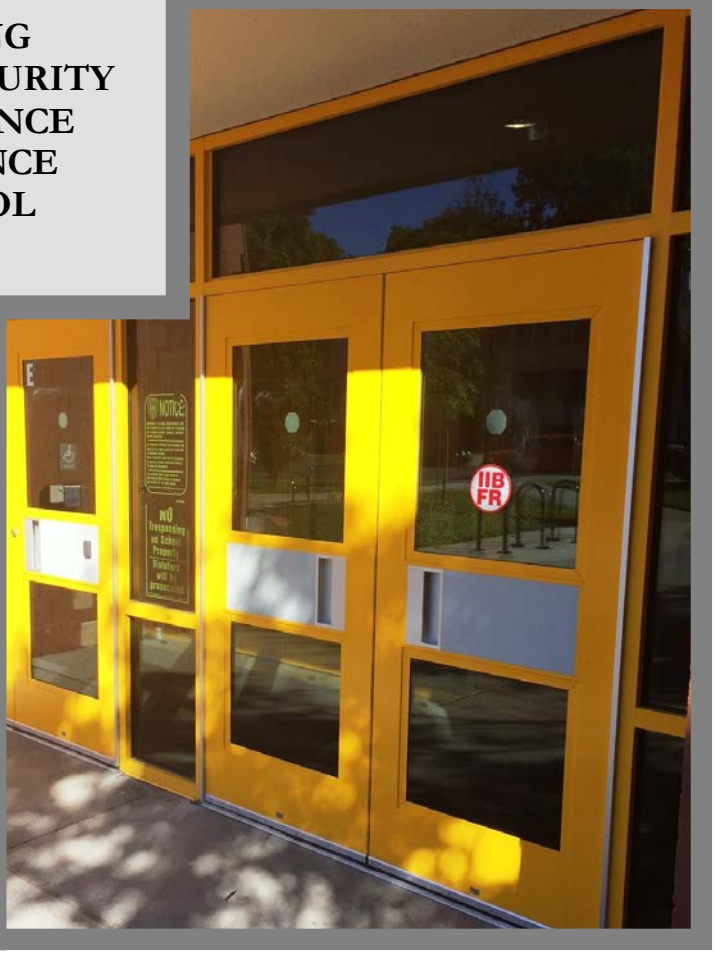
SYRACUSE GLASS COMPANY

SECURIVUE® LAMINATED GLASS

- SAFETY GLAZING
- RAILINGS
- CANOPIES
- SLOPED GLAZING
- ENTRANCE SECURITY
- STORM RESISTANCE
- BLAST RESISTANCE
- SOUND CONTROL
- UV REDUCTION



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SECURIVUE® LAMINATED GLASS

Laminated glass contains two or more plies of glass fused together with interlayers by the application of heat and pressure.

INTERLAYERS

POLYVINYL BUTERAL (PVB) is the standard architectural interlayer, available in three (3) thicknesses .030", .060", .090" in clear and Kuraray Transparent White colors.

- Laminated glass with .030" or greater PVB thickness will meet safety glazing regulations.
- Laminated glass with Heat Strengthened or tempered glass plies requires .060" or greater PVB to accommodate the uneven surfaces of HS or tempered glass.

SENTRYGLAS in an Ionoplast interlayer available in .060" and .090" thicknesses in clear color.

- SentryGlas is recommended for exterior, exposed edge applications, like railings and canopies, because it will not absorb water and discolor along the edge.
- SentryGlas is also five (5) times stronger than PVB, which can allow for larger sizes or thinner make-ups.

GLASS

Syracuse Glass inventories a wide variety of annealed laminated glass products with .030" PVB interlayers:

- 1/4", 3/8", 1/2" Clear
- 1/4" Bronze, Gray, Green, Arctic Snow White
- 1/4" Pyrolytic Low E

This stock material or custom annealed laminated glass (even with MSVD costings) can be cut to size on a LISEC laminated glass cutting line.

Laminated Glass containing Heat Strengthened or fully tempered glass plies is increasing in use due to code requirements for glass guards and railings with walking surfaces below, and to add the impact resistance of tempered glass to the security features of the interlayers.

Syracuse Glass is uniquely suited to produce high quality HS and tempered laminated glass products:

- two (2) full convection tempering furnaces, both with Osprey by LiteSentry devices that Measure and document glass surface flatness,
- a LISEC laminating line designed especially for the production of HS and tempered laminated glass (even with MSVD Low-E coated glass) featuring a special glass washer, a "spider crane" that allows for precise glass positioning and small edge "offsets", a climate controlled clean room, a heating and nip roller section that can be very precisely controlled using both infrared and convection heat, and an autoclave in which the heat and pressure can be supplemented by silicone blankets and vacuum to reduce defects, particularly useful for thick laminates with holes and notches.
- two (2) precision CNC milling machines integrated with order entry and glass labeling software
- two (2) LISEC vertical insulating glass lines with polysulfide or silicone seal options.

CERTIFICATIONS

ASTM C1172 Standard Specification for Laminated Architectural Flat Glass
CPSC 16 CFR 1201 Cat II
ANSI 297.1 Class A
CAN/CGBS 12.1 Cat I and II
SGC is a licensee in the Safety Glazing Certification Council (SGCC)

TECHNICAL NOTES

- HS or Tempered Glass requires 060 PVB or Ionoplast at minimum. 030 PVB suitable for annealed glass only.

- Equipment Capability: 8" X 12" MINIMUM – 96" X 140" MAXIMUM

- Full Sized Mock up Recommended for evaluation of distortion of reflected images in HS or tempered laminated monolithic or insulating glass, particularly important for tinted glass and Low-E coatings.

- Select Ionoplast interlayer for exterior canopies and railings with exposed edges.

- SGC can provide glass strength and center of glass deflection using ASTM E 1300 software based on design load supplied by customer or design professional provided the glass is 1, 2, 3 or 4 side supported. Point supported glass cannot be evaluated with this software. Point supported applications must be custom engineered.

APPLICATION NOTES:

- Building Code Safety Glazing Material Compliance – Vertical Glazing

FOUR SIDED SUPPORT MAX SIZES

PRODUCT	MAX. SIZE	MAKE-UP
1/4" Annld 030	25 Sf	2.7 mm - 030 PVB 2.7 mm
3/8" Annld 030	35 Sf	3/16" - 030 PVB 3/16"
1/2" Annld 030	50 Sf	1/4" - 030 PVB 1/4"
5/16" HS or Temp 060	18 Sf	3.2 mm - 060 PVB 3.2 mm
7/16" HS or Temp 060	40 Sf	3/16" - 060 PVB 3/16"
9/16" HS or Temp 060	50 Sf	1/4" - 060 PVB 1/4"

- Building Code Sloped Glazing and Skylights
(installed at a slope of 15° or more from the vertical plans)

FOUR SIDED SUPPORT MAX. SIZES

PRODUCT	MAX. SIZE	MAKE-UP
1/4" Annld 030	12 Sf	2.7 mm - 060 PVB 2.7 mm
3/8" Annld 030	18 Sf	3/16" - 060 PVB 3/16"
1/2" Annld 030	25 Sf	1/4" - 060 PVB 1/4"
5/16" HS or Temp 060	18 Sf	3.2 mm - 060 PVB 3.2 mm
7/16" HS or Temp 060	40 Sf	3/16" - 060 PVB 3/16"
9/16" HS or Temp 060	40 Sf	1/4" - 060 PVB 1/4"

These are conservative size maximums recommended by AAMA. Project specific analysis by a design professional may determine larger sizes.

ENTRANCE SECURITY

An intruder with a gun or bat can quickly break tempered glass and gain access. Annealed 030 laminated glass allows the passage of bullets, but remains intact, preventing easy access. HS or tempered 060 laminated glass adds more resistance to impact in doors subject to heavy use typical of schools.

RAILINGS AND GUARDS

Glass railings are typically 9/16" tempered laminated glass or, if installed where there are no walking surfaces below, 1/2" tempered. Due to the potential for offset of the tempered plies in tempered laminated glass of up to 1/8”, it is recommended to design gaps between lites of at least 3/8”.

SentryGlas is the recommended interlayer in exterior ratings if edges are exposed. PVB, 060 thickness, is recommended for interior railings or exterior railings with covered edges.

CANOPIES

Typical glass is at least 9/16” fully tempered 060 Ionomer laminated glass if the edges are exposed, 060 PVB if not. Fully tempered glass required to resist severe stresses of glass in canopies, particularly if point supported.

UV SCREENING

PVB of 030 or thicker will block 99% of UV radiation with a wavelength of less than 380 nm. This will significantly slow the damage to interior artwork, fabrics and finishes, but not eliminate damage entirely, since light in the visible range and other factors contribute.

SOUND CONTROL

Laminated glass and laminated insulating glass can reduce the transmission of sound compared to non-laminated glass.

HURRICANE/WINDBORNE DEBRIS

Laminated glass can be used for hurricane/windborne debris applications. Small missile specifications typically include 060 PVB, large missile 090 PVB. SGC does not test, label, or certify to ASTM E1996 Standard.

BLAST RESISTANCE

SGC can use ASTM F2248 and E1300 to determine suitability of laminated glass make ups for blast resistance applications, when supplied with blast force and standoff distance. Blast resistance is also dependent on the glass being installed properly into a blast resistant framing system.

SECURITY

Typical make ups include annealed, HS or tempered glass with a 060 PVB interlayer. SGC does not test, label or certify to UL 752.

BULLET RESISTANCE, DETENTION

SGC does not test, label or certify to UL 752, ASTM F1915, ASTM F1233.

TYPICAL LAMINATED GLASS APPLICATIONS AND MAKE-UPS

	SAFETY GLAZING	RAILINGS WALKING SURFACE BELOW		CANOPIES		SLOPED GLAZING	LOW-MED BLAST RESISTANCE	HURRICANE/ WINDBORNE DEBRIS		BURGLARY SECURITY
		INTERIOR	EXTERIOR	COVERED EDGES	EXPOSED EDGES			SMALL MISSILE	LARGE MISSILE	
TYPICAL INTERLAYERS										
PVB .030"	X					X	X			
PVB .060"	X	X		X		X	X	X		X
PVB .090"	X						X		X	
SENTRY GLASS .060"	X		X		X		X	X		
SENTRY GLASS .090"	X								X	
TYPICAL GLASS										
THICKNESS OF PLIES	3.2mm-1/2"	1/4"	1/4"	≥ 1/4"	≥1/4"	3.2mm-1/4"	3.2mm-1/4"	1/4"		3.2mm-1/4"
PLY TYPE	A, HS, FT	FT	FT	FT	FT	A, HS, FT	A, HS	**IG:** In -A, HS/Out - FT		A, HS
CERTIFICATION & LABELING	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO
STANDARD	16CFR1201						GSA ISC,	ASTM E 1996		UL752
	ANSI Z 97.1						ASTM F 1642			

.060 Minimum Interlayer Thickness for HS or Tempered Plys.

Glass in Railings must be either tempered laminated or, if no walking surfaces below, tempered.

Glass in Canopies is typically tempered laminated with at least 1/4" thick glass plies.

Glass for Point Supported Applications must be tempered laminated or tempered.

All Interlayers provide UV reduction.

All PVB Interlayers reduce sound transmission.

SGC does not supply glass for Balistic or Detention applications.