

Covered Arc Welding Electrodes for Low Temperature Service Steel

| Brand Name | Identification Color | | Specification | | Dia. mm | Application and Characteristics |
|------------|----------------------|------------|---------------------|-----------------|---------------------------------|--|
| | End | Secondary | JIS | AWS | | |
| N-5F | Yellow | Pink | Z 3211 E4928-GAP | — | 5.0 5.5 6.0 7.0 8.0 | Iron powder low hydrogen type electrode for horizontal and flat fillet welding of aluminium-killed steel for low temperature service. Weld metal shows excellent toughness at -45~-60°C. Weldability is good and bead is beautiful with equal leg length and without undercuts. It also is suitable for gravity welding. |
| | Welding Position | | AWS/ASME | F/1G | HF/2F | |
| N-11 | Green | Dark brown | Z 3211 E5516-3N3APL | ☆ A5.5 E8016-G | 3.2 4.0 5.0 6.0 | Low hydrogen type electrodes assuring excellent toughness at -45 ~ -60°C. N-11 is suitable for all position welding. |
| | Welding Position | | AWS/ASME | F/1G | HF/2F H/2G OH/4G VU/3G | |
| N-12 | Green | Green | Z 3211 E5516-N5APL | ☆ A5.5 E8016-C1 | 3.2 4.0 5.0 6.0 | Low hydrogen type electrode for all positions. It is suitable for welding cryogenic LPG tanks since weld metal shows excellent toughness at -50~-60°C. |
| | Welding Position | | AWS/ASME | F/1G | HF/2F H/2G OH/4G VU/3G | |
| N-13 | Green | Orange | Z 3211 E5516-N7L | ☆ A5.5 E8016-C2 | 2.6 3.2 4.0 5.0 6.0 | Low hydrogen type electrode for all positions. Weld metal shows excellent toughness even at -60~-75°C. |
| | Welding Position | | AWS/ASME | F/1G | HF/2F H/2G OH/4G VU/3G | |
| N-16 | Blue | White | Z 3211 E5516-N13APL | ☆ A5.5 E8016-G | 2.6 3.2 4.0 5.0 | Low hydrogen type electrode for welding 3.5% Ni steel for low temperature service in all positions. Weld metal contains 6.5%Ni and shows excellent toughness at -75~ -105°C. |
| | Welding Position | | AWS/ASME | F/1G | HF/2F H/2G OH/4G VU/3G | |

Note : Figure of illustration relating to the symbol of welding position in the table mentioned above.



| Typical Chemical Composition of Weld Metal (%) | | | | | | Typical Mechanical Properties of Weld Metal | | | | |
|--|------|------|-------|-------|------|---|-----------------------|---------------|-------------------------|------------|
| C | Si | Mn | P | S | Ni | Yield Strength, MPa | Tensile Strength, MPa | Elongation, % | Charpy 2V-notch, J, 0°C | PWHT |
| 0.07 | 0.19 | 1.12 | 0.012 | 0.007 | 0.73 | 480 | 550 | 29 | -60°C 68 | — |
| 0.07 | 0.49 | 1.15 | 0.012 | 0.005 | 1.62 | 540 | 610 | 29 | -60°C 94 -45°C 130 | — |
| 0.06 | 0.44 | 1.02 | 0.015 | 0.005 | 2.38 | 520 | 600 | 28 | -60°C 110 -50°C 120 | — |
| 0.05 | 0.42 | 0.46 | 0.010 | 0.008 | 3.35 | 500 | 580 | 29 | -75°C 120 -60°C 140 | — |
| 0.04 | 0.17 | 0.28 | 0.010 | 0.005 | 6.65 | 600 | 680 | 21 | -105°C 110 | As-welded |
| | | | | | | 580 | 640 | 26 | -105°C 95 | 600°C ×1hr |