Metal
Solutions

EOS StainlessSteel 316L
Material Data Sheet

EOS StainlessSteel 316L

EOS StainlessSteel 316L is a high performance marine-grade austenitic stainless steel that is molybdenum alloyed for enhanced corrosion resistance in chloride environments. 316L is a standard material for numerous applications in process, energy, paper, transportation and other industries.

Main Characteristics:

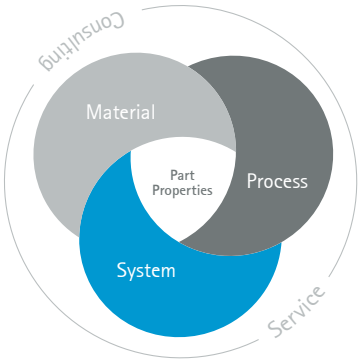
- → High ductility and toughness
- → High strength
- → High corrosion resistance

Typical Applications:

- → Chemical industry
- → Food processing
- → Medical devices

The EOS Quality Triangle

EOS uses an approach that is unique in the AM industry, taking each of the three central technical elements of the production process into account: the system, the material and the process – together simply described as the Quality Triangle. EOS focuses on delivering reproducible part properties for the customer.



All of the data stated in this material data sheet is produced according to EOS Quality Management System and international standards.

Powder Properties

The chemical composition of EOS StainlessSteel 316L corresponds to ASTM F138 material standard for Surgical Implants (UNS S31673).

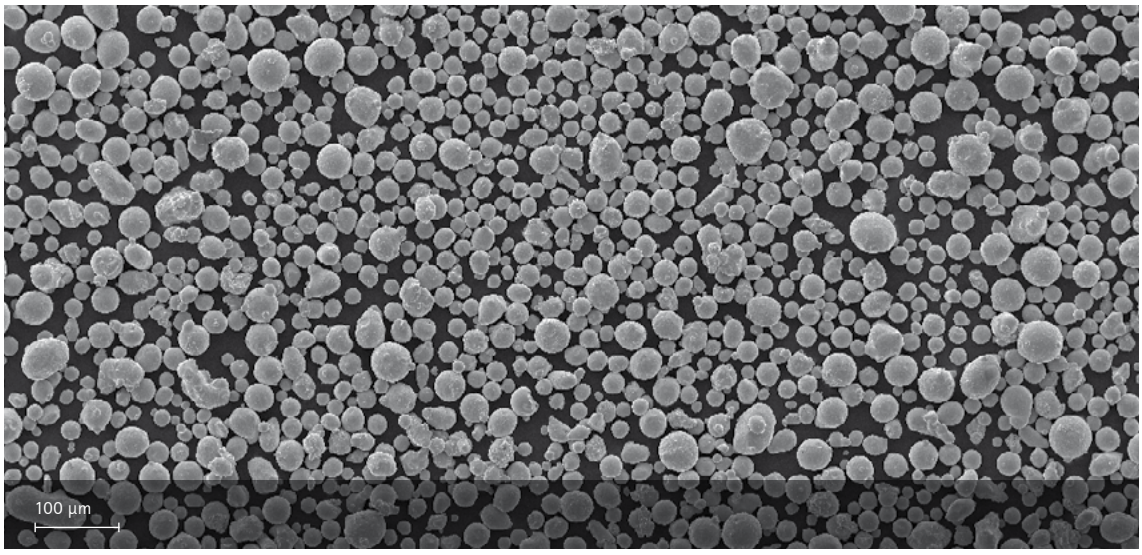
Powder chemical composition (wt.-%)

Element	Min.	Max.
Fe	Balance	
Cr	17.00	19.00
Ni	13.00	15.00
Mo	2.25	3.00
C	-	0.03
N	-	0.10

Powder particle size

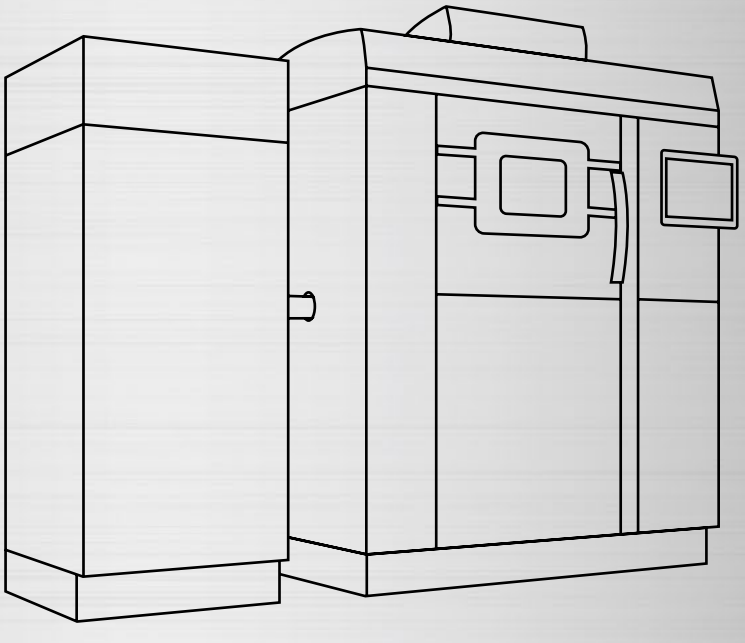
Generic particle size distribution	20 – 65 µm

SEM picture of EOS StainlessSteel 316L powder.



TRL 7

Premium



EOS StainlessSteel 316L
for EOS M 290 | 40 µm

Process Information
Chemical and Physical Part Properties
Heat Treatment
Mechanical Properties
Additional Data

CR365 v03/12.2016

EOS StainlessSteel 316L for EOS M 290 | 40 µm

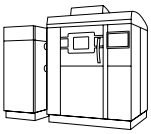
Process Information

This process product is optimized for building high quality parts with EOS M 290 system reliably using EOS StainlessSteel 316L. Mechanical properties have been validated to TRL7 level.

System set-up	EOS M 290
EOS ParameterSet	316L 40µm FlexLine
EOSPAR name	316L_040_FlexM291_1.X
Software requirements	EOSPRINT 2.7 or newer EOSYSTEM 2.11 or newer
Powder part no.	9011-0032
Recoater blade	EOS HSS blade
Nozzle	EOS grid nozzle
Inert gas	Argon
Sieve	63 µm

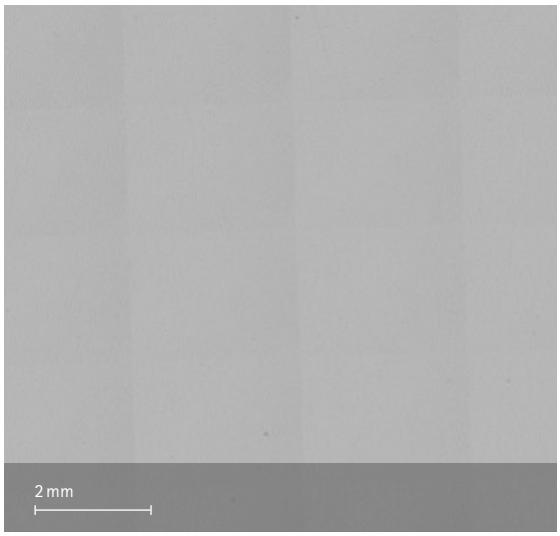
Additional information	
Layer thickness	40 µm
Min. wall thickness	0.1 mm
Typical dimensional change after HT	+0.2 %
Volume rate	3.7 mm^3/s

Chemical and Physical Properties of Parts



Chemical composition of built parts is compliant to EOS StainlessSteel 316L powder chemical composition.

Micrograph of polished surface



Microstructure solution annealed
Etched with etchant Kallings 2

Defects	Result	Number of samples
Average defect percentage	0.015 %	20
Density, ISO3369	**Result**	**Number of samples**
Average density	≥ 7.97 g/cm³	20

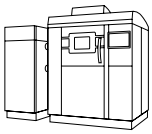
Heat Treatment

Heat treatment according to AMS 2759 is optional.

Stress relief: Hold temperature 900 °C, hold time minimum 2 h when thoroughly heated, water quenching

Solution annealing: Hold temperature 1 150 °C, hold time minimum 1.5 h when thoroughly heated, water quenching

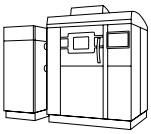
Mechanical Properties as manufactured



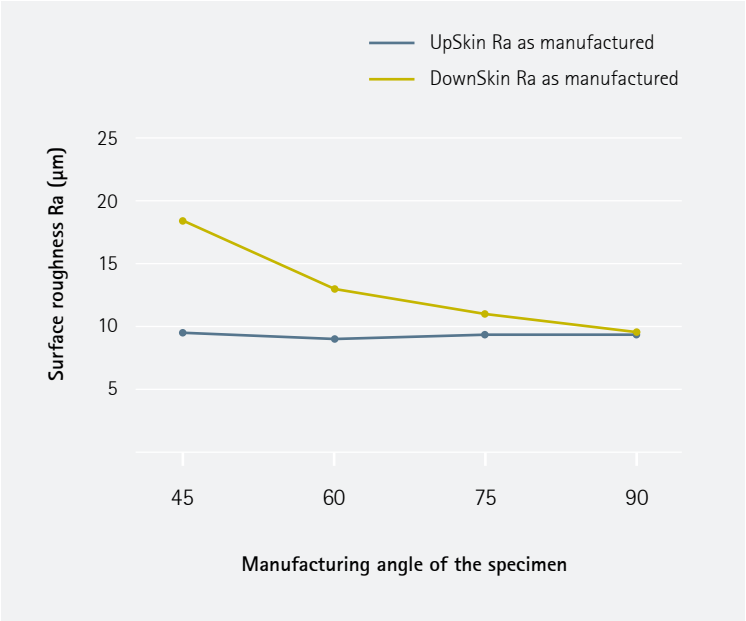
Mechanical properties ISO6892-1

	Yield strength $R_{p0.2}$ [MPa]	Tensile strength R_m [MPa]	Elongation at break A [%]	Number of samples
Vertical	480	570	51	105
Horizontal	540	640	40	90

Additional Data



Surface Roughness



Coefficient of Thermal Expansion ASTM E228

Temperature	25-100 °C	25-200 °C	25-300 °C	25-400 °C
CTE	15.72 *10^{-6}/K	16.75 *10^{-6}/K	17.27 *10^{-6}/K	17.70 *10^{-6}/K