

Aerospace Structural Fittings in Ti-6Al-4V (Grade 5 Titanium)

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This solution looks at how VT machining manufactures **lightweight structural fittings, brackets and lugs for airframe and engine assemblies** for the aerospace & defense sector, and how process and material choices combine to hit demanding requirements. It is written as a starting point for your own design discussion — every part is ultimately quoted and engineered to your drawing.

The natural first choice for this kind of component is [Ti-6Al-4V Titanium](#). Ti-6Al-4V (ASTM Grade 5) offers an excellent strength-to-weight ratio and corrosion resistance, making it the most widely specified titanium alloy in aerospace.

Why Ti-6Al-4V Titanium?

Ti-6Al-4V Titanium is specified here because of how its properties match the duty of lightweight structural fittings, brackets and lugs for airframe and engine assemblies. We confirm the exact grade, temper or heat-treat condition with you before machining, and can supply material certificates for traceability. See our dedicated [CNC 5-Axis Machining Ti-6Al-4V Titanium](#) capability page for process-and-grade detail.

Material Alternatives & Substitutions

Depending on cost, corrosion, strength or weight priorities, several alloys can substitute for Ti-6Al-4V Titanium. Each links to its machining capability page:

Alternative	When to choose it
Grade 23 Titanium (Ti-6Al-4V ELI)	extra-low-interstitial variant for higher fracture toughness and fatigue-critical parts
Grade 5 Titanium	the same Ti-6Al-4V composition in standard interstitial grade
Inconel 718	nickel superalloy where high-temperature strength matters more than weight
7075 Aluminum	a lighter, lower-cost option for less load-critical structure

Recommended Process Routes

For lightweight structural fittings, brackets and lugs for airframe and engine assemblies, the core shaping operations are usually:

- [CNC 5-Axis Machining](#) — primary shaping of the main geometry.
- [CNC Milling](#) — primary shaping of the main geometry.
- [CNC Precision Machining](#) — primary shaping of the main geometry.

High-Tolerance Process Combination

Where the drawing calls for true position to ± 0.01 mm on bolt patterns, tight flatness on mating faces and controlled surface finish on fatigue-critical fillets, a single operation is rarely enough. We recommend combining processes in sequence so each stage refines the last:

1. [CNC 5-Axis Machining](#) — rough and semi-finish the part close to net shape, leaving controlled stock for finishing.
2. [CNC Cylindrical Grinding](#) — bring critical features to final size and geometry with a precision finishing pass.
3. [CNC Wire EDM](#) — produce the tightest features or hardened-material details that cannot be cut conventionally.
4. [CNC Deburring](#) — achieve the final surface finish, edge condition and cosmetic quality.

Sequencing the work this way isolates roughing distortion from the finishing stages, which is how tight tolerances are held repeatably in production. We plan the exact route from your tolerance scheme and first-article results.

Feature & Secondary Operations

Additional features and finishing are added with:

- [CNC Turning](#)
- [CNC Drilling](#)
- [CNC Tapping](#)
- [CNC Broaching](#)

Related Applications

This solution supports the following application areas — each shows the broader range of parts and materials we make for that industry:

- [Aerospace Components](#)

Standards & References

Relevant standards for this kind of work include ASTM B348 (Ti bar/billet), AMS 4928 (aerospace Ti-6Al-4V), ASTM F136 (Ti-6Al-4V ELI surgical). These are cited for guidance only; we work to the standards and revisions named on your drawing.

Authoritative public references used in preparing this overview:

- [Ti-6Al-4V alloy overview \(UNS R56400, Grade 5\)](#)
- [ASTM B348 specification summary](#)

Frequently Asked Questions

What is the best material for lightweight structural fittings, brackets and lugs for airframe and engine assemblies?

Ti-6Al-4V Titanium is the usual first choice because ti-6Al-4V (ASTM Grade 5) offers an excellent strength-to-weight ratio and corrosion resistance, making it the most widely specified titanium alloy in aerospace. Alternatives such as Grade 23 Titanium (Ti-6Al-4V ELI), Grade 5 Titanium, Inconel 718 are used when cost, corrosion or weight priorities differ.

Which processes hold the tightest tolerances for lightweight structural fittings, brackets and lugs for airframe and engine assemblies?

We combine processes in sequence — typically CNC 5-Axis Machining, CNC Cylindrical Grinding, CNC Wire EDM, CNC Deburring — so roughing distortion is separated from finishing and the critical features are produced last.

Can you machine Ti-6Al-4V Titanium to my drawing?

Yes. Send your CAD or 2D drawing, the grade and condition, the quantity and any finish or inspection requirements, and our engineers will confirm feasibility, pricing and lead time — usually within one business day.

What quality documentation can you provide?

Material certificates, dimensional inspection reports and first-article documentation are available on request, aligned to the standards named on your drawing.

Need lightweight structural fittings, brackets and lugs for airframe and engine assemblies manufactured to your spec? Send your drawing and quantity for a fast quotation.

[Request a Quote](#)