

316/316L Stainless Steel

UNS S31600/S31603
W. Nr 1.4401/1.4404

316 is an austenitic chromium nickel stainless steel containing molybdenum. This addition increases general corrosion resistance, improves resistance to pitting from chloride ion solutions, and provides increased strength at elevated temperatures. Properties are similar to those of Type 304/304L except that this alloy is somewhat stronger at elevated temperatures. Corrosion resistance is improved, particularly against sulfuric, hydrochloric, acetic, formic and tartaric acids; acid sulfates and alkaline chlorides. Type 316L is an extra-low carbon version of Type 316 that minimizes harmful carbide precipitation during welding.

Applications include: Exhaust manifolds, furnace parts, heat exchangers, jet engine parts, pharmaceutical and photographic equipment, valve and pump trim, tubing, chemical equipment, digesters, tanks, evaporators, paper and textile processing equipment, food processing equipment, and marine atmosphere parts.

Industries supplied include: Aerospace, Chemical Processing, Food Processing, Power Generation, General Manufacturing

Nominal Composition

	C	Mn	Si	S	P	Ni	Cr	Mo	N	Fe
min	-	-	-	-	-	10.5	16.5	2.00	-	Bal
max	0.07	2.00	1.00	0.030	0.045	13.5	18.0	2.50	0.10	-

Physical Properties

	At 70°F	At 20°C
Density	0.285 lb/in ³	8.00 g/cm ³
Modulus of Elasticity (E)	28.0 x 10 ³ ksi	193 GPa
Modulus of Rigidity (G)	10.1 x 10 ³ ksi	70 GPa
Coefficient of Expansion	9.2 µin/in-°F (70-212°F)	16.6 µm/m-°C (20-100°C)
Electrical Resistivity	29.1 µohm-in	74.0 µohm-cm
Thermal Conductivity	9.4 Btu-in/ft ² -hr-°F (212°F)	16.2 W/m-°C (100°C)

Applicable Specifications

Wire & Bar | ASTM A276, A313, A478, A493

Typical Mechanical Properties – Spring Applications

Condition	Heat Treatment	Tensile Strength	Suggested Operating Conditions
316 Annealed	1900-2050°F (1038-1121°C)	105 ksi max (724 MPa)	-200°F to 1700°F (-184°C to 927°C)
316L Annealed	1900-2050°F (1038-1121°C)	100 ksi max (690 MPa)	-200°F to 1700°F (-184°C to 927°C)
316/316L Spring Temper	Stress relieve 900°F (482°C)	≤.105" dia. 200-275 ksi (1380-1895 MPa) >.105" ≤.250" dia. 150-225 ksi (1035-1550 MPa) >.250" ≤.625" dia. 125-170 ksi (860-1170 MPa)	-200°F to 550°F (-184°C to 288°C)

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