QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)
(See QW-200.1, Section IX, ASME Boiler & Pressure Vessel Code)

Company Name: XYZ COMPANY By: JOE BLOW

Welding Procedure Spec. No.: GTAW-1 Date: 2-29-92 Supporting PQR No. (s): GTAW-1

Revision No.: 0 Date: 2-29-92

Welding Process(s): GTAW Type(s): MANUAL
(Automatic, Manual, Machine, or Semi-Auto)

JOINTS (QW-402)

Details

Joint Design: ALL

Backing: (Yes) X (No) X SEE PRODUCTION DRAWINGS

Backing Material: (Type): CARBON STEEL
(Refer to both backing & retainers)

XMetal • Nonfusing Metal
• Nonmetalic • Other

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 the bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

*BASE METALS (QW-403)

P-No. 4 Group No. 1 to P-No. 4 Group No. 1

OR

Specification type and grade SA 387 CLI

to Specification type and grade SA 387 CLI

OR

Chem. Analysis and Mech. Prop.

to Chem. Analysis and Mech. Prop.

Thickness range:

Base Metal: Groove: 1/16" - 1/2" Fillet: ALL

Pipe Dia. Range: Groove: ALL Fillet: ALL

* FILLER METALS (QW-404)

Spec. No. (SFA):	SFA 5.29		
AWS No. (Class):	ER 70S2		
Filler Metal F-No.:	6		
Chem. Comp. - A No.:	3		
Size of Filler Metals:	1/16" - 1/8"		

Weld Metal
Thickness range:

Groove:	1/2" MAX.		
Fillet:	ALL		
Electrode-Flux (Class):	N/A		
Flux Trade Name:	N/A		
Consumable Insert:	YES		
Other:			

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

QW-482 (Back)

WPS No.: GTAW-1 Rev. No.: 0

POSITIONS (QW-405)

Position(s) of Groove: ALL

Welding Progression: Up X Down

Positions(s) of Fillet ALL

POSTWELD HEAT TREATMENT (QW-407)

Temperature Range 1100 DEG

Time Range 1 HR PER INCH

PREHEAT (QW-406)

Preheat Temp. Min.: 60 DEG

Interpass Temp. Max.: 650 DEG MAX

Preheat Maint.: NONE

(Continuous or special heating where applicable should be recorded.)

GAS ((QW-408)

Percent Composition

	Gas(es)	(Mixture)	Flow Rate
Shielding:	ARGON	99.9%	85 CFH
Trailing:	N/A		
Backing:	N/A		

ELECTRICAL CHARACTERISTICS (QW-409)

Current AC or DC DC Polarity REVERSE

Amps Range 110-160 Volts (Range) 12-17

(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 N/A
(Pure Tungsten, 2% Thoriated, etc.)

Mode of metal Transfer for GMAW N/A
(Spray arc, short circuiting arc, etc.)

Electrode Wire feed speed range N/A

TECHNIQUE (QW-410)

String or Weave Bead BOTH

Orifice or Gas Cup Size 1/2"

Initial and Interpass Cleaning (Brushing, Grinding, etc.) BRUSHING AND GRINDING

Method of Back Gouging NONE

Oscillation NONE

Contact Tube to Work Distance 1/2"

Multiple or Single Pass (per side) MULTIPASS

Multiple or Single Electrodes SINGLE

Travel Speed (Range) 20-30 IPM

Peening NONE

Other

Weld Layer(s)	Process	Class	Filler Metal Dia.	Filler Metal Type Polar.	Current Amp Range	Current Volt Range	Travel Speed Range	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, Etc.)
ALL	GTAW		3/32"	DCRP	110-160	12-17	20-30	

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORDS (PQR)
(See QW-200.2, Section IX, ASME Boiler and Pressure vessel Code)
Record Actual Conditions Used to Weld Test Coupon

Company Name: XYZ COMPANY
Procedure Qualification Record No.: GTAW-2 Date: 2-29-92
WPS No.: GTAW-1
Welding Process(s) GTAW
Types (Manual, Automatic, Semi-Auto.): MANUAL

JOINTS (QW-402)

SEE PRODUCTION DRAWINGS

Groove Design of Test Coupon
(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)

BASE METALS (QW-403)
Material Spec.: SA-387 GR 11
Type or Grade: CL1
P-No.: 4 to P-No.: 4
Thickness of Test Coupon: 1/4"
Diameter of Test Coupon: N/A PLATE
Other:

FILLER METALS (QW-404)

SFA Specification:	SFA 5.9	
AWS Classification:	ER 70S-2	
Filler Metal F No.:	F-6	
Weld metal Analysis No.:	A-1	
Size of Filler metal:	1/16"	
Other:		
Weld Metal Thickness:	1/4"	

POSITION (QW-405)
Position of Groove: 1 G
Weld Progression (Uphill, Downhill): N/A
Other:

PREHEAT (QW-406)
Preheat Temp.: 250 DEG
Interpass temp.: N/A
Other:

POSTWELD HEAT TREATMENT (QW-407)
Temperature: 1100 DEG
Time: 1HR
Other:

GAS (QW-408)

	Percent Composition Gas(es)	(Mixture)	Flow Rate
Shielding:	ARGON/CO2	75/25	20-30CFH
Trailing:	N/A		
Backing:	ARGON	99.9%	10-15CFH

ELECTRICAL CHARACTERISTICS (QW-409)
Current: DC
Polarity: STRAIGHT
Amps.: 100 Volts: 15
Tungsten Electrode Size: 1/8"
Other:

TECHNIQUE (QW-410)
Travel Speed: 10 IPM
String or Weave BOTH
Oscillation: N/A
Multipass or Single Pass(perside) MULTIPLE
Single or Multiple Electrodes: MULTIPLE
Other:

QW-483 (Back)

PQR No.: GTAW-1

Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load Lb.	Ultimate Unit Stress psi	Type of Failure & Location
T-1	N/A	.505	.200	14,200	71,000	DF/HAZ
T-2	N/A	.480	.180	13,800	76,666	DF/HAZ

Guided Bend Tests (QW-160)

Type and Figure No.	Result
SIDE #1	ACCEPTABLE
SIDE #2	1/4 " LINEAR INDICATION ACCEPT
SIDE #3	ACCEPT

Toughness Tests (QW-170)

Specimen No.	Notch Location	Specimen Size	Test Temp.	Impact Values			Drop Weight Break (Y/N)
				Ft. Lbs.	% Shear	Mils	

Comments: _____

Fillet Weld Test (QW-180)

Result — Satisfactory: Yes: _____ No: _____ Penetration Into Parent Metal: Yes: ____ No: ___

Macro — Results: _____

Other Tests

Type of Test: _____

Deposit Analysis: _____

Other: _____

Welder's Name: JOE BLOW JR Clock No.: _____ Stamp No.: _____

Tests conducted by: XYZ LAB Laboratory Test No.: 1234

We 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 IX of the ASME Code.

Manufacturer: BILL'S TANK SHOP

Date: 2-29-92 By: _____

WPS # GMAW-1, REV. 0 AND PQR #GMAW-1

1. The base material thickness range shown on the WPS:

   a. should be 3/16" - 4" maximum
   b. should be 3/16" - 2" maximum
   c. is proper as shown
   d. should be 3/16" - 8" maximum

2. The deposited weld metal thickness range shown on the WPS:

   a. is acceptable as shown
   b. is beyond the range allowed by the Code
   c. is acceptable if impact tests are performed
   d. none of the above

3. The filler metal shown on the WPS:

   a. is acceptable as shown
   b. is unacceptable because ER 70S-2 was qualified, and ER 70S-7 is shown on the WPS
   c. is incorrect for the SFA # correlating to the AWS Classification
   d. cannot be used with the GMAW process

4. The mode of transfer shown on the WPS:

   a. is unacceptable for that qualified on the PQR
   b. is acceptable as shown
   c. should be "pulsed" on the WPS
   d. none of the above

5. The gas shielding shown on the WPS is:

   a. acceptable as shown
   b. unacceptable, because the composition has changed
   c. not required because GMAW can be run without gas
   d. none of the above

6. The 3G position of the test coupon indicates that the plate:

   a. was tested in the horizontal position
   b. was tested in the overhead position
   c. was tested in the 45° fixed position
   d. none of the above

7. The tension test results shown on the PQR are:

   a. acceptable as shown
   b. unacceptable because of insufficient strength
   c. unacceptable because an insufficient number of tests were taken for the thickness welded
   d. unacceptable because of errors in mathematical calculations

8. The bend test results shown on the PQR are:

   a. acceptable as shown
   b. unacceptable because of incorrect type of specimens tested
   c. unacceptable because results do not meet the Code
   d. unacceptable because not enough bend tests were taken

9. The PQR is acceptable because:

   a. It is properly certified
   b. it does not list toughness tests
   c. it has the welder's name and lab # listed
   d. the PQR is unacceptable because it has not been properly certified

10. A non-essential variable that has not been addressed on the PQR is:

   a. peening
   b. electrode spacing
   c. gas cup size
   d. not applicable - non-essential variables do not have to be addressed on the PQR

11. An essential variable (or variables) that has not been addressed on the PQR is:

   a. QW 403.9
   b. QW 404.24 - QW 404.27
   c. QW-402.1
   d. both a & b above

QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)
(See QW-200.1, Section IX, ASME Boiler & Pressure Vessel Code)

Company Name: XYZ COMPANY By: JOE BLOW

Welding Procedure Spec. No.: GMAW-1 Date: 2-29-92 Supporting PQR No. (s): GMAW-1

Revision No.: 0 Date: 2-29-92

Welding Process(s): GMAW (SHORT ARC) Type(s): SEMI-AUTO
(Automatic, Manual, Machine, or Semi-Auto)

JOINTS (QW-402)

Details

Joint Design: SINGLE VEE GROOVE

Backing: (Yes) _____ (No) X

Backing Material: (Type): NONE
(Refer to both backing & retainers)

- Metal
- Nonmetalic
- Nonfusing Metal
- Other

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 the bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

*BASE METALS (QW-403)

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

OR

Specification type and grade SA-36

to Specification type and grade SA-36

OR

Chem. Analysis and Mech. Prop. _____

to Chem. Analysis and Mech. Prop. _____

Thickness range:

Base Metal: Groove: 3/16" - UNLIMITED Fillet: ALL

Pipe Dia. Range: Groove: ALL Fillet: ALL

* FILLER METALS (QW-404)

Spec. No. (SFA):	SFA 5.18		
AWS No. (Class):	ER 70S-7		
Filler Metal F-No.:	6		
Chem. Comp. - A No.:	1		
Size of Filler Metals:	1/8" - 3/32"		

Weld Metal

Thickness range:

Groove:	UNLIMITED		
Fillet:	UNLIMITED		
Electrode-Flux (Class):	N/A		
Flux Trade Name:	N/A		
Consumable Insert:	N/A		
Other:			

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

QW-482 (Back)

WPS No.: _____ Rev. No.: _____

POSITIONS (QW-405)

Position(s) of Groove: ALL

Welding Progression: Up X Down X

Positions(s) of Fillet ALL

POSTWELD HEAT TREATMENT (QW-407)

Temperature Range NONE

Time Range _____

PREHEAT (QW-406)

Preheat Temp. Min.: 60 DEG MIN

Interpass Temp. Max.: NONE

Preheat Maint.: _____

(Continuous or special heating where applicable should be recorded.)

GAS ((QW-408)

Percent Composition

	Gas(es)	(Mixture)	Flow Rate
Shielding:	YES	75%CO2/25%A	25-30 CFH
Trailing:	NONE		
Backing:	NONE		

ELECTRICAL CHARACTERISTICS (QW-409)

Current AC or DC DC Polarity REVERSE

Amps Range 120-200 Volts (Range) 14-18

(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 _____
(Pure Tungsten, 2% Thoriated, etc.)

Mode of metal Transfer for GMAW SHORT CIRCUITING
(Spray arc, short circuiting arc, etc.)

Electrode Wire feed speed range _____

TECHNIQUE (QW-410)

String or Weave Bead STRING

Orifice or Gas Cup Size 1/2"

Initial and Interpass Cleaning (Brushing, Grinding, etc.) GRINDING, BRUSHING

Method of Back Gouging NONE

Oscillation REVERSE

Contact Tube to Work Distance 1/8" - 1/4"

Multiple or Single Pass (per side) MULTIPLE

Multiple or Single Electrodes SINGLE

Travel Speed (Range) 10-15 IPM

Peening NONE

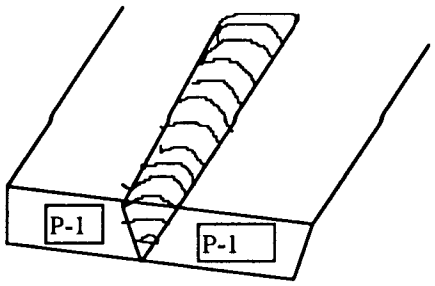
Other NO PASS GREATER THAN 1/2"

Weld Layer(s)	Process	Class	Filler Metal Dia.	Filler Metal Type Polar.	Current Amp Range	Current Volt Range	Travel Speed Range	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, Etc.)
ALL	GMAW S/C ARC	ER-70S-7	1/8" OR 3/32"	DCRP	12-200	14-19	10-15 IPM	NONE

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORDS (PQR)
(See QW-200.2, Section IX, ASME Boiler and Pressure vessel Code)
Record Actual Conditions Used to Weld Test Coupon

Company Name: XYZ COMPANY
Procedure Qualification Record No.: GMAW-1 Date: 2-29-92
WPS No.: GMAW-1
Welding Process(s): GMAW-1 SHORT CIRCUITING ARC
Types (Manual, Automatic, Semi-Auto.): SEMI-AUTO

JOINTS (QW-402)



Groove Design of Test Coupon
(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)

BASE METALS (QW-403)
Material Spec.: SA 516
Type or Grade: GR 70
P-No.: 1 to P-No.: 1
Thickness of Test Coupon: 2"
Diameter of Test Coupon: N/A
Other:

FILLER METALS (QW-404)
SFA Specification: 5.18
AWS Classification: ER 70 S-2
Filler Metal F No.: 6
Weld metal Analysis No.: 1
Size of Filler metal: 1/8"
Other:
Weld Metal Thickness: 2"

POSITION (QW-405)
Position of Groove: 3G
Weld Progression (Uphill, Downhill) DOWNHILL
Other:

PREHEAT (QW-406)
Preheat Temp.: 60 DEG
Interpass temp 650 DEG
Other:

POSTWELD HEAT TREATMENT (QW-407)
Temperature: NONE
Time:
Other:

GAS (QW-408)

	Percent Composition Gas(es)	(Mixture)	Flow
Shielding:	YES	C02	20 CFH
Trailing:	NONE		
Backing:	NONE		

ELECTRICAL CHARACTERISTICS (QW-409)
Current: DC
Polarity: RP
Amps.: 130 Volts: 17
Tungsten Electrode Size: NA
Other:

TECHNIQUE (QW-410)
Travel Speed: 12 IPM
String orWeaveBead WEAVE
Oscillation: NONE
Multipass orSingle Pass (perside): MULTIPASS
Single or Multiple Electrodes: SINGLE
Other:

QW-483 (Back)

PQR No.: GMAW-1

Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load Lb.	Ultimate Unit Stress psi	Type of Failure & Location
T-1	.750	1"	.750	56,400	75,200	DF-HAZ
T-2	.749	1"	.749	54,200	72,363	DF-HAZ

Guided Bend Tests (QW-160)

Type and Figure No.	Result
FACE #1	PASS
FACE #2	PASS
ROOT #1	PASS
ROOT #2	PASS

Toughness Tests (QW-170)

Specimen No.	Notch Location	Specimen Size	Test Temp.	Impact Values			Drop Weight Break (Y/N)
				Ft. Lbs.	% Shear	Mils	

Comments: _____

Fillet Weld Test (QW-180)

Result — Satisfactory: Yes: _____ No: _____ Penetration Into Parent Metal: Yes: ___ No: ____

Macro — Results: _____

Other Tests

Type of Test: _____

Deposit Analysis: _____

Other: _____

Welder's Name: JOE BLOW JR Clock No.: 2 Stamp No.: 3

Tests conducted by: JIMS TEST LAB Laboratory Test No.: 1234

We 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 IX of the ASME Code.

Manufacturer: BILLS WELDING SHOP

Date: 2-29-92 By: BILL BLOW

WPS #SAW-1, REV. O, PQR #SAW-1

1. The deposited weld metal thickness range listed on the WPS:

   a. is correct as shown
   b. is incorrect - should be 3/16" - 2" max.
   c. should be 4" max.
   d. none of the above

2. The SFA specification for the filler metal classification shown is:

   a. SFA 5.7
   b. SFA 5.17
   c. SFA 5.30
   d. SFA 5.20

3. An essential variable that has not been addressed on both the WPS and PQR is:

   a. QW-404.36
   b. QW-403.9
   c. QW-403.13
   d. all of the above

4. The pipe diameter range listed on the WPS:

   a. is acceptable as shown
   b. is incorrect - plate does not qualify for pipe
   c. should be ≥ 24" o.d.
   d. should be shown as ≥ 2 7/8" o.d.

5. Post-weld heat treatment as shown on the WPS/PQR is:

   a. incorrect, as all codes require PWHT in this thickness
   b. incorrect, as the PQR should be PWHT'd
   c. incorrect as the WPS should specify required PWHT of production welds
   d. none of the above

6. The tension test results shown on the PQR are:

   a. acceptable as shown
   b. unacceptable due to insufficient width of specimens
   c. unacceptable due to insufficient number of specimens
   d. unacceptable because multiple specimens cannot be used in this thickness of plate coupon

7. The bend test results shown on the PQR are:

   a. acceptable as shown
   b. unacceptable due to insufficient number of specimens
   c. unacceptable due to wrong type of bend test specimen
   d. unacceptable due to wrong size of specimen

8. The tension test results shown on the PQR are:

   a. sufficiently strong to meet the Code
   b. too weak to meet the Code
   c. 1.5% over the rated base metal tensile strength, and therefore, do not meet the Code
   d. unacceptable because the results look "bogus"

9. The PQR:

   a. does not need to be signed
   b. must be signed to be "Code legal"
   c. must be signed by the President of the Company
   d. none of the above

10. An essential variable that is addressed on the WPS but not addressed on the PQR is:

   a. QW 404.25
   b. QW 406.1
   c. QW 407
   d. QW 404.34

QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)
(See QW-200.1, Section IX, ASME Boiler & Pressure Vessel Code)

Company Name: XYZ COMPANY By: JOE BLOW

Welding Procedure Spec. No.: SAW-1 Date: 2-29-92 Supporting PQR No. (s): SAW-1

Revision No.: 0 Date: 2-29-92

Welding Process(s): SAW Type(s): MACHINE
(Automatic, Manual, Machine, or Semi-Auto)

Details

JOINTS (QW-402)

Joint Design: DOUBLE VEE GROOVE

Backing: (Yes) X (No) _____

Backing Material: (Type): WELD METAL
(Refer to both backing & retainers)

- XMetal
- Nonfusing Metal
- Nonmetalic
- Other

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 the bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

*BASE METALS (QW-403)

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

OR

Specification type and grade SA 285 GR C

to Specification type and grade SA 285 GR C

OR

Chem. Analysis and Mech. Prop. _____

to Chem. Analysis and Mech. Prop. _____

Thickness range:

Base Metal: Groove: 3/16" - 2" Fillet: N/A

Pipe Dia. Range: Groove: 6" OD AND OVER Fillet: N/A

Other NO PASS GREATER THAN 1/2" THICKNESS

* FILLER METALS (QW-404)

Spec. No. (SFA):	5.17		
AWS No. (Class):	F7A-EM12		
Filler Metal F-No.:	6		
Chem. Comp. - A No.:	1		
Size of Filler Metals:	1/8" - 1/4"		

Weld Metal

Thickness range: 2" MAX.

Groove:	2" MAX		
Fillet:	N/A		
Electrode-Flux (Class):	F7A2 (NEUTRAL)		
Flux Trade Name:	LINCOLN		
Consumable Insert:	N/A		
Other:	NO SUPPLEMENTAL POWDER		

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

QW-482 (Back)

WPS No.: _____ Rev. No.: _____

POSITIONS (QW-405)

Position(s) of Groove: 1G

Welding Progression: Up N/A Down N/A

Positions(s) of Fillet NONE

POSTWELD HEAT TREATMENT (QW-407)

Temperature Range NONE

Time Range NONE

PREHEAT (QW-406)

Preheat Temp. Min.: 60 DEG F MIN

Interpass Temp. Max.: 650 DEG F MAX

Preheat Maint.: NONE

(Continuous or special heating where applicable should be recorded.)

GAS ((QW-408)

Percent Composition

	Gas(es)	(Mixture)	Flow Rate
Shielding:	N/A		
Trailing:	N/A		
Backing:	N/A		

ELECTRICAL CHARACTERISTICS (QW-409)

Current AC or DC DC Polarity REVERSE

Amps Range 300-400 Volts (Range) 34-40

(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 N/A
(Pure Tungsten, 2% Thoriated, etc.)

Mode of metal Transfer for GMAW N/A
(Spray arc, short circuiting arc, etc.)

Electrode Wire feed speed range 60-100 IPM

TECHNIQUE (QW-410)

String or Weave Bead STRING

Orifice or Gas Cup Size N/A

Initial and Interpass Cleaning (Brushing, Grinding, etc.) BRUSHING AND GRINDING

Method of Back Gouging AIR CARBON ARC

Oscillation NONE

Contact Tube to Work Distance 1/8" - 1/4"

Multiple or Single Pass (per side) MULTIPLE

Multiple or Single Electrodes SINGLE

Travel Speed (Range) 27-40 IPM

Peening NONE PERMITTED

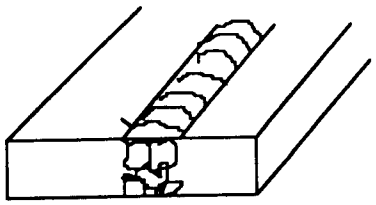
Other _____

Weld Layer(s)	Process	Class	Filler Metal Dia.	Filler Metal Type Polar.	Current Amp Range	Current Volt Range	Travel Speed Range	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, Etc.)
ALL	SAW	F7A-EM12	1/8-1/4	DCRP	300-400	34-40	27-40 IPM	

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORDS (PQR)
(See QW-200.2, Section IX, ASME Boiler and Pressure vessel Code)
Record Actual Conditions Used to Weld Test Coupon

Company Name: XYZ COMPANY
Procedure Qualification Record No.: SAW-1 Date: 2-29-92
WPS No.: SAW-1
Welding Process(s): SAW
Types (Manual, Automatic, Semi-Auto.): MACHINE

JOINTS (QW-402)



Groove Design of Test Coupon
(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)

BASE METALS (QW-403)
Material Spec.: SA 285
Type or Grade: GR C
P-No.: 1 to P-No.: 1
Thickness of Test Coupon: 1"
Diameter of Test Coupon: N/A
Other: NO SUPPLEMENTAL POWDER USED

FILLER METALS (QW-404)
SFA Specification: 5.7
AWS Classification: F7A-EM12
Filler Metal F No.: 6
Weld metal Analysis No.: 1
Size of Filler metal: 1/8"
Other: NO PASS GREATER THAN 1/2" THICK
Weld Metal Thickness: 1"

POSITION (QW-405)
Position of Groove: 1G
Weld Progression (Uphill, Downhill): FLAT
Other:

PREHEAT (QW-406)
Preheat Temp.: 60 DEG F
Interpass temp.: 650 DEG F
Other:

POSTWELD HEAT TREATMENT (QW-407)
Temperature: NONE
Time:
Other:

GAS (QW-408)

	Gas(es)	Percent Composition (Mixture)	Flow
Shielding:	NONE		
Trailing:	-		
Backing:	-		

ELECTRICAL CHARACTERISTICS (QW-409)
Current: DC
Polarity: REVERSE
Amps.: Volts:
Tungsten Electrode Size:
Other:

TECHNIQUE (QW-410)
Travel Speed: 30 IPM
String or Weave Bead: STRING
Oscillation: NONE
Multipass or Single Pass (perside): MULTIPASS
Single or Multiple Electrodes: SINGLE
Other:

QW-483 (Back)

PQR No.: SAW-1

Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load Lb.	Ultimate Unit Stress psi	Type of Failure & Location
1	.750	.500	.375	37,500	100,000	DF/HAZ
2	.750	.500	.375	35,000	93,300	DF/HAZ
3	.750	.500	.375	37,500	100,000	DF/HAZ
4	.750	.500	.375	35,000	93,300	DF/HAZ

Guided Bend Tests (QW-160)

Type and Figure No.	Result
SIDE #1 QW 462.2	ACCEPT
SIDE #2 QW 462.2	ACCEPT
SIDE #3 QW 462.2	ACCEPT
SIDE #4 QW 462.2	ACCEPT

Toughness Tests (QW-170)

Specimen No.	Notch Location	Specimen Size	Test Temp.	Impact Values			Drop Weight Break (Y/N)
				Ft. Lbs.	% Shear	Mils	

Comments: _____

Fillet Weld Test (QW-180)

Result --- Satisfactory: Yes: _____ No: _____ Penetration Into Parent Metal: Yes: ___ No: _____

Macro --- Results: _____

Other Tests

Type of Test: _____

Deposit Analysis: _____

Other: _____

Welder's Name: JOE BLOW JR Clock No.: _____ Stamp No.: _____

Tests conducted by: XYZ NDE LAB Laboratory Test No.: _____

We 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 IX of the ASME Code.

Manufacturer: XYZ COMPANY

Date: 2-29-92 By: JOE BLOW

WPS #SMAW-1, REV. 0 AND PQR # SMAW-1A

1. The base metal thickness range shown on the WPS is:

   a. correct as shown
   b. incorrect - should be - 1/16" - 1 1/2"
   c. incorrect - should be - 3/16" - 2"
   d. incorrect - should be 3/8" - 1"

2. The deposited weld metal thickness range shown on the WPS is:

   a. correct as shown
   b. incorrect - should be "unlimited"
   c. incorrect - should be 8" maximum
   d. incorrect - should be 2" maximum

3. The welding rod change (from 7018 on the PQR to 7016 on the WPS) is:

   a. acceptable as shown
   b. unacceptable - can only be 7018 on the WPS
   c. acceptable - provided the rod is 7016 A1
   d. unacceptable - the rod on the WPS must be 6010 only

4. The preheat temperature shown on the WPS should be:

   a. 60° F minimum
   b. 100° F minimum
   c. 250° F minimum
   d. 300° F minimum

5. The tension test specimen results shown on the PQR are:

   a. acceptable as shown
   b. unacceptable - not enough specimens
   c. unacceptable - ultimate stress does not meet ASME IX
   d. unacceptable - width of specimens are incorrect

6. The bend test results shown on the PQR are:

   a. acceptable as shown
   b. unacceptable - defect greater than allowed
   c. unacceptable - wrong type and insufficient number of specimens
   d. unacceptable - incorrect Figure # - should be QW-463.2

7. The PQR must be _____ to be "Code legal".

   a. certified
   b. notarized
   c. authorized
   d. witnessed

8. Essential variable # QW 403.9 has been:

   a. correctly addressed on the WPS
   b. incorrectly addressed on the WPS
   c. not addressed on the PQR
   d. both B & C above

9. The position of the groove on the PQR is:

a. acceptable as shown
b. unacceptable - essential variable not addressed
c. unacceptable - position shown does not correlate to plate
d. both B & C above

10. The PQR shows "string" beads. The WPS shows "both" string and weave beads. This condition is:

a. unacceptable - doesn't meet Code
b. acceptable - meets Code
c. acceptable if "string" beads are in the root only
d. acceptable if "weave" beads are in the cap pass only

QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)
(See QW-200.1, Section IX, ASME Boiler & Pressure Vessel Code)

Company Name: XYZ COMPANY By: JOE BLOW

Welding Procedure Spec. No.: SMAW-1 Date: 2-19-92 Supporting PQR No. (s): SMAW-1

Revision No.: 0 Date: 2-19-92

Welding Process(s): SMAW Type(s): AUTOMATIC
(Automatic, Manual, Machine, or Semi-Auto)

JOINTS (QW-402)

Details

Joint Design: SINGLE VEE GROOVE

Backing: (Yes) X (No) X

SEE PRODUCTION DRAWING

Backing Material: (Type): CARBON STEEL OR W. METAL
(Refer to both backing & retainers)

x Metal • Nonfusing Metal
• Nonmetalic • Other

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 the bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

*BASE METALS (QW-403)

P-No. 1 Group No. 1 to P-No. 1 Group No. 1
OR
Specification type and grade _____
to Specification type and grade _____
OR
Chem. Analysis and Mech. Prop. _____
to Chem. Analysis and Mech. Prop. _____

Thickness range:
Base Metal: Groove: 1/16" - 2" Fillet: ALL
Pipe Dia. Range: Groove: ALL Fillet: ALL

* FILLER METALS (QW-404)

Spec. No. (SFA):	SFA 5.1		
AWS No. (Class):	E 7016		
Filler Metal F-No.:	6		
Chem. Comp. - A No.:	4		
Size of Filler Metals:	ALL		

Deposited Weld Metal
Thickness range:

Groove:	ALL		
Fillet:	ALL		
Electrode-Flux (Class):	N/A		
Flux Trade Name:	N/A		
Consumable Insert:	NONE		
Other:			

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

QW-482 (Back)

WPS No.: _____ Rev. No.: _____

POSITIONS (QW-405)
Position(s) of Groove: ALL
Welding Progression: Up YES Down YES
Positions(s) of Fillet ALL

POSTWELD HEAT TREATMENT (QW-407)
Temperature Range NONE
Time Range NONE

PREHEAT (QW-406)
Preheat Temp. Min.: NONE
Interpass Temp. Max.: NONE
Preheat Maint.: NONE

(Continuous or special heating where applicable should be recorded.)

GAS ((QW-408)
Percent Composition

	Gas(es)	(Mixture)	Flow Rate
Shielding:	NONE		
Trailing:	NONE	-	-
Backing:	NONE	-	-

ELECTRICAL CHARACTERISTICS (QW-409)

Current AC or DC DC Polarity REVERSE
Amps Range 100-120 Volts (Range) 12-20

(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 NONE
(Pure Tungsten, 2% Thoriated, etc.)

Mode of metal Transfer for GMAW _____
(Spray arc, short circuiting arc, etc.)

Electrode Wire feed speed range NONE

TECHNIQUE (QW-410)

String or Weave Bead BOTH
Orifice or Gas Cup Size N/A
Initial and Interpass Cleaning (Brushing, Grinding, etc.) BRUSHING, GRINDING
Method of Back Gouging CARBON ARC ELECTRODE
Oscillation NONE ALLOWED
Contact Tube to Work Distance 1/2" MAXIMUM
Multiple or Single Pass (per side) MULTIPLE PASS - NO PASS GREATER THAN 3/4"
Multiple or Single Electrodes MULTIPLE
Travel Speed (Range) 10 IPM
Peening PEENING IS ALLOWED
Other

Weld Layer(s)	Process	Class	Filler Metal Dia.	Filler Metal Type Polar.	Current Amp Range	Current Volt Range	Travel Speed Range	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, Etc.)
ALL	SMAW	E7016	ALL	DCRP	100-200	12-20	AS REQUIRED	

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORDS (PQR)

(See QW-200.2, Section IX, ASME Boiler and Pressure vessel Code)
Record Actual Conditions Used to Weld Test Coupon

Company Name: XYZ COMPANY
Procedure Qualification Record No.: SMAW-1A Date: 2-19-92
WPS No.: SMAW-1
Welding Process(s): SMAW
Types (Manual, Automatic, Semi-Auto.): MANUAL

JOINTS (QW-402)

SINGLE "VEE" GROOVE, 60 DEG ANGLE, NO BACKING

Groove Design of Test Coupon
(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)

BASE METALS (QW-403)
Material Spec.: SA 516
Type or Grade: 70
P-No.: 1 to P-No.: 1
Thickness of Test Coupon: 1"
Diameter of Test Coupon PLATE
Other:

FILLER METALS (QW-404)
SFA Specification: SFA 5.1
AWS Classification: E 7018
Filler Metal F No.: 4
Weld metal Analysis No.: 1
Size of Filler metal: 1/8"
Other:
Weld Metal Thickness: 1"

POSITION (QW-405)
Position of Groove: 6G
Weld Progression (Uphill, Downhill):
Other:

PREHEAT (QW-406)
Preheat Temp.: 200 DEG
Interpass temp.: 650 DEG
Other:

POSTWELD HEAT TREATMENT (QW-407)
Temperature:
Time: NONE
Other:

GAS (QW-408)

	Percent Composition Gas(es)	(Mixture)	Flow
Shielding:	NONE		
Trailing:	NONE		
Backing:	NONE		

ELECTRICAL CHARACTERISTICS (QW-409)
Current: DIRECT
Polarity: REVERSE
Amps.: 100 Volts: 10
Tungsten Electrode Size: N/A
Other:

TECHNIQUE (QW-410)
Travel Speed: 25 IPM
String or Weave Bead STRING
Oscillation: NONE
Multipass or Single Pass(perside): MULTIPASS
Single or Multiple Electrodes: SINGLE
Other:

QW-483 (Back)

PQR No.: SMAW-1

Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load Lb.	Ultimate Unit Stress psi	Type of Failure & Location
T-1	.750	.985	.7387	54,100	73,236	BF/WM
T-2	.751	.975	.6253	40,000	63,969	BF/WM

Guided Bend Tests (QW-160)

Type and Figure No.	Result
QW 462.2 - FACE	ONE DEFECT 1/16" LONG - ACCEPT
QW 462.2 - ROOT	NO DEFECTS

Toughness Tests (QW-170)

Specimen No.	Notch Location	Specimen Size	Test Temp.	Impact Values			Drop Weight Break (Y/N)
				Ft. Lbs.	% Shear	Mils	

Comments: _____

Fillet Weld Test (QW-180)

Result — Satisfactory: Yes: _____ No: _____ Penetration Into Parent Metal: Yes: ____ No: _____

Macro — Results: _____

Other Tests

Type of Test: _____

Deposit Analysis: _____

Other: _____

Welder's Name: JOE BLOW JR. Clock No.: _____ Stamp No.: _____

Tests conducted by: XYZ MET LAB Laboratory Test No.: #1

We 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 IX of the ASME Code.

Manufacturer: JOE BLOW

Date: 2-19-92 By: XYZ COMPANY

WELDING PROCEDURE REVIEW ANSWER SHEET

WPS# GTAW-1, REV. 0 AND PQR #GTAW-2

1. a
2. b
3. d
4. b
5. d
6. c
7. c
8. d
9. b
10. b
11. b
12. a
13. a

WELDING PROCEDURE REVIEW ANSWER SHEET

WPS #GMAW-1, REV. 0 AND PQR #GMAW-1

1. d
2. b
3. a
4. b
5. b
6. d
7. c
8. b
9. d
10. d
11. d

WELDING PROCEDURE REVIEW ANSWER SHEET

WPS #SAW-1, REV. 0 - PQR # SAW-1

1. a
2. b
3. a
4. a
5. d
6. d
7. a
8. a
9. b
10. d

WELDING PROCEDURE REVIEW ANSWER SHEET

WPS #SMAW-1, REV. 0, PQR #SMAW-1A

1. c
2. d
3. a
4. b
5. c
6. c
7. a
8. d
9. c
10. b