

Type 316 (UNS S31600) is a molybdenum-bearing austenitic stainless steel which is more resistant to general corrosion and pitting/crevice corrosion than the conventional chromium-nickel austenitic stainless steels such as Type 304. This alloy also offers higher creep, stress-to-rupture and tensile strength at elevated temperatures. In addition to excellent corrosion resistance and strength properties, grades 316 and 316L also provide the excellent fabricability and formability which are typical of austenitic stainless steels.

## 316 Chemical Composition

<b>C</b>	Carbon - 0.08% maximum
<b>Mn</b>	Manganese - 2.00% maximum
<b>Si</b>	Silicon - 0.75% maximum
<b>Cr</b>	Chromium - 16.00 - 18.00%
<b>Ni</b>	Nickel - 10.00 - 14.00%
<b>Mo</b>	Molybdenum - 2.00 - 3.00%
<b>P</b>	Phosphorous - 0.045% max
<b>S</b>	Sulfur - 0.030% maximum
<b>N</b>	Nitrogen - 0.10% max
<b>Fe</b>	Iron - Balance

## 316L Chemical Composition

<b>C</b>	Carbon - 0.030% maximum
<b>Mn</b>	Manganese - 2.00% maximum
<b>Si</b>	Silicon - 0.75% maximum
<b>Cr</b>	Chromium - 16.00 - 18.00%
<b>Ni</b>	Nickel - 10.00 - 14.00%
<b>Mo</b>	Molybdenum - 2.00 - 3.00%
<b>P</b>	Phosphorous - 0.045% max
<b>S</b>	Sulfur - 0.030% maximum
<b>N</b>	Nitrogen - 0.10% max
<b>Fe</b>	Iron - Balance

## Standard Inventory Specifications

- UNS S31600
- UNS S31603
- AMS 5524
- AMS 5507
- ASTM A 167
- ASTM A 240
- ASTM F 138
- ASTM F 899
- ASME SA 167
- ASME SA2 40

## Forms Stocked

- Bar - 0.250" - 6.250" thick
- Coil - 0.010" - 0.125" thick
- Sheet - 0.010" - 0.125" thick
- Rolled Strip - 0.0008" - 0.015"

## Applications

- Oil & petroleum refining equipment
- Aerospace structures
- Stainless steel base plates
- Food processing equipment
- Pulp and paper processing
- Soap handling equipment
- Textile industry equipment
- Architectural
- Pharmaceutical processing



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## Features

- Excellent corrosion resistance
- Higher creep, stress-to-rupture and tensile strength at elevated temperature
- Able to maintain clean surfaces

The technical data provided is for information only and not for design purposes. It is not warranted or guaranteed.

**Resistance to Corrosion:** Types 316 is more resistant to atmospheric and other mild types of corrosion than Types 302, 304 and 304L. In general, media that do not corrode Types 302, 304, and 304L, will not attack these molybdenum-containing grades. One known exception is highly oxidizing acids such as nitric acid to which the molybdenum-bearing stainless steels are less resistant.

## Physical Properties

- Melting Range: 2540-2630°F (1390-1440°C)
- Density: 0.29 lb/in<sup>3</sup> (8.027 g/cm<sup>3</sup>)
- Modulus of Elasticity in Tension:  $29 \times 10^6$  psi (200 GPa)
- Modulus of Shear:  $11.9 \times 10^6$  psi (82 Gpa)

## Linear Coefficient of Thermal Expansion

Temperature Range		Mean Coefficient of thermal Expansion	
°C	°F	cm/cm°C	in/in/°F
20-100	68-212	$16.5 \cdot 10^{-6}$	$9.2 \cdot 10^{-6}$
20-500	68-932	$18.2 \cdot 10^{-6}$	$10.1 \cdot 10^{-6}$
20-1000	68-1832	$19.5 \cdot 10^{-6}$	$10.8 \cdot 10^{-6}$

## Thermal Conductivity

Temperature Range		Coefficients	
°C	°F	W/m·K	Btu/(hr/ft <sup>2</sup> /hr/°F/ft)
20-100	68-212	14.6	100.8

## Specific Heat

Temperature Range		J/kg°K	Btu/lb/°F
°C	°F		
20	68	450	0.108
93	200	450	0.116

## Magnetic Permeability

H/m annealed  
1.02 Max @ 200 H

## Electrical resistivity (Annealed Condition)

Temperature Range		microhm-cm	microhm-in
°C	°F		
20	68	29.1	74.0

## Mechanical Properties

Minimum mechanical properties for annealed type 316 austenitic stainless steel plate, sheet and strip as required by ASTM specifications A240 and ASME specification SA-240, are shown below

Grade	Tensil Strength, Min.		0.2% Yield Strength, Min.		Elong. In 2" (50mm)		Hardness, Max.	
	psi	MPa	psi	MPa	%, Min.	Brinell	RB	
316	75000	515	30000	205	40	217	95	
316L	70000	485	25000	170	40	217	95	