

ACRYLITE® Optical mar resistant Extruded Sheet



Product

ACRYLITE® Optical mar resistant sheet is a continuously manufactured acrylic sheet that has excellent abrasion and chemical resistant properties with outstanding optical quality. It is available with coating on one side (MR1) or two sides (MR2). While two-side coated sheet provides maximum protection, one side coated sheet offers economic advantages for applications where only one side of the sheet is exposed. In addition, the uncoated side is ideal for silk screening.

Applications

ACRYLITE® Optical mar resistant sheet is ideal for a wide variety of applications including:

- Glazing
- P-O-P Displays / Store Fixtures
- Menu Boards
- Electronic Displays / Museum Displays
- Signs & Directories
- Furniture & Interiors
- Framing
- Sports Arena Glazing
- Architectural Glazing
- Security Glazing
- Automotive Interiors
- Instrument Cluster Panels



Properties

ACRYLITE® Optical mar resistant sheet provides the following outstanding properties:

- Optical clarity
- Abrasion resistance
- Chemical resistance
- Ease of fabrication
- Light weight – half the weight of glass
- Strength – many times the impact strength of glass

ACRYLITE® Optical mar resistant sheet resists marring and scratching from everyday public contact, daily cleanings, airborne dirt and dust that are found in many applications. This property significantly extends the service life of the product. Although the coating provides an extremely hard surface to resist these abuses, it is not resistant to intentional gouging with sharp-tipped objects, such as knives or screwdrivers.

Because ACRYLITE® Optical mar resistant sheet offers protection from chemical attack, many household glass cleaners can be used on the coated surfaces. Recommended cleaning agents and chemical resistance information can be found on page 4.

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Product Specifications

Color	Color Number	Size	Thickness
Clear	OA000 MR1	48" x 96"	0.060" (1.5mm)
	OA000 MR2	60"x96"	0.080" (2mm)
		72"x96"	0.118" (3mm)
			0.177" (4.5mm)
			0.220" (5.6mm)
			0.236" (6mm)
			0.354" (9mm)
			0.472" (12mm)

Abrasion Resistance

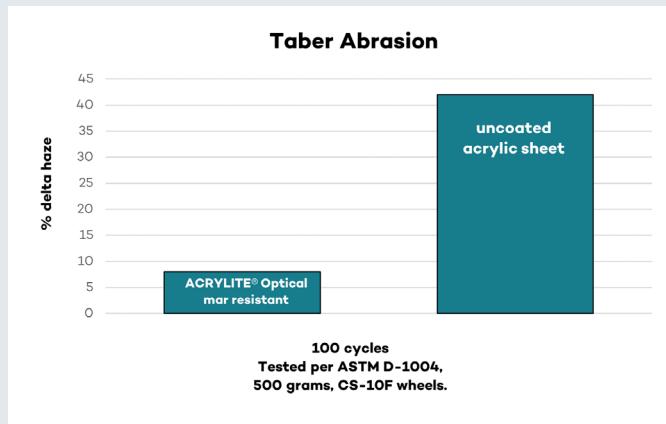
Scratching is the most common type of abrasion and is often caused by frequent cleaning and handling.

Resistance to wear is measured by exposing a sample to continuous contact with an abrasive wheel in the Taber Abrasion Test.

The following graph shows typical test data demonstrating the outstanding properties that ACRYLITE® Optical mar resistant sheet offers versus conventional uncoated acrylic.

Physical Properties

Property		ASTM Method	Typical Substrate Value (3.0 mm Thickness)
Mechanical	Tensile Strength	D 638	10,000 psi (69 M Pa)
	Elongation, Rupture	-	4.5%
	Modulus of Elasticity	-	4000,-000 (2800 M Pa)
	Flexural Strength	D 790	17,000 psi (117 M Pa)
	Modulus of Elasticity	-	480,000 psi (3300 M Pa)
	Izod Milled Notched	D 256	0.4 ft.lbs/in. (21.6 J/m) of notch
Optical	Light Transmission	D 1003	92%
Thermal	Deflection Temperature Under Load (264 psi)	D 648	195°F (91°C)
	Vicat Softening Point	D 1525	220°F (105°C)
	Coefficient of Linear Thermal Expansion	D 696	0.000040 in/in·°F (.000068 m/m·°C)
	Coefficient of Thermal Conductivity	C 177	1.3 BTU/hr.ft.2·°F/in (.19W/m·°K)
Flammability	Burn Rate	D 635	1.0 in/min (25 mm/min)
	Self-Ignition Temperature	D 1929	830°F (443°C)
	Smoke Density Rating	D 2843	1%
Abrasion Resistance of the Coating	-	-	Change in Haze
	Rotary Brass Wool (25 cycles)	Proprietary method	< 1%
	Taber Abrasion (100 cycles)	D 1044	< 2%
	Falling Sand (3,000 grams)	DIN 52 348	< 10%



Weathering

ACRYLITE® Optical mar resistant sheet is primarily intended for indoor applications such as picture framing, P-O-P displays, store fixtures, menu boards, etc. Use in outdoor applications is typically limited to three years of exposure.

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Chemical Resistance

The following table shows typical test data demonstrating the resistance of ACRYLITE® Optical mar resistant sheet to various chemicals versus uncoated sheet.

Note: some chemicals will attack edges and uncoated surfaces of the sheet.

Chemical	ACRYLITE® Optical mar resistant	Standard Acrylic Sheet
Acetone	> 24 hrs	< 15 min
Ethylene Dichloride	> 24 hrs	< 15 min
Gasoline	> 24 hrs	> 24 hrs
Hydrochloric Acid	> 24 hrs	> 24 hrs
Methyl Alcohol	> 24 hrs	> 24 hrs
Methyllene Chloride	> 24 hrs	< 15 min
Methyl Ethyl Ketone	> 24 hrs	> 15 min
Nitric Acid	> 24 hrs	< 15 min
Sodium Hydroxide	> 24 hrs	< 24 hrs
Sulfuric Acid	> 24 hrs	< 15 min
Toluene	> 24 hrs	< 15 min
Isopropanol	> 24 hrs	> 24 hrs
Kerosene	> 24 hrs	> 24 hrs

Testing the resistance of these chemicals was conducted per ASTM D 1308. Time intervals for visually inspecting the sheet surface: 15 minutes, 1 hour and 24 hours. The table shows the time it took the chemical to visually attack the surface.

Fabrication

ACRYLITE® Optical mar resistant sheet can be stored, saw cut, drilled, routed, milled and laser cut using the same tooling and techniques that are used when machining ACRYLITE® sheet. Please refer to ACRYLITE® sheet Technical Briefs on www.acrylite.co for details on how to perform certain machining steps or to find manufacturers of equipment and tooling. When performing any type of machining operation to ACRYLITE® Optical mar resistant sheet, it is recommended to leave the protective masking on the sheet.

There are certain operations that are not recommended for ACRYLITE® Optical mar resistant sheet. They may damage, or in some manner, adversely affect the performance of the abrasion resistant coating. The following operations have fabrication restrictions:

Edge Preparation: Scraping, wet sanding, and buffing are acceptable methods of preparing a finished edge. Flame polishing is not recommended. Overspray from the flame will cause the surface coating to crack or craze. This may lead to delamination of the coating and a loss of abrasion resistance in the affected area.

Cementing: ACRYLITE® Optical mar resistant sheet is available with the abrasion resistant coating on one or two sides. When cementing to a non-coated surface, use the same solvent or polymerizable cements commonly used on ACRYLITE® sheet. Solvent cementing to an abrasion resistant coated side requires surface preparation. To solvent cement to the coated side, the coating must first be removed by wet sanding or routing. When removing the coating, ensure that the bonding surface is flat, clean and free of stress.

Annealing the piece will ensure a stress free surface. Refer to the "Cementing" Technical Brief for details, procedures and a list of acceptable cements on www.acrylite.co.

Thermoforming: Line bending or thermoforming ACRYLITE® Optical mar resistant sheet is not recommended. Due to differences in the thermal properties of the coating and substrate, these heating processes can lead to delamination of the coating.



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Painting, Silkscreening: The abrasion resistant coating provides chemical resistance which will prevent some inks or paints from adhering properly.

NOTE: the uncoated side of the one-side coated product is ideal for these applications. Contact our Resource Center for more information.

Cleaning

A liquid detergent and water solution is the recommended cleaner for ACRYLITE® Optical mar resistant sheet. While the use of abrasive cleaners is not recommended, the following brand name cleaners have been tested and found to work well on coated surfaces.

- Fantastik® household cleaner
- Mr. Clean® household cleaner
- Formula 409® household cleaner
- Top Job® household cleaner
- Glass Plus® cleaner
- Windex® window cleaner

Graffiti Removal: Several solvents and cleaning agents are effective in graffiti removal. Although ACRYLITE® Optical mar resistant abrasion resistant sheet has excellent chemical resistance, cleaners and solvents should be tested before using to ensure that they do not harm the coating. Avoid exposure of edges and uncoated sheet surface to cleaning agents. For additional information, visit our Resource Center at www.acrylite.co.

Recommended Cleaners: Due to the varying nature of graffiti, some cleaning agents will be more effective at removal than others. The cleaning agent below has been found to work well on a variety of graffiti. Be sure to read the supplier's SDS and follow their directions carefully for handling, use and disposal of the cleaner.

Commercial Remover: GRAFFITI TERMINATOR REMOVER, West Coast Chemical Corp, 800-223-0526.

Procedure: Apply the cleaner generously, avoiding contact with uncoated surfaces. Allow the cleaner to penetrate the graffiti for 2 – 5 minutes. Remove the graffiti by rubbing with a soft cloth. Repeat these steps as needed to remove the graffiti. A plastic putty knife or smoother blade (found in the wallpaper section of a home improvement store) may be used to scrape at stubborn or hardened paints, but care must be taken not to gouge the coating. Never use a razor blade, metal knife or scraper. Wash the area with mild soap and water to remove residue.

Code Approval

ACRYLITE® Optical mar resistant sheet meets the requirements of the following codes and regulations:

- ANSI Z 97.1 for Safety Glazing Materials Used in Buildings
- ANSI Z26.1, AS-4, 5, 6 & 7 for Safety Glazing Materials for Glazing Motor Vehicles
- Uniform Building Codes for use as a Light



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Fire Precautions

ACRYLITE® sheet is a combustible thermoplastic. Precautions should be taken to protect this material from flames and high heat sources. ACRYLITE® sheet usually burns rapidly to completion if not extinguished. The products of combustion, if sufficient air is present, are carbon dioxide and water. However, in many fires sufficient air will not be available and toxic carbon monoxide will be formed, as it will when other common combustible materials are burned. We urge good judgement in the use of this versatile material and recommend that building codes be followed carefully to assure it is used properly.

Compatibility

Like other plastic materials, ACRYLITE® sheet is subject to crazing, cracking or discoloration if brought into contact with incompatible materials. These materials may include cleaners, polishes, adhesives, sealants, gasketing or packaging materials, cutting emulsions, etc. See the Tech Briefs in this series for more information, or contact your ACRYLITE® sheet Distributor for information on a specific product.

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