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# 310 STAINLESS STEEL, UNS S31000

Strip, Coil, Foil & Wire, ASTM A5167, ASTM A 276, ASTM 314,  
ASTM 580, QQ-S-763

## Applications

Kilns, heat exchangers, furnace parts, muffles and retorts, annealing covers, food processing equipment, cryogenic structures.

## Description

Type 310 stainless is an austenitic heat resistant alloy 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 Type 304. Stainless 310 is often used at cryogenic temperatures, with excellent toughness to -450 °F.

## 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: 0.289 lbs/in<sup>3</sup> 8.00 g/cm<sup>3</sup>

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

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Specific Heat: BTU/lb-°F (J/g-°C):

32 - 212 °F (0 - 100 °C): 0.12 (0.50)

Thermal Conductivity: BTU-in/hr-ft<sup>2</sup>-°F (W/m•K):

32 - 212 °F (0 - 100 °C): 112 (16.2)

Mean Coefficient of Thermal Expansion:  $\mu\text{in/in-}^\circ\text{F}$  ( $\mu\text{m/m-}^\circ\text{C}$ )

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 10<sup>3</sup> (193 - 200 x 10<sup>3</sup>) in tension

Magnetic Permeability, H = 200: Annealed  $\leq$  1.008

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

## Forms

Coil – Strip, Foil, Ribbon

Wire – Profile, Round, Flat, Square

## Mechanical Properties at Room Temperature

### Properties: Annealed Typical

Ultimate Tensile Strength: 70 KSI min (482 MPa min)

Yield Strength: 30 KSI min (206 MPa min)

Elongation: 40% min

### Properties: Tempered

Alloy 310 can be cold worked to various tempers. Contact Ulbrich Technical Service for additional information.

## Additional Properties

### Corrosion Resistance

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

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## Finishes

# 1 – Hot rolled annealed and descaled. It is available in strip, foil and ribbon. It is used for applications where a smooth decorative finish is not required.

# 2D – Dull finish produced by cold rolling, annealing and descaling. Used for deep drawn parts and those parts that need to retain lubricants in the forming process.

# 2B – Smooth finish produced by cold rolling, annealing and descaling. A light cold rolling pass is added after anneal with polished rolls giving it a brighter finish than 2D.

#BA – Bright annealed cold rolled and bright annealed

#CBA – Course bright annealed cold rolled matte finish and bright anneal

#2 – Cold Rolled

# 2BA – Smooth finish produced by cold rolling and bright annealing. A light pass using highly polished rolls produces a glossy finish. A 2BA finish may be used for lightly formed applications where a glossy finish is desired in the formed part.

Polished – Various grit finish for specific polish finished requirements.

*\* Not all finishes are available for all alloys – Contact Ulbrich Sales for more information.*

## Wire Finishes

XC – Extra clean bright annealed or bright annealed and cold rolled

Grease – Ultra-bright finish (for decorative applications)

Soap – Soap is not removed from tempered wire to act as a lubricant.

*\* Contact Ulbrich Wire for custom wire finishes.*

## 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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