

# CERTIFICATE OF CONFORMANCE



Electrode: **Innershield® NR®-233**  
 Electrode Size: **.072" (1.8 mm)**  
 Specification: **AWS D1.8:2016**  
 Date: **April 21, 2020**

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			16507250	16507250
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			21	22
Nominal Current, A			250	320
Wire Feed Speed, cm/min (in/min)			406 (160)	559 (220)
Average Heat Input, kJ/cm (kJ/in)	Not Specified	Not Specified	2.7 (67.9)	1.2 (30.1)
Travel Speed, cm/min (in/min)			12 (4.7)	36 (14)
Contact Tip to Work Distance, mm (in)			22 (7/8)	22 (7/8)
Pass/Layers			8/5	17/6
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
<b>Mechanical properties of weld deposits</b>				
Tensile Strength, MPa (ksi)	(70 min.)	(70 min.)	570 (82)	630 (91)
Yield Strength, 0.2% Offset, MPa (ksi)	(58 min.)	(58 min.)	400 (59)	500 (73)
Elongation %	22 min.	22 min.	28	25
Average Impact Energy	(40 min.)	(40 min.)	79 (58)	73 (54)
Joules @ 0 °C (ft-lbs @ 32 °F)			77,78,80 (57,58,59)	70,75,75 (52,55,55)

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Operating Settings	High Heat Input Requirements	Low Heat Input Requirements	High Heat Input Results	Low Heat Input Results
Electrode Lot			16530347	16530347
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			21	22
Nominal Current, A			250	320
Wire Feed Speed, cm/min (in/min)			406 (160)	559 (220)
Average Heat Input, kJ/cm (kJ/in)	Not Specified	Not Specified	2.6 (65.3)	1.2 (31)
Travel Speed, cm/min (in/min)			12 (4.8)	35 (13.6)
Contact Tip to Work Distance, mm (in)			22 (7/8)	22 (7/8)
Pass/Layers			8/5	17/6
Preheat Temperature, °C (°F)	(250 min.)	(120 max.)	135 (275)	25 (80)
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
<b>Mechanical properties of weld deposits</b>				
Tensile Strength, MPa (ksi)	(70 min.)	(70 min.)	560 (82)	620 (89)
Yield Strength, 0.2% Offset, MPa (ksi)	(58 min.)	(58 min.)	410 (60)	490 (71)
Elongation %	22 min.	22 min.	28	25
Average Impact Energy	(40 min.)	(40 min.)	80 (59)	82 (60)
Joules @ 0 °C (ft-lbs @ 32 °F)			77,81,83 (57,59,61)	80,81,83 (59,60,61)

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Electrode Size: **.072" (1.8 mm)**  
Specification: **AWS D1.8:2016**  
Date: **April 21, 2020**

1. 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.
2. This product satisfies the requirements of AWS D1.8:2016, Annex E, after exposure for 8 weeks at 80°F / 80% relative humidity.
3. The Charpy V-notch impact values reported at 0 °C (32 °F) are required when the Lowest Anticipated Service Temperature (LAST) is -11 °C (12 °F).
4. The strength and elongation properties reported here were obtained from tensile specimens artificially aged at 105°C (220°F) for 48 hours.
5. 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.

April 21, 2020

Daniel Gaul, Certification Supervisor

Date

April 21, 2020

Jon Ogborn, Manager, Consumable  
Compliance

Date

# CERTIFICATE OF CONFORMANCE



Electrode: **Innershield NR-233**  
 Electrode Size: **.072" (1.8 mm)**  
 Specification: **AWS D1.8:2016**  
 Date: **November 06, 2017**

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			14817223	14817223
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			21	22
Nominal Current, A			250	300
Wire Feed Speed, cm/min (in/min)			406 (160)	559 (220)
Average Heat Input, kJ/mm (kJ/in)	Not Specified	Not Specified	2.6 (67)	1.2 (31)
Travel Speed, cm/min (in/min)			12 (4.72)	33 (12.97)
Contact Tip to Work Distance, mm (in)			22 (7/8)	22 (7/8)
Pass/Layers			8/5	17/6
Preheat Temperature, °C (°F)	(250 min.)	(120 max.)	135 (275)	20 (71)
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.)	590 (86)	620 (89)
Yield Strength, 0.2% Offset, MPa (ksi)	(58 min.)	(58 min.)	400 (58)	490 (71)
Elongation %	22 min.	22 min.	27	24

Average Impact Energy Joules @ 0 °C (ft-lbs @ 32 °F)	(40 min.)	(40 min.)	64 (47) 62,65,66 (46,48,49)	67 (50) 66,68,68 (49,50,50)
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- This product satisfies the requirements of AWS D1.8:2016, Annex E, after exposure for 8 weeks at 80°F / 80% relative humidity.
- The Charpy V-notch impact values reported at 0 °C (32 °F) are required when the Lowest Anticipated Service Temperature (LAST) is -11 °C (12 °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.

*Toronto Cunningham* November 06, 2017  
 Toronto Cunningham, Certification Supervisor Date

*Jonathan S. Ogborn* November 06, 2017  
 Jon Ogborn, Manager, Consumable Compliance Date