



# 316 Stainless Steel, UNS S31600

Shaped, Flat, Square, Round, Fine Wire, Plated and Bare Wire  
ASTM A666, AMS 5524

## 316 Alloy Description

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Alloy 316 is an austenitic chromium-nickel stainless steel containing molybdenum. This addition increases corrosion resistance, improves resistance to pitting chloride ion solutions and provide increased strength at elevated temperatures. Corrosion resistance is improved, particularly against sulfuric, hydrochloric, acetic, formic and tartaric acids, acid sulfates and alkaline chlorides. Properties are similar to those of alloy 304 except alloy 316 is somewhat stronger at elevated temperatures.

## Applications

Screening application in marine environment  
Pulp and Paper Equipment  
Heat exchangers  
Propeller shafts, Fittings  
Dyeing Equipment  
Exterior Architectural components in Marine Coastal Areas.

## Chemistry Typical

Carbon: 0.08 max  
Manganese: 2.00 max  
Silicon: 1.00 max  
Chromium: 16.00-18.00

Nickel: 10.00-14.00

Molybdenum: 2.00-3.00

Phosphorus 0.040

Sulfur: 0.030 max

Copper: 0.75 max

Iron: Balance

## Physical Properties

Density: 0.29 lbs/in<sup>3</sup>, 7.99 g/cm<sup>3</sup>

Electrical Resistivity: microhm-in (microhm-cm):

68°F (20°C): 29.4 (74.0)

Specific Heat: BTU/lb/°F (kJ/kg•K):

32-212°F (0-100°C): 0.12 (0.50)

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

At 212°F (100°C): 9.4 (16.2)

At 932°F (500°C): 12.4 (21.4)

Mean Coefficient of Thermal Expansion: in/in/°F (μm/m•K)

32-212°F (0-100°C):  $8.9 \times 10^{-6}$ (16.0)

32-600°F (0-315°C):  $9.0 \times 10^{-6}$ (16.2)

32-1000°F (0-538°C):  $9.7 \times 10^{-6}$ (17.5)

32-1200°F (0-649°C):  $10.3 \times 10^{-6}$ (18.5)

32-1500°F (0-871°C):  $11.1 \times 10^{-6}$ (18.5)

Modulus of Elasticity: KSI (MPa)

$28.0 \times 10^3$  ( $193 \times 10^3$ ) in tension

$11.2 \times 10^3$  ( $77 \times 10^3$ ) in torsion

Magnetic Permeability: H = 200 Oersteds:

Annealed Melting Range: °F (°C) 2500 – 2590 (1371 – 1421)

## Mechanical Properties at Room Temperature

## **Properties: Typical**

Ultimate Tensile Strength: 75 KSI min (515 MPA min)

Yield Strength: (0.2% Offset) 30 KSI min (205 MPA min)

Elongation: 40% min

Hardness: Rb 95 max

## **Properties: Tempered**

### **1/8H**

Ultimate Tensile Strength: 100 KSI min (690 MPa min)

Yield Strength: (0.2% Offset) 55 KSI min (380 MPa min)

Elongation: 25% min

### **1/4H**

Ultimate Tensile Strength: 125 KSI min (860 MPa min)

Yield Strength: (0.2% Offset) 75 KSI min (515 MPA min)

Elongation: 10% min

## **Properties Tempered**

Alloy 316 can be cold rolled to achieve the temper properties required by specific customers and/or manufacturing requirements. Contact Ulbrich Wire for details.

## Additional Properties

### **Corrosion Resistance**

See 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

## **Cold Forming**

Type 316 can be readily formed and drawn.

## **Heat Treatment**

Alloy 316 is non hardenable by heat treatment.

## **Welding**

Alloy 316 is weldable by common fusion and resistance methods. It can develop intergranular corrosion in the welded areas due to the high carbon content. For best results refer to: SSINA's "Welding of Stainless Steels and Other Joining Methods"

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