



CAUL PLATE

TECHNICAL DATA

Strength and Ductility at Elevated Temperatures

INTRODUCTION

Lightweight but strong, aluminum has been the material of choice for caul plates in the manufacture of plywood, fiberboard, hardboard, and particle board, as well as plastic-and veneer-faced furniture. Aluminum has certain characteristics which make it eminently suitable for this application. As a result of our commitment to quality and value, Alcoa is the world's leading producer of aluminum sheet and plate products.

FIVE CRITICAL REQUIREMENTS OF CAUL MATERIAL

I. Strength

Caul plates must have sufficient compressive yield strength at elevated temperatures of up to 350°F (176°C) to resist buckling and edge waves from friction constrained thermal expansion. The compressive yield strengths of Alcoa's 2024-T81 and 6061-T6 provide excellent resistance to buckling. (See Table 1). For operations where the pressure usually exceeds 150 psi and the temperature exceeds 300°F (148°C), 2024-T81 is the superior performer, due to its higher compressive yield strength, and should provide greatly increased service life under these conditions. Further, this alloy is more forgiving of gaps between adjacent panels which are cured at the same time. This allows for the use of wider cauls.

II. Heat Transfer Capacity

The ideal caul material should provide rapid heat transfer from press plate to the load in order to speed resin curing, thereby shortening the process cycle time. Typically, aluminum thermal conductivity for 2024 and 6061 is approximately 1100 BTU in/ft²hr F° which is roughly 36% higher than sheet steel.

III. Corrosion Resistance

Aluminum has a naturally occurring thin and transparent oxide layer which provides its well-known corrosion resistance. To further enhance corrosion performance, this oxide layer can be artificially thickened by anodizing. This has been shown to be an effective way to increase the life cycle of aluminum caul plates. Alcoa will drop-ship material to the anodizer of your choice, or provide a finished anodized product at customer request.

TABLE 1. TYPICAL MECHANICAL PROPERTIES

Sheet	Ultimate (KSI)	Tensile Yield (KSI)	Compressive Yield at 330°F (KSI)	Elongation %
2024-T81	71	66	36	7.6
6061-T6	49	44	25	11.8

IV. Defect-Free Surface

Imperfections, such as nicks, gouges, scratches, slivers, etc. cannot be tolerated on cauls used for pressing hardboard or applying impregnated paper overlays, because they will be transferred to the final product. Alcoa's Davenport Works is the world's leading supplier of surface critical products, such as aircraft skin sheet and bright anodized sheet for automotive, appliance and architectural applications. This capability enables Alcoa to provide a superior surface on our caul plate products.

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V. Light Weight

Caul plates need to be light weight for ease of handling in and out of the press. Aluminum weighs about 35% as much as steel by volume: 170 lbs. per cubic foot of aluminum, versus 490 lbs. per cubic foot of steel.

TABLE 2. PHYSICAL PROPERTIES

Property	6061-T6	2024-T81
Modulus (KSI x 10 ³)	10	10.6
Density (lbs/in ³)	0.098	0.101
Coefficient of Thermal Expansion (68°F to 212°F per F°)	13.1 X 10 ⁻⁶	12.9 X 10 ⁻⁶
Thermal Conductivity at 77°F (BTU in/ft ² hr F°)	1160	1050
Melting Range	1080-1205	935-1180

TABLE 3. SIZES AVAILABLE

Alcoa's unique capability to produce widths greater than 62 inches provides more options for processors than any manufacturer in North America.

	Thickness	Width	Length
Sheet	0.020-0.249"	36-98"	475"max
Plate	0.250-0.330"	36-98"	475"max

S H A P E S

Alcoa can offer semi-fabricated products with features to facilitate transfer of cauls through the manufacturing process, i.e., rounded corners or key-holes, as in the sketch below.



Specific costs and design parameters are available upon review of customer drawing.

C O N C L U S I O N

Alcoa has extensive experience in supplying aluminum caulk plate to both North American and International customers. For many years, we have offered a variety of alloys and surface finishes to suit individual customers' requirements. This experience enables us to confidently offer the alloys described above. Alcoa's technical and sales staff is prepared to discuss the most desirable product for your application. Inquiries are welcome and may be directed to your local Alcoa sales office or the address below.

PRODUCT SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

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