



Certificate of Conformance to Requirements for Welding Electrode

Product Type: Metalloy EM13KS
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) |
|--------------------|-----------------|-------|----------------------|------------|--------------|----------------|--------------------------------|
| 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 (F6P8-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 (F7P6-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 (F6P6-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-511 (F7P10-EC1) | 525 / DCEP | 29 | 62 (1.6) | 1 (25) | 65(18) | 300(149) | 16 (40.6) |
| HN-511 (F7A10-EC1) | 525 / DCEP | 29 | 62 (1.6) | 1 (25) | 65(18) | 300(149) | 16 (40.6) |
| HN-590 (F7A8-EC1) | 525 / DCEP | 29 | 62 (1.6) | 1 (25) | 65(18) | 300(149) | 16 (40.6) |
| HN-590 (F7P8-EC1) | 525 / DCEP | 29 | 62 (1.6) | 1 (25) | 65(18) | 300(149) | 16 (40.6) |
| HA-495 (F7A4-EC1) | 525 / DCEP | 29 | 70 (1.8) | 1 (25) | 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" |
|--------------------|----------|--------------------|------------------------------------|--------------------------|---------------|
| SWX 110 (F7A6-EC1) | PC0987 | Aged 48 Hrs 200F | 73,000 (506) | 64,000 (439) | 28 |
| SWX 110 (F7P6-EC1) | PC0988 | SR 1 Hr @ 1150F | 77,000 (528) | 64,000 (444) | 32 |
| SWX 120 (F7A8-EC1) | PC0989 | Aged 48 Hrs 200F | 70,000 (486) | 58,000 (400) | 29 |
| SWX 120 (F6P8-EC1) | PC0990 | SR 1 Hr @ 1150F | 66,000 (454) | 51,000 (350) | 34 |
| SWX 130 (F7A6-EC1) | PC0991 | Aged 48 Hrs 200F | 77,000 (528) | 65,000 (450) | 31 |
| SWX 130 (F7P6-EC1) | PC0992 | SR 1 Hr @ 1150F | 72,000 (499) | 58,000 (401) | 33 |
| SWX 135 (F7A6-EC1) | PC0993 | Aged 48 Hrs 200F | 71,000 (490) | 59,000 (407) | 28 |
| SWX 135 (F6P6-EC1) | PC0994 | SR 1 Hr @ 1150F | 67,000 (463) | 52,000 (359) | 34 |
| SWX 150 (F7A8-EC1) | PC0995 | Aged 48 Hrs 200F | 73,000 (504) | 64,000 (439) | 30 |
| SWX 150 (F6P8-EC1) | PC0996 | SR 1 Hr @ 1150F | 67,000 (462) | 52,000 (361) | 35 |
| HN-511 (F7P10-EC1) | PC3483 | SR 1 Hr @ 1150F | 77,000 (531) | 66,000 (455) | 29 |
| HN-511 (F7A10-EC1) | PC3484 | Aged 48 Hrs 200F | 72,000 (494) | 58,000 (403) | 34 |
| HN-590 (F7A8-EC1) | PC3516 | Aged 48 Hrs 200F | 78,000 (534) | 68,000 (467) | 28 |
| HN-590 (F7P8-EC1) | PC3517 | SR 1 Hr @ 1150F | 73,000 (501) | 59,000 (407) | 31 |
| HA-495 (F7A4-EC1) | PC3571 | Aged 48 Hrs 200F | 89,000 (614) | 77,000 (531) | 24 |

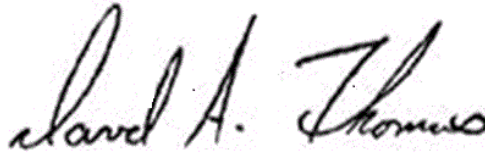
Mechanical Properties - Impact

| Shielding Medium | Ref. No. | Testing Conditions | Temp. F (C) | Individuals ft.lb.(J) | Avg. ft.lb.(J) | Type |
|--------------------|----------|--------------------|-------------|---------------------------|----------------|----------------|
| SWX 110 (F7A6-EC1) | PC0987 | As Welded | -80 (-62) | 102,90,99 (138,122,134) | 97 (132) | Charpy-V-Notch |
| SWX 110 (F7P6-EC1) | PC0988 | SR 1 Hr @ 1150F | -80 (-62) | 256,265,270 (347,359,366) | 264 (357) | Charpy-V-Notch |
| SWX 120 (F7A8-EC1) | PC0989 | As Welded | -80 (-62) | 108,98,109 (146,133,148) | 105 (142) | Charpy-V-Notch |
| SWX 120 (F6P8-EC1) | PC0990 | SR 1 Hr @ 1150F | -80 (-62) | 137,138,154 (186,187,209) | 143 (194) | Charpy-V-Notch |
| SWX 130 (F7A6-EC1) | PC0991 | As Welded | -60 (-51) | 97,76,37 (132,103,50) | 70 (95) | Charpy-V-Notch |
| SWX 130 (F7P6-EC1) | PC0992 | SR 1 Hr @ 1150F | -80 (-62) | 91,87,75 (123,118,102) | 84 (114) | Charpy-V-Notch |
| SWX 135 (F7A6-EC1) | PC0993 | As Welded | -80 (-62) | 98,90,90 (133,122,122) | 93 (126) | Charpy-V-Notch |
| SWX 135 (F6P6-EC1) | PC0994 | SR 1 Hr @ 1150F | -80 (-62) | 144,101,110 (195,137,149) | 118 (160) | Charpy-V-Notch |
| SWX 150 (F7A8-EC1) | PC0995 | As Welded | -80 (-62) | 165,153,163 (224,207,221) | 160 (217) | Charpy-V-Notch |
| SWX 150 (F6P8-EC1) | PC0996 | SR 1 Hr @ 1150F | -100 (-73) | 116,110,236 (157,149,320) | 154 (209) | Charpy-V-Notch |
| HN-511 (F7P10-EC1) | PC3483 | SR 1 Hr @ 1150F | -100 (-73) | 92,84,97 (125,114,132) | 91 (123) | Charpy-V-Notch |
| HN-511 (F7A10-EC1) | PC3484 | As Welded | -100 (-73) | 132,114,102 (179,155,138) | 116 (157) | Charpy-V-Notch |
| HN-590 (F7A8-EC1) | PC3516 | As Welded | -80 (-62) | 68,62,76 (92,84,103) | 69 (93) | Charpy-V-Notch |
| HN-590 (F7P8-EC1) | PC3517 | SR 1 Hr @ 1150F | -80 (-62) | 76,74,77 (103,100,104) | 76 (103) | Charpy-V-Notch |
| HA-495 (F7A4-EC1) | PC3571 | As Welded | -40 (-40) | 20,27,20 (27,37,27) | 22 (30) | Charpy-V-Notch |

| Ref.No. | Radiographic Inspection | Fillet Weld Test | | |
|---------|-------------------------|------------------|------------|------------|
| PC0987 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC0988 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC0989 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC0990 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC0991 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC0992 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC0993 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC0994 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC0995 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC0996 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC3483 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC3484 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC3516 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC3517 | Conforms | Horizontal : | Overhead : | Vertical : |
| PC3571 | 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 | |
|-----------------------------|------|------|-------|-------|------|------|------|---|------|------|----|----|----|----|---|---|----|----|----|---|----|----|----|--|
| SWX 110 (F7A6-EC1) / PC0987 | 0.06 | 1.20 | 0.014 | 0.010 | 0.28 | 0.06 | 0.06 | | 0.04 | 0.01 | | | | | | | | | | | | | | |
| SWX 120 (F7A8-EC1) / PC0989 | 0.05 | 1.19 | 0.013 | 0.009 | 0.19 | 0.06 | 0.04 | | 0.04 | 0.01 | | | | | | | | | | | | | | |
| SWX 130 (F7A6-EC1) / PC0991 | 0.06 | 1.24 | 0.014 | 0.010 | 0.36 | 0.07 | 0.06 | | 0.04 | 0.01 | | | | | | | | | | | | | | |
| SWX 135 (F7A6-EC1) / PC0993 | 0.05 | 1.15 | 0.014 | 0.009 | 0.19 | 0.08 | 0.05 | | 0.05 | 0.01 | | | | | | | | | | | | | | |
| SWX 150 (F7A8-EC1) / PC0995 | 0.06 | 1.00 | 0.011 | 0.007 | 0.19 | 0.08 | 0.05 | | 0.03 | 0.01 | | | | | | | | | | | | | | |
| HN-511 (F7A10-EC1) / PC3484 | 0.08 | 1.18 | 0.020 | 0.007 | 0.23 | 0.09 | 0.05 | | 0.05 | 0.01 | | | | | | | | | | | | | | |
| HN-590 (F7A8-EC1) / PC3516 | 0.04 | 1.43 | 0.023 | 0.009 | 0.28 | 0.07 | 0.05 | | 0.04 | 0.01 | | | | | | | | | | | | | | |
| HA-495 (F7A4-EC1) / PC3571 | 0.06 | 1.43 | 0.023 | 0.009 | 0.58 | 0.07 | 0.05 | | 0.04 | 0.01 | | | | | | | | | | | | | | |



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").