

Description

Stainless Steel Grade 409CB/1.4512 is a stabilized ferritic stainless steel with excellent oxidation and corrosion resistance. This grade contains niobium, which enhances its strength and weldability. It is particularly suited for applications requiring high-temperature resistance and good mechanical properties.

Chemical Composition

- Chromium (Cr): 10.5 - 11.75%
 - Nickel (Ni): $\leq 0.5\%$
 - Manganese (Mn): $\leq 1.0\%$
 - Silicon (Si): $\leq 1.0\%$
 - Carbon (C): $\leq 0.03\%$
 - Phosphorus (P): $\leq 0.04\%$
 - Sulfur (S): $\leq 0.02\%$
 - Niobium (Nb): 0.3 - 0.6%
 - Iron (Fe): Balance
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Mechanical Properties

- Tensile Strength: 380 - 450 MPa
 - Yield Strength: 200 - 280 MPa
 - Elongation: 20 - 25%
 - Hardness: 65 - 95 HRB
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Thermal & Physical Properties

- Density: 7.75 g/cm³
- Melting Point: 1450°C (2642°F)
- Thermal Conductivity: 25 W/m·K at 20°C
- Specific Heat Capacity: 460 J/kg·K at 20°C

- Coefficient of Thermal Expansion: 11.0 $\mu\text{m}/\text{m}\cdot\text{K}$ from 20°C to 100°C
 - Electrical Resistivity: 0.60 $\mu\Omega\cdot\text{m}$ at 20°C
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Other Designations

- UNS: S40920
 - EN: 1.4512
 - JIS: SUS 409L
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Fabrication and Heat Treatment

- Welding: Grade 409CB/1.4512 is readily weldable using conventional welding techniques. Preheating is not typically required, and post-weld annealing is necessary only for high-stress applications.
 - Forming: This grade can be formed using standard methods. Its formability is similar to other ferritic stainless steels.
 - Heat Treatment: Annealing should be performed at 760-815°C (1400-1500°F) followed by air cooling. This process relieves stresses and restores ductility.
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Applications

- Automotive Exhaust Systems: Widely used for catalytic converters, mufflers, and tailpipes due to its resistance to high temperatures and corrosion.
 - Construction: Suitable for structural components and building facades.
 - Industrial Equipment: Used in equipment subjected to high-temperature environments, such as furnaces and heat exchangers.
 - Food Processing: Ideal for components in food processing equipment where high strength and corrosion resistance are essential.
 - Petrochemical: Suitable for storage tanks, heat exchangers, and other equipment in the oil and gas industry.
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Supplied Forms

- Coils
 - Bars
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Features

- Oxidation Resistance: Excellent resistance to oxidation, particularly at elevated temperatures.
- Corrosion Resistance: Good resistance to corrosion in mildly corrosive environments.
- High Temperature Strength: Maintains strength and stability at high temperatures, making it ideal for exhaust systems and similar applications.
- Weldability: Enhanced weldability due to the presence of niobium.
- Cost-Effective: Lower cost compared to austenitic stainless steels while providing sufficient performance for many applications.
- Formability: Can be easily formed and fabricated using standard methods.

