DIRECT METAL LASER SINTERING

Titanium Ti-6Al-4V

Aerospace-Grade Lightweight Alloy

Ti-6Al-4V is the most widely used titanium alloy, offering an exceptional combination of high strength, low weight, and excellent corrosion resistance. Perfect for demanding aerospace, automotive, and high-performance applications.



SURFACE FINISHES



Standard Finish Natural

Supports are carefully removed and parts are shot peened to a uniform matte surface, which also helps relieve residual stresses. Critical features may receive light machining for tighter tolerances.



Machining & Polishing Enhanced

Precision machining and polishing enhance surface quality for critical applications, achieving tighter tolerances and a smooth, high-gloss metallic finish.



Performance Paint Premium

An automotive-grade coating that enhances aesthetics and durability. Each part is hand-finished with professional-grade equipment for exceptional adhesion, in matte to semi-gloss with custom colour matching.

BUILD VOLUME	LEAD TIME	LAYER HEIGHT	TOLERANCE
250 × 250 × 325 mm	From 4 business days	0.04-0.08 mm	±0.3% (min ±0.3 mm)

MECHANICAL PROPERTIES

Titanium Ti-6Al-4V delivers dependable strength and fatigue resistance, giving teams a proven DMLS baseline for production aerospace, motorsport and industrial parts. Its balanced mechanical profile handles demanding load conditions while preventing brittleness in critical applications.

The values are for heat-treated parts, which EOS recommends, and the vertical (Z) and horizontal (XY) rows show the slight anisotropy of laser-melted titanium. Parts keep their integrity under repeated stress, which suits aircraft structural components, precision mechanical components and racing suspension parts that need precise geometry and tight tolerances.

PROPERTY	VALUE	TEST STANDARD
Tensile Strength, Heat Treated (Z and XY)	**1080 MPa**	ISO 6892-1
Yield Strength, Heat Treated (Z)	**1010 MPa**	ISO 6892-1
Yield Strength, Heat Treated (XY)	**970 MPa**	ISO 6892-1
Elongation at Break, Heat Treated (Z)	**15 %**	ISO 6892-1
Elongation at Break, Heat Treated (XY)	**14 %**	ISO 6892-1
Reduction of Area, Heat Treated	**≥ 25 %**	ISO 6892-1
Modulus of Elasticity (XY and Z)	**110 GPa**	ISO 6892-1 Annex D (EOS Ti64 MDS, M 290, 07.2022)
Fatigue Strength, Heat Treated (10^7 cycles)	**595 MPa**	ASTM E466 / ISO 12107

THERMAL PROPERTIES

Titanium Ti-6Al-4V keeps useful strength up to its long-term operating limit, from engine-bay components to industrial equipment near heat sources. Design to the maximum long-term operating temperature; the melting range and beta transus are alloy constants that matter for heat treatment and HIP, not for service.

Its low thermal expansion keeps assemblies stable as they warm, and its low thermal conductivity means titanium holds heat locally rather than spreading it like aluminium.

PROPERTY	VALUE	TEST STANDARD
Maximum Long-Term Operating Temperature	**350 °C**	EOS Ti64 MDS, M 290 (07.2022)
Coefficient of Thermal Expansion (25–100 °C)	**9.0 ×10⁻⁶/K**	ASTM E228
Coefficient of Thermal Expansion (25–200 °C)	**9.4 ×10⁻⁶/K**	ASTM E228
Coefficient of Thermal Expansion (25–300 °C)	**9.7 ×10⁻⁶/K**	ASTM E228
Melting Range (Liquidus)	**1650–1660 °C**	TIMET Grade 5 alloy data
Beta Transus	**996 °C**	TIMET Grade 5 alloy data
Thermal Conductivity (20 °C)	**6.6 W/m·K**	TIMET Grade 5 alloy data
Specific Heat (20 °C)	**0.58 J/g·K**	TIMET Grade 5 alloy data

PHYSICAL PROPERTIES

Low density makes sections lightweight yet durable, and near-full part density keeps critical features in tolerance and downstream finishing predictable. The defect percentage shows how little porosity remains in the printed metal.

The composition rows are the EOS powder limits, which sit within Grade 5 requirements. Hardness is the as-built value, measured before heat treatment, machining and surface finishing.

PROPERTY	VALUE	TEST STANDARD
Part Density	**≥ 4.4 g/cm³**	ISO 3369
Average Defect Percentage	**0.01 %**	EOS cross-section method
Vickers Hardness, As Built	**320 HV5**	EN ISO 6507-1 (EOS Ti64 MDS, M 290, 06.2022)
Titanium (Ti)	**Balance**	EOS powder specification
Aluminum (Al)	**5.50–6.75 wt%**	EOS powder specification
Vanadium (V)	**3.50–4.50 wt%**	EOS powder specification
Oxygen (O)	**≤ 0.20 wt%**	EOS powder specification
Iron (Fe)	**≤ 0.30 wt%**	EOS powder specification
Carbon (C)	**≤ 0.08 wt%**	EOS powder specification
Nitrogen (N)	**≤ 0.05 wt%**	EOS powder specification
Hydrogen (H)	**≤ 0.015 wt%**	EOS powder specification
Yttrium (Y)	**≤ 0.005 wt%**	EOS powder specification
Other Elements, Each	**≤ 0.10 wt%**	EOS powder specification
Other Elements, Total	**≤ 0.40 wt%**	EOS powder specification

ELECTRICAL PROPERTIES

Titanium Ti-6Al-4V conducts electricity, so parts can be grounded, but its resistivity is far higher than aluminium or copper, which makes it a fit for grounded housings and fixtures rather than current-carrying parts.

Its relative magnetic permeability is close to 1, so it is effectively non-magnetic for sensor mounts and instrument hardware near magnetic fields.

PROPERTY	VALUE	TEST STANDARD
Electrical Resistivity (0 °C)	**1.68×10^{-6} Ω·m**	TIMET Grade 5 alloy data
Magnetic Permeability (relative, 20 Oe)	**1.00005**	TIMET Grade 5 alloy data

CHEMICAL PROPERTIES

EOS publishes no chemical resistance table for printed Ti-6Al-4V, so the ratings come from TIMET's corrosion data for titanium. A stable oxide film gives the resistance: oxidizing and neutral environments keep it intact, reducing acids break it down faster as concentration and temperature rise, and fluorides attack it directly. TIMET notes that Ti-6Al-4V is somewhat less resistant than unalloyed titanium and can be susceptible to stress corrosion cracking in chloride service under some conditions.

Chemical ratings are screening guidance; confirm them with application-specific testing before production release.

CHEMICAL	RATING
Seawater	**Excellent**
Marine Atmosphere	**Excellent**
Neutral Chloride Brines	**Good**
Nitric Acid, Below Boiling	**Good**
Wet Chlorine and Hypochlorite Solutions	**Good**
Dry Chlorine Gas	**Poor**
Alkaline Solutions (Sodium and Potassium Hydroxide)	**Good**
Acetic Acid	**Good**
Organic Solvents	**Good**
Dilute Hydrochloric, Sulfuric and Phosphoric Acid, Room Temperature	**Moderate**
Hydrochloric or Sulfuric Acid, Hot or Concentrated	**Poor**
Hydrofluoric Acid	**Poor**

COMPLIANCE

EOS classifies the powder as ASTM B348 Grade 5 titanium. In EOS testing, heat-treated parts exceed the tensile minimums of ASTM F1472 for wrought Ti-6Al-4V.

Quality teams can start aerospace and industrial qualification from this supplier data, and flight approval of each part stays with its design owner.

STANDARD	STATUS
ASTM B348 Grade 5 EOS classifies the powder as Grade 5 titanium alloy	EOS classification
ASTM F2924 Additive manufacturing Ti-6Al-4V by powder bed fusion; part chemistry complies	EOS stated
ASTM F3302 Finished part properties for powder bed fusion titanium alloys; part chemistry complies	EOS stated
ASTM F1472 Wrought Ti-6Al-4V; part chemistry complies and heat-treated tensile results exceed its minimums (930 MPa UTS, 860 MPa yield, 10% elongation)	EOS tested

MANUFACTURING

Heat treatment	**Stress relief at about 800 °C in vacuum, with HIP (hot isostatic pressing) available**