

CERTIFICATE OF CONFORMANCE



Electrode: **Innershield® NR®-232-H**
 Electrode Size: **.068" (1.7 mm)**
 Specification: **AWS D1.8:2016**
 Date: **March 28, 2019**

This is to certify that the above listed product was manufactured to meet the Class T4 requirement of AWS A5.01 as required by clause 6.3.1.2 of AWS D1.8:2016.

It was manufactured and supplied according to a Quality System Program that meets the requirements of ISO9001 among others as documented on The Lincoln Electric web page (<http://www.lincolnelectric.com/en-us/company/Pages/certifications.aspx>).

Operating Settings	High Heat Input Requirements	Low Heat Input Requirements	High Heat Input Results	Low Heat Input Results
Electrode Lot			15031917	15031917
Base Material			ASTM A572 steel (Grade 50)	ASTM A572 steel (Grade 50)
Current Type/Polarity			DC-	DC-
Plate Thickness, mm (in)	(3/4)	(3/4)	19 (3/4)	19 (3/4)
Nominal Voltage, V			20.5	22
Wire Feed Speed, cm/min (in/min)			381 (150)	508 (200)
Nominal Current, A			230	275
Average Heat Input, kJ/mm (kJ/in)	Not Specified	Not Specified	2.8 (70.2)	1.2 (30.6)
Travel Speed, cm/min (in/min)			10 (3.9)	27 (10.6)
Contact Tip to Work Distance, mm (in)			25 (1)	22 (7/8)
Pass/Layers			8/5	19/6
Preheat Temperature, °C (°F)	(250 min.)	(120 max.)	135 (275)	20 (72)
Interpass Temperature, °C (°F)	(450 min.)	(250 max.)	230 (450)	120 (250)
Postweld Heat Treatment	As-welded	As-welded	As-welded	As-welded
Weld Position			3G	1G
Mechanical properties of weld deposits				
Tensile Strength, MPa (ksi)	(70 min.)	(70 min.)	580 (84)	640 (92)
Yield Strength, 0.2% Offset, MPa (ksi)	(58 min.)	(58 min.)	450 (65)	520 (75)
Elongation %	22 min.	22 min.	28	26
Average Impact Energy	(40 min.)	(40 min.)	86 (64)	64 (47)
Joules @ -18 °C (ft-lbs @ 0 °F)			86,86,87 (63,63,64)	63,63,65 (46,47,48)

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Operating Settings	High Heat Input Requirements	Low Heat Input Requirements	High Heat Input Results	Low Heat Input Results
Electrode Lot			15584208	15584208
Base Material			ASTM A572 steel (Grade 50)	ASTM A572 steel (Grade 50)
Current Type/Polarity			DC-	DC-
Plate Thickness, mm (in)	(3/4)	(3/4)	19 (3/4)	19 (3/4)
Nominal Voltage, V			20	22
Wire Feed Speed, cm/min (in/min)			381 (150)	508 (200)
Nominal Current, A			230	280
Average Heat Input, kJ/mm (kJ/in)	Not Specified	Not Specified	2.9 (74)	1.2 (30.7)
Travel Speed, cm/min (in/min)			9 (3.7)	30 (12)
Contact Tip to Work Distance, mm (in)			25 (1)	25 (1)
Pass/Layers			8/5	18/6
Preheat Temperature, °C (°F)	(250 min.)	(120 max.)	135 (275)	20 (70)
Interpass Temperature, °C (°F)	(450 min.)	(250 max.)	230 (450)	120 (250)
Postweld Heat Treatment	As-welded	As-welded	As-welded	As-welded
Weld Position			3G	1G
Mechanical properties of weld deposits				
Tensile Strength, MPa (ksi)	(70 min.)	(70 min.)	570 (83)	610 (89)
Yield Strength, 0.2% Offset, MPa (ksi)	(58 min.)	(58 min.)	440 (64)	490 (71)
Elongation %	22 min.	22 min.	28	26
Average Impact Energy	(40 min.)	(40 min.)	84 (62)	68 (50)
Joules @ -18 °C (ft-lbs @ 0 °F)			80,84,87 (59,62,64)	65,68,70 (48,51,52)

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Operating Settings	High Heat Input Requirements	Low Heat Input Requirements	High Heat Input Results	Low Heat Input Results
Electrode Lot			15955863	15955863
Base Material			ASTM A572 steel (Grade 50)	ASTM A572 steel (Grade 50)
Current Type/Polarity			DC-	DC-
Plate Thickness, mm (in)	(3/4)	(3/4)	19 (3/4)	19 (3/4)
Nominal Voltage, V			20	22
Wire Feed Speed, cm/min (in/min)			381 (150)	508 (200)
Nominal Current, A			235	280
Average Heat Input, kJ/mm (kJ/in)	Not Specified	Not Specified	2.9 (72.7)	1.2 (30.7)
Travel Speed, cm/min (in/min)			10 (3.8)	30 (12)
Contact Tip to Work Distance, mm (in)			25 (1)	25 (1)
Pass/Layers			8/5	18/6
Preheat Temperature, °C (°F)	(250 min.)	(120 max.)	175 (350)	20 (70)
Interpass Temperature, °C (°F)	(450 min.)	(250 max.)	230 (450)	120 (250)
Postweld Heat Treatment	As-welded	As-welded	As-welded	As-welded
Weld Position			3G	1G
Mechanical properties of weld deposits				
Tensile Strength, MPa (ksi)	(70 min.)	(70 min.)	580 (84)	580 (84)
Yield Strength, 0.2% Offset, MPa (ksi)	(58 min.)	(58 min.)	450 (65)	470 (68)
Elongation %	22 min.	22 min.	30	26
Average Impact Energy	(40 min.)	(40 min.)	79 (58)	66 (49)
Joules @ -18 °C (ft-lbs @ 0 °F)			77,80,80 (57,59,59)	60,69,70 (44,51,52)

- This product satisfies the requirements of AWS D1.8:2016, Annex E, after exposure for 1 week at 80°F / 80% relative humidity.
- This document meets the requirements of AWS A5.01M/A5.01 Schedule F. When a specific lot number is referenced it also meets the requirements of EN10204, type 2.2. It does not meet the requirements of type 3.1.
- The Charpy V-notch impact values reported at -18 °C (0 °F) are required when the Lowest Anticipated Service Temperature (LAST) is -29 °C (-20 °F).
- The strength and elongation properties reported here were obtained from tensile specimens artificially aged at 105°C (220°F) for 48 hours.
- 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.

Michael Poole August 29, 2019
 Michael Poole, Certification Supervisor Date

Jonathan S. Ogborn August 30, 2019
 Jon Ogborn, Manager, Consumable Compliance Date