



MATERIAL DATA SHEET

Stainless Steel 316L

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General Information

Stainless steel 316L has been employed in broad spectrum of industrial sectors such as aeronautical, chemical and food processing as well as marine application for their exceptional corrosion resistance and mechanical qualities. Over the years, implementation of additive manufacturing of 316L has exponentially increased thanks to its greater design freedom compared to traditional manufacturing techniques.

In this material data sheet, mechanical and surface properties of 316L printed in 40 μm layer thickness parameters provided by EOS are reported. All the printing and measurements are conducted at AMEXCI's facility.



Stainless Steel 316L

Build rate: 13 cm³/h

40 μm



High precision with 40 μm layer thickness.

Mechanical Properties

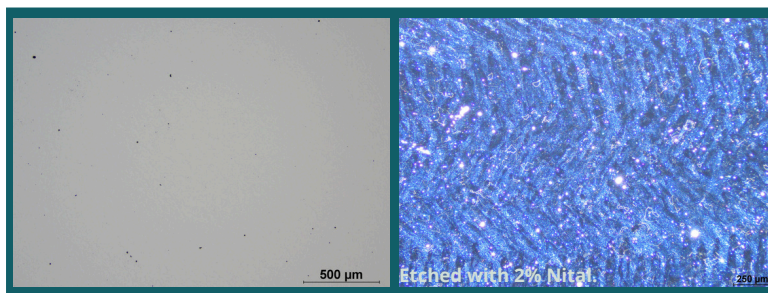
Build direction	Condition*	Tensile strength R _m [MPa]		Yield strength R _{p0.2} [MPa]		Elongation after fracture A5 [%]		Number of samples
		\bar{x}	σ	\bar{x}	σ	\bar{x}	σ	
Horizontal	900° C stress relieved	606	1	355	2	46	1	10
Vertical		579	2	334	1	52	1	10+

Build direction	Condition*	Absorbed energy KV8 [J]		Number of samples
		\bar{x}	σ	
Horizontal	900° C stress relieved	149	11	20+
Vertical		160	9	20+

\bar{x} : Mean value, σ : Standard deviation, Σ : Total.

*Heat treatment according to AMS2759: 1,5 hours at 900 °C under argon atmosphere followed by air cooling.

Microstructure



Porosity [%]		Number of samples
\bar{x}	σ	
0,03	0,02	5+

\bar{x} : Mean value, σ : Standard deviation, Σ : Total.

Disclaimer & Notes

General Information

- The powder chemical composition of 316L 15 - 45 VG is purchased from Höganäs.
- All the samples were printed using an EOS M290 (400 W) with respective printing layer thicknesses of 40 µm with 316L_040_FlexM291 parameter provided by EOS.
- The stress relieving is performed at 900°C for 1,5 hours, followed by air cooling according to AMS2759.
- All samples were tested and analyzed internally at AMEXCI's materials lab.

Standards

- AMEXCI has the capacity to perform tensile testing according to both SS-EN ISO6892-1 and ASTM E8/E8M. The data in this document tested following SS-EN ISO6892-1.
- The impact testing data presented in this document comes from samples tested according to standard SS-EN ISO 148-1, using an 8 mm striker.
- AMEXCI has the capacity to test the hardness using the Vickers method, following the standards SS-EN ISO6507-1 and ASTM E92.

Disclaimer

- With respect to actual part properties achieved with 316L printed at AMEXCI, with this material data sheet results, AMEXCI gives no warranty and disclaims any liability as part properties are subject to variation and dependent on different external factors such as part geometry. Further details of the test procedures used by AMEXCI are available on request.

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