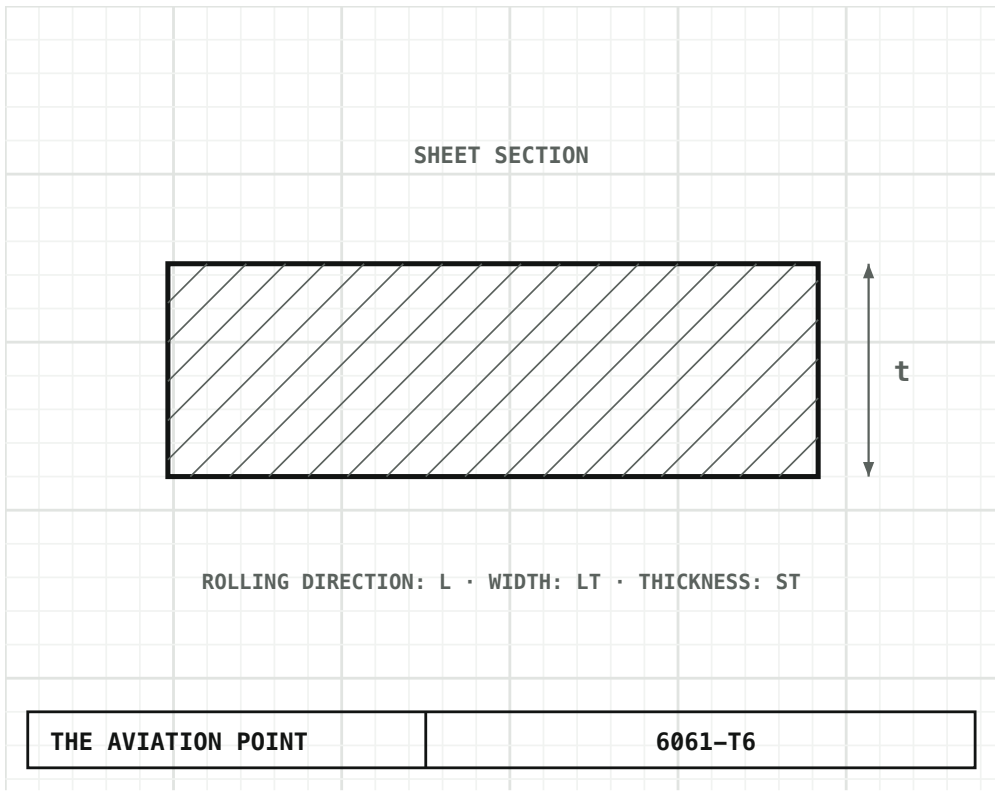
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6061-T6 — wrought aluminum alloy

The forgiving alloy: it bends, extrudes and welds.



Schematic

Designation

Item	Value
Designation	6061-T6
Class	Aluminum
Type	wrought aluminum alloy

Composition

Element	Limit
Si	0.40–0.8
Fe	0.7
Cu	0.15–0.40
Mn	0.15
Mg	0.8–1.2
Cr	0.04–0.35
Zn	0.25
Ti	0.15
Al	Remainder

A single number is a maximum. Other elements: 0.05 each, 0.15 total, except where the Teal Sheets say otherwise. Source: Aluminum Association Teal Sheets (Aug 2018).

Specifications and forms

Specification	Form
AMS 4025, 4026, 4027, AMS-QQ-A-250/11	Sheet and plate
AMS 4115, 4116, 4117, AMS-QQ-A-225/8	Bar and rod
AMS 4150, 4160, 4161, 4172, 4173, AMS-QQ-A-200/8	Extrusion
AMS 4080, 4082, AMS-WW-T-700/6	Seamless drawn tubing
AMS 4127, AMS 4248, AMS-A-22771, AMS-QQ-A-367	Forging

Specifications as listed by MIL-HDBK-5J. Federal QQ-A specifications passed to SAE as AMS-QQ-A. Check the current revision.

Properties

Property	Value	Source
Brinell hardness, 6061-T6	95 (500 kg load, 10 mm ball)	AC 43.13-1B CHG 1, Table 4-5
Brinell hardness, 6061-T4 / 6061-O	65 / 30	AC 43.13-1B CHG 1, Table 4-5
Weldability	Generally weldable by all commercial procedures	FAA-H-8083-31, p. 4-31
Density	0.098 lb/in³ (2.70 g/cm³)	MIL-HDBK-5J; Teal Sheets
Arc / spot welding, T6	A / A	MIL-HDBK-5J Table 3.1.3.4(a)
Stress corrosion, T6	A in L, LT and ST	MIL-HDBK-5J Table 3.1.2.3.1(a)
Drawn tube T6, 0.025-0.500 in wall	Ftu 42, Fty 35 ksi (S basis, L)	MIL-HDBK-5J Table 3.6.2.0(c1)

Hardness is a check on temper, not a strength value. Bend radii are in the table below.

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

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Bend radii, 6061 (AC 43.13-1B Table 4-6)

Alloy and temper	0.016"	0.032"	0.064"	0.128"	0.182"	0.258"
6061-O	0	0 – 1t	0 – 1t	0 – 1t	0 – 1t	0 – 1t
6061-T4	0 – 1t	0 – 1t	½t – 1½t	1t – 2t	1½t – 3t	2½t – 4t
6061-T6	0 – 1t	½t – 1½t	1t – 2t	1½t – 3t	2t – 4t	3t – 4t

Recommended radii for 90-degree bends, sheet thickness t. "0" means no radius required. Alclad sheet may be bent over slightly smaller radii than the uncoated alloy (Table 4-6 footnote 1).

Minimum bend radius, inches (AMT Handbook Chart 204)

Alloy and temper	0.020"	0.032"	0.040"	0.063"	0.125"	0.190"
5052-O, 6061-O, 5052-H32	.03	.03	.06	.06	.12	.19
7178-O, 2024-O, 5052-H34, 6061-T4, 7075-O	.03	.03	.06	.09	.25	.38
6061-T6	.03	.06	.09	.16	.31	.56

Selected thicknesses from FAA-H-8083-31B Chart 204, p. 4-61. Chart 204 and AC Table 4-6 do not agree everywhere: where they differ, use the larger radius or the SRM.

Design allowables — 6061-T6/T62 sheet

Property	A basis	B basis	Unit
Ftu, L	42	43	ksi
Ftu, LT	42	43	ksi
Fty, L	36	38	ksi
Fty, LT	35	37	ksi
Fcy, L	35	37	ksi
Fcy, LT	36	38	ksi
Fsu	27	28	ksi
Fbru, e/D = 1.5	67	69	ksi
Fbru, e/D = 2.0	88	90	ksi

Property	A basis	B basis	Unit
Fbry, e/D = 1.5	50	53	ksi
Fbry, e/D = 2.0	58	61	ksi
Elongation, LT, 0.010–0.020 in (minimum)	8	—	%
Elongation, LT, 0.021–0.249 in (minimum)	10	—	%
E	9.9	9.9	10^3 ksi
Ec	10.1	10.1	10^3 ksi
G	3.8	3.8	10^3 ksi
Density	0.098	0.098	lb/in³

Form: sheet; temper: T6 and T62; specification: AMS 4025, AMS 4027 and AMS-QQ-A-250/11; thickness 0.010–0.249 in. The handbook gives elongation in its Table 3.6.2.0(b3), p. 3-266, as a minimum by thickness (the values here), not by basis. E, Ec, G and density are printed once across all columns. T651 plate is in Table 3.6.2.0(b2), p. 3-265, and is not shown here. Source: MIL-HDBK-5J (31 Jan 2003), Table 3.6.2.0(b1), p. 3-264. MIL-HDBK-5J (2003) is superseded by MMPDS; check current MMPDS before design use. Density 0.098 lb/in³ is about 2.71 g/cm³ (converted); the sheet weight calculator uses the same figure.

Forms and thicknesses in stock

Distributor sheet	Listed	Thickness, in
6061T6 Bare Aluminum	0.016"–0.190" · bare · lb/ft²	.016, .020, .025, .032, .040, .050, .063, .090, .125, .190
6061-T6 Aluminium Sheet	0.020"–0.125" · 4×2, 4×4, 6×4 ft	.020, .025, .032, .040, .050, .063, .090, .125
6061T6 Round Aluminum Tubing	3/16"–4" OD · wall · lb/ft	.028, .035, .049, .058, .065, .083, .095, .120, .125, .128, .250

As distributors list them, not a statement of what a specification allows.

Weight by thickness

Thickness, in	mm	lb/ft²	kg/m²
0.016	0.41	0.228	1.11
0.020	0.51	0.285	1.39
0.025	0.64	0.353	1.72
0.032	0.81	0.452	2.21
0.040	1.02	0.570	2.78
0.050	1.27	0.713	3.48
0.063	1.60	0.889	4.34
0.090	2.29	1.270	6.20
0.125	3.17	1.760	8.59

Weight as a distributor lists it. Kilograms and millimetres converted.

Notes

- **Not a source of design allowables.** Strength values come from MMPDS with their basis and thickness range; the structural repair manual governs a repair.
- **Not a substitute for 2024-T3 or 7075-T6** unless the drawing permits it. It is weaker and less fatigue-tolerant. Material substitution in a structural repair is approved-data territory.
- **Weld repair of primary structure is not covered here.** Follow the SRM.

SOURCES · FAA AC 43.13-1B CHG 1, Chapter 4 — Tables 4-4, 4-5, 4-6, 4-9, 4-10; par. 4-54 · FAA-H-8083-31, AMT Handbook — Airframe, Volume 1, Chapter 4, p. 4-31 · MIL-HDBK-5J, Metallic Materials and Elements for Aerospace Vehicle Structures · MIL-HDBK-5J, Table 3.6.2.0, p. 3-264 · MIL-HDBK-5J, Table 3.6.2.0, p. 3-266 · MMPDS · MIL-HDBK-5J, Chapter 3 · Aluminum Association, International Alloy Designations, rev. Aug 2018 · FAA-H-8083-31B, AMT Handbook — Airframe, Volume 1, Chapter 4 · Distributor listings

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