

## Inconel 925- Technical Specification

**1. Product Description:** - Inconel 925 is a nickel-iron-chromium-based super alloy enhanced with molybdenum, copper, titanium, and aluminum. It combines excellent corrosion resistance with high strength, making it ideal for sour gas and high-stress environments. Its applications primarily include the oil and gas industry, where resistance to sulfide stress corrosion cracking is essential.

### **2. Chemical Composition:-**

Element	Percentage (%)
Nickel (Ni)	42.0-46.0
Chromium (Cr)	19.5-23.5
Iron (Fe)	Balance
Molybdenum (Mo)	2.5-3.5
Copper (Cu)	1.5-3.0
Titanium (Ti)	1.9-2.4
Aluminum (Al)	0.10-0.50
Manganese (Mn)	1.0 max
Silicon (Si)	0.5 max
Carbon (C)	0.03 max
Sulfur (S)	0.03 max
Phosphorus (P)	0.03 max

### **3. Mechanical Properties:-**

Property	Value
Tensile Strength	~135 ksi (930 MPa)
Yield Strength (0.2%)	~85 ksi (586 MPa)
Elongation	15-25%
Hardness (Rockwell)	~C30-C35

## 4. Physical Properties:-

Property	Value
Density	8.14 g/cm <sup>3</sup>
Melting Range	1350–1400°C (2462–2552°F)
Thermal Conductivity	~10 W/m·K (at 20°C)
Electrical Resistivity	~1.25 μΩ·m (at 20°C)

**5. Heat Treatment:** - Inconel 925 is heat-treated for optimal strength and corrosion resistance.

- Solution Annealing: ~1030–1080°C (1886–1976°F), followed by rapid cooling.
- Aging: Typically at ~760°C (1400°F) to form strengthening precipitates ( $\gamma'$  and  $\gamma''$ ).

## 6. Applications:-

- Oil & Gas: Downhole tubing, safety valves, packers, hangers, and wellhead components.
- Marine: Corrosion-resistant components for seawater applications.
- Chemical Processing: Acid-resistant components, pumps, and pipelines.

## 7. Corrosion Resistance:-

- Sour Gas Resistance: Excellent resistance to sulfide stress corrosion cracking in H<sub>2</sub>S-rich environments.
- Pitting and Crevice Corrosion: High resistance in chloride-rich conditions.
- General Corrosion: Outstanding resistance in oxidizing and reducing environments, including acid attacks.