



Certificate of Conformance to Requirements for Welding Electrode

Product Type: SubCOR N1S
Classification: ECNi1
Specifications: AWS A5.23/A5.23M; ASME SFA 5.23
Diameter Tested: 5/32"
Date Tested: 10/17/2023
Date Generated: 10/23/2023

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 ISO 9001, 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.

THE STEEL USED IN THIS LOT OF MATERIAL WAS MELTED AND MANUFACTURED IN THE U.S.A.

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-590 (F7P10-ECNi1-Ni1 H8)	525 / DCEP	28	61 (1.5)	1.25 (32)	300(149)	300(149)	16 (40.6)
SWX 120	525 / DCEP	28	60 (1.5)	1.25 (32)	300(149)	300(149)	16 (40.6)
SWX 150	525 / DCEP	28	60 (1.5)	1.25 (32)	300(149)	300(149)	16 (40.6)
SWX 150	525 / DCEP	28	60 (1.5)	1.25 (32)	300(149)	300(149)	16 (40.6)
HN-590	485-515 / DCEP	29	60 (1.5)	1 1/2 (32)	300(149)	300(149)	16 (40.6)
HN-590	525 / DCEP	28	61 (1.5)	1 1/4 (32)	300(149)	300(149)	16.5 (41.9)

Mechanical Properties - Tensile

Shielding Medium	Ref. No.	Testing Conditions	Ult. Tensile Strength psi (MPa)	Yield Strength psi (MPa)	Elong.% in 2"
HN-590 (F7P10-ECNi1-Ni1 H8)	PE2963	SR 1 Hr @ 1150F	82,000 (563)	67,000 (460)	28
SWX 120	PE2965	Aged 48 Hrs 220F	83,000 (572)	72,000 (494)	27
SWX 150	PE2968	Aged 48 Hrs 220F	78,000 (541)	66,000 (452)	28
SWX 150	PE2982	SR 1 Hr @ 1150F	75,000 (514)	60,000 (415)	30
HN-590	PE6678	Aged 48 Hrs 220F	86,000 (596)	74,000 (509)	26
HN-590	PE7093	SR 1 Hr @ 1150F	84,000 (578)	70,000 (483)	27

Mechanical Properties - Impact

Shielding Medium	Ref. No.	Testing Conditions	Temp. F (C)	Individuals ft.lb.(J)	Avg. ft.lb.(J)	Type
HN-590 (F7P10-ECNi1-Ni1 H8)	PE2963	SR 1 Hr @ 1150F	-100 (-73)	21,28,23 (28,38,31)	24 (33)	Charpy-V-Notch
SWX 120	PE2965	As Welded	-100 (-73)	17,27,42 (23,37,57)	29 (39)	Charpy-V-Notch
SWX 150	PE2968	As Welded	-80 (-62)	84,79,81 (114,107,110)	81 (110)	Charpy-V-Notch
SWX 150	PE2982	SR 1 Hr @ 1150F	-100 (-73)	128,113,116 (174,153,157)	119 (161)	Charpy-V-Notch
HN-590	PE6678	As Welded	-80 (-62)	35,35,32 (47,47,43)	34 (46)	Charpy-V-Notch
HN-590	PE7093	SR 1 Hr @ 1150F	-80 (-62)	47,49,48 (64,66,65)	48 (65)	Charpy-V-Notch

Ref.No.	Radiographic Inspection	Fillet Weld Test					
PE2963	Conforms	Horizontal :	Overhead :	Vertical :	Horizontal :	Overhead :	Vertical :
PE2965	Conforms	Horizontal :	Overhead :	Vertical :	Horizontal :	Overhead :	Vertical :
PE2968	Conforms	Horizontal :	Overhead :	Vertical :	Horizontal :	Overhead :	Vertical :
PE2982	Conforms	Horizontal :	Overhead :	Vertical :	Horizontal :	Overhead :	Vertical :
PE6678	Conforms	Horizontal :	Overhead :	Vertical :	Horizontal :	Overhead :	Vertical :
PE7093	Conforms	Horizontal :	Overhead :	Vertical :	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	Sb	As
HN-590 (F7P10-ECNi1-Ni1 H8) / PE2963	0.06	1.80	0.018	0.010	0.43	0.07	0.05	0.006	0.89	0.02		0.004			0.0009										
SWX 120 / PE2965	0.06	1.55	0.019	0.008	0.34	0.07	0.05	0.005	0.88	0.02		0.002			0.0010										
SWX 150 / PE2968	0.08	0.95	0.013	0.006	0.38	0.08	0.05	0.006	0.88	0.02		0.001			0.0012										
HN-590 / PE6678	0.06	1.64	0.020	0.008	0.39	0.05	0.05	0.006	0.84	0.02		0.003			0.0005										

Diffusible Hydrogen Collected per AWS A4.3

SWX 150	7.9 ml/100g of weld metal for 5/32 in diameter 48% relative humidity
SWX 120	7.1 ml/100g of weld metal for 5/32 in diameter 48% relative humidity
HN-590	5.3 ml/100g of weld metal for 5/32 in diameter 44% relative humidity

James A. Owens

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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.