

Description

Stainless Steel Grade 13-8 Mo is a precipitation-hardening martensitic stainless steel with high strength and excellent corrosion resistance. It is specifically designed for applications requiring high strength, durability, and resistance to extreme environments. This grade is commonly used in aerospace, chemical, and oil and gas industries where performance and reliability are critical.

Chemical Composition

- Chromium (Cr): 12.0 - 14.0%
 - Nickel (Ni): 7.0 - 9.0%
 - Molybdenum (Mo): 1.75 - 2.25%
 - Carbon (C): 0.07 - 0.15%
 - Manganese (Mn): 0.60 - 1.00%
 - Silicon (Si): 0.50% Max
 - Phosphorus (P): 0.04% Max
 - Sulfur (S): 0.03% Max
 - Iron (Fe): Balance
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Mechanical Properties

- Tensile Strength: 1300 - 1600 MPa (190 - 230 ksi)
 - Yield Strength: 1100 MPa (160 ksi) Min
 - Elongation: 6% Min (in 50 mm)
 - Hardness: 30 - 35 HRC (Rockwell Hardness Scale)
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Thermal & Physical Properties

- Density: 7.80 g/cm³
- Thermal Conductivity: 25.4 W/m·K
- Specific Heat Capacity: 0.50 J/g·K
- Melting Point: Approx. 1400 - 1450°C (2550 - 2650°F)

- Coefficient of Thermal Expansion: $13.0 \times 10^{-6} / ^\circ\text{C}$
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Other Designations

- DIN: X5CrNiMo12-1
 - AISI: 13-8 Mo
 - UNS: S13800
 - BS: 2346 (alternative reference for certain applications)
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Fabrication and Heat Treatment

- Machining: Can be machined using conventional techniques, though it is more challenging in its hardened state.
 - Welding: Generally not recommended in the hardened condition; requires pre-heating and post-weld heat treatment if welding is necessary.
 - Heat Treatment:
 - Solution Annealing: Heat to $1040 - 1100^\circ\text{C}$ ($1900 - 2010^\circ\text{F}$), followed by rapid quenching.
 - Aging: Heat to $480 - 700^\circ\text{C}$ ($900 - 1300^\circ\text{F}$) to achieve desired hardness and strength.
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Applications

- Aerospace: Aircraft components, landing gear, and structural parts.
 - Chemical Processing: Equipment exposed to corrosive environments.
 - Oil & Gas: Components in high-pressure and high-temperature environments.
 - Defense: High-performance parts and equipment requiring high strength and durability.
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Supplied Forms

- Bars
 - Forgings
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Features

- High Strength: Excellent mechanical properties and high tensile strength.
- Corrosion Resistance: Good resistance to oxidation and corrosion in severe environments.
- Durability: Superior wear resistance and toughness.
- Precipitation Hardening: Achieved through heat treatment to enhance mechanical properties.

