Marine Construction Dredging Pile Driving
1501 Taylor Way • Tacoma, Washington 98421
PHONES: Tacoma (253) 254-0118,
Seattle (206) 623-0114,
Fax (253) 254-0155

CONTRACTORS LIC NO. 223-01-AM-ER-IC*372 NO.

AMERICAN CONSTRUCTION COMPANY

DATE January 27, 2011

TO: Columbia River Crossing Project Office
700 Washington Street, Suite 300
Vancouver, WA 98660

Attn: Frank Green, P.E.

JOB #: MC 02-11

TITLE: Columbia River Bridge Temporary Pile Test Program (#8078)

THE FOLLOWING ITEMS ARE BEING SENT:

Herewith	X
Under Separate Cover	
Direct	

QUANTITY	DESCRIPTION
6 EA	Piling Submittal 002: Welder & Welding Inspector certifications
6 EA	Piling Submittal 002: Driving Shoes Certifications and Catalogue Cuts
6 EA	Piling Submittal 002: Welding Procedure for Pipe Pile Splicing
6 EA	Piling Submittal 002: Welding Procedure for Driving Shoe Attachment
6 EA	Piling Submittal 002: Welding material certification

These items are being sent:

X	Per your request
X	Please keep us advised of action taken
X	For you to process
X	For your inspection and approval
X	For your general information and file
X	For your approval or corrections

REMARKS:

Please contact us promptly if there is a problem or question

COPY TO:

AMERICAN CONSTRUCTION COMPANY, INC.

BY: _____
Vernon Uy

FARWEST FABRICATION
Welding Procedure Specification

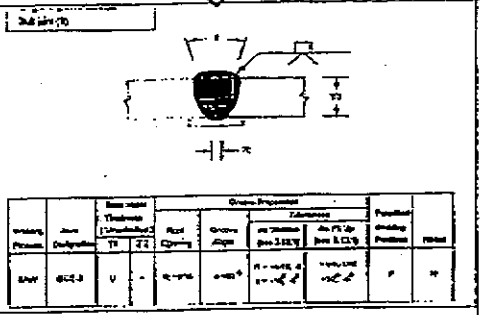
WPS-FWF-API-X52
Page 1 of 2

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 ☐
Supporting PQR(s) PQR-FWF-API-X52

SHANNON T. TOMEK
CWI 08050191
QC1 EXP: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 _____

Joint Detail



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

FILLER METALS
AWS Specification A5.18 A5.17
AWS Classification ER70S-3 _____
E81T1K _____

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

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

POSITION
Position of Groove 1G 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 _____

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

POSTWELD HEAT TREATMENT PWHT Required ☐
Temp. _____ Time _____

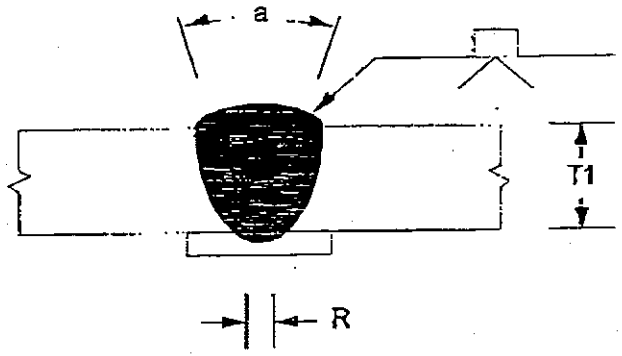
WELDING PROCEDURE

Layer/Pass	Process	Filler Metal Class	Diameter	Cur. Type	Amps or WFS	Volts	Travel Speed	Other Notes
	GMAW	ER70S-3	.035	DCEP	194-237 A	24-27.8 V	13-17 IPM	

FARWEST FABRICATION
Welding Procedure Specification

Joint Detail

Butt joint (B)



Welding Process	Joint Designation	Base Metal Thickness (U=unlimited) T1	T2	Groove Preparation: Root Opening	Groove Angle	Tolerances: As Detailed (see 3.13.1)	Tolerances: As Fit Up (see 3.13.1)	Permitted Welding Positions	Notes
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 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. 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 T_1, 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 T_1, 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

Farwest Fabrication
Procedure Qualification Record

PQR-FWF-API-X52
Page 1 of 3

PQR No. PQR-FWF-API-X52 Revision 0 Date 12/30/2008/ Shannon Tomek

Authorized By C.Crites Date 12/30/2008 Type Manual ☐ Machine ☒

Welding Process(es) GMAW SAW Reference WPS No. FWF-WPS-01X52 Semi-Auto ☒ Auto ☐

JOINT

Type Butt Single ☒ Double Weld ☐

Backing Yes ☒ No ☐

Backing Material A36

Root Opening 3/16" Root Face Dimension 0

Groove Angle 60 DEG. Radius (J-U)

Back Gouging Yes ☐ No ☒

Method

Joint Detail

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

BASE METALS

Material Spec. API 5L to API 5L

Type or Grade X52 to X52

Thickness: Groove (in.) .500 Fillet (in.)

Diameter (Pipe, in.) 8

FILLER METALS

AWS Specification A5.18 A5.17

AWS Classification ER70S-3 EM12K

SHIELDING

Flux Gas AR/CO2

350 Composition 90/10

Electrode-Flux (Class) Flow Rate 35 CFH

F7A2-EM12K Gas Cup Size 3/4

PREHEAT

Preheat Temp., Min. 70 DEG. F

Interpass Temp., Min. 70 DEG. F Max. 500 DEG. F

POSTWELD HEAT TREATMENT Required ☐

Temp.

Time

POSITION

Position of Groove 1G 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

TECHNIQUE

Stringer or Weave Bead Stringer

Multi-pass or Single Pass (per side) Multiple

Number of Electrodes ONE

Electrode Spacing: Longitudinal

Lateral Angle 3 DEGREES

Contact Tube to Work Distance 1" - 1 1/4

Peening NOT ALLOWED

Interpass Cleaning CHIPPING

WELDING PROCEDURE

Layer/Pass	Process	Filler Metal Class	Diameter	Current Type	Amps or WFS	Volts	Travel Speed	Other Notes
ONE	GMAW	ER70S-3	.035	DCEP	215 A	26 V	15 IPM	

Farwest Fabrication
Procedure Qualification Record

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: 85099 Result ACCEPT
UT report no: _____ Result _____

FILLET WELD TEST RESULTS

Minimum size multiple pass

Macroetch

1. _____ 3. _____
2. _____

Maximum size single pass

Macroetch

1. _____ 3. _____
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

Farwest Fabrication
Procedure Qualification Record

Joint Detail

MEMO

ESAB® 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

C	Mn	Si	S	P	Cu	Total 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)
Radiogra hy Test Met all requirements			31	(42)
			29 (avg 3)	(39) (avg 3)

Welding Conditions

Arc Voltage	28	Base Pl te	A515/516 Gd 70 1 in Thick
Ampera e	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 m ximum 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

48" Drive Shoes

Vancouver Iron & Steel, Inc.

MATERIAL CERTIFICATE

Customer: Versa Steel Inc. Date: 9-Mar-09

PO Number: 2947 Part Number: VS748

Heat Number: Total Quantity: 3

Specification : ASTM A148 Gr. 60-50

Heat Treatment: NORMALIZE

CHEMICALS	
Carbon	0.21
Silicon	0.58
Manganese	0.66
Phosphorus	0.01
Sulfur	0.01
Chromium	
Nickel	
Molybdenum	
Copper	
Vanadium	
Aluminum	0.04
Magnesium	

MECHANICAL		
Tensile	85,500	psi
Yield	54,500	psi
Elong.	25	%
Reduc.	42	%
Brinell	179	BHN

LOT NUMBER	
Julian Date	Qty.

CHARPY TEST:

Notch: Temp:

Test 1:

Test 2:

Test 3:

Average:

We certify that the above items have been melted and manufactured in the United States in accordance with, and conform to, the applicable specifications, standards, requirements, instructions and/or drawings referenced on the above purchase order, subject to our acknowledgment of said purchase order.

24" ϕ DRIVE SHOES

VANCOUVER IRON & STEEL, INC

MATERIAL CERTIFICATE

Customer: Versa Steel Inc. Date: 12/20/2010

PO Number: 2907 2883 Part Number: VS724-80/50

Heat Number: Total Quantity: 76

Specification: ASTM-A148 Gr. 80-50

Heat Treatment: NORMALIZE

	CHEMICALS		MECHANICAL		LOT NUMBER Julian Date	Qnty.
Carbon	0.26	Tensile	82,500	psi		
Silicon	0.55	Yield	53,000	psi		
Manganese	0.86	Elong.	28	%		
Phosphorus	0.01	Reduc.	30	%		
Sulfur	0.01	Brinell	174	BHN		
Chromium	0.13					
Nickel	0.06					
Molybdenum	0.10	CHARPY TEST:				
Copper	0.13	Notch:		Temp:		
Vanadium						
Aluminum	0.04	Test 1:				
Magnesium		Test 2:				
		Test 3:				
		Average:				

We certify that the above items have been melted and manufactured in the United States in accordance with, and conform to the applicable specifications, standard, requirements, instructions and/or drawings referenced on the above purchase order, subject to our acknowledgement of said purchase order.

Vancouver Iron and Steel, Inc

Quality Assurance Department

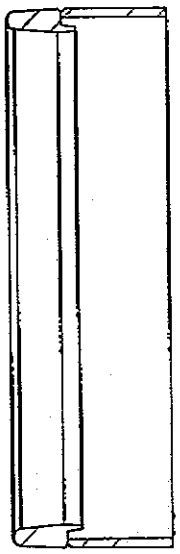
Phone: 1-800-678-0814 / 1-503-287-9822 Fax: 1-800-287-7483 / 1-503-287-7483

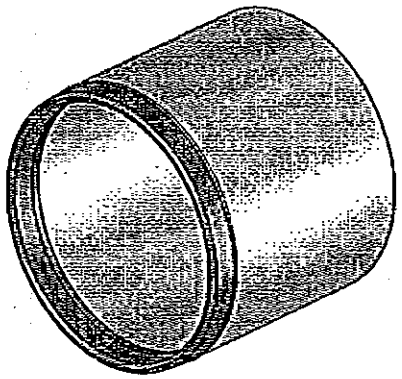
Versa- Steel, Inc.

www.piletips.com

1618 NE 1st Avenue Portland, Oregon 97232-1136

Open End Cutting Shoe
Data Sheet



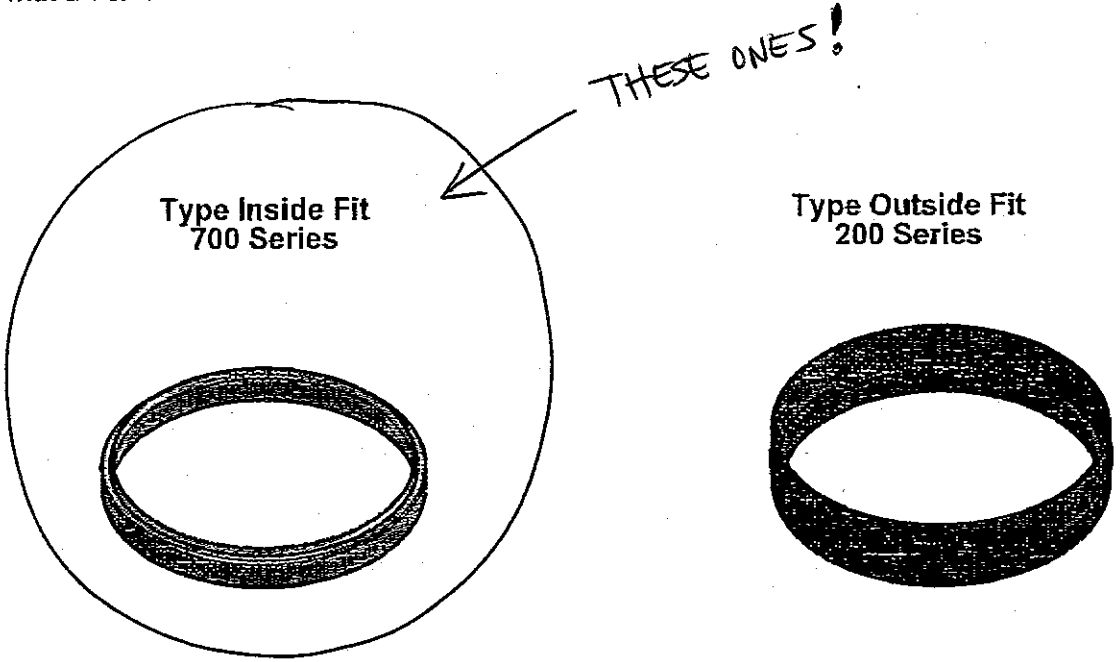


Product Description

Our inside fit and outside fit cutting shoes are designed to install with a slip-on fit. The design places the cross-sectional area directly below the wall of the pipe for maximum support during penetration. They are a more heavy duty construction than other brands.

The inside fit cutting shoe has a weld prep chamfer built into the casting. Slip shoe inside pipe and using a 70xx series rod weld a 5/16" or larger weld all around.

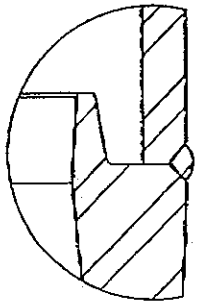
The outside fit cutting shoe has a natural fillet on top for easy welding. These slip fit shoes are easily attached with a 5/16" or larger fillet weld at the top of the flange. Weld all around the shoe with a 70xx series rod.



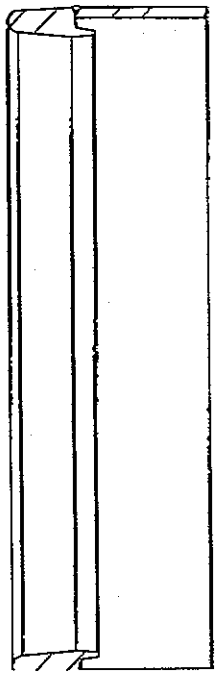
Versa Steel Open End Cutting Shoe and Pipe Cross-Section View

Open End Cutting Shoes

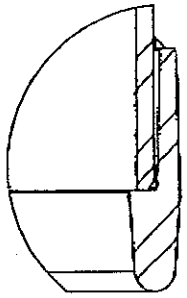
Type Inside Fit
700 Series



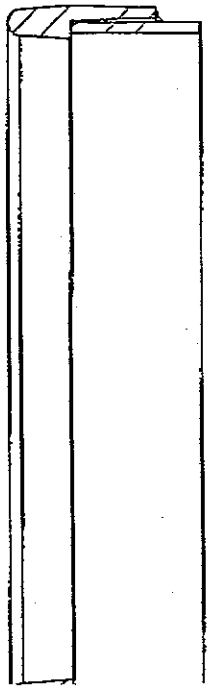
These tips are designed with a weld chamfer built into the casting. Slip shoe inside pipe and using a 70xx series rod weld a 5/16" or larger weld all around.



Type Outside Fit
200 Series



These slip fit shoes are easily attached with a 5/16" or larger fillet weld at the top of the flange. For best results, weld all around the shoe with a 70xx series rod.



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 ☐
Supporting PQR(s)

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

JOINT

Type Corner 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 DETAILS)

BASE METALS

Material Spec. API 5L to ASTM A148
Type or Grade X42/ X52 to Grade 50/90
Thickness: Groove (in) .500 - .590
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	

SHIELDING

Flux: ESAB 350
Electrode-Flux (Class): F7A2-EM12K
Gas: CO2/ARGON
Composition: 10/90
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: ONE
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. 150 DEG.F.

Thickness	Temperature
Up to 3/4"	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

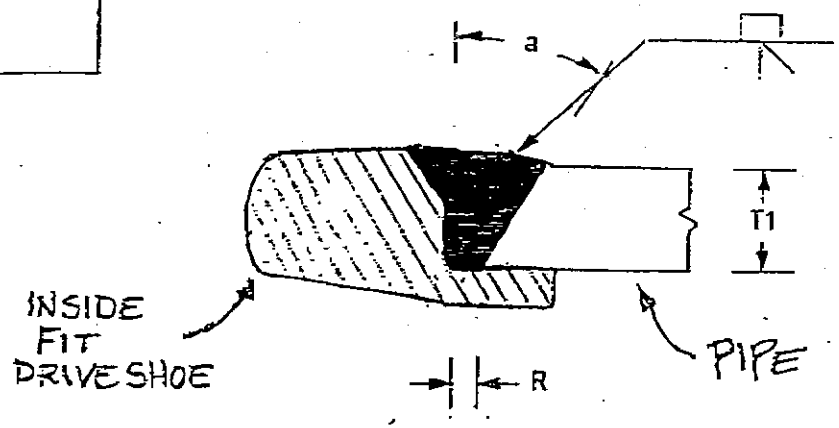
WELDING PROCEDURE

Layer/Pass	Process	Filler Metal Class	Diameter	Cur. Type	Amps or WFS	Volts	Travel Speed	Other Notes

Farwest Fabrication
Welding Procedure Specification

Joint Detail

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



Welding Process	Joint Designation	Base Metal Thickness (U=unlimited) T1	T2	Groove Preparation: Root Opening	Groove Angle	Tolerances: As Detailed (see 3.13.1)	Tolerances: As Fit Up (see 3.13.1)	Permitted Welding Positions	Notes
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.
- Br: 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, 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 T_1, 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 T_1, 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

NORTHWEST LABORATORIES *of Seattle, Incorporated*

ESTABLISHED 1896

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241 South Holden Street • Seattle, WA 98108-4359 • Phone: (206) 763-6252 • Fax: (206) 763-3949 www. nwlabs1896.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

Sample #	T1	T2	Specified
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)

No.	Type of Bend	Results
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.

Farwest Fabrication
Welding Operator Qualification Test Record

MIKE KRESS X52
Page 1 of 1

WQTR No. MIKE KRESS X52 Welder Name Mike Kress Welder Id MK
WPS No. WPS-FWF-API-X52 Revision 0 Date 1/6/2009

Variables	Record Actual Values Used In Qualification	Qualification Range
Process (Table 4.10, Item (2)])	GMAW/SAW	GMAW, SAW
Transfer Mode (GMAW): Short-Cir. ☐ Globular ☐ Spray ☒		Short-Circuiting ☐ Globular ☐ Spray ☒
Type Manual ☐ Machine ☐ Semi-Auto ☒ Auto ☐		Manual ☐ Machine ☐ Semi-Auto ☒ Auto ☐
Number of Electrodes Single ☒ Multiple ☐		Single ☐ Multiple ☐
Current/Polarity AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐		AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐
Position (Table 4.10, Item (5)])	6GR	6GR
Weld Progression: (Table 4.10, Item (7)]) Up ☐ Down ☒		Up ☐ Down ☒
Backing [Table 4.10, Item (9)] Use Backing ☒		With Backing ☒ Without Backing ☐
Consumable Insert (GTAW) Use Insert ☐		With Insert ☐ Without Insert ☐
Material/Spec.	API 5LX52 to API 5LX52	API 5LX52/ASTM A252 GR3
Thickness (Plate): Groove (in)		-
Fillet (in)		-
Thickness (Pipe/tube): Groove (in)	.500	3/16" - Unlimited in
Fillet (in)		-
Diameter(Pipe): Groove (in)	8 5/8"	4 - Unlimited in
Fillet ( )		-
Notes		
Filler Metal [Table 10, Item (3)]		
Spec.	A5.18/A5.17	AS TESTED
Class.	ER70S3/EM12K	AS TESTED
F-No.		
Gas/Flux Type [Table 4.10, Item (4)]	CO2/AR	AS TESTED
Other		

VISUAL INSPECTION (4.8.1) Acceptable Yes

GUIDED BEND TEST RESULTS (4.30.5)

Type	Result	Type	Result
SIDE 1	ACCEPT	SIDE 2	ACCEPT
SIDE 3	ACCEPT	SIDE 4	ACCEPT

Fillet Test Results (4.30.2.3 and 4.30.4.1)

Appearance Fillet Size Macroetch
Fracture Test Root Penetration Description
Inspected By Shannon Tomek Test No. MKX52 Organization Farwest Fabrication Date 1/3/2009

SHANNON T. TOMEK 5866191 CWI QC

RADIOGRAPHIC TEST RESULTS (4.30.3.1)

Film Identification No.	Result	Remark
	ACCEPT	

Interpreted By Paul Shane Guidry

WELDER, WELDING OPERATOR, OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder WELDING OPERATOR
Name ADAM GREEN Identification No. AG
Welding Procedure Specification No. FWF-WPS- Rev -0 Date 11-16-2007

37-X70

	Record Actual Values Used in Qualification	Qualification Range
Variables		
Process/Type [Table 4.10, Item (1)]	GMAW/SAW	
Electrode (single or multiple) [Table 4.10, Item (8)]	SINGLE	AS TESTED
Current/Polarity	DCEP	
Position [Table 4.10, Item (4)]	1G ROTATED	AS TESTED
Weld Progression [Table 4.10, Item (6)]	N/A	N/A
Backing (YES or NO) [Table 4.10, Item (7)]	YES	AS TESTED
Material/Spec.	API 5L X70 10 X70	
Base Metal		
Thickness: (Plate)		
Groove	N/A	N/A
Fillet		
Thickness: (Pipe/tube)		
Groove	.500 WALL	.250-1.00
Fillet	N/A	N/A
Diameter: (Pipe)	12" PIPE	12" AND UP
Groove	SAME	SAME
Fillet	N/A	N/A
Filler Metal [Table 4.10, Item (3)]		
Spec. No.	AWS A5.17 / A5.18	
Class	ER70S3 / EH12K	
F-No. [Table 4.10, Item (2)]	N/A	N/A
Gas/Flux Type [Table 4.10, Item (3)]	AR / CO2	
Other		AS TESTED

VISUAL INSPECTION (4.8.1)
Acceptable YES or NO YES

Guided Bend Test Results (4.30.5)

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

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 [signature] 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

1263 3rd 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	MATL	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 : FWP-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 (lbs)	Tensile (psi)	Fracture Location
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" Ma

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

Note : Results conform to specification requirements.

Respectfully,

Wayne Langley
Laboratory Supervisor

Farwest Fabrication

FG-01

Welding Operator Qualification Test Record

WQTR No. FG-01 Welder Name Fernando Gonzalas Welder Id FG

WPS No. FWF-WPS-01-252GR3 Revision. 0 Date 12/1/2010

Variables	Record Actual Values Used in Qualification	Qualification Range
Process (Table 4.10, Item (1))	GMAW/SAW	AS TESTED
Transfer Mode (GMAW): Short-Cir. ☐ Globular ☐ Spray ☒		Short-Circuiting ☐ Globular ☐ Spray ☒
Type Manual ☐ Machine ☐ Semi-Auto ☒ Auto ☐		Manual ☐ Machine ☐ Semi-Auto ☒ Auto ☐
Number of Electrodes Single ☒ Multiple ☐		Single ☒ Multiple ☐
Current/Polarity AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐		AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐
Position (Table 4.10, Item (4))	1G ROTATED	AS TESTED
Weld Progression: (Table 4.10, Item (6)) Up ☐ Down ☒		Up ☐ Down ☒
Backing [Table 4.10, Item (7)] Use Backing ☒		With Backing ☒ Without Backing ☐
Consumable Insert (GTAW) Use Insert ☐		With Insert ☐ Without Insert ☐
Material/Spec.	ASTM A252 GR3 to A252 GR3	
Thickness (Plate): Groove ( )		-
Fillet ( )		-
Thickness (Pipe/tube): Groove (in)	.500	.1875 - Unlimited in
Fillet ( )		.1875 - Unlimited in
Diameter(Pipe): Groove (in)	8	4 - Unlimited in
Fillet ( )		- Unlimited in
Notes		
Filler Metal (Table 10, Item (2))		
Spec.	AWS A5.18/5.17	AS TESTED
Class.	ER70S3/EM12K	AS TESTED
F-No.	N/A	
Gas/Flux Type (Table 4.10, Item (3))	CO2/AR-EM12K	AS TESTED
Other		

VISUAL INSPECTION (4.8.1) Acceptable Yes

GUIDED BEND TEST RESULTS (4.30.5)

Type	Result	Type	Result

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

Fillet Test Results (4.30.2.3 and 4.30.4.1)

Appearance Fillet Size Macroetch

Fracture Test Root Penetration Description

Inspected By Shannon Tomek Test No. FG-01 Organization Farwest Fabrication Date 12/1/2010

RADIOGRAPHIC TEST RESULTS (4.30.3.1)

Film Identification No.	Result	Remark

Interpreted By William Mace

DATE: 12-7-10

PM TESTING LABORATORTY INC.

PAGE 1 OF 1

RADIOGRAPHIC REPORT – *WELDS*

FORM QC 25A, 04/16/10

CUSTOMER	FARWEST FAB	P.O.#	ST 1180
NDT CONTROL #	93977		
PART #	GMAW/SAW 16 ROTATED	PART NAME	WELDER QUAL
SPECIFICATION	AWS D1.1	REV.	10
ACCEPTANCE	AWS D1.1	REV.	10
SPECIFICATION		REV.	
ACCEPTANCE		REV.	
MATERIAL	CS	MT EXAM REQUIRED	
PT EXAM REQUIRED			
REMARKS	FG - FERNANDO GONZALES	JOB NUMBER	156025
X-RAY		GAMMA RAY	K

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

Summary: PT | MT | RT

PM TESTING LABORATORY INC.

RADIOGRAPHIC TECHNIQUE – TUBES

FORM QC-03A, 01/11/08

CUSTOMER Farwest Fab — PART NUMBER Header Quick

ALLOY 05 — PART NAME

SPECIFICATION AWS D1.1 Rev. 10 — ACCEPTANCE AWS D1.1 Rev. 10

INSPECTION CLASS: — GRADE: — MODEL # — STATE OF MFG. USA

RT INSPECTIONS PERFORMED PER PMT 003-3 REVISION 12 — NDT CONTROL # 93577

ISOTOPE	EXPOSURE DEVICE	X-RAY
[X] Iridium 192 [ ] Cobalt 60	Kv Rating —	Ma Rating —
Manufacturer: IPC	Model: 1A100	Source / Focal Spot Size: .1"X1"

Number of View(s) 3 (0-1)(1-2)(2-0) — Angle(s)

Source to Film Distance: 9" — Angle of Beam: 90° — Area of Interest Thickness: .5"

Penetrameter – [X] Film Side [ ] Source Side — Alloy: 55 — Type: ASTM — Size: 16

Pentrameter Shim – Alloy: same — Thickness: — — Quality Level: 2ulee

Film Brand: AGFA — Film Type: D7 — Film Size: 7.5" X 17" — No. Of Films: 6

Front Screen – Material: Pb — Thickness: .005" — Back Screen – Material: Pb — Thickness: .010"

Kv: — — Ma / Curies: 53 — Exposure Time: 40 sec — Density range: 2.0 - 4.0

GEOMETRIC UN-SHARPNESS MEETS THE MINIMUM REQUIREMENTS OF PMT-003-3 TABLE I @ .5 Ug in.

Radiographic Contrast (According to TABLE 2 PMT 003-3) @ >2%

Maximum distance from source side of object to the film (part distance +1/8" cassette): 5/8"

Minimum source to object distance: 8.5"

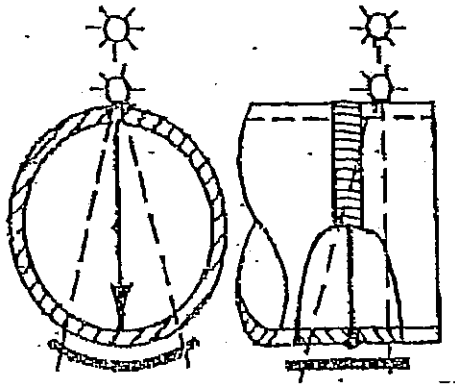
Single ____ or double X wall exposure. — Single X or double ____ wall viewing.

Development: [ ] Automatic [X] Manual — Time: 11 min — Temp: 89 F.

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

SKETCH

Optional Source Location



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PSI Information To Build On
Engineering • Consulting • Testing

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% CO_2

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
Steve Moore, Lab Supervisor, Mechanical Testing Services

Date: January 27, 2010

We certify that the statements in this record are correct and that the test coupons were prepared

Copy

PSI Information To Build On
Engineering • Consulting • Testing

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% CO_2
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# 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
Steve Moore, Lab Supervisor, Mechanical Testing Services

Date: January 27, 2010

We certify that the statements in this record are correct and that the test coupons were prepared

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

PRESIDENT AWS

CHAIR, QUALIFICATION COMMITT

CHAIR, CERTIFICATION COMMITT