

# CERTIFICATE OF CONFORMANCE



Electrode: **Innershield® NR®-232**  
 Electrode Size: **.072" (1.8 mm)**  
 Specification: **AWS D1.8:2016**  
 Date: **January 02, 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			16292786	16292786
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			22	20
Wire Feed Speed, cm/min (in/min)			394 (155)	457 (180)
Nominal Current, A			250	290
Average Heat Input, kJ/mm (kJ/in)	Not Specified	Not Specified	2.9 (72.9)	1.2 (30.4)
Travel Speed, cm/min (in/min)			11 (4.5)	29 (11.3)
Contact Tip to Work Distance, mm (in)			25 (1)	25 (1)
Pass/Layers			8/5	20/7
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.)	580 (84)	620 (90)
Yield Strength, 0.2% Offset, MPa (ksi)	(58 min.)	(58 min.)	410 (60)	480 (70)
Elongation %	22 min.	22 min.	27	26
Average Impact Energy	(40 min.)	(40 min.)	78 (58)	63 (46)
Joules @ -18 °C (ft-lbs @ 0 °F)			73,79,82 (54,58,60)	55,65,69 (40,48,51)

- 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.
- This product satisfies the requirements of AWS D1.8:2016, Annex E, after exposure for 1 week at 80°F / 80% relative humidity.
- 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.

January 02, 2020

Daniel Gaul, Certification Supervisor

Date

January 03, 2020

Jon Ogborn, Manager, Consumable Compliance

Date

# CERTIFICATE OF CONFORMANCE



Product: **Innershield® NR®-232**  
 Electrode Lot Number: **14914274**  
 Classification: **E71T-8-H16**  
 Specification: **AWS D1.8:2016**  
 Date: **March 21, 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 6.3.8.1 of AWS D1.8:2016.

The product stated herein was manufactured and supplied in accordance with the Quality System Program of The Lincoln Electric Co., Cleveland, Ohio, U.S.A. as outlined in our Quality Assurance Manual. The Quality System Program of The Lincoln Electric Co. has been accepted by ASME, ABS and approved by VdTUV, and is certified to ISO 9001.

Operating Settings	AWS D1.8 Requirements	High Heat Input Results	Low Heat Input Results
Required Size for Classification		.072" (1.8 mm)	.072" (1.8 mm)
Current Type/Polarity		DC-	DC-
Nominal Voltage, V		22	20
Wire Feed Speed, cm/min (in/min)		394 (155)	457 (180)
Nominal Current, A		255	295
Average Heat Input, kJ/mm (kJ/in)		2.8 (72)	1.1 (29)
Contact Tip to Work Distance, mm (in)		25 (1)	25 (1)
Travel Speed, cm/min (in/min)		13 (5)	30 (12)
Pass/Layers		8/5	21/7
Preheat Temperature, °C (°F)		135 (275)	20 (72)
Interpass Temperature, °C (°F)		230 (450)	120 (250)
Weld Position		3G	1G
<b>Mechanical properties of weld deposits</b>			
Tensile Strength, MPa (ksi)	(70 min.)	570 (83)	640 (93)
Yield Strength, 0.2% Offset, MPa (ksi)	(58 min.)	400 (58)	520 (75)
Elongation %	22 min.	28	25
Average Impact Energy Joules @ -34 °C (ft-lbs @ -29 °F)	(40 min.)	61 (45) 57,62,63 (42,45,47)	55 (41) 53,55,57 (39,41,42)

- The Charpy V-notch impact values reported at -34 °C (-29 °F) are required when the Lowest Anticipated Service Temperature (LAST) is -45 °C (-49 °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*      March 21, 2017  
 Toronto Cunningham, Certification Supervisor      Date

*Jonathan S. Ogborn*      March 21, 2017  
 Jon Ogborn, Manager, Consumable Compliance      Date

# CERTIFICATE OF CONFORMANCE



Electrode: **Innershield NR-232**  
 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			14810717	14810717
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			22	20
Wire Feed Speed, cm/min (in/min)			394 (155)	457 (180)
Nominal Current, A			245	270
Average Heat Input, kJ/mm (kJ/in)	Not Specified	Not Specified	2.9 (73)	1.2 (30)
Travel Speed, cm/min (in/min)			11 (4.44)	27 (10.8)
Contact Tip to Work Distance, mm (in)			25 (1)	22 (7/8)
Pass/Layers			8/5	18/7
Preheat Temperature, °C (°F)	(250 min.)	(120 max.)	135 (275)	20 (68)
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)	630 (92)
Yield Strength, 0.2% Offset, MPa (ksi)	(58 min.)	(58 min.)	410 (59)	500 (72)
Elongation %	22 min.	22 min.	28	26
Average Impact Energy	(40 min.)	(40 min.)	59 (43)	61 (45)
Joules @ -18 °C (ft-lbs @ 0 °F)			54,60,62 (40,44,46)	58,61,63 (43,45,46)

1. This product satisfies the requirements of AWS D1.8:2016, Annex E, after exposure for 1 week at 80°F / 80% relative humidity.
2. 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).
3. The strength and elongation properties reported here were obtained from tensile specimens artificially aged at 105°C (220°F) for 48 hours.
4. 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