



ALLOY 2090-T83 SHEET

TECHNICAL DATA

High Strength / Low Density Sheet

DESCRIPTION

Alloy 2090-T83 sheet is a fully commercialized aluminum-lithium alloy developed for high strength aerospace applications. The Al-Cu-Li alloy offers an 8 per cent density savings when compared with other aerospace alloys. Alloy 2090-T83 also has a 10 per cent higher elastic modulus. When coupled with the low density feature, this provides for unique weight saving benefits.

Alloy 2090-T83 has strengths comparable with other high strength aluminum alloys and superior corrosion resistance. The alloy is also one of the most weldable aluminum products available. Some material features of 2090 vary from conventional aluminum alloys and need to be considered during design and material selection. Specific details are further defined in Alcoa's Green Letter on 2090 alloy.

APPLICATIONS

Alcoa has produced over 200,000 pounds of 2090 sheet in various tempers for commercial use. Alloy 2090-T83 sheet is designed for use where high strength requirements are necessary. Currently 2090-T83 sheet is being used for aircraft floor bulkhead stiffeners to take advantage of the high strength and lower density to achieve a substantial weight reduction.

Initial uses include wing leading and trailing edges, fuselage bulkhead webs and internal frame-work parts. Alloy 2090 is also being considered for many applications in advanced aircraft including wing structures.

MINIMUM MECHANICAL PROPERTIES 2090-T83 .40-.125" THICKNESS

	L	LT	45°
Tensile Strength, ksi(Mpa)	77 (531)	73 (503)	64 (441)
Yield Strength, ksi(Mpa)	70 (483)	66 (455)	56 (386)
Elongation, %	3	5	
Toughness, Kc ksi√in. (Mpa√m)*	40 (43.9)		
Density, lbs./in. ³ (g/cm ³)		0.093 (2.59)	
Modulus, Msi		11.5	
*Kc - 16" x 44" (406 mm x 1118 mm) sheet panel (L-T orientation); Typical Property			

CHEMICAL COMPOSITION LIMITS – ALLOY 2090

Cu 2.4-3.0	Cr 0.05	Others, each . . 0.05
Li 1.9-2.6	Ti 0.15	Others, total . . 0.15
Zr 0.08-0.15	Si 0.10	Aluminum Remainder
Fe 0.12	Mg 0.25	
Mn 0.05	Zn 0.10	

TOUGHNESS AND FATIGUE

The typical fracture toughness of 2090-T83 sheet is 40 ksi√in. The constant amplitude fatigue results of 2090-T83 and 7075-T6 are similar. Fatigue crack growth rates of alloy 2090-T83 are slower than 7075-T6 and 7475-T61 rates.

CORROSION AND WELDING

The corrosion resistance and welding response of 2090-T83 sheet are superior to 2024-T3 and 7075-T6 sheet products. Long term atmospheric exposure has verified the excellent corrosion resistance of 2090-T83 sheet.

SUPPLYING THE WORLD'S BEST



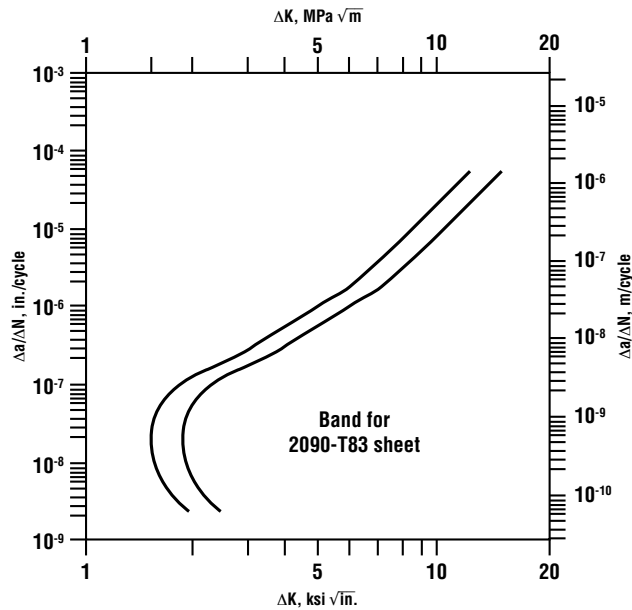
PRODUCT SPECIFICATIONS

AMS 4251 specification has been issued for bare 2090-T83 sheet. Design allowable data have also been generated and approved by the MIL-HDBK-5 Committee. Various customer specifications have also been written for 2090-T83 sheet.

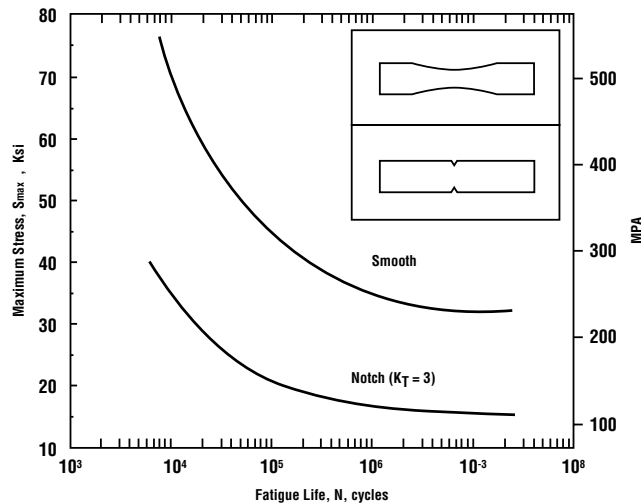
STOCKING PROGRAM

Alcoa has instituted a stocking program at the Davenport location. Various gauges and width samples are available. Contact your local Alcoa sales office for more information.

**FATIGUE CRACK PROPAGATION RATE OF 2090-T83 SHEET
L-T ORIENTATION, R-RATIO = +0.33, HIGH HUMIDITY (R.H. = 96%) AIR**



AXIAL-STRESS FATIGUE (S-N) DATA FOR 2090-T83 SHEET L AND LT ORIENTATIONS, R-RATIO = +0.1, AMBIENT AIR



PRODUCT SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

ALCOA MILL PRODUCTS, INC.

P.O. BOX 8025 • BETTENDORF, IOWA 52722 • (800) 523-9596 • www.millproducts-alcoa.com

