16 noise control

This section provides an introductory guide to control of noise using glass. It is important to note that laboratory sound reduction results as shown, may differ from actual site conditions and results. Careful consideration should also be given to the frequency and intensity of the sound, framing types and construction, window surrounding/building material construction and any specialised acoustic requirements.

sound insulation

As a general rule, increasing mass will improve sound insulation. Brick and concrete walls have stronger sound insulating values because they are of greater mass when compared to glass. But because we need glass to see through, to provide natural daylight and to enhance a buildings look and appeal, the need for greater sound control when using glass becomes more important.

Sound originates from something that vibrates which generates changes in air pressure. Frequency is used to refer to the number of vibrations or changes in air pressure per second. The value given is usually expressed as hertz (Hz) (i.e. 750Hz). Different sounds produce different frequencies. Traffic noise as an example, produces sounds most intensely in the lower frequency range. The Intensity or Loudness of a sound is of most concern to people. The loudness of a sound is rated as Decibels or 'dB'.

Where there is a noise problem to solve, three areas have to examined:

1 determine and/or measure the external noise;

2 sound insulation rating of the window system/glazing; and

3 the resultant noise level in the room.

Table 16a provides a guide to examples of noise measured in decibels (dB) against the recommended noise levels for a room in a building. Table 16b shows the sound reduction ratings of many different types of glass, including annealed, laminated and VLam Hush ™. Having determined the external noise level rating and the desired internal noise level for a given room, the next step is to subtract the glass reduction rating of Table 16b from the Table 16a noise levels.

For example:

- External noise source – Loud traffic 80dB
- Bed Room recommended noise level – 40dB

= 80dB – 40dB = 40dB rating required for window/glazing system

= (from table 16b) 12.5 VLam Hush in single glass form

sound reduction index (Rw)

The table data shown is measured as a single-number Rw rating of the sound reduction through a wall or other building element. Since the sound reduction may be different at different frequencies, test measurements are subjected to a standard procedure which yields a single number that is about equal to the average sound reduction in the middle of the human hearing range.

the human ear

- Under typical field conditions the ear cannot detect a change of 1–2dB;
- The ear will not pick up a change of 3dB if there is a time lapse between the two sounds and they are of moderate or low intensity;
- A change of 5–7dB can always be detected;
- For every 10dB increase/decrease in intensity we perceive the sound as being a doubling/halving of the noise level.

table 16a:

Common sound levels – Environment	dB
Threshold of hearing	0
Conversational speech	65
Average traffic (kerbside)	70
Busy traffic	75
Loud traffic	80
Live band (20 metres)	105

Recommended interior noise levels	dB
Bedroom	30-40
Classroom	35-40
Living room	40-45
Private office	40-45
Open office	45-50

did you know?

- **Sound reduction** will improve with increased glass thickness due to the greater mass involved;
- **Sound reduction** will decrease somewhat with increasingly larger glass areas but not enough to make much difference in the majority of architectural glass sizes;
- **Sound reduction** will improve with the use of laminated glass due to the vibration dampening effect of the PVB interlayer. Laminated glass is particularly effective for interior partitions as it reduces the 'coincidence dip' attributed to monolithic glass in the 1000–2000Hz range, a range attributed to the human voice;
- **Sound reduction** will improve with the use of glass/airspace combinations, but the performance is critically dependent upon the width of the airspace. An airspace of 100mm is generally regarded as a minimum for reasonable benefits at medium to high frequencies. The optimum airspace is about 300mm.

coincidence dip

This occurs where the panel vibrates in unison with the frequency of the sound. The result is that the sound insulation values of the glass panel are reduced at that specific frequency. The frequency at which the 'dip' occurs varies with the thickness and the stiffness of the glass. The thicker and stiffer the glass, the lower the frequency at which the 'dip' occurs. Where specific frequencies are targeted for noise reduction, an analysis of where the frequency 'dip' occurs for the glass type under consideration is important.

vlam hush™

Viridian's **VLam Hush™** is a Grade A safety laminated glass that uses a specially developed interlayer to dampen noise, providing enhanced sound insulation performance. This means that thinner and lighter glass can be used for equivalent acoustic performance. VLam Hush reduces the coincidence dip of standard monolithic and laminated glass.

National Glass stocks a range of VLam Hush clear including 6.5mm, 10.5mm and 12.5mm. Maximum sizes are 3660 x 2440.

table 16b:
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
dB Reduction	30	32	32	36	37	37	40	33	36	37	36	38	39	40