt/Fillets	**Diameter:**	10”	
Thickness:	.365 wall (3/8in.)	**Filler:**	1/8 & 5/32 E-6010	1/8 & 5/32 E-7018
Material:	ASTM A-106/53 Gr B	**Preheat:**	~70°F	IPT ~73°F
Position:	6F Girth welds and 2G Fixed (Modified to 45° angle)	**Current:**	DCEP	**Amps:** 70-125
Progression:	E-7018 V/Up E-6010 V/Up/Dn. root	**Volts:**	22-26	

GUIDED BEND TESTS

No.	Type	Result	No.	Type	Result
1.	Side	Acc.	5.	Side	Acc.
2.	Side	Acc.	6.	Side	Acc.
3.	Side	Acc.	7.	Side	Acc.
4.	Side	Acc.	8.	Side	Acc.

TENSILE TESTS

No.	Specimen Type	Area Sq./ in	Applied Load	Ultimate Tensile	Character of failure and location
1.	Figure 4	0.3721	28057.62	75408.51	BM
2.	Figure 4	0.3684	27372.56	74297.56	BM

NICK-BREAK TESTS

No.	Type	Remarks on Nick-Break tests
1.	Figure 5	Clean (Minor atomic H) Cup & Cone
2.	Figure 5	Clean (Minor atomic H) Cup & Cone

Welders Name: Brett McNeil **Z No.:** 09815 **Stamp**: _____

Procedure developed and conducted by: By: KG Fellers Date: 10/20/2005
Signature on File

We certify that the statements herein are correct and that the tests were conducted in accordance with API-1104 – App. B and LANL Welding Program Chapter 13 Engineering Standards Manual

Authorized by: Kelly Bingham **Date:** 10/20/2005
Signature on File