Optium® Acrylic Glazing

Facts and Specifications

anti-reflective | anti-static | abrasion resistant | UV protection

Optium® Combines the Best of Both Worlds: Glass and Acrylic For Framing and Display Applications

Optium® Acrylic Glazing, by Tru Vue combines the best qualities of anti-reflective safety glass and UV filtering acrylic in one product, for all of your aesthetic and conservation needs.

Museums around the world depend on Optium® Acrylic Glazing to protect, conserve, and display their most valuable and historic collections.

Optium® Acrylic Glazing is the ideal solution for your challenging frame and display requirements.

Optium® Acrylic Glazing Features and Benefits:

- **Anti-reflective** coating reduces reflection to less than 1.6% at 90 degree angle, and optimizes appearance while significantly reducing distracting reflections.
- **Anti-static** protection that actually exceeds glass and dissipates up to 2000 times more static than regular acrylic, making it safe for friable materials and minimizing cleaning.
- **Abrasion-resistant** glazing offers up to 20x more protection than regular acrylic and resists minor scratches associated with frequent cleaning like anti-reflective glass. Can be reused for traveling and temporary exhibits.
- Maximum **UV protection** filters up to 99% of damaging 300-380 nm UV rays so you can display sensitive objects.
- **Lightweight** – 50% lighter than glass. Perfect for large items and structurally sensitive frames.
- Easy cleaning – cleans like glass. Dry cleaning with soft, lint-free cloth recommended. **Do not use an acrylic cleaner on this product.** (i.e. Brillianize)
- Shatter-resistant, thermal insulating, and anti-static properties provide a secure and protected environment. Great for microclimates.
- Can be used inside or outside (weather resistant).

Size Availability

Optium Museum Acrylic® (Blocks up to 99% of UV radiation)

Thickness	Size	Sq. Ft./	Max Lites	Total Sq. Ft.
3.0 mm (1/8 in.)	48 x 96 in. (1219 x 2438 mm)	32	1 (box)	32 (2.97 sqm)
3.0 mm (1/8 in.)	48 x 96 in. (1219 x 2438 mm)	32	1 to 40 (crate)	32 to 1280 (2.97 to 118.92 sqm)
3.0 mm (1/8 in.)	48 x 96 in. (1219 x 2438 mm)	32	25 (box/pallet)	800 (74.32 sqm)
Approx. lite wt.: 22lbs./9.98kg I .7lbs. per ft²/.32kg per m² I Approx. empty crate wt.: 329lbs./149.23kg				
4.5 mm (3/16 in.)	72 x 96 in. (1829 x 2438 mm)	48	1 to 26 (crate)	48 to 1248 (4.46 to 115.94 sqm)
Approx. lite wt.: 54lbs./24.50kg I 1.13lbs. per ft²/.51kg per m² I Approx. empty crate wt.: 478lbs./216.82kg				
6.0 mm (1/4 in.)	72 x 120 in. (1829 x 3048 mm)	60	1 to 20 (crate)	60 to 1200 (5.57 to 111.48 sqm)
Approx. lite wt.: 89lbs./40.37kg I 1.5lbs. per ft²/.68kg per m² I Approx. empty crate wt.: 500lbs./226.79kg				

Optium Acrylic® (Blocks up to 93% of UV radiation)

Thickness	Size	Sq. Ft./	Max Lites	Total Sq. Ft.
3.0 mm (1/8 in.)	48 x 96 in. (1219 x 2438 mm)	32	1 (box)	32 (2.97 sqm)
3.0 mm (1/8 in.)	48 x 96 in. (1219 x 2438 mm)	32	1 to 40 (crate)	32 to 1280 (2.97 to 118.92 sqm)
3.0 mm (1/8 in.)	48 x 96 in. (1219 x 2438 mm)	32	25 (box/pallet)	800 (74.32 sqm)
Approx. lite wt.: 22lbs./9.98kg I .7lbs. per ft²/.32kg per m² I Approx. empty crate wt.: 329lbs./149.23kg				

Ask your Representative about Cut-to-Size Availability.

Product Comparison Chart

		Optium Museum Acrylic® *3.0mm (1/8 in), 4.5mm (3/16 in) & 6.0mm (1/4 in)*	Optium Acrylic® *3.0mm (1/8 in)*
Physical Characteristics	Substrate	Clear, hard coat abrasion-resistant, UV filtering extruded acrylic	Clear, hard coat abrasion-resistant extruded acrylic
	Thickness Consistency	+/- 5% (i.e., 6mm +/- 0.3mm) Most uniform consistency of acrylic substrates.	
	Product Identification	Protective film with product identification label. *(please email info@tru-vue.com with questions regarding product identification)*	
Performance Data	UV Protection 300–380mm	Up to 99%	Up to 93%
	Light transmission, total ASTM D-1003	>98%	
	Light Reflection/ Double-sided Anti-Reflection Haze	<1.6%	
	Outgassing Oddy Test	None (<200 degrees F/93 degrees C)	
	Accelerated Aging Q-sun Xenon Arc test	Anti-reflective, anti-static, UV protection and light transmission remain unchanged after 2000 hours (100 years) of Q-sun Xenon arc testing at exposure intentsity of 100,000 Lux.	
Specifications	Tensile Strength Modulus of Elasticity ASTM D-638	10,000 – 11,030 psi 400,000 – 490, 000 psi	
	Flexural Strength Modulus of Elasticity ASTM D-790	17,000 psi 480,000 – 490,000 psi	
	Impact Strength – Izod Milled Notch ASTM D-256	0.28 – 0.4 ft. lbs./in. of notch	
	Impact Strength – Gardner – falling weight ASTM 5420-04	18.1 ft-lbs (6.0mm) Optium Acrylic Glazing products are significantly more impact-resistant than annealed glass and similar to that of tempered glass. If subject to impact beyond the limit of resistance, it does not shatter into small slivers, but breaks into larger pieces.	
	Humidity Resistance MIL-C-48497A, para 4.5.3.2	No deterioration after 40 days @ 50°C, 95% RH	

Magnetron Sputtered Process

Coating and Visual Color Impression (Transmitted and Reflected Color)

- Magnetron sputtered anti-reflective coating helps ensure maximum durability and strength
- Utilizes hard-coated, abrasion resistant acrylic sheet
- Patented Tru Vue® Optium Technology
- Thin film coatings bonded to substrate at an atomic level
- Long-lasting anti-static protection
- Won't oxidize and degrade overtime

Transmitted color appears color neutral to pale yellowish. Light reflection is reduced to less than 2% at 90 degrees. The anti-reflective coating is designed to perform in a museum gallery setting. On works hung vertically, and it is optimized when viewed at a 90 degree angle. However, if the angle of view changes so does the amount and color of the reflection. Beyond that, reflections become visible in a subtle greenish/blue color* and certain lighting conditions may make this more noticeable.

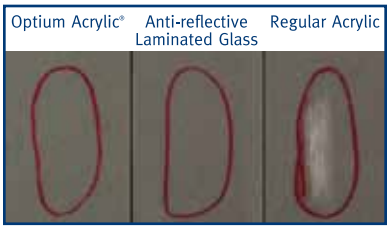
Some variation in the color and or intensity of the color of the reflection is considered acceptable as a normal and inherent characteristic of any anti-reflective product. The color and intensity of the reflection can vary within a sheet and from sheet to sheet. The amount of reflection however is significantly lower than the reflection of regular uncoated glass or acrylic and is considered normal and inherent characteristic of an anti-reflective product. (ASTM D-1929)

* Previously, reddish/purple. Optium's reflected color was changed in 2010 in response to customer requests to be more consistent in color with other anti-reflective glazing products.

Specifications (continued)

Temperature and Flammability

	Optium Museum Acrylic® *3.0mm (1/8 in), 4.5mm (3/16 in) & 6.0mm (1/4 in)*	Optium Acrylic® *3.0mm (1/8 in)*
Corrosion Resistance (Salt Fog) ASTM B117 & B-368-03 & B368-97	48 hr. No Deterioration 50°C, 95% RH After exposure for 7 – 24 hr cycles (168 hours), the coating shows no damage – **Passed**	
RoHS compliance testing	(dangerous substance testing: presence of Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent chromium (Hex-Cr)) – **Passed**	
Photographic Activity Test ISO 18916 & ISO 18902	ISO 18916 Silver Image Interaction • Gelatin Staining • Mottling of Image • Interaction Detector Overall performance – **Passed** ISO 18902 Overall performance – **Meet; "Photo-safe" per ISO 18902 section 3.9**	
Coating Adhesion (Snap Tape) MIL-C-48497A, para 4.5.3.1	The coating shows no damage after snap removal of tape.	
Solubility MIL-C-48497A	After a 24-hour immersion or exposure at room temperature (60°-90°F), the anti-reflection coating shows no deterioration in the following solutions: • *Distilled Water* • *Saline Solution (170gm of NaCl per 3.8 liters of water)* • *Acetone* • *Ethyl Alcohol* • *Isopropyl Alcohol* • *Coffee* • *Coke*	
Flammability Self-Extinguish UV945VA & 5VB	No acrylic will self-extinguish, and therefore Optium Acrylic products do not meet this requirement. Optium Acrylic products are combustible and usually burn to completion if not extinguished. Precautions should be taken to protect this material from flames and high heat sources.	
Flammability Self-Ignition Temp. ASTM-D-1929	830 – 833°F / 443 – 445°C	
Horizontal Burning Test Avg. Burn Rate ASTM D-635	1.0 – 1.019 in./min / 2.5 cm/min (3mm)	
Smoke Density ASTM D-2843	3.4 – 6.4% (3mm)	
UL 94 Rating	94HB	
Deflection Temp. (264 psi load) ASTM D-648	203 – 210°F / 95 – 99°C	
Vicat Softening Point ASTM D-1525	210 – 220°F / 99 – 105°C	
Max. Continuous Service Temp.	170 – 190°F / 77 – 88°C	
Coefficient of Thermal Expansion ASTM D-696	0.00003 – 0.00004 in/in °F / 0.000054 – 0.000072 m/m °C	
Water Vapor Transmission Rate (@ 50% R.H.)	0.014 gm/100 in^2 × day Optium Acrylic Glazing performs like regular uncoated acrylic in response to changes in relative humidity. The vapor transmission rate is low enough that reasonable levels of humidity can be maintained inside an acrylic enclosure by using appropriate desiccants. Optium Acrylic Glazing should not be used for applications that must be hermetically sealed.	



Abrasion Resistance MIL-C-14806A, para 4.4.7& MIL-M13508C, para 4.4.5

The coating shows no signs of deterioration, other than discoloration, after being subjected to 20-alcohol soaked cheesecloth test at 2-2.5 lbs. The coating shows no damage after 600 dry cloth rubs at 2.5 lbs.

- Optium Acrylic Glazing performs like anti-reflective glass and offers up to 20 times the protection against minor scratches compared to uncoated acrylic.
- Optium Acrylic Glazing stands up to frequent cleaning and re-use from traveling/temporary exhibits.

Electrical Surface Resistivity (Anti-Static) ASTM D257

The surface resistivity is less than 10^{12} ohm/sq at 20% Relative Humidity.

- Our anti-static protection actually exceeds that of glass and is engineered to immediately dissipate static charges.
- Independent tests show that Optium Acrylic Glazing is up to 2000 times more anti-static than regular acrylic.
- Safe for friable materials.
- Does not attract dust – minimizes cleaning.

Long-lasting anti-static protection

23 C and 50% r.h.	Surface Resistivity (Ohms/square)	Static Decay (seconds)
Optium Acrylic Glazing	5.0E+10	0.01
Uncoated Acrylic	1.0E+14	Infinite

Framing and Fabrication Guidelines

Application Recommendations	
Space Expansion & Contraction	Allow at least 1/16th" of clearance for each 12" of frame length. In conditions of extreme humidity or temperature, greater allowances may be necessary. In outdoor use, where summer – winter temperatures vary as much as 100° F at 48" sheet will expand/contract approximately 3/16".
Rabbet size	When estimating the rabbet size, allow for the applicable glazing thickness and add to it the thickness of each of the other components used. Insuring the proper rabbet size is essential in supporting the framing components and helps guard against bowing.
Max. # of Mats	Any
Application	Pastels • Charcoal • Static Sensitive Pieces • Custom display cases • Shadowboxes • B&W and Bright Colored Pictures • Posters • Vitrines • Large Pieces • Shipping • Earthquake Zones • Safety Areas • Pieces requiring Maximum UV protection • Can be fabricated and cemented for museum quality, bubble-free joints
Framing Practices for 40 x 60 and larger acrylic sheets	To prevent bowing, twisting, and/or warping during framing, provide reinforcing support of the acrylic sheet. When working with a spacer to separate the object from the glazing, allow sufficient depth of the spacer (2" to 2.5" (5cm-6cm) for a full 6mm, 72x120 sheet) to protect object from flexing of the acrylic sheet.
Silkscreen Printing	Yes; however, the acrylic requires a low temperature process, so the completed silkscreen is fairly soft.
Handling and Storage	
Cutting	6mm and above, fabricate using a power saw with a blade specifically designed to cut acrylic. Contact Tru Vue for saw blade recommendations. 4.5mm and below, place Optium® Acrylic on a clean, dust-free work area. Cover the work table with a soft, clean, lint-free felt. Use a cutter "scribe and break" method. Optium Acrylic Glazing should NOT be cut with a laser. The extreme heat can cause crazing, which may lead to delamination of the coating.
Cleaning	For safety of the object, use ammonia-free cleaner. Spray solution on a lint-free or micro-fiber cloth and then apply to the acrylic. Do NOT use regular acrylic cleaners.
Handling	Due to anti-reflective coating, fingerprints or dirt are more visible but are easily removed. Cotton or nitrile rubber gloves should be worn to minimize fingerprints and other particles. Optium® Acrylic Glazing products are covered with a protective film masking on each surface that prevents scratching during handling and cutting and should be left in place as long as possible. To remove the masking, start at one corner and pull towards the opposite side of the sheet slowly and evenly without stopping. The masking should never be exposed to excessive sunlight or outdoor conditions for extended periods of time. Use of glass-skin during transportation is not recommended.
Storing	To avoid leaving water spots on the anti-reflective coating, don't store in areas where condensation might occur. Use 2-ply rag board or pH neutral paper for interleaf during short-term storage. Stack horizontally with larger sheets at the bottom, or lean at an angle of approximately 10° to prevent bowing. Although climate control for long-term storage is not required, we recommend you remove any protective film masking, use pH neutral paper to separate the parts and never expose the masking to excessive sunlight or outdoor conditions for extended periods of time. Allow 24 hours for climatizing before exhibiting. Optium Acrylic Glazing can withstand extreme temperatures of minus 30° F (-34° C) to 160° F (71° C). If storing framed pieces, please note that Optium Acrylic Glazing expands and contracts, so allow for size variation and avoid shipping horizontally as expansion/contraction of the sheet may cause vibration or rubbing against the surface of the artwork.
Case Fabrication for Extruded Substrates *(for additional info, refer to manual)*	
Coating Removal	Cementing on or to Optium cannot be attained without first removing the coating due to the chemical resistance. All Optium products have a hard-coat and an anti-reflective film on both surfaces which are approximately 0.005 in. thick and must be removed from the joint area before attempting to cement the pieces together. When removing, ensure that the bonding surface is flat, clean, and free of stress. The hard-coat can be removed by scraping, wet sanding the joint area with 500 grit or finer sandpaper mounted on a sanding block or by machining with a router or milling machine. To set the width, painters masking tape with electrical tape on top or a table saw fence can be used. A vacuum hose connection to remove & collect small particles produced by scraping is also recommended.
Joint Type	Miter joints have an advantage because the coating removal step is accomplished when the miter is cut and the anti-reflective properties of the Optium are maintained to the edge of the completed joint. The disadvantages are: material thickness variations can prevent the joints from mating together cleanly and each piece must be cut very precisely. Butt joints can also be used with Optium so long as the hard-coat is removed from the joint area. The adhesive is introduced into the open side of this joint by using a suitable syringe. Avoid bubbles.
Joining	Polymerizing adhesives fill better and, therefore, impose fewer demands on the accuracy of fit between the parts. They are recommended where high strength and good resistance to environmental conditions are required. Crazing in the joints of extruded substrate material may occur during the joining process and is more apparent when using a two part glue or if the case is subject to unusual physical and or environmental stress. If properly done, solvent cements also yield strong, transparent joints, but do not have filling properties, so you may see bubbles when it dries. Other two-component adhesives like epoxy resins, isocyanates (polyurethane), phenolics and aminoplastics are not suitable for bonding Optium Acrylic Glazing sheets to itself or other materials because their adhesion is very low.

Optium utilizes an inherently UV stable, non-yellowing, abrasion-resistant sheet that maintains its original appearance and color despite heat, cold, sunlight and humidity. It withstands the adverse effects of outdoor weathering and has been found to experience no significant loss of light transmittance or any appreciable increase in yellowing after accelerated weathering. This should help ensure many years of trouble free performance.

Optium® Acrylic Glazing

Tru Vue®

www.tru-vue.com