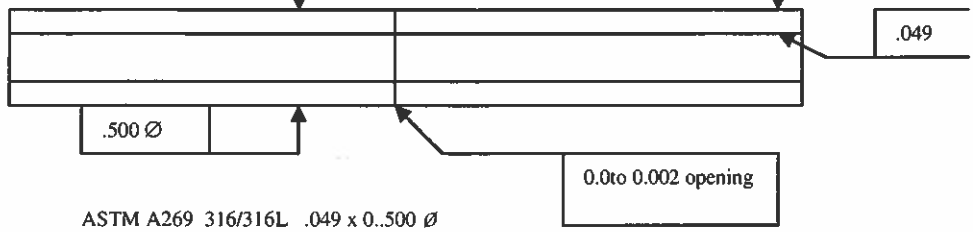
Fermilab — Fermi National Accelerator Laboratory

Technical Division-Machine Shop

Procedure Qualification Record No. *Fermi PQR Cajon/Orbital 003*	Date
Revision: __ **Date:** _____ **Remarks:**	*3/10/2010***
Welding Process/Weld Type: *GTAW/Automatic*	**WPS No.** *Fermi WPS Cajon/Orbital 003*

Joints (QW-402) **Details:**

Weld Type:	*Groove Weld*	**Backing:**	*Argon Gas*	**Root Opening:**	*0-.002"*	**Root Face:**	*.049"*



ASTM A269 316/316L .049 x 0..500 Ø

Base Metals (QW-403)	**Postweld Heat Treatment (QW-407)**
Material Spec.: ASTM A 269 Type: 316/316L	Temperature: None
S-No. 8, Group 1 To S-No. 8, Group 1	Time: N/A
Coupon Thickness: .049" Coupon Diameter: .500"Ø	Other: N/A
Other:	

Filler Metals (QW-404)		**Gas (QW-408)**			
SFA Specification:	Autogenous		Gas	% Mixture	Flow Rate
AWS Classification:		Shielding:	Argon	99.9%	12 CFH
Filler Metal F- No.:	Weld Metal Analysis A-No.: 8	Trailing:	None		
Size of Filler Metal :	Weld Metal Thickness:	Backing:	Argon	99.9%	10 CFH
Other:					

Position (QW-405)	**Electrical Charastics (QW-409)**
Position of Groove: 5G	Current & Polarity: *DCEN-Pulsing*
Weld Progression (Uphill, Downhill): *Uphill & Downhill*	Amps & Volts: See Cajon Sequence Chart
Other:	Tungsten Electrode & Size: EWCe-2

Preheat (QW-406)	**Technique (QW-410)**			
Preheat Temperature: *Ambient 69° F*	Travel Speed:	*As Req.*	Stringer or Weave	*Stringer*
Interpass Temperature: *Not Recorded*	Oscillation:	*None*	Multipass or Single:	*Single*
Other:	Single or Multiple Electrodes: *Single*			

Sequence Chart : *Cajon Welding System 100D with 5H Welding Head for .049 x .500Ø ASTM A269 316/316L*

Impulse	Maintenance	Frequency	Duty Cycle		Start	Duration	
56.0	**25.0**	**15**	**25**		**40**	**15**	

Pre-purge	Dwell	Down-slope	Post Purge		Speed		
10	**22**	**15**	**30**		**35**		

Special Notes		Gas Settings		
ARC Length	**.035**	Type	**Argon**	
Gage Setting	**.846**	Head	**12CFH**	
Material	**316/316L**	Tube	**10CFH**	
Wall Thickness	**.049**	Head Model	**5H**	Date: *2/01/2010*
Outside Diameter	**1/2Ø**	Power Supply	**100D**	Welder: *Harbacek #8*

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Fermilab	*Fermi National Accelerator Laboratory* *Technical Division-Machine Shop*	
Procedure Qualification Record No. *Fermi PQR Cajon/Orbital 003*		Back PQR
Revision: __ **Date:** _____ **Remarks:**		
Welding Process/Weld Type: *GTAW/Automatic*	**WPS No.** *Fermi WPS Cajon/Orbital 003*	

Tensile Test (QW-150)

Specimen No.	Width (in.)	Thickness (in.)	Area (Squared in.)	Ultimate Total Load (lbs.)	Ultimate Stress (PSI)	Failure Type & Location
1	*.4020*	*.500*	*0.0694*	*5429.0*	*78200*	*Ductile- HAZ*
2	*.4020*	*.500*	*0.0694*	*5450.0*	*78500*	*Ductile-WM*

Guided Bend Test (QW-160)

Figure Number & Type	Result	Figure Number Type	Result
QW-462.3 Face Bend	***Acceptable***	QW-462.3 Root Bend	***Acceptable***
QW-462.3 Face Bend	***Acceptable***	QW-462.3 Root Bend	***Acceptable***

Visual Examination: *Acceptable*	**Radiography per ASME Section IX, QW-191.2.**	

Radiography conducted by:	Reference Number	

Mechanical Tests conducted by: *Exova*	Reference Number	*T 002964*

Welding of Test Coupon conducted by: *Fermi National Accelerator Laboratory*	Verification No. *2012010-3RH*

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 Boiler and Pressure Vessel Code.

Fermi National Accelerator Laboratory [signature] 3/10/2010

Manufacturer Authorized Representative Date

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