



PREL-LAM

Laminated Glass

DESCRIPTION

Laminated, or safety, glass consists of two or more plies of glass (annealed or tempered) bonded together by interlayers of polyvinyl butyral (PVB). During the laminating process, the glass is subjected to a pressure of 180 to 200 PSI and a temperature of between 275° and 300 °F in an autoclave to ensure permanent adhesion of the different layers.

When laminated glass is fractured, the PVB interlayer acts like a shield, retaining the fragments of glass and keeping the area safe until the unit can be replaced. Prel-Lam laminated glass safe for use in transportation and architectural applications, where protection against personal injury is crucial.

COMPONENTS

By changing the number, type and thickness of the components used, we can create glazings with distinct properties. Combining different components can enhance energy performance, reinforce glass structure, meet certain safety standards and change the glass's appearance.

Glass	Manufacturing Process	Interlayers
Clear	Tempered	PVB
Ultraclear		PVB Vanceva®
Tinted	Heat-strengthened	Sentryglas
Reflective	Silkscreened	Spallshield
Antiglare	Digital printed	Liquid Crystal
Self-cleaning	Curved*	
Low-e		

*Contact us to ensure the feasibility of your project.

SAFETY

The glass/PVB combination offers outstanding resistance to heavy impacts and punctures. The laminate's composition and the tests it is subjected to will depend on the impacts the glass is required to withstand.

Laminated glass is recommended for numerous applications, including canopies, sunrooms, skylights, atriums, and more.

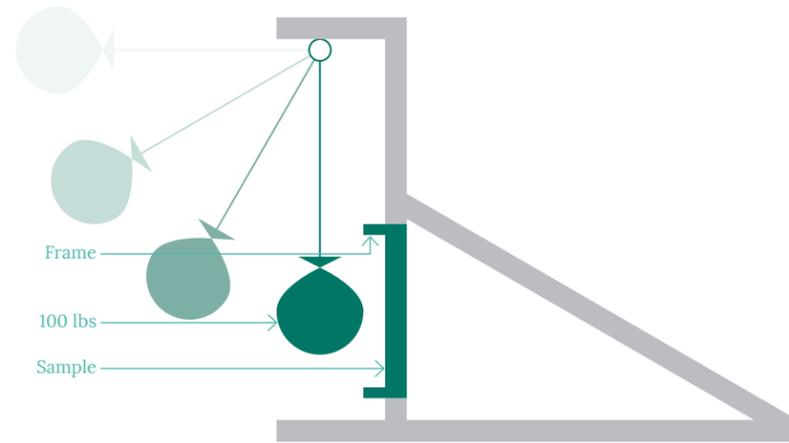
Different standards and codes require that laminated safety glass used in indoor and outdoor hall doors, revolving doors, and bath and shower doors/surrounds meets the following criteria.

CRITERIA FOR LAMINATED SAFETY GLASS

	Class 1	Class 2
Definition	9 sq.ft. or less, except patio doors, shower doors and panels.	9 sq.ft. or less, except patio doors, shower doors and panels.
Test requirements	Kinetic energy on impact 150 ft.-lb. (250 joules)	Kinetic energy on impact 400 ft.-lb. (540 joules)
Standard	CPSC 16 CFR 1201 CLASS 1 CAN/CGSB 12.1 CLASS 1 ANSI Z97.1	CPSC 16 CFR 1201 CLASS 2 CAN/CGSB 12.1 CLASS 2 ANSI Z97.1
Laminated glass with PVB interlayer	2 lites bonded together with 0.015" PVB interlayer	2 lites bonded together with 0.030" PVB interlayer

The impact test involves hitting a glass sample with a 100-lb. shot bag. The force of impact depends on the height from which the bag is dropped.

There are a variety of different specialty films available that can be incorporated for safety glass to meet certain specific requirements. Ionomer resin, for example, can replace a PVB interlayer to create glass that is more resistant than PVB and provides structural resistance in the event of breakage. Ionomer interlayered glass is ideal for applications that require glass to be load-bearing, such as railings.



Laminated Glass Impact Test

OPTICAL AND THERMAL PROPERTIES

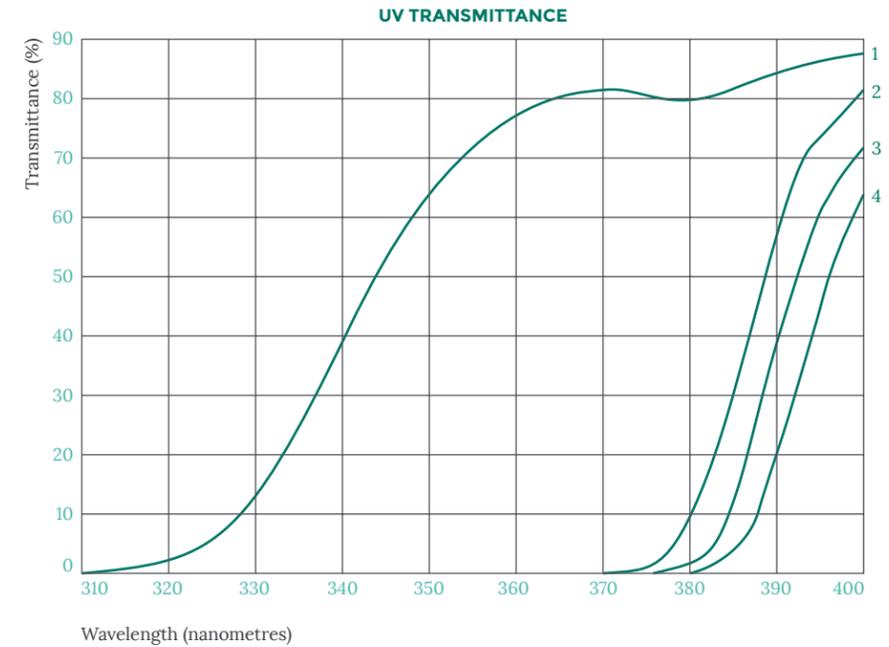
Luminous transmittance, reflection, and light and energy absorption depend on the type of glazing and the colour of the PVB interlayer (see table).

SOLAR ENERGY CONTROL PERFORMANCE Heat and Light Control Characteristics

	Designation	% Visible Light Transmittance	Solar properties		Relative Heat Gain BTU/h. sq.ft.	
			% Transmittance	Shading Coefficient		
Laminated glass mass	Clear	89	77	.92	198	
	Blue-green	RB2-3773	72	63	.84	180
	Translucent white	RB2-2165	65	57	.79	170
	Light bronze	RB2-6452	53	52	.75	162
	Medium bronze	RB2-6428	29	36	.63	138
	Grey	RB2-6544	46	50	.73	159
	Cool blue	RB2-6376	74	70	.88	189
	Light neutral brown	RB2-3655	56	54	.76	165
	Medium neutral brown	RB2-3628	28	33	.60	133
	Dark neutral brown	RB2-3609	9	16	.47	107
Pigmented colours Laminated insulating glass (1" nominal thickness)	Medium blue	RB2-0828	29	39	.65	142
	Clear		79	59	.79	166
	Blue-green	377300	64	50	.70	147
	Light bronze	645200	47	41	.61	121
	Light neutral brown	365500	50	42	.62	131
	Grey	654400	41	39	.59	125
	Cool blue	637600	66	55	.75	156
Translucent white	216500	58	45	.65	136	

UV FILTRATION

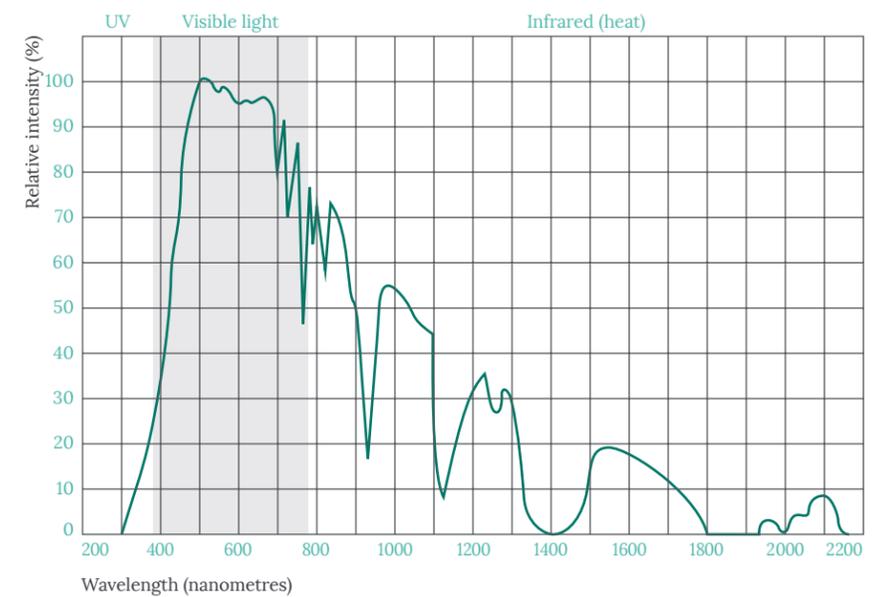
Due to its composition, laminated glass provides effective protection against the fading of fabrics, clothing and other interior objects caused by the sun's ultraviolet rays. It will filter over 99% of UV radiation below 380-nanometre wavelengths.



LEGEND

- 1 6mm transparent monolithic glass
- 2 6mm transparent laminated glass - 0.38 mm PVB
- 3 6mm transparent laminated glass - 0.76 mm PVB
- 4 6mm transparent laminated glass - 1.52 mm PVB

SOLAR ENERGY TRANSMITTANCE



COLOUR INTERLAYER COMBINATIONS

Glass influences architecture and design in a variety of ways. Vanceva® interlayers offer an impressive array of colours that can transform any glass surface into a unique work of art without sacrificing the practical aspects of laminated glass. With its 16 base colours, this system can include up to four different PVB layers and

create over 17 000 colours. From dark and unique, to daring and bright, the Vanceva® system has something for every project. It also protects against UV rays, fading fabric and furniture colours, glare, and solar energy transmission.

NOISE CONTROL

Sound is a vibration (in the air, generally), that is likely to be detected by the ear. Sound is produced when a sound source disturbs the air surrounding it.

Noise control glass reduces the external noise that usually travels through regular glass. The ability of sound waves to pass through glass depends on how heavy, strong and thick it is. Like all materials, glass has a coincidence frequency that allows maximum sound transmission. Different glass configurations are available to counter this defect and reinforce sound protection.

The acoustic characteristics of sealed insulating (thermos) glass depend on the total mass of the glass products used, their symmetry and their air space. PVB interlayers have mechanical properties that disperse the vibrations caused by sound waves in heat, especially those at coincidence frequency and those at frequencies of 800 Hz and higher.

Consult our acoustic performance guide for more information.



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