A sound solution for effective noise reduction

Reducing Unwanted Noise

Whether it's from traffic, aircraft, trains, factories or even neighbours, unwanted noise is a nuisance but it can be reduced with the right selection of glass. The **VLam™ Hush** and **ComfortHush™** range of laminated glass is specifically developed to do just that.

Reduce Vibration

Ordinary glass can vibrate at the same frequency as the noise source, allowing sound to penetrate through the window. **VLam™ Hush** and **ComfortHush™** includes a special 3-layer laminate that has been specifically engineered to reduce vibration, making it effective in reducing urban noise.

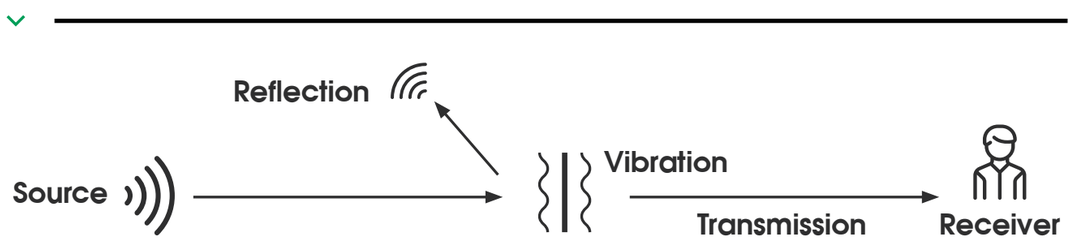
Reduce the Transmission of Noise

There are three things that occur when sound waves encounter a window:

1. They may be **reflected** away, causing little concern to those inside the building
2. They may be **absorbed** through dampening and dissipated, causing little concern to those inside the building
3. **What isn't reflected or absorbed is transmitted through the window by vibration or air leakage**

Addressing a Noise Problem

Typically the weakest point in a home is the windows. Installing windows with good acoustic performance needs to be supported with the careful selection and insulation of walls, floors and roof materials to enhance the overall acoustic performance of your home. It is essential to ensure that all other paths in the exterior of the building have also been sealed.



Typically, suburban traffic noise is a low frequency noise, while aircraft produce a high frequency noise.

Table 1

Common sound levels		Recommended interior noise levels	
Environment	dB		dB
Threshold of hearing	0	Bedroom	30-40
Conventional speech	65	Classroom	35-40
Average traffic (curbside)	70	Living room	40-45
Busy traffic	75	Private office	40-45
Loud traffic	80	Open office	45-50
Live band (20 metres)	105		

Table 2 - Sound Insulation data (dB)

	Monolithic							Laminated			VLam™ Hush			
Thickness (mm)	3	5	6	10	12	15	19	6.38	10.38	12.38	6.5	8.5	10.5	12.5
Single	30	32	32	36	37	37	40	33	36	37	36	37	38	40
ThermoTech™	-	34	35	-	-	-	-	-	-	-	40	42	43	-

ThermoTech™ is an IGU with 16mm airspace and 6mm, 8mm or 10mm outer and 8.5mm VLam™ Hush inner.

Note: Contact Viridian for additional test data

Designing to Solve a Noise Problem

There are generally three components to be considered when solving a noise problem. These are the external noise, the noise reduction of the wall (windows and glazing) and the resulting noise in the room. The process of design requires that the external noise level is determined by measurement and the desired internal noise level is decided (Refer to table 1).

The source of the noise may be higher at certain frequencies. Typically, suburban traffic noise is a low frequency noise, while aircraft produce a high frequency noise.

A detailed solution would involve measuring the nature and intensity of the offending sound and choosing a glass product which would reduce the intensity sufficiently at all frequencies.

It should be noted that glass is only one part of the room and all other components must be assessed as well.

Reduce Air Leakage

Cracks, crevices and even the smallest gaps will greatly reduce the performance of windows by providing opportunities for sound to travel through. It is critical that **VLam™ Hush** and **ComfortHush™** are used in combination with a carefully selected window frame that is well sealed to significantly reduce air leakage. Many window manufacturers make and test windows designed to improve acoustic performance and energy efficiency. It is important these windows are professionally installed to reduce air leakage by ensuring a good seal between the exterior of the window and the wall it is being installed into.

Sound Reduction Index

- The Weighted Sound Reduction Index (**Rw**) is a number used to rate the effectiveness of a soundproofing system or material. Increasing the **Rw** by one translates to a reduction of approximately 1db in noise level. Therefore, the higher the **Rw** number, the better a sound insulator it will be.
- The ***coincidence dip*** is the frequency at which the glass panel vibrates in unison with the frequency of the incident sound pressure waves. The result is the sound insulation properties of glass being strongly reduced at this specific frequency.

The nature of the decibel scale illustrates how a small variation in decibels equates to quite a large difference in what we hear. A difference of 5dB is identifiable by the human ear.

Common Solutions

Thick glass – the greater the thickness the better the noise reduction for low frequencies such as traffic noise. However, standard glass has a coincidence dip when the glass vibrates at the same frequency as the noise source. This is dependent on glass thickness but generally occurs at higher frequencies.

Laminated glass – the interlayer is particularly effective at dampening which provides superior sound reduction over the same thickness monolithic glass. Further, the dampening effect of laminated glass reduces the coincidence dip at these higher frequencies and therefore is a solution for aircraft and voice noise.

Double glazing – standard insulating glass units do not provide good noise reduction. For insulating glass units to be effective, an air gap of 50mm to 100mm needs to be provided. However, the incorporation of one or two panels of laminated glass, a glass of differing thickness or **VLam™ Hush** into the unit provides excellent results.

VIRIDIAN GLASS GUIDE™: NOISE

Normal Conversation - 60dB

Dog Barking 70dB - 2x as loud as 60dB

Loud Traffic 80dB - 4x as loud as 60dB

Train Whistle at 150m 90dB - 8x as loud as 60dB

Lawn Mower 100dB - 16x as loud as 60dB

Rock Concert 100dB - 16x as loud as 60dB