XACT METAL

Material Data Sheet

Austenitic Stainless Steel 316L

Printer Process Specifications

Material	316L (UNS S31673, 1.4441)
Layer Thickness	30 microns
Laser Power	100 W
Additive Manufacturing System	XM200C

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

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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

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As Printed Mechanical Properties

	As Built
Component Density	7.96 g/cc (99.5%)
Ultimate Tensile Strength (UTS) - ASTM E8	
Horizontal (XY) [ksi (MPa)]	87 (600)
Vertical (Z)[ksi (MPa)]	85 (586)
Yield Strength - ASTM E8	
Horizontal (XY) [ksi (MPa)]	64 (432)
Vertical (Z) [ksi (MPa)]	69 (473)
Elongation at Break - ASTM E8	
Horizontal (XY)	39.5 %
Vertical (Z)	40 %
Modulus of Elasticity - ASTM E8	
Horizontal (XY) [ksi (GPa)]	25,550 (176)
Vertical (Z) [ksi (GPa)]	27,100 (187)
Hardness (Rockwell)	90 HRB

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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