

Diameter: .045"

Shielding Gas: M20-ArC-10 Current/Polarity: DCEP Classification: E70C-6M H4

Specification: AWS A5.18/A5.18M:2017

Test Completed: 4/21/2021

Certificate of Conformance For AWS D1.8/D1.8M, Seismic Supplement

This is to certify that the product named herein is of the same classification, manufacturing process, and material requirements as the material used for the tests completed on the date shown, the results of which are recorded below. All tests required by the code or specifications were performed at that time and the material tested met all requirements. The product was manufactured and supplied by the Quality Management System of Hobart Brothers, which meets the requirements of ISO 9001:2015, ANSI/AWS A5.01, and other specification and Military requirements, as applicable.

Voltage 27 25.5 Test Reference # PE2254 Current (amps) 350 280 WFS (ipm) 575 385 Travel Speed (ipm) 7.2 15.4 Stick Out 3/4" 3/4" # of passes 8 16 # of layers 4 6 Preheat Temp. °F 300+/-25 RT Interpass Temp. °F 300+/-50 200+/-25 Weld Position 1G 1G Test Settings High Heat Input Low Heat Inp	88,600 77,400 26 92						
Current (amps) 350 280 WFS (ipm) 575 385 Travel Speed (ipm) 7.2 15.4 Stick Out 3/4" 3/4" # of passes 8 16 # of layers 4 6 Preheat Temp. °F 300+/-25 RT Interpass Temp. °F 500+/-50 200+/-25 Weld Position 1G Test Settings High Heat Input Low Heat Input	88,600 77,400 26						
Current (amps) 350 280 WFS (ipm) 575 385 Travel Speed (ipm) 7.2 15.4 Stick Out 3/4" 3/4" # of passes 8 16 # of layers 4 6 Preheat Temp. °F 300+/-25 RT Interpass Temp. °F 500+/-50 200+/-25 Weld Position 1G Test Settings High Heat Input Low Heat Input	77,400 26						
AWS DI.8							
AWS DI.8	ow Heat Input						
81,1 kJ/in 29,8 kJ/in Mechanical Properties Requirements 81,1 kJ/in	29.8 kJ/in						
Voltage 27 25.5 Test Reference # PE2212	PE2210						
Current (amps) 350 280 WFS (ipm) 560 385 Travel Speed (ipm) 7.0 14.44 Stick Out 3/4" 3/4" # of passes 6 16 # of layers 4 6 Preheat Temp. °F 300+/-25 RT Interpass Temp. °F 500+/-50 200+/-25 Weld Position 1G Tensile Strength (psi) Yield Strength (psi) Elongation (%) Average Charpy V-notch Impact Properties ft•lbs @ +70 °F +70 °F Weld Position 40	84,500 72,500 28 68						
Test Settings High Heat Input Low Heat Input Lot-# D608031003121 AWS D1.8 High Heat Input Lo	ow Heat Input						
Allouillo	29.9 kJ/in						
Voltage 27 25.5 Test Reference # PE2194	PE2195						
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F Weld Position 350 285 385 Tensile Strength (psi) Yield Strength (psi) Strength (psi) Yield Strength (psi) Elongation (%) Average Charpy V-notch Impact Properties ft•lbs @ +70 °F Weld Position 70,000 74,800 S8,000 S9,700 Elongation (%) Average Charpy V-notch Impact Properties ft•lbs @ +70 °F	82,000 71,000 26 79						
Diffusible Hydrogen - Tested in accordance with AWS A5.18/A5.18M, Clause 15 & Extended Exposure - in accordance with AWS D1.8/D1.8M							
Condition Lot - # Test Reference # Average (ml/100	Average (ml/100g)						
As Received D670911005 HB4803 1.5 (ml/100g)	3 (3 /						
7 Day Exposure D670911005 HB4828 3.0 (ml/100g)							

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Diameter: .045"

Shielding Gas: M20-ArC-15 **Current/Polarity:** DCEP **Classification:** E70C-6M H4

Specification: AWS A5.18/A5.18M:2017

Test Completed: 10/20/2022

Certificate of Conformance For AWS D1.8/D1.8M, Seismic Supplement

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Test Settings	High Heat Input	Low Heat Input	Lot- # G63488	AWS D1.8	High Heat Input	Low Heat Input
	72.0 kJ/in	24.3 kJ/in	Mechanical Properties	Requirements	72.0 kJ/in	24.3 kJ/in
Voltage	28.6 315	31 285	Test Reference #		PE4852	PE4856
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers	565 6.7 3/4" 6 4	480 16.5 3/4" 18 7	Tensile Strength (psi) Yield Strength (psi) Elongation (%) Average Charpy V-notch	70,000 58,000 22	78,000 61,900 29	88,000 77,000 25
Preheat Temp. °F Interpass Temp. °F Weld Position	300+/-25 500+/-50 1G	RT 200+/-25 1G	Impact Properties ft•lbs @ +70 ºF	40	64	78

Test Settings	High Heat Input	Low Heat Input	Lot- # G62855	AWS D1.8	High Heat Input	Low Heat Input
	79.9 kJ/in	24.9 kJ/in	Mechanical Properties	Requirements	79.9 kJ/in	24.9 kJ/in
Voltage	27	26	Test Reference #		PE4862	PE4861
Current (amps)	315	285				
WFS (ipm)	575	390				
Travel Speed (ipm)	6.7	16.35	Tensile Strength (psi)	70,000	80,000	89,000
Stick Out	3/4"	3/4"	Yield Strength (psi)	58,000	64,000	79,000
# of passes	6	17	Elongation (%)	22	28	25
# of layers	4	7	Average Charpy V-notch			
Preheat Temp. ⁰F	300+/-25	RT	Impact Properties ft•lbs @	40	74	89
Interpass Temp. °F	500+/-50	200+/-25	+70 °F			
Weld Position	1G	1G				
Weld Position	1G	1G				

Test Settings	High Heat Input	Low Heat Input	Lot- # G63517	AWS D1.8	High Heat Input	Low Heat Input
	75.3 kJ/in	25.8 kJ/in	Mechanical Properties	Requirements	81.1 kJ/in	25.8 kJ/in
Voltage	27	25.5	Test Reference #		PE4870	PE4869
Current (amps)	340	250				
WFS (ipm)	575	480				
Travel Speed (ipm)	7.37	15.72	Tensile Strength (psi)	70,000	78,000	84,000
Stick Out	3/4"	3/4"	Yield Strength (psi)	58,000	62,000	72,000
# of passes	6	18	Elongation (%)	22	29	27
# of layers	4	7	Average Charpy V-notch			
Preheat Temp. ⁰F	300+/-25	RT	Impact Properties ft•lbs @	40	69	90
Interpass Temp. °F	500+/-50	200+/-25	+70 °F			
Weld Position	1G	1G				
1						

Diffusible Hydrogen - Tested in accordance with AWS A5.18/A5.18M, Clause 15 & Extended Exposure - in accordance with AWS D1.8/D1.8M										
Condition Lot - # Test Reference # Average (ml/100g)										
As Received	As Received G63488 HB6248 1.7 (ml/100g)									
7 Day Exposure	, J									

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francon



Diameter: .045"

Shielding Gas: M21-ArC-25 Current/Polarity: DCEP Classification: E70C-6M H4

Specification: AWS A5.18/A5.18M:2017

Test Completed: 5/4/2021

Certificate of Conformance For AWS D1.8/D1.8M, Seismic Supplement

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Test Settings	High Heat In	out Low Heat Input	Lot-#	D670911005	AWS D1.	8 High Heat Input	Low Heat Input	
	81.6 kJ/in	27.5 kJ/in		Mechanical Properties	Requireme		27.5 kJ/in	
Voltage	28	26		Test Reference #		PE2252	PE2261	
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F Weld Position	340 560 7.0 3/4" 8 4 300+/-25 500+/-50		Ave	ensile Strength (psi) Yield Strength (psi) Elongation (%) erage Charpy V-notch act Properties ft•lbs @ +70 °F	70,00 58,00 22 40	,	85,500 74,100 26 78	
Test Settings	High Heat In	out Low Heat Input	Lot-#	F62327		。 High Heat Input	Low Heat Input	
root oottings	82,5 kJ/in	T .		Mechanical Properties	AWS D1. Requireme	•	29.2 kJ/in	
Voltage	28	26		Test Reference #		PE2211	PE2209	
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F Weld Position	350 560 7.14 3/4" 6 4 300+/-25 500+/-50		Ave	ensile Strength (psi) Yield Strength (psi) Elongation (%) erage Charpy V-notch act Properties ft•lbs @ +70 °F	70,00 58,00 22 40		82,200 71,500 27 54	
Test Settings	High Heat In	out Low Heat Input	Lot-#	D608031003121	AWS D1.	8 High Heat Input	Low Heat Input	
	78,6 kJ/in	29.0 kJ/in		Mechanical Properties	Requireme	78.6 kJ/in	29.0 kJ/in	
Voltage	28	26		Test Reference #		PE2356	PE2193	
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F Weld Position	345 560 7.42 3/4" 7 4 300+/-25 500+/-50		Ave	ensile Strength (psi) Yield Strength (psi) Elongation (%) erage Charpy V-notch act Properties ft•lbs @ +70 °F	70,00 58,00 22 40		80,800 68,400 26 70	
	D			rdance with AWS A5.18/A5.1 accordance with AWS D1.8/D		se 15		
Condition Lot - #				Test Reference #		Average (ml/100g)		
As Received D6709110				HB4802	0.7 (ml/100g)			

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7 Day Exposure

D670911005

Sail A. Thoms

HB4816

1.9 (ml/100g)



Diameter: .052"

Shielding Gas: M20-ArC-10 Current/Polarity: DCEP Classification: E70C-6M H4

Specification: AWS A5.18/A5.18M:2017

Test Completed: 4/22/2021

Interpass Temp. °F

Weld Position

Certificate of Conformance For AWS D1.8/D1.8M, Seismic Supplement

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Test Settings	High Heat Input	Low Heat Input		Lot-# F624251201	AWS D1.8	High Heat Input	Low Heat Input
	80.4 kJ/in	28.2 kJ/in		Mechanical Properties	Requirements	80.4 kJ/in	28.2 kJ/in
Voltage	29.5	26		Test Reference #		PE2262	PE2253
Current (amps)	350	275	i				
WFS (ipm)	415	265					
Travel Speed (ipm)	7.7	15.2		Tensile Strength (psi)	70,000	75,900	83,300
Stick Out	3/4"	3/4"		Yield Strength (psi)	58,000	59,800	71,800
# of passes	6	16		Elongation (%)	22	31	26
# of layers	3	6		Average Charpy V-notch			
Preheat Temp. °F	300+/-25	RT		Impact Properties ft•lbs @	40	103	76
Interpass Temp. ⁰F	500+/-50	200+/-25		+70 °F			
Weld Position	1G	1G					
	<u> </u>						
Test Settings	High Heat Input	Low Heat Input		Lot-# D670121202031	AWS D1.8	High Heat Input	Low Heat Input
	79.3 kJ/in	29.4 kJ/in		Mechanical Properties	Requirements	79.3 kJ/in	29,4 kJ/in
Voltage	27	25	Ī	Test Reference#		PE2229	PE2227
Current (amps)	375	275	i				
WFS (ipm)	420	270					
Travel Speed (ipm)	7.68	14.1		Tensile Strength (psi)	70,000	76,100	85,700
Stick Out	3/4"	3/4"		Yield Strength (psi)	58,000	61,500	75,100
# of passes	7	17		Elongation (%)	22	33	26
# of layers	4	6		Average Charpy V-notch			
Preheat Temp. ⁰F	300+/-25	RT		Impact Properties ft•lbs @	40	107	82
Interpass Temp. °F	500+/-50	200+/-25		+70 °F			
Weld Position	1G	1G					
	<u> </u>	<u> </u>					<u> </u>
Test Settings	High Heat Input	Low Heat Input		Lot-# D607821203031	AWS D1.8	High Heat Input	Low Heat Input
	78.7 kJ/in	29.5 kJ/in	ļ	Mechanical Properties	Requirements	78.7 kJ/in	29.5 kJ/in
Voltage	27	26		Test Reference #		PE2106	PE1903
Current (amps)	375	275					
WFS (ipm)	415	265					
Travel Speed (ipm)	7.85	14.65		Tensile Strength (psi)	70,000	77,500	86,800
Stick Out	3/4"	3/4"		Yield Strength (psi)	58,000	61,300	75,700
# of passes	7	16		Elongation (%)	22	30	26
# of layers	4	6		Average Charpy V-notch			
Preheat Temp. °F	300+/-25	RT		Impact Properties ft•lbs @	40	70	78

Diffusible Hydrogen - Tested in accordance with AWS A5.18/A5.18M, Clause 15 & Extended Exposure - in accordance with AWS D1.8/D1.8M										
Condition Lot - # Test Reference # Average (ml/100g)										
As Received F624251201 HB4804 1.7 (ml/100g)										
7 Day Exposure	7 Day Exposure F624251201 HB4828 3.8 (ml/100g)									

+70 °F

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500+/-50

1G

200+/-25

1G



Diameter: .052"

Shielding Gas: M20-ArC-15 Current/Polarity: DCEP Classification: E70C-6M H4

Specification: AWS A5.18/A5.18M:2017

Test Completed: 5/17/2021

Certificate of Conformance For AWS D1.8/D1.8M, Seismic Supplement

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Test Settings	High Heat Input	Low Heat Input	Lot-# F62931	AWS D1.8	High Heat Input	Low Heat Input
	80.2 kJ/in	29.6 kJ/in	Mechanical Properties	Requirements	80.2 kJ/in	29.6 kJ/in
Voltage	27.5	25.5	Test Reference #		PE2286	PE2287
Current (amps)	375	275				
WFS (ipm)	420	270				
Travel Speed (ipm)	7.72	14.34	Tensile Strength (psi)	70,000	72,500	80,400
Stick Out	3/4"	3/4"	Yield Strength (psi)	58,000	58,500	68,600
# of passes	7	18	Elongation (%)	22	32	27
# of layers	4	6	Average Charpy V-notch			
Preheat Temp. °F	300+/-25	RT	Impact Properties ft•lbs @	40	84	64
Interpass Temp. °F	500+/-50	200+/-25	+70 °F			
Weld Position	1G	1G				
Test Settings	High Heat Input	Low Heat Input	Lot-# D670121202031	AWS D1.8	High Heat Input	Low Heat Input
	80.0 kJ/in	29,2 kJ/in	Mechanical Properties	Requirements	80.0 kJ/in	29,2 kJ/in
Voltage	27.5	25.5	Test Reference #		PE2276	PE2275
	275	275		1 1		i

Test Settings	High Heat Input	Low Heat Input	Lot-# D670121202031	AWS D1.8	High Heat Input	Low Heat Input
	80.0 kJ/in	29,2 kJ/in	Mechanical Properties	Requirements	80.0 kJ/in	29,2 kJ/in
Voltage	27.5	25.5	Test Reference #		PE2276	PE2275
Current (amps)	375	275				
WFS (ipm)	420	275				
Travel Speed (ipm)	7.74	14.47	Tensile Strength (psi)	70,000	75,200	82,600
Stick Out	3/4"	3/4"	Yield Strength (psi)	58,000	59,500	70,700
# of passes	7	18	Elongation (%)	22	30	27
# of layers	4	6	Average Charpy V-notch			
Preheat Temp. ⁰F	300+/-25	RT	Impact Properties ft•lbs @	40	95	81
Interpass Temp. ⁰F	500+/-50	200+/-25	+70 °F			
Weld Position	1G	1G				

Test Settings	High Heat Input	Low Heat Input		Lot-# F624251201	AWS D1.8	High Heat Input	Low Heat Input
	79.4 kJ/in	29.7 kJ/in		Mechanical Properties	Requirements	79.4 kJ/in	29.7 kJ/in
Voltage	29.5	27	Ī	Test Reference #		PE2294	PE2263
Current (amps)	350	275					
WFS (ipm)	415	270					
Travel Speed (ipm)	7.8	15.0		Tensile Strength (psi)	70,000	74,200	82,400
Stick Out	3/4"	3/4"		Yield Strength (psi)	58,000	58,600	71,100
# of passes	7	17		Elongation (%)	22	30	27
# of layers	4	6		Average Charpy V-notch			
Preheat Temp. ⁰F	300+/-25	RT		Impact Properties ft•lbs @	40	67	84
Interpass Temp. ⁰F	500+/-50	200+/-25		+70 °F			
Weld Position	1G	1G					

Diffusible Hydrogen - Tested in accordance with AWS A5.18/A5.18M, Clause 15 & Extended Exposure - in accordance with AWS D1.8/D1.8M								
Condition	Average (ml/100g)							
As Received	F624251201	HB4813	1.6 (ml/100g)					
30 Day Exposure	F624251201	HB4868	2.9 (ml/100g)					
45 Day Exposure	F624251201	HB4863	2.9 (ml/100g)					

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Diameter: .052"

Shielding Gas: M21-ArC-25 Current/Polarity: DCEP Classification: E70C-6M H4

Specification: AWS A5.18/A5.18M:2017

Test Completed: 4/23/2021

Certificate of Conformance For AWS D1.8/D1.8M, Seismic Supplement

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Test Settings	High Heat Input	Low Heat Input	Lot-# D670121201031	AWS D1.8	High Heat Input	Low Heat Input
	81.2 kJ/in	29.5 kJ/in	Mechanical Properties	Requirements	81.2 kJ/in	29.5 kJ/in
Voltage	29.5	27	Test Reference #		PE2228	PE2226
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F Weld Position	350 410 7.65 3/4" 7 4 300+/-25 500+/-50	275 270 15.2 3/4" 17 6 RT 200+/-25 1G	Tensile Strength (psi) Yield Strength (psi) Elongation (%) Average Charpy V-notch Impact Properties ft•lbs @ +70 °F	70,000 58,000 22 40	71,800 57,600 32 102	82,900 72,300 26 71
Test Settings	High Heat Input	Low Heat Input	Lot-# F624251201	AWS D1.8	High Heat Input	Low Heat Input
	78.4 kJ/in	28.7 kJ/in	Mechanical Properties	Requirements	78.4 kJ/in	28.7 kJ/in
Voltage	29.5	27	Test Reference #		PE2200	PE2198
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F Weld Position	350 410 7.9 3/4" 6 3 300+/-25 500+/-50	275 265 15.5 3/4" 17 6 RT 200+/-25 1G	Tensile Strength (psi) Yield Strength (psi) Elongation (%) Average Charpy V-notch Impact Properties ft•lbs @ +70 °F	70,000 58,000 22 40	72,600 58,100 31 81	81,200 69,800 26 51

Test Settings	High Heat Input	Low Heat Input	Lot-# D607821203031	AWS D1.8	High Heat Input	Low Heat Input
	79.0 kJ/in	30.4 kJ/in	Mechanical Properties	Requirements	79.0 kJ/in	30.4 kJ/in
Voltage	29.5	27	Test Reference#		PE1871	PE1901
Current (amps)	350	275				
WFS (ipm)	410	265				
Travel Speed (ipm)	7.92	14.72	Tensile Strength (psi)	70,000	76,400	84,000
Stick Out	3/4"	3/4"	Yield Strength (psi)	58,000	61,400	71,800
# of passes	7	17	Elongation (%)	22	30	26
# of layers	4	6	Average Charpy V-notch			
Preheat Temp. ⁰F	300+/-25	RT	Impact Properties ft•lbs @	40	60	53
Interpass Temp. ⁰F	500+/-50	200+/-25	+70 °F			
Weld Position	1G	1G				

Diffusible Hydrogen - Tested in accordance with AWS A5.18/A5.18M, Clause 15 & Extended Exposure - in accordance with AWS D1.8/D1.8M							
Condition	Lot -#	Test Reference #	Average (ml/100g)				
As Received	F624251201	HB4805	1.0 (ml/100g)				
7 Day Exposure	F624251201	HB4827	1.8 (ml/100g)				

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Diameter: .052"

Shielding Gas: Ozoline C8 Current/Polarity: DCEP Classification: E70C-6M H4

Specification: AWS A5.18/A5.18M:2017

Test Completed: 11/19/2021

Certificate of Conformance For AWS D1.8/D1.8M, Seismic Supplement

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Test Settings	High Heat Input	Low Heat Input	Lot-# F64777	AWS D1.8	High Heat Input	Low Heat Input
	77.3 kJ/in	29.5 kJ/in	Mechanical Properties	Requirements	77.3 kJ/in	29.5 kJ/in
Voltage	29	26	Test Reference #		PE3175	PE3176
Current (amps)	350	300				
WFS (ipm)	410	300				
Travel Speed (ipm)	7.89	15.91	Tensile Strength (psi)	70,000	73,000	85,000
Stick Out	1"	3/4"	Yield Strength (psi)	58,000	58,000	74,000
# of passes	7	15	Elongation (%)	22	30	26
# of layers	4	6	Average Charpy V-notch			
Preheat Temp. °F	300+/-25	RT	Impact Properties ft•lbs @	40	56	68
Interpass Temp. ⁰F	500+/-50	200+/-25	+70 °F			
Weld Position	1G	1G				
						
Test Settings	High Heat Input	Low Heat Input	Lot-# F65403	AWS D18	High Heat Input	Low Heat Input
Test Settings	High Heat Input 78.5 kJ/in	Low Heat Input 29.7 kJ/in	Lot-# F65403 Mechanical Properties	AWS D1.8 Requirements	High Heat Input 78.5 kJ/in	Low Heat Input 29.7 kJ/in
	 					
Voltage	78.5 kJ/in	29.7 kJ/in	Mechanical Properties		78.5 kJ/in	29.7 kJ/in
Voltage Current (amps)	78.5 kJ/in 29	29.7 kJ/in 26	Mechanical Properties		78.5 kJ/in	29.7 kJ/in
Voltage Current (amps) WFS (ipm)	78.5 kJ/in 29 350 410 7.92	29.7 kJ/in 26 300	Mechanical Properties		78.5 kJ/in	29.7 kJ/in
Voltage Current (amps)	78.5 kJ/in 29 350 410	29.7 kJ/in 26 300 300 15.83 1"	Mechanical Properties Test Reference #	Requirements	78.5 kJ/in PE3189	29.7 kJ/in PE3190
Voltage Current (amps) WFS (ipm) Travel Speed (ipm)	78.5 kJ/in 29 350 410 7.92	29.7 kJ/in 26 300 300 15.83 1" 15	Mechanical Properties Test Reference # Tensile Strength (psi) Yield Strength (psi) Elongation (%)	Requirements	78.5 kJ/in PE3189 76,000	29.7 kJ/in PE3190 88,000
Voltage Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out	78.5 kJ/in 29 350 410 7.92 1" 7	29.7 kJ/in 26 300 300 15.83 1" 15 6	Mechanical Properties Test Reference # Tensile Strength (psi) Yield Strength (psi)	70,000 58,000	78.5 kJ/in PE3189 76,000 60,000 33	29.7 kJ/in PE3190 88,000 77,000 26
Voltage Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes	78.5 kJ/in 29 350 410 7.92 1" 7 4 300+/-25	29.7 kJ/in 26 300 300 15.83 1" 15 6	Mechanical Properties Test Reference # Tensile Strength (psi) Yield Strength (psi) Elongation (%) Average Charpy V-notch Impact Properties ft•lbs @	70,000 58,000	78.5 kJ/in PE3189 76,000 60,000	29.7 kJ/in PE3190 88,000 77,000
Voltage Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F	78.5 kJ/in 29 350 410 7.92 1" 7 4 300+/-25 500+/-50	29.7 kJ/in 26 300 300 15.83 1" 15 6 RT 200+/-25	Mechanical Properties Test Reference # Tensile Strength (psi) Yield Strength (psi) Elongation (%) Average Charpy V-notch	70,000 58,000 22	78.5 kJ/in PE3189 76,000 60,000 33	29.7 kJ/in PE3190 88,000 77,000 26
Voltage Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F	78.5 kJ/in 29 350 410 7.92 1" 7 4 300+/-25	29.7 kJ/in 26 300 300 15.83 1" 15 6	Mechanical Properties Test Reference # Tensile Strength (psi) Yield Strength (psi) Elongation (%) Average Charpy V-notch Impact Properties ft•lbs @	70,000 58,000 22	78.5 kJ/in PE3189 76,000 60,000 33	29.7 kJ/in PE3190 88,000 77,000 26
Voltage Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F	78.5 kJ/in 29 350 410 7.92 1" 7 4 300+/-25 500+/-50	29.7 kJ/in 26 300 300 15.83 1" 15 6 RT 200+/-25	Mechanical Properties Test Reference # Tensile Strength (psi) Yield Strength (psi) Elongation (%) Average Charpy V-notch Impact Properties ft•lbs @	70,000 58,000 22	78.5 kJ/in PE3189 76,000 60,000 33	29.7 kJ/in PE3190 88,000 77,000 26
Voltage Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F	78.5 kJ/in 29 350 410 7.92 1" 7 4 300+/-25 500+/-50	29.7 kJ/in 26 300 300 15.83 1" 15 6 RT 200+/-25	Mechanical Properties Test Reference # Tensile Strength (psi) Yield Strength (psi) Elongation (%) Average Charpy V-notch Impact Properties ft•lbs @	70,000 58,000 22	78.5 kJ/in PE3189 76,000 60,000 33	29.7 kJ/in PE3190 88,000 77,000 26

Test Settings	High Heat Input	Low Heat Input	Lot-# F64916	AWS D1.8	High Heat Input	Low Heat Input
	77.0 kJ/in	30.1 kJ/in	Mechanical Properties	Requirements	77.0 kJ/in	30.1 kJ/in
Voltage	29	26	Test Reference#		PE3191	PE3192
Current (amps)	350	300				
WFS (ipm)	410	300				
Travel Speed (ipm)	7.92	15.59	Tensile Strength (psi)	70,000	75,000	86,000
Stick Out	1"	1"	Yield Strength (psi)	58,000	60,000	76,000
# of passes	7	15	Elongation (%)	22	32	26
# of layers	4	6	Average Charpy V-notch			
Preheat Temp. ⁰F	300+/-25	RT	Impact Properties ft•lbs @	40	81	70
Interpass Temp. ⁰F	500+/-50	200+/-25	+70 °F			
Weld Position	1G	1G				

Diffusible Hydrogen - Tested in accordance with AWS A5.18/A5.18M, Clause 15 & Extended Exposure - in accordance with AWS D1.8/D1.8M							
Condition	Lot - #	Test Reference #	Average (ml/100g)				
As Received	F64916	HB5277	4.0 (ml/100g)				
7 Day Exposure	F64916	HB5278	6.0 (ml/100g)				

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Diameter: 1/16"

Shielding Gas: M20-ArC-10 Current/Polarity: DCEP Classification: E70C-6M H4

Specification: AWS A5.18/A5.18M:2017

Test Completed: 5/12/2021

Certificate of Conformance For AWS D1.8/D1.8M, Seismic Supplement

This is to certify that the product named herein is of the same classification, manufacturing process, and material requirements as the material used for the tests completed on the date shown, the results of which are recorded below. All tests required by the code or specifications were performed at that time and the material tested met all requirements. The product was manufactured and supplied by the Quality Management System of Hobart Brothers, which meets the requirements of ISO 9001:2015, ANSI/AWS A5.01, and other specification and Military requirements, as applicable.

rest Completed. 3/12/	2021					
Test Settings	High Heat Input	Low Heat Input	Lot-# D607811301251	AWS D1.8	High Heat Input	Low Heat Input
	78.9 kJ/in	31.3 kJ/in	Mechanical Properties	Requirements	78.9 kJ/in	31.3 kJ/in
Voltage	26.5	26	Test Reference #		PE1982	PE1981
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F Weld Position	375 295 7.64 3/4" 7 4 300+/-25 500+/-50 1G	300 220 15.51 7/8" 17 6 RT 200+/-25 1G	Tensile Strength (psi) Yield Strength (psi) Elongation (%) Average Charpy V-notch Impact Properties ft•lbs @ +70 °F	70,000 58,000 22 40	80,100 63,800 31 83	90,400 78,300 25 78
Test Settings	High Heat Input	Low Heat Input	Lot-# F623171301	AWS D1.8	High Heat Input	Low Heat Input
	80.3 kJ/in	30.8 kJ/in	Mechanical Properties	Requirements	80.3 kJ/in	30.8 kJ/in
Voltage	26.5	30	Test Reference #		PE2339	PE2299
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F Weld Position	375 295 7.45 3/4" 7 4 300+/-25 500+/-50	350 200 15.0 7/8" 16 7 RT 200+/-25 1G	Tensile Strength (psi) Yield Strength (psi) Elongation (%) Average Charpy V-notch Impact Properties ft•lbs @ +70 °F	70,000 58,000 22 40	73,400 58,500 31 80	79,400 67,000 27 67
Test Settings	High Heat Input	Low Heat Input	Lot-# F62351	AWO D4 6	High Heat Input	Low Heat Input
	81.4 kJ/in	29.8 kJ/in	Mechanical Properties	AWS D1.8 Requirements	81.4 kJ/in	29.8 kJ/in
	26.5	26	Test Reference #		DE2387	PF2372

Test Settings	High Heat Input	Low Heat Input		Lot-# F62351	AWS D1.8	High Heat Input	Low Heat Input
	81.4 kJ/in	29,8 kJ/in		Mechanical Properties	Requirements	81.4 kJ/in	29.8 kJ/in
Voltage	26.5	26	1	Test Reference #		PE2387	PE2372
Current (amps)	375	300					
WFS (ipm)	295	220					
Travel Speed (ipm)	7.38	15.7		Tensile Strength (psi)	70,000	75,300	85,400
Stick Out	1"	1"		Yield Strength (psi)	58,000	59,800	73,800
# of passes	7	17		Elongation (%)	22	30	27
# of layers	4	6		Average Charpy V-notch			
Preheat Temp. °F	300+/-25	RT		Impact Properties ft•lbs @	40	85	79
Interpass Temp. °F	500+/-50	200+/-25		+70 °F			
Weld Position	1G	1G					

Diffusible Hydrogen - Tested in accordance with AWS A5.18/A5.18M, Clause 15 & Extended Exposure - in accordance with AWS D1.8/D1.8M							
Condition	Lot -#	Test Reference #	Average (ml/100g)				
As Received	F62351	HB4810	1.4 (ml/100g)				
7 Day Exposure	F62351	HB4825	2.6 (ml/100g)				

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Diameter: 1/16"

Shielding Gas: M20-ArC-15 Current/Polarity: DCEP Classification: E70C-6M H4

Specification: AWS A5.18/A5.18M:2017

Test Completed: 5/12/2021 Test Settings

Certificate of Conformance For AWS D1.8/D1.8M, Seismic Supplement

This is to certify that the product named herein is of the same classification, manufacturing process, and nms is to certify that the product name interims of the same chassineation, maintacturing process, and material requirements as the material used for the tests completed on the date shown, the results of which are recorded below. All tests required by the code or specifications were performed at that time and the material tested met all requirements. The product was manufactured and supplied by the Quality Management System of Hobart Brothers, which meets the requirements of ISO 9001:2015, ANSI/AWS A5.01, and other specification and Military requirements, as applicable.

Test Settings	High Heat Inp	out Low Heat Input	Lot-#	D607811301251	AWS D1.8	High Heat Input	Low Heat Input
	79.8 kJ/in	30.3 kJ/in		Mechanical Properties	Requireme	^{nts} 79.8 kJ/in	30.3 kJ/in
Voltage	27	26.5		Test Reference #		PE2291	PE2292
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F Weld Position	360 276 7.32 3/4" 7 4 300+/-25 500+/-50		Av	Fensile Strength (psi) Yield Strength (psi) Elongation (%) Ferage Charpy V-notch bact Properties ft•lbs @ +70 °F	70,000 58,000 22 40		85,100 72,900 27 94
Test Settings	High Heat Inp	out Low Heat Input	Lot-#	F623171301	AWS D1.	High Heat Input	Low Heat Input
	80.6 kJ/in	Y		Mechanical Properties	Requirement		30,6 kJ/in
Voltage	27	26,5		Test Reference #		PE2344	PE2358
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F Weld Position	360 275 7.24 3/4" 7 4 300+/-25 500+/-50		Av	Fensile Strength (psi) Yield Strength (psi) Elongation (%) Perage Charpy V-notch pact Properties ft•lbs @ +70 °F	70,000 58,000 22 40		78,600 65,700 27 87
Test Settings	High Heat Inp	out Low Heat Input	Lot-#	F62351	AWS D1.	High Heat Input	Low Heat Input
	78.0 kJ/in			Mechanical Properties	Requirement		30.3 kJ/in
Voltage	27	26.5		Test Reference #		PE2385	PE2384
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F Weld Position	360 275 7.52 3/4" 7 4 300+/-25 500+/-50	285 191 15.0 3/4" 17 6 RT	Av	Fensile Strength (psi) Yield Strength (psi) Elongation (%) Ferage Charpy V-notch Deact Properties ft•lbs @ +70 °F	70,000 58,000 22 40		80,300 68,900 27 82
	D			ordance with AWS A5.18/A5.1 accordance with AWS D1.8/D		e 15	
Condition	Ī	Lot -#	posure - III	Test Reference #	1.01/1	Average (m	/100g)

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F62351

F62351

As Received

7 Day Exposure

V. VA. Thomas

0.8 (ml/100g)

2.8 (ml/100g)

HB4807

HB4823



Diameter: 1/16"

Shielding Gas: M21-ArC-25 Current/Polarity: DCEP Classification: E70C-6M H4

Specification: AWS A5.18/A5.18M:2017

High Heat Input

Low Heat Input

Test Completed: 5/13/2021
Test Settings Hig

Certificate of Conformance For AWS D1.8/D1.8M, Seismic Supplement

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AWS D1.8

High Heat Input

Low Heat Input

	80.2 kJ/in	31.1 kJ/in		Mechanical Properties	Requireme	ents	80.2 kJ/in	31.1 kJ/in
Voltage Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F Weld Position	28 350 272 7.35 3/4" 7 4 300+/-25 500+/-50 1G	27 275 195 14.35 7/8" 16 6 RT 200+/-25	Av	Test Reference # Tensile Strength (psi) Yield Strength (psi) Elongation (%) erage Charpy V-notch pact Properties ft•lbs @ +70 °F	70,00 58,00 22 40	00	76,300 61,500 32 89	84,100 72,300 29 78
Test Settings	High Heat Inpu	t Low Heat Input	Lot-#	F623171301	AWS D1	. 1	High Heat Input	Low Heat Input
	79.9 kJ/in	30.5 kJ/in		Mechanical Properties	Requireme		79.9 kJ/in	30.5 kJ/in
Voltage	28	26.5		Test Reference #		T	PE2346	PE2352
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F	350 265 7.37 3/4" 7 4 300+/-25 500+/-50	275 195 14.35 3/4" 18 6 RT	Av	Fensile Strength (psi) Yield Strength (psi) Elongation (%) erage Charpy V-notch pact Properties ft•lbs @	70,00 58,00 22 40		71,200 57,900 33 65	81,400 68,600 26 74
Interpass Temp. °F Weld Position	1G	200+/-25 1G		+70 °F				
		1G	Lot-#	+/0 °F F62351	AWS D1	18	High Heat Input	Low Heat Input
Weld Position	1G	1G	Lot-#		AWS D1 Requireme	I.8 ents	High Heat Input 81.8 kJ/in	Low Heat Input 29.8 kJ/in
Weld Position Test Settings	1G High Heat Inpu	1G	Lot-#	F62351	AWS D1 Requireme	I.8 ents		
Weld Position	1G High Heat Inpu 81.8 kJ/in	1G t Low Heat Input 29.8 kJ/in	T	F62351 Mechanical Properties	70,00 58,00 22	ents 00	81 <u>.</u> 8 kJ/in	29.8 kJ/in
Voltage Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F	1G High Heat Inpu 81.8 kJ/in 28 350 255 7.2 7/8" 7 4 300+/-25 500+/-50 1G	1G t Low Heat Input 29.8 kJ/in 26.5 285 191 14.73 3/4" 17 6 RT 200+/-25 1G fusible Hydrogen - To	Av Imp	F62351 Mechanical Properties Test Reference # Fensile Strength (psi) Yield Strength (psi) Elongation (%) erage Charpy V-notch pact Properties ft•lbs @	70,00 58,00 22 40)00)00	81.8 kJ/in PE2381 71,200 58,100 33	29.8 kJ/in PE2388 80,700 69,600 26
Voltage Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F	1G High Heat Inpu 81.8 kJ/in 28 350 255 7.2 7/8" 7 4 300+/-25 500+/-50 1G	1G t Low Heat Input 29.8 kJ/in 26.5 285 191 14.73 3/4" 17 6 RT 200+/-25 1G fusible Hydrogen - To	Av Imp	F62351 Mechanical Properties Test Reference # Tensile Strength (psi) Yield Strength (psi) Elongation (%) erage Charpy V-notch pact Properties ft•lbs @ +70 °F	70,00 58,00 22 40)00)00	81.8 kJ/in PE2381 71,200 58,100 33	29.8 kJ/in PE2388 80,700 69,600 26 71

Lot-# D607811301251

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7 Day Exposure

F62351

Sail A. Thomas

HB4824

2.9 (ml/100g)



Diameter: 1/16"

Shielding Gas: Ozoline C8 Current/Polarity: DCEP Classification: E70C-6M H4

Specification: AWS A5.18/A5.18M:2017

Test Completed: 11/19/2021

Certificate of Conformance For AWS D1.8/D1.8M, Seismic Supplement

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Test Settings	High Heat Input	Low Heat Input	Lot-# F63663	AWS D1.8	High Heat Input	Low Heat Input
	80.3 kJ/in	30.0 kJ/in	Mechanical Properties	Requirements	80.3 kJ/in	30.0 kJ/in
Voltage	26.5	25	Test Reference #		PE3194	PE3195
Current (amps) WFS (ipm) Travel Speed (ipm) Stick Out # of passes # of layers Preheat Temp. °F Interpass Temp. °F Weld Position	360 275 7.16 1" 7 4 300+/-25 500+/-50 1G	300 205 15.01 1" 15 6 RT 200+/-25 1G	Tensile Strength (psi) Yield Strength (psi) Elongation (%) Average Charpy V-notch Impact Properties ft•lbs @ +70 °F	70,000 58,000 22 40	75,000 60,000 30 98	84,000 72,000 27 98
Test Settings	<u> </u>				_	_
	High Heat Input	Low Heat Input	Lot-# F62317	AVMO DA O	High Heat Input	Low Heat Input
1001 001111190	High Heat Input 79,8 kJ/in	Low Heat Input 30.1 kJ/in	Lot-# F62317 Mechanical Properties	AWS D1.8 Requirements	High Heat Input 79.8 kJ/in	Low Heat Input 30.1 kJ/in
Voltage						

Test Settings	High Heat Input	Low Heat Input	Lot-# F62899	AWS D1.8	High Heat Input	Low Heat Input
	78.9 kJ/in	30.0 kJ/in	Mechanical Properties	Requirements	78.9 kJ/in	30.0 kJ/in
Voltage	26.5	25	Test Reference#		PE3215	PE3216
Current (amps)	360	300				
WFS (ipm)	275	205				
Travel Speed (ipm)	7.29	15.09	Tensile Strength (psi)	70,000	76,000	86,000
Stick Out	1"	1"	Yield Strength (psi)	58,000	62,000	75,000
# of passes	7	15	Elongation (%)	22	31	25
# of layers	4	6	Average Charpy V-notch			
Preheat Temp. ⁰F	300+/-25	RT	Impact Properties ft•lbs @	40	72	77
Interpass Temp. ⁰F	500+/-50	200+/-25	+70 °F			
Weld Position	1G	1G				

Diffusible Hydrogen - Tested in accordance with AWS A5.18/A5.18M, Clause 15 & Extended Exposure - in accordance with AWS D1.8/D1.8M								
Condition	Condition Lot -#		Average (ml/100g)					
As Received	F62899	HB5279	3.1 (ml/100g)					
7 Day Exposure	F62899	HB5280	4.6 (ml/100g)					

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