WPS ES155001

QW-482 SUGGESTED FORMAT F(
(See QW-201.1, Section

Supporting PQR 900-1-A

Welding Procedure

N (WPS)

Company Name Fermi Nat'l. Acc. Lab. By: _____

Welding Procedure Specification No. ES155001** Date _____ Supporting PQR No.(s) ~~820329~~ 900-1-A

Revision No. _____ Date _____

Welding Process(es) GTAW Type(s) Manual
(Automatic, Manual, Machine, or Semi-Auto.)

JOINTS (QW-402) Details

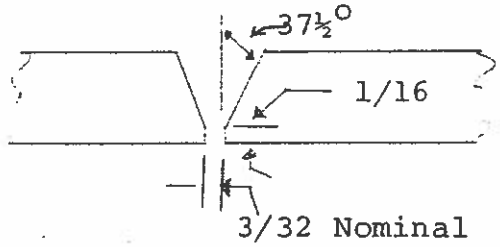
Joint Design V Groove 37½°, 3/32 gap 1/32 to 1/16 gap

Backing (Yes) _____ (No) _____

Backing Material (Type) _____

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)



*BASE METALS (QW-403)

P-No. 8 Group No. 1 to P-No. 8 Group No. 1

OR

Specification type and grade 304-SA

to Specification type and grade _____

OR

Chem. Analysis and Mech. Prop. 18CR-8-NI

to Chem. Analysis and Mech. Prop. _____

Thickness Range:

Base Metal: Groove 37½° Fillet _____

Deposited Weld Metal

Pipe Dia. Range: Groove 6" dia. SCH 40 (277 wall) Fillet _____

Other _____

*FILLER METALS (QW-404)

F-No. 6 Other _____

A-No. 8 Other _____

Spec. No. (SFA) 5.9.77

AWS No. (Class) A5.9.77

Size of filler metals 1/16" to 3/32 dia.

(Electrode, Cold Wire, Hot Wire, etc.)

Electrode-Flux (Class) NA

Flux Trade Name NA

Consumable Insert NA

*Each base metal-filler metal combination should be recorded individually.

** Formerly FNL- WP-900

(6/30/79) This form (E00006) may be obtained from the Order Dept., ASME, 345 E. 47 St., N.Y., N.Y. 10017

WPS

QW-482 (Back)

POSITIONS (QW-405)

Position(s) of Groove 6 G

Welding Progression: Up X Down

Position(s) of Fillet

POSTWELD HEAT TREATMENT (QW-407)

Temperature Range NA

Time Range NA

PREHEAT (QW-406)

Preheat Temp. Min. NONE

Interpass Temp. Max. 350°F max.

Preheat Maintenance

(Continuous or special heating where applicable should be recorded)

GAS (QW-408)

Shielding Gas(es)

Percent Composition (mixtures)

Flow Rate

Gas Backing

Trailing Shielding Gas Composition

ELECTRICAL CHARACTERISTICS (QW-409)

Current AC or DC DC Polarity STRAIGHT

Amps (Range) 55 to 75 Volts (Range) 9-12

(Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)

Tungsten Electrode Size and Type 2% Thoriated 3/32" dia. (Pure Tungsten, 2% Thoriated, etc.)

Mode of Metal Transfer for GMAW NA (Spray arc, short circuiting arc, etc.)

Electrode Wire feed speed range NA

TECHNIQUE (QW-410)

String or Weave Bead STRINGER

Orifice or Gas Cup Size #6 (5/16" 3/8)

Initial and Interpass Cleaning (Brushing, Grinding, etc.) BRUSHING AND/OR GRIND

Method of Back Gouging NA

Oscillation MINIMAL *

Contact Tube to Work Distance NA

Multiple or Single Pass (per side) MULTIPLE

Multiple or Single Electrodes SINGLE

Travel Speed (Range) 4 to 8

Peening NA

Other

Weld Layer(s)	Process	Filler Metal		Current		Volt Range	Travel Speed Range	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, Etc.)
		Class	Dia.	Type Polar.	Amp Range			
1	GTAW	ER308	1/16	DCSP	70-110	10-14	As Required	
2-Final	GTAW	ER308	3/32	DCSP	100-225	14-20	As Required	

*Bead Width Should not Appreciably Exceed Gas Orifice Diameter.

WPS

RESEARCH AND CHEMISTS

AS A MUTU... ARE SUBMIT... FOR PUBLIC...

Supports WPS ES133001
Formerly FNL-WP-900

...ES. ALL REPORTS ...AUTHORIZATION ...M OR REGARDING OUR REPORTS IS RESERVED PENDING OUR WRITTEN APPROVAL.

Order No. CH 3514

Date 10-21-73

P.O.# 0356-61

PHYSICAL TEST REPORT OF WELDING PROCEDURE QUALIFICATION TESTS

Client Nuclear Welding Inc.
P. O. Box 254, La Grange, Illinois 60525

Specification No. FNL-WP 900 Date

Welding Process GTAW Manual or Machine Manual

Material Specification CR-NI to of Group No. to Group No.

Thickness (if pipe, diameter and wall thickness) 0.280 Pipe

Thickness Range this test qualifies

Filler Metal Classification

Weld Metal Analysis No. A- (ASME Sec. 9 only)

For oxyacetylene welding – State if Filler Metal is silicon or aluminum killed.

Flux or Atmosphere

Flux Trade Name or Composition

Inert Gas Composition

Trade Name Flow Rate

Is Backing Strip used? Preheat Temp. Range

Postheat Treatment

Position 6-G

(For plate, flat, horizontal, vertical, or overhead; if vertical, state whether up or down, For pipe: Axis of pipe vertical, horizontal fixed, or horizontal rolled).

Welding Procedure

Single or Multiple Pass

Single or Multiple Arc

– For Information Only –

Filler Wire – Diameter

Trade Name

Type of Backing

Welding Techniques

Joint Dimensions Accord with

amps volts inches per min.

Above information by PTL ☐ Client ☒ Other

Preparation of specimens witnessed by PTL Yes ☐ No ☒

Reduced Section Tensile Test

SPECIMEN NO.	DIMENSIONS-INCHES WIDTH	DIMENSIONS-INCHES THICKNESS	AREA SQ. IN.	ULTIMATE TOTAL LOAD, LBS.	ULTIMATE UNIT STRESS, PSI	CHARACTER OF FAILURE AND LOCATION
Tensile 1	1.577	.270	.425	43,000	101200	BM
Tensile 2	1.580	.268	.423	42,500	100500	BM

Guided Bend Tests

TYPE AND FIGURE NO.	RESULT	TYPE AND FIGURE NO.	RESULT
FACE	PASS	FACE	PASS
ROOT	PASS	ROOT	PASS

Welder's Name James Forgater Clock No. SS#354-20-2108 Stamp No. TS-930-12

Did the welder by virtue of these tests meet welder performance requirements? ☒ Yes ☐ No

Test witnessed by Nuclear Welding Inc. Test No. 1407

per Client

Results of tests (do) (do not) meet requirements of

ASME Sect. IX & III

PITTSBURGH TESTING LABORATORY

By David A. Dunn

David A. Dunn, Chicago

PQR

PITTSBURGH, PA.

AS A MUTUAL PROTECTION TO CLIENTS, THE PUBLIC AND OURSELVES, ALL REPORTS ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF CLIENTS, AND AUTHORIZATION FOR PUBLICATION OF STATEMENTS, CONCLUSIONS OR EXTRACTS FROM OR REGARDING OUR REPORTS IS RESERVED PENDING OUR WRITTEN APPROVAL.

Order No. CH 5698

Date 8/5/82

PO #43643

PHYSICAL TEST REPORT OF WELDER PERFORMANCE QUALIFICATION TESTS

Client: Fermi National Accelerator Laboratory

P. O. Box 500, Batavia, Illinois 60510

Welder Name M. REYNOLDS Clock No. 3993 Stamp No. 48

Welding Process GTAW

Position (For vertical weld state whether upward or downward) 6G
(For Plate: Flat, horizontal, vertical, or overhead; For Pipe: Axis of pipe vertical, horizontal fixed or horizontal rolled).

In accordance with Procedure Specification No. ES155001 Formerly ENA-WP-900

Material – Specification SA312 to SA312 of P-No. 8 to P-No. 8

Diameter and Wall Thickness (if pipe) otherwise Joint Thickness 6" SCH 40 (.280 Wall)

Thickness Range this qualifies 1/16 to .560

Filler Metal

Specification No. SAF 5.9

Describe Filler Metal ER-308L

Is Backing Strip Used? N/A

– For Information Only –

Filler Metal Diameter and Trade Name N/A Flux for Submerged Arc or Gas for Inert Gas Shielded Arc Welding N/A

Above Information by: PTL ☐ Client ☒ Other

Preparation of specimen witnessed by PTL Yes ☐ No ☒

Guided Bend Test Results

TYPE AND FIGURE NO.	RESULT	FIGURE NO.	RESULT
Face	PASS	Face	PASS
Root	PASS	Root	PASS

Test Witnessed by Client Test No. 10691

per

Results of tests (do) (do not) meet requirements of ASME SECT IX

Remarks machined and tested by P.T.L.

dl
lcc: Client

PITTSBURGH TESTING LABORATORY

By [signature]

WPQ

Fermilab

WELDER QUALIFICATION TEST RECORD

Welder's Name Dan Watkins Ident. No. 25 Date 3-9-84

Welding Process(es) GTAW Type Manual

Test in Accordance with WPS No. 155001

Material Spec. Spec/Grade No. SA 213T304 to Spec/Grade SA 213T304

P No. 8 to P No. 8 Thick. .277 Dia. 6"

Filler Metal Spec. No. SFA 5.9 Class. No. ER308 F No. 6

Backing None

Position 6G Weld Progression Upward

Gas Type Argon Composition 100%

Electrical Characteristics: Current DC Polarity Straight

Other Qualifies up to .554" Thickness

FOR INFORMATION ONLY

Filler Metal Diameter and Trade Name Techalloy 1/16"

Submerged Arc Flux Trade Name N/A

Gas Metal Arc Welding Shield Gas Trade Name N/A

GUIDED BEND TEST RESULTS

Specimen No.	Type	Figure No.	Results
1	Face	QW 462.3a	Acceptable
2	Root	QW 462.3a	Acceptable
3	Face	QW 462.3a	Acceptable
4	Root	QW 462.3a	Acceptable

RADIOGRAPHIC TEST RESULTS
(FOR ALTERNATIVE QUALIFICATION BY RADIOGRAPHY)

Radiographic Results N/A

Test Conducted by IFR Engineering Test No. 008-15

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordace with the requirements of Section IX of the ASME Code.

WPQ

By: James Parato

Date: 4/4/90

Welding Procedure Specification (WPS)
Code AWS D1.6 / D1.6 M

Prequalified X Qualified by Testing ____ Procedure Qualification Records ____

Company Name Hi – Tech Manufacturing
Welding Process(es) GTAW
Supporting PQR No.(s) ____

Joint Design Used
Type: Single ( ) Double Weld (x)
Backing: Yes ( ) No (x)
Backing Material ____
Root Opening 1/8" Root Face Dimension ____
Groove Angle 60° Radius (J-U) ____
Back Gouging: Yes (x) No ( )Method Grinding

Base Metals
Material Spec. UNS S30403 (304 L)
Type or Grade ____
Thickness: Groove 3/8" Fillet ____
Diameter (pipe) ____

Filler Metals
AWS Specification A 5.9
AWS Classification ER 309/309L

Shielding
Flux ____ Gas Argon Flow Rate 22 CFH
Composition 100%
Electrode Flux Class ____ Gas Cup Size 3/8

Preheat
Preheat Temp., Min. Sufficient to remove moisture
Interpass Temp., Min. ____
Max. 350°F

Identification No. WPS 100
Revision: ____ Date: ____ By: ____
Authorized By Simon Sorsher Date: 12/7/07
Type: Manual: ( ) Semi – Automatic (x)
Machine ( ) Automatic ( )

Position
Position of Groove 1G Fillet ____
Vertical Progression: Up ( ) Down ( )

Electrical Characteristics
Transfer Mode (GMAW)
Short Circuiting ( ) Globular ( ) Spray ( )
Current AC ( ) DCEP ( ) DCEN (x) Pulse ( )
Other ____
Tungsten Electrode (GTAW)
Size: 3/32"
Type: 2% Thoriated

Technique
Stringer of weave Stringer
Multiple or Single Pass (per side) Multi-pass
Number of Electrodes 1
Electrode Spacing: Longitudinal ____
Lateral ____
Angle ____
Contact Tube to Work Distance ____
Peening ____
Interpass Cleaning Wire Brush / Grinding

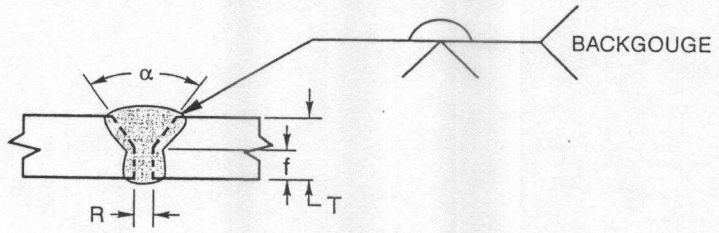
Postweld Heat Treatment
Temp. ____
Time ____

See page 2 for welding Procedure

Welding Procedure

Pass or Weld Layers	Process	Filler Metals Class	Filler Metals Diameter	Current Type and Polarity	Amps or Wire Feed Speed	Volts	Travel Speed
All	GTAW	ER 309/309L	3/32	DCEN	225		6 IPM

Single-V-groove weld (2)
Butt joint (B)



Welding Process	Joint Designation	Base Metal Thickness (U = Unlimited) T	Groove Preparation: Root Opening Root Face Groove Angle	Groove Preparation: Tolerances: As Detailed (see 3.24.2)	Groove Preparation: Tolerances: As Fit-Up (see 5.4)	Permitted Welding Positions	Notes
SMAW GTAW	B-U2	U	R = 0 to T/2 ≤ 1/8 f = 0 to T/2 ≤ 1/8 α = 60°	+T/4 ≤ 1/16, –0 +T/4 ≤ 1/16, –0 + 10°, –0°	+1/16, –T/2 ≤ 1/8 Not limited[a] +10°, –5°	All	d, k, o
	B-L2	2 max.					
GMAW FCAW	B-U2-GF	U	R = 0 to T/2 ≤ 1/8 f = 0 to T/2 ≤ 1/8 α = 45°	+T/4 ≤ 1/16, –0 +T/4 ≤ 1/16, –0 + 10°, –0°	+1/16, –T/2 ≤ 1/8 Not limited[a] +10°, –5°	All	a, d, k, o
SAW	B-L2c-S	Over 1/2 to 1	R = 0 f = 1/4 max. α = 60°	R = ±0 f = +0, –1/16 α = +10°, –0°	+1/16, –0 ±1/16 +10°, –5°	F	d, k
		Over 1 to 1-1/2	R = 0 f = 1/2 max. α = 60°				
		Over 1-1/2 to 2	R = 0 f = 5/8 max. α = 60°				

[a] Limited by a minimum groove depth.

Figure 3.5

WELDER OR WELDING OPERATOR QUALIFICATION TEST RECORD

Type of welder Welder
Name Stainislaw Tracz Identification No. 1710
Welding Procedure Specification No. WPS 100 Rev. Date 12-7-07

Variables	Record Actual Values Used in Qualification	Qualification Range
Process / Type	GTAW	GTAW / Single Electrode
Electrode (single or multiple)	Single	
Current / Polarity	DCEN	Qualifies DCEN Flat grooves & fillets
Position	1G	
Weld Progression		
Backing (YES or NO)	No	with or without
Material / Spec.	ASTM –A-36 to Same	any in table 3.2
Base Metal		
Thickness: (Plate)	3/8"	1/16" to ¾"
Groove		1/16" to ¾"
Thickness: (Pipe / Tube)		
Groove		See tables 4.3 & 4.4
Fillet		
Diameter: (Pipe)		
Groove		
Fillet		
Filler Metal		
Spec No.	AWS – A5.9	Qualifies to any F-6 specification in table 4.5
Class	ER 309/309L	
F-No.	F-6	
Gas / Flux Type	Argon 100%	Argon 100%
Other		

STEVE P. TARRANT
CWI 06110581
QC1 EXP. 11/09

VISUAL INSPECTION

Acceptable YES or NO Yes

Guided Bend Test Results

Type		Result	Type	Result
(1)	Face	Acceptable	N/A	
(1)	Root	Acceptable	N/A	

Fillet Test Results

Appearance _____ Fillet Size _____
Fracture Test Root Penetration _____ Macroetch _____
(Describe the location, nature, and size of any crack or tearing of the specimen.)

Inspected by Steve Tarrant Test Number 270
Organization Weldstar Date 12-12-07

RADIOGRAPHIC TEST RESULTS

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 Clause 4 of AWS D1.6 2007 Structural Welding Guide Stainless Steel

Manufacturer or Contractor Hi-Tech Manufacturing Authorized By Simon Sorsher
Date 12-7-07