

WELDING PROCEDURE SPECIFICATION

NO.8-3-1

FOR

GAS TUNGSTEN ARC WELDING (GTAW)

OF

AUSTENITIC STAINLESS STEEL PIPE, VALVES, FITTINGS AND FLANGES
USING ERXXX FILLER METAL WITHOUT POSTWELD HEAT TREATMENT



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J. F. Ahern Company
(Company)

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Jointly Developed With The
NATIONAL CERTIFIED PIPE WELDING BUREAU
5410 Grosvenor Lane, Suite 120
Bethesda, MD 20814

WELDING PROCEDURE SPECIFICATION (WPS)

Company Name: J. F. AHERN CO.
WPS Number: 8-3-1 **Original WPS Date:** 4-1-75 **Supporting PQRs:** 87802, 87804
Revision Number: 1 (8.10) **Revision Date:** 5-5-87
Welding Process: Gas Tungsten Arc (GTAW) **Type:** Manual

Joints (QW-402)

Joint Design: Sq, SBev, V, U, J, Fillet, Repair, Build-up **Details:** See other side for typical joints
Backing: Optional **Backing Material Type:** Stainless Steel, when used

Base Metals (QW-403)	Filler Metals (QW-404)	Root	Balance
P-Number: 8 Group Number: 1	Specification Number (SFA):	5.9	5.9
to P-Number: 8 Group Number: 1	Classification:	ERXXX (see below)	ERXXX (see below)
Thickness Range	F-number:	6	6
Groove Welds: 1/16 to 8"	A-Number:	8	8
Fillet Welds: All	Maximum Deposited Weld		
Pipe Diameter Range	Metal Thickness - Groove:		8" (includes root)
Groove Welds: Over 1" O.D.	- Fillet:	All	All
Fillet Welds: All	Maximum Bead Thickness:	1/8"	1/8"
	Flux Trade Name:	N/A	N/A
	Consumable Insert:	None	None

Positions (QW-405)	Postweld Heat Treatment (QW-407)	Technique (QW-410)
Welding Positions: All Welding Progression: Uphill	Temp. Range: None Time Range: N/A	String or Weave Bead: Either Method of Backgouging: None Initial and Interpass Cleaning: Grind to remove cutting oxide, solvent clean to remove cutting oil. Grind or wire brush to remove slag and silica deposits. Orifice or Gas Cup Size: #4 to #12 Oscillation: N/A Contact Tube to Work Distance: N/A Multiple or Single Pass: Either Multiple or Single Electrode: N/A Peening: Not Permitted Other: Use 3/32" tungsten on Schedule 5 or 10 pipe When welding different types of 300 series stainlesses to each other, select a filler metal designated for both types.
Preheat and Interpass Temperature (QW-406)	Electrical Characteristics (QW-409)	
Minimum Preheat: 50°F Maximum Interpass: 350°F* Preheat Maintenance: Not Required	Current Type: DC Polarity: Straight Amperage: See Table Electrode Feed Speed: N/A Voltage: N/A Travel Speed: See Table Tungsten Type: 2% Thorium Tungsten Size: 3/32, 1/8" Pulsed Current: None	
Gas (QW-408)		
Shielding Gas: 100% Argon Composition: Welding Gr. Flow Rate: 8-20 CFH Gas Backing: Ar or N at 5-15 CFH Trailing Shield: None		

Weld Layer*	Welding Process	Filler Metal		Current		Volts	Travel Speed * (ipm)	Base Metal / Other Filler Metal	
		Class	Dia. (in)	Type/Polarity	Amps			Base Metal	Other Filler Metal
1(S5,10)	GTAW(3/32)	As Above	3/32 or 1/8	DCSP	40-60		2-4	304, 308, 308L, 316, 316L	308L, 316, 316L
1(S40+)	GTAW	As Above	3/32 or 1/8	DCSP	70-100		2-4	316, 316L	316L
Fill and Fillets	GTAW	As Above	3/32	DCSP	70-170		2-6	316L, 321, 347	308L, 321
	GTAW	As Above	1/8	DCSP	70-200		2-8	*These values are recommended only, not mandatory	

The undersigned contractor, a member of the National Certified Pipe Welding Bureau, hereby adopts this jointly developed procedure as its company Welding Procedure Specification and certifies that this procedure has been qualified as shown on the attached Procedure Qualification Record.



Contractor: J. F. AHERN CO.

By: _____ Date: _____

Title: _____ WPS 8-3-1

PROCEDURE QUALIFICATION RECORD (PQR)

WPS followed during welding of test coupon: WP-43, Rev 17 dated 1/21/83 Test Date: 2-11-83
 Welding Process(s) used: Gas Tungsten Arc Type: Manual
 Base Metal Specification: SA-240, Type 304 to Base Metal Specification: SA-240, Type 304
 P-No: 8 Group No: 1 to P-No: 8 Group No: 1 Thickness: 1.75"
 Plate: Diameter of Pipe: _____ Joint Type: Single V-Groove without backing, 1/8 root opening
 Filler Metal Specification: SFA 5.9 AWS Classification: ER308L - ER308 F-No: 6
 A-No: 8 Filler Metal Size: 3/32, 1/8 Supplementary Filler Metal: NA
 Weld Metal Deposit Thickness: 1.75 Maximum Pass Thickness: 0.188
 Preheat Temp (*F): 50 Interpass Temp (*F): 350 Welding Position/Progression: 3G Uphill
 Tungsten Type/Size: 2% Thorla, 1/8" Current: DC Polarity: SP Travel Speed: NA lpm
 Postweld Heat Treatment (*F): None Heat Treatment Time (Hrs): NA
 Shielding Gas Composition: Welding Grade Argon, 25-35 CFH Backing Gas: Argon, 25-35 CFH
 Stringer/Weave Bead: Stringer and Weave Transfer Mode: NA
 Oscillation: NA Single/Multi-Pass: Multi Single/Multi-Arc: Single

Layer	Process	Filler Class	Diameter	Amperage	Travel Speed	Other
1,2	GTAW	ER308L	3/32	90	2.4-2.5 lpm	
3	GTAW	ER308	1/8	110	2.0 lpm	
4/81	GTAW	ER308	1/8	125-145	2-3 lpm	

Reduced Section Tensile Tests

Specimen No.	Width/Dia.	Thickness	Area	Ult. Load (lbs)	Ult. Stress (psi)	Failure Location
T11 Crown	0.508		0.203	17,800	87,700	Base Metal
T12 Root	0.510		0.204	18,400	90,200	Base Metal
T21 Crown	0.510		0.204	18,400	90,200	Base Metal
T22 Root	0.510		0.204	18,100	88,700	Base Metal

Guided Bend Tests [] QW-452.2 (Side) [] QW-462.3(a) (Trans R&F) [] QW-462.3(b) (Long R&F)

Side	Acceptable	Side	Acceptable
Side	Acceptable	Side	Acceptable

Welder's Name: J. Hancock, H. Cain Stamp No. 950-731, 13-65 Test Number: M-6988

Welding Witnessed by: L. M. Petrick, ESI Specimens Evaluated by: Lucius Pitkin Laboratory

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

**NATIONAL CERTIFIED
PIPE WELDING BUREAU**



Contractor: J. F. AHERN CO.

BY: [Signature]
Chairman, Technical Committee

By: _____ Date: _____

PROCEDURE QUALIFICATION RECORD (PQR)

WPS followed during welding of test coupon: SP-302, Rev 2 Test Date: 7-7-77
 Welding Process(s) used: Gas Tungsten Arc Type: Manual
 Base Metal Specification: SA-312 type 304 to Base Metal Specification: SA-312 type 304
 P-No: 8 Group No: 1 to P-No: 8 Group No: 1 Thickness: 0.280
 Plate: — Diameter if Pipe: 6" Joint Type: Single V-Groove without backing
 Filler Metal Specification: SFA 5.9 AWS Classification: ER308 F-No: 6
 A-No: 8 Filler Metal Size: 1/16, 3/32, 1/8 Supplementary Filler Metal: NA
 Weld Metal Deposit Thickness: 0.280 Maximum Pass Thickness: 0.10
 Preheat Temp (°F): 60 Interpass Temp (°F): 350 Welding Position/Progression: 1G Rolled
 Tungsten Type/Size: Not Recorded Current: DC Polarity: SP Travel Speed: below lpm
 Postweld Heat Treatment (°F): None Heat Treatment Time (Hrs): NA
 Shielding Gas Composition: Welding Grade Argon, 15-25 CFH Backing Gas: Argon, 10-20 CFH
 Stringer/Weave Bead: Weave, 3X wire size Transfer Mode: NA
 Oscillation: NA Single/Multi-Pass: Multi Single/Multi-Arc: Single

Layer	Process	Filler Class	Diameter	Amperage	Travel Speed	Other
	GTAW	ER308	1/16	95	2.0 lpm	
	GTAW	ER308	3/32	105	2.0	
	GTAW	ER308	1/8	120	2.0	

Reduced Section Tensile Tests

Specimen No.	Width/Dia.	Thickness	Area	Ult. Load (lbs)	Ult. Stress (psi)	Failure Location
T-1	0.753	0.200	0.151	13,250	88,000	Weld Metal
T-2	0.752	0.216	0.162	14,150	87,100	Weld Metal

Guided Bend Tests [] QW-452.2 (Side) [X] QW-462.3(a) (Trans R&F) [] QW-462.3(b) (Long R&F)

Face	No defects-acceptable	Root	No defects-acceptable
Face	No defects-acceptable	Root	No defects-acceptable

Welder's Name: Jim Gilchrist Stamp No. F-305 Test Number: 776238

Welding Witnessed by: James J. Sekely Specimens Evaluated by: Earl Gallagher, PTL

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

**NATIONAL CERTIFIED
PIPE WELDING BUREAU**



Contractor: J. F. AHERN CO.

BY: James J. Sekely
Chairman, Technical Committee

By: _____ Date: _____