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**Technical Specification of Titanium Powder Ti64 ELI**

**Technical Data**

Powder properties

The chemical composition of the powder (wt-%):

Material composition

Element	Min	Max
Al	5.50	6.50
V	3.50	4.50
O	-----	0.13
N	-----	0.05
C	-----	0.08
H	-----	0.015
Fe	-----	0.25
Y	-----	0.005

Other elements, each - 0.10

Other elements, total - 0.40

Ti Bal.

Max. particle size

> 63 $\mu$ m max. 0.3 wt%

General process data

Layer thickness 30  $\mu$ m

Volume rate [1] 5 mm<sup>3</sup>/s (18 cm<sup>3</sup>/h) 1.1 in<sup>3</sup>/h

[1] The volume rate is a measure of build speed during laser exposure of the skin area per laser scanner. The total build speed depends on this volume rate and many other factors such as exposure parameters of contours, supports, up and downskin, recoating time, Home-In or LPM settings.

## **Material data sheet**

Physical and chemical properties of parts

Part density [2] Approx. 4.41 g/cm<sup>3</sup>

Approx. 0.159 lb/in<sup>3</sup>

Min. wall thickness [3]

Approx. 0.3 - 0.4 mm

Approx. 0.012 - 0.016 inch

Surface roughness after shot peening [4] Ra 5 - 9 µm; Rz 20-50 µm

Ra 0.20 – 0.35 x 10<sup>-3</sup> inch

Rz 0.79– 1.96 x 10<sup>-3</sup> inch

[2] Weighing in air and water according to ISO 3369.

[3] Mechanical stability is dependent on geometry (wall height etc.) and application.

[4] Measurement according to ISO 4287. Due to the layerwise building the roughness strongly depends on the orientation of the surface, for example sloping and curved surfaces exhibit a stair-step effect.

## **Hardness**

Hardness as build [5] Approx. 320 HV5

[5] Hardness measurement according to standard EN ISO 6507-1 with load 5kg (HV5)

Material data sheet

Tensile data at room temperature [6, 7]

Heat treated [8]

Horizontal Vertical

Ultimate tensile strength, Rm 1055 MPa 1075 MPa

Yield strength, Rp0.2 945 MPa 965 MPa

Elongation at break, A 13 % 14 %

Reduction of area, Z > 25 % > 25 %

[6] Tensile testing according to ISO 6892-1 A14, proportional test pieces. Horizontal: diameter of the neck area 5

mm (0.2 inch), original gauge length 20 mm (0.79 inch). Vertical: diameter of the neck area 4 mm (0.16 inch),

original gauge length 16 mm (0.63 inch).

[7] The numbers are average values determined from samples with horizontal and vertical orientation respectively

Values are subject to variations depending on process conditions.

[8] Heat treatment procedure: Specimens were heat treated at 800 °C for 2 hours in argon inert atmosphere.