



ASM Aerospace Specification Metals Inc.



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Aluminum 2024-T3

Subcategory: 2000 Series Aluminum Alloy; Aluminum Alloy; Metal; Nonferrous Metal

Close Analogs:

Composition Notes:

A Zr + Ti limit of 0.20 percent maximum may be used with this alloy designation for extruded and forged products only, but only when the supplier or producer and the purchaser have mutually so agreed.

Agreement may be indicated, for example, by reference to a standard, by letter, by order note, or other means which allow the Zr + Ti limit.

Aluminum content reported is calculated as remainder.

Composition information provided by the Aluminum Association and is not for design.

Key Words: Aluminium 2024-T3; UNS A92024; ISO A1Cu4Mg1; NF A-U4G1 (France); DIN A1CuMg2; AA2024-T3, ASME SB211; CSA CG42 (Canada)

| Component | Wt. % | Component | Wt. % | Component | Wt. % |
|-----------|-------------|--------------|-----------|-----------|----------|
| Al | 90.7 - 94.7 | Mg | 1.2 - 1.8 | Si | Max 0.5 |
| Cr | Max 0.1 | Mn | 0.3 - 0.9 | Ti | Max 0.15 |
| Cu | 3.8 - 4.9 | Other, each | Max 0.05 | Zn | Max 0.25 |
| Fe | Max 0.5 | Other, total | Max 0.15 | | |

Material Notes:

General 2024 characteristics and uses (from Alcoa): Good machinability and surface finish capabilities. A high strength material of adequate workability. Has largely superseded 2017 for structural applications.

Uses: Aircraft fittings, gears and shafts, bolts, clock parts, computer parts, couplings, fuse parts, hydraulic valve bodies, missile parts, munitions, nuts, pistons, rectifier parts, worm gears, fastening devices, veterinary and orthopedic equipment, structures.

Data points with the AA note have been provided by the Aluminum Association, Inc. and are NOT FOR DESIGN.

| Physical Properties | Metric | English | Comments |
|---------------------|------------------|------------------------|-------------|
| Density | <u>2.78 g/cc</u> | 0.1 lb/in ³ | AA; Typical |

Mechanical Properties

| | | | |
|---------------------------|-----------------|------------|----------------------------------------------------------------------------------------------------------------|
| Hardness, Brinell | 120 | 120 | AA; Typical; 500 g load; 10 mm ball |
| Hardness, Knoop | 150 | 150 | Converted from Brinell Hardness Value |
| Hardness, Rockwell A | 46.8 | 46.8 | Converted from Brinell Hardness Value |
| Hardness, Rockwell B | 75 | 75 | Converted from Brinell Hardness Value |
| Hardness, Vickers | 137 | 137 | Converted from Brinell Hardness Value |
| Ultimate Tensile Strength | <u>483 MPa</u> | 70000 psi | AA; Typical |
| Tensile Yield Strength | <u>345 MPa</u> | 50000 psi | AA; Typical |
| Elongation at Break | <u>18 %</u> | 18 % | AA; Typical; 1/16 in. (1.6 mm) Thickness |
| Modulus of Elasticity | <u>73.1 GPa</u> | 10600 ksi | AA; Typical; Average of tension and compression. Compression modulus is about 2% greater than tensile modulus. |
| Notched Tensile Strength | <u>379 MPa</u> | 55000 psi | 2.5 cm width x 0.16 cm thick side-notched specimen, $K_t = 17$. |
| Ultimate Bearing Strength | <u>855 MPa</u> | 124000 psi | Edge distance/pin diameter = 2.0 |
| Bearing Yield Strength | <u>524 MPa</u> | 76000 psi | Edge distance/pin diameter = 2.0 |
| Poisson's Ratio | 0.33 | 0.33 | |
| Fatigue Strength | <u>138 MPa</u> | 20000 psi | AA; 500,000,000 cycles completely reversed stress; RR Moore machine/specimen |
| Machinability | <u>70 %</u> | 70 % | 0-100 Scale of Aluminum Alloys |
| Shear Modulus | <u>28 GPa</u> | 4060 ksi | |
| Shear Strength | <u>283 MPa</u> | 41000 psi | AA; Typical |

Electrical Properties

| | | | |
|------------------------|-------------------------|------------------|---------------------|
| Electrical Resistivity | <u>5.82e-006 ohm-cm</u> | 5.82e-006 ohm-cm | AA; Typical at 68°F |
|------------------------|-------------------------|------------------|---------------------|

Thermal Properties

| | | | |
|------------------------|------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTE, linear 68°F | <u>23.2 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$</u> | 12.9 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$ | AA; Typical; Average over 68-212°F range. |
| CTE, linear 250°C | <u>24.7 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$</u> | 13.7 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$ | Average over the range 20-300°C |
| Specific Heat Capacity | <u>0.875 J/g$\cdot^\circ\text{C}$</u> | 0.209 BTU/lb $\cdot^\circ\text{F}$ | |
| Thermal Conductivity | <u>121 W/m-K</u> | 840 BTU-in/hr-ft $^2\cdot^\circ\text{F}$ | AA; Typical at 77°F |
| Melting Point | 502 - 638 °C | 935 - 1180 °F | AA; Typical range based on typical composition for wrought products 1/4 inch thickness or greater. Eutectic melting is not eliminated by homogenization. |
| Solidus | <u>502 °C</u> | 935 °F | AA; Typical |
| Liquidus | <u>638 °C</u> | 1180 °F | AA; Typical |

Processing Properties

| | | |
|-----------------------|---------------|--------|
| Annealing Temperature | <u>413 °C</u> | 775 °F |
| Solution Temperature | <u>256 °C</u> | 493 °F |

References for this datasheet.

Some of the values displayed above may have been converted from their original units and/or rounded in order to display the information in a consistent format. Users requiring more precise data for scientific or engineering calculations can click on the property value to see the original value as well as raw conversions to equivalent units. We advise that you only use the original value or one of its raw conversions in your calculations to minimize rounding error.