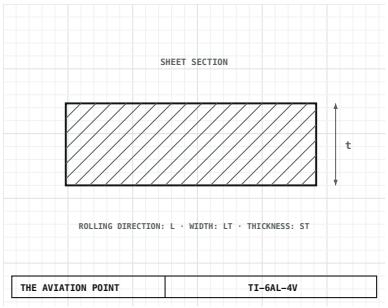
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Ti-6Al-4V — alpha-beta titanium alloy

The workhorse titanium alloy.



Schematic

Designation

Item	Value
Designation	Ti-6Al-4V
Class	Titanium
Type	alpha-beta titanium alloy

Properties

Property	Value	Source
Against steel and aluminum	30 % stronger than steel and nearly 50 % lighter; 60 % heavier than aluminum and twice as strong	FAA-H-8083-31, p. 4-85 (the handbook's general statement, not a design value)
Against pure titanium	Approximately 3 times stronger	FAA-H-8083-31, p. 4-85
Service temperature	Moderate strength up to 600 °F (315 °C)	FAA-H-8083-31, p. 4-85
Stress relief after cold forming (annealed 6Al-4V)	Above 1,250 °F and below 1,450 °F, held more than 30 minutes and less than 10 hours	FAA-H-8083-31, p. 4-85
Largest hole drilled in one step	0.1563 in	FAA-H-8083-31, p. 4-86
Heat tint colours	Blue at 700–800 °F, purple at 800–950 °F, gray or black at 1,000 °F or higher	AC 43.13-1B CHG 1, par. 6-181a

The 30 % and 60 % comparisons are the handbook's own wording. Do not use them in a calculation; use the allowables for the exact condition.

Design allowables — Ti-6Al-4V annealed sheet

Property	A basis	B basis	Unit
Ftu, L	134	139	ksi
Ftu, LT	134	139	ksi
Fty, L	126	131	ksi
Fty, LT	126	131	ksi
Fcy, L	133	138	ksi
Fcy, LT	135	141	ksi
Fsu	87	90	ksi
Fbru, e/D = 1.5	213	221	ksi
Fbru, e/D = 2.0	272	283	ksi

Property	A basis	B basis	Unit
Fbry, e/D = 1.5	171	178	ksi
Fbry, e/D = 2.0	208	217	ksi
Elongation, L (S-basis)	8	—	%
Elongation, LT (S-basis)	8	—	%
E	16.0	16.0	10^3 ksi
Ec	16.4	16.4	10^3 ksi
G	6.2	6.2	10^3 ksi
Density	0.160	0.160	lb/in³

Form: sheet; condition: annealed; specification: AMS 4911 and AMS-T-9046 Comp. AB-1; thickness 0.1875 in and under. Bearing values are dry-pin values (MIL-HDBK-5J Section 1.4.7.1). The handbook footnotes the elongation: 8% for 0.025 to 0.062 in and 10% for 0.063 in and above, printed in the A column with the B cell blank. E, Ec, G and density are printed once across all columns. Source: MIL-HDBK-5J (31 Jan 2003), Table 5.4.1.0(b), p. 5-53. MIL-HDBK-5J (2003) is superseded by MMPDS; check current MMPDS before design use. Density 0.160 lb/in³ is about 4.43 g/cm³ (converted), from the same MIL-HDBK-5J table.

Notes

- **Not a source of design allowables.** Strength depends on the condition and form. Use MMPDS with the basis; the SRM governs a repair.
- **No bend radii on this page.** AC Table 4-6 covers aluminum only. The minimum radius chart for the actual alloy and condition comes from the manufacturer or SRM.
- **Not a substitute for steel or aluminum.** Substitution changes stiffness, weight and galvanic pairs. It is approved-data territory.

SOURCES · FAA-H-8083-31, AMT Handbook — Airframe, Volume 1, Chapter 4 — Working Titanium, pp. 4-85 to 4-86 · FAA AC 43.13-1B CHG 1, Chapter 6 — par. 6-181 · MIL-HDBK-5J, Metallic Materials and Elements for Aerospace Vehicle Structures · MIL-HDBK-5J, Table 5.4.1.0, p. 5-53 · FAA AC 43.13-1B CHG 1 · MIL-HDBK-5J, Metallic Materials and Elements for Aerospace Vehicle Structures · MMPDS

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Reference data. The aircraft manufacturer's documentation (SRM / IPC) takes precedence.

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