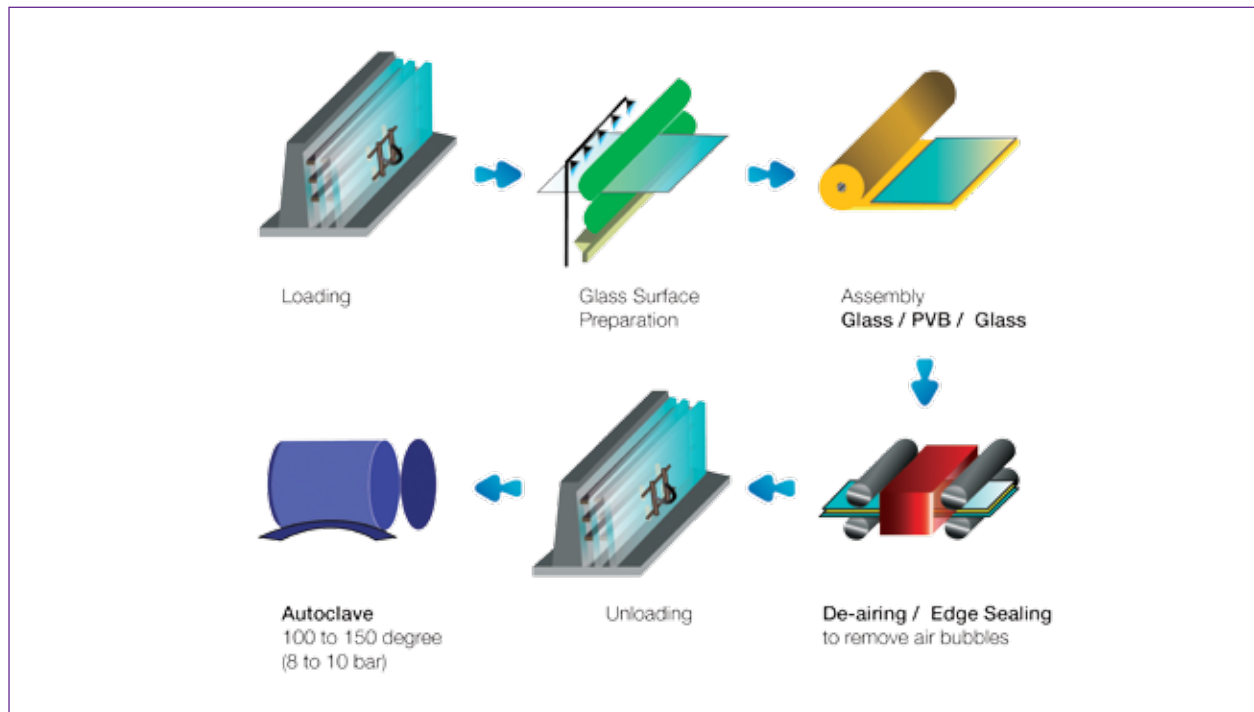




Cryst 
Safety Glass

CSG
LAMINATED
GLASS

What is Laminated glass and how is it made?



Process of Tempered glass

Laminated glass is a type of glass that is tinted with one or more plastic interlay namely, Polyvinyl Butyral (PVB) under heat and pressure. Laminated glass is also a type

of safety glass. When broken its fragments will adhere to the plastic sheets.

Properties of Laminated Glass

01 Safety

CSG Laminated Safety Glass uses superior quality PVB from company such as Dupont and Saflex. When combined with our superior laminating process we are able to produce reliable laminated glass.

PVB interlayers absorb the energy of the impact, resisting penetration. Although the glass may break, the glass fragments remain firmly bonded to the interlayer, minimizing the risk of injuries.

02 Security

CSG Laminated Glass resists intrusion because the interlayer continues to safeguard the building even after the glass itself is broken. It cannot be cut from only one side, so ordinary glasscutters are useless.

CSG Laminated Glass tends to resist impact. In multi-ply configurations, it can even resist bullets, heavy objects, or

small explosions. In most cases, it takes many blows at the same spot, to penetrate the glass.

At times even if it is accidentally broken, the interlayer continues to safeguard the building until the glass is replaced. Re-glazing can be done when convenient.

03 Sound Reduction

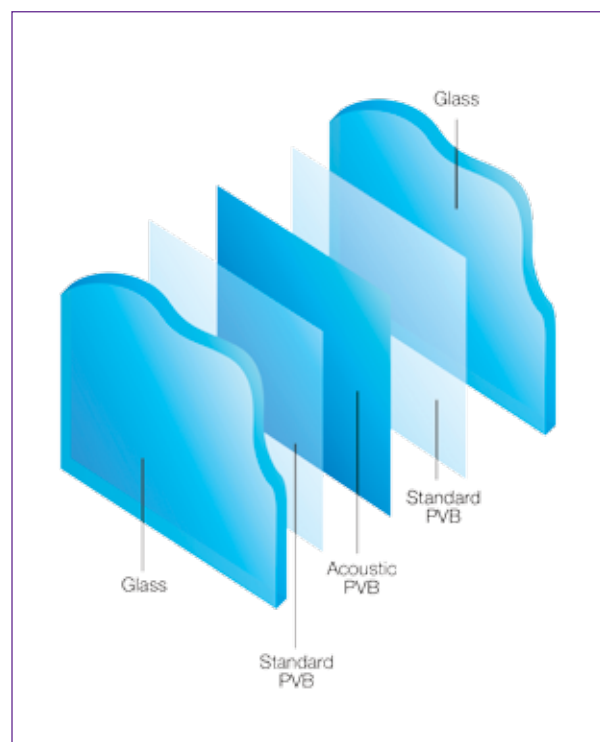
CSG Laminated Glass has proven to be an excellent barrier to noise, having a higher sound reduction index than monolithic glass of equal thickness between the frequencies of 125Hz and 4,000Hz. This sound dampening is due to the “viscoelastic” properties of the interlayer material. The coincidence effect experienced with monolithic glass at certain frequencies is also considerably reduced with Laminated glass, and the noise reduction performance of IG units can be greatly improved by incorporating at least one layer of Laminated glass. This makes it ideal for airports, hotels, data processing centres, recording studios, and any building near airports, highways, or train lines.

less is barely perceptible; an increase or decrease of 5 dB is clearly perceptible; and an increase or decrease of 10 dB is perceived as a doubling or halving of noise level. The following chart indicates typical laboratory-measured sound transmission losses for various glass configurations.

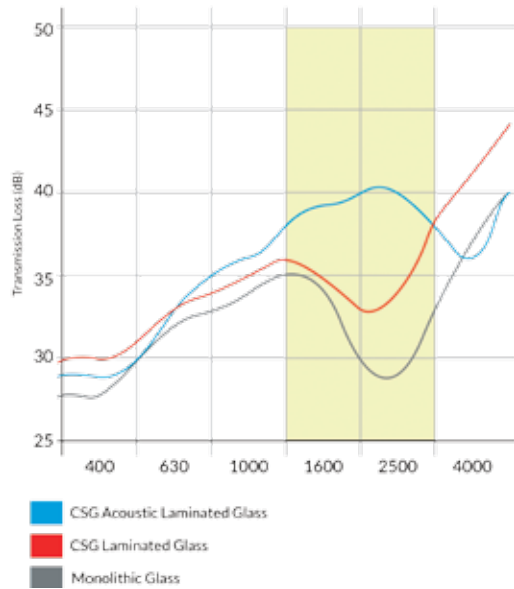
Tailored for noise control applications, CSG Acoustic Laminated Glass is available upon request.

The acoustic performance of glazing assemblies is expressed in two terms:

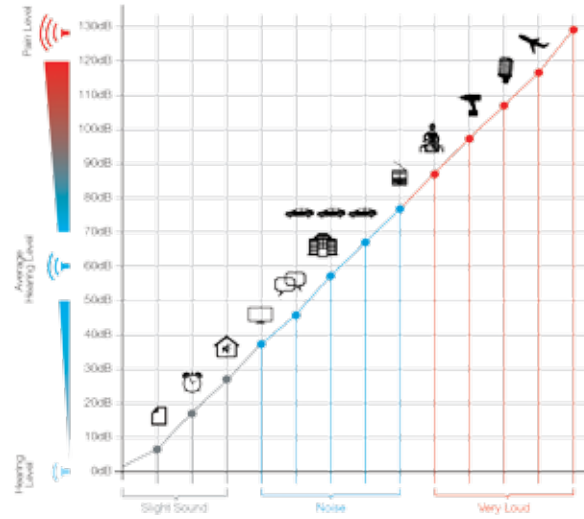
Sound Transmission Class (STC) is used to measure the sound transmission loss of interior walls, ceilings and floors; and Outdoor-Indoor Transmission Class (OITC), which measures the sound transmission loss of exterior glazing applications. High sound transmission loss – good sound insulation – is desired in many commercial curtain wall applications. Limiting sound transmission through glazing requires review and testing of the entire glazing system. Laminated glass and insulating glass tend to produce higher OITC ratings because the laminate dampens vibration and the air space limits sound transmission. An important feature of the human perception of continuous sound is that an increase or decrease in sound pressure level by 3 dB or



Sound Transmission Loss



Noise Reduction



Typical Sound Transmission Loss (dB)

Glazing Type	Configuration (inches)	Configuration (mm)	STC	OITC
Monolithic	1/8	3	28	25
Monolithic	1/8	3	29	25
Monolithic	3/16	5	30	28
Monolithic	1/4	10	32	29
Monolithic	3/8	12	35	32
Monolithic	1/2	3, 3.2	37	33
Laminated	1/8-0.030 Saflex® - 1/8	3, 3.2Q	33	30
Laminated	1/8-0.030 Saflex® Q-1/8	5, 5.2Q	36	32
Laminated	3/16-0.030 Saflex® Q-1/8	6, 6.2Q	38	34
Laminated	1/4-0.030 Saflex® Q-1/4	6, 12.2Q	39	35
Laminated	1/4-0.030 Saflex® Q-1/2	8, 8.2Q	41	36
Laminated	5/16-0.030 Saflex® Q-5/16	6[12.7]6	40	35
Standard IGU	1/4[1/2 AS] 1/4	6[12.7]6	38	30
Standard IGU	1/4[1 AS] 1/4	6[25.4]6	40	32
Laminated IGU	1/4[12 AS] 3/16-0.030 Saflex® Q-3/16	6[12]5.5.2Q	44	35
Laminated IGU	1/4[1 1/16 AS] 5/16-0.030 Saflex® Q-5/16	6[18]8.8.2Q	45	35
Monolithic	1/8-Saflex Q-1/8[1/2 AS] 5/16-Saflex® Q-5/16	3.3.2Q[12]8.8.2Q	47	38

STC : Sound Transmission Glass

OITC : Outdoor, Indoor Transmission Glass

04 Solar Energy Control

Natural light plays an important role in architectural design, but too much sunlight can also mean too much heat gain. To lower air conditioning costs and control glaze, laminated glass can be used. Laminated glass can also combine with reflective coated glass or low-e glass with heat absorbing glass tints.

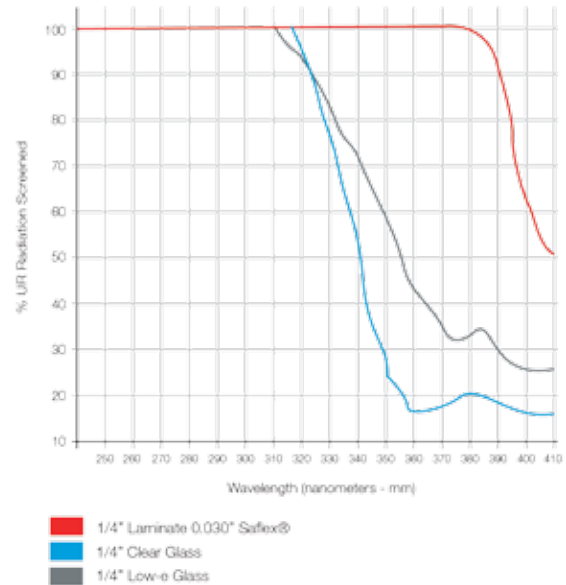
05 UV Elimination

Ultraviolet light is the leading cause of fading of furnishings, pictures, and fabrics. Laminated glass screens out 99% of the sun's UV radiation protecting interior furnishing, displays or merchandise from fading.



Seringin Residences Kuchai Lama, Kuala Lumpur

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.

CSG Laminated Glass has been certified as Grade A safety glass since 2015 under the SIRIM product certification scheme which follows the AS / NZS 2208 Safety Glazing Materials in Building, requirement and guidelines.

CSG Laminated Safety Glass strictly meet the following requirement:

- ◇ Thickness requirement (4 to 19mm)
- ◇ Size tolerance requirement
- ◇ Squareness of rectangular requirement
- ◇ Flatness
- ◇ Boil test
- ◇ Pummel test

CSG Laminating Capabilities

Equipment	Nos	Brand	Max Size (mm)	Min Size (mm)	Nominal Thickness (mm)	PVC Thickness	Standard
Laminated Glass Line	1	North Glass	2140 x 6000	300 x 300	6.38-50.0	0.38,0.76, 1.14,1.52	AS / NZS2208



Pre-Pressing



Autoclave

