Nimonic 80A - Technical Specification

1. Product Description:-

Nimonic 80A is a nickel-chromium-based superalloy reinforced with titanium and aluminum for exceptional high-temperature strength and oxidation resistance. It is widely used in gas turbines, nuclear reactors, and aerospace applications where both heat resistance and mechanical strength are critical.

2. Chemical Composition:-

Element	Percentage (%)
Nickel (Ni)	69.0 min
Chromium (Cr)	18.0–21.0
Titanium (Ti)	1.8–2.7
Aluminum (Al)	1.0–1.8
Iron (Fe)	3.0 max
Manganese (Mn)	1.0 max
Silicon (Si)	1.0 max
Carbon (C)	0.06–0.20
Copper (Cu)	0.2 max
Cobalt (Co)	2.0 max
Sulfur (S)	0.015 max

3. Mechanical Properties:-

Property	Value
Tensile Strength	~140 ksi (965 MPa)
Yield Strength (0.2%)	~100 ksi (690 MPa)
Elongation	15–25%
Hardness (Rockwell)	~B90

4. Physical Properties:-

Property	Value
Density	8.19 g/cm^3
Melting Range	~1320°C (2408°F)
Thermal Conductivity	~11.2 W/m·K (at 20°C)
Electrical Resistivity	~1.1 μΩ·m (at 20°C)

5. Heat Treatment:-

- **Solution Annealing**: 1080–1100°C (1976–2012°F), followed by rapid cooling.
- **Aging**: Aged at 700–750°C (1292–1382°F) to enhance mechanical properties through precipitation strengthening.

6. Applications:-

- Aerospace: Turbine blades, discs, and other high-temperature components.
- Power Generation: Gas turbine components.
- Nuclear Industry: Structural materials exposed to high temperatures.
- Automotive: Valves and exhaust system components for high-performance engines.

7. Corrosion Resistance:-

- Excellent resistance to oxidation at elevated temperatures up to 815°C (1500°F).
- Good resistance to scaling and creep in harsh environments.