

Alloy A286 - Technical Specification

1. Product Description:- Alloy A286 is a high-performance, age-hardenable iron-nickel-chromium alloy that offers excellent strength and resistance to oxidation and corrosion at elevated temperatures. It is widely used in applications where high strength and resistance to oxidation and corrosion at elevated temperatures are required, such as in the aerospace, chemical processing, and power generation industries.

Composition: A286 is primarily composed of iron (Fe), nickel (Ni), chromium (Cr), and a small percentage of titanium (Ti) and aluminum (Al). The alloy is designed to provide high strength at elevated temperatures, excellent resistance to oxidation, and good corrosion resistance in harsh environments.

Form: It is available in various forms such as bars, sheets, forgings, fasteners, and more.

2. Chemical Composition:-

Element	Composition Range
Nickel (Ni)	24-28%
Chromium (Cr)	13-15%
Iron (Fe)	Balance
Manganese (Mn)	1.0-2.0%
Silicon (Si)	1.0% max
Titanium (Ti)	1.8-2.5%
Aluminum (Al)	0.2-0.5%
Carbon (C)	0.05% max
Phosphorus (P)	0.04% max
Sulfur (S)	0.03% max

3. Mechanical Properties:-

Property	Value
Tensile Strength (Ultimate)	120-140 ksi (827-965 MPa)
Yield Strength	80-100 ksi (552-690 MPa)
Elongation (in 2 inches or 50mm)	20% min
Hardness (Rockwell B)	95-100 HRB
Modulus of Elasticity	30 x 10 ³ ksi (207 GPa)
Poisson's Ratio	0.30-0.33

4. Physical Properties:-

Property	Value
Density	7.95 g/cm ³ (0.287 lb/in ³)
Melting Point	1370-1415°C (2500-2599°F)
Thermal Conductivity	14.9 W/m·K at 100°C
Specific Heat Capacity	0.46 J/g·K
Electrical Resistivity	0.68 μΩ·cm at 20°C

5. Heat Treatment:-

- **Solution Annealing:** Heat the material to 1020-1100°C (1870-2012°F), followed by air cooling.
- **Age Hardening (Precipitation Hardening):** After solution annealing, age at 760-815°C (1400-1500°F) for 4-8 hours, followed by air cooling.

6. Applications:-

- **Aerospace and Aviation:** Turbine engines, gas turbines, exhaust systems, and other high-stress components exposed to high temperatures.
- **Chemical Processing:** High-temperature reaction vessels, heat exchangers, and other components exposed to corrosive environments.
- **Power Generation:** Gas turbines, compressor blades, and other parts that operate at high temperatures.
- **Marine and Industrial Equipment:** Components exposed to high-temperature marine environments.

7. Corrosion Resistance:- Alloy A286 has good resistance to oxidation at temperatures up to 1600°F (871°C) and exhibits excellent resistance to a variety of gases and chemicals. It also offers resistance to pitting and crevice corrosion in chloride environments, as well as good resistance to general corrosion in acidic conditions.