



Grade	Code	UNS	Titanium
TiGr5	Ti6Al4V	R56400	

Titanium Grade 5 Properties

TiGr5 is a heat-treatable titanium alloy containing approximately **6% aluminum and 4% vanadium**, with an **$\alpha+\beta$ phase structure**. Compared with commercially pure titanium grades, it provides higher mechanical strength, good fatigue resistance, low density, and a high strength-to-weight ratio. Thanks to the stable titanium oxide film formed on its surface, it has high general corrosion resistance and delivers reliable performance in many aggressive environments. Ti6Al4V can have its mechanical properties optimized by heat treatment; therefore, it is one of the most commercially widespread titanium alloys used in engineering applications requiring both strength and structural stability.

Chemical Analysis (TiGr5)

N %	C %	H %	O %	Fe %	Al %	V %	Ti %	Other Elements %
max. 0.05	max. 0.08	max. 0.015	max. 0.20	max. 0.40	5.50 – 6.75	3.50 – 4.50	Balance	max. 0.10 each / max. 0.40 total

Mechanical Properties

Product Form	Rp0.2, MPa	Rm, MPa	Elongation [%]	Hardness [HRC]	Density [g/cm ³]
Round Bar	827 – 862 min.	896 – 931 min.	8 – 10 min.	30 – 34	4,43
Plate	823 – 828 min.	893 – 895 min.	10 min.	30 – 34	4,43
Sheet	866 min.	920 min.	8 – 10 min.	30 – 34	4,43

Note: Values may vary depending on product section, thickness/diameter, test direction, and the applicable standard. Especially for bars, minimum yield and tensile strength values may decrease as the diameter increases according to AMS 4928; for sheet/plate products, elongation may vary depending on thickness under specifications such as AMS 4911 / AMS-T-9046.

Applications

Sector	Products
Aerospace	Compressor blades, engine disks, aircraft body connection parts
Space and Defense	Rocket motor cases, pressure vessel components, high-strength forged load-bearing parts
Medical	Orthopedic implants, surgical instruments, prosthetic connection parts
Marine and Offshore	Seawater-resistant connection parts, pump parts, valve parts
Automotive and Motorsport	Engine valves, connecting rods, suspension parts
Oil, Gas and Geothermal	Well equipment parts, riser connection elements, high-strength downhole parts
Chemical Process and Industrial Equipment	Pump equipment, valve equipment, process line connection parts
Sports and Performance Products	Bicycle parts, golf equipment, lightweight and high-strength



fasteners

Description

Ti6Al4V is generally evaluated for service temperatures up to approximately **350–400 °C**. Although some datasheets state that it can be used from cryogenic temperatures up to about **427 °C**, a more conservative limit is usually preferred under continuous service and high-load conditions. It is machinable; however, due to its low thermal conductivity, heat tends to build up in the cutting zone. Therefore, low cutting speeds, rigid clamping, sharp tools, and generous chlorine-free coolant are recommended. Its weldability is considered good, but inert gas shielding is essential during welding to prevent oxygen, nitrogen, and hydrogen contamination. In terms of heat treatment, it can be used in annealed, stress-relieved, or solution-treated + aged condition; solution treatment + aging heat treatment can increase strength, while section size and cooling rate are decisive factors for the final properties.

Specification

TiGr5, Ti6Al4V, Titanium Grade5, R56400

Standard

Product Form	ASTM	AMS	Description
Round Bar	ASTM B348	AMS 4928	Common annealed AMS standard for bar, wire, forging, and ring products
Forged Bar	ASTM B381	AMS 4920 / AMS 4928	Considered as a forged product or forging stock
Plate	ASTM B265	AMS 4911	Common annealed AMS standard used for sheet, strip, and plate
Sheet	ASTM B265	AMS 4911	Common standard used for thin sheet form

Other Grades You May Review

1. TiGr5 Eli
2. Ti3Al2.5V
3. TiGr2