Saflex®

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BuyLine 3109

Protective Interlayers for Laminated Glass

Saflex® - The Brand to Trust

Around the world, Saflex is the most trusted name in laminated glass interlayer technology – delivering consistent performance, durability, reliable and knowledgeable service. As a result, Saflex interlayers for laminated glass are used in nearly 50% of laminated glass applications in automotive and architectural industries.

CONTENTS

The benefits of laminated glass made with Saflex architectural glazing interlayer

Unsurpassed Safety
performance

Laminated glass made with Saflex® brand interlayers is a safety glazing material that meets Federal requirements 16 CFR 1201 Cat I and Cat II and ANSI Z97.1 Class A and Class B when using 0.015 inch and 0.030 inch Saflex PVB interlayer products as appropriate.

Hurricane Protection

When it comes to hurricane protection, Saflex is the interlayer of choice. When used in properly designed window and door systems, laminated glass made with Saflex interlayer will successfully meet hurricane regulations and standards including:

- The International Building Code (IBC)
- The International Residential Code (IRC)
- National Fire Protection Association - Building Construction & Safety Code (NFPA 5000)
- The Florida Building Code
- Dade County Florida product certification requirements
- ASTM International standards and specifications for windborne debris impact and pressure cycling standards
- Level E certification for critical structures (hospitals, etc.)

For residential applications, Saflex interlayer can be incorporated into hurricane-certified window and door systems. For commercial applications, properly designed glazing systems made with Saflex interlayer will pass large and small missile-hurricane requirements.

Extreme Wind & Impact—Glass Constructions

Missile	Regulation	Glass Configuration[1]	
Large	TAS 201/3 Dade	Glass /	0.090" Saflex*; 0.100" Saflex HP; or 0.075" Vanceva VSO2™ / Glass
Large	SSTD-12	Glass /	0.090" Saflex*; 0.100" Saflex HP; or 0.075" Vanceva VSO2™ / Glass
Large	ASTM E 1886/1996 (Level D)	Glass/	0.090" Saflex*; 0.100" Saflex HP; or 0.075" Vanceva VSO2™ / Glass
	(Level E)	Glass/	0.150" Vanceva VSO2™ ; 0.175" Saflex HP + VSO2; 0.200" Saflex HP / Glass
Small	SSTD-12	Glass / minimum 0.060" Saflex / Glass	
Small	ASTM E 1886/1996	Glass/ minimum 0.060" Saflex* / Glass	

[1] Glass must be designed to meet ASCE-7 & ASTM E 1300
* Thinner gauge has been demonstrated to intermittently pass the large missile impact test.

Jade Ocean: Hurricane Glazing featuring Saflex®

Seismic Protection

Laminated glazing systems made with Saflex interlayer are highly resistant to the dynamic rocking motions of an earthquake, helping to maintain the integrity of the building envelope and helping to prevent injury and damage from glass fallout.

Performance of Various Glass Types in a Dry-Glazed Curtain Wall System Subject to Identical Dynamic Rocking Motions

Annealed Laminated – 1/4", 3/8" (6mm, 10mm)	No Glass Fallout
Heat Strengthened Laminated – 7/16" (11mm)	No Glass Fallout
Fully Tempered Laminated – 7/16" (11mm)	Significant Fallout
Annealed Monolithic – 3/8" (10mm)	Significant Fallout

The Brand to Trust Since 1927

Over 80 years ago, the originators of the Saflex business started an entirely new industry based on the belief that glass could be made better through lamination. While glass was a common material in 1927, it typically occupied relatively small spaces in automobiles and buildings. Through lamination and the introduction of Saflex interlayer, automotive and architectural designers began to rethink glass and the possibilities it lent to their designs.

FRONT COVER : LEFT: PROJECT: Winnie Palmer Hospital for Women & Babies ARCHITECT: Jonathan Bailey Associates GLASS FABRICATOR : Viracon PHOTOGRAPHER: Bob Braun

Contact the Architectural Glazing Solutions Centre (AGSC) @ 1.877.674.1233, www.saflex.com or glazin@solutia.com for a customized architectural solution.

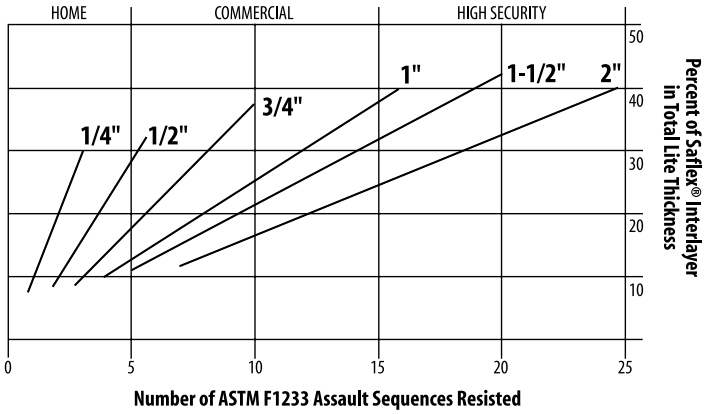
Advanced Security *performance*

Security Glazing

Laminated architectural glazing made with Saflex interlayer provides a significant improvement over monolithic glass products in resistance to forced entry and is capable of passing Underwriters Laboratory Burglary Resistance Test UL 972 and ASTM F1233 Standard Test Method for Security Glazing Materials and Systems.

Products constructed from laminated glass are referred to as security glazing and are designed to withstand the complex dynamic structural loads resulting from intentional impact or assault. Since burglaries, forced entries or ballistic attacks are often targeted toward the easiest opportunity and lowest perceived risk, the presence of laminated security glazing made with Saflex interlayer may be enough to thwart an attack.

Forced-Entry Performance of Laminated Security Glazing*



***Note:** The failure point of nearly all materials subjected to the ASTM forced-entry test is dependent upon the precise sequence of attacks to which they are exposed. It cannot be assumed that an aggressor will follow the precise test sequence to which the material was originally exposed in establishing its relative forced-entry resistance.

Bomb Blast Protection

Not all laminated glass is the same, and the same glass configuration may not meet every facility's needs. For any installation where a blast hazard is suspected, a risk assessment of the facility should be completed prior to installation of any product.

Each project is unique. There is no industry standard that defines a level of required protection. The amount of desired protection, followed by balancing the acceptable risk, must be determined before several key items are addressed from a glazing standpoint, including:

- Amount of glass desired in the structure
- Structural capacity of glass (wind and/or snow load)
- Blast load determination
- Acceptable hazard level
- Stand-off distance
- Life cycle of glazing product
- Environment and image

With an increased desire for added protection, more glass use in buildings has become the trend. Recently developed glazing and framing techniques, including structural blast performance combined with the long life cycle of laminated glass, allow the use of more glass in buildings without sacrificing comfort or protection.

Seattle Courthouse: Security Glazing featuring Saflex®

Greater Acoustic *performance*

Sound transmission into building spaces is generally through the path of least resistance -- the windows. When standard glazing configurations are not sufficient to limit the transmission of sound into building spaces, window systems with superior sound dampening performance must be considered. That is where Saflex can help.

Saflex has introduced an advanced acoustical interlayer featuring SilentGlass Technology™. It is the perfect solution for Architects and building owners demanding high performance sound attenuation.

Laminated glass made with Saflex SilentGlass Technology™ can reduce irritating outside noise by up to 50%. This superior acoustical offering provides a significantly higher level of sound reduction capabilities and greater dampening performance when compared to standard laminated glass. There is no need to increase the overall thickness of the glass or the air space to achieve higher STC performance for the same configuration. Visual clarity and optical quality are not sacrificed when using Saflex SilentGlass Technology in laminated glass applications. Such applications include airports and surrounding structures, hotels, sports stadiums, train stations, high-rises and educational facilities.

Sound Transmission Loss Data

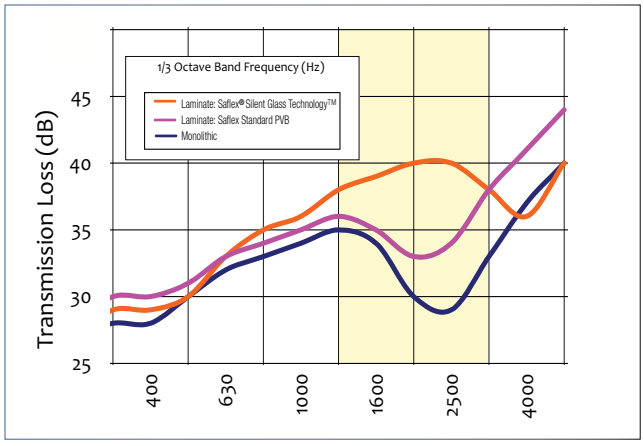


Figure 1: Sound Transmission Loss of Monolothic Glass, Laminated Glass with Saflex SilentGlass Technology and Saflex R series interlayer. Laminated glass configuration: 3mm glass/0.76mm interlayer/3mm (1/8in./0.030 in Saflex interlayer/1/8 in) glass.

ARCHITECTURAL FIRMS: RMark Sexton of Krueck & Sexton Architects
GLASS FABRICATOR: Viracon, Owatonna, MN
GLAZING INTERLAYER: Saflex, St. Louis
PHOTOGRAPHER: Carl Finke

Spertus Museum of Jewish Studies in Chicago:
Acoustic Performance featuring Saflex®

Sustainability *performance*

Saflex has a long standing commitment to safe, compliant operations with a focus on continuously improving the health, safety and environmental aspects of its business. Saflex's U.S. production facilities operate using 30 percent post industrial recycled content and do not use post consumer product in its facilities. However, the finished product as supplied to the consumer may be recycled into secondary materials for various markets. Saflex supports the architectural community in their efforts to create sustainable buildings. The use of laminated glazing made with Saflex interlayer allows designers to use more glass in designs overall through its structural support attributes and can be used to secure points towards LEED certification for architectural projects in the following categories:

LEED CATEGORY: Energy and Atmosphere
CREDIT 1: Optimize Energy Performance
LEED CREDIT: 1-10 points
SAFLEX CONTRIBUTION: Saflex offers a wide range of glazing interlayers that can contribute significantly to solar heat gain reduction in structural glazing applications. These high-performance interlayers allow architects to specify more glazing in their designs to help meet the requirements for the Energy and Atmosphere category.

LEED CATEGORY: Materials and Resources
CREDIT 4: Recycled Content
LEED CREDIT: 1-2 points
SAFLEX CONTRIBUTION: Saflex manufacturing processes utilize 30 percent post-industrial recycled content. Saflex does not use post consumer product in its facilities. However the finished product, as supplied to the consumer, may be recycled into secondary materials for various markets.

LEED CATEGORY: Indoor Environmental Quality
CREDIT 8: Daylight & Views
LEED CREDIT: 1-2 points
SAFLEX CONTRIBUTION: Daylight reduces heat gain created by artificial light. Saflex interlayer can contribute to Solar Heat Gain Performance which allows architects to use more glazing in the overall building design without increasing loads on the building's Heating Ventilation and Cooling (HVAC) systems.

Unique Aesthetic *performance*

Vanceva® Color Studio by Saflex

The Vanceva color interlayer studio enables design professionals to specify a wide range of colors in unlimited applications to achieve performance and design goals. This unique interlayer system allows for thousands of color possibilities, combined with the key benefits and performance attributes of clear Saflex products, delivering the ultimate combination of functionality and aesthetic design flexibility. For more information please visit: **www.vanceva.com**

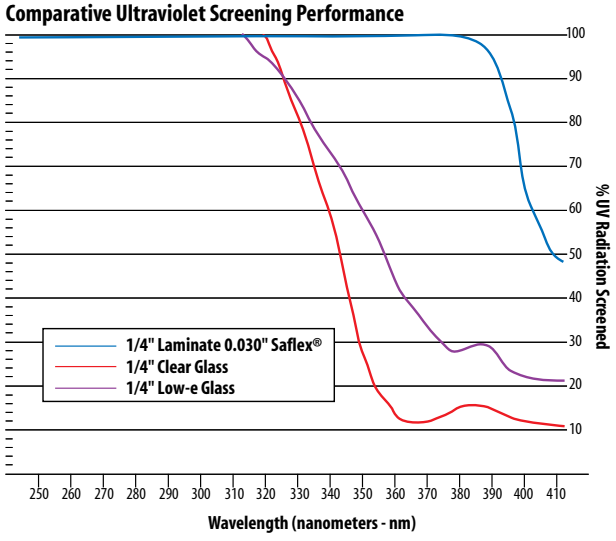
The right color for any project

- **Translucent Colors** - If a project requires a frosted or acid-etched look, a translucent color can be created by adding a white Vanceva interlayer to the color mix.
- **Opaque Colors** - Opaque Vanceva interlayer, when added to any other color selection, will also make that color opaque. Perfect for spandrel glass applications.
- **Specialty Colors** - Concentrated colored pigments in a single interlayer are now enough to add brilliant hues to laminated glass that help achieve even more distinctive looks.
- **Fade-resistant** - Vanceva color interlayer systems are made with heat- and light-stable pigments instead of dyes to produce colors that resist fading.

UV & Thermal *performance*

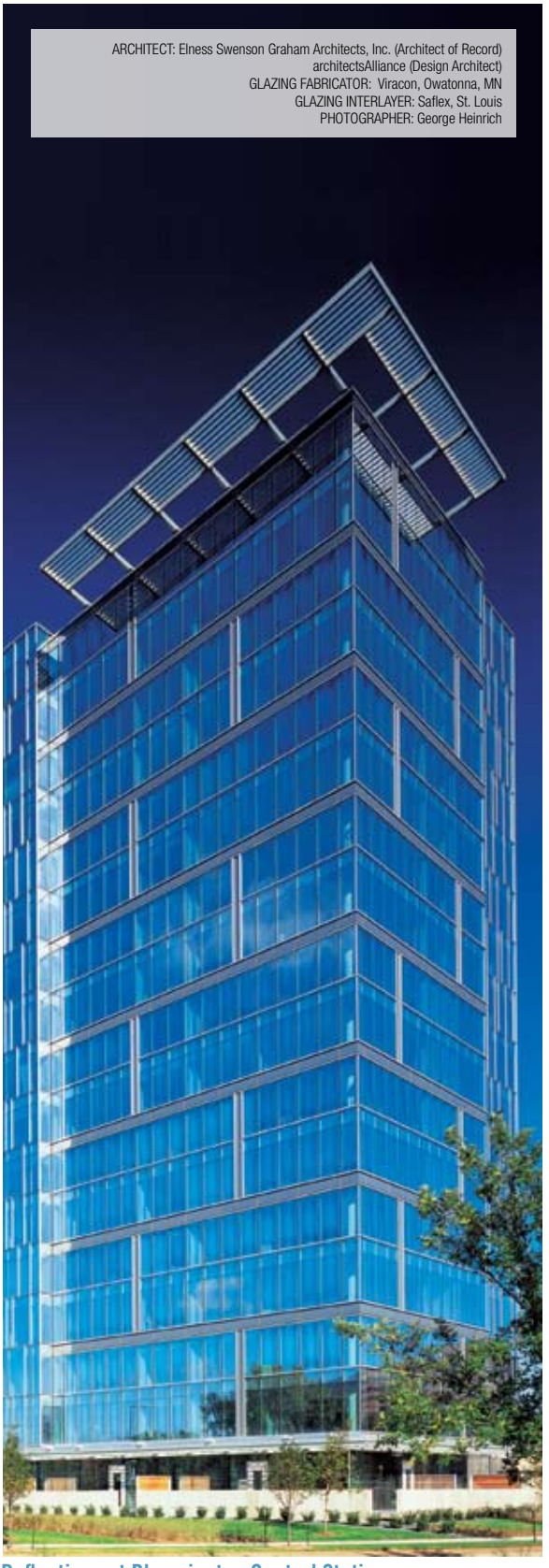
Because the amount of energy transferred through glazing impacts the costs of heating, cooling and lighting a building, solar and thermal energy controls must be carefully considered when designing and specifying a glazing system. When combined with the appropriate types of glass, Saflex interlayer can effectively manage heat buildup, as well as, help reduce fading and damage from ultraviolet radiation.

Comparative Ultraviolet Screening Performance



UV screening defined as the ability of the configuration to screen greater than 99% of UV radiation to 380nm wave length.

ARCHITECT: Elness Swenson Graham Architects, Inc. (Architect of Record)
architectsAlliance (Design Architect)
GLAZING FABRICATOR: Viracon, Owatonna, MN
GLAZING INTERLAYER: Saflex, St. Louis
PHOTOGRAPHER: George Heinrich



Reflections at Bloomington Central Station:
UV & Thermal Glazing featuring Saflex®

Structural *performance*

Research shows that laminated glass units are as strong as monolithic glass lites of the same nominal thickness unless adverse environmental conditions exist. Laminate strength may be decreased versus monolithic glass when subjected to certain long-term loads such as snow loads or `high heat for extended periods of time. Selection of the proper laminated glass thickness to carry the design load requires following the principles outlined in ASTM E1300.

Designing for Breakage

If glass breakage presents a hazard or liability to persons below the envelope of a building that has been compromised, laminated glass offers a solution. If breakage occurs, laminated glass made with Saflex interlayer can remain in the window opening because of its inherent retention characteristics after breakage has occurred.

Glazing Sealants & Laminated Glass

For sealants that are necessary to install laminated glass, manufacturers generally recommend resilient, non-hardening sealant compounds, tapes or elastomeric gaskets. Saflex has conducted extensive tests on many commercial sealants to validate this recommendation. For details of the test procedures and results visit www.saflex.com. For additional information on available commercial sealants, contact your glazing manufacturer or Saflex.

Glazing Practices

Proper glazing practices should be followed when installing laminated glass. In general:

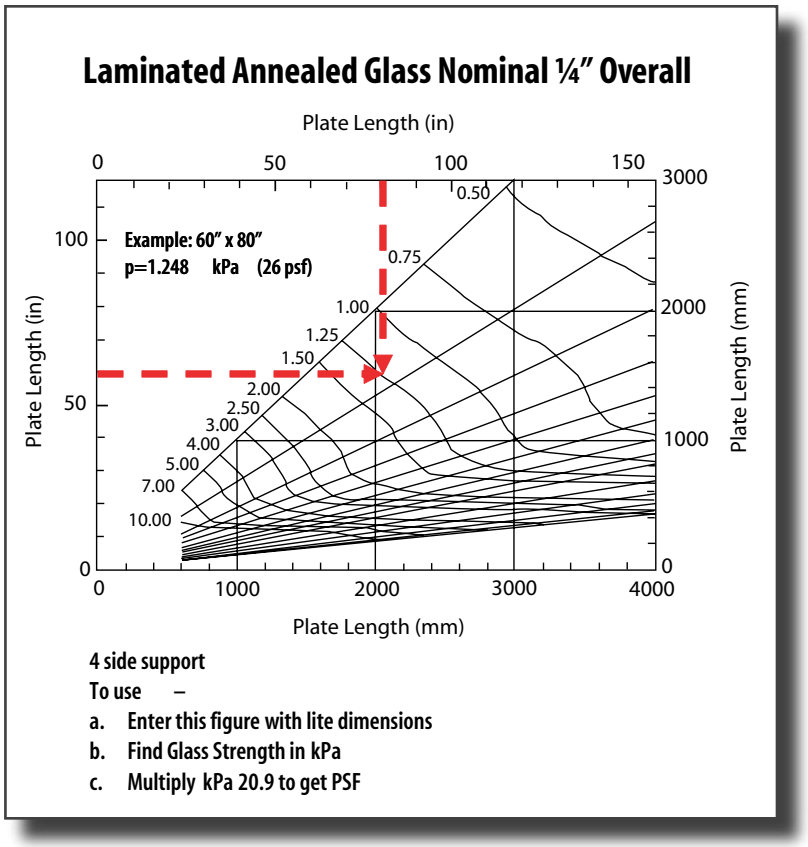
- Edges should be cleanly cut and free of damage
- The weather seal should be tight
- Water should not be allowed to collect in the glazing channel
- Weep holes should be provided and open to allow drainage
- Prolonged exposure of the laminate edge to moisture can result in cloudiness
- Laminated glass should be kept dry and any potential for chemical spillage over the glass should be eliminated.

Thickness and Fabrication

Standard laminate thickness can usually be accommodated in conventional glass frames. It can be fabricated with clear or tinted annealed (AN), heat-strengthened (HS), chemically strengthened (CS/CT) and fully tempered (FT) glass. Coated glass can be used and laminated glass can be fabricated for one or both lites of insulating glass units. When specifying laminated glass that utilizes lites strengthened by a heating and cooling process (i.e., heat-strengthened or fully tempered), use of a minimum of 1.52 mm (0.060 inch) Saflex interlayer is recommended. The heating and cooling process used to strengthen and temper glass can cause optical deviation.

GLAZING INTERLAYER: Saflex, St. Louis
PHOTOGRAPHER: Piyada Kongchonrak

Toyota Showroom: Structural Glazing featuring Saflex®



4 side support
To use –

a. **Enter this figure with lite dimensions**
b. **Find Glass Strength in kPa**
c. **Multiply kPa 20.9 to get PSF**

Laminate Specification Data

Performance Characteristics of Laminated Glass Made with Saflex Interlayer

Nominal Overall in. (mm)	Unit Configuration, Inches	CPSC Cat. I	CPSC Cat. II	ASTM F 1233 Class 1	UL 972	Blast Resistance	STC	OITC	Tvis %	Tsol %	Tuv	SC	SHGC	U-Factor BTU/h-ft2-F	RHG BTU/h-FT2	Hurricane Small Missile	Hurricane Large Missile	Seismic
Monolithic - (Single Lite Glass)																		
1/4" (6mm)		—	—	—	—	—	31	27	0.88	0.77	0.66	0.94	0.82	1.03	201	—	—	—
1/2" (12mm)		—	—	—	—	—	37	33	0.85	0.63	.053	0.83	0.72	0.98	180	—	—	—
Laminated (Glass - Saflex Interlayer - Glass)																		
1/4" (6mm)	Lami - 0.030" Saflex® - Lami	•	•	—	—	•	34	30	0.86	0.72	0.00	0.91	0.79	1.00	194	—	—	•
5/16" (7mm)	1/8" - 0.030" Saflex® - 1/8"	•	•	—	—	•	34	30	0.88	0.72	0.00	0.91	0.78	1.00	194	—	—	•
5/16" (7mm)	1/8" - 0.030" Saflex® SilentGlass Technology™ - 1/8"	•	•	—	—	•	35	31	0.88	0.71	0.00	0.89	0.77	1.00	190	—	—	•
5/16" (7mm)	1/8" - 0.060" Saflex® - 1/8"	•	•	•	•	•	35	31	0.86	0.65	0.00	0.85	0.74	0.94	183	•	—	•
5/16" (7mm)	1/8" - 0.075" Vanceva® Storm - 1/8"	•	•	•	•	•	33	33	0.87	0.71	0.00	0.89	0.77	0.97	190	•	•	•
5/16" (7mm)	1/8" - 0.090" Saflex® - 1/8"	•	•	•	•	•	35	32	0.88	0.68	0.00	0.87	0.76	0.96	187	•	•	•
5/16" (7mm)	1/8" - 0.100" Saflex® HP - 1/8"	•	•	—	—	•	35*	32*	0.87	0.67	0.00	0.87	0.75	0.95	185	•	•	•
9/16" (13mm)	1/4" - 0.030" Saflex® - 1/4"	•	•	—	—	•	37	33	0.82	0.61	0.00	0.82	0.71	0.95	176	—	—	•
9/16" (14mm)	1/4" - 0.060" Saflex® - 1/4"	•	•	•	•	•	37	33	0.86	0.65	0.00	0.85	0.74	0.94	183	•	•	•
9/16" (14mm)	1/4" - 0.090" Saflex® - 1/4"	•	•	•	•	•	37*	33*	0.64	0.60	0.00	0.84	0.73	181	181	•	•	•
9/16" (13mm)	1/4" - 0.030" Saflex®SilentGlass Technology™ - 1/4"	•	•	—	—	•	38	34	0.85	0.61	0.00	0.81	0.70	0.96	174	—	—	•
9/16" (14mm)	1/4" - 0.075" Vanceva® Storm - 1/4"	•	•	•	•	•	37	34	0.85	0.64	0.00	0.84	0.72	0.93	179	•	•	•
Insulated Glass Units (Monolithic Glass - Air Space - Monolithic Glass)																		
1" (25mm)	1/4"[1/2" A.S.]1/4"	—	—	—	—	—	35	27	0.79	0.60	0.00	0.81	0.70	0.47	168	—	—	—
1-1/2" (38mm)	1/4"[1" A.S.]1/4"	—	—	—	—	—	37	27	0.79	0.60	0.00	0.81	0.70	0.49	168	—	—	—
Laminated Insulating Units (Monolithic Glass - Air Space - Laminated Glass (inboard)																		
5/16" (22mm)	1/4" LAG30[1/2" A.S.]1/8"	•	•	—	—	•	37	31	0.80	0.61	0.00	0.79	0.68	0.47	164	—	—	•
5/16" (24mm)	1/4" LAG60[1/2" A.S.]1/8"	•	•	•	•	•	37	31	0.80	0.59	0.00	0.77	0.67	0.47	162	•	•	•
5/16" (24mm)	1/4" LAG90[1/2" A.S.]1/8"	•	•	•	•	•	37*	31*	0.78	0.54	0.00	0.72	0.63	0.46	151	•	•	•
1" (25mm)	1/4" LAG30[1/2" A.S.]1/4"	•	•	—	—	•	39	32	0.79	0.56	0.00	0.77	0.67	0.47	161	—	—	•
1" (26mm)	1/4" LAG60[1/2" A.S.]1/4"	•	•	•	•	•	39*	32*	0.79	0.55	0.00	0.66	0.66	0.46	158	•	•	•
1" (27mm)	1/4" LAG75[1/2". A.S.]1/4"	•	•	•	•	•	39*	32*	0.78	0.55	0.00	0.76	0.66	0.46	158	•	•	•
1" (27mm)	1/4" LAG90[1/2" A.S.]1/4"	•	•	•	•	•	39*	32*	0.78	0.53	0.00	0.74	0.64	0.46	0.46	•	•	•
1" (27mm)	1/4" LAG100[1/2" A.S.]1/4"	•	•	•	•	•	39*	32*	0.77	0.52	0.00	0.73	0.63	0.46	153	•	•	•
Double Laminated IGU (Laminated Glass - Air Space - Laminated Glass)																		
1" (26mm)	1/4" LAG30[1/2" A.S.]1/4" LAG30	•	•	—	—	•	40	33	0.79	0.56	0.00	0.77	0.67	0.46	160	—	—	•
1" (26mm)	1/4" LAG30[1/2" A.S.]1/4" LAG60	•	•	•	•	•	39	34	0.79	0.55	0.00	0.76	0.66	0.46	159	•	•	•
1-1/8" (28mm)	1/4" LAG30[1/2" A.S.]1/4" LAG90	•	•	•	•	•	40	35	0.78	0.53	0.00	0.76	0.65	0.45	0.45	•	•	•
1-5/16" (33mm)	1/4" LAG30[1/2" A.S.]9/16" LAG75	•	•	•	•	•	39*	34*	0.76	0.50	0.00	0.74	0.64	0.64	153	•	•	•
1-5/8" (41mm)	1/4" LAG30[1/2" A.S.]1/4" LAG30[1/2" A.S.]	•	•	•	•	•	40*	35*	0.74	0.45	0.00	0.68	0.59	0.43	0.43	•	•	•
Triple Laminated IGU (Laminated Glass - Air Space - Laminated Glass - Air Space - Laminated Glass)																		
1 3/4" (46mm)	1/4" LAG30[1/2" A.S.]1/4" LAG30[1/2" A.S.]	•	•	•	•	•	44	33	0.70	0.44	0.00	0.67	0.58	0.30	138	•	—	•

Information provided by Solutia Inc. The data and information set forth above are based on samples tested and are not guaranteed for all samples or applications. All data calculated using Lawrence Berkeley Laboratory Window 5 Program; NFRC/ASHRAE Conditions; center of glass values; US Standard units. Data presented is not inclusive of all product/color offerings. Contact the manufacturer for a full product and performance listing. *Estimated Acoustical Rating.

Notes: XX = Interlayer gauge in mils. For example: 1/4"LAGXX = symmetrical 1/8" glass plus interlayer. 9/16"LAGXX = symmetrical 1/4" glass plus interlayer.
Light to Solar Gain (LSG) is calculated by dividing the Tvis% by the SHGC

Saflex

Heat & Light Control Characteristics of Laminated Glass Made with Saflex Interlayer

Description	Solar Transmittance %	Visible Light Transmittance %	Shading Coefficient (SC)	Solar Heat Gain Coefficient (SHGC)	LSG (Light to Solar Gain)	U-Factor BTU/hr-ft2-F	Relative Heat Gain (RHG) BTU/hr-ft2
Clear Protective Interlayers							
Saflex® 0.030 inch	0.73	0.88	0.91	0.78	1.13	1.00	194
Saflex® 0.060 inch	0.71	0.88	0.89	0.77	1.14	0.97	191
Saflex® 0.090 inch	0.68	0.88	0.87	0.76	1.16	0.96	187
Saflex® HP 0.100 inch	0.67	0.87	0.87	0.75	1.16	0.95	185
Vanceva® Storm 0.075 inch	0.71	0.87	0.89	0.77	1.13	0.97	190
Colored Protective Interlayers							
Vanceva® Polar White *	0.08	0.07	0.26	0.22	0.30	1.01	64
Vanceva® Arctic Snow	0.60	0.68	0.78	0.68	1.00	1.01	170
Vanceva® Cool White	0.67	0.81	0.85	0.73	1.11	1.01	182
Vanceva® Ruby Red	0.62	0.48	0.83	0.72	0.67	1.01	178
Vanceva® Coral Rose	0.70	0.76	0.89	0.77	0.99	1.01	190
Vanceva® Sahara Sun	0.63	0.78	0.83	0.72	1.08	1.01	179
Vanceva® Golden Light	0.69	0.85	0.88	0.76	1.12	1.01	188
Vanceva® Sapphire	0.55	0.52	0.77	0.67	0.77	1.01	167
Vanceva® Aquamarine	0.69	0.77	0.87	0.76	1.02	1.01	188
Vanceva® Evening Shadow	0.48	0.49	0.72	0.62	0.80	1.01	156
Vanceva® Smoke Grey	0.67	0.78	0.86	0.75	1.04	1.01	185
Vanceva® True Blue	0.42	0.12	0.66	0.57	0.20	1.01	144
Vanceva® Deep Red	0.38	0.15	0.63	0.54	0.28	1.01	139
Vanceva® Tangerine	0.54	0.41	0.75	0.65	0.64	1.01	164
Saflex® Blue Green	0.64	0.72	0.84	0.72	0.99	1.01	180
Saflex® Cool Blue	0.67	0.74	0.86	0.74	0.99	1.01	184
Saflex® Light Sky Blue	0.65	0.67	0.84	0.73	0.92	1.01	181
Saflex® Grey	0.47	0.42	0.71	0.61	0.69	1.01	155
Saflex® Medium Blue Grey	0.38	0.30	0.64	0.55	0.55	1.01	140
Saflex® Bronze	0.51	0.52	0.74	0.64	0.82	1.01	161
Saflex® Medium Bronze	0.65	0.69	0.84	0.73	0.94	1.01	181
Saflex® Medium Neutral Brown	0.32	0.28	0.60	0.51	0.55	1.01	132

Information provided by Solutia Inc. The data and information set forth above are based on calculations and are not guaranteed for all samples or applications. All data calculated using Lawrence Berkeley Laboratory Window 5.2 Product; NFRC/ASHRAE Conditions; center of Glass Values; USD Standard units. Laminates constructed as: 3 mm (0.125 inch) Clear glass - [Saflex Interlayer] - 3 mm (0.125 inch) Clear glass. Colored laminate configurations consist of 0.38 mm Saflex interlayer unless noted. All alternate interlayer thicknesses as designated.
* Estimated data for Polar White.

CONTACT SAFLEX

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