THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM

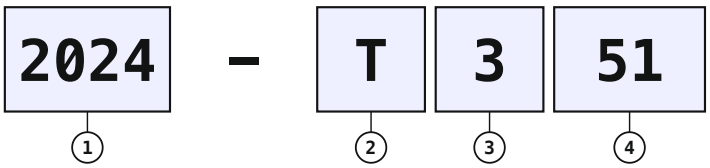
2219 Aluminum

An aluminum-copper alloy that does what other 2000 series alloys do not: it is rated readily weldable, it holds strength hot and it works cold.

REFERENCE DRAWING — NOT APPROVED DATA · THE SRM ALWAYS GOVERNS

THE MARKING

ALLOY NUMBER, THEN TEMPER



SERIES

FIRST DIGIT: MAIN ALLOYING ELEMENT

SERIES	ELEMENT	EXAMPLES
1xxx	Aluminum, 99 % or more	1100
2xxx	Copper	2024, 2219
3xxx	Manganese	3003
5xxx	Magnesium	5052, 5086
6xxx	Magnesium and silicon	6061, 6063
7xxx	Zinc	7075, 7050

BASIC TEMPER LETTERS

AC 43.13-1B TABLE 4-4

LETTER	MEANING
F	As fabricated. No property limits
O	Annealed: the softest temper
H	Strain-hardened (non heat-treatable)
T	Heat-treated to a stable temper

PARTS LIST

#	WHAT IT SAYS
1	Alloy number: the composition
2	T: heat-treated
3	3: solution treated, cold-worked
4	51: stretched 1 to 3 % set

NOTES

1. Dimensions in inches. Do not scale: the SRM sets the values.
2. For reference. The applicable manual always governs.
3. Based on AC 43.13-1B Table 4-4, AA Teal Sheets.

REVISIONS

REV	DESCRIPTION	DATE
A	First issue	2026-10-30

The Aviation Point. Structural repair reference

TITLE: **Aluminum alloy and temper code**

DRAWING NO.	REV	SCALE	SHEET
TAP-DWG-047	A	NTS	1 OF 1

APPLIES TO: Wrought aluminum alloys

DO NOT SCALE DRAWING

Temper meanings from AC 43.13-1B Table 4-4. Full list: aluminum temper chart.

Key facts

Property	Value	Source
Density	0.103 lb/in³ (2.84 g/cm³)	MIL-HDBK-5J; Teal Sheets
Arc welding, O and T6/T8 tempers	A (readily weldable)	MIL-HDBK-5J Table 3.1.3.4(a)
Spot welding, T6/T8 tempers	A	MIL-HDBK-5J Table 3.1.3.4(a)
Stress corrosion, T6, T85XX, T87	A in L, LT and ST (plate)	MIL-HDBK-5J Table 3.1.2.3.1(a)
Stress corrosion, T351X, T37	ST: D	MIL-HDBK-5J Table 3.1.2.3.1(a)
E / Ec / G	10.5 / 10.8 / 4.0 × 10³ ksi	MIL-HDBK-5J Table 3.2.8.0(b1)

Composition limits, weight percent

Element	Limit
Si	0.20
Fe	0.30
Cu	5.8–6.8
Mn	0.20–0.40
Mg	0.02
Zn	0.10
Ti	0.02–0.10
V	0.05–0.15
Zr	0.10–0.25
Al	Remainder

Educational reference only, not approved data. Always consult the applicable SRM, AMM, or AC 43.13-1B and your certifying authority.

THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM

THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT

Design allowables, 2219 sheet and plate

Property, ksi	T62 A	T62 B	T81 A	T81 B
Ftu, L	54	55	61	62
Ftu, LT	54	55	62	63
Fty, L	36	37	47	48
Fty, LT	36	37	46	47
Fcy, L	37	39	47	48
Fcy, LT	37	38	48	49
Fsu	31	32	35	35
Fbru, e/D = 1.5	84	85	95	96
Fbru, e/D = 2.0	107	109	121	123
Fbry, e/D = 1.5	62	64	76	78
Fbry, e/D = 2.0	79	81	92	94

Specifications and product forms

Specification	Form
AMS 4031, AMS-QQ-A-250/30	Sheet and plate
AMS 4162, AMS 4163	Extrusion
AMS 4144	Hand forging

Key points

- **Not a source of design allowables.** Values are for reference. MMPDS and the SRM govern a repair.
- **Not a substitution approval.** A different alloy or temper needs approved data.
- **Welding structure is approved-data work.** A weld repair needs the SRM or an approval.

SOURCES · FAA-H-8083-31B, AMT Handbook — Airframe, Volume 1, Chapter 4 · MIL-HDBK-5J, Chapter 3 · Aluminum Association, International Alloy Designations, rev. Aug 2018 · MMPDS

SCAN · OPEN THIS GUIDE
theaviationpoint.com/materials/aluminum/2219/

Educational reference only, not approved data. Always consult the applicable SRM, AMM, or AC 43.13-1B and your certifying authority.

THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT