

Material Data Sheet

Austenitic Stainless Steel 316L

Printer Process Specifications

Material	316L (UNS S31673, 1.4441)
Layer Thickness	30 microns
LAser Diameter	100 microns
Laser Power	200 W
Additive Manufacturing System	XM200G

Material Description

316L is an austenitic stainless steel alloyed with up to 18% chromium, 14% nickel, & 3% molybdenum and with less than 0.03% carbon. The low carbon content minimizes sensitization (carbide precipitation at grain boundaries) and subsequently enhances weldability. It is a very popular alloy commonly used in petrochemical, food processing, marine, consumer/lifestyle, and similar applications requiring corrosion resistance, impact toughness, and good weldability.

Material Properties

- High hardness and toughness
- High corrosion resistance
- Highly machinable / Can be polished and shot peened
- Good weldability

Applications

- Industrial processing components such as spindles and screws
- Surgical tools
- Maritime components
- Cutlery, kitchenware, and fashion eyewear

General Wrought Material Data ⁽¹⁾

Density	8 g/cc
Thermal Conductivity	16.2 W/m·K
Melting Range	1371 to 1399 °C
Coefficient of Thermal Expansion (0 to 100 °C)	16 x 10 ⁶ / K

⁽¹⁾ From AZO Materials

Chemical Composition ⁽²⁾

Element	Mass %
Fe	Balance
Cr	16.00 to 18.00
Ni	10.00 to 14.00
Mo	2.00 to 3.00
Mn	2.00 Max
Si	1.00 Max
N	0.10 Max
O	0.10 Max
P	0.04 Max
C	0.03 Max
S	0.03 Max

⁽²⁾ From PraxAir Surface Technologies

Mechanical Properties

	Mean Value	Standard Deviation
Component Density [g/cc]	7.99	--
Percentage of Theoretical density	99.8%	--
Ultimate Tensile Strength (UTS) - ASTM E8		
Horizontal (XY) [ksi (MPa)]	89.5 (617)	9.42 (3.1)
Vertical (Z) [ksi (MPa)]	83.0 (572)	13.6 (2.8)
Yield Strength - ASTM E8		
Horizontal (XY) [ksi (MPa)]	67.4 (465)	24.2 (1.6)
Vertical (Z) [ksi (MPa)]	63.5 (438)	4.21 (6.9)
Elongation at Break - ASTM E8		
Horizontal (XY)	43%	1.0%
Vertical (Z)	48%	5.8%
Hardness (Rockwell) - ASTM E18	90 HRB	0.9 HRC

Powder Particle Size Distribution ⁽³⁾

Per ASTM B822 (Using Microtrac)	Min	Max
-16	N/A	5
d10 (microns)	15	25
d50 (microns)	25	35
d90 (microns)	40	60

⁽³⁾ From PraxAir Surface Technologies



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