

Material Information



Titanium Ti₆Al₄V

Introduction

Titanium Ti₆Al₄V, while having exceptional tensile strength and toughness, is one of the lightest engineering metal materials available for 3D printing. It is widely used, has remarkable corrosion resistance, and can withstand intensely high temperatures without performance degradation.

Advantages

Corrosion resistance. Excellent fatigue resistance. Good high-temperature properties. Biocompatible. High strength-to-weight ratio.

Disadvantages

Expensive and difficult to change shape or weld.

Tolerance

±300µm or 0.3%

Recommendation

Titanium Ti₆Al₄V is used for prototypes, spare parts, and functional parts. From welded pipes and valves to heat exchanges, aircraft, naval vessels and even spaceships, titanium can be found in many heavy-duty applications. It is also one of the most used metal materials in the medical industry.

Material Specifications		
Hardness	ISO 6597-1:03-2006	340 HV
Density	WGE-Prod-067EN	4.39 g/cm ³
Relative density	WGE-Prod-067EN	99.5%
Tensile strength	DIN EN ISO 6892-1:2009	980MPa
Elongation at Break	DIN EN ISO 6892-1:2009	14%
Yield strength	DIN EN ISO 6892-1:2009	900MPa
Elastic modulus	DIN EN ISO 6892-1:2009	110GPa
Roughness Ra	ISO 4287 / AITM 1-00070	20 µm
Roughness Rz	ISO 4287 / AITM 1-00070	80 µm

Attention

Although it is feasible to print complex structures with Titanium alloy powder, the finished product can be difficult to work with due to its hardness and strength. We therefore recommend you consider all potential manufacturing processes when designing.

Applications

3DSPRO finds people using Titanium Ti_6Al_4V to make functional parts and prototypes in the following industries and applications.

Aerospace:

Jet engines, airframes, structural materials for aircraft bodies, fuel tanks, landing gears, bolts, and springs.

Automotive:

Engine parts such as connecting rods, wrist pins, valves, valve retainers and springs, rocker arms and camshafts.

Medical:

Human implants such as the femoral head, hip joint, humerus, skull, knee joint, elbow joint, shoulder joint, metacarpophalangeal joint, and fastening screws.

Consumer supplies:

Golf clubs, tennis rackets, bicycles, wristwatches, glasses, knives, jewelry, and sculptures.