

## Description

Stainless Steel Grade 410/1.4006 is a martensitic stainless steel with high strength and hardness properties. It is magnetic in both annealed and hardened conditions. Grade 410/1.4006 offers good corrosion resistance to mild atmospheres, steam, and mild chemical environments. This steel grade is primarily used where high mechanical properties are required and can be hardened and tempered to achieve a wide range of hardness and mechanical properties.

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## Chemical Composition

- Carbon (C): 0.08-0.15%
  - Chromium (Cr): 11.5-13.5%
  - Manganese (Mn):  $\leq 1.0\%$
  - Silicon (Si):  $\leq 1.0\%$
  - Phosphorus (P):  $\leq 0.040\%$
  - Sulfur (S):  $\leq 0.030\%$
  - Nickel (Ni):  $\leq 0.75\%$
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## Mechanical Properties

- Tensile Strength: 450-750 MPa
  - Yield Strength: 205 MPa (minimum)
  - Elongation: 20% (in 50 mm)
  - Hardness: Rockwell C20 (annealed) to C45 (hardened)
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## Thermal & Physical Properties

- Density: 7.75 g/cm<sup>3</sup>
- Melting Point: 1480-1530 °C
- Thermal Conductivity: 24.9 W/m·K (at 100 °C)
- Specific Heat Capacity: 460 J/kg·K (at 20 °C)

- Electrical Resistivity: 0.60  $\mu\Omega\cdot\text{m}$  (at 20 °C)
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## Other Designations

- UNS: S41000
  - EN: 1.4006
  - JIS: SUS 410
  - DIN: X12Cr13
  - AISI: 410
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## Fabrication and Heat Treatment

- Forming: Grade 410 can be easily formed using standard methods. However, forming should be done in the annealed condition.
- Welding: Can be welded using all standard methods, but pre-heating and post-weld heat treatment are recommended to reduce the risk of cracking.
- Machining: This grade exhibits good machinability in the annealed or normalized condition but is more challenging to machine when hardened.
- Heat Treatment:
  - Annealing: Heat to 815-900 °C, hold for 1-2 hours, and then furnace cool slowly.
  - Hardening: Heat to 925-1010 °C, followed by air or oil quenching.
  - Tempering: Heat to 150-370 °C for improving toughness and reduce brittleness.

STAINLESS STEEL WIRES & BARS

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## Applications

- Cutlery: Knives, kitchen utensils.
- Valves: Valves and pumps in the oil and gas industry.
- Fasteners: Screws, bolts, and nuts.
- Automotive: Components like shafts and exhaust systems.
- Petroleum Refining: Equipment and components subjected to mild corrosion and high stress.
- Power Generation: Steam and gas turbines.

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## Supplied Forms

- Bars
  - Wires
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## Features

- Corrosion Resistance: Good resistance to mild environments, steam, and mild chemicals.
- High Strength: Excellent tensile and yield strength, especially when hardened.
- Hardness: Can be heat-treated to high levels of hardness for wear resistance.
- Machinability: Good machinability in the annealed condition.
- Magnetic: Exhibits magnetic properties, making it suitable for certain applications.
- Versatility: Suitable for a variety of applications due to its combination of strength, hardness, and corrosion resistance.

