

COMMON ARC WPS REVIEW AND ACCEPTANCE

I have reviewed the WPS listed below and have indicated those accepted for use during Common Arc simultaneous testing sessions. In accordance with Section IX, QG-106.3(b), I certify that the contractor noted below has (check as appropriate):

___ certified procedure qualification records (PQR) meeting the requirements of Section IX of the ASME Code that support the WPS checked below;

___ adopted an SWPS in accordance with Article V of Section IX of the ASME Code that covers the range of variables to be followed during the performance qualification using the WPS checked below.

- ___ CA-01 GTAW-SMAW Low Alloy
- ___ CA-02 SMAW Low Alloy BR
- ___ CA-03 GTAW-SMAW SS
- ___ CA-04 SMAW Low Alloy 6010
- ___ CA-05 FCAW Gas & BR
- ___ CA-06 FCAW BR Up
- ___ CA-07 FCAW BR Down
- ___ CA-08 FCAW Gas & BR
- ___ CA-09 FTA-SMA Inconel
- ___ CA-11 FCAW SS
- ___ CA-12 SMAW 7010

Participating Contractor (print) _____

Authorized Representative (print name) _____

Authorized Representative (sign) _____ Date: _____

WPS NO: CA - 01
 Issue Date: January 1, 2009

Revision No: 2
 Revision Date: September 25, 2009

Welding Processes: GTAW/SMAW
 Type: Manual

BASE METALS: P-No: <u>1</u> to P No: <u>1</u> Base Metal Thickness Range: Groove: <u>1/16" - 3/4"</u> Diameter Range: Groove: <u>All</u>																																																			
Other: <u>Maximum deposited pass thickness shall not exceed 1/2". Filler metal must be added for all GTAW passes.</u> <u>This WPS intended for performance qualification only.</u>																																																			
JOINTS: Joint Design: <u>Vee - Groove</u> Backing (Type): <u>None</u> Material: <u>N/A</u> Root Spacing: <u>1/8"</u> Maximum Retainers: <u>N/A</u> Other: <u>None</u>																																																			
POSITIONS: Groove Position: <u>All</u> Weld Progression: <u>Vertical Up</u>																																																			
PREHEAT: Temperature Interpass Temp: <u>50°F</u> Minimum <u>600°F</u> Maximum Preheat Maint: <u>Throughout all welding</u>				TYPICAL SKETCH POSTWELD HEAT TREATMENT: (QW-407) Temp Range: <u>None</u> Time Range: <u>N/A</u> Other: <u>N/A</u>																																															
FILLER METALS: (QW-404) <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;"></td> <td style="width:25%; text-align: center;">GTAW</td> <td style="width:25%; text-align: center;">SMAW</td> </tr> <tr> <td>SFA No:</td> <td style="text-align: center;"><u>5.18</u></td> <td style="text-align: center;"><u>5.1</u></td> </tr> <tr> <td>AWS No:</td> <td style="text-align: center;"><u>ER70S-2</u></td> <td style="text-align: center;"><u>E7018</u></td> </tr> <tr> <td>F-No:</td> <td style="text-align: center;"><u>6</u></td> <td style="text-align: center;"><u>4</u></td> </tr> <tr> <td>A-No:</td> <td style="text-align: center;"><u>1</u></td> <td style="text-align: center;"><u>1</u></td> </tr> <tr> <td>Maximum Deposited Thickness:</td> <td style="text-align: center;"><u>1/8"</u></td> <td style="text-align: center;"><u>3/4"</u></td> </tr> <tr> <td>Electrode Flux:</td> <td style="text-align: center;"><u>N/A</u></td> <td style="text-align: center;"><u>N/A</u></td> </tr> <tr> <td>Consumable Insert:</td> <td style="text-align: center;"><u>N/A</u></td> <td style="text-align: center;"><u>N/A</u></td> </tr> <tr> <td>Other:</td> <td style="text-align: center;"><u>None</u></td> <td style="text-align: center;"><u>None</u></td> </tr> </table>					GTAW	SMAW	SFA No:	<u>5.18</u>	<u>5.1</u>	AWS No:	<u>ER70S-2</u>	<u>E7018</u>	F-No:	<u>6</u>	<u>4</u>	A-No:	<u>1</u>	<u>1</u>	Maximum Deposited Thickness:	<u>1/8"</u>	<u>3/4"</u>	Electrode Flux:	<u>N/A</u>	<u>N/A</u>	Consumable Insert:	<u>N/A</u>	<u>N/A</u>	Other:	<u>None</u>	<u>None</u>	GAS: (QW-408) <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:30%;"></th> <th style="width:20%;">Gas</th> <th style="width:20%;">Composition</th> <th style="width:30%;">Flow Rate</th> </tr> </thead> <tbody> <tr> <td>Shielding (GTAW):</td> <td style="text-align: center;"><u>Argon</u></td> <td style="text-align: center;"><u>100%</u></td> <td style="text-align: center;"><u>15 - 20 cfm</u></td> </tr> <tr> <td>Backing:</td> <td style="text-align: center;"><u>N/A</u></td> <td style="text-align: center;"><u>N/A</u></td> <td style="text-align: center;"><u>N/A</u></td> </tr> <tr> <td>Shielding (GMAW):</td> <td style="text-align: center;"><u>N/A</u></td> <td style="text-align: center;"><u>N/A</u></td> <td style="text-align: center;"><u>N/A</u></td> </tr> </tbody> </table>					Gas	Composition	Flow Rate	Shielding (GTAW):	<u>Argon</u>	<u>100%</u>	<u>15 - 20 cfm</u>	Backing:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	Shielding (GMAW):	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	
	GTAW	SMAW																																																	
SFA No:	<u>5.18</u>	<u>5.1</u>																																																	
AWS No:	<u>ER70S-2</u>	<u>E7018</u>																																																	
F-No:	<u>6</u>	<u>4</u>																																																	
A-No:	<u>1</u>	<u>1</u>																																																	
Maximum Deposited Thickness:	<u>1/8"</u>	<u>3/4"</u>																																																	
Electrode Flux:	<u>N/A</u>	<u>N/A</u>																																																	
Consumable Insert:	<u>N/A</u>	<u>N/A</u>																																																	
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TECHNIQUE: (QW-410) Beads-Stringer or Weave: <u>Stringer or Weave</u> Cup or Nozzle Size: <u>5/16" - 3/8"</u> Oscillation: <u>N/A</u> Nozzle to Work Distance: <u>N/A</u>				ELECTRICAL CHARACTERISTICS: (QW-409) Tungsten Electrode: <u>3/32" or 1/8" diameter EWLa-1.5 (1.5% Lanthanated)</u> Metal Transfer Mode: <u>N/A</u> Wire Feed Speed: <u>N/A</u> Current Pulsing: <u>N/A</u> Passes Per Side: <u>Single or Multiple</u> Peening: <u>Not Allowed</u> Electrode Stickout: <u>N/A</u> No. Electrodes: <u>Single</u>																																															
INITIAL/INTERPASS CLEANING: <u>As required to produce weld surfaces free of dirt, grease, or other contaminant prior to each weld pass.</u> BACK GOUGE: <u>None.</u>																																																			
<table border="1" style="width:100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Weld Layer</th> <th rowspan="2">Process</th> <th colspan="2">Filler Metal</th> <th colspan="2">Current</th> <th rowspan="2">Volts</th> <th rowspan="2">Other</th> </tr> <tr> <th>Class</th> <th>Diameter</th> <th>Polarity</th> <th>Amps.</th> </tr> </thead> <tbody> <tr> <td>Root</td> <td>GTAW</td> <td>ER70S-2</td> <td>3/32"</td> <td>DCSP</td> <td>70 - 140</td> <td>10 - 15</td> <td>N/A</td> </tr> <tr> <td>Root</td> <td>GTAW</td> <td>ER70S-2</td> <td>1/8"</td> <td>DCSP</td> <td>70 - 140</td> <td>10 - 15</td> <td>N/A</td> </tr> <tr> <td>Fill & Cap</td> <td>SMAW</td> <td>E7018</td> <td>3/32"</td> <td>DCRP</td> <td>70 - 110</td> <td>18 - 26</td> <td>N/A</td> </tr> <tr> <td>Fill & Cap</td> <td>SMAW</td> <td>E7018</td> <td>1/8"</td> <td>DCRP</td> <td>90 - 150</td> <td>18 - 26</td> <td>N/A</td> </tr> </tbody> </table>								Weld Layer	Process	Filler Metal		Current		Volts	Other	Class	Diameter	Polarity	Amps.	Root	GTAW	ER70S-2	3/32"	DCSP	70 - 140	10 - 15	N/A	Root	GTAW	ER70S-2	1/8"	DCSP	70 - 140	10 - 15	N/A	Fill & Cap	SMAW	E7018	3/32"	DCRP	70 - 110	18 - 26	N/A	Fill & Cap	SMAW	E7018	1/8"	DCRP	90 - 150	18 - 26	N/A
Weld Layer	Process	Filler Metal		Current		Volts	Other																																												
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Fill & Cap	SMAW	E7018	1/8"	DCRP	90 - 150	18 - 26	N/A																																												

WPS NO: CA - 02
 Issue Date: January 1, 2009

Revision No: 1
 Revision Date: April 2, 2009

Welding Processes: SMAW
 Type: Manual

BASE METALS:																																							
P-No: <u>1</u> to P No: <u>1</u>			Base Metal Thickness Range: <u>1/16" - 3/4"</u>			Diameter Range: <u>All</u>																																	
Other: <u>Maximum deposited pass thickness not to exceed 1/2". This WPS intended for performance qualification only.</u>																																							
JOINTS:					<p>37.5 ° 1/4" Max.</p>																																		
Joint Design: <u>Vee - Groove</u> Backing (Type): <u>Metal</u> Material: <u>P-No. 1</u> Root Spacing: <u>1/4"</u> Maximum Retainers: <u>N/A</u> Other: <u>None</u>																																							
POSITIONS:					TYPICAL SKETCH																																		
Groove Position: <u>All</u> Weld Progression: <u>Vertical Up</u>					POSTWELD HEAT TREATMENT: (QW-407) Temp Range: <u>None</u> Time Range: <u>N/A</u> Other: <u>N/A</u>																																		
PREHEAT:					GAS: (QW-408)																																		
Temperature: <u>50°F</u> Minimum Interpass Temp: <u>600°F</u> Maximum Preheat Maint: <u>Throughout all welding</u>					<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Gas</th> <th>Composition</th> <th>Flow Rate</th> </tr> </thead> <tbody> <tr> <td>Shielding (GTAW):</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>Backing:</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>Shielding (FCAW):</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>					Gas	Composition	Flow Rate	Shielding (GTAW):	N/A	N/A	N/A	Backing:	N/A	N/A	N/A	Shielding (FCAW):	N/A	N/A	N/A															
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Backing:	N/A	N/A	N/A																																				
Shielding (FCAW):	N/A	N/A	N/A																																				
FILLER METALS: (QW-404)					ELECTRICAL CHARACTERISTICS: (QW-409)																																		
Process: <u>SMAW</u> SFA No: <u>5.1</u> AWS No: <u>E7018</u> F-No: <u>4</u> A-No: <u>1</u> Max. Deposited Thickness: <u>3/4"</u> - Groove - Electrode Flux: <u>N/A</u> Other: <u>None</u>					Tungsten Electrode: <u>N/A</u> Metal Transfer Mode: <u>N/A</u> Wire Feed Speed: <u>N/A</u> Current Pulsing: <u>N/A</u>																																		
TECHNIQUE: (QW-410)					Passes Per Side: <u>Single or Multiple</u> Peening: <u>Not Allowed</u> Electrode Stickout: <u>N/A</u> No. Electrodes: <u>Single</u>																																		
Beads-Stringer or Weave: <u>Stringer or Weave</u> Cup or Nozzle Size: <u>N/A</u> Oscillation: <u>N/A</u> Nozzle to Work Distances: <u>N/A</u>					INITIAL/INTERPASS CLEANING: <u>As required to produce weld surfaces free of dirt, grease, or other contaminant prior to each weld pass.</u> BACK GOUGE: <u>None</u>																																		
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Weld Layer	Process	Filler Metal		Polarity	Current		Volts	Other																															
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Root, Fill & Cap	SMAW	E7018	3/32"	DCRP	70 - 110	18 - 26	N/A																																
Root, Fill & Cap	SMAW	E7018	1/8"	DCRP	90 - 150	18 - 26	N/A																																

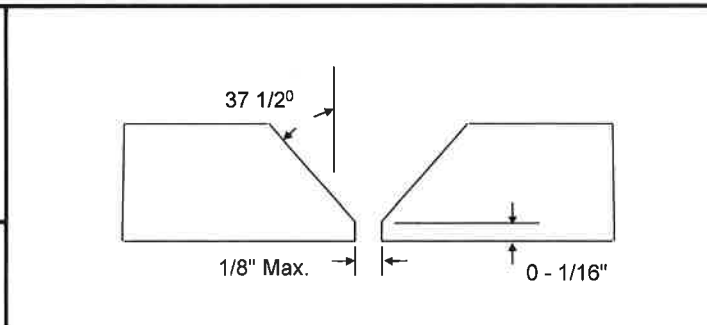
WPS NO: CA - 03
 Issue Date: January 1, 2009

Revision No: 3
 Revision Date: 10/13/2021 (gen)

Welding Processes: GTAW/SMAW
 Type: Manual

BASE METALS:
 P-No: 1 to P-No: 1 or P-No: 8 to P-No: 8*
Base Metal Thickness Range: Groove: 1/16" - 3/4" **Diameter Range:** Groove: All
 Other: Maximum deposited pass thickness not to exceed 1/2". Filler metal must be added for all GTAW passes.
This WPS intended for performance qualification only.

JOINTS:
 Joint Design: Vee - Groove
 Backing (Type): None
 Material: N/A
 Root Spacing: 1/8" Maximum
 Retainers: None
 Other: None



POSITIONS:
 Groove Position: All
 Weld Progression: Vertical Up

PREHEAT: **Temperature**
50°F Minimum
 Interpass Temp: 350°F Maximum
 Preheat Maint: Throughout all welding

POSTWELD HEAT TREATMENT: (QW-407)
 Temp Range: None
 Time Range: N/A
 Other: N/A

FILLER METALS: (QW-404)

Process:	GTAW	SMAW
SFA No:	<u>5.9</u>	<u>5.4</u>
AWS No:	<u>ER309/309L</u>	<u>E309/309L-16</u>
F-No:	<u>6</u>	<u>5</u>
A-No:	<u>8</u>	<u>8</u>
Maximum Deposited Thickness:	<u>1/8"</u> - Groove -	<u>3/4"</u>
Electrode Flux:	<u>N/A</u>	<u>N/A</u>
Consumable Insert:	<u>N/A</u>	<u>N/A</u>
Other:	<u>None</u>	<u>None</u>

GAS: (QW-408)

	Gas	Composition	Flow Rate
Shielding (GTAW):	<u>Argon</u>	<u>100%</u>	<u>10 - 20 cfm</u>
Backing	<u>Argon</u>	<u>100%</u>	<u>5 - 15 cfm</u>
Shielding (GMAW):	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Trailing:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

TECHNIQUE: (QW-410)
 Beads-Stringer or Weave: Stringer or Weave
 Cup or Nozzle Size: 5/16" to 3/8"
 Oscillation: N/A
 Nozzle to Work Distance: N/A

ELECTRICAL CHARACTERISTICS: (QW-409)
 Tungsten Electrode: 3/32" or 1/8" diameter EWLa-1.5 (1.5% Lanthanated)
 Metal Transfer Mode: N/A
 Wire Feed Speed: N/A
 Current Pulsing: N/A
 Passes Per Side: Single or Multiple
 Peening: Not Allowed
 Electrode Stickout: N/A
 No. Electrodes: Single

INITIAL/INTERPASS CLEANING: As required to produce weld surfaces free of dirt, grease, or other contaminant prior to each weld pass.
BACK GOUGE: None.

Weld Layer	Process	Filler Metal		Polarity	Current			Other
		Class	Diameter		Amps.	Volts		
Root or Root	GTAW	ER309/309L	3/32"	DCSP	80 - 110	10 - 14	N/A	
Fill & Cap and / or Fill & Cap	GTAW	ER309/309L	1/8"	DCSP	100 - 130	10 - 14	N/A	
Fill & Cap	SMAW	E309/309L-16	3/32"	DCRP	40 - 70	18 - 26	N/A	
Fill & Cap	SMAW	E309/309L-16	1/8"	DCRP	60 - 100	18 - 26	N/A	

*Note: Common Arc only provides P-1 materials for testing.

WPS NO: CA - 04
 Issue Date: January 1, 2009

Revision No: 1
 Revision Date: April 2, 2009

Welding Processes: SMAW
 Type: Manual

BASE METALS:											
P-No: <u>1</u> to P No: <u>1</u>											
Base Metal Thickness Range: <u>1/16" - 3/4"</u>			Diameter Range: <u>All</u>			Groove: <u>All</u>					
Other: <u>Maximum deposited pass thickness not to exceed 1/2". This WPS intended for performance qualification only.</u>											
JOINTS:			<p>TYPICAL SKETCH</p>								
Joint Design: <u>Vee - Groove</u>											
Backing (Type): <u>None</u>											
Material: <u>N/A</u>											
Root Spacing: <u>1/8" Maximum</u>											
Retainers: <u>N/A</u>											
Other: <u>None</u>											
POSITIONS:											
Groove Position: <u>All</u>											
Weld Progression: <u>Vertical Up</u>											
PREHEAT:											
Temperature: <u>50°F Minimum</u>											
Interpass Temp: <u>600°F Maximum</u>											
Preheat Maint: <u>Throughout all welding</u>											
FILLER METALS:											
Process: <u>SMAW</u>			<u>SMAW</u>								
SFA No: <u>5.1</u>			<u>5.1</u>								
AWS No: <u>E6010</u>			<u>E7018</u>								
F-No: <u>3</u>			<u>4</u>								
A-No: <u>1</u>			<u>1</u>								
Maximum Deposited Thickness: <u>1/8" - Groove - 3/4"</u>											
Electrode Flux: <u>N/A</u>			<u>N/A</u>								
Consumable Insert: <u>N/A</u>			<u>N/A</u>								
Other: <u>None</u>			<u>None</u>								
GAS:											
			Gas			Composition			Flow Rate		
Shielding (GTAW):			<u>N/A</u>			<u>N/A</u>			<u>N/A</u>		
Backing:			<u>N/A</u>			<u>N/A</u>			<u>N/A</u>		
Shielding (FCAW):			<u>N/A</u>			<u>N/A</u>			<u>N/A</u>		
ELECTRICAL CHARACTERISTICS:											
Tungsten Electrode: <u>N/A</u>											
Metal Transfer Mode: <u>N/A</u>											
Wire Feed Speed: <u>N/A</u>											
Current Pulsing: <u>N/A</u>											
TECHNIQUE:											
Beads-Stringer or Weave: <u>Stringer or Weave</u>			Passes Per Side: <u>Single or Multiple</u>								
Cup or Nozzle Size: <u>N/A</u>			Peening: <u>Not Allowed</u>								
Oscillation: <u>N/A</u>			Electrode Stickout: <u>N/A</u>								
Nozzle to Work Distance: <u>N/A</u>			No. Electrodes: <u>Single</u>								
INITIAL/INTERPASS CLEANING: <u>As required to produce weld surfaces free of dirt, grease, or other contaminant prior to each weld pass.</u>											
BACK GOUGE: <u>None.</u>											
Weld Layer	Process	Filler Metal		Polarity	Current		Volts	Other			
		Class	Diameter		Amps.						
Root or Root	SMAW	E6010	3/32"	DCRP	40 - 70	18 - 26	N/A				
Fill & Cap and / or Fill & Cap	SMAW	E6010	1/8"	DCRP	75 - 130	18 - 26	N/A				
	SMAW	E7018	3/32"	DCRP	70 - 110	18 - 26	N/A				
	SMAW	E7018	1/8"	DCRP	90 - 150	18 - 26	N/A				

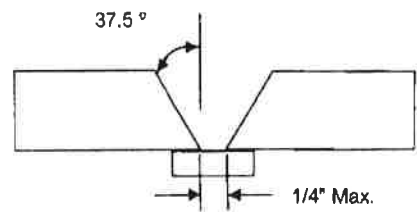
WPS NO: CA - 05
 Issue Date: January 1, 2009

Revision No: 1
 Revision Date: April 2, 2009

Welding Processes: FCAW
 Type: Semi-Automatic

BASE METALS:
 P-No: 1 to P No: 1
 Base Metal Thickness Range: Groove: 1/16" - 3/4" Diameter Range: Groove: All
 Other: Maximum deposited pass thickness not to exceed 1/2". This WPS intended for performance qualification only.

JOINTS:
 Joint Design: Vee - Groove
 Backing (Type): Metal
 Material: P-No. 1
 Root Spacing: 1/4" Maximum
 Retainers: N/A
 Other: None



POSITIONS:
 Groove Position: All
 Weld Progression: Vertical Up

PREHEAT: Temperature
 Interpass Temp: 50°F Minimum
 Preheat Maint: 600°F Maximum
Throughout all welding

TYPICAL SKETCH
POSTWELD HEAT TREATMENT: (QW-407)
 Temp Range: None
 Time Range: N/A
 Other: N/A

FILLER METALS: (QW-404)
 Process: FCAW
 SFA No: 5.20
 AWS No: E71T-1M
 F-No: 6
 A-No: 1
 Max. Deposited Thickness: 3/4" - Groove -
 Other: None

GAS: (QW-408)

	Gas	Composition	Flow Rate
Shielding (GTAW):	N/A	N/A	N/A
Backing	N/A	N/A	N/A
Shielding (FCAW):	Argon/CO ₂	75%/25%	25 - 30 cfm

ELECTRICAL CHARACTERISTICS: (QW-409)
 Tungsten Electrode: N/A
 Metal Transfer Mode: Spray
 Wire Feed Speed: 300 - 750 ipm
 Current Pulsing: N/A

TECHNIQUE: (QW-410)
 Beads-Stringer or Weave: Stringer or Weave
 Cup or Nozzle Size: 5/8"
 Oscillation: N/A
 Nozzle to Work Distance: 1/2"

Passes Per Side: Single or Multiple
 Peening: Not Allowed
 Electrode Stickout: 3/4"
 No. Electrodes: Single

INITIAL/INTERPASS CLEANING: As required to produce weld surfaces free of dirt, grease, or other contaminant prior to each weld pass.
BACK GOUGE: None.

Weld Layer	Process	Filler Metal		Polarity	Current		Volts	Other
		Class	Diameter		Amps.			
Root, Fill & Cap or Root, Fill & Cap or Root, Fill & Cap	FCAW	E71T-1M	0.035"	DCRP	130 - 180	22 - 28	N/A	
	FCAW	E71T-1M	0.045"	DCRP	130 - 180	22 - 28	N/A	
	FCAW	E71T-1M	0.062"	DCRP	130 - 180	22 - 28	N/A	

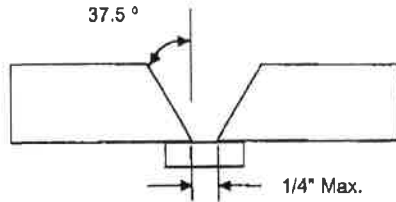
WPS NO: CA - 06
 Issue Date: January 1, 2009

Revision No: 0
 Revision Date: January 1, 2009

Welding Processes: FCAW
 Type: Semi Automatic

BASE METALS:
 P-No: 1 to P No: 1
 Base Metal Thickness Range: 1/16" - 3/4" Diameter Range: All Groove: All
 Other: Self Shielded FCAW - Maximum deposited pass thickness not to exceed 1/2". This WPS intended for performance qualification only.

JOINTS:
 Joint Design: Vee - Groove
 Backing (Type): Metal
 Material: P-No 1
 Root Spacing: 1/4" Maximum
 Retainers: None
 Other: None



POSITIONS:
 Groove Position: All
 Weld Progression: Vertical Up

TYPICAL SKETCH
POSTWELD HEAT TREATMENT:
 Temp Range: None
 Time Range: N/A
 Other: N/A

PREHEAT: Temperature
50°F Minimum
 Interpass Temp: 600°F Maximum
 Preheat Maint: Throughout all welding

FILLER METALS:
 Process: FCAW
 SFA No: 5.20
 AWS No: E71T-11
 F-No: 6
 A-No: 1
 Maximum Deposited Thickness: 3/4" - Groove -
 Other: None

GAS:

	Gas	Composition	Flow Rate
Shielding (GTAW):	N/A	N/A	N/A
Backing:	N/A	N/A	N/A
Shielding (GMAW):	N/A	N/A	N/A

ELECTRICAL CHARACTERISTICS:
 Tungsten Electrode: N/A
 Metal Transfer Mode: Spray
 Wire Feed Speed: 150 - 275 ipm
 Current Pulsing: N/A

TECHNIQUE:
 Beads-Stringer or Weave: Stringer or Weave
 Cup or Nozzle Size: 5/8"
 Oscillation: N/A
 Nozzle to Work Distance: 3/4" - 1"

Passes Per Side: Single or Multiple
 Peening: Not Allowed
 Electrode Stickout: 1/2"
 No. Electrodes: Single

INITIAL/INTERPASS CLEANING: As required to produce weld surfaces free of dirt, grease, or other contaminant prior to each weld pass.
BACK GOUGE: None.

Weld Layer	Process	Filler Metal		Polarity	Current		Other
		Class	Diameter		Amps.	Volts	
Root, Fill & Cap	FCAW	E71T-11	0.035"	DC-SP	160 - 220	20 - 26	N/A
Root, Fill & Cap	FCAW	E71T-11	0.045"	DC-SP	160 - 220	20 - 26	N/A
Root, Fill & Cap	FCAW	E71T-11	0.062"	DC-SP	160 - 220	20 - 26	N/A

WPS NO: CA - 07
 Issue Date: January 1, 2009

Revision No: 0
 Revision Date: January 1, 2009

Welding Processes: FCAW
 Type: Semi Automatic

BASE METALS:																			
P-No: <u>1</u> to P No: <u>1</u>		Base Metal Thickness Range: Groove: <u>1/16" - 3/4"</u>		Diameter Range: Groove: <u>All</u>															
Other: <u>Self Shielded FCAW - Maximum deposited pass thickness not to exceed 1/2". This WPS intended for performance qualification only.</u>																			
JOINTS:				<p>TYPICAL SKETCH</p>															
Joint Design: <u>Vee - Groove</u>																			
Backing (Type): <u>Metal</u>																			
Material: <u>P-No 1</u>																			
Root Spacing: <u>1/4"</u> Maximum																			
Retainers: <u>None</u>																			
Other: <u>None</u>																			
POSITIONS:																			
Groove Position: <u>All</u>																			
Weld Progression: <u>Vertical Down</u>																			
PREHEAT:				POSTWELD HEAT TREATMENT:															
Temperature: <u>50°F</u> Minimum				Temp Range: <u>None</u>															
Interpass Temp: <u>600°F</u> Maximum				Time Range: <u>N/A</u>															
Preheat Maint: <u>Throughout all welding</u>				Other: <u>N/A</u>															
FILLER METALS:				GAS:															
Process: <u>FCAW</u>				<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Gas</th> <th>Composition</th> <th>Flow Rate</th> </tr> </thead> <tbody> <tr> <td>Shielding (GTAW):</td> <td><u>N/A</u></td> <td><u>N/A</u></td> </tr> <tr> <td>Backing</td> <td><u>N/A</u></td> <td><u>N/A</u></td> </tr> <tr> <td>Shielding (GMAW):</td> <td><u>N/A</u></td> <td><u>N/A</u></td> </tr> </tbody> </table>				Gas	Composition	Flow Rate	Shielding (GTAW):	<u>N/A</u>	<u>N/A</u>	Backing	<u>N/A</u>	<u>N/A</u>	Shielding (GMAW):	<u>N/A</u>	<u>N/A</u>
Gas	Composition	Flow Rate																	
Shielding (GTAW):	<u>N/A</u>	<u>N/A</u>																	
Backing	<u>N/A</u>	<u>N/A</u>																	
Shielding (GMAW):	<u>N/A</u>	<u>N/A</u>																	
SFA No: <u>5.20</u>																			
AWS No: <u>E71T-11</u>																			
F-No: <u>6</u>																			
A-No: <u>1</u>																			
Maximum Deposited Thickness: <u>3/4"</u> - Groove -				ELECTRICAL CHARACTERISTICS:															
Other: <u>None</u>				Tungsten Electrode: <u>N/A</u>															
				Metal Transfer Mode: <u>Spray</u>															
				Wire Feed Speed: <u>150 - 275 ipm</u>															
				Current Pulsing: <u>N/A</u>															
TECHNIQUE:																			
Beads-Stringer or Weave: <u>Stringer or Weave</u>				Passes Per Side: <u>Single or Multiple</u>															
Cup or Nozzle Size: <u>5/8"</u>				Peening: <u>Not Allowed</u>															
Oscillation: <u>N/A</u>				Electrode Stickout: <u>1/2"</u>															
Nozzle to Work Distance: <u>3/4" - 1"</u>				No. Electrodes: <u>Single</u>															
INITIAL/INTERPASS CLEANING: <u>As required to produce weld surfaces free of dirt, grease, or other contaminant prior to each weld pass.</u>																			
BACK GOUGE: <u>None.</u>																			
Weld Layer	Process	Filler Metal		Current		Volts	Other												
		Class	Diameter	Polarity	Amps.														
Root, Fill & Cap	FCAW	E71T-11	0.035"	DC-SP	160 - 220	20 - 26	N/A												
or Root, Fill & Cap	FCAW	E71T-11	0.045"	DC-SP	160 - 220	20 - 26	N/A												
or Root, Fill & Cap	FCAW	E71T-11	0.062"	DC-SP	160 - 220	20 - 26	N/A												

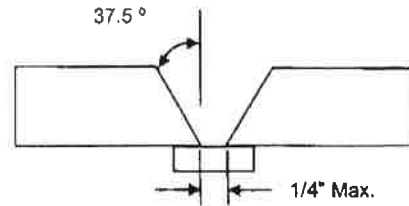
WPS NO: CA - 08
 Issue Date: June 10, 2015

Revision No: 0
 Revision Date: June 10, 2015

Welding Processes: FCAW
 Type: Semi-Automatic

BASE METALS:
 P-No: 1 to P No: 1
Base Metal Thickness Range: **Groove:** 1/16" - 3/4" **Diameter Range:** **Groove:** All
 Other: Maximum deposited pass thickness not to exceed 1/2". This WPS intended for performance qualification only.

JOINTS:
 Joint Design: Vee - Groove
 Backing (Type): Metal
 Material: P-No. 1
 Root Spacing: 1/4" Maximum
 Retainers: N/A
 Other: None



POSITIONS:
 Groove Position: All
 Weld Progression: Vertical Up

PREHEAT: **Temperature**
50°F Minimum
 Interpass Temp: 600°F Maximum
 Preheat Maint: Throughout all welding

TYPICAL SKETCH
POSTWELD HEAT TREATMENT: (QW-407)
 Temp Range: None
 Time Range: N/A
 Other: N/A

FILLER METALS: (QW-404)
 Process: FCAW
 SFA No: 5.20
 AWS No: E71T-12M
 F-No: 6
 A-No: 1
 Max. Deposited Thickness: 3/4" - Groove -
 Other: None

GAS: (QW-408)

Gas	Composition	Flow Rate
Shielding (GTAW):	N/A	N/A
Backing	N/A	N/A
Shielding (FCAW):	Argon/CO ₂	75%/25%
		25 - 30 cfm

ELECTRICAL CHARACTERISTICS: (QW-409)
 Tungsten Electrode: N/A
 Metal Transfer Mode: Spray
 Wire Feed Speed: 300 - 750 ipm
 Current Pulsing: N/A

TECHNIQUE: (QW-410)
 Beads-Stringer or Weave: Stringer or Weave
 Cup or Nozzle Size: 5/8"
 Oscillation: N/A
 Nozzle to Work Distance: 1/2"

Passes Per Side: Single or Multiple
 Peening: Not Allowed
 Electrode Stickout: 3/4"
 No. Electrodes: Single

INITIAL/INTERPASS CLEANING: As required to produce weld surfaces free of dirt, grease, or other contaminant prior to each weld pass.
BACK GOUGE: None.

Weld Layer	Process	Filler Metal		Polarity	Current		Volts	Other
		Class	Diameter		Amps.			
Root, Fill & Cap or Root, Fill & Cap or Root, Fill & Cap	FCAW	E71T-12M	0.035"	DCRP	130 - 180	22 - 28	N/A	
	FCAW	E71T-12M	0.045"	DCRP	130 - 180	22 - 28	N/A	
	FCAW	E71T-12M	0.062"	DCRP	130 - 180	22 - 28	N/A	

WPS NO: CA - 09
 Issue Date: September 22, 2015

Revision No: 0
 Revision Date: September 22, 2015

Welding Processes: GTAW/SMAW
 Type: Manual

BASE METALS:																																																			
P-No: <u>43</u>		to		P No: <u>43</u>																																															
Base Metal Thickness Range:		Groove: <u>1/16" - 3/4"</u>		Diameter Range:		Groove: <u>All</u>																																													
Other: <u>Maximum deposited pass thickness not to exceed 1/2". Filler metal must be added for all GTAW passes. This WPS intended for performance qualification only.</u>																																																			
JOINTS:				<p>TYPICAL SKETCH</p>																																															
GTAW		SMAW																																																	
Joint Design:	<u>Vee - Groove</u>	<u>Vee-Groove</u>																																																	
Backing (Type):	<u>Gas</u>	<u>Metal</u>																																																	
Material:	<u>Argon</u>	<u>P-No. 43</u>																																																	
Root Spacing:	<u>5/32" Maximum</u>	<u>1/4"</u>																																																	
Retainers:	<u>None</u>	<u>None</u>																																																	
Other:	<u>None</u>	<u>None</u>																																																	
POSITIONS:																																																			
Groove Position:	<u>All</u>																																																		
Weld Progression:	<u>Vertical Up</u>																																																		
PREHEAT:				POSTWELD HEAT TREATMENT: (QW-407)																																															
Temperature				Temp Range:		<u>None</u>																																													
Interpass Temp:	<u>50°F Minimum</u>			Time Range:		<u>N/A</u>																																													
Preheat Maint:	<u>350°F Maximum</u>			Other:		<u>N/A</u>																																													
<u>Throughout all welding</u>																																																			
FILLER METALS: (QW-404)				GAS: (QW-408)																																															
Process:	<u>GTAW</u>		<u>SMAW</u>		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Gas</th> <th>Composition</th> <th>Flow Rate</th> </tr> </thead> <tbody> <tr> <td>Shielding (GTAW):</td> <td><u>Argon</u></td> <td><u>100%</u></td> <td><u>10 - 20 cfh</u></td> </tr> <tr> <td>Backing:</td> <td><u>Argon</u></td> <td><u>100%</u></td> <td><u>5 - 15 cfh</u></td> </tr> <tr> <td>Shielding (GMAW):</td> <td><u>N/A</u></td> <td><u>N/A</u></td> <td><u>N/A</u></td> </tr> <tr> <td>Trailing:</td> <td><u>N/A</u></td> <td><u>N/A</u></td> <td><u>N/A</u></td> </tr> </tbody> </table>			Gas	Composition	Flow Rate	Shielding (GTAW):	<u>Argon</u>	<u>100%</u>	<u>10 - 20 cfh</u>	Backing:	<u>Argon</u>	<u>100%</u>	<u>5 - 15 cfh</u>	Shielding (GMAW):	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	Trailing:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>																									
Gas	Composition	Flow Rate																																																	
Shielding (GTAW):	<u>Argon</u>	<u>100%</u>	<u>10 - 20 cfh</u>																																																
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Shielding (GMAW):	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>																																																
Trailing:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>																																																
SFA No:	<u>5.14</u>		<u>5.11</u>																																																
AWS No:	<u>ERNiCr-3</u>		<u>ENiCrFe-3</u>																																																
F-No:	<u>43</u>		<u>43</u>																																																
A-No:	<u>N/A</u>		<u>N/A</u>																																																
Maximum Deposited Thickness:	<u>1/8" - Groove -</u>		<u>3/4"</u>																																																
Electrode Flux:	<u>N/A</u>		<u>N/A</u>																																																
Consumable Insert:	<u>N/A</u>		<u>N/A</u>																																																
Other:	<u>None</u>		<u>None</u>																																																
TECHNIQUE: (QW-410)				ELECTRICAL CHARACTERISTICS: (QW-409)																																															
Beads-Stringer or Weave:	<u>Stringer or Weave</u>			Tungsten Electrode:		<u>3/32" or 1/8" diameter EWLa-1.5 (1.5% Lanthanated)</u>																																													
Cup or Nozzle Size:	<u>5/16" to 3/8"</u>			Metal Transfer Mode:		<u>N/A</u>																																													
Oscillation:	<u>N/A</u>			Wire Feed Speed:		<u>N/A</u>																																													
Nozzle to Work Distance:	<u>N/A</u>			Current Pulsing:		<u>N/A</u>																																													
Passes Per Side:				<u>Single or Multiple</u>																																															
Peening:				<u>Not Allowed</u>																																															
Electrode Stickout:				<u>N/A</u>																																															
No. Electrodes:				<u>Single</u>																																															
INITIAL/INTERPASS CLEANING: <u>As required to produce weld surfaces free of dirt, grease, or other contaminant prior to each weld pass.</u>																																																			
BACK GOUGE: <u>None.</u>																																																			
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Weld Layer</th> <th rowspan="2">Process</th> <th colspan="2">Filler Metal</th> <th colspan="2">Current</th> <th rowspan="2">Volts</th> <th rowspan="2">Other</th> </tr> <tr> <th>Class</th> <th>Diameter</th> <th>Polarity</th> <th>Amps.</th> </tr> </thead> <tbody> <tr> <td>Root or Root</td> <td>GTAW</td> <td>ERNiCr-3</td> <td>3/32"</td> <td>DCSP</td> <td>95-200</td> <td>10 - 13</td> <td>N/A</td> </tr> <tr> <td>Root</td> <td>GTAW</td> <td>ERNiCr-3</td> <td>1/8"</td> <td>DCSP</td> <td>95-200</td> <td>10 - 13</td> <td>N/A</td> </tr> <tr> <td>Fill & Cap and / or</td> <td>SMAW</td> <td>ENiCrFe-3</td> <td>3/32"</td> <td>DCRP</td> <td>40-65</td> <td>24-28</td> <td>N/A</td> </tr> <tr> <td>Fill & Cap</td> <td>SMAW</td> <td>ENiCrFe-3</td> <td>1/8"</td> <td>DCRP</td> <td>65-95</td> <td>26-30</td> <td>N/A</td> </tr> </tbody> </table>								Weld Layer	Process	Filler Metal		Current		Volts	Other	Class	Diameter	Polarity	Amps.	Root or Root	GTAW	ERNiCr-3	3/32"	DCSP	95-200	10 - 13	N/A	Root	GTAW	ERNiCr-3	1/8"	DCSP	95-200	10 - 13	N/A	Fill & Cap and / or	SMAW	ENiCrFe-3	3/32"	DCRP	40-65	24-28	N/A	Fill & Cap	SMAW	ENiCrFe-3	1/8"	DCRP	65-95	26-30	N/A
Weld Layer	Process	Filler Metal		Current		Volts	Other																																												
		Class	Diameter	Polarity	Amps.																																														
Root or Root	GTAW	ERNiCr-3	3/32"	DCSP	95-200	10 - 13	N/A																																												
Root	GTAW	ERNiCr-3	1/8"	DCSP	95-200	10 - 13	N/A																																												
Fill & Cap and / or	SMAW	ENiCrFe-3	3/32"	DCRP	40-65	24-28	N/A																																												
Fill & Cap	SMAW	ENiCrFe-3	1/8"	DCRP	65-95	26-30	N/A																																												

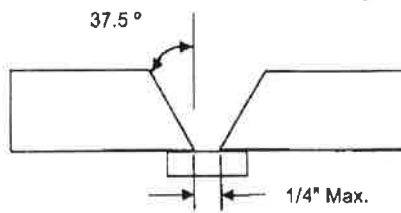
WPS NO: CA - 11
 Issue Date: January 1, 2009

Revision No: 2
 Revision Date: January 22, 2020

Welding Processes: FCAW
 Type: Semi Automatic

BASE METALS:
 P-No: 1 to P No: 1
 Base Metal Thickness Range: Groove: 1/16" - 1/2" Diameter Range: Groove: All
 Maximum deposited pass thickness not to exceed 1/2". This WPS intended for performance qualification only.

JOINTS:
 Joint Design: Vee - Groove
 Backing (Type): Metal
 Material: P-No 1
 Root Spacing: 1/4" Maximum
 Retainers: None
 Other: None



POSITIONS:
 Groove Position: All
 Weld Progression: Vertical Up

PREHEAT:
 Temperature
50°F Minimum
 Interpass Temp: 600°F Maximum
 Preheat Maint: Throughout all welding

TYPICAL SKETCH
POSTWELD HEAT TREATMENT:
 Temp Range: None
 Time Range: N/A
 Other: N/A

FILLER METALS:
 Process: FCAW
 SFA No: 5.22
 AWS No: E309T1-4
 F-No: 6
 A-No: 8
 Maximum Deposited Thickness: 0.500 - Groove -
 Other: None

GAS:

	Gas	Composition	Flow Rate
Shielding (GTAW):	N/A	N/A	N/A
Backing	N/A	N/A	N/A
Shielding (FCAW):	Argon/CO ₂	75%/25%	25 - 30 cfm

ELECTRICAL CHARACTERISTICS:
 Tungsten Electrode: N/A
 Metal Transfer Mode: Spray
 Wire Feed Speed: 150 - 275 ipm
 Current Pulsing: N/A

TECHNIQUE:
 Beads-Stringer or Weave: Stringer or Weave
 Cup or Nozzle Size: 5/8"
 Oscillation: N/A
 Nozzle to Work Distance: 3/4" - 1"

Passes Per Side: Single or Multiple
 Peening: Not Allowed
 Electrode Stickout: 1/2"
 No. Electrodes: Single

INITIAL/INTERPASS CLEANING: As required to produce weld surfaces free of dirt, grease, or other contaminant prior to each weld pass.
 BACK GOUGE: None.

Weld Layer	Process	Filler Metal		Polarity	Current		Volts	Other
		Class	Diameter		Amps.			
Root, Fill & Cap	FCAW	E309T1-4	0.035"	DC-RP	160 - 220	20 - 26	N/A	
Root, Fill & Cap	FCAW	E309T1-4	0.045"	DC-RP	160 - 220	20 - 26	N/A	
Root, Fill & Cap	FCAW	E309T1-4	0.062"	DC-RP	160 - 220	20 - 26	N/A	

WPS NO: **CA - 12**

Issue Date: July 24, 2020

Revision No: **0**

Revision Date: _____

Welding Processes: SMAW
Type: Manual

BASE METALS:
P-No: 1 to P No: 1
Base Metal Thickness Range: Groove: 3/16" - 1.250" **Diameter Range:** Groove: All
Other: Maximum deposited pass thickness not to exceed 1/2".
This WPS intended for performance qualification only.

JOINTS:
Joint Design: Vee - Groove
Backing (Type): None
Material: N/A
Root Spacing: 1/16" Maximum
Retainers: None
Other: None

POSITIONS:
Groove Position: All
Weld Progression: Vertical Up

PREHEAT: **Temperature**
50°F Minimum
Interpass Temp: 350°F Maximum
Preheat Maint: Throughout all welding

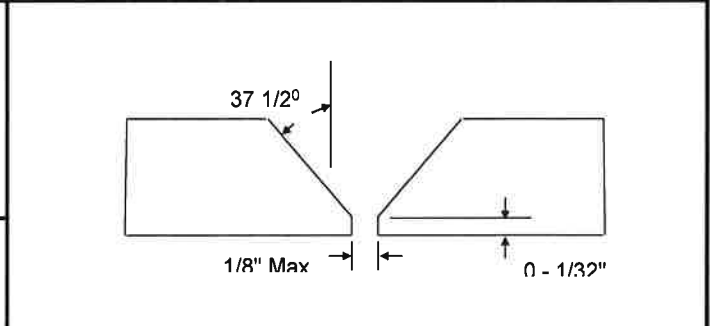
FILLER METALS: (QW-404)

	SMAW	SMAW
Process:	<u>SMAW</u>	<u>SMAW</u>
SFA No:	<u>5.5</u>	<u>5.5</u>
AWS No:	<u>ER7010</u>	<u>E7018</u>
F-No:	<u>3</u>	<u>4</u>
A-No:	<u>2</u>	<u>2</u>
Maximum Deposited Thickness:	<u>0.250</u> - Groove -	<u>1.000</u>
Electrode Flux:	<u>N/A</u>	<u>N/A</u>
Consumable Insert:	<u>N/A</u>	<u>N/A</u>
Other:	<u>None</u>	<u>None</u>

TECHNIQUE: (QW-410)
Beads-Stringer or Weave: Stringer or Weave
Cup or Nozzle Size: 5/16" to 3/8"
Oscillation: N/A
Nozzle to Work Distance: N/A

INITIAL/INTERPASS CLEANING: As required to produce weld surfaces free of dirt, grease, or other contaminant prior to each weld pass.
BACK GOUGE: None.

Weld Layer	Process	Filler Metal		Current		Volts	Other
		Class	Diameter	Polarity	Amps.		
Root or Root	SMAW	E7010-A1	3/32"	DCRP	70 -120	19-25	N/A
Fill & Cap and / or	SMAW	E7010-A1	1/8"	DCRP	100 - 150	20-28	N/A
Fill & Cap	SMAW	E7018-A1	3/32"	DCRP	70 - 120	19-25	N/A
Fill & Cap	SMAW	E7018-A1	1/8"	DCRP	100 - 150	20-28	N/A



POSTWELD HEAT TREATMENT: (QW-407)
Temp Range: None
Time Range: N/A
Other: N/A

GAS: (QW-408)

	Gas	Composition	Flow Rate
Shielding :	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Backing	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Shielding (GMAW):	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Trailing:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

ELECTRICAL CHARACTERISTICS: (QW-409)
Tungsten Electrode: 3/32" or 1/8" diameter EWLa-1.5 (1.5% Lanthanated)
Metal Transfer Mode: N/A
Wire Feed Speed: N/A
Current Pulsing: N/A

Passes Per Side: Single or Multiple
Peening: Not Allowed
Electrode Stickout: N/A
No. Electrodes: Single