



Image credit: Velo3D

# MATERIALS FOR 3D PRINTING

## **INCONEL**



**DANISH  
TECHNOLOGICAL  
INSTITUTE**

# Inconel 625

## Nickel alloy

The material properties for Inconel are high strength, good ductility, and good resistance to corrosion. Inconel is suitable for parts that repeatedly alternate between heat and cold at high loads.

We print inconel with Laser Powder Bed Fusion technology that prints in powder and uses a laser to weld the powder layers together. The technology requires support structure to attach the part to the build platform. The support is mechanically removed after printing.

The raw prints that come out of the printer have a surface finish similar to a cast metal part. The surface can subsequently be processed with various finishes.

The technology can print parts that meet ISO 2768-m 1 - however, the tolerances depend a lot on the geometry of the part.

MATERIAL PROPERTIES (STANDARD)	60 µm, 400 W – Raw print
TENSILE STRENGTH [Rm]	1057 ±5 MPa
YOUNG'S MODULUS [E]	191 ±47 GPa
YIELD STRENGTH [Rp0,2]	708 ±15 MPa
ELONGATION AT BREAK [A]	33 ±1 %
REDUCTION OF CROSS SECTION [Z]	41 ±4 %
VICKERS HARDNESS [HV10]	291 ±4
POWDER DENSITY	8,44 g/cm <sup>3</sup>
PART DENSITY	>99,5 %

SURFACE TEXTURE	Raw	Media blasted	Processed
Average roughness [Ra]	8 ±1	4 ±1	0,8

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#### Technology:

- Laser Powder Bed Fusion

#### Printers:

- SLM Solutions - SLM280

#### Build volume:

- 280 x 280 x 365 mm

#### Layer thickness

- 60 µm (normal)

#### Possible post-processing:

- De-stressing
- Heat treatment
- Deburring
- Media blasting
- Conventional processing

#### Design features:

- Minimum feature size 0,6 mm
- Minimum channel size Ø2 mm
- Minimum wall thickness 1 mm
- Support for overhangs less than 45°
- Hole for emptying powder Ø5 mm

#### Design guides:

- Minimize the volume of the part as much as possible
- Avoid large changes in the cross-sectional area of the part
- Use camphors and roundings - they are "free"
- Consider the print orientation in your design



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