



VIVISTONE™ WHITE ONYX

PRODUCT DATA



FORMS+SURFACES®



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ViviStone White Onyx unites the beauty of stone with the convenience of architectural glass. Nearly indistinguishable from real stone, White Onyx offers a modern take on a classic neutral aesthetic. Subtle shifts of white and grey, accented by charcoal veining, give this stone character and dimension without being overpowering.

PRODUCT FEATURES

- Suitable for interior and exterior applications.
- Requires minimal maintenance: with decorative treatment inside the glass, rather than surface-applied, glass surfaces are easy to clean.
- Configurations include popular architectural glass thicknesses and types: annealed, heat strengthened, tempered, flat or curved, single or double glazed.
- Products are manufactured to specification and provided cut to size and ready to install.

MATERIAL DESCRIPTION

ViviStone White Onyx is defined by three parameters that are key to product specification:

CONFIGURATION	SLAB	FINISH
Refers to the amount of light transmitted - or not - through the glass. As outlined below, two standard options exist. View is a single-sided or double-sided configuration that consists of color graphic interlayers between two transparent lites of glass. Reflect is a single-sided configuration comprised of color graphic interlayers between a transparent lite of glass and a reflective glass backer.	The graphic interlayers for White Onyx are available in four standard slab options with maximum dimensions of 48" x 102". See page three for details.	Defines the surface appearance of your glass selection. ViviStone White Onyx finish options include Pearlex+ and Standard. Refer to page four for complete finish descriptions.

PRODUCTS & APPLICATIONS

GLASS LITES	F+S SYSTEMS
ViviStone White Onyx glass is ideal for architectural accents such as columns, railings, partitions, and other custom applications. Processing options include polished edges, tempering, notches, cutouts and pattern cuts. ViviStone White Onyx can be specified in any size up to 48" x 102" (1219 mm x 2590 mm). Please contact us for information on larger custom sizes. A variety of glass hardware components are available for use with ViviStone White Onyx glass. See page five for available options.	<ul style="list-style-type: none"> • LEVELr Wall Cladding System • LEVELr Column System • LEVELe Wall Cladding System • LEVELe Column System • LEVELe Elevator Interiors <ul style="list-style-type: none"> • LEVELc Elevator Interiors • LightPlane Panels • Doors

GLASS CHARACTERISTICS

SAFETY	FIRE RATING
ViviStone White Onyx is available in annealed, tempered or heat strengthened glass. We recommend heat strengthening for glass over 50 square feet. Tempering is required for glass with holes and cutouts. For questions about glass strengthening and safety, please contact us.	ViviStone White Onyx glass is Class A fire rated in accordance with ASTM designation E84-09, standard test method of surface burning characteristics of building materials. The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.
PROFILE	EXTERIOR APPLICATIONS & WATER FEATURES
ViviStone White Onyx glass can be made to fit a flat or curved profile. Curved profiles are subject to certain limitations. If a curved profile is needed, please contact us to discuss guidelines and documentation needed for specification.	<ul style="list-style-type: none"> • For exterior applications where edges are exposed, and for any water feature, Dupont™ Sentryglas® structural interlayer will be used in place of the standard glass interlayer. VividGlass is a certified Sentryglas laminator. • The image in the interlayer for exterior applications and water features will be held back 1/16" to 1/8" from the outside edge of the glass to ensure that the interlayer graphic is fully sealed around the perimeter edges of the glass.

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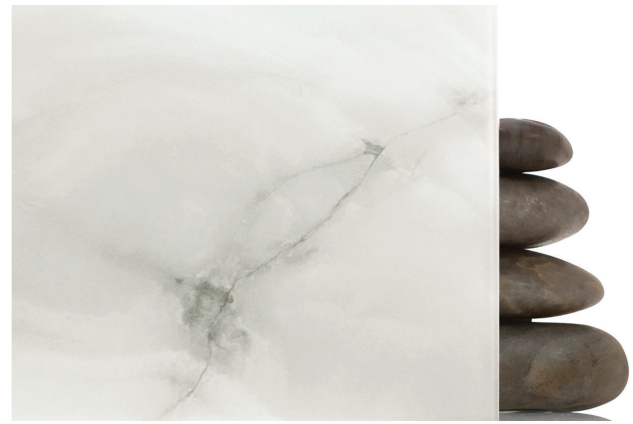
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HOW TO SPECIFY

A Design Guide is available to lead you through the specification process in a simple, checkbox format. The Design Guide captures all the information needed to generate a quote: configuration, finish, pattern, as well as other options. To get started, just give us a call or visit us at www.forms-surfaces.com.

CONFIGURATION OPTIONS

VIEW	
	<p>ViviStone White Onyx, View, is a single-sided or double-sided configuration that consists of graphic interlayers between two transparent lites of glass.</p> <p>Typical Applications: Double-sided View is ideal for use in doors, as partitions or room dividers, and in other applications where semi-privacy is desired. Single-sided View can be used in backlit configurations for displays.</p> <p>Note: ViviStone White Onyx, View in double-sided configuration does not allow light transmission through the interlayer.</p> <p>(Configuration shown: ViviStone White Onyx, View, single)</p>
REFLECT	
	<p>ViviStone White Onyx, Reflect, is a single-sided configuration that consists of graphic interlayers between a transparent lite of glass and a reflective glass backer.</p> <p>Typical Applications: Reflect is ideal for one-sided applications where glass will be used against another surface, for example, LEVEl and LEVELc-2000N Elevator Interiors, LEVELr and LEVEl Wall Cladding Systems, or custom fabrications.</p> <p>(Configuration shown: ViviStone White Onyx, Reflect)</p>



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SLAB OPTIONS

ViviStone White Onyx is available in four slab options. The size as shown for each slab is 48" x 102", but smaller sections can be specified if desired. The ViviStone Virtual Quarry allows you to select from our collection of ViviStone slabs, assemble and configure a design to meet your project needs, and save your work to return to at any time. To get started visit www.forms-surfaces.com, or to access the Virtual Quarry directly go to www.virtualquarry.com.



WHITE ONYX A-1



WHITE ONYX A-2



WHITE ONYX A-3




WHITE ONYX A-4



FINISH OPTIONS


Glass finish defines the surface appearance of your glass selection. The different options vary in levels of diffusion, reflectivity, glare and optical distortion, and provide unique solutions for the needs of each individual project. Please refer to the chart below for the characteristics of the available glass finishes.

PEARLEX+™	
	<p>Surface: Finely etched Diffusion: Minimal Reflectivity: Non-reflective Glare: Minimal Optical distortion: Minimal Maintenance: Fingerprint resistant; exceptionally easy to clean Durability: Highly durable; extremely scratch-resistant Can incorporate logos, photos, text or graphic art</p>
STANDARD	
	<p>Surface: Smooth Diffusion: None Reflectivity: Reflective Glare: High Optical distortion: None Maintenance: Easy to clean Durability: Durable Can incorporate logos, photos, text or graphic art</p>



HARDWARE OPTIONS

ViviStone White Onyx glass is available with a variety of different hardware options. Please contact our project management team for help with project-specific requirements. All options are suitable for interior use.

SLOT MOUNT STANDOFF		<ul style="list-style-type: none"> • Designed for mounting glass vertically or horizontally without drilling holes in the glass • Available in five finishes: Polished Brass, Polished Gun Metal, Polished Chrome, Satin Chrome and Satin Stainless Steel • Accommodates three different glass thicknesses: 1/4" (6.3 mm), 3/8" (9.5 mm), 1/2" (12.7 mm)
		
EDGE GRIP STANDOFF		<ul style="list-style-type: none"> • Designed for mounting glass to walls or other vertical substrates without drilling holes in the glass • Available in five finishes: Polished Brass, Polished Gun Metal, Polished Chrome, Satin Chrome and Satin Stainless Steel • Accommodates three different glass thicknesses: 1/4" (6.3 mm), 3/8" (9.5 mm), 1/2" (12.7 mm)
		
ROUND STANDOFF		<ul style="list-style-type: none"> • Designed for mounting glass vertically or horizontally • Eight different base lengths are available • Regardless of base length, holes must be drilled in the glass for assembly • Available in six finishes: Polished Brass, Polished Gun Metal, Polished Stainless Steel, Satin Stainless Steel, Satin Chrome and Polished Chrome • Accommodates three different glass thicknesses: 1/4" (6.3 mm), 3/8" (9.5 mm), 1/2" (12.7 mm)
		
SPIDER FITTING		<ul style="list-style-type: none"> • Designed for mounting glass to walls, posts, other structural substrates with minimal visible connections • Holes must be drilled in the glass for assembly • Available in two finishes: Satin Stainless Steel and Polished Stainless Steel • Available in 1-, 2-, 3- and 4-arm configurations • Accommodates glass thicknesses between 1/2" (12 mm) and 13/16" (20 mm)
		
SQUARE MALL CLAMP		<ul style="list-style-type: none"> • Designed for joining vertical lites of glass without drilling holes in the glass • Available in three finishes: Polished Brass, Satin Stainless Steel and Polished Stainless Steel • Accommodates glass thicknesses between 3/8" (9.5 mm) and 3/4" (19 mm)
		
TAPERED RAIL SYSTEM		<ul style="list-style-type: none"> • Designed to secure fixed glass panels in various layouts without drilling holes in the glass • Available in six finishes: Polished Brass, Polished Stainless Steel, Satin Stainless Steel, Satin Anodized, Black Bronze Anodized and Black Powdercoat • Accommodates two different glass thicknesses: 3/8" (9.5 mm) and 1/2" (12.7 mm)
		



SOUND ATTENUATION

Shear damping by the VividGlass interlayer improves acoustical performance over a wide audible-frequency range and practically eliminates the coincidence dip typical of architectural glass in the 1,000 to 2,000 Hertz band—where significant levels of general environmental noise occur.

For Sound Transmission Class (STC) and Sound Transmission Loss (TL) information, please refer to the enclosure to the table below.

Table with columns: GLASS MAKEUP (GLASS TYPE, TOTAL THICKNESS), FREQUENCY (HZ) (100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000), and STC. Rows include LAMINATED GLASS (7.7mm and 13.7mm) and MONOLITHIC GLASS (6mm and 12mm).

ULTRA-VIOLET SCREENING

VividGlass transmits less than one-tenth of one percent of UV. It blocks over 99.5% of solar radiation at wavelengths 380 NM and below, where by comparison, 1/4" clear float glass transmits over 70%.

RECEIVING, STORAGE, HANDLING, PROTECTION, AND MAINTENANCE

Table with four main sections: ORDERING, RECEIVING, STORAGE, HANDLING, PROTECTION, and MAINTENANCE. Each section contains specific instructions for handling and maintaining the glass.



PRODUCT PERFORMANCE-COMPLIANCE WITH STANDARDS

VividGlass architectural glass complies with all major building codes as laminated safety glass and meets the following U.S. industry standards:

GLASS QUALITY	SAFETY GLAZING
<ul style="list-style-type: none"> • ASTM C1036—Specification for Flat Glass • ASTM C1048—Specification for Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass where heat treated glass is specified • ASTM C1172—Specification for Laminated Architectural Flat Glass augmented by VividGlass inspection guidelines for laminated glass, and level CBA rated in accordance with ASTM E-773—Test Method for Seal Durability of Sealed Insulating Glass Units • ASTM C1172-03—Specification for Maximum Allowable Overall Bow and Warp for Laminated other than Annealed Transparent Glasses • ASTM E-774—Specification for Sealed Insulating Glass Units where insulating glass is specified 	<ul style="list-style-type: none"> • ANSI Z-97.1—Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings • CPSC 16 CFR 1201—Safety Standard for Architectural Glazing Materials, Category I and II

VividGlass architectural glass complies with and meets the following Canadian industry standards:

GLASS QUALITY	SAFETY GLAZING
<ul style="list-style-type: none"> • CAN/CGSB-12.1-M – Specification for M90 Tempered or Laminated Glass 	<ul style="list-style-type: none"> • CAN/CGSB-12.1-M – Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings

GLASS DIMENSIONAL TOLERANCES

Units in the following table are expressed in inches (millimeters). Dimensional tolerances for length and width include any flare or mismatch. Closer tolerances may be achieved if required [for example, finished dimensional tolerances for frameless doors are +0", -1/16" (+0mm, -1.6mm)].

NOMINAL THICKNESS GLASS, INTERLAYER	THICKNESS RANGE	DIMENSIONAL ANNEALED	TOLERANCES STRENGTHENED
9/32 (6.9) 2 lts 1/8, 0.037 (3, 0.9)	0.267–0.305 (6.74–7.70)	+5/32, -1/16 (+4.0, -1.6)	+7/32, -3/32 (+5.6, -2.4)
5/16 (7.7) 2 lts 1/8, 0.067 (3, 1.7)	0.297–0.335 (7.54–8.50)	N/A	+7/32, -3/32 (+5.6, -2.4)
13/32 (10.9) 2 lts 3/16, 0.037 (5, 0.9)	0.397–0.435 (10.04–11.00)	+1/4, -1/16 (+6.4, -1.6)	+1/4, -1/8 (+6.4, -3.2)
7/16 (11.7) 2 lts 3/16, 0.067 (5, 1.7)	0.427–0.465 (10.84–11.80)	N/A	+1/4, -1/8 (+6.4, -3.2)
17/32 (12.9) 2 lts 1/4, 0.037 (6, 0.9)	0.475–0.525 (12.02–13.30)	+1/4, -1/16 (+6.4, -1.6)	+1/4, -1/8 (+6.4, -3.2)
9/16 (13.7) 2 lts 1/4, 0.067 (6, 1.7)	0.505–0.555 (12.82–14.10)	N/A	+1/4, -1/8 (+6.4, -3.2)
25/32 (20.9) 2 lts 3/8, 0.037 (10, 0.9)	0.747–0.849 (18.94–21.52)	+1/4, -1/16 (+6.4, -1.6)	N/A
13/16 (21.7) 2 lts 3/8, 0.067 (10, 1.7)	0.777–0.879 (19.74–22.32)	N/A	+5/16, -1/8 (+7.9, -3.2)

GRAPHICS DIMENSIONS AND TOLERANCES

GRAPHIC FEATURE	DIMENSION	
	in	mm
Size	±1/8	±3.2
Registration	±1/8	±3.2
Color Trap	+1/8	+3.2
Panel-to-Panel Match	±1/4	±6.4

Registration is placement of the interlayer within the glass area. The **Color Trap** is the overlap of adjoining imprinted densities or colors. **Panel-to-Panel Match** can be controlled more tightly in the field, during glazing, when the glazing system is designed to accommodate shimming.



INSPECTION GUIDELINES

VISION AREA GLAZING - To incorporate unique product characteristics, the following table supersedes ASTM C1172, Table 3.

CHARACTERISTIC	SIZE THRU 25 SF (2.33M2)		SIZE OVER 25 SF (2.33M2)	
	CENTRAL	OUTER	CENTRAL	OUTER
Boil (Bubble)	1/16"	3/32"	1/8"	3/16"
	1.6mm	2.4mm	3.2mm	4.8mm
Blow-In, Edge Boil	N/A	C 1/4"	N/A	C 1/4"
		6.4mm		6.4mm
		E 1/32"		E 1/16"
		0.8mm		1.6mm
Discoloration	None	None	None	None
Fuse	1/32"	1/16"	1/16"	3/32"
	0.8mm	1.6mm	1.6mm	2.4mm
Hair, Lint (Single Strand)	Light	Med	Light	Med
Inside Dirt (Spot)	1/16"	3/32"	3/32"	5/32"
	1.6mm	2.4mm	2.4mm	4.0mm
Concentrated Lint (Area)	Light	Light	Light	Light
Slippage, Mismatch	N/A	1/16"	N/A	3/32"
		1.6mm		2.4mm
Separation, Delamination	None	1/4"	None	1/4"
		6.4mm		6.4mm
Short Interlayer	N/A	C 1/4"	N/A	C 1/4"
Unlaminated Area Chip	6.4mm		6.4mm	
		E 1/16"		E 3/32"
		1.6mm		2.4mm
Interlayer Scuff, Dirt Streak	Light	Light	Light	Light
Interlayer Edge Ripple (15.2cm) Maximum Length	N/A	C 1/2"	N/A	C 1/2" - 6" (15.2 cm)
	12.7mm	12.7mm		
		E 3/8"		E 3/8"
Interlayer Pinholes, Voids	No	Clusters	No	Clusters
	1/16" (1.6mm) Maximum Diameter	Clusters	Clusters	
Interlayer Streaking, Mottling	Med	Med	Med	Med
Interlayer Roll-Wave Distortion	Heavy	Med	Heavy	Med

The **Central Area** is an area formed by an oval or circle whose axes or diameters, when centered, do not exceed 80% of the overall dimension; the **Outer Area** is the remaining perimeter.

C = Conventionally glazed, unexposed edge; **E** = Butt-glazed or other exposed edge

Light = Barely noticeable when viewed from a distance of three feet (one meter) under normal lighting conditions

Medium = Noticeable from three, but not 11 feet (one, not 3.5m)

Heavy = Plainly noticeable from any viewing distance



GLAZING GUIDELINES

GENERAL PRINCIPLES	
<ul style="list-style-type: none"> The glazing system must structurally support the glass, firmly and gently. It must cushion to prevent load points and excessive clamping pressures, isolate rotational forces, and minimize load transfer from the surround to the glass. For exterior applications, the glass must float in the frame and allow no metal-to-glass contact. For laminated or insulating glass, the glazing channel also must be drained to prevent prolonged moisture contact with the edge. Design for a properly functioning glazing system requires consideration of a number of factors including design modules, glass types and compatibility between components. Following the outlined glazing principles will assure a durable exterior installation and minimize glass breakage due to mechanical and thermal stresses. Reference to current guidelines published by the Glass Association of North America (GANA), American Architectural Manufacturers Association (AAMA), and Sealed Insulating Glass Manufacturers Association (SIGMA), as applicable, is recommended. Modification to these recommendations may be appropriate for special glazing systems, including pre-formed lock-strip gaskets, skylight systems, structural setting systems, bolt and plate assemblies, and interior glazing. 	
THE FRAMING SYSTEM	THE SURROUND
<ul style="list-style-type: none"> Curtain wall or window anchors and expansion joints should be designed to accommodate building and wall movement without transfer of undue forces to the framing. Horizontal expansion joints should be provided at each vertical member, or at 20' maximum spacing. Vertical expansion should be allowed at each floor. The system should be designed to permit erection with expansion joints almost fully open in cold weather and almost fully closed in hot weather. At design loads, inward and outward deflection of glass framing members must be limited to the length of the unsupported span divided by 175, or 3/4", whichever is less. Horizontal deflection of the sill member should be limited to prevent breakage. A limit of 1/8", or 25% of design edge clearance, whichever is less, is recommended. Rotation or twisting of the sill member should be limited to one degree from horizontal plane. The framing system should provide openings which are square within 1/8" difference in the diagonals, have maximum corner offset of 1/32", and have maximum bow of 1/16" per 4' length. 	<ul style="list-style-type: none"> When annealed glass is exposed to direct sunlight and set directly into a high heat-capacity material, such as concrete, it may be unable to withstand the resultant thermal stresses. Depending on thermal absorbance of the glass selected, the time of year, and temperature extremes, thermal stress due to exterior shading may be problematic. Maximum stress from this source occurs when a narrow shadow band, 1–2" wide, lingers at the glass edge for an hour or longer. Combinations of narrow horizontal, vertical and diagonal shadows create greater edge stress. Double-diagonal shading with the sunlit V-shape centered at an edge creates high stress. Please keep in mind, the position of interior shading devices and heating outlets can affect the degree of thermal stress in glass. Heat strengthening adds sufficient strength to withstand most adverse conditions and is recommended for the glass when the designer believes the application warrants additional thermal-stress resistance.

The glazing channel must be dimensioned to adequately cushion and retain the glass, while minimizing thermal stress and preventing metal-to-glass contact. It must accommodate glass fabrication tolerances and facilitate initial and replacement glazing, free from probable edge damage.

The nominal bite and minimal edge and face clearances detailed below should be provided. Units are expressed in inches (millimeters).

Glass Type	Nominal Thickness	Face Clearance	Edge Clearance	Bite
	Glass, Interlayer	Minimal	Minimal	Nominal
Single	9/32 (6.9)			
	2 lts 1/8, 0.037 (3, 0.9)	1/8 (3.2)	1/4 (6.4)	3/8 (9.5)
	5/16 (7.7)			
	2 lts 1/8, 0.067 (3, 1.7)	1/8 (3.2)	1/4 (6.4)	3/8 (9.5)
	17/32 (12.9)			
	2 lts 1/4, 0.037 (6, 0.9)	1/8 (3.2)	1/4 (6.4)	1/2 (12.7)
	9/16 (13.7)			
	2 lts 1/4, 0.067 (6, 1.7)	1/8 (3.2)	1/4 (6.4)	1/2 (12.7)
	25/32 (20.9)			
	2 lts 3/8, 0.037 (10, 0.9)	3/16 (4.8)	1/4 (6.4)	1/2 (12.7)
Insulating	13/16 (21.7)			
	2 lts 3/8, 0.067 (10, 1.7)	3/16 (4.8)	5/16 (7.9)	1/2 (12.7)
	1-1/32 (26.2)	3/16 (4.8)	1/4 (6.4)	1/2 (12.7)
	1 lt 9/32 (7) lam			
	1/2 cavity			
	1 lt 1/4 (6)			
	1-1/16 (27)	3/16 (4.8)	1/4 (6.4)	1/2 (12.7)
1 lt 5/16 (8) lam				
1/2 cavity				
1 lt 1/4 (6)				



The system must drain adequately to assure that the edge of the glass will not be submersed in water for prolonged periods of time. If weep holes are used, they should be minimally 5/16" diameter, or elongated slots of similar area, so they will not become easily plugged or bridge over due to surface tension. Three holes should be used at each sill in the bottom of the glazing channel—one in the center and two flanking, between jamb and setting block.

SETTING BLOCKS	SPACERS AND OTHER GLAZING ACCESSORIES
<ul style="list-style-type: none"> Setting blocks made of permanently resilient neoprene, silicone, or other material compatible with the sealants used, 80–90 Shore A Durometer hardness, should be located in the sill glazing channel to support the glass. Two should be used per lite, centered at quarter points to support half the weight of the lite. The length of each block should be 0.100" for each square foot of glass area, but not less than 6"; width should be 1/16" less than the full channel width; and height should be appropriate to provide proper bite and edge clearance. 	<ul style="list-style-type: none"> Continuous rubber-like sealant beads, gaskets or spacers should be used to maintain face clearances within the glazing channel. For wet-glazing systems, intermittent shims, 40–60 durometer, inserted on both sides of the glass, opposite each other on 18–24" centers around the perimeter, sized minimally 4" long, to provide at least 1/8" purchase on the edge, and to fit snugly, may be used for centering until the sealant cures. Gaskets or spacers should be made of permanently resilient sealant-compatible material. Their hardness will depend on specific design function. For large lites in dry-glazing systems, edge blocks should be used to limit any potential lateral shifting of the glass due to vibration, wind loading, or thermal forces. These should be pre-cured, resilient neoprene, silicone, or other material compatible with the sealants used; 40–60 Shore A Durometer hardness; and sized 6" in length by full-channel width by edge-clearance-less-1/8" height—to allow a little initial space between the block and the edge of the glass. The joints of dry-glazing gaskets should be cut and sealed in accordance with the manufacturers' recommendations to provide watertight and airtight seal.

SEALANTS

For other laminated glass products, various non-hardening, solid sealants can be used successfully with VividGlass. In product selection, consider such factors as weather resistance and other fundamental mechanical properties, durability, cost, and compatibility with other glazing components, including the laminated glass itself if direct sealant-to-edge contact is anticipated.

The VividGlass interlayer system is an advanced derivative of DuPont™ Butacite®. In direct sealant-to-edge contact, low molecular-weight sealant by-products—like water, plasticizers, solvents, acetic acid, ammonia, alcohol, and amines—may lead to potentially objectionable interlayer discoloration or minor edge separation. Because formulations vary over time and by manufacturer, compatibility testing of components should be initiated by the glazing contractor and conducted by the sealant manufacturer for critical applications. Where silicone is considered in such details, it should be non-acidic, neutral curing (alkoxy type). Acetoxy type silicone is not compatible with architectural laminated glass.

Sealants should be applied according to the manufacturer's recommendations. Work should be done only with clean, dry surfaces. Temperature during installation should be above 50°F (10°C) and for 24 hours after application. To limit thermal edge stress in conventional setting systems, the exterior watershed should be limited to 1/16".