Certificate of Conformance to Requirements for Welding Electrode

Product Type:	**HOBALLOY 10018D2**
Classification:	**E10018-D2 H4R**
Specifications:	**AWS A5.5/A5.5M; ASME SFA 5.5**
Diameter Tested:	
Date Tested:	**2/8/2022**
Date Generated:	**2/8/2022**

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.

MADE IN THE U.S. OF U.S. AND IMPORTED MATERIALS.

Test Settings

Size	Polarity	Amps	Volts	Preheat F(C)	Interpass F(C)
3/16X14 in	DCEP	235	25-26	225 (107)	225 (107)
5/32X14 in	AC	200	26 - 24	()	()
5/32X14 in	DCEP	180	26 - 24	225 (107)	225 (107)
3/16X14 in	DCEP	225	25-26	225 (107)	225 (107)
1/4X18 in	DCEP	325	27 - 26	225 (107)	225 (107)
1/4X18 in	DCEP	340	27 - 26	225 (107)	225 (107)

Mechanical Properties - Tensile

Size / Polarity	Ref. No.	Testing Conditions	Ult. Tensile Strength psi(MPa)	Yield Strength psi(MPa)	Elong.% in 2"
5/32X14 in / AC	PE3451	SR 1 Hr @ 1150F	112,000 (772)	104,000 (717)	**20**
5/32X14 in / DCEP	PE3453	SR 1 Hr @ 1150F	105,000 (724)	95,000 (655)	**23**
3/16X14 in / AC	PE3501	SR 1 Hr @ 1150F	104,000 (717)	93,000 (640)	**22**
3/16X14 in / DCEP	PE3514	SR 1 Hr @ 1150F	101,000 (696)	90,000 (623)	**23**
1/4X18 in / DCEP	PE3509	SR 1 Hr @ 1150F	103,000 (710)	90,000 (624)	**25**
1/4X18 in / DCEP	PE3529	SR 1 Hr @ 1150F	109,000 (752)	96,000 (661)	**24**

Mechanical Properties - Impact

Size / Polarity	Ref. No.	Testing Conditions	Test Temp. F(C)	Individuals ft.lb.(J)	Average ft.lb.(J)	Type
3/16X14 in / DCEP	PE3418	SR 1 Hr @ 1150F	-60 F (-51 C)	31,24,30 (42,33,41)	28 (38)	Charpy-V-Notch
5/32X14 in / AC	PE3451	SR 1 Hr @ 1150F	-60 F (-51 C)	47,43,45 (64,58,61)	45 (61)	Charpy-V-Notch
5/32X14 in / DCEP	PE3453	SR 1 Hr @ 1150F	-60 F (-51 C)	40,47,52 (54,64,70)	46 (63)	Charpy-V-Notch
3/16X14 in / DCEP	PE3465	SR 1 Hr @ 1150F	-60 F (-51 C)	62,60,62 (84,81,84)	61 (83)	Charpy-V-Notch
1/4X18 in / DCEP	PE3509	SR 1 Hr @ 1150F	-60 F (-51 C)	53,50,33 (72,68,45)	45 (61)	Charpy-V-Notch
1/4X18 in / DCEP	PE3529	SR 1 Hr @ 1150F	-60 F (-51 C)	44,43,32 (60,58,43)	40 (54)	Charpy-V-Notch

Size / Polarity	Ref. No.	Radiograph	Fillet Weld Test					
5/32X14 in / AC	PE3451	Conforms	Horizontal :		Overhead :	Conforms	Vertical :	Conforms
5/32X14 in / DCEP	PE3453	Conforms	Horizontal :		Overhead :	Conforms	Vertical :	Conforms
3/16X14 in / DCEP	PE3418	Conforms	Horizontal :	Conforms	Overhead :		Vertical :	
3/16X14 in / DCEP	PE3465	Conforms	Horizontal :	Conforms	Overhead :		Vertical :	
1/4X18 in / DCEP	PE3509	Conforms	Horizontal :	Conforms	Overhead :		Vertical :	
1/4X18 in / DCEP	PE3529	Conforms	Horizontal :	Conforms	Overhead :		Vertical :	

Chemical Analysis

Size / Polarity / 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
1/4X18 in / AC / CD80092	0.05	1.66	0.02	0.01	0.17				0.40	0.34															
1/4X18 in / DCEP / CD80093	0.05	1.65	0.02	0.01	0.17				0.39	0.34															
5/32X14 in / DCEP / CD81748	0.06	1.84	0.01	0.01	0.19				0.42	0.39															
5/32X14 in / AC / CD81754	0.06	1.78	0.01	0.01	0.20				0.42	0.40															

1/4X18 in / CD80092	Total H2O Method : Train - As Received	Total Coating Moisture : 0.048
1/4X18 in / CD80093	Total H2O Method : Train - 9 Hour	Total Coating Moisture : 0.29
5/32X14 in / CD81748	Total H2O Method : Train - As Received	Total Coating Moisture : 0.053
5/32X14 in / CD81754	Total H2O Method : Train - 9 Hour	Total Coating Moisture : 0.4

Diffusible Hydrogen Collected per AWS A4.3

3.8 ml/100g of weld metal for 1/4X18 in diameter 21% relative humidity
3.6 ml/100g of weld metal for 5/32X14 in diameter 16% relative humidity
3.5 ml/100g of weld metal for 3/16X14 in diameter 16% 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.