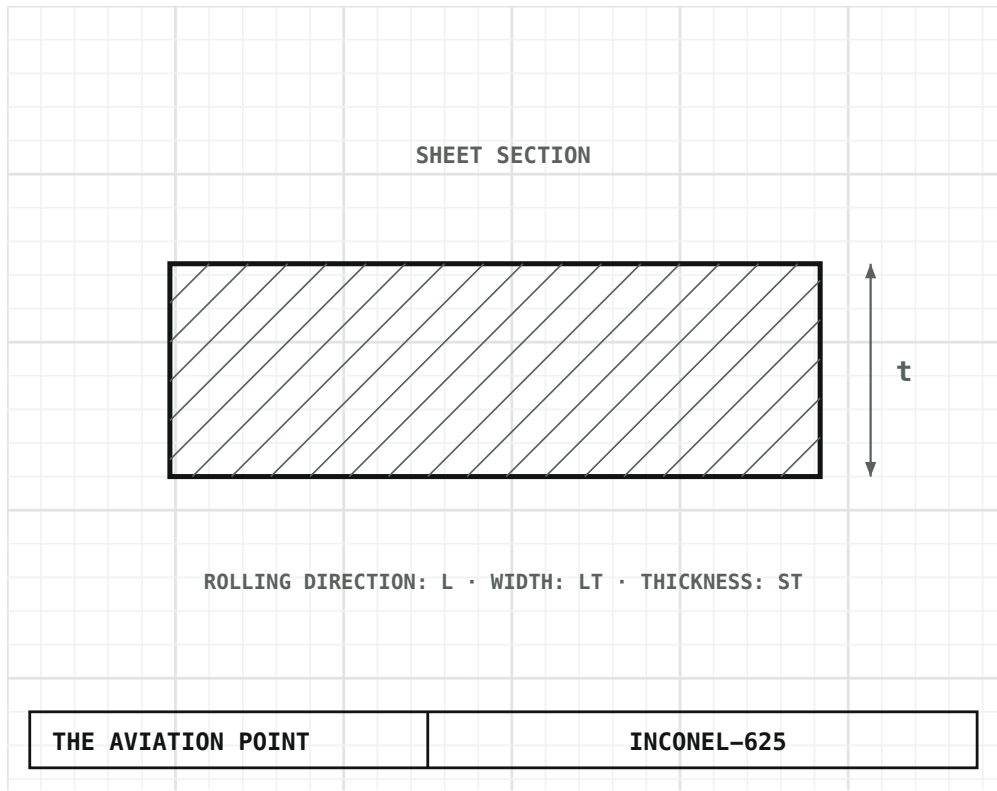
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Inconel 625 — nickel-base alloy

The weldable nickel alloy for exhaust and powerplant structure.



Schematic

Designation

Item	Value
Designation	Inconel 625
Class	Nickel alloys
Type	nickel-base alloy

Composition

Item	Limit	Source
Composition	Nickel 58 % min, chromium 20-23 %, molybdenum 8-10 %, niobium plus tantalum 3.15–4.15 %, iron 5 % max	Special Metals, Inconel alloy 625 bulletin, limiting chemical composition

Properties

Property	Value	Source
Type	Solid-solution, matrix-strengthened nickel-base alloy; no precipitation hardening needed	MIL-HDBK-5J, par. 6.3.3.0
Temperature	Corrosion and oxidation resistance to about 1,800 °F	MIL-HDBK-5J, par. 6.3.3.0
Condition	Annealed at 1,700 to 1,900 °F	MIL-HDBK-5J, par. 6.3.3.0
Sheet, strip, plate	AMS 5599, annealed	MIL-HDBK-5J, Table 6.3.3.0(a)
Bar, forging, ring	AMS 5666, annealed	MIL-HDBK-5J, Table 6.3.3.0(a)
Welding	Can be welded by common industrial practices	MIL-HDBK-5J, par. 6.3.3.0

Design allowables — Inconel 625 sheet and plate, annealed (AMS 5599)

Thickness, in	Basis	Ftu LT	Fty LT	Fsu
0.062 and under	A	120	57	79
0.063–0.109	A	120	56	79
0.110–0.140	A	120	55	79
0.141–0.187	A	119	54	79
0.188–0.250	S	120	60	79
0.251–1.000	S	120	60	—

Elongation 30 percent (S basis, LT). E = 29.8 × 10^3 ksi, G = 11.8 × 10^3 ksi, density 0.305 lb/in^3. B-basis values and L-direction values are in the table.

Notes

- **Annealed values only.** Cold work before annealing changes them.
- **Powerplant material.** The engine manufacturer's manual governs any repair.

SOURCES · MIL-HDBK-5J, Metallic Materials and Elements for Aerospace Vehicle Structures · FAA-H-8083-31B, Aviation Maintenance Technician Handbook, Airframe, Volume 1 · MMPDS · Special Metals, Inconel alloy 625

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