

316L Stainless Steel

316L is a marine-grade austenitic stainless steel with molybdenum for better chloride corrosion resistance. It prints with high as-built ductility and toughness, and its chemistry matches ASTM F138 / UNS S31673.

ASTM F138

Chemistry aligns with UNS S31673

7.97 g/cm³

Typical as-manufactured density (ISO 3369)

20–65 µm

Powder particle size distribution

About this alloy

316L is a low-carbon stainless steel used when corrosion resistance and ductility both matter. The molybdenum addition supports chloride resistance, which makes this alloy common in chemical, food, medical, and marine-related hardware. As-built 316L already has strong elongation, so heat treatment is optional and application-driven.

Typical applications

Chemical processing components, food processing equipment, medical devices and instruments, and marine or transportation hardware that needs corrosion-resistant, functional metal performance.

Powder chemical composition (wt.-%)

ELEMENT	MIN.	MAX.
Fe	Balance	Balance
Cr	17.0	19.0
Ni	13.0	15.0
Mo	2.25	3.00
C	—	0.03
N	—	0.10

Published process options (EOS M 290)

PROCESS	BUILD RATE	MIN. WALL	INERT GAS
20 µm layer	2.0 mm ³ /s	0.3–0.4 mm	Argon
40 µm layer	3.7 mm ³ /s	0.1 mm	Argon

Mechanical properties, as manufactured (ISO 6892-1)

PROCESS	ORIENTATION	YIELD RP0.2 [MPa]	TENSILE RM [MPa]	ELONGATION A [%]
EOS M 290, 20 µm	Vertical	480	560	49
EOS M 290, 20 µm	Horizontal	540	645	38
EOS M 290, 40 µm	Vertical	490	580	49
EOS M 290, 40 µm	Horizontal	530	630	41

Additional published EOS values: M 300-4 40 µm (V 510/610/40, H 580/670/35), M 300-4 80 µm (V 490/620/40, H 550/660/35), M 400-4 40 µm (V 450/550/50, H 500/600/35), and M 400-4 80 µm (V 450/550/45, H 500/600/35).

Density and defects, as manufactured

PROCESS	AVG. DEFECT PERCENTAGE	DENSITY (ISO 3369)
EOS M 290, 20 µm	0.018%	e 7.97g/cm ³
EOS M 290, 40 µm	0.015%	e 7.97g/cm ³

Coefficient of thermal expansion (as manufactured)

TEMPERATURE	CTE
25–100 °C	15.72×10 ⁻⁶ /K
25–200 °C	16.75×10 ⁻⁶ /K
25–300 °C	17.27×10 ⁻⁶ /K
25–400 °C	17.7×10 ⁻⁶ /K

Optional heat treatment

Stress relief route: 900 °C for at least 2 hours, then water quench or high-speed gas quench. Solution annealing route: 1150 °C for at least 1.5 hours with the same fast quench requirement. Quench speed needs to be high enough to avoid chromium carbide precipitation.

As-built 316L already has high ductility, so heat treatment is optional and should be selected from service requirements rather than used automatically.

Source and notes

Values are drawn from the EOS StainlessSteel 316L material data sheet ([OEM source](#)). Results vary with system settings, geometry, build layout, and post-processing and are not a guarantee of properties on your part.

Full page: <https://www.evologymfg.com/manufacturing-capabilities/dmls-direct-metal-laser-sintering/316l-stainless-steel>