

From: [Olk, John](#)
To: [Daly, Keith](#);
cc: [Green, Frank](#); [Peppers, Nicki](#);
Subject: 8078, Weld Procedures
Date: Tuesday, February 01, 2011 12:50:51 PM
Attachments: [8078 - Farwest Weld Procedures.pdf](#)

This is Approved.

John Olk P.E.
WSDOT Bridge Construction Support Engineer
360-705-7395

Check Submittal Status Online: <http://www.wsdot.wa.gov/eesc/bridge/conlog/>

From: Daly, Keith [mailto:dalyk@columbiarivercrossing.com]
Sent: Thursday, January 27, 2011 4:09 PM
To: Olk, John
Cc: Szewcik, Mark; Green, Frank; Peppers, Nicki; document.control
Subject: Contract 8078, I-5 Columbia River Bridge Temporary Pile Test Program

John,

Please see attached welding procedures and welder certifications for Contract 8078. Please call if you have any questions. Thanks.

Keith Daly
Assistant Business Manager


Columbia River Crossing Project | <mailto:dalyk@columbiarivercrossing.org>
700 Washington St. Suite 300, Vancouver, WA 98660
office: 360.816.8870 | Office: 503.256.2726 Ext. 8870
Fax: 360.737.0294

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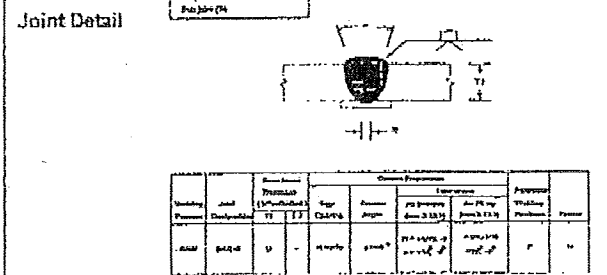
8078

FARWEST FABRICATION Welding Procedure Specification

WPS-FWF-API-X52
Page 1 of 2

WPS No. WPS-FWF-API-X52 Date 1/17/2009 By SHANNON TOMEK Type Manual Machine
 Authorized By C.CRITES Date 1/17/2009 Revision _____ Semi Auto Auto
 Welding Process(es) GMAW SAW Prequalified  CWI 88050191
 Supporting PQR(s) PQR-FWF-API-X52 QC1-F&P-05/01/2012

JOINT
 Type Butt Single Double Weld
 Backing Yes No
 Backing Material ASTM A36
 Root Opening 3/16" Root Face Dimension 0
 Groove Angle 60 DEG. Radius (J-U) _____
 Back Gouge Yes No
 Method _____



BASE METALS
 Material Spec. API 5LX to API 5LX
 Type or Grade 52 to 52
 Thickness: Groove (in) 3/16 - Unlimited
 Fillet (in) _____
 Diameter (Pipe, in) 4 - Unlimited

POSITION
 Position of Groove 1G ROTATED Fillet _____
 Vertical Progression: Up Down

FILLER METALS
 AWS Specification A5.18 A5.17
 AWS Classification ER70S-3
EM12K

ELECTRICAL CHARACTERISTICS
 Transfer Mode (GMAW):
 Short-Circuiting Globular Spray
 Current AC DCEP DCEN Pulsed
 Other _____
 Tungsten Electrode (GTAW):
 Size _____ Type _____

SHIELDING
 Flux ESAB 350 Gas AR/CO2
 Composition 90/10
 Electrode-Flux (Class) F7A2-EM12K Flow Rate 30-40 CFH
 Gas Cup Size 3/4"

TECHNIQUE
 Stringer or Weave Bead Stringer
 Multi-pass or Single Pass (per side) Multiple
 Number of Electrodes 1
 Electrode Spacing: Longitudinal _____
 Lateral _____
 Angle 3 DEG.
 Contact Tube to Work Distance 1-1 1/4"
 Peening NOT ALLOWED
 Interpass Cleaning CHIPPING

PREHEAT
 Preheat Temp., Min. 50 DEG. F
 Thickness Up to 3/4" Temperature 50 DEG. F
 Over 3/4" to 1-1/2" 150 DEG. F
 Over 1-1/2" to 2-1/2" 225 DEG. F
 Over 2-1/2" 300 DEG. F
 Interpass Temp., Min. 50 DEG. F Max. 500 DEG. F

POSTWELD HEAT TREATMENT PWHT Required
 Temp. _____ Time _____

WELDING PROCEDURE

Layer/Pass	Process	Filler Metal Class	Diameter	Cur. Type	Amps or WFS	Volts	Travel Speed	Other Notes
1	GMAW	ER70S-3	.035	DCEP	194-237 A (427-522)	24-27.8 V	13-17 IPM	
2	SAW	EM12K	.125	DCEP	387-473 A	27.9-32 V	19-25 IPM	
3-7	SAW	EM12K	.125	DCEP	459-581 A	28.8-33 V	22-30 IPM	

CONTR. NO. 8078

OFFICE COPY

CHKD. BY NSB

DATE 2-1-11

~~APPROVED AS NOTED~~

~~RETURNED FOR CORRECTION~~

APPROVED

WASHINGTON STATE
 DEPARTMENT OF TRANSPORTATION
 BRIDGE AND STRUCTURES OFFICE
 BY: CONSTRUCTION SUPPORT ENGINEER

DATE FEB - 1 2011

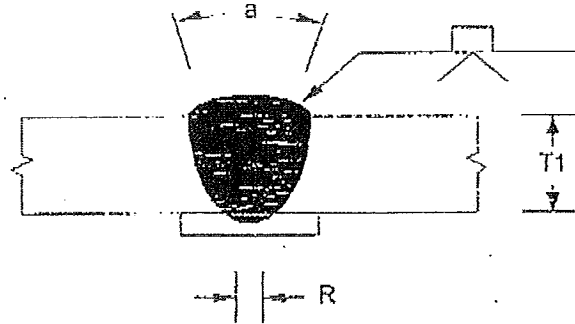
FARWEST FABRICATION Welding Procedure Specification

WPS-FWF-API-XS2

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Joint Detail

Butt joint (B)



Welding Process	Joint Designation	Base Metal Thickness (U=unlimited)		Groove Preparation			Permitted Welding Positions	Notes	
		T1	T2	Root Opening	Groove Angle	Tolerances			
						As Detailed (see 3.13.1)			As Fit Up (see 3.13.1)
SAW	B-U2-S	U	-	R=3/16	a=60°	R = +1/16, -0 a = +10°, -0°	+1/4, -1/16 +10°, -5°	F	N

MEMO

Notes:

- A: Not prequalified for gas metal arc welding using short circuiting transfer nor GTAW. Refer to Annex A.
- B: Joint is welded from one side only.
- Br: Cyclic load application limits these joints to the horizontal welding position (see 2.27.5).
- C: Backgouge root to scum metal before welding second side.
- D: SMAW detailed joints may be used for prequalified GMAW (except GMAW-S) and FCAW.
- E: Minimum weld size (E) as shown in Table 3.4. S as specified on drawings.
- J: If fillet welds are used in statically loaded structures to reinforce groove welds in corner and T-joints, these shall be equal to 1/4 T₁, but need not exceed 3/8 in. (10 mm). Groove welds in corner and T-joints of cyclically loaded structures shall be reinforced with fillet welds equal to 1/4 T₁, but need not exceed 3/8 in. (10 mm).
- M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.
- Mp: Double-groove welds may have grooves of unequal depth, provided these conform to the limitations of Note E. Also the weld size (E) applies individually to each groove.
- N: The orientation of the two members in the joints may vary from 135° to 180° for butt joints, or 45° to 135° for corner joints, or 45° to 90° for T-joints.
- V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.
- Z: Weld size (E) is based on joints welded flush.

Farwest Fabrication Procedure Qualification Record

PQR-FWF-API-X52
Page 2 of 3

TEST RESULTS TENSILE TEST

Specimen no.	Width	Thickness	Area	Ultimate tensile load, lb	Ultimate unit stress, psi	Character of failure and location
T1	.747	.484	.362	23,850	66,000	BASE MATERIAL
T2	.740	.484	.358	23,650	66,000	BASE MATERIAL

GUIDED BEND TEST

Specimen no.	Type of bend	Result	Remark
1	SIDE	ACCEPTABLE	
2	SIDE	ACCEPTABLE	
3	SIDE	ACCEPTABLE	
4	SIDE	ACCEPTABLE	

VISUAL INSPECTION

Appearance ACCEPTABLE
 Undercut ACCEPTABLE
 Piping porosity ACCEPTABLE
 Convexity ACCEPTABLE
 Test date 12/30/2008
 Witnessed by Shannon Tomek

Other Test



SHANNON T. TOMEK
 CWI 88050191
 QC1 EXP. 05/01/2012

Radiographic-ultrasonic examination

RT report no: 85089 Result ACCEPT
 UT report no: _____ Result _____

FILLET WELD TEST RESULTS

Minimum size multiple pass	Maximum size single pass
Macroetch	Macroetch
1. _____ 3. _____	1. _____ 3. _____
2. _____	2. _____

All-weld-metal tension test

Tensile strength, psi _____
 Yield point/strength, psi _____
 Elongation in 2 in., % _____
 Laboratory test no. _____

Welder's name Mike Kress Clock no. MK Stamp no. MK

Test conducted by Northwest Laboratories Laboratory _____

Test number E82737-1 Per Richard Schefsky II

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of section 4 of ANSI/AWS D1.1, (2008) Structural Welding Code-Steel.
 (year)

Manufacturer FARWEST FABRICATION By CHARLES GRITES Date 1/20/2009
 Title PRESIDENT

Farwest Fabrication Procedure Qualification Record

PQR-FWF-API-X52

Page 3 of 3

Joint Detail



MEMO

A large, empty rectangular box intended for a memo or additional notes.



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WELDING QUALIFICATION TEST

Project Number: 689-06014

WPS Number: PNB-PQR-03

Tested For: P.N. Best & Co., Inc.

Date: January 7, 2010

Spec. Code: AWS D1.1-08

Report No: 689-06014-1a

Welders Name: Dennis Garrity

SSN: --

Filler Metal: AWS A5.18/A5.17, Class ER70S-6/ EM12K

Flux: 90% Argon/ 10% CO₂

Base Metal Spec.: ASTM A252 GR 3

Preheat: 70°F

Plate or Pipe: Pipe Thickness: 1/2"

Inches: 8" Sch 80

Type of Joint: V-Groove Fig. No.: 4.21

Backing: Yes

Single/Double Welded: Single

Process: GMAW/ SAW

Single/Multiple Pass: Multiple Amp: 160/ 475-500

Current: DC

Progression: N/A Volt: 30/30-33 Polarity: Reverse

GROOVE WELD TESTS

Position Tested	Radiographic Test	Bend Tests			Positions Qualified	Thickness Qualified	Diameter Qualified	Process Qualified
		Root	Face	Side				
1G				Passed	1G, 1-2F	3/16"-Unl.	4" & Up	GMAW/ SAW

Visual Inspection (4.8.1) Acceptable: YES X NO _____ City of Portland# 5303

Welding Test Conducted/Witnessed By: P.N. Best & Co., Inc. - Mr. Shannon Tomer CWI# 88050191

Mechanical Tests Conducted By: Professional Service Industries, Inc.

Steve Moore Date: January 27, 2010
 Steve Moore, Lab Supervisor, Mechanical Testing Services

We certify that the statements in this record are correct and that the test coupons were prepared, welded, and tested in accordance with AWS D1.1-08.

Organization: P.N. Best & Co., Inc.

By: _____ Date: January 7, 2010

Services performed for this project have been conducted with that level of care and skill ordinarily exercised by members of the profession currently practicing in this area under similar budget and time restraints. No warranty, expressed or implied, is made. The included test results apply only to the specific samples tested and may not represent the entire product. Reports may not be reproduced, except in full, without written permission of PSI.
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WELDING QUALIFICATION TEST

Project Number: 689-06014

WPS Number: PNB-PQR-03

Tested For: P.N. Best & Co., Inc.

Date: January 7, 2010

Spec. Code: AWS D1.1-08

Report No: 689-06014-1b

Welders Name: Jeffery Hobbs

SSN: ---

Filler Metal: AWS A5.18/ A5.17, Class ER70S-6/ EM12K

Flux: 90% Argon/10% CO₂

Base Metal Spec.: ASTM A252 GR 3

Preheat: 70°F

Plate or Pipe: Pipe

Thickness: 1/2"

Inches: 8" Sch 80

Type of Joint: V-Groove

Fig. No.: 4.21

Backing: Yes

Single/Double Welded: Single

Process: GMAW/ SAW

Single/Multiple Pass: Multiple

Amp: 160/ 475-500

Current: DC

Progression: N/A

Volt: 30/ 30-33

Polarity: Reverse

GROOVE WELD TESTS

Position Tested	Radiographic Test	Bend Tests			Positions Qualified	Thickness Qualified	Diameter Qualified	Process Qualified
		Root	Face	Side				
1G				Passed	1G, 1-2F	3/16"-Unl.	4" & Up	GMAW/ SAW

Visual Inspection (4.8.1) Acceptable: YES NO City of Portland# 5304

Welding Test Conducted/Witnessed By: P.N. Best & Co., Inc. -- Mr. Shannon Tomer CWI# 88050191

Mechanical Tests Conducted By: Professional Service Industries, Inc.

Steve Moore Date: January 27, 2010
Steve Moore, Lab Supervisor, Mechanical Testing Services

We certify that the statements in this record are correct and that the test coupons were prepared, welded, and tested in accordance with AWS D1.1-08.

Organization: P.N. Best & Co., Inc.

By: _____ Date: January 7, 2010

Services performed for this project have been conducted with that level of care and skill ordinarily exercised by members of the profession currently practicing in this area under similar budget and time restraints. No warranty, expressed or implied, is made. The included test results apply only to the specific samples tested and may not represent the entire product. Reports may not be reproduced, except in full, without written permission of PSI.

NORTHWEST LABORATORIES *of Seattle, Incorporated*

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Technical Services for: Industry, commerce, Legal Profession & Insurance Industry

241 South Holden Street • Seattle, WA 98108-4359 • Phone: (206) 763-6252 • Fax: (206) 783-3949 www.nwlabsl896.com

Report To: Farwest Fabrication

Date: January 13, 2009

Report On: Weld Procedure Qualification

Lab No.: E82737-1

IDENTIFICATION:

Procedure Qualification Tests Per AWS D1.1 06

Base Material:	8" API 5LX52 – API 5LX52 -Pipe	Process:	GMAW/SAW
Welder:	Michael Kress, ID #MK	Filler:	EM12K
PQR No.	FWF-01-X52	Position:	1G Rotated

TRANSVERSE TENSILE TEST

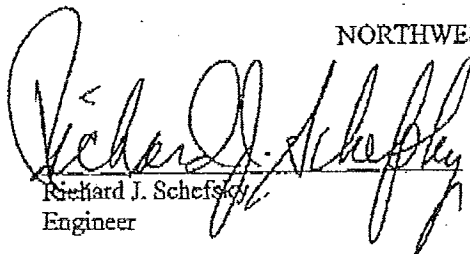
<u>Sample #</u>	<u>T1</u>	<u>T2</u>	<u>Specified</u>
Pipe OD (in.)	8.625	8.625	
Width (in.)	0.747	0.740	
Thickness (in.)	0.484	0.484	
Area (sq. in.)	0.362	0.358	
Ultimate Load, Lbs.	23,850	23,650	
Tensile Strength (psi)	66,000	66,000	66,000 min.
Fracture Location	Base Material	Base Material	

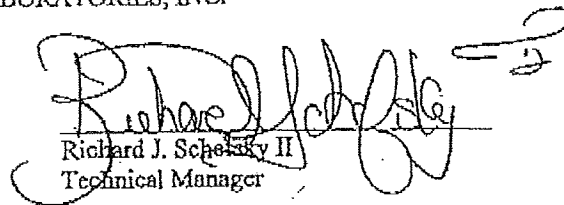
TRANSVERSE BEND TEST (180° COLD BEND)

<u>No.</u>	<u>Type of Bend</u>	<u>Results</u>
1	Side	Pass – No Visual Defects
2	Side	Pass – No Visual Defects
3	Side	Pass – No Visual Defects
4	Side	Pass – No Visual Defects

This report applies only to the actual samples tested. Northwest Laboratories does not certify, warrant, or guarantee any products manufactured by others. Samples discarded within thirty (30) days unless otherwise requested in writing by you.

NORTHWEST LABORATORIES, INC.


 Richard J. Schefsky
 Engineer


 Richard J. Schefsky II
 Technical Manager

Farwest Fabrication Welding Operator Qualification Test Record

MIKE KRESS X52
Page 1 of 1

WQTR No. <u>MIKE KRESS X52</u> Welder Name <u>Mike Kress</u> Welder Id <u>MK</u>			
WPS No. <u>WPS-FWF-API-X52</u> Revision <u>0</u> Date <u>1/6/2009</u>			
<p>Variables Record Actual Values Used In Qualification</p> <p>Process (Table 4.10, Item (2)) <u>GMAW/SAW</u></p> <p>Transfer Mode (GMAW): Short-Cir. <input type="checkbox"/> Globular <input type="checkbox"/> Spray <input checked="" type="checkbox"/></p> <p>Type Manual <input type="checkbox"/> Machine <input type="checkbox"/> Semi-Auto <input checked="" type="checkbox"/> Auto <input type="checkbox"/></p> <p>Number of Electrodes Single <input checked="" type="checkbox"/> Multiple <input type="checkbox"/></p> <p>Current/Polarity AC <input type="checkbox"/> DCEP <input checked="" type="checkbox"/> DCEN <input type="checkbox"/> Pulsed <input type="checkbox"/></p> <p>Position (Table 4.10, Item (5)) <u>5GR</u></p> <p>Weld Progression: (Table 4.10, Item (7)) Up <input type="checkbox"/> Down <input checked="" type="checkbox"/></p> <p>Backing (Table 4.10, Item (8)) Use Backing <input checked="" type="checkbox"/></p> <p>Consumable Insert (GTAW) Use Insert <input type="checkbox"/></p> <p>Material/Spec. <u>API 5LX52</u> to <u>API 5LX52</u></p> <p>Thickness (Plate): Groove (in) _____ Fillet (in) _____</p> <p>Thickness (Pipe/tube): Groove (in) <u>.500</u> Fillet (in) _____</p> <p>Diameter(Pipe): Groove (in) <u>8 5/8"</u> Fillet () _____</p> <p>Notes _____</p> <p>Filler Metal (Table 10, Item (3)) Spec. <u>A5.18/A5.17</u> Class. <u>ER70S3/EM12K</u> F-No. _____</p> <p>Gas/Flux Type (Table 4.10, Item (4)) <u>CO2/AR</u></p> <p>Other _____</p>	<p>Qualification Range</p> <p><u>GMAW, SAW</u></p> <p>Short-Circuiting <input type="checkbox"/> Globular <input type="checkbox"/> Spray <input checked="" type="checkbox"/></p> <p>Manual <input type="checkbox"/> Machine <input type="checkbox"/> Semi-Auto <input checked="" type="checkbox"/> Auto <input type="checkbox"/></p> <p>Single <input type="checkbox"/> Multiple <input type="checkbox"/></p> <p>AC <input type="checkbox"/> DCEP <input checked="" type="checkbox"/> DCEN <input type="checkbox"/> Pulsed <input type="checkbox"/></p> <p><u>5GR</u></p> <p>Up <input type="checkbox"/> Down <input checked="" type="checkbox"/></p> <p>With Backing <input checked="" type="checkbox"/> Without Backing <input type="checkbox"/></p> <p>With Insert <input type="checkbox"/> Without Insert <input type="checkbox"/></p> <p><u>API 5LX52/ASTM A252 GR3</u></p> <p>_____ - _____</p> <p>_____ - _____</p> <p><u>3/16"</u> - <u>Unlimited</u> in</p> <p>_____ - _____</p> <p><u>4</u> - <u>Unlimited</u> in</p> <p>_____ - _____</p> <p>_____ - _____</p> <p><u>AS TESTED</u></p> <p><u>AS TESTED</u></p> <p>_____ - _____</p> <p><u>AS TESTED</u></p>		
VISUAL INSPECTION (4.8.1) Acceptable <u>Yes</u>			
GUIDED BEND TEST RESULTS (4.30.5)			
Type	Result	Type	Result
SIDE 1	ACCEPT	SIDE 2	ACCEPT
SIDE 3	ACCEPT	SIDE 4	ACCEPT
<p>Appearance _____ Fillet Size _____ Macroetch _____</p> <p>Fracture Test Root Penetration _____ Description _____</p> <p>Inspected By <u>Shannon Tomok</u> Test No. <u>MKX52</u> Organization <u>Farwest Fabrication</u> Date <u>1/3/2009</u></p>			
RADIOGRAPHIC TEST RESULTS (4.30.3.1)			
Film Identification No.	Result	Remark	
0-1	ACCEPT		Interpreted By <u>Paul Shane Guldry</u> Organization <u>PM Testing Laboratories</u> Test No. <u>85099</u> Date <u>1/3/2009</u>
2-0	ACCEPT		
1-2	ACCEPT		
<p>We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of section 4 of ANSI/AWS D1.1, (<u>2006</u>) Structural Welding Code-Steel. (year)</p> <p>Manufacturer <u>Farwest Fabrication</u> Authorized By <u>C. Crites</u> Date <u>1/6/2009</u></p>			

WELDER, WELDING OPERATOR, OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder WELDING OPERATOR
 Name ADAM GREEN Identification No. AG
 Welding Procedure Specification No. ENF-WPS- Rev 5 Date 11-16-2007

Variables	Record Actual Values Used in Qualification	Qualification Range
Process/Type [Table 4.10, Item (1)]	<u>GMAW/SAW</u>	<u>AS TESTED</u>
Electrode (single or multiple) [Table 4.10, Item (8)]	<u>SINGLE</u>	
Current/Polarity	<u>DCEP</u>	
Position [Table 4.10, Item (4)]	<u>1G ROTATED</u>	<u>AS TESTED</u>
Weld Progression [Table 4.10, Item (6)]	<u>N/A</u>	<u>N/A</u>
Backing (YES or NO) [Table 4.10, Item (7)]	<u>YES</u>	<u>AS TESTED</u>
Material/Spec.	<u>API 5L X70¹⁰ X70</u>	
Base Metal		
Thickness: (Plate)		
Groove	<u>N/A</u>	<u>N/A</u>
Fillet		
Thickness: (Pipe/tube)		
Groove	<u>.500 WALL</u>	<u>.250-1.00</u>
Fillet	<u>N/A</u>	<u>N/A</u>
Diameter: (Pipe)	<u>12" PIPE</u>	<u>12" AND UP</u>
Groove	<u>SAME</u>	<u>SAME</u>
Fillet	<u>N/A</u>	<u>N/A</u>
Filler Metal [Table 4.10, Item (3)]		
Spec. No.	<u>AWS A5.17 / A5.18</u>	
Class	<u>ER70S3 / EH1ZK</u>	
F.No. [Table 4.10, Item (2)]	<u>N/A</u>	<u>N/A</u>
Gas/Flux Type [Table 4.10, Item (3)]	<u>AR / CO2</u>	
Other		<u>AS TESTED</u>

VISUAL INSPECTION (4.8.1)
 Acceptable YES or NO YES

Guided Bend Test Results (4.30.5)

Type	Result	Type	Result
<u>SEE METAL TEST REPORT #</u>			
	<u>113505</u>	<u>11/16/07</u>	

Fillet Test Results (4.30.2.3 and 4.30.4.1)

Appearance N/A Fillet Size N/A
 Fracture Test Root Penetration N/A Macroetch N/A

(Describe the location, nature, and size of any crack or tearing of the specimen.)

Inspected by Shannon Test Number 037X70
 Organization FARWEST FABRICATION Date 11-15-07

RADIOGRAPHIC TEST RESULTS (4.30.3.1)

Film Identification Number	Results	Remarks	Film Identification Number	Results	Remarks

Interpreted by _____ Test Number _____
 Organization _____ Date _____

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of section 4 of AWS D1.1, (2006) Structural Welding Code—Steel.

Manufacturer or Contractor FARWEST FABRICATION Authorized By C. CRITES
 Form E-4 _____ Date 11-16-07

1200 5TH AVENUE SOUTH
Kent, Washington 98032
Phone (253) 813-5970 Fax (253) 813-5971
(800) 200-1376

Farvest Fabrications LAB 113505 11/16/2007
5521 184th St E PO# 5395
Puyallup WATL API 5L; Grade X70
WA 98375 SPEC AWS D1.1/D1.1M:2006
Shannon Tomek SIZE 24" Dia. X .500" Wall

TEST REPORT

Page 1 of 1

Weld Procedure Qualification

ID : FWF-PQR-37-X70 Qty : 1 Welded Pipe
Process : GMAW/SAW Position: 1G Rotated
Welder : Adam Green

Tension Tests Figure 4.14

ID	Size Thick / Width	Area	Tensile		Fracture Location
			(lbs)	(psi)	
113505-1T	.434 / .752	.326	28,400	87,100	Weld
-2T	.434 / .756	.328	28,900	88,200	Weld

Min. Req. : 82,000.

Note : Acceptance criteria per API 5L 42nd Edition, Jan 2000 and
AWS D1.1 Section 4.8.3.5.

Bend Tests Figure 4.13

ID	Type	Results
113505-1SB	Side	Satisfactory
-2SB	Side	Satisfactory
-3SB	Side	Satisfactory
-4SB	Side	Satisfactory

Bend sample thickness: 0.375" Bend angle: 180° Bend Diameter: 2" Ha

Note : Acceptance criteria per AWS D1.1 Section 4.8.3.3.

Note : Results conform to specification requirements.

Respectfully,

Wayne Langley
Laboratory Supervisor

THIS CERTIFICATE SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF METALTEST, INC. THE RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL LAW.

Farwest Fabrication

Welding Operator Qualification Test Record

Page 1 of 2
FG-01

WQTR No. FG-01 Welder Name Fernando Gonzales Welder Id. FG
WPS No. FWF-WPS-01-252GR3 Revision 0 Date 12/1/2010

Variables	Record Actual Values Used In Qualification
Process (Table 4.10, Item (1))	<u>GMAW/SAW</u>
Transfer Mode (GMAW): Short-Cir. <input type="checkbox"/> Globular <input type="checkbox"/> Spray <input checked="" type="checkbox"/>	
Type Manual <input type="checkbox"/> Machine <input type="checkbox"/> Semi-Auto <input checked="" type="checkbox"/> Auto <input type="checkbox"/>	
Number of Electrodes Single <input checked="" type="checkbox"/> Multiple <input type="checkbox"/>	
Current/Polarity AC <input type="checkbox"/> DCEP <input checked="" type="checkbox"/> DCEN <input type="checkbox"/> Pulsed <input type="checkbox"/>	
Position (Table 4.10, Item (4))	<u>1G ROTATED</u>
Weld Progression: (Table 4.10, Item (6)) Up <input type="checkbox"/> Down <input checked="" type="checkbox"/>	
Backing [Table 4.10, Item (7)] Use Backing <input checked="" type="checkbox"/>	
Consumable Insert (GTAW) Use Insert <input type="checkbox"/>	
Material/Spec. <u>ASTM A252 GR3</u> to <u>A252 GR3</u>	
Thickness (Plate): Groove () _____	
Fillet () _____	
Thickness (Pipe/tube): Groove (in) <u>.500</u>	
Fillet () _____	
Diameter(Pipe): Groove (in) <u>8</u>	
Fillet () _____	
Notes _____	
Filler Metal (Table 10, Item (2))	
Spec. <u>AWS A5.18/5.17</u>	
Class. <u>ER70S3JEM12K</u>	
F-No. <u>N/A</u>	
Gas/Flux Type (Table 4.10, Item (3)) <u>CO2/AR-EM12K</u>	
Other _____	

Qualification Range

AS TESTED

Short-Circuiting Globular Spray

Manual Machine Semi-Auto Auto

Single Multiple

AC DCEP DCEN Pulsed

AS TESTED

Up Down

With Backing Without Backing

With Insert Without Insert

_____ - _____

_____ - _____

.1875 - Unlimited in

.1875 - Unlimited in

4 - Unlimited in

_____ - Unlimited in

AS TESTED

AS TESTED

AS TESTED

VISUAL INSPECTION (4.8.1) Acceptable Yes
GUIDED BEND TEST RESULTS (4.30.5)

Type	Result	Type	Result
SHANNON T. TOMEK			
CWI 88050191 Fillet Test Results (4.30.2.3 and 4.30.4.1)			
Appearance <u>QC1 EXP. 05/01/2012</u> Fillet Size _____ Macroetch _____			
Fracture Test Root Penetration _____ Description _____			
Inspected By <u>Shannon Tomek</u> Test No. <u>FG-01</u> Organization <u>Farwest Fabrication</u> Date <u>12/1/2010</u>			

RADIOGRAPHIC TEST RESULTS (4.30.3.1)

Film Identification No.	Result	Remark	
0-1	ACCEPT		Interpreted By <u>William Mace</u> Organization <u>PM Testing Laboratory, Inc</u> Test No. <u>93977</u> Date <u>12/7/2010</u>
2-0	ACCEPT		
1-2	ACCEPT		

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of section 4 of ANSI/AWS D1.1, (2006) Structural Welding Code-Steel.

Manufacturer Farwest Fabrication Authorized By Charles Crites Date 12/8/2010

DATE: 12-2-10

PM TESTING LABORATORY INC.
RADIOGRAPHIC REPORT -- WELDS
 FORM QC25A, 04/15/10

PAGE 1 OF 1

CUSTOMER	<u>FARWEST FAB</u>	P.O.#	<u>ST 1100</u>	NDI CONTROL#	<u>97977</u>
PART#	<u>CORRAL SAW 16 ROTATED</u>	PART NAME	<u>WELDED GVAL</u>		
SPECIFICATION	<u>AWS D1.1</u>	REV.	<u>10</u>	ACCEPTANCE	<u>AWS D1.1</u> REV. <u>15</u>
SPECIFICATION		REV.		ACCEPTANCE	REV.
MATERIAL	<u>CS</u>	MT EXAM REQUIRED	<input type="checkbox"/>	PT EXAM REQUIRED	<input type="checkbox"/>
REMARKS	<u>FG - FERNANDO (CONTRACT)</u>		JOB NUMBER	<u>156025</u>	

Weld No.	View No.	porosity	slag incl.	lack of pen	lack of fusion	burn thru	under cut	crack	drop thru	conceal-ity	sur-face	ACC	REJ	REMARKS	wall thick	pipe dia.
FG	0-1														.5"	8"
	1-2	1														
	2-0	1														

Film:				Summary:		
4 X 10 =	7 X 17 =	=	=	PT	MT	RT
						1
5 X 7 =	10 X 12 =	=	=			1
8 X 10 =	11 X 14 =	=	=			0
4 1/2 X 17 = 3	14 X 17 =	=	=			1

INSPECTED BY [Signature] NDT LEVEL IC
 FILM RETAINED AT PM TESTING FILM RETURNED TO CUSTOMER



PM TESTING LABORATORY INC.
RADIOGRAPHIC TECHNIQUE - TUBES
FORM QC-03A, 01/11/08

CUSTOMER <u>FALMEST F&O</u>	PART NUMBER <u>W2002 2002</u>
ALLOY <u>CS</u>	PART NAME
SPECIFICATION <u>ASME B1.1 Rev. 10</u>	ACCEPTANCE <u>ASME B1.1</u> Rev. <u>10</u>
INSPECTION CLASS: _____ GRADE: _____	MODEL # _____ STATE OF MFG. <u>WIS</u>
RT INSPECTIONS PERFORMED PER PMT 003-3 REVISION <u>12</u>	NDT CONTROL # <u>93977</u>

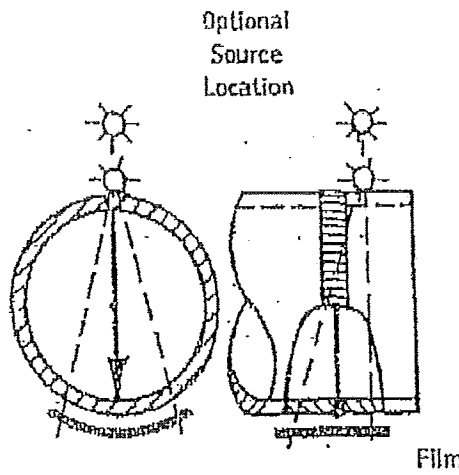
ISOTOPE	EXPOSURE DEVICE	X-RAY
<input checked="" type="checkbox"/> Iridium 192	<input type="checkbox"/> Cobalt 60	Kv Rating _____ Ma Rating _____
Manufacturer: <u>W.C.</u>	Model: <u>12100</u>	Source / Focal Spot Size: <u>1.7KJ4</u>

Number of View(s) <u>3 (2-1)(1-2)(6-0)</u>	Angle(s)
Source to Film Distance: <u>9"</u>	Angle of Beam: <u>90°</u> Area of Interest Thickness: <u>.5"</u>
Penetrator - <input checked="" type="checkbox"/> Film Side <input type="checkbox"/> Source Side	Alloy: <u>CS</u> Type: <u>ASTM</u> Size: <u>1/8</u>
Penetrator Shim - Alloy: _____ Thickness: _____	Quality Level: <u>7016</u>
Film Brand: <u>AGFA</u> Film Type: <u>D7</u> Film Size: <u>11x17"</u> No. Of Films: <u>2</u>	
Front Screen - Material: <u>PC</u> Thickness: <u>.045"</u> Back Screen - Material: <u>PC</u> Thickness: <u>.020"</u>	
Kv: _____ Ma/Curies: <u>53</u> Exposure Time: <u>90 sec</u> Density range: <u>2.0-4.0</u>	

GEOMETRIC UN-SHARPNESS MEETS THE MINIMUM REQUIREMENTS OF PMT-003-3 TABLE I @ 0.6 Ug in.
 Radiographic Contrast (According to TABLE 2 PMT 003-3) @ > 2.7
 Maximum distance from source side of object to the film (part distance +1/8" cassette): 5/8"
 Minimum source to object distance: 2.5"

Single _____ or double <input checked="" type="checkbox"/> wall exposure.	Single <input checked="" type="checkbox"/> or double _____ wall viewing.
Development: <input type="checkbox"/> Automatic <input checked="" type="checkbox"/> Manual	Time: <u>10 min</u> Temp: <u>80° F</u>

MUST BE VERIFIED ON THE RADIOGRAPHIC REPORT FOR EACH LOT. ANY DIFFERENCES REQUIRE REVISION, SKETCH



RADIOGRAPHER: [Signature]
 APPROVED BY: _____

LEVEL: III DATE: 12-2-10
 LEVEL: III DATE: _____

89/21/87 15:53:22

ESAB->

253 847 2847 ESAB

Page 004



ESAB Welding & Cutting Products

CERTIFICATE OF CONFORMANCE
TO SPECIFICATION REQUIREMENTS
FOR WELDING ELECTRODES AND FLUXES

SECTION NO 3

SUPPLIED TO QUANTITY
DIAMETER
HEAT
FLUX LOT

This is to certify that Spoolarc 81 electrode Classification EM12K, and ESAB OK Flux 350 submerged arc welding flux AWS ASME Classification F7A2-EM12K-H8 as supplied on the above order, are of the same classification, manufacturing process and material requirements as the flux-electrode combination tested on January 12 2007

All tests required by Specification AWS ASME SFAS 17 (F-No 6) and ANSI/AWS A5 01 Schedule G were performed The materials tested met all the requirements for Classification F7A2-EM12K-H8 The chemical composition of the electrode and mechanical properties of the deposited weld metal were as follows

CHEMICAL COMPOSITION OF ELECTRODE						Total
C	Mn	Si	S	P	Cu	Other Elements
09	1.06	22	011	008	10	< 50

CHEMICAL COMPOSITION OF DEPOSITED WELD METAL				
04	2.00	84	008	022

WELD TEST NO	070112-1AW	AS-WELDED	CHARPY V-NOTCH IMPACT
			Ft-Lbs @ 22°F (Joules @ -30°C)
Tensile Test			
Yield Strength, ksi (MPa)	69.8	(481)	34 (46)
Tensile Strength, ksi (MPa)	84.6	(583)	25 (34)
Elongation 2-in %	26.7		27 (36)
			28 (38)
			31 (42)
			29 (avg 3) (39) (avg 3)
Radiography Test Met all requirements			
Welding Conditions			
Arc Voltage	28	Base Plate	A515/516 Gd 70 1 in Thick
Amperage	540 DCEP	Set-up	30° incl angle 1/2 in Root gap
Travel Speed	16 ipm	No of Layers	8 layers of 2 passes 1 layer 4 passes
Diameter	5/32-in	Preheat	60 - 325°F, Interpass 300 ± 25°F

CAUTION OK Flux 350 is an active flux Active fluxes should be limited to multipass welding in plate a maximum of 1-in (25 mm) thick More highly alloyed wires than Spoolarc 80, 81 or 29S should not be used Voltages in multipass welds should be limited to a maximum of 35 or even lower if weld procedure tests indicate excessive hardness is encountered

WELD METAL DIFFUSIBLE HYDROGEN
ml 100g (Flux baked @ 550° F for 1 hour)
3.2 3.3, 3.6 4.2 (3.6 avg)

Winfred Steyer
Winfred Steyer Materials Standards Specialist

COMPANY	ADDRESS	PHONE	FAX
ESAB Welding & Cutting Products	3325 Middle Road Ashland, OH 44005-0716	(440) 992-4412	(440) 992-1219

American Welding Society



Certifies that Welding Inspector
Shannon T Tomek

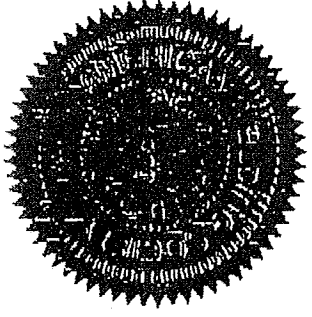
*has complied with the requirements of AWS QC1,
Standard for AWS Certification of Welding Inspectors*

88050191

CERTIFICATE NUMBER

May 1 2012

EXPIRATION DATE



Walter W. Matthews
PRESIDENT AWS

D. O. P. S.
CHAIR, QUALIFICATION COMMITTEE

Joe Williams
CHAIR, CERTIFICATION COMMITTEE

Farwest Fabrication Welding Procedure Specification

WPS-FWF-API-SHOE

Page 1 of 2

WPS No. WPS-FWF-API-SHOE Date 1/11/2004 By Shannon Tomek Type Manual Machine
 Authorized By C. Crites Date 1/11/2004 Revision 0 Semi-Auto Auto
 Welding Process(es) SAW Prequalified SHANNON T. TOMEK
 Supporting PQR(s) _____ CWI 00050191



QC1 Exp. 05/01/2012

JOINT

Type Cornor Single Double Weld
 Backing Yes No
 Backing Material SHOE FLANGE
 Root Opening PER DETAIL Root Face Dimension 0
 Groove Angle 30 DEG Radius (J-U) _____
 Back Gouge Yes No
 Method _____

Joint Detail

(SEE PAGE 2 FOR DETAIL)

APPROVED
 WASHINGTON STATE
 DEPARTMENT OF TRANSPORTATION
 BRIDGE AND STRUCTURES OFFICE
 BY: CONSTRUCTION SUPPORT ENGINEER
 DATE **FEB - 1 2011**

BASE METALS

Material Spec. API 5L to ASTM A448
 Type or Grade X42 X52 to Grade 60/90
 Thickness: Groove (in) .500 - .500
 Fillet (in) _____ - _____
 Diameter (Pipe, in) 8 - 24

POSITION

Position of Groove IG ROTATED Fillet _____
 Vertical Progression: Up Down

ELECTRICAL CHARACTERISTICS

Transfer Mode (GMAW):
 Short-Circuiting Globular Spray
 Current: AC DCEP DCEN Pulsed
 Other _____
 Tungsten Electrode (GTAW):
 Size _____ Type _____

FILLER METALS

AWS Specification A5.17 A5.17
 AWS Classification ER70S3
EM12K

TECHNIQUE

Stringer or Weave Bead Stringer
 Multi-pass or Single Pass (per side) Multiple
 Number of Electrodes ONE
 Electrode Spacing: Longitudinal _____
 Lateral _____
 Angle 3 DEG.
 Contact Tube to Work Distance 1-1 1/4"
 Peening NOT ALLOWED
 Interpass Cleaning CHIPPING

SHIELDING

Flux Gas CO2/ARGON
ESAB 350 Composition 10/90
 Electrode-Flux (Class) Flow Rate 30-40 CFH
F7A2-EM12K Gas Cup Size 3/4"

PREHEAT

Preheat Temp., Min. 150 DEG.F.
 Thickness Up to 3/4" Temperature 150 DEG.F.
 Over 3/4" to 1-1/2" 150 DEG.F.
 Over 1-1/2" to 2-1/2" 150 DEG.F.
 Over 2-1/2" N/A
 Interpass Temp., Min. 150 DEG.F. Max. 450 DEG.F.

POSTWELD HEAT TREATMENT PWHT Required

Temp. _____ Time _____

WELDING PROCEDURE

Layer/Pass	Process	Filler Metal Class	Diameter	Current Type	Amps on WFS	Volts	Travel Speed	Other Notes
ONE	GMAW	ER70S3	.035	DCEP	195-235 A (420-522)	24-28 V	13-17 IPM	
2 ^	SAW	EM12K	.125	DCEP	460-560 A	28-32 V	22-30 IPM	

CONTR. NO. 8078
 OFFICE COPY
 CHD. BY NSB
 DATE 2-1-11
 APPROVED AS NOTED
 RETURNED FOR CORRECTION

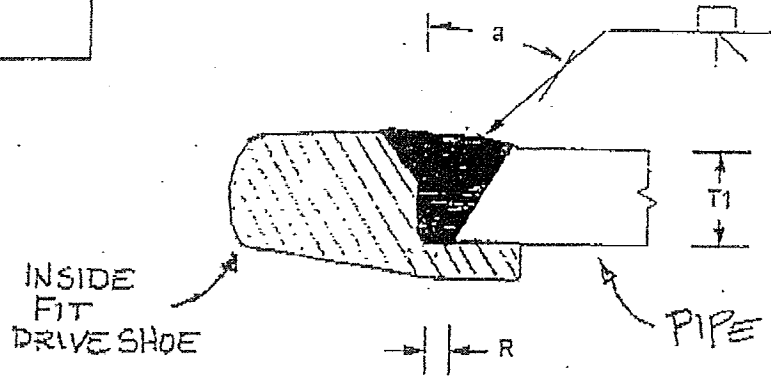
Farwest Fabrication Welding Procedure Specification

WPS-FWF-API-SHOE

Page 2 of 2

Joint Detail

Single-bevel-groove-weld (4)
T-joint (T)
Corner joint (C)



Welding Process	Joint Designation	Base Metal Thickness (U=unlimited)		Groove Preparation				Permitted Welding Positions	Notes
		T1	T2	Root Opening	Groove Angle	Tolerances			
						As Detailed (see 3.13.1)	As Fit Up (see 3.13.1)		
SAW	TC-U4a-S	U	U	R = 3/8	a = 30°	R = +1/16, -0 a = +10°, -0°	+1/4, -1/16 +10°, -5°	F	J, N, V
				R = 1/4	a = 45°				

MEMO

Notes:

- A: Not prequalified for gas metal arc welding using short circuiting transfer nor GTAW. Refer to Annex A.
- B: Joint is welded from one side only.
- Bc: Cyclic load application limits these joints to the horizontal welding position (see 2.27.5).
- C: Backgouge root to sound metal before welding second side.
- D: SMAW detailed joints may be used for prequalified GMAW (except GMAW-S) and FCAW.
- E: Minimum weld size (E) as shown in Table 3.4.6 as specified on drawings.
- J: If fillet welds are used in statically loaded structures to reinforce groove welds in corner and T-joints, these shall be equal to 1/4 T₁, but need not exceed 3/8 in. (10 mm). Groove welds in corner and T-joints of cyclically loaded structures shall be reinforced with fillet welds equal to 1/4 T₁, but need not exceed 3/8 in. (10 mm).
- M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.
- Mp: Double-groove welds may have grooves of unequal depth, provided these conform to the limitations of Note E. Also the weld size (E) applies individually to each groove.
- N: The orientation of the two members in the joints may vary from 135° to 180° for butt joints, or 45° to 135° for corner joints, or 45° to 90° for T-joints.
- V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.
- Z: Weld size (E) is based on joints welded flush.