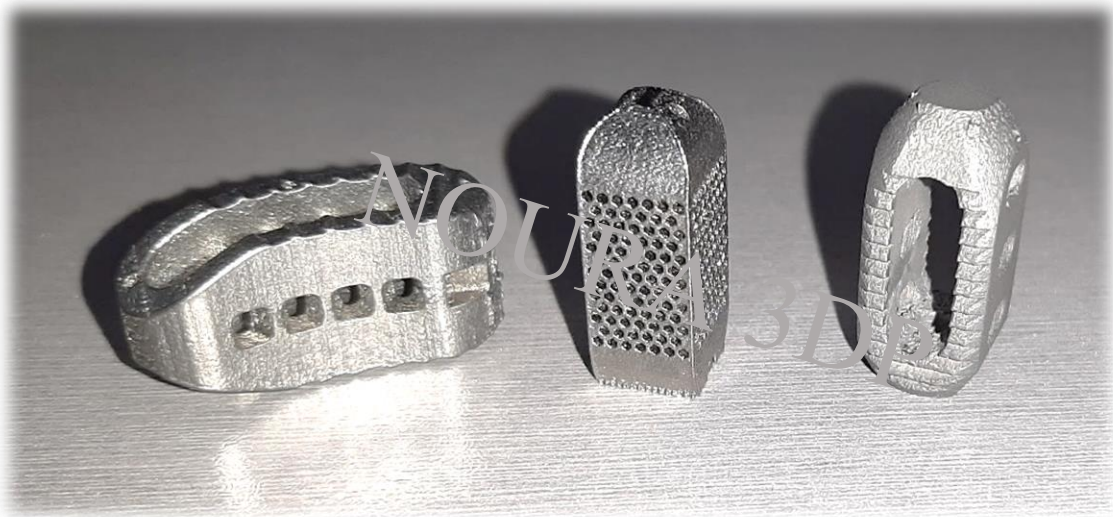


Ti-6Al-4V
30 μ m

- **Ti-6Al-4V Overview**

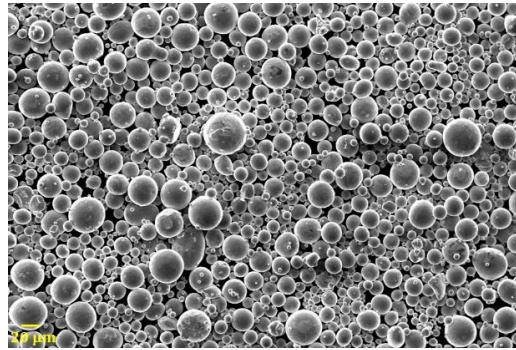
Ti-6Al-4V is one of the widely-used materials that has been manufactured by the selective laser melting (SLM) method. Excellent mechanical properties, low specific weight, and good corrosion resistance are the main unique characteristics of this material. So, it can be appropriate for a wide range of applications in aerospace and medical industries. The parts produced of Ti-6Al-4V by the SLM method can be machined (or any post-processing) as those manufactured by conventional cast or wrought procedures.



- Powder Characteristics**

Chemical composition [1]		
Element	Min.	Max.
Al	5.50	6.5
V	3.50	4.50
Fe	-	0.25
O	-	0.13
C	-	0.08
N	-	0.05
H	-	0.012
Y	-	0.005
Other elements each	-	0.10
Other elements total	-	0.40
Ti	Bal.	

[1] Chemical composition corresponds to ASTM F3001



Morphology of Ti-6Al-4V powder

- Processing conditions**

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

Parameters	
Powder type	Ti64-Gr.23
SLM machine	NOURA M100P
Coater blade type	Soft
Chamber inert gas	Ar
Sieving module	53 μ m
Machine software	Noura SLM software
Parameter set:	Ti64-HQ
Layer thickness	30 μ m
Volume building rate [2]	8-13 cm^3/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**

As-built	Ra < 12 μm
After shot peening	Ra < 6 μm
After electropolish	Ra < 2 μm

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

- **Mechanical properties [4]**

- **Room-temperature tensile properties in As-built state**

Condition	UTS (MPa)	EI (%)
As-built-XY	1050±50	12±4
As-built-Z	1010±50	12±4

- **Room-temperature tensile properties in Heat-Treated state [5]**

Condition	UTS (MPa)	EI (%)
Heat treated-XY	960±50	15 ±4
Heat treated-Z	890±50	14 ±4

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

[5] Stress relief Heat treatment: 2 hours at 800°C in vacuum furnace or Argon atmosphere.

- **Hardness**

Hardness	HV.
As-built	360±30
Heat treated	302±20

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, build project, parameter settings, and sample preparation. Deviations 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.