



## ALLOY 2124 PLATE

## TECHNICAL DATA

### Strength and Ductility at Elevated Temperatures

#### DESCRIPTION

Alloy 2124-T851 plate was developed primarily for elevated temperature applications requiring guaranteed fracture toughness and improved short transverse properties in plate gauges over 1.0 inches (25.40 mm) thick. This plate alloy also exhibits good strength retention and creep resistance at elevated temperatures up to 350° F (177°C). Fracture toughness levels of 2124-T851 plate are substantially higher than 2024-T851.

Alloy 2124-T851 plate is available in thicknesses from 1.50 inch (38.1 mm) through 6.00 inches (152.4 mm) with guaranteed minimum fracture toughness.

#### THICK PLATE FABRICATION IMPROVEMENTS

Through the application of statistical process control techniques recently implemented at Alcoa's Davenport, Iowa plant, additional quality improvements have been made to thick gauges of alloy 2124 plate. As a result Alcoa will guarantee strength improvements of 2 to 3 ksi, elongation improvements of 1 to 3 percent for the L and LT direction and 0.5 percent for the ST direction over mechanical properties shown in this fact sheet. Fracture toughness improvements of 1 to 3 ksi√in will be guaranteed on request. As with all Alcoa thick plate products Class A ultrasonic quality will also be guaranteed.

#### APPLICATIONS

Alloy 2124-T851 is recommended for moderately elevated temperature applications (250-350°F, 121-177°C) requiring better short-transverse ductility and fracture toughness guarantees than are available with 2024-T851 plate. The primary use is machined fuselage bulkheads and wing skins in high-performance military aircraft.

#### MECHANICAL PROPERTIES – ROOM TEMPERATURE – 2124 PLATE (ALL GAUGE RANGES NOT SHOWN)

Guaranteed Minimum Long Transverse Mechanical Properties  
Alloy 2024-T851 guaranteed properties shown for comparison.

	2124-T851		2024-T851
Thickness: in. (mm)	1.001-2.000 (25.43-50.80)	5.001-6.000 (127.03-152.40)	1.000-1.499 (25.40-38.07)
Tensile Strength, ksi (Mpa)	66 (455)	63 (435)	66 (455)
Yield Strength, ksi (Mpa)	57 (395)	54 (370)	57 (395)
Elongation, %	5	4	5
Note: 2024-T851 not available in thicker gauges.			

#### ELEVATED TEMPERATURE NOMINAL YIELD STRENGTHS

Tests at temperatures after indicated exposure time.  
1.500-2.000 in. (38.1-50.8 mm) gauge  
Test direction: Long transverse

Exposure time:	2124-T851		7075-T7351	
	10 hours	10,000 hours	10 hours	10,000 hours
75°F ksi (Mpa)	64 (440)	64 (440)	63 (435)	63 (435)
212°F ksi (Mpa)	61 (420)	61 (420)	59 (405)	58 (400)
300°F ksi (Mpa)	57 (395)	49 (340)	50 (345)	27 (185)
400°F ksi (Mpa)	45 (310)	20 (140)	28 (195)	13 (90)

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**FRACTURE TOUGHNESS**

Fracture toughness is guaranteed for alloy 2124-T851 plate (but not for alloy 2024-T851 plate) and shows more consistent values in different test directions than 2024-T851. For complete data, refer to Alcoa Green Letter 217.

**K<sub>IC</sub> FRACTURE TOUGHNESS VALUES – KSI IN (MPa√M)**

Test direction:	L-T	T-L	S-L
2024-T851 Typical Not Guaranteed	22 (24.2) -	20 (22.0) -	17 (18.7) -
2124-T851 Typical Guaranteed minimum-1.5-6.0 in. (38.1-127.0 mm) thickness	29 (31.9) 24 (26.4)	24 (26.4) 20 (22.0)	24 (26.4) 18 (19.8)

**FATIGUE PROPERTIES**

The fatigue properties of alloy 2124-T851 are similar to those of 2024-T851.

**CORROSION RESISTANCE**

Alloy 2124-T851 resistance to atmospheric corrosion is comparable to that of conventionally fabricated 2024-T851.

Tests conducted on numerous lots of 2124-T851 show good resistance to stress corrosion cracking, particularly in the short-transverse direction. In 20 years of service there are no reported incidents of SCC failures.

Alloy 2124-T851 has excellent exfoliation corrosion resistance.

**THERMAL TREATMENTS**

The recommended practices for solution heat-treating and precipitation aging for 2124 plate are specified in MIL-H-6088.

**PROCUREMENT SPECIFICATIONS**

Temper	2124-T851
Specification	AMS 4101, QQ-A-250/29
MIL-HDBK-5	
Coverage	Approved

**REFERENCES:**

- Alcoa Green Letter No. 217-  
*Alcoa Alloy 2124 Plate.*
- The Aluminum Association, *Position on Fracture Toughness Requirements and Quality Control Testing T-5*
- MIL-H-6088, *Heat Treatment of Aluminum Alloys*

**CHEMICAL COMPOSITION LIMITS (WT.%)**

	Alloy 2124	Alloy 2024
Si . . . . .	0.20	0.50
Fe . . . . .	0.30	0.50
Cu . . . . .	3.8-4.9	3.8-4.9
Mn . . . . .	0.30-0.9	0.30-0.9
Mg . . . . .	1.2-1.8	1.2-1.8
Cr . . . . .	0.10	0.10
Zn . . . . .	0.25	0.25
Ti . . . . .	0.15	0.15
Others, each . . . .	0.05	0.05
Others, total . . . .	0.15	0.15
Aluminum . . . . .	Remainder	Remainder

Note: Value maximum if range not shown

PRODUCT SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

**ALCOA MILL PRODUCTS, INC.**

