Ti-6Al-4V

Titanium alloy, Grade 23 (ELI)

Printer **One Click Metal MPRINTpro**

Layer height **30 µm · 90 µm**

OVERVIEW

Ti-6Al-4V Grade 23 is a lightweight, high-strength titanium alloy with excellent corrosion resistance. Aluminum and vanadium keep its microstructure stable at both low and elevated temperatures.

Grade 23 is the extra-low-interstitial version: its reduced oxygen content improves corrosion resistance, and the alloy is biocompatible.

KEY BENEFITS

- Highest strength-to-weight ratio of our metals
- Excellent corrosion resistance
- High strength and toughness
- Biocompatible alloy

MECHANICAL PROPERTIES

Property	Test method	30 µm as built	90 µm as built	Stress relieved ‡
Yield strength ($R_{p0.2}$)	ISO 6892-1	784 MPa 113.7 ksi · ± 35	1,161 MPa 168.4 ksi · ± 10	1,125 MPa 163.2 ksi · ± 10
Tensile strength (R_m)	ISO 6892-1	1,137 MPa 164.9 ksi · ± 7	1,249 MPa 181.2 ksi · ± 9	1,162 MPa 168.5 ksi · ± 9
Elongation at break (A)	ISO 6892-1	15.6% ± 1.2%	8.1% ± 0.5%	9.8% ± 1.1%
Young's modulus	ISO 6892-1	*Not reported*	114 GPa 16.5 Msi · ± 3	120 GPa 17.4 Msi · ± 2

Averages, with standard deviation (±). Typical values, not guaranteed minimums. Design with margin.

‡ OCM does not state the layer height of the stress-relieved specimens.

PHYSICAL PROPERTIES & SURFACE FINISH

Property · surface measured along Z axis	30 µm	90 µm
Relative density	≥ 99.9%	≥ 99.7%
Average defect (porosity)	< 0.1%	< 0.3%
Surface roughness R_a, as built	6.5 µm 256 µin	≈ 15 µm ≈ 590 µin
Surface roughness R_z, as built	28.7 µm 1,130 µin	≈ 70 µm ≈ 2,760 µin
Surface roughness R_a, blasted	3.5 µm 138 µin	≈ 7 µm ≈ 280 µin
Surface roughness R_z, blasted	13.1 µm 516 µin	≈ 30 µm ≈ 1,180 µin

Heat treatment: OCM recommends a stress-relief heat treatment for Ti-6Al-4V to relieve the residual stress built up during printing and prevent distortion, warping or cracking when parts are removed from the build plate.

GENERAL POWDER PROPERTIES

Nominal particle size	Powder bulk density	Flowability
15–45 µm	**2.52 g/cm³**	**6 s/50 g**
Spherical	ø 5.0 mm, static	ø 5.0 mm, static

DIMENSIONAL TOLERANCES

Direction	First inch (25 mm)	Each additional inch (25 mm)
XY (horizontal)	± 0.003–0.005 in ± 0.08–0.13 mm	+ 0.002 in + 0.05 mm
Z (vertical)	± 0.010 in ± 0.25 mm	+ 0.002 in + 0.05 mm

Typical IA3D tolerances; results depend on part size and geometry. For tighter fits, **talk to an engineer**.

POWDER CHEMICAL COMPOSITION

Element	Min. (wt.%)	Max. (wt.%)
Ti	Balance	
Al	5.5	6.5
V	3.5	4.5

Element	Min. (wt.%)	Max. (wt.%)
Fe	—	0.25
O	—	0.13

TYPICAL APPLICATIONS

- Firearm suppressors and suppressor components
- Defense and firearm components
- Aerospace and aviation hardware
- Lightweight structural brackets and housings
- Medical devices and implants
- Automotive and motorsports parts

GOOD TO KNOW

- **Operating temperature:** Typically used for continuous service up to about 400 °C (750 °F). Above this, strength and oxidation resistance drop off.
- **Surface:** as-built and blasted roughness is shown on page 1.

TEST CONDITIONS & SOURCE

Source: One Click Metal Material Data Sheet, Titanium Ti-6Al-4V Grade 23, all layer heights (2026). Mechanical values are One Click Metal averages from tensile testing to ISO 6892-1, as built and after stress relief, using OCM's standard parameter sets for each layer height on the **One Click Metal MPRINTpro**. Surface roughness was measured along the Z axis. Operating temperature is general guidance for Ti-6Al-4V, not OCM data.

Disclaimer: Material properties are provided as a general reference to help with material selection. Actual part properties depend on geometry, orientation, wall thickness, build position, heat treatment, post-processing and service conditions, and may differ from the values shown. This sheet does not guarantee specific properties or suitability for a particular application. Validate critical parts under real operating conditions.

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