310 Stainless Steel, UNS S31000

Shaped, Flat, Square, Round, Fine Wire, Plated and Un-plated
ASTM A5167, ASTM A 276, ASTM 314, ASTM 580, QQ-S-763

310 Alloy Description

Alloy 310 stainless is an austenitic stainless steel with a high nickel and chromium content which makes the alloy heat resistant with excellent resistance to oxidation under mildly cyclic conditions through 2000°F. Its high chromium and nickel contents provide comparable corrosion resistance, superior resistance to oxidation and the retention of a larger fraction of room temperature strength than the common austenitic alloys like alloy 304. Stainless alloy 310 is often used at cryogenic temperatures, with excellent toughness to -450°F.
Applications
Kilns
Heat exchangers
Furnace parts, muffles and retorts, annealing covers
Food processing equipment
Cryogenic structures.

Chemistry Typical
Carbon: 0.25 max
Phosphorus: 0.045 max
Silicon: 1.50 max
Nickel: 19.00-22.00
Manganese: 2.00 max
Sulfur: 0.030 max
Chromium: 24.00-26.00
Molybdenum: 0.75 max
Copper: 0.50 max
Iron: Balance

Physical Properties
Density: .289 lb/in³, 8.00 g/cm³

Electrical Resistivity: ohm-cir-mil/ft:
At 70 °F (21°C): 469.0

Specific Heat: BTU/lb-°F (J/g-°C) 32-212°F (0-100°C): 0.12(0.5)

Thermal Conductivity: BTU-in/hr-ft²-°F (W/m•K):
32-212°F (0-100°C): 112 (16.2)

Mean Coefficient of Thermal Expansion: µin/in-°F (µm/m-°C)
32-212 °F (0-100 °C): 8.78(15.8)
32-599 °F (0-315 °C): 9.00(16.2)
32-1000 °F (0-540 °C): 9.39(16.9)
32-1200 °F (0–650 °C): 10.6(19.1)

Modulus of Elasticity: KSI (MPa)
28-29 x 10³ (193-200 x 10³) in tension

Magnetic Permeability, \( H = 200 \): Annealed \( \leq 1.008 \)

Melting Range: 2550-2650 °F (1400-1455°C):

**Mechanical Properties at Room Temperature**

**Properties: Annealed Typical**
Ultimate Tensile Strength: 70 KSI min (482 MPa min)
Yield Strength: 30 KSI min (206MPa min )
Elongation: 40 % min

**Properties: Tempered**
Alloy 310 can be supplied in various rolled to temper conditions. Contact Ulbrich Wire with

**Additional Properties**

**Corrosion Resistance**
Refer to NACE (National Association of Corrosion Engineers) for recommendations.

**Standard Wire Finishes**
Extra Clean: (XC) Extra clean is also referred to as “bright annealed” or “bright annealed and cold rolled”
Grease (round wire only): Drawn in a heavy grease produces an “Ultra bright” finish for decorative applications
Soap (round wire only): Soap is used as a lubricant in the drawing process and is not removed. It acts as a lubricant during customer part forming operation. A soap finish is available in tempered products.
Plated: Many plating options are available.
Special finishes are available: Contact Ulbrich Wire Sales with special finish and plating requests

**Forms**
Continuous Coils
Cut to lengths
Precision cutting

**Heat Treatment**
Alloy 310 is non hardenable by heat treatment.
Welding
For best results refer to: SSINA’s “Welding of Stainless Steels and Other Joining Methods”.

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