Certificate of Conformance to Requirements for Welding Electrode

Product Type:	Metalloy EM13K-S MOD
Classification:	EC1
Specifications:	AWS A5.17-97; ASME SFA5.17
Diameter Tested:	5/32"
Date Tested:	06/30/2014
Date Generated:	7/22/2014

This is to certify that the product named above and supplied on the referenced order number is of the same classification, manufacturing process, and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at that time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of Hobart Brothers, which meets the requirements of ISO9001, ANSI/AWS A5.01, and other specification and Military requirements, as applicable. This document supplies actual test results of non-specific inspection in conformance with the requirements of EN 10204, type 2.2 certification.

Test Settings

Shielding Medium	Amps / Polarity	Volts	WFS in/min(m/min)	ESO in(mm)	Preheat F(C)	Interpass F(C)	Travel Speed in/min(cm/min)
HN-511 (F7A8-EC1)	525 / DCEP	28	69 (1.8)	1.25 (32)	65(18)	300(149)	16 (40.6)
HN-511 (F7P4-EC1)	540 / DCEP	28	16 (0.4)	1.25 (32)	60(16)	300(149)	16 (40.6)
SWX 110 (F7A6-EC1)	525 / DCEP	28.5	65 (1.7)	1.25 (32)	Room Temp	300(149)	16 (40.6)
SWX 110 (F7P6-EC1)	525 / DCEP	28.5	65 (1.7)	1.25 (32)	Room Temp	300(149)	16 (40.6)
SWX 120 (F7A8-EC1)	525 / DCEP	28.5	65 (1.7)	1.25 (32)	Room Temp	300(149)	16 (40.6)
SWX 120 (F7P8-EC1)	525 / DCEP	28.5	65 (1.7)	1.25 (32)	Room Temp	300(149)	16 (40.6)
SWX 130 (F7A6-EC1)	525 / DCEP	28.5	65 (1.7)	1.25 (32)	Room Temp	300(149)	16 (40.6)
SWX 130 (F7P8-EC1)	525 / DCEP	28.5	65 (1.7)	1.25 (32)	Room Temp	300(149)	16 (40.6)
SWX 135 (F7A6-EC1)	525 / DCEP	28.5	65 (1.7)	1.25 (32)	Room Temp	300(149)	16 (40.6)
SWX 135 (F7P8-EC1)	525 / DCEP	28.5	65 (1.7)	1.25 (32)	Room Temp	300(149)	16 (40.6)
SWX 150 (F7A8-EC1)	525 / DCEP	28.5	65 (1.7)	1.25 (32)	Room Temp	300(149)	16 (40.6)
SWX 150 (F6P8-EC1)	525 / DCEP	28.5	65 (1.7)	1.25 (32)	Room Temp	300(149)	16 (40.6)
HN-590 (F7P4-EC1)	525 / DCEP	27.5	65 (1.7)	1.25 (32)	65(18)	300(149)	16 (40.6)
HN-590 (F7A8-EC1)	525 / DCEP	27.5	65 (1.7)	1.25 (32)	65(18)	300(149)	16 (40.6)

Mechanical Properties - Tensile

Shielding Medium	Ref. No.	Testing Conditions	Ult. Tensile Strength psi (MPa)	Yield Strength psi (MPa)	Elong.% in 2"
HN-511 (F7A8-EC1)	PC0157	Aged 48 Hrs 200F	83,000 (570)	74,000 (512)	27
HN-511 (F7P4-EC1)	PC0158	SR 1 Hr @ 1150F	80,000 (554)	68,000 (467)	28
SWX 110 (F7A6-EC1)	PC0853	Aged 48 Hrs 200F	84,000 (582)	76,000 (524)	29
SWX 110 (F7P6-EC1)	PC0854	SR 1 Hr @ 1150F	80,000 (554)	68,000 (467)	31
SWX 120 (F7A8-EC1)	PC0855	Aged 48 Hrs 200F	82,000 (568)	72,000 (496)	29
SWX 120 (F7P8-EC1)	PC0856	SR 1 Hr @ 1150F	80,000 (548)	67,000 (460)	29
SWX 130 (F7A6-EC1)	PC0858	Aged 48 Hrs 200F	87,000 (598)	76,000 (527)	27
SWX 130 (F7P8-EC1)	PC0859	SR 1 Hr @ 1150F	82,000 (569)	68,000 (466)	29
SWX 135 (F7A6-EC1)	PC0860	Aged 48 Hrs 200F	81,000 (558)	70,000 (483)	28
SWX 135 (F7P8-EC1)	PC0863	SR 1 Hr @ 1150F	77,000 (529)	62,000 (426)	30
SWX 150 (F7A8-EC1)	PC0865	Aged 48 Hrs 200F	79,000 (546)	70,000 (481)	29
SWX 150 (F6P8-EC1)	PC1435	SR 1 Hr @ 1150F	78,000 (541)	65,000 (447)	32
HN-590 (F7P4-EC1)	PC3581	SR 1 Hr @ 1150F	83,000 (571)	69,000 (478)	28
HN-590 (F7A8-EC1)	PC3582	Aged 48 Hrs 200F	87,000 (603)	78,000 (538)	25

Mechanical Properties - Impact

Shielding Medium	Ref. No.	Testing Conditions	Temp. F (C)	Individuals ft.lb.(J)	Avg. ft.lb.(J)	Type
HN-511 (F7A8-EC1)	PC0157	As Welded	-80 (-62)	130,94,90 (176,127,122)	105 (142)	Charpy-V-Notch
HN-511 (F7P4-EC1)	PC0158	SR 1 Hr @ 1150F	-40 (-40)	192,224,191 (260,304,259)	202 (274)	Charpy-V-Notch
SWX 110 (F7A6-EC1)	PC0853	As Welded	-80 (-62)	114,107,125 (155,145,169)	115 (156)	Charpy-V-Notch
SWX 110 (F7P6-EC1)	PC0854	SR 1 Hr @ 1150F	-80 (-62)	112,107,96 (152,145,130)	105 (142)	Charpy-V-Notch
SWX 120 (F7A8-EC1)	PC0855	As Welded	-80 (-62)	162,164,158 (220,222,214)	161 (219)	Charpy-V-Notch
SWX 120 (F7P8-EC1)	PC0856	SR 1 Hr @ 1150F	-80 (-62)	137,130,136 (186,176,184)	134 (182)	Charpy-V-Notch
SWX 130 (F7A6-EC1)	PC0858	As Welded	-80 (-62)	55,52,42 (75,70,57)	50 (67)	Charpy-V-Notch
SWX 130 (F7P8-EC1)	PC0859	As Welded	-80 (-62)	41,48,51 (56,65,69)	47 (63)	Charpy-V-Notch
SWX 135 (F7A6-EC1)	PC0860	As Welded	-60 (-51)	100,80,97 (136,108,132)	92 (125)	Charpy-V-Notch
SWX 135 (F7P8-EC1)	PC0863	As Welded	-80 (-62)	72,71,53 (98,96,72)	65 (89)	Charpy-V-Notch
SWX 150 (F7A8-EC1)	PC0865	As Welded	-100 (-73)	104,104,102 (141,141,138)	103 (140)	Charpy-V-Notch
SWX 150 (F6P8-EC1)	PC1435	SR 1 Hr @ 1150F	-80 (-62)	42,22,45 (57,30,61)	36 (49)	Charpy-V-Notch
HN-590 (F7P4-EC1)	PC3581	SR 1 Hr @ 1150F	-40 (-40)	87,92,83 (118,125,113)	87 (118)	Charpy-V-Notch
HN-590 (F7A8-EC1)	PC3582	As Welded	-80 (-62)	61,54,52 (83,73,70)	56 (75)	Charpy-V-Notch

Ref.No.	Radiographic Inspection	Fillet Weld Test					
PC0157	Conforms	Horizontal :		Overhead :		Vertical :	
PC0158	Conforms	Horizontal :		Overhead :		Vertical :	
PC0853	Conforms	Horizontal :		Overhead :		Vertical :	
PC0854	Conforms	Horizontal :		Overhead :		Vertical :	
PC0855	Conforms	Horizontal :		Overhead :		Vertical :	
PC0856	Conforms	Horizontal :		Overhead :		Vertical :	
PC0858	Conforms	Horizontal :		Overhead :		Vertical :	
PC0859	Conforms	Horizontal :		Overhead :		Vertical :	
PC0860	Conforms	Horizontal :		Overhead :		Vertical :	
PC0863	Conforms	Horizontal :		Overhead :		Vertical :	
PC0865	Conforms	Horizontal :		Overhead :		Vertical :	
PC1435	Conforms	Horizontal :		Overhead :		Vertical :	
PC3581	Conforms	Horizontal :		Overhead :		Vertical :	
PC3582	Conforms	Horizontal :		Overhead :		Vertical :	

Chemical Analysis

Shielding Medium / Ref. No	C	Mn	P	S	Si	Cu	Cr	V	Ni	Mo	Al	Ti	Nb	Co	B	W	Sn	Fe	Sb	N	Mg	Zn	Be
HN-511 (F7A8-EC1) / PC0157	0.08	1.06	0.016	0.005	0.26	0.07				0.08													
SWX 110 (F7A6-EC1) / PC0853	0.07	1.29	0.013	0.008	0.39	0.06				0.06													
SWX 120 (F7A8-EC1) / PC0855	0.08	1.15	0.014	0.008	0.27	0.06				0.09													
SWX 130 (F7A6-EC1) / PC0858	0.06	1.13	0.012	0.005	0.39	0.05				0.07													
SWX 135 (F7A6-EC1) / PC0860	0.06	1.29	0.015	0.006	0.27	0.07				0.08													
SWX 150 (F7A8-EC1) / PC0865	0.08	0.91	0.010	0.004	0.29	0.06				0.07													
HN-590 (F7P4-EC1) / PC3581	0.08	1.50	0.016	0.007	0.37	0.07				0.08													
HN-590 (F7A8-EC1) / PC3582	0.08	1.42	0.017	0.008	0.44	0.08				0.09													

Diffusible Hydrogen Collected per AWS A4.3

HN-590	2.9 ml/100g of weld metal for 5/32 in diameter 62% relative humidity

Dave Thomas, Quality Assurance Rep.

Certification and Limited Warranty - Data for the above supplied product are those obtained when welded and tested in accordance with the above specification. All tests for the above classification were satisfied. Other tests and procedures may produce different results. Hobart Brothers produces welding consumables under continuing quality assurance programs audited and approved by the American Bureau of Shipping ("ABS").