# ULTRACORE® 81NI2C-H

Low Alloy, All Position ▪ AWS E81T1-Ni2C-JH4

## KEY FEATURES

- Capable of producing weld deposits withimpact toughness exceeding 54 - 84 J (40 - 62 ft▪lbf) at -51°C (-60°F)
- Designed for welding with 100% $CO_2$ shielding gas
- Premium arc performance and bead appearance
- H4 diffusible hydrogen levels
- ProTech® foil bag packaging

## CONFORMANCES

| | |
|---|---|
| **AWS A5.29/A5.29M:** | E81T1-Ni2C-JH4 |
| **ASME SFA-A5.29:** | E81T1-Ni2C-JH4 |
| **ABS:** | 3YSA H5 |
| **Lloyd's Register:** | 3YS H5 |
| **DNV Grade:** | III Y40MS H5 |
| **CWB/CSA W48-06:** | E551T1-Ni2C-JH4 (E81T1-Ni2C-JH4) |
| **EN ISO 17632-B:** | T556T1-1CA-N5-H5 |

## WELDING POSITIONS

All, except vertical down

## TYPICAL APPLICATIONS

- Mining
- Offshore
- Bridge fabrication
- High strength fabrication

## SHIELDING GAS

100% $CO_2$
Flow Rate: 40-50 CFH

## DIAMETERS / PACKAGING

| Diameter in (mm) | 33 lb (15 kg) Spool* |
|---|---|
| 0.045 (1.1) | ED032215 |
| 0.052 (1.3) | ED032278 |
| 1/16 (1.6) | ED032214 |

**Spool may be plastic or fiber.*

## MECHANICAL PROPERTIES[1] – *As Required per AWS A5.29/A5.29M*

| | Yield Strength[2] MPa (ksi) | Tensile Strength MPa (ksi) | Elongation % | Charpy V-Notch J (ft▪lbf) @ -40°C (-40°F) | Charpy V-Notch J (ft▪lbf) @ -51°C (-60°F) |
|---|---|---|---|---|---|
| **Requirements[4]** - AWS E81T1-Ni2C-JH4 | 470 (68) min | 550-670 (80-100) | 19 min | 27 (20) min | 27 (20) min |
| **Typical Results[3]** As-Welded with 100% $CO_2$ | 555-600 (80-86) | 615-650 (89-94) | 26-28 | 76-111 (56-82) | 54-84 (40-62) |

## DEPOSIT COMPOSITION[1] – *As Required per AWS A5.29/A5.29M*

| | %C | %Mn | %Si | %S |
|---|---|---|---|---|
| **Requirements**[4] - AWS E81T1-Ni2C-JH4 | 0.12 max | 1.50 max | 0.80 max | 0.030 max |
| **Typical Results**[3] As-Welded with 100% $CO_2$ | 0.04-0.05 | 1.14-1.24 | 0.27-0.32 | 0.006-0.007 |
| | **%P** | **%Ni** | **Diffusible Hydrogen (mL/100g weld deposit)** | |
| **Requirements**[4] - AWS E81T1-Ni2C-JH4 | 0.030 max | 1.75-2.75 | 4.0 max | |
| **Typical Results**[3] As-Welded with 100% $CO_2$ | 0.006-0.007 | 1.86-2.19 | 2-4 | |

## TYPICAL OPERATING PROCEDURES

| Diameter, Polarity Shielding Gas | CTWD[5] 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 (%) |
|---|---|---|---|---|---|---|---|
| 0.045 in (1.1 mm), DC+ 100% $CO_2$ | 25 (1) | 4.4 (175) | 23-28 | 140 | 1.8 (4.0) | 1.6 (3.5) | 86-88 |
| | | 5.1 (200) | 24-29 | 150 | 2.1 (4.6) | 1.8 (4.0) | |
| | | 6.4 (250) | 25-30 | 165 | 2.6 (5.7) | 2.3 (5.0) | |
| | | 7.6 (300) | 25-30 | 190 | 3.1 (6.8) | 2.7 (6.0) | |
| | | 8.9 (350) | 26-31 | 205 | 3.6 (8.0) | 3.2 (7.0) | |
| | | 9.5 (375) | 26-31 | 225 | 3.9 (8.6) | 3.4 (7.5) | |
| | | 10.8 (425) | 27-32 | 245 | 4.4 (9.7) | 3.8 (8.5) | |
| | | 12.1 (475) | 28-33 | 265 | 4.9 (10.8) | 4.3 (9.5) | |
| | | 12.7 (500) | 29-34 | 275 | 5.2 (11.4) | 4.5 (10.0) | |
| 0.052 in (1.3 mm), DC+ 100% $CO_2$ | 25 (1) | 3.8 (150) | 23-28 | 150 | 2.0 (4.5) | 1.8 (3.9) | 86-88 |
| | | 4.7 (185) | 24-29 | 165 | 2.5 (5.5) | 2.2 (4.8) | |
| | | 5.7 (225) | 24-29 | 190 | 3.1 (6.7) | 2.7 (5.9) | |
| | | 6.4 (250) | 25-30 | 215 | 3.4 (7.5) | 2.9 (6.5) | |
| | | 7.0 (275) | 25-30 | 235 | 3.7 (8.2) | 3.2 (7.2) | |
| | | 7.6 (300) | 26-31 | 255 | 4.1 (9.0) | 3.5 (7.8) | |
| | | 8.5 (335) | 26-31 | 275 | 4.5 (10.0) | 4.0 (8.7) | |
| | | 9.5 (375) | 27-32 | 295 | 5.1 (11.2) | 4.4 (9.8) | |
| | | 10.2 (400) | 27-34 | 310 | 5.4 (12.0) | 4.7 (10.4) | |
| 1/16 in (1.6 mm), DC+ 100% $CO_2$ | 25 (1) | 3.8 (150) | 24-29 | 200 | 2.9 (6.3) | 2.5 (5.5) | 86-88 |
| | | 4.4 (175) | 24-30 | 210 | 3.3 (7.4) | 2.9 (6.4) | |
| | | 5.1 (200) | 25-30 | 235 | 3.8 (8.4) | 3.3 (7.3) | |
| | | 5.7 (225) | 25-31 | 265 | 4.3 (9.5) | 3.7 (8.2) | |
| | | 6.4 (250) | 26-31 | 305 | 4.8 (10.5) | 4.2 (9.2) | |
| | | 7.0 (275) | 26-32 | 305 | 5.3 (11.6) | 4.6 (10.1) | |
| | | 8.3 (325) | 27-32 | 335 | 6.2 (13.7) | 5.4 (11.9) | |
| | | 8.9 (350) | 28-34 | 365 | 6.7 (14.7) | 5.8 (12.8) | |

*[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer on pg. 13. [4]As-Welded with 100% $CO_2$. [5]To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.*