Plexiglas® MC Sheet

Product Description

Plexiglas MC is an economical sheet made by a proprietary process known as melt calendaring. It offers many of the same high-quality features as Plexiglas G. In addition, it has exceptional thickness tolerance and can be thermoformed to greater detail. It is well suited to nearly all the conventional uses for which acrylic sheet has long been noted. Plexiglas MC sheet is available in sign white, black and 27 translucent and transparent colors, in thickness from 0.080" to 0.354", and in various sheet sizes.

Features and Benefits

- Chemical Resistance: good
- Abrasion Resistance: fair
- Electrical Properties: fair
- Formability: yes
- Clarity: excellent in some colors, fair in opaque colors
- Impact Resistance: low
- Texture: yes - different textures/ patterns available
- Color: yes - many different colors available
- Standard Sizes: yes - many standard sheet sizes are available
- Temperature Resistance: fair
- Weatherability: good
- Flammability: no
- UV Resistance: yes
- Code Approvals: yes – Plexiglas MC sheet is recognized by Underwriters Laboratories with a UL flame class of 94HB. Subject to one or more of the following tests: ultraviolet light, water exposure or immersion in accordance with UL 746C, where the acceptability for outdoor use is to be determined by Underwriters Laboratories.
- Degrees of Light Transmission: Varies from fair to excellent depending on sheet color and/or thickness.
- Printability: yes

Datasheet

Property	Test Method	Units
Thickness, Nominal, Inch		0.236
Specific Gravity	ASTM D792	1.19
Optical		
Refractive Index	ASTM D542	1.49
Light Transmittance and haze “as received” ▪ Parallel ▪ Total ▪ Haze	ASTM D1003	 91%* 92%* 1%*
After five years outdoor exposure, Bristol, PA, 45° angle, facing south ▪ Parallel ▪ Total ▪ Haze		 90%* 92%* 3%*
After 240 hours artificial exposure, Carbon Arc Type, per ASTM G-23 ▪ Parallel		 --

• Haze		--
Artificial weathering, fluorescent sunlamp with dew, 10 cycles, 240 hours exposure ▪ Crazing ▪ Warping	ASTM D1501 or Fed. Test Std. 406 6024	 None None
Instrumental measurement change in Yellowness index after artificial weathering	ASTM D1925	0.8
Ultraviolet transmission, 320 nm	Beckman DU-792	0%
Mechanical		
Tensile Strength (0.25" specimen-0.2"/min) ▪ Maximum ▪ Rupture ▪ Elongation, maximum ▪ Elongation, rupture ▪ Modulus of Elasticity	ASTM D638	 10,200 psi 10,200 psi 4.5% 4.5% 450,000 psi
Poisson's ratio		--
Flexural Strength (span depth ratio 16, 0.1"/min) ▪ Maximum ▪ Rupture ▪ Deflection, maximum ▪ Deflection, rupture ▪ Modulus of Elasticity	ASTM D790	 15,000 psi 15,000 psi 0.5 in 0.5 in 450,000 psi
Compressive Strength (0.5"/min) ▪ Maximum ▪ Modulus of Elasticity	ASTM D695	 16,000 psi 430,000 psi
Compressive deformation under load ▪ 2,000 psi at 122° F, 24 hrs ▪ 4,000 psi at 122° F, 24 hrs (Conditioned 48 hrs at 122° F)	ASTM D621 Method A	 0.3% 0.9%
Shear Strength	ASTM D732	--
Shear Modulus		--
Impact Strength ▪ Charpy unnotched @ 73° F ▪ Izod milled notch @ 73° F	ASTM D256	 7.0 ft-lb/1/2" X 1" sect. 0.3 ft-lb/ in. of notch
Rockwell Hardness	ASTM D785	M-90*
Barcol Number	ASTM D2583	--
Resistance to Stress, Critical Crazing Stress ▪ Isopropyl alcohol ▪ Toluene	ARTC Mod. of MIL-P-6997	 1,300 psi 1,200 psi
Thermal		
Hot forming temperature		275-350° F
Deflection Temperature under (flexural) load 3.6° F/min-264 psi	ASTM D648	200° F*
Maximum Recommended Continuous Service Temperature		170 - 190° F
Coefficient of Thermal Expansion ▪ -40°F ▪ -20 ▪ 0	ASTM E831	 2.7×10^{-5} in./in./° F 2.9×10^{-5} in./in./° F 3.1×10^{-5} in./in./° F 3.2×10^{-5} in./in./° F

▪ 20 ▪ 40 ▪ 60 ▪ 80 ▪ 100		3.4 x 10^{-5} in./in./° F 3.6 x 10^{-5} in./in./° F 3.9 x 10^{-5} in./in./° F 4.3 x 10^{-5} in./in./° F
Coefficient of Thermal Conductivity	Cenco-Fitch	1.3 BTU/(hr.)/(sq. ft.)/(° F/in.)
Specific heat at 77°		0.35 BTU/(lb.)(° F)
Electrical		
Dielectric Strength, short time test	ASTM D149	500 volts/mil
Dielectric Constant ▪ 60 Hz ▪ 1,000 Hz ▪ 1,000,000 Hz	ASTM D150	 3.7 3.3 2.2
Power Factor ▪ 60 Hz ▪ 1,000 Hz ▪ 1,000,000 Hz	ASTM D150	 0.05 0.04 0.03
Loss Factor ▪ 60 Hz ▪ 1,000 Hz ▪ 1,000,000 Hz	ASTM D150	 0.19 0.13 0.07
Arc resistance	ASTM D495	No Tracking
Volume Resistivity	ASTM D257	1 X 10^{18} ohm-cm
Surface Resistivity	ASTM D257	1 X 10^{17} ohm/sq cm
Miscellaneous		
Horizontal burning test avg. ▪ Burning rate	ASTM D635	2.5 cm/min. (1.0*)(in./min.)
Smoke density	ASTM D2843	4-10%
Flammability Classification	UL 94	94HB
Water absorption, 24 hrs at 73° F ▪ Weight loss on drying ▪ Weight gain on immersion ▪ Soluble matter lost ▪ Water absorbed ▪ Dimensional changes on immersion	ASTM D570	 0.1*% 0.3*% 0.0*% 0.3*% 0.0*%
Water absorption (weight gain) after immersion for: ▪ 1 day ▪ 2 days ▪ 7 days ▪ 28 days ▪ 56 days ▪ 84 days	ASTM D229 and ASTM D570	 -- -- -- -- -- --
Humidity expansion, change in length on going from 20% to 90% relative humidity at equilibrium, 74° F		--
Odor		None
Taste		None

**This value will change with thickness. The value given is for the thickness indicated in the column heading.*
(1) Values reported are averages and should not be used for specification purposes.
(2) Samples conditioned per ASTM D618, Procedure B, except where noted.
(3) The values are after the material has been heated for forming.
N.A. = Not Applicable

Technical Guides

DESIGN CONSIDERATIONS

Thermal Expansion and Contraction

Due to thermal expansion and contraction, Plexiglas sheet is subject to greater dimensional change than other materials with which it is used in construction. This dimensional change difference is shown in Table eight.

Rigidity

Plexiglas sheet is not as rigid as many other materials used in building, although it is more rigid than most other thermoplastic sheet materials. Lower rigidity can cause the material to deflect under load, and as a result, foreshorten. Rigidity expressed in terms of modulus is shown in Table eight.

Table 8: Thermal Expansion/Contraction and Rigidity Comparison of Plexiglas sheet vs. Other Building Materials

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

Temperature/Humidity Bowing

Different temperature and/or humidity conditions on the inner and outer surfaces of Plexiglas sheet may cause the 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 when the temperature and humidity differentials are equalized.

Bowing does not affect visibility through flat transparent Plexiglas sheet, but may cause distorted reflection. In translucent or opaque panels where visibility through the material is not required, surface textures or formed designs will help disguise specular reflection distortions.

Service Temperature

The allowable continuous service temperature ranges for Plexiglas G sheet (180° F to 200° F) and Plexiglas MC sheet (170° F to 190° F) are sufficiently high for exterior applications and fluorescent lighting.

Installation

To accommodate the greater thermal movement and deflection foreshortening, Plexiglas sheet will perform best when these recommendations are followed:

1. Plexiglas sheets or panels should be installed in a channel frame engaging all edges of the material so that the material is free to expand and contract without restraint.

2. The channel frame or rabbet depth should be sufficient to allow for thermal contraction and foreshortening of the Plexiglas sheet, without withdrawal of the edges from the frame. Channel depth specifications are given in the glazing sections of this brochure**.**

3. Through-bolting or use of other inflexible fastenings that do not provide for expansion and contraction may cause failure of the installation.

4. Before installation in the channel frame, Plexiglas sheet should be cut sufficiently shorter than the channel frame dimensions to allow for thermal expansion.

5. Sealant compounds and tapes should be types that are sufficiently extensible to accommodate thermal expansion and contraction of the Plexiglas sheet, and that adhere to both the Plexiglas sheet and the frame. Sealants and tapes should be tested for chemical compatibility with Plexiglas sheet.

6. Forming Plexiglas sheet will increase its rigidity if the shape is properly designed. Whenever practical, formed Plexiglas sheet panels should be specified for large unsupported areas where wind or snow loads are involved. Trade associations, such as the American Architectural Manufacturers Association (AAMA) in Chicago, have developed design recommendations for formed shapes, such as free-blown skylights.

7. If forming Plexiglas sheet is not practical, increasing the thickness of a flat Plexiglas sheet will increase rigidity. If flat sheet is used in overhead glazing, it is to be installed on a slope greater than 10° from the horizontal, and engaged along all four edges.

Design Stress

IMPORTANT - Stresses considerably below ASTM tensile and flexural values will produce a light surface check known as crazing. To avoid stress crazing, design limits for continuously imposed loads should not exceed 1500 psi for Plexiglas G sheet and 750 psi for Plexiglas MC sheet at or below room temperature.

Stresses of slightly greater magnitude but of short duration may not cause crazing. Optimum properties can be obtained by sanding cut edges as noted under the Plexiglas glazing preparation section.

Custom design using Plexiglas for load bearing should only be done by a design professional familiar with plastics.

Horizontal Installation

Flat plates of Plexiglas sheet installed horizontally will deform permanently under continuous loads such as snow, ice or water or in large, unsupported spans under their own weight. Deflections of horizontal installations can be avoided by forming Plexiglas sheet to increase its rigidity, as in corrugated or slightly domed sheets.

In interior installations such as luminous ceilings where forming may not be practical or aesthetically desirable, care must be taken to correlate unsupported span dimensions and load requirements with adequate sheet thickness. Specific data for such installations follow.

Table 9: Estimated Surface Deflection of Horizontally Mounted, Flat Panels of Plexiglas G Sheet

(All four edges simply supported. Load is weight of Plexiglas sheet only. Temperature < or = 120°F. Not for specification purpose.)				
Thickness (in)	**Size (in)**	**Initial (in)**	**One Year (in)**	**Three Years (in)**
.118	12 x 12	1/16	1/16	1/16
	18 x 18	1/16	1/16	1/16
	24 x 24	1/8	3/16	3/16
	30 x 30	3/16	5/16	5/16
	36 x 36	5/16	7/16	7/16
	42 x 42	3/8	9/16	9/16
	48 x 48	1/2	11/16	3/4
	60 x 60	3/4	1	1-1/16
.177	12 x 12	1/16	1/16	1/16
	18 x 18	1/16	1/16	1/16
	24 x 24	1/16	1/8	1/8
	30 x 30	1/8	3/16	3/16
	36 x 36	3/16	5/16	3/8
	42 x 42	5/16	7/16	1/2
	48 x 48	7/16	5/8	5/8
	60 x 60	11/16	7/8	15/16
.236	12 x 12	1/16	1/16	1/16
	18 x 18	1/16	1/16	1/16
	24 x 24	1/16	1/16	1/16
	30 x 30	1/16	1/8	1/8
	36 x 36	1/8	1/4	1/4
	42 x 42	1/4	3/8	3/8
	48 x 48	9/16	1/2	9/16
	60 x 60	9/16	13/16	7/8

U-Factors for Plexiglas Sheet

The amount of heat conducted through Plexiglas glazing is slightly lower than for glass of the same thickness. The values tabulated below are U-factors for vertical (windows) and horizontal (skylights) Plexiglas glazing. R-values = 1/U-value. U-values are largely unaffected by the color of Plexiglas sheet.

Table 12: U-Factor for Vertical Windows (BTU/hr./sq. ft./° F)										
Construction	**Winter Heat Loss* Sheet Thickness (in)**					**Summer Heat Gain** Sheet Thickness (in)**				
	.118	**.177**	**.236**	**.354**	**.472**	**.118**	**.177**	**.236**	**.354**	**.944**
Single-Glazed	1.06	1.01	0.96	0.88	0.81	0.98	0.93	0.89	0.82	0.76
Double-Glazed 1/4" air space	0.55	0.52	0.49	-	-	0.56	0.53	0.50	-	-
Double-Glazed 1/2" air space	0.47	0.45	0.43	-	-	0.50	0.48	0.45	-	-

*15mph wind velocity.
**7.5 mph wind velocity

Table 13: U-Factor for Horizontal Panels (BTU/hr/sq ft/°F)

Description Plastic Bubbles	Winter*	Summer**
Single-Walled	1.15	0.80
Double-Walled	0.70	0.46

*Values from ASHRAE Handbook of Fundamentals. Thickness not listed; assume 3/16".
**Based on area of opening, not total surface area.

Total Energy Transfer Through Skylights

Computer programs are available to calculate the complicated balance of energies due to solar heat gain, heat transfer, daylight and electrical lighting.
Many of the national skylight firms offer this calculation service. In addition, a Skylight Energy Handbook or an IBM computer disc is available by writing: AAMA, 1827 Walden Office Square, Suite 104, Schaumburg, IL 60173; or by calling (847) 303-5664

INTERIOR INSULATING WINDOWS

Interior insulating windows are a relatively new idea. Unlike exterior storm windows, interior insulating windows glazed with Plexiglas acrylic sheet can be virtually airtight. The Plexiglas sheet sets up a thermal cavity between the single-glazed window and the inside of a building. This arrangement cuts energy losses at every window while creating a more comfortable, draft-free interior. And the idea works year-round, preventing winter heat from getting out, and summer heat from getting in. Interior insulating windows also reduce troublesome noise transmissions through single-glass glazing by approximately 10 decibels over the entire sound spectrum. Plexiglas glazing may only be used for interior insulating windows under building codes that permit combustable interior windows in the same manner as combustable primary windows. (See building codes for more information.)

Plexiglas sheet in 0.80" and greater thicknesses meets the requirements of the ANSI Z97.1 standard for safety glazing materials (see "Building Codes" for more information).

LIGHT TRANSMITTANCE VS. WAVELENGTH

Spectrophotometric Curves for Plexiglas Sheet

Figure 2 depicts spectrophotometric curves in the visible band of the electromagnetic spectrum for clear, gray and bronze colors of Plexiglas sheet.

Note the relative flatness of the neutral gray densities, which allows indoor color fidelity. The somewhat higher transmittance values in the red band for the bronze densities give a warmer color tone to colored objects viewed in daylight transmitted through these densities. The darker grays and bronzes absorb a significant part of the UV spectrum.

GLAZING DETAILS AND INSTALLATION

Small, Intermediate and Large Light Glazing

8. Determine thickness* and rabbet dimensions from Tables 14(A, B, C, or D) or Table 15. When unusual loading, temperature or humidity conditions exist, special engineering analysis may be required.

9. Determine from Table 16 the recommended thermal expansion clearances for Plexiglas sheet in the sash for both horizontal and vertical dimensions. The total height and width of the Plexiglas acrylic light should be cut shorter than the overall sash opening

dimensions by the amount shown in Table 16. The cut Plexiglas acrylic edges must be smooth and free of chips and hairline cracks.

10. For smaller lights (up to 24" x 24"), select installation method from Figures 3 to 5. Use non-hardening elastic glazing compound. Apply back putty to the rabbet and bed the Plexiglas acrylic light in the sash, so that it is centered both vertically and horizontally. Fasten Plexiglas acrylic light with glazing points or clips, apply face putty and trim the sealant to slope away from the sheet for proper watershed. Metals or wood beads can also be used as in Figure 5, with the elastic glazing compound serving as a weather sealant in the sash.

For larger lights, select sealing details and sealant type. See Figure 6 for intermediate lights up to 72", and Figure 7 for large lights. Specify installation method from Figures 3 through 7.

*These thickness recommendations are based on meeting wind load requirements for the maximum light size specified. Where high impact resistance is a prime requirement of the Plexiglas glazing, the Plexiglas sheet thickness may need to be increased. Breakage resistance data listed earlier can serve as guides for selecting the proper thickness of Plexiglas to withstand high impact.

Tables 14A, 14B, 14C and 14D:
Allowable Framing Sizes for Plexiglas Acrylic Sheets

Table 14A -- Sheet Thickness of 0.177" (4.5mm)

Plexiglas G or MC					
Rabbet Dimensions* (inches)	**Depth / Width**	7/16	1/2	5/8	3/4
		7/16	7/16	7/16	7/16
Maximum Sash Opening (inches)	**20psf**	24 x 40	24 x 46	24 x 63	24 x 85
		30 x 39	30 x 45	36 x 58	36 x 77
		36 x 38	36 x 43	48 x 53	48 x 71
		37 x 37	42 x 42	51 x 51	60 x 65
	30psf	24 x 39	24 x 44	24 x 59	36 x 71
		30 x 37	30 x 43	36 x 53	48 x 63
		36 x 36	36 x 41	48 x 48	58 x 58
		-	40 x 40	-	-
	40psf	24 x 37	24 x 43	24 x 56	36 x 65
		30 x 36	30 x 41	36 x 49	48 x 57
		35 x 35	36 x 39	46 x 46	54 x 64
		-	39 x 39	-	-

*Width noted does not include interior vision strips.

Table 14B -- Sheet Thickness of 0.236" (6.0mm)

Plexiglas G or MC						
Rabbet Dimensions* (inches)	**Depth / Width**	7/16	1/2	5/8	3/4	1
		1/2	1/2	1/2	1/2	5/8
Maximum Sash Opening	**20psf**	24 x 41	24 x 47	24 x 67	60 x 72	-
		30 x 40	30 x 46	36 x 62	69 x 69	-
		36 x 40	36 x 45	48 x 58	-	-

(inches)		39 x 39	44 x 44	55 x 55	-	-
	30psf	24 x 40	24 x 46	24 x 63	48 x 71	60 x 96
		30 x 39	30 x 45	36 x 58	60 x 65	72 x 90
		36 x 38	36 x 43	48 x 53	63 x 63	84 x 84
		38 x 38	42 x 42	51 x 51	-	-
	40psf	24 x 39	24 x 45	24 x 61	36 x 72	48 x 96
		30 x 38	30 x 43	36 x 54	48 x 66	60 x 90
		36 x 37	36 x 42	48 x 48	60 x 60	72 x 82
		37 x 37	41 x 41	-	-	78 x 78

*Width noted does not include interior vision strips.

Table 14C -- Sheet Thickness of 0.354" (9.0mm)						
Plexiglas G or MC						
Rabbet Dimensions* (inches)	**Depth Width**	1/2	3/4	1	1-1/8	1-1/4
		5/8	3/4	3/4	3/4	7/8
Maximum Sash Opening (inches)	**20psf**	24 x 39	48 x 85	-	-	72 x 120
		30 x 48	60 x 81	-	-	-
		42 x 47	72 x 79	-	-	-
		46 x 46	77 x 77	-	-	-
	30psf	24 x 48	48 x 79	-	-	72 x 120
		30 x 46	60 x 75	-	-	-
		42 x 45	70 x 70	-	-	-
		45 x 45	-	-	-	-
	40psf	24 x 27	48 x 75	72 x 76	-	72 x 120
		30 x 46	60 x 70	-	-	-
		42 x 43	67 x 67	-	-	-
		43 x 43	-	-	-	-

*Width noted does not include interior vision strips.

Table 14D -- Sheet Thickness of 0.472" (12.0mm)					
Plexiglas G or MC					
Rabbet Dimensions* (inches)	**Depth Width**	1/2	3/4	1	1-1/8
		5/8	7/8	7/8	1
Maximum Sash Opening (inches)	**20psf**	24 x 49	48 x 90	72 x 120	72 x 120
		30 x 48	60 x 86	-	-
		42 x 47	72 x 83	-	-
		46 x 46	-	-	-
	30psf	24 x 48	48 x 85	72 x 116	72 x 120
		30 x 46	60 x 81	-	-
		42 x 45	72 x 78	-	-
		45 x 45	77 x 77	-	-
	40psf	24 x 47	48 x 81	72 x 108	72 x 120
		30 x 46	60 x 72	-	-
		42 x 43	72 x 72	-	-
		43 x 43	-	-	-

*Width noted does not include interior vision strips.

Table 15 (up to 24" x 24")			
Plexiglas G & Plexiglas MC Sheets			
Thickness (in)	**Minimum Rabbet Depths (in)**		
	20 psf	**30 psf**	**40 psf**
.098	9/32	5/16	11/32
.118	9/32	9/32	5/16
.177	1/4	9/32	9/32
.236	1/4	1/4	9/32

Table 16: Expansion Clearance for Plexiglas G & MC Glazing (in)		
Length (in)	**Clear**	**Tinted***
To 36	1/16	1/16
To 60	1/8	3/16
To 96	3/16	5/16
To 120	1/4	3/8

*Less than 60% light transmission.

GENERAL GLAZING SPECIFICATIONS

Scope

11. Where indicated on the architectural drawings, all glazing in windows, doors, partitions, or as otherwise specified will be Plexiglas acrylic plastic sheet as manufactured by ATOFINA Chemicals, Inc.

12. Work included:

- Furnishing all Plexiglas glazing specified by drawings
- Preparation of all sashes or frames
- Fitting of all Plexiglas glazing
- Installation of all Plexiglas glazing
- Applications of all sealants of the type recommended for Plexiglas glazing. Use sealant primers recommended by sealant manufacturer
- Cleaning of all Plexiglas glazing

Glazing Materials

Plexiglas G and MC colorless sheets:
Thickness _____

Transparent Solar Control Series:
Color # _____, Thickness_____

Colors other than Solar Control Series:
Color # _____, Pattern #_____
Thickness_____

Plexiglas UF sheet (ultraviolet filter): UF-3 or UF-4 Thickness_____

General Conditions

1. Plexiglas glazing shall be handled with care during storage, cutting, transporting and installation to avoid scratching or marring of its surface.

2. Upon completion of glazing installation, Plexiglas acrylic shall be protected from paint, plaster and tar splashes with drop cloths or other suitable covering.

WORKMANSHIP, INSTALLATION

Sash and Sash Preparation

13. Rabbet depth and rabbet width of sash openings are to be in agreement with Plexiglas glazing design Tables 14(A, B, C, or D) or Table 15. Rabbet should engage the Plexiglas glazing on all edges.

14. Remove all projections, such as burrs in the sash rabbet.

15. All surfaces of wood and steel are to be prime-painted by others before application of glazing compound or sealant. Aluminum sash is to be cleaned with recommended solvents to remove protective finishes and grease.

16. Apply sealant manufacturer's recommended primer to the sash to ensure proper adhesion by the sealant.

Plexiglas Sheet Glazing Preparation

3. Accurately measure the inside width and height of each sash opening before cutting Plexiglas sheet to size.

4. The height and width of the Plexiglas acrylic sheet are to be cut shorter than the overall inside sash opening dimensions to allow for thermal expansion by the amount shown in Tables 14(A, B, C, or D) for intermediate and large light glazing.

5. After cutting the Plexiglas sheet, the cut edges should either be scraped or sanded to provide edges smooth and free of chips or hairline cracks. This step ensures optimum impact strength.

6. Unmask Plexiglas acrylic sheet just prior to installation.

7. Protect Plexiglas acrylic from excess sealant smears with a paperback adhesive tape around the edges adjacent to the rabbets.

8. The edges of Plexiglas acrylic sheet are to be thoroughly cleaned with VM&P naphtha before setting in sash.

Sealants

Specify sealants and glazing details. Suggested glazing details are shown on the following page for small, intermediate and large glazing. Sealants should be applied in accordance with the manufacturer's recommendations. The use of 1/8" thick neoprene setting blocks and acrylic terpolymer heel beads is optional.

Some gasket and sealant materials while in contact with Plexiglas sheet could cause crazing of the sheet under certain conditions. Before using any such materials, the contractor should test them thoroughly, duplicating end-use conditions as closely as possible, to ensure their compatibility.

Cleaning and Finishing

1. Glazing compound and masking paper adhesives are to be removed from Plexiglas acrylic sheet by using a soft cloth wetted with VM&P naphtha or kerosene, followed immediately by a thorough cleaning with soap and water.

2. Do not use razor blades or other sharp instruments, such as a putty knife, to remove spots.

3. Clean Plexiglas acrylic with a soft damp cloth or chamois, wiping the surface gently.

4. Wash with mild soap or detergent and water, or household ammonia and water. Use as much water as possible in washing. Apply to large areas with a bristle mop used in window washing and to smaller areas with a clean soft cloth, sponge or chamois.

5. If it is necessary to dry the washed surface, use a clean damp chamois.

SEALANTS FOR Plexiglas GLAZING

Small Lights (up to 24")

Limited thermal and load movements in small light sizes allow the use of a variety of non-hardening caulking compounds. These compounds range in both cost and performance, from oil-based caulks to the better acrylic latex caulks. Caulking compounds offer advantages in respect to cost and ease of application compared with the high-performance elastomers, such as the silicones that are required for larger light sizes.

Intermediate (up to 72") and Large Lights (up to 120")

All light sizes in this category are glazed in a channel system, where the legs of the channel are the fixed and removable stops (Figures 6 - 7). Required rabbet dimensions are listed in the "Allowable Framing Sizes" chart (Tables 14A, B, C, or D) for various sash openings, loads, and Plexiglas glazing thicknesses. The rabbet width specified provides the proper sealant width that is essential to accommodate combined wind, thermal, and humidity movements in the Plexiglas acrylic light.

SEALANT DEPTH

The depth of the sealant is a constant 1/4" for all light sizes. The sealant depth is set by inserting a filler tape in between the Plexiglas glazing and the exterior stop.

Intermediate Lights

A gunned-in sealant bead 1/4" wide by 1/4" deep is specified for all sizes within the intermediate range. The distance between the fixed and removable stops must be no less than the thickness of the Plexiglas glazing plus the specified minimum 1/4" sealant width.

Gun-grade acrylic latex caulks that allow 15% joint movement may be used for intermediate light sizes up to a maximum of 36". Beyond this size, one of the high-performance silicone sealants listed under the Large Lights section below must be used.

Large Lights

High-performance polysulfide and silicone sealants provide joint movement capability ranging from ±25% to ±50%. Only those sealants capable of ±50% joint movement should be used for Plexiglas acrylic light sizes larger than 96".

SEALANTS

Below is a list of sealant manufacturers and the approximate joint movement capability of their sealants. Sealants and sealant dimensions listed are only indicative of required joint movement. Sealants are listed as a selection guide and are not intended to exclude the sealants of other manufacturers.

Sealant preparation, application and performance are the responsibility of the sealant manufacturer. ATOFINA has not tested and does not guarantee sealant performance.

OTHER SEALANTS

- Butyl tapes - refer to manufacturers such as Tremco for limitations and recommendations.
- Keyed-in gaskets - limited to proven proprietary OEM systems such as storm doors and skylights.
- Structural gaskets - not recommended.

GENERAL INSTALLATION NOTES

- Rabbet depth per "Allowable Framing Sizes" chart and expansion clearance for Table 16 do not include tolerances in size and squareness of the installed sash. Cut Plexiglas sheet to fit each field-measured sash opening.

- Expansion clearance for Table 16 and sealant width are based on cutting the Plexiglas sheet to size and installing the sealants at ambient temperatures near 70°F. Ambient temperatures that vary more than ±20°F from this median will require adjustments in the expansion clearance and sealant width.

- Hold reasonably close to the recommended expansion clearances. Excessive clearance could result in insufficient grip along sheet edges under fully contracted conditions.

- The non-oily filler tape specified includes materials such as polyethylene and polyurethane foams of medium density. More dense or firmer filler tapes will require a bond breaker between the tape and the sealant.

Glazing Sealant Suppliers			
#	**Manufacturer**	**Location**	**Telephone**
1	DAP	Dayton, OH	(513) 253-7154
2	Dow Corning	Midland, MI	(517) 496-6000
3	General Electric	Waterford, NY	(518) 237-3330
4	Pecora	Harleysville, PA	(215) 723-6051
5	Tremco	Cleveland, OH	(216) 292-5000

Glazing Sealants

Size Category	**Long Dimension (in)**	**Sealant Elongation Requirement**	**Sealant Width* (in)**	**Generic Glazing Compound of Sealant**	**Supplier No.** (See chart above)
Small	up to 24	-	-	Non-hardening caulk	1

Medium	24 to 36	±15%	1/4	Acrylic latex gun grade	-
Medium	36 to 72	±25%	1/4	Silicone	2,3,4,5
Large	72 to 96	±25%	3/8	Silicone	2,3,4,5
Large	96 to 120	±50%	1/2	Silicone	3,4,5

*Sealant depth is a constant 1/4".

MAINTENANCE

Cleaning Directions

Washing

Wash Plexiglas sheet with a mild soap or detergent and lukewarm water solution. Use a clean soft cloth or sponge and as much solution as possible. Rinse well. Dry by blotting with a damp cloth or chamois.

Do not use

Window cleaning fluids, scouring compounds, gritty cloths, leaded or ethyl gasolines or solvents such as alcohol, acetone, carbon tetrachloride, etc. To remove tar, grease, paint, etc., use a good grade of naphtha or kerosene. Users of these solvents should become familiar with their properties to handle them safely.

Polishing

Apply a thin, even coat of a good grade of automobile paste wax (not a cleaner-wax combination) with a soft clean cloth to protect the surface of the Plexiglas sheet and maintain its luster. Buff lightly with a clean cotton flannel or jersey cloth. After polishing, wipe with a clean damp cloth to ground any electro-static charges that may attract dust particles.

Antistatic Coatings

These coatings can be used to prevent the accumulation of electrostatic charge.

UNDERWRITERS LISTINGS

Underwriters Laboratories

Both Plexiglas G and MC sheet, colorless and all colors, are listed as recognized components by Underwriters Laboratories with a UL flame class of 94HB. These products are subjected to one or more of the following tests: ultraviolet light, water exposure or immersion in accordance with UL 746C, where the acceptability for outdoor use is to be determined by Underwriters Laboratories.

SAFETY CONSIDERATIONS

Health and Safety

Some materials described in this brochure may contain volatile components and/or are combustible. Employees should be properly protected.

Before using any materials, the user should become familiar with the properties of the product and the precautions necessary for its safe usage. Material safety data sheets (MSDS) should be obtained for this purpose from the manufacturer for appropriate health and safety precautions prior to their use.

USES AND APPLICATIONS

SOLAR CONTROL

Sunlight and Heat

Plexiglas sheet is used extensively to allow daylight (direct and diffuse) to enter buildings. It provides an aesthetically pleasing effect, and it reduces energy needs for interior lighting.
Like all light sources, sunlight produces heat. The following information can be used to judge the relative light (visible transmittance) and heating (shading coefficient) benefits.

Types of Plexiglas Sheet

Both transparent colors and white translucent Plexiglas sheet function well for this purpose. Transparent colors function by absorbing some sunlight and heat, while allowing the remainder to filter through. These colors offer the advantage of see-through, so that the outdoors can be seen, but light, glare and heat are controlled. White translucent colors scatter and diffuse sunlight, to take maximum advantage of its daylighting characteristics. Most of the sunlight that does not come through is reflected, rather than absorbed.

Visible Light and Solar Energy Transmittance

Plexiglas transparent colors are produced in densities varying from light to dark, providing a range of visible light and solar energy transmittance values. This range of values lets the glazing material specifier select the density that most effectively satisfies the interrelated requirements for adequate daylight illumination, control of solar heat gain, and glare within a building.
As the color saturation of each of the transparent Plexiglas sheet colors increases, the control of both solar heat and sky glare becomes more effective. For best control of solar heat gain always use the transparent color as the outer pane and the colorless material as the inner pane in multi-pane glazings.

Different densities of each color can be used in combination because the color tones of the various densities in each color are identical. So two densities of neutral gray or bronze will coordinate in sunscreens - window glazing combinations - or in different elevations of a transparent enclosure.

Colored objects viewed in daylight transmitted through the neutral gray series will have a natural appearance because this series transmits light nearly uniformly across the visible band of the electromagnetic spectrum. The transparent bronze series of color densities imparts color warmth to colored objects viewed in light transmitted through the material because its transmittance in the red band (from 650 to 700 nanometers) is somewhat higher than that in the cooler color bands.

Plexiglas Sheet and Fire

Plexiglas sheet must be used with an appreciation for the fact that it is a combustible material. In general, the same fire precautions that are observed in connection with the handling and use of any ordinary combustible material should be observed when handling, storing or using Plexiglas sheet.

Building codes define good practice in the use of Plexiglas sheet for light transmission and control on a design and engineering basis that takes into account the combustibility and fire characteristics of the material.

The fire hazard of uses of Plexiglas sheet can be kept at an acceptable level by complying with building codes and observing established principles of fire safety. We list the fire response

characteristics of Plexiglas sheet in one column and the design, engineering, and fire protection implications of the characteristics in the adjacent column.

FIRE RESPONSE CHARACTERISTICS	RECOMMENDED PRACTICES
The ignition temperature of Plexiglas acrylic is higher than that of most woods but it will ignite readily and, when involved in fire, will burn vigorously and generate heat rapidly.	Install Plexiglas acrylic away from sources of intense heat or flame. Enclose edges of Plexiglas acrylic components. Observe building code stipulations and restrictions. Do not use more Plexiglas acrylic than required to perform the function required of it. Employ fire protective systems, e.g. sprinklers, fire detectors, automatic vents, as hazard analysis indicates.
Plexiglas acrylic softens when heated above 260° F, which is approximately 300° below its ignition temperature.	Do not use Plexiglas acrylic as a supporting element or in any location where resistance to fire penetration is required.
Plexiglas acrylic, if held in position when burning, will drip burning droplets.	If overhead lighting, mount Plexiglas acrylic in free-channel mountings to ensure fallout prior to ignition. When used in interior window systems, mount the Plexiglas sheet in such a manner as to ensure fallout prior to ignition. Extinguish burning Plexiglas acrylic with water or fire extinguishers.
When installed as a wall or ceiling finish or when laminated to a substrate, Plexiglas acrylic provides a surface over which flame may spread rapidly and release heat and gases contributing to flashover.	Do not install Plexiglas acrylic as applied wall or ceiling finish or as a substrate surfacing material for large interior surface areas in building applications unless the areas are protected by an automatic sprinkler system and approval is obtained from the controlling jurisdiction.
Large-area installations of Plexiglas acrylic such as transparent enclosures and continuous sections of interior window systems are not provided for in building code regulations because they do not conform to area limitations and therefore require special permits based on analysis of all relevant fire safety considerations.	Relevant considerations are use of the structure (occupancy); location (exposure); height and area; nature of interior arrangements (decorations, finishes code regulations furnishings); availability and construction of fire exits; need for special fire protection systems such as sprinklers, automatic heat and smoke vents, early warning devices and deluge systems or water curtains. Unless there are extenuating circumstances, sprinkler systems should be used.
Burning Plexiglas acrylic does not produce either excessive quantities of smoke or gases more toxic than those produced by burning wood or paper. The concentratian of carbon monoxide and/or carbon dioxide released by burning Plexiglas acrylic is a factor of the quantity of Plexiglas acrylic involved and the conditions of burning.	The use of Plexiglas acrylic is not restricted because of the character of its products of decomposition but because of its combustibility and burning characteristics.

Building Codes

All grades and colors of Plexiglas sheet are classified as a CC-2 light transmitting thermoplastic

material under the model building codes. Typical values for Plexiglas sheets are: self-ignition temperature (ASTM D1929) in a range of 740° to 880°F; smoke density rating (ASTM D2843 between 4 and 12%; and horizontal burn rate (ASTM D635) between 1.1 and 1.9 in/mm. Note: these are small-scale tests and should not be used to predict how a material will behave in actual fire.

Copies of the approvals of Plexiglas sheet under various codes will be made available upon request. In addition, reports on the status of Plexiglas sheet under Federal Government regulations will be provided promptly.
Assistance can be provided by ATOFINA code consultants and engineers in interpreting the codes for installations of Plexiglas sheet that constitute justifiable exceptions to existing restrictions.

Approvals and research recommendations of general interest include: ICBO Research Recommendation No. 1084; BOCA Report No. 91-24 and SBCC Report No. 91-80; New York City Board of Standards and Appeals Calendars 444-60SM, 657-63-SM; New York City Department of Water Supply, Gas & Electricity approval for use in signs and lighting fixtures; New York City MEA 107-69-M, MEA 146-80-M, MEA 139-80-M; California Fire Marshall File No. A2560-007.

Building Codes and Interior Insulating Windows
Interior window systems that utilize combustible plastics are not specifically addressed in most building codes. Some jurisdictions have permitted combustible interior window systems to be used in the same manner as combustible primary windows, which are controlled by building codes that impose limitations on their use. Under the model building codes, Plexiglas acrylic plastic is classified as CC-2 combustible, light-transmitting plastic material, and as such can be used in accordance with the limitations of the prevailing code.

In other instances, interior window systems have been considered as interior finish. Plexiglas acrylic plastic is not approved as an interior finish material under any building code. In these cases, consideration must be given to the type of occupancy, fire protection devices, structure, height, area limitations, separation requirements, and the manner in which the window systems respond to an interior fire.

It is important to note that regardless of how the window system is classified by regulatory officials, the approvals for Plexiglas sheet do not constitute an approval for an interior window system in which Plexiglas sheet may be utilized. Each window system must be approved by the jurisdiction in which it will be used. Additional information regarding applicable building codes for Plexiglas sheet can be obtained by calling our Plastics Technology Center in Bristol, PA at (215) 785-8337 or (800) 217-3258.