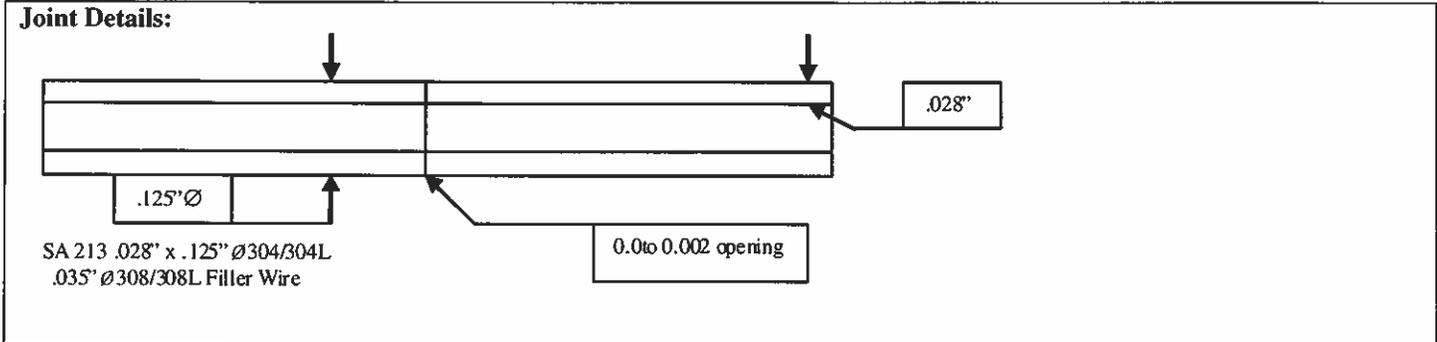


## Welding Procedure Specification

<b>Welding Procedure Specification No.:</b> <i>Fermi WPS SS-11-001</i>			<b>Date:</b> <i>10/20/2010</i>
<b>Revision No.:</b>	<b>Revision Date:</b>	<b>Remarks:</b>	<b>Supporting PQR No.(s):</b> <i>PQR-SS-11</i>
<b>Welding Processes:</b>	<b>GTAW</b>	<b>(1)Type: Manual</b>	<b>(2)Type:</b>
<small>(Manual, Automatic, Machine, Semi-automatic)</small>			

<b>Joints (QW-402):</b>			
<b>Joint Design:</b> <i>Square Butt Groove</i>	<b>Backing:</b> <i>No</i>	<b>Backing Material (Type) Root:</b> <i>Gas</i>	
<b>Retainer:</b> <i>Yes *** No</i>	<b>Type:</b> <i>Non Metallic *** Metallic (Non-fusing)</i>		



<b>Base Metals (QW403):</b>	<i>P-No.: 8, Group 1</i>	<b>To</b>	<i>P-No.: P 8, Group 1</i>	
<b>Specification Type and Grade:</b> <i>ASME SA 213-Type 304/304L</i>				
<b>TO Specification Type and Grade:</b> <i>ASME SA 213-Type 304/304L</i>				
<b>OR Chemical Analysis and Mechanical Properties:</b>				
<b>TO Chemical Analysis and Mechanical properties:</b>				
<b>Thickness Range:</b>	<b>Process 1</b>		<b>Process 2</b>	
<b>Base Metal:</b>	Groove: <i>.028"-.056"</i>	Fillet: <i>Unlimited</i>	Groove:	Fillet:
<b>Deposited Weld Metal:</b>	Groove: <i>.028"-.056"</i>	Fillet: <i>Unlimited</i>	Groove:	Fillet:
<b>Pipe Diameter Range:</b>	Groove: <i>.125" <math>\varnothing</math> Min. &amp; Above</i>	Fillet: <i>Unlimited</i>	Groove:	Fillet:
<b>Other:</b>				

<b>Filler Metals (QW-404)</b>	Process 1		Process 2	
<b>Specification No. (SFA):</b>	<i>5.9</i>			
<b>AWS No, (Class):</b>	<i>ER 308/308L</i>			
<b>F-No.:</b>	<i>6</i>			
<b>A No.:</b>	<i>8</i>			
<b>Size of Filler Metals:</b>	<i>.035</i>			
<b>Deposited Weld Metal Thickness Range:</b>	Groove: <i>.028"-.056"</i>	Fillet: <i>Unlimited</i>	Groove:	Fillet:
<b>Electrode-Flux (Class):</b>	<i>N/A</i>			
<b>Flux Trade Name:</b>	<i>N/A</i>			
<b>Consumable Insert:</b>	<i>None</i>			
<b>Other:</b>				

Each Base Metal-Filler Metal Combination should be recorded individually

*Use of Fermilab Welding Procedures and Welder Qualifications for non-Fermilab work shall be at the sole risk and responsibility of the Subcontractor, and the Subcontractor shall indemnify and save Fermilab and the government harmless from any and all claims, demands, actions or causes of action, and for any expense or loss by reason of Subcontractor's and their employees possession and use of Fermilab procedures and qualifications.*

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Positions (QW-405)		Post Heat Treatment (QW-407)	
Positions of Groove:	6G	Temperature Range:	None
Welding Progression	Upward	Time Range	N/A
Positions of Fillet	Unlimited		

Preheat (QW-408)		Gas (QW-408)			
Preheat Temperature:	Minimum 50 ° F			% Composition	
Interpass Temperature:	Maximum-Not Recorded		Gases	Mixture	Flow Rate
Preheat Maintenance:	None	Shielding	Argon	99.99%	10-15 CFH
Minimum Welding Temperature	50 ° F	Trailing	None	***	***
		Backing	Argon	99.99%	1 CFH

Electrical Characteristics (QW-409)				
Current – AC or DC:	Direct Current	Polarity: Straight	Characteristics	Non-Pulsing
Tungsten Electrode:	Size: .040" Ø to 1/16" Ø		EWTh-2	
Mode of Metal Transfer for GMAW:	N/A			
Electrode Wire Feed Speed Range:	N/A			

Technique (QW-410)	
String or Weave Bead:	String
Orifice or Gas Cup Size:	#4, #5, #6, or #7 Gas Lens
Initial Interpass Cleaning (Brushing, Grinding, etc.):	Wire brush surface -Initial Solvent Clean-wire brush finish weld
Method of Back Gouging:	None
Oscillation:	None
Contact Tube to Work Distance:	N/A
Multiple or Single Pass (per side):	Single
Multiple or Single Electrode(s):	Single
Travel Speed (Range):	As Required
Peening:	None
Other: Maintain a maximum of 1 CFH of Argon inside of tube during welding	

Sequence Chart:								
Weld Layers	Processes	Filler Metal		Current		Voltage Range	Travel Speed Range	Other (Power Source) (Special Requirement)
		Class	Ø	Type Polarity	Amperage Range			
1-Final	GTAW	304/304L	.040	DCEN	10-20	10-14	As Required	Use .040" Ø or 1/16" Ø EWTh-2  Use remote foot pedal amperage control

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