

# INNERSHIELD® NR®-211-MP

Mild Steel, All Position ■ AWS E71T-11, E71T11-AZ-CS3

## KEY FEATURES

- Versatile welding capability on a variety of base materials
- High operator appeal and good bead appearance
- Easy slag removal
- Fast freezing characteristics accommodate poor fit-up

## WELDING POSITIONS

All, except 3/32 in (2.4 mm) diameter

## MAXIMUM PLATE THICKNESS

| Diameter - in (mm) | Maximum Plate Thickness - in (mm) |
|--------------------|-----------------------------------|
| 0.030 (0.8)        | 5/16 (7.9)                        |
| 0.035 (0.9)        | 5/16 (7.9)                        |
| 0.045 (1.1)        | 5/16 (7.9)                        |
| 0.068 (1.7)        | 1/2 (12.7)                        |
| 5/64 (2.0)         | 1/2 (12.7)                        |
| 3/32 (2.4)         | 1/2 (12.7)                        |

## DIAMETERS / PACKAGING

| Diameter<br>in (mm) | 1 lb (0.5 kg) Plastic Spool<br>5 lb (2.3 kg) Master Carton | 10 lb (4.5 kg)<br>Plastic Spool | 14 lb (6.4 kg) Coil<br>56 lb (25.4 kg) Master Carton |
|---------------------|--|---------------------------------|--|
| 0.030 (0.8)         | ED031448   | ED033130                        |  |
| 0.035 (0.9)         | ED030584   | ED016354                        |  |
| 0.045 (1.1)         |  | ED016363                        |  |
| 0.068 (1.7)         |  |                                 | ED012506   |
| 5/64 (2.0)          |  |                                 | ED012508   |
| 3/32 (2.4)          |  |                                 |  |
| Diameter<br>in (mm) | 25 lb (11.3 kg)<br>Steel Spool                             | 50 lb (22.7 kg)<br>Coil         | 500 lb (227 kg)<br>Accu-Trak® Drum                   |
| 0.030 (0.8)         |  |                                 |  |
| 0.035 (0.9)         | ED030637   |                                 | ED029838   |
| 0.045 (1.1)         | ED030638   |                                 | ED029028   |
| 0.068 (1.7)         | ED030641   | ED012507                        |  |
| 5/64 (2.0)          | ED030645   | ED012509                        |  |
| 3/32 (2.4)          |  | ED013866                        |  |

## MECHANICAL PROPERTIES<sup>(1)</sup>

|                                | Yield Strength <sup>(2)</sup><br>MPa (ksi) | Tensile Strength<br>MPa (ksi) | Elongation<br>% | Hardness<br>Rockwell B |
|--------------------------------|--|-------------------------------|-----------------|------------------------|
| Requirements - AWS E71T-11     | 400 (58) min                               | 480-655 (70-95)               | 20 min          | —                      |
| Typical Results <sup>(3)</sup> | 435-475 (63-69)                            | 605-645 (88-94)               | 22-25           | 89-92                  |

<sup>(1)</sup>Typical all weld metal. <sup>(2)</sup>Measured with 0.2% offset. <sup>(3)</sup>See test results disclaimer

## CONFORMANCES

|                          |                    |
|--------------------------|--------------------|
| <b>AWS A5.20/A5.20M:</b> | E71T-11            |
| <b>AWS A5.36:</b>        | E71T11-AZ-CS3      |
| <b>ASME SFA-A5.20:</b>   | E71T-11            |
| <b>ABS:</b>              | E71T-11*           |
| <b>CWB/CSA W48-06:</b>   | E491T-11-H16       |
| <b>DB:</b>               | EN 758 T42 Z S N 1 |
| <b>TUV:</b>              | EN 758 T42 Z S N 1 |
| <b>EN ISO 17632-B</b>    | T49ZT11-1NA-H15    |
| <b>JIS Z 3313:</b>       | T 49 TG-1 N S      |

\*Except 0.030 in (0.8 mm) and 0.035 in (0.9 mm) diameters

## TYPICAL APPLICATIONS

- Sheet or thin gauge metal
- Galvanized sheet metal
- Robotic / hard automation
- General fabrication
- 5/16 in. maximum plate thickness for 0.045 in. and smaller diameters
- 1/2 in. maximum plate thickness for 0.068 - 3/32 in. diameters

**DEPOSIT COMPOSITION<sup>(1)</sup>**

|                                      | %C        | %Mn       | %Si       | %S       | %P       | %Al     |
|--------------------------------------|-----------|-----------|-----------|----------|----------|---------|
| <b>Requirements - AWS E71T-11</b>    | 0.30 max  | 1.75 max  | 0.60 max  | 0.03 max | 0.03 max | 1.8 max |
| <b>Typical Results<sup>(3)</sup></b> | 0.23-0.26 | 0.57-0.66 | 0.17-0.26 | ≤0.01    | ≤0.01    | 1.3-1.6 |

**TYPICAL OPERATING PROCEDURES**

| Diameter, Polarity     | CTWD mm (in)      | Wire Feed Speed m/min (in/min) | Voltage (volts) | Approx. Current (amps) | Melt-Off Rate kg/hr (lb/hr) | Deposition Rate kg/hr (lb/hr) | Efficiency (%) |
|------------------------|-------------------|--------------------------------|-----------------|------------------------|-----------------------------|-------------------------------|----------------|
| 0.030 in (0.8 mm), DC- | 13 (1/2)          | 1.3 (50)                       | 13-14           | 30                     | 0.2 (0.5)                   | 0.2 (0.4)                     | 81             |
|                        |                   | 2.5 (100)                      | 13-14           | 60                     | 0.5 (1.1)                   | 0.4 (0.8)                     | 75             |
|                        |                   | 3.8 (150)                      | 14-15           | 80                     | 0.7 (1.6)                   | 0.6 (1.2)                     | 78             |
|                        |                   | 5.1 (200)                      | 14-15           | 100                    | 1.0 (2.1)                   | 0.8 (1.7)                     | 81             |
|                        |                   | 6.4 (250)                      | 15-16           | 130                    | 1.2 (2.6)                   | 1.0 (2.1)                     | 80             |
|                        |                   | 7.6 (300)                      | 18-19           | 140                    | 1.4 (3.2)                   | 1.2 (2.6)                     | 81             |
| 0.035 in (0.9 mm), DC- | 13-16 (1/2-5/8)   | 1.3 (50)                       | 14-15           | 30                     | 0.4 (0.8)                   | 0.3 (0.7)                     | 81             |
|                        |                   | 1.8 (70)                       | 15-16           | 60                     | 0.5 (1.2)                   | 0.5 (1.0)                     | 83             |
|                        |                   | 2.8 (110)                      | 16-17           | 115                    | 0.7 (1.6)                   | 0.6 (1.3)                     | 78             |
|                        |                   | 3.8 (150)                      | 17-18           | 130                    | 1.0 (2.2)                   | 0.8 (1.7)                     | 78             |
|                        |                   | 5.1 (200)                      | 18-19           | 155                    | 1.4 (3.0)                   | 1.1 (2.5)                     | 84             |
|                        |                   | 7.0 (275)                      | 20-21           | 155                    | 2.0 (4.4)                   | 1.5 (3.4)                     | 78             |
| 0.045 in (1.1 mm), DC- | 16 (5/8)          | 1.8 (70)                       | 15-16           | 120                    | 0.7 (1.6)                   | 0.5 (1.1)                     | 69             |
|                        |                   | 2.3 (90)                       | 16-17           | 140                    | 1.0 (2.2)                   | 0.8 (1.7)                     | 77             |
|                        |                   | 2.8 (110)                      | 17-18           | 160                    | 1.2 (2.7)                   | 1.0 (2.3)                     | 85             |
|                        |                   | 3.3 (130)                      | 18-19           | 170                    | 1.5 (3.2)                   | 1.2 (2.7)                     | 84             |
| 0.068 in (1.7 mm), DC- | 19-32 (3/4-1 1/4) | 1.0 (40)                       | 15-16           | 125                    | 1.0 (2.1)                   | 0.8 (1.7)                     | 81             |
|                        |                   | 1.9 (75)                       | 18-19           | 190                    | 1.8 (4.0)                   | 1.5 (3.4)                     | 85             |
|                        |                   | 3.3 (130)                      | 20-21           | 270                    | 3.2 (7.0)                   | 2.8 (6.1)                     | 88             |
|                        |                   | 4.4 (175)                      | 23-24           | 300                    | 4.3 (9.4)                   | 3.8 (8.4)                     | 89             |
| 5/64 in (2.0 mm), DC-  | 19-32 (3/4-1 1/4) | 1.3 (50)                       | 16-17           | 180                    | 1.6 (3.5)                   | 1.3 (2.9)                     | 83             |
|                        |                   | 1.9 (75)                       | 18-19           | 235                    | 2.4 (5.3)                   | 2.0 (4.5)                     | 85             |
|                        |                   | 3.0 (120)                      | 20-21           | 290                    | 3.8 (8.4)                   | 3.4 (7.4)                     | 88             |
|                        |                   | 4.1 (160)                      | 22-23           | 325                    | 5.1 (11.2)                  | 4.5 (10.0)                    | 89             |
| 3/32 in (2.4 mm), DC-  | 19-32 (3/4-1 1/4) | 1.3 (50)                       | 16-17           | 245                    | 2.3 (5.0)                   | 1.9 (4.2)                     | 84             |
|                        |                   | 1.9 (75)                       | 19-20           | 305                    | 3.4 (7.5)                   | 2.9 (6.4)                     | 85             |
|                        |                   | 2.5 (100)                      | 20-21           | 365                    | 4.5 (10.0)                  | 3.9 (8.7)                     | 87             |
|                        |                   | 3.3 (130)                      | 22-23           | 400                    | 5.9 (12.9)                  | 5.1 (11.3)                    | 88             |

<sup>(1)</sup>Typical all weld metal. <sup>(2)</sup>Measured with 0.2% offset. <sup>(3)</sup>See test results disclaimer

Material Safety Data Sheets (MSDS) and Certificates of Conformance are available on our website at [www.lincolnelectric.com](http://www.lincolnelectric.com)

**TEST RESULTS**

Test results for mechanical properties, deposit or electrode composition and diffusible hydrogen levels were obtained from a weld produced and tested according to prescribed standards, and should not be assumed to be the expected results in a particular application or weldment. Actual results will vary depending on many factors, including, but not limited to, weld procedure, plate chemistry and temperature, weldment design and fabrication methods. Users are cautioned to confirm by qualification testing, or other appropriate means, the suitability of any welding consumable and procedure before use in the intended application.

**CUSTOMER ASSISTANCE POLICY**

The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to [www.lincolnelectric.com](http://www.lincolnelectric.com) for any updated information.