

## Inconel 600 (UNS N06600) — Material Data Sheet

ASTM B166 bar · UNS N06600 · Inconel® alloy 600 (Ni-Cr-Fe)

*Solid-solution nickel-chromium-iron alloy, hot or cold worked*

The general-purpose nickel-chromium alloy — oxidation resistant to 2000 °F, immune to chloride stress-corrosion cracking, for furnace, heat-treat and nuclear hardware.

|                               |            |                         |                           |
|-------------------------------|------------|-------------------------|---------------------------|
| TENSILE, HOT WORKED (½–3 IN.) | 90 ksi min | NICKEL                  | 72.0 % min                |
| YIELD, HOT WORKED (½–3 IN.)   | 40 ksi min | MAX SERVICE TEMPERATURE | About 2000 °F (oxidation) |
| TENSILE, ANNEALED             | 80 ksi min | MAGNETIC                | No                        |

### Nominal composition



■ Ni balance ~ 75.4% ■ Cr ~ 15.50% ■ Fe ~ 8.00% ■ Mn ~ 0.50% ■ C, Cu, Si, S trace

Midpoints of the specification ranges, for orientation only. Limits are in the table.

### Chemical composition — Inconel 600 (N06600) per ASTM B166 Table 1

| Element   | Symbol | Min % | Max % |
|-----------|--------|-------|-------|
| Nickel    | Ni     | 72.0  | —     |
| Chromium  | Cr     | 14.0  | 17.0  |
| Iron      | Fe     | 6.0   | 10.0  |
| Manganese | Mn     | —     | 1.0   |
| Carbon    | C      | —     | 0.15  |
| Copper    | Cu     | —     | 0.5   |
| Silicon   | Si     | —     | 0.5   |
| Sulfur    | S      | —     | 0.015 |

Values per ASTM B166-19 Table 1 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

### Physical properties (typical)

|                       |                                                    |
|-----------------------|----------------------------------------------------|
| DENSITY               | 0.304 lb/in <sup>3</sup> (8.42 g/cm <sup>3</sup> ) |
| MODULUS OF ELASTICITY | 30.0 × 10 <sup>6</sup> psi (207 GPa)               |
| MELTING RANGE         | 2470–2575 °F                                       |
| MAGNETIC              | No                                                 |

### Heat treatment

Not age hardenable. Supplied hot worked, cold worked or annealed as ordered.

### Bar properties — Inconel 600 rod and bar per ASTM B166 Table 2

| Condition and size                               | Tensile strength, min (ksi) | Yield strength 0.2%, min (ksi) | Elongation, min (%) |
|--------------------------------------------------|-----------------------------|--------------------------------|---------------------|
| Cold worked, as worked — rounds under ½ in.      | 120                         | 90                             | 7                   |
| Cold worked, as worked — rounds ½ to 1 in.       | 110                         | 85                             | 10                  |
| Cold worked, as worked — rounds over 1 to 2½ in. | 105                         | 80                             | 12                  |
| Hot worked, as worked — rounds ¼ to ½ in.        | 95                          | 45                             | 20                  |
| Hot worked, as worked — rounds over ½ to 3 in.   | 90                          | 40                             | 25                  |
| Hot worked, as worked — rounds over 3 in.        | 85                          | 35                             | 30                  |
| Annealed — all sizes                             | 80                          | 35                             | 30                  |

Values per ASTM B166-19 Table 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Applicable standards

|             |                                              |
|-------------|----------------------------------------------|
| ASTM B166   | Nickel-chromium-iron alloy rod, bar and wire |
| ASME SB-166 | Boiler and Pressure Vessel Code equivalent   |
| ASTM B168   | Alloy 600 plate, sheet and strip             |
| AMS 5665    | Aerospace alloy 600 bar                      |

Forms we supply in Inconel 600

- Full-thread studs and stud bolts
- Hex and heavy hex bolts
- Socket head cap screws
- Hex nuts in the same alloy
- Threaded rod
- Machined components from certified bar

Typical applications

- Furnace muffles, retorts and heat-treat fixtures
- Nuclear steam-generator and reactor hardware
- Chemical process equipment in caustic and chlorides
- Exhaust and high-temperature ducting fasteners
- Cryogenic-to-2000 °F hardware