

L-PBF PROCESS

Layer thickness	30 µm
Laser power	200 W
Theoretical build-up rate	7,8 cm ³ /h

POWDER MATERIAL

Ti-6Al-4V High Performance Titanium is a high-performance alloy characterised by having excellent mechanical properties with a low specific weight and good corrosion resistance. Titanium and its alloys have been used successfully in the automotive and aerospace industry since the 1950s. Furthermore, titanium stands out through thermal expansion coefficient. Due to titanium's biocompatibility, it can also be used in medical technology. Thus, implants for dentistry or individual hip implants can be manufactured of TiAl6V4 ELI Grade 23 (extra low interstitials, small amount of interstitial iron and oxygen atoms). Components made of TiAl6V4 show a homogenous, nearly non-porous structure, with mechanical characteristic values in the range of material specifications. Through subsequent processing such as heat-treatments (e.g. stress-relief annealing, recrystallization annealing, precipitation hardening) or hot isostatic pressing (HIP), the components' properties can be adapted to meet specific requirements.

PHYSICAL PROPERTIES

Particle Size	15 µm – 45 µm
Density	4,5 g/cm ³
Thermal conductivity	6 - 8 W/mK
Melting range	1635°C – 1665 °C
Thermal expansion	8 x 10 ⁻⁶ K ⁻¹ – 9 x 10 ⁻⁶ K ⁻¹

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CHEMICAL COMPOSITION

Element -	Mass fraction
Ti	Balance
Al	5,5-6,5%
V	3,5-4,5%
Fe	<0,25%
O	<0,13%
C	<0,08%
N	<0,05%
H	<0,012%

MECHANICAL DATA

		As built	Heat-treated
Tensile strength	R _m	1165,2 MPa ± 19,7 MPa	957 MPa ± 5 MPa
Yield strength	R _{p0,2}	998,2 MPa ± 23,2 MPa	852 MPa ± 11 MPa
Elongation at break	A	9,39% ± 0,91%	13% ± 1%
Young's modulus	E	111,62 GPa ± 2,83 GPa	120 GPa ± 4 GPa
Vickers Hardness		361 HV 10 ± 10 HV 10	308 HV 10 ± 5 HV 10
Roughness average	Ra	12 µm ± 1 µm	
Mean roughness depth	Rz	75 µm ± 7 µm	

All values are subject to natural volatilities depending on applied powder material, process parameters and surrounding conditions.

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