

CERTIFICATE OF CONFORMANCE
(APPLIES ONLY TO U.S. PRODUCTS)



Product: Outershield® 70
Classification: E70T-1C-H16, E70T-9C-H16
Specification: AWS A5.20-2005, ASME SFA-5.20
Test Completed: April 30, 2009

[3 Year]

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 according to the Quality System Program of the Lincoln Electric Company, Cleveland, Ohio, U.S.A., which meets the requirements of ISO9001, NCA3800, ANSI/AWS A5.01, and other specification and Military requirements, as applicable. The Quality System Program has been approved by ASME, ABS, and VdTUV.

Operating Settings	AWS/ASME Requirements	Results	
		1/16 inch	3/32 inch
Electrode Size		1/16 inch	3/32 inch
Polarity	DC+	DC+	DC+
Shielding Gas (per AWS A5.32)	100% CO ₂ (SG-C)	100% CO ₂ (SG-C)	100% CO ₂ (SG-C)
Voltage, V		25	29
Wire Feed Speed, cm/min (in/min)		635 (250)	508 (200)
Current, amps		275	470
Heat Input Avg., kJ/mm (kJ/in.)		1.5 (37)	2.0 (52)
Contact Tip to Work Distance, mm (in.)		25 (1)	25 (1)
Passes/Layers		14/7	9/5
Preheat Temp, °C (°F)	(60 min.)	20 (72)	25 (74)
Interpass Temp, °C (°F)	(275 - 325)	165 (325)	165 (325)

Mechanical properties of the weld deposits (in the as-welded condition)

Tensile Strength, MPa (ksi)	(70 - 95)	580 (84)	610 (88)
Yield Strength, 0.2% offset MPa (ksi)	(58 min.)	520 (76)	520 (75)
Elongation, %	22 min.	28	29
Average Hardness Rockwell B	Not Required	91	91
Avg. Charpy V-notch Impact Properties		82 (60)	33 (24)
Joules @ -29 °C (ft-lbs @ -20 °F)	(20 min.)	74,83,88 (55,61,65)	27,35,37 (20,26,27)
Avg.		96 (70)	45 (33)
Joules @ -18 °C (ft-lbs @ 0 °F)	(20 min.)	94,94,99 (69,69,73)	41,46,47 (30,34,35)

Chemical composition (weight %)

C	0.12 max.	0.04	0.07
Mn	1.75 max.	1.38	1.46
Si	0.90 max.	0.62	0.67
S	0.03 max.	0.01	0.01
P	0.03 max.	0.01	0.01
Diffusible Hydrogen (mL/100g) per AWS A4.3	16.0 max.	7.8	10.4
Absolute Humidity (grains moisture/lb dry air)		51	51

The strength and elongation properties were obtained from 12.5 mm (0.500 in), A4 tensile specimen artificially aged at 105°C (220 °F) for 48 hours, as permitted by AWS A5.20-2005. A naturally aged tensile specimen may take months to achieve the specified properties. See AWS A5.20-2005, paragraph A8.3. The time required for the natural aging of weld deposits is dependent upon ambient conditions, weldment geometry, the metallurgical structure of the weld deposit and other factors.


This certificate complies to the requirements of EN 10204, Type 2.2.

Radiographic Test: Met requirements. Fillet Weld Test: (positions as required): Met requirements.

Test assembly constructed of A36. The electrode diameters required to be tested are 3/32 in. and 1/16 in. the 5/64 in. size will also meet these requirements.

Results below the detection limits of the instrument or lower than the precision required by specification are reported as zero.

Strength values in SI units are reported to the nearest 10 MPa converted from actual data. Preheat and interpass temperature values in SI units are reported to the nearest 5 degrees.

 May 5, 2009
James R. Fogle, Certification Supervisor Date

 06 May 2009
David A. Fink, Manager, Compliance Engineering, Date
Consumable R&D Department