

Inconel 825 - Technical Specification

1. Product Description:- Inconel 825 is a corrosion-resistant nickel-iron-chromium alloy with additions of molybdenum, copper, and titanium. It offers excellent resistance to reducing and oxidizing acids, stress-corrosion cracking, and localized attacks such as pitting and crevice corrosion. It is widely used in chemical processing, marine, and nuclear applications.

2. Chemical Composition:-

Element	Percentage (%)
Nickel (Ni)	38.0-46.0
Iron (Fe)	Balance
Chromium (Cr)	19.5-23.5
Molybdenum (Mo)	2.5-3.5
Copper (Cu)	1.5-3.0
Titanium (Ti)	0.6-1.2
Manganese (Mn)	1.0 max
Silicon (Si)	0.5 max
Carbon (C)	0.05 max
Sulfur (S)	0.03 max

3. Mechanical Properties:-

Property	Value
Tensile Strength	~85 ksi (586 MPa)
Yield Strength (0.2%)	~35 ksi (241 MPa)
Elongation	30-40%
Hardness (Rockwell)	~B90

4. Physical Properties:-

Property	Value
Density	8.14 g/cm ³
Melting Range	1350–1400°C (2462–2552°F)
Thermal Conductivity	~11 W/m·K (at 20°C)
Specific Heat Capacity	~440 J/kg·K
Electrical Resistivity	~1.23 μΩ·m (at 20°C)

5. Heat Treatment: - Inconel 825 achieves its properties through annealing. The recommended annealing temperature is ~940–980°C (1724–1796°F), followed by air cooling to optimize corrosion resistance and mechanical properties.

6. Applications:-

- **Chemical Processing:** Acid production, heat exchangers, and storage tanks.
- **Marine Industry:** Seawater equipment, desalination plants, and piping systems.
- **Oil & Gas:** Gas scrubbers, pipelines, and offshore equipment.
- **Nuclear Industry:** Waste processing and storage vessels.

7. Corrosion Resistance:-

- Outstanding resistance to reducing and oxidizing acids like sulfuric, phosphoric, and nitric acids.
- High resistance to chloride-induced stress-corrosion cracking and localized corrosion.
- Excellent performance in marine and brine environments.