Description

Stainless Steel Grade 316/1.4401 is an austenitic chromium-nickel stainless steel containing molybdenum. This addition increases its corrosion resistance, especially against chlorides and other industrial solvents. It is known for its excellent formability, weldability, and high creep, stress-to-rupture, and tensile strength at elevated temperatures. Due to its enhanced properties, 316 stainless steel is widely used in various industries, particularly in harsh environments.

Chemical Composition

- Chromium (Cr): 16.0 - 18.0%
- Nickel (Ni): 10.0 - 14.0%
- Molybdenum (Mo): 2.0 - 3.0%
- Manganese (Mn): ≤ 2.0%
- Silicon (Si): ≤ 0.75%
- Carbon (C): ≤ 0.08%
- Phosphorus (P): ≤ 0.045%
- Sulfur (S): ≤ 0.030%
- Nitrogen (N): ≤ 0.10%

Mechanical Properties

- Tensile Strength: 515 - 690 MPa
- Yield Strength: 205 MPa
- Elongation at Break: 40%
- Hardness: ≤ 95 HRB

Thermal & Physical Properties

- Density: 8.00 g/cm³
- Melting Point: 1375 - 1400°C

- Thermal Conductivity: 16.3 W/m·K (at 100°C)
- Specific Heat Capacity: 500 J/kg·K (at 0 - 100°C)
- Electrical Resistivity: 7.4 x 10^-7 Ω·m (at 20°C)
- Coefficient of Thermal Expansion: 16.0 µm/m·K (0 - 100°C)

Other Designations

- UNS: S31600
- EN: 1.4401
- AISI: 316
- JIS: SUS 316

Fabrication and Heat Treatment

- Fabrication: Grade 316 can be easily welded and processed by standard shop fabrication practices. It is commonly used in the annealed condition and possesses excellent welding characteristics.
- Heat Treatment: Annealing should be done at 1010-1120°C followed by rapid cooling to enhance corrosion resistance. 316 stainless steel cannot be hardened by heat treatment, only by cold working.

Applications

- Marine Environments: Components exposed to salt water and brine solutions.
- Chemical Processing: Equipment and machinery exposed to chemicals.
- Food and Beverage Industry: Storage and processing equipment.
- Pharmaceutical Equipment: Sterile manufacturing and processing.
- Petrochemical Plants: Pipelines, valves, and storage tanks.
- Medical Devices: Surgical instruments and implants.
- Architectural Applications: Coastal building materials and facades.

Supplied Forms

- Bars
- Wires
- Coils

Features

- Corrosion Resistance: Excellent resistance to chlorides, acidic environments, and other corrosive elements.
- High Strength: Maintains high strength and toughness at both high and low temperatures.
- Formability and Weldability: Easily fabricated and welded using conventional techniques.
- Durability: Resistant to pitting and crevice corrosion, enhancing longevity in harsh environments.
- Aesthetic Appeal: Offers a shiny, attractive finish, suitable for architectural applications.