

Breakage Resistance:

The figures below show that various thickness of acrylic sheet have greater impact resistance than other types of glass when impacted with a hard object, such as a stone.

IMPACT RESISTANCE OF ACRYLIC SHEET AND OTHER MATERIALS

Material	Nominal Thickness:	Energy to Break (ft-lb)
Acrylic Sheet	2.5 mm	3.0
Acrylic Sheet	3.0 mm	4.7
Acrylic Sheet	4.5 mm	11.1
Acrylic Sheet	6.0 mm	18.1
Single strength Window Glass	.100 in	0.8
Double Strength Window Glass	.125 in	1.8
Plate Glass	.187 in	2.0
Plate Glass	.250 in	1.0
Laminated Safety Glass	.250 in	1.1
Rough Wire Glass	.250 in	2.2
Polished Wire Glass	.250 in	0.4

AIR CANNON IMPACT STRENGTH

Acrylic Sheet Nominal Thickness (mm)	Baseball (0.32#)	Steel Tipped Dart (0.6 lb 1/2" Rad. Tip)
3.0	47 mph	5 ft.lb.
6.0	84 mph	16 ft.lb.
9.0	105 mph	27 ft.lb.
12.0	147 mph	40 ft.lb.
18.0	184 mph	53 ft.lb.
24.0	220 mph	68 ft.lb.

Light Transmittance:

The colorless form, Acrylic sheet is as transparent as the finest optical glass. Its total light transmittance is 92 percent, and haze measurement for colorless sheet averages only 1 percent.

SOLAR ENERGY TRANSMITTANCE and SHADING COEFFICIENTS

Acrylic Sheet	Transmittance (%)	Transmittance (%)	Shade Coefficients Vertical
	Visible Light	Solar Energy	

2370 Bronze (Dark)	10 %	20 %	0.46
2412 Bronze (Med.)	27	35	0.58
2404 Bronze (Light)	49	56	0.75
2111 Green	77	76	-
2092 Green	26	57	-
2069 Blue	55	71	0.89
Colorless (Clear)	92	85	0.98

- **2412 Bronze is our standard (recommend) sheet in bright solariums.**
- **Super White Translucent grades are preferred in south face roof areas for alleviation of extreme heat build-up in solariums - this transmits and bathes areas below in a natural cool white light plus delivering all your required light for the growth of plants, yet shades the area for human activity.**

Ultraviolet Transmittance: Regular Acrylic glaze sheet (G & MC), will block some portions of the UV spectrum, but special grades are required when all (UF-3) or most (UF-4) of the UV needs to be absorbed.



Weight:

Acrylic Sheet is approximately less than 50% as heavy as glass and 43% as heavy as aluminum.

Lexan "MacroLux" Panels [double wall extruded sheet] is 1/8 the weight of glass.

COMPARATIVE WEIGHTS (lb/ft²)

Thickness (mm)	Acrylic Sheet	MacroLux Panels	Glass Single Glaze	Glass Double Glaze
6	1.45	0.266	2.07	6.15
8	1.93	0.350	4.10	8.19
10	2.92	0.410	5.12	10.24

Total Energy Transfer:

The amount of heat conducted through Acrylic glazing is lower than for glass of the same thickness.

U-Factor: (BTU/hr/sq.ft./ ° F)

Description:	Winter	Summer
Single Walled	1.15	0.80
Double Walled	0.70	0.46



Chemical Resistance:

While most household cleaners can safely be used with acrylic sheet, the material is affected by alcohol, paint thinners, turpentine, and similar petroleum solvents. To clean paint and grease, utilize NAPHTHA or KEROSENE for safe removal. Regular cleaning with a mild dish detergent and plenty of water is preferred, dry with clean cotton or air dry. A good grade of automobile wax can be applied as a polish, and is very useful in removal of minor surface abrasions.

Weather Resistance:

Acrylic sheet has proved its ability to withstand weather and sun exposure with negligible loss of light transmission and clarity. The manufacturers warranty expresses a 10 year guarantee of less than 3% CHANGE in light transmission and clarity within this interval. No other type of plastic offers this assurance of satisfactory outdoor performance.

Heat Forming:

When acrylic sheet is heated to its optimum forming temperature (approximately 325°F - 350°F), it becomes soft and pliable, and can be formed to almost any desired shape. As the material cools in its formed shape, it stiffens and retains the shape to which it has been formed. This permits architects to specify complex designed panels in small quantity at reasonable tooling costs.

Cold Forming:

Flat sheets of acrylic can be cold-formed ... bent while cold to a smooth contour ... and held to the radius by springing the material into a curved channel support. The recommended radius of curvature for "G sheet" should be at least 180 times the thickness of the sheet.

Minimum Radius of Curvature for Cold-Formed Acrylic Sheet

Sheet Thickness (mm)	Min. Radius (in)
1.5 mm	11 in
3	21
4.5	32
6	42.5

8.5	60
12	86

Our standard minimum radius for 4.5 mm sheet is 36"

Sound Abatement:

Acrylic sheet offers equal to or better sound loss characteristics than glass. It also has much better breakage resistance, so it can be used as a transparent sound barrier to reduce noise levels and increase safety at the same time.

Comparison of Noise Reduction Characteristics of Acrylic Sheet and Other Materials

Construction Material	Approximate dB (A) Noise Reduction
Acrylic Sheet 3 mm	25
Acrylic Sheet 6 mm	29
Acrylic Sheet 12 mm	33
Glass (1/8")	25
Glass (1/4")	27
Plywood (1")	26
Steel (1/8")	37
Sheet Lead (1/16")	38
Wood Stud Partition (4")	38

Thermal Expansion & Contraction Factor:

Due to the thermal expansion and contraction, acrylic sheet is subject to greater dimensional change than other materials with which it is used in construction. This is factored into account when dimensions are laid out for any project. Considerations must be given to the overall temperature gradient (max. & min. values) that the glazed structure will be subjected to, and allowances are made to the sheet dimensions according to those values.

Thermal Expansion and Contraction Factor

Material	Expansion Coefficients ("/"/°F)	Typical Modulus (psi)
Acrylic Sheet	0.0000410	450,000
Aluminum	0.0000129	10,000,000
Steel	0.0000063	30,000,000
Plate Glass	0.0000050	10,000,000

Example: (Sheet Location: = 25 1/2" x 14') If the ambient temperature at time of dimensional cutting is room temp. - then sheet is trimmed to 25 1/4" x 13' 5/8". Thereby, if sheet is cold at dimensioning, you must realize it is now contracted, and if the sheet is hot at time of trim, the sheet may be fully expanded.

You therefore trim to what the opposite extreme temperature would consist of. Generally, on a sheet at 14 ft., the max. off-cut is approx. 1/2" - 5/8" in length, and approx. 3/16" to 1/4" in width. For smaller sheets, the maximal length off-cut is reduced proportionally.



Temperature / Humidity Bowing:

Different temperature and/or humidity conditions on the inner and outer surfaces of thinner acrylic sheet may cause sheet to bow somewhat in the direction of the higher temperature and/or humidity. However, this type of bowing is reversible, and the sheet will return to its original flatness once the temp./humidity differentials are equalized. Bowing does not affect visibility through flat transparent sheet, but may cause distorted reflection. In translucent or opaque panels where visibility through the material is not required, this nature exhibits a specular disguise to reflective distortions. This will not occur in curved glaze, cold formed or heat formed. This event is lessened by use of thicker glaze panels on narrow width dimensions.

Service Temperature:

The allowable continuous service temperature range for Acrylic sheet is 170° F to 200° F for exterior applications.

Design Stress:

To avoid stress crazing [light surface checking of panel], design stress limits for continuously imposed loads should not exceed 1500 psi for acrylic "G" sheet, and 750 psi for acrylic "MC" sheet at or below room temperature.