

Titanium Ti-6Al-4V



Material description

Ti-6Al-4V is the most popular titanium alloy using up almost half of the total titanium production. Because of its readiness in welding, casting and wrought technologies, Ti-6Al-4V was one of the early materials to be adopted in metal Additive Manufacturing for prototypes and small runs of components. Ti6Al4V is lightweight with density of 4.41 g/cm³, strong, corrosion resistant, and biocompatible which further its use in metal AM.

Physical properties¹

Density (based on 4.41 g/cm ³ theoretical density)	> 99.9%
Pore size	< 100 μm
Porosity rate	< 0.1%
Hardness	min. 300 HV10

Mechanical properties

	As Built	Stress Relieved ²
Tensile strength Horizontal (XY) Vertical (Z)	1160 MPa ± 30 MPa 1160 MPa ± 30 MPa	980 MPa ± 30 MPa 980 MPa ± 30 MPa
Proof strength (Rp 0.2%) Horizontal (XY) Vertical (Z)	1050 MPa ± 20 MPa 1050 MPa ± 50 MPa	930 MPa ± 30 MPa 930 MPa ± 40 MPa
Modulus of elasticity Horizontal (XY) Vertical (Z)	105 ± 5 GPa 105 ± 5 GPa	110 ± 10 GPa 114 ± 10 GPa
Elongation at break Horizontal (XY) Vertical (Z)	5.5 ± 2% 5.5 ± 2%	10 ± 2% 10 ± 2%

¹ All data gathered using ASTM E8M flat un-machined specimens that were wire EDM to profile with cross section of 2mmx6mm at the gauge section conforms to ASTM F2924 standard for AM Ti6Al4V. 3T also has data for ISO-6892 machined round specimens which are conforming to EOS datasheet..

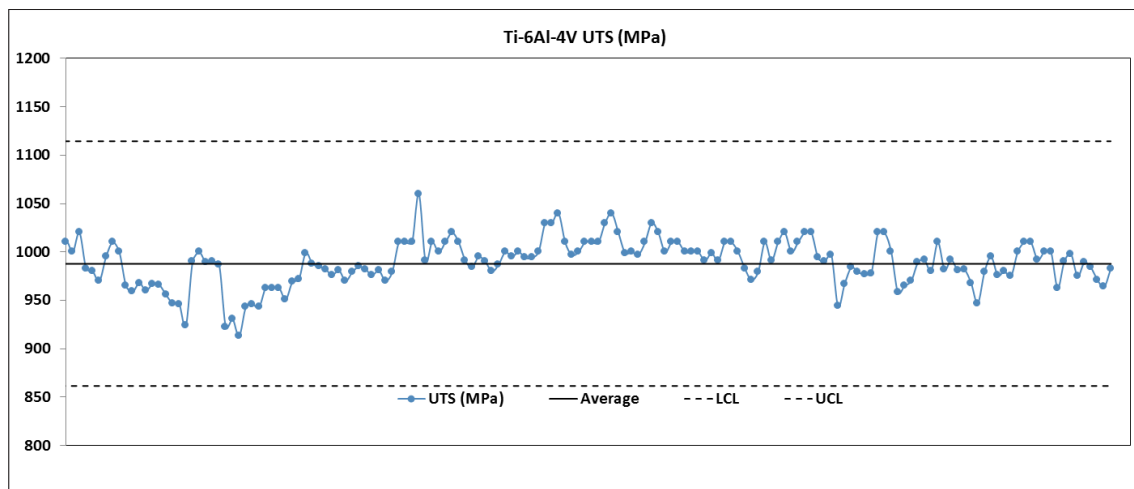
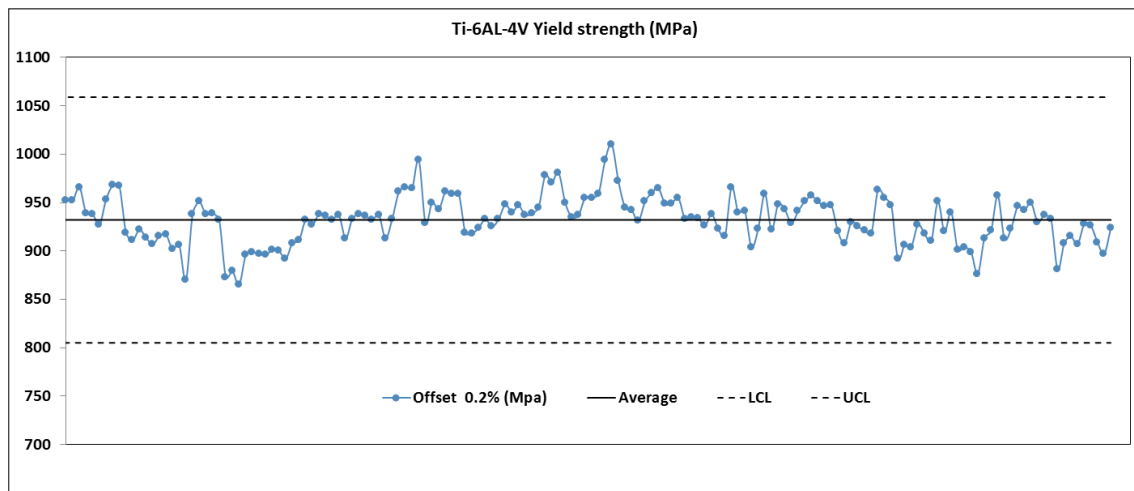
² Stress relief at 800°C for 2 hours in a vacuum furnace with specimens on build plate. Please contact us for bespoke heat treatment to achieve different mechanical properties.

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Chemical properties

Material composition wt%	Ti	Balance	Al	5.50-6.75	V	3.50-4.50
	O	0.2 max	N	0.05 max	C	0.08 max
	H	0.015 max	Fe	0.3 max		

Statistical Process Control Charts³



Material Properties	Applications	Finishes	Industries
<ul style="list-style-type: none"> Corrosion Resistant Lightweight Biocompatible Weldable 	<ul style="list-style-type: none"> Prototyping Engineering Biomedical Implants Small series production 	<ul style="list-style-type: none"> Machined Spark-eroded Welded Micro shot-peened Polished Coated 	<ul style="list-style-type: none"> Automotive Motorsport Aerospace Medical

³ Data conforming to ASTM F2924 for AM TiAl4V was generated in a production environment through calibration builds, production builds and testing of powders during the goods in procedure. Specimen geometry is ASTM E8M flat un-machined with cross section of 2mmx6mm at the gauge section.