

Description

Stainless Steel Grade 409/1.4512 is a ferritic stainless steel that is primarily used in automotive exhaust systems and other applications requiring good resistance to oxidation and corrosion at elevated temperatures. It offers a combination of durability and resistance to various environmental factors, making it a suitable choice for demanding applications. This grade is characterized by its high chromium content, which enhances its resistance to oxidation, while its low carbon content ensures excellent weldability.

Chemical Composition

- Chromium (Cr): 10.5 - 11.75%
- Nickel (Ni): $\leq 0.75\%$
- Manganese (Mn): 0.5 - 1.0%
- Silicon (Si): $\leq 0.75\%$
- Carbon (C): $\leq 0.08\%$
- Phosphorus (P): $\leq 0.04\%$
- Sulfur (S): $\leq 0.03\%$
- Iron (Fe): Balance

DIN Number: 1.4512

Mechanical Properties

- Tensile Strength: 450 - 600 MPa (65 - 87 ksi)
 - Yield Strength: 275 MPa (40 ksi)
 - Elongation: 20% (min)
 - Hardness: Typically around 200 HV (Vickers Hardness)
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Thermal & Physical Properties

- Density: 7.75 g/cm³ (0.28 lb/in³)

- Thermal Conductivity: 24.0 W/m·K (167 BTU·in/hr·ft²·°F)
 - Specific Heat Capacity: 500 J/kg·K (0.12 BTU/lb·°F)
 - Melting Point: Approx. 1480°C (2700°F)
 - Coefficient of Thermal Expansion: $11.0 \times 10^{-6}/K$ ($6.1 \times 10^{-6}/°F$)
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Other Designations

- UNS: S40900
 - JIS: SUS 409
 - AISI: 409
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Fabrication and Heat Treatment

- Welding: Grade 409 can be welded using conventional welding methods such as MIG, TIG, and resistance welding. Preheating is generally not required, but post-weld heat treatment may be performed to relieve stresses and reduce hardness.
- Machining: This grade can be machined using standard tools. Due to its toughness, cutting speeds may need to be adjusted accordingly.
- Heat Treatment: Generally, Grade 409 is not heat-treated in most applications. It is used in the as-rolled or annealed condition. If heat treatment is required, it typically involves heating to 800 - 850°C (1470 - 1560°F) followed by cooling in air.

STAINLESS STEEL WIRES & BARS

Applications

- Automotive Exhaust Systems: Commonly used in mufflers, catalytic converters, and exhaust manifolds due to its resistance to high temperatures and oxidation.
- Industrial Equipment: Used in various components exposed to high temperatures and corrosive environments.
- Architectural Applications: Occasionally used in decorative and structural elements where a combination of strength and resistance to weathering is required.

Supplied Forms

- Bars
 - Coils
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Features

- Oxidation Resistance: Offers good resistance to oxidation and scaling at elevated temperatures.
- Corrosion Resistance: Provides moderate resistance to corrosion in mildly corrosive environments.
- High Strength: Ensures durability and performance under stress and high-temperature conditions.
- Cost-Effectiveness: More affordable compared to higher nickel-containing stainless steels, making it a cost-effective choice for many applications.
- Weldability: Good weldability, suitable for various fabrication processes.

