

Description

Stainless Steel Grade 427/1.4016 is a ferritic stainless steel known for its high resistance to oxidation and corrosion. It is primarily used in applications requiring good mechanical properties and moderate corrosion resistance at elevated temperatures. Grade 427 offers a balance of good toughness, ductility, and resistance to scaling, making it suitable for a variety of industrial applications.

Chemical Composition

- Chromium (Cr): 15.0 - 17.0%
 - Nickel (Ni): $\leq 1.0\%$
 - Manganese (Mn): $\leq 1.0\%$
 - Silicon (Si): $\leq 1.0\%$
 - Carbon (C): $\leq 0.12\%$
 - Phosphorus (P): $\leq 0.040\%$
 - Sulfur (S): $\leq 0.030\%$
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Mechanical Properties

- Tensile Strength: 450 - 600 MPa
 - Yield Strength: 280 MPa (minimum)
 - Elongation: 20% (minimum)
 - Hardness: 80 HRB (maximum)
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Thermal & Physical Properties

- Density: 7.75 g/cm³
- Thermal Conductivity: 25 W/m·K at 23°C
- Specific Heat: 460 J/kg·K at 23°C
- Electrical Resistivity: 600 $\mu\Omega\cdot\text{cm}$ at 23°C
- Coefficient of Thermal Expansion: $10.2 \times 10^{-6} / ^\circ\text{C}$ (20-100°C)

Other Designations

- DIN Number: 1.4016
- UNS Number: S42700
- JIS Number: SUS 427

Fabrication and Heat Treatment

Fabrication:

- Forming: Grade 427/1.4016 can be readily formed using standard techniques. Its ductility makes it suitable for a variety of forming operations.
- Welding: This grade can be welded using standard welding techniques. Preheating is generally not required, but post-weld annealing may be necessary to restore corrosion resistance.

Heat Treatment:

- Annealing: Anneal at 760-815°C (1400-1500°F), followed by air cooling. This treatment ensures a homogeneous structure and relieves internal stresses.
- Hardening: Not hardenable by heat treatment. Hardening is achieved through cold working processes.

Applications

- Automotive: Exhaust systems, heat exchangers, and catalytic converters.
 - Industrial: Furnace components, heat exchangers, and chemical processing equipment.
 - Construction: Structural components, roofing, and cladding.
 - Appliances: Heating elements, ovens, and other high-temperature appliances.
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Supplied Forms

- Bars: Round, square, and hexagonal bars.
 - Coils
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Features

- Oxidation Resistance: Excellent resistance to oxidation and scaling at elevated temperatures.
- Corrosion Resistance: Moderate resistance to corrosion in a variety of environments.
- Good Mechanical Properties: Offers a good balance of strength, toughness, and ductility.
- Fabrication: Easily fabricated and welded, suitable for a wide range of applications.
- Cost-Effective: Provides a cost-effective alternative to higher alloyed stainless steels with sufficient performance for many applications.

