

# Nickel-Alloys: Standard Nickel Grades

Wire • Bar • Strip • Ribbon

**Nickel 200 and Nickel 201** are the most widely used standard grades of commercially available pure wrought Nickel. These alloys offer good thermal conductivity, mechanical properties, resistance against many corrosive environments, in particular against caustic alkalis, low electrical resistivity, and good magnetostrictive properties. Ni 200 is easily workable by forming and drawing. **Nickel 201** is a low carbon variation of Ni 200 and has a very low work hardening rate which allows it to be easily cold formed. It also offers better creep resistance and is preferred over Ni 200 for applications that experience temperatures over 315°F (600°C).

**Nickel 205** is used for applications similar to those of Ni 200, but mostly where higher purity and conductivity are required. Ni 205 is produced by compositional adjustments to Ni 200 chemistry. These adjustments help in improving properties needed for electrical and electronic applications.

| Specifications |                  |              |                 |
|----------------|------------------|--------------|-----------------|
| Alloy          | British Standard | Werkstoff Nr | UNS designation |
| Ni 200/201     | BS 3075 (NA11)   | 2.4060       | N02200/01       |
| Ni 205/205 LC  | -                | 2.4061       | N02205          |

| Nominal Chemical composition (%) |          |          |         |          |          |          |          |
|----------------------------------|----------|----------|---------|----------|----------|----------|----------|
| Alloy                            | Ni       | Mn       | Fe      | Si       | Cu       | C        | Ti       |
| Ni 200                           | Min 99.2 | Max 0.30 | Max 0.2 | Max 0.10 | Max 0.20 | Max 0.10 | Max 0.10 |
| Ni 201                           | Min 99.2 | Max 0.30 | Max 0.2 | Max 0.10 | Max 0.20 | Max 0.05 | Max 0.10 |
| Ni 205                           | Min 99.6 | Max 0.20 | Max 0.2 | Max 0.10 | Max 0.10 | Max 0.05 | Max 0.05 |
| Ni 205 LC                        | Min 99.6 | Max 0.20 | Max 0.2 | Max 0.10 | Max 0.10 | Max 0.02 | Max 0.05 |

| Physical properties (at room temperature) |                              |                                 |  |   |
|---|------------------------------|---------------------------------|--|---|
| Alloy                                     | Density<br>g/cm <sup>3</sup> | Thermal<br>Conductivity<br>W/mK | Thermal Linear<br>Expansion Coeff.<br>b/w 20-95°C<br>10 <sup>-6</sup> /K | Electrical<br>Resistivity<br>at 20°C<br>μΩ-cm |
| Ni 200/201                                | 8.89                         | 70.20                           | 13.3   | 9.0   |
| Ni 205/205 LC                             | 8.89                         | 75.00                           | 13.3   | 8.9   |

| Mechanical Properties (for cold drawn annealed wire) |                                       |     |   |     |
|--|---------------------------------------|-----|---|-----|
| Alloy  | Tensile strength<br>N/mm <sup>2</sup> |     | Elongation<br>% at L <sub>0</sub> = 100 mm<br>Nominal dia in mm |     |
|  | Min                                   | Max | Min   | Max |
| Ni 200/201   | 400                                   | 550 | 20  | 30  |
| Ni 205/205 LC  | 400                                   | 530 | 20  | 30  |

## Applications

**Nickel 200 and 201** alloys are used as leads for electrical & electronic components & as lead-in-wire components for lamps. They are used in making wire mesh & filters for chemical & petrochemical industries. They are also used in Ni-Cd batteries, for welding overlay, and for making flux cored wires for welding applications.

**Nickel 205** is typically used for transistor housings, lead wires, anodes for electronic valves, and for making wire mesh and filters for chemical and petrochemical industries.