

**316 L Stainless Steel**  
**30  $\mu\text{m}$  & 60  $\mu\text{m}$**

### AISI 316L Stainless Steel

AISI 316L is one of the widely-used stainless steels that has already been manufactured with selective laser melting (SLM) method. High ductility and excellent corrosion resistance are the main unique characteristics of this material. So, it can be appropriate for a wide range of applications in aerospace, automotive, and medical industries as well as any other applications. It has to be noted that AISI 316L processed via SLM method has anisotropic properties due to the layer-wise nature of the process.

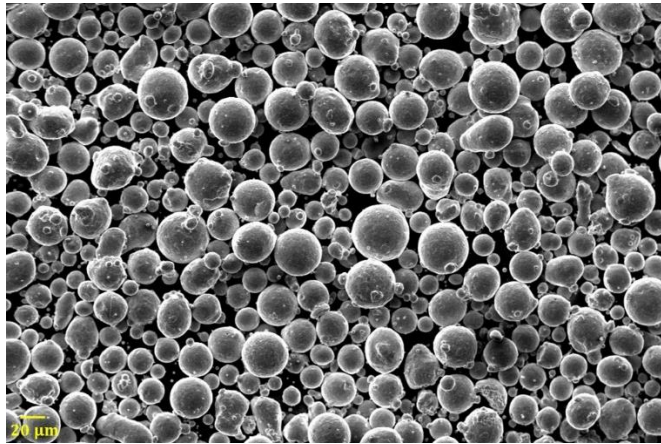


- Powder Characteristics**

Chemical composition [1]

Element	Min.	Max.
C	-	0.03
Mn	-	2
Si	-	1.00
P	-	0.045
S	-	0.030
Cr	16	18
Ni	10	14
Mo	2.00	3.00
Fe	Bal.	

[1] Chemical composition corresponds to ASTM F3184



SEM micrograph of AISI 316L powder.

- Processing conditions**

Parts that are reported in this document have been built under the following conditions:

Parameters	
Powder type	SS 316L
SLM machine	NOURA M100P
Coater blade type	Soft
Chamber inert gas	Argon
Machine software	Noura SLM software
Parameter set	316L-HQ
Layer thickness	30 μm – 60 μm
Volume building rate [2]	8-18 cm <sup>3</sup> /h

[2] Laser scanning time is considered to determine the volume building rate. Other factors, such as coating time, have an impact on total build time effectively.

- **Relative density**

Relative density has been measured > 99% via image analysis method. Using thicker layer thicknesses for producing parts may have an impact on sample's density. It is noted that relative density of the samples is directly related to SLM system, software version, machine installation and preparation, powder, build project, and parameter settings.

- **Roughness of the parts [3]**

As-built	Ra < 12 $\mu\text{m}$
After shot peening	Ra < 5 $\mu\text{m}$

[3] Roughness of the parts is directly related to the orientation of the surface with respect to the building platform.

- **Mechanical properties**

- **Room-temperature tensile properties [4]**

properties	UTS (MPa)		EI (%)	
	30 $\mu\text{m}$	60 $\mu\text{m}$	30 $\mu\text{m}$	60 $\mu\text{m}$
As-built Horizontal	620 $\pm$ 50	610 $\pm$ 50	35 $\pm$ 5	26 $\pm$ 5

[4] Samples have been fabricated and then mechanically machined according to ASTM E8, Specimen 4.

- **Hardness**

Hardness	HV.
As-built	220 $\pm$ 15

Followed data are gained based on particular defined test procedures and supported by Noura if all of the experiments are done in the same circumstances used by NOURA including SLM system, software version, machine installation and preparation, powder and build project, parameter settings, and sample preparation. Any deviation from the above-mentioned settings can influence the reported values. It is noted that following data are reported based on our knowledge and experience at the time of publication. Accordingly, the data may be subjected to change as a result of progressive process improvement. NOURA does not warrant any properties or fitness of the parts for a specific purpose, unless explicitly agreed upon. This also applies regarding any rights of protection as well as laws and regulations.