

Inconel 600 - Technical Specifications

1. Product Description:

Inconel 600 is a nickel-chromium alloy known for its excellent corrosion and oxidation resistance at high temperatures. This alloy exhibits outstanding performance under extreme conditions, including exposure to harsh chemicals, high pressure, and thermal cycling. Commonly used in chemical processing, aerospace, and nuclear engineering, Inconel 600 offers high mechanical strength and stability across a wide temperature range.

2. Chemical Composition (by weight):-

Element	Percentage (%)
Nickel (Ni)	72.0
Chromium (Cr)	14.0 -17.0
Iron (Fe)	6.0- 10.0
Carbon (C)	0.15
Manganese (Mn)	1.00
Silicon (Si)	0.50
Sulfur (S)	0.015
Copper (Cu)	0.50

3. Mechanical Properties:-

Property	Percentage (%)
0.2% Yield Strength (MPa)	240
Tensile Strength (MPa)	550
Elongation (% in 4D)	30
Hardness (Rockwell B)	80 -100

4. Heat Treatment:-

Inconel 600 is supplied in the annealed condition to optimize ductility and corrosion resistance. The heat treatment process involves:

Annealing: Heat to 1010–1150°C (1850–2100°F), followed by air cooling or rapid quenching.

Stress Relieving: Heat to 870–900°C (1600–1650°F) for one hour, then air cool to minimize residual stresses.

5. Physical Properties:

Property	Value
Density	~8.47 g/cm ³
Melting Point	~1350–1410°C (2460–2570°F)
Thermal Conductivity	~14.9 W/m·K (at 20°C)
Specific Heat Capacity	~444 J/kg·K (at 20°C)
Elastic Modulus (Young's)	~206 GPa
Electrical Resistivity	~1.0 μΩ·m (at 20°C)
Thermal Expansion Coefficient	13.3 x 10 ⁻⁶ /K (20–100°C)

6. Applications:

Inconel 600's superior properties make it suitable for a range of demanding applications:

Chemical Processing: Heat exchangers, evaporators, and processing equipment resistant to acid and alkali corrosion.

Aerospace: Jet engine components, exhaust liners, and turbine seals exposed to high temperatures.

Nuclear Industry: Reactor components requiring resistance to radiation and chemical degradation.

Heat Treatment: Furnace fixtures and retorts exposed to oxidizing and reducing atmospheres.

7. Corrosion Resistance:-

Inconel 600 offers outstanding resistance to:

- Oxidizing and reducing environments.
- Chloride-ion stress-corrosion cracking.
- Organic and inorganic acids, including nitric and hydrochloric acid.
- High-temperature oxidation and scaling.