Always use a current GGF Member.
To see the latest list of GGF Members
visit www.ggf.org.uk/directory

Glass and Glazing Federation

WINDOWS AND DOORS
REFERENCE 30.11
JANUARY 2015

Acoustics

How glazing can help reduce noise entering the home

Scope

This document offers some guidance as to how replacing or upgrading your windows can help reduce noise entering your home.

What is noise?

Noise is defined as being unwanted sound. Noise is often a sound that distracts or disturbs us.

Sound travels through air (and solids and liquids) like the ripple seen on the surface of a pond when a stone is thrown into it. Sound waves emanate from the source in all directions, gradually reducing in intensity. It is these waves of sound that cause our ear drums to vibrate and are interpreted by the brain as sound (see figure 1).

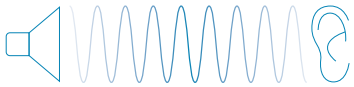

Fig 1 – Sound waves

Frequency is defined as the number of vibrations per second. The higher the number of vibrations per second, the higher the pitch. The pitch is the way we perceive the frequency of sound. Tones that are high in pitch are high frequency and tones that are low pitch are considered low frequency (see figure 2).

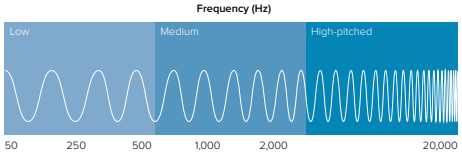

Fig 2 – Frequency

The sound intensity describes how soft or loud the sound is (this is measured in decibels dB). A low dB value indicates a soft sound and a high dB value a loud sound (see figure 3).

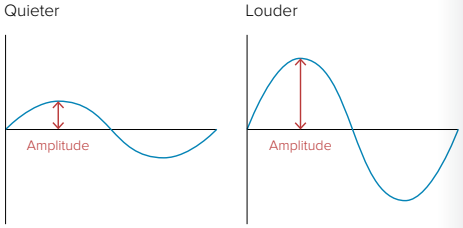

Fig 3 – Intensity

Amplitude is Loudness. A given change in amplitude is not necessarily perceived as being proportionate to the change in loudness. This is because loudness is also effected by the frequency of the sound. Loudness is measured as sound Pressure Level in decibels (dB) (see figure 4).

Change in SPL (dB)	+/– 3	+/– 5	+/– 10
Apparent loudness change	Just perceptible	Clearly noticeable	Twice (or half as loud)

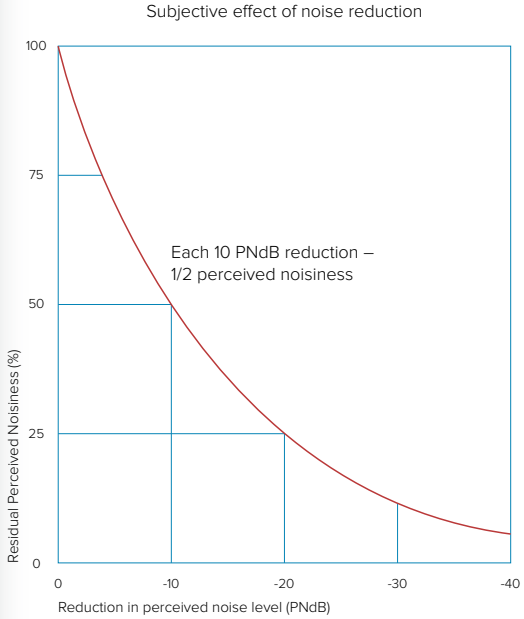

Fig 4 – Apparent loudness

The illustration (figure 5) indicates typical sound pressure levels for various noises and how they are perceived by the human ear.

Level (dB)	Impression	Type of Noise
140	Unbearable Sound	Siren
130		
120		Jet Plane
110	Painful Sound	
100		Pneumatic Drill
90		Noisy Street
80	Bearable Sound	
70		Street Traffic
60	Medium	Conversation
50		
40	Quiet	
30		
20	Very quiet	Quiet Forest
10		
0	Silence	Treshold of Hearing

Fig 5 – Typical sound levels

The perception of noise will vary from person to person depending upon the source of the noise and the individual's tolerance/acceptance of a given type of noise. E.g. a person living next to a busy road for a number of years may have become accustomed to it, whereas a person re-locating from a quiet location to the same busy road, may find the noise a nuisance.

Reducing noise through glazing

Reducing airborne noise can be one of the many benefits of having replacement or secondary glazing / windows installed. This document offers some guidance as to how replacing or upgrading your windows can help reduce noise entering your home.

Replacing or upgrading the glazed elements of the property may not provide a single solution to noise entering the home. Depending upon the source of the noise and type of property, replacing or upgrading the glazing may only be part of the solution, bear in mind that replacement windows will not reduce noise transmitted through walls, floors or ceilings (see figure 6).

Simply requesting acoustic glazing may not provide a satisfactory outcome, therefore it is important to discuss your requirements and expectations of the glazing with the window installation company. By explaining the source of noise that you are trying to reduce, the glazing company can advise you on what can be achieved.

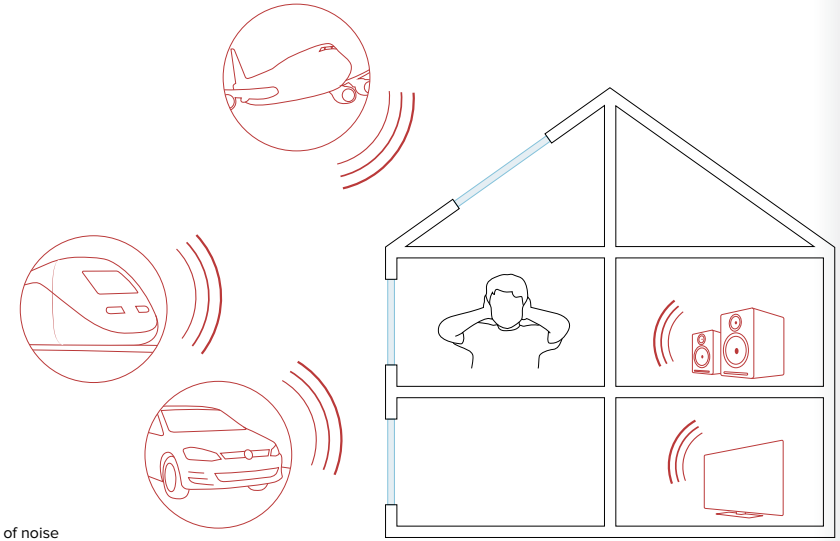

Fig 6 – Source of noise

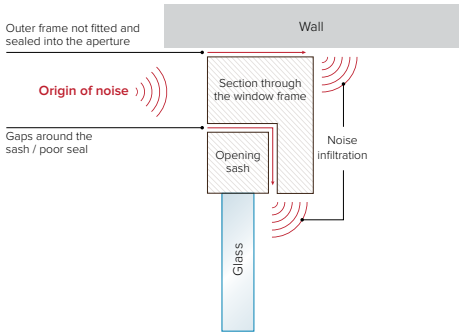

Fig 7 – Sound infiltration

It is important to bear in mind that many windows are designed to provide your property with a means of ventilation. Back ground ventilation through trickle ventilators can, if left in the open position, provide a passage for sound to travel. Likewise an open window, perhaps in the night lock position, will not aid sound reduction.

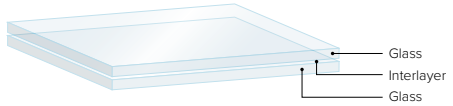

Fig 8 – Laminated glass

Correct installation of good quality, well-made windows or secondary glazing systems may result in a noticeable reduction in noise levels. It is very important that both new windows and secondary glazing systems are fitted and sealed correctly. Any air gaps around your window will seriously affect the noise reduction properties. It is also important that any opening window can be securely closed with a good quality seal. If the window does not close correctly noise will be able to infiltrate the property (see figure 7), as mentioned previously, noise entering the home via roofs, walls and floors will not be reduced as a result of any changes to the properties glazing.

The type of glass used within your replacement window could have an effect on the level of noise reduction. Glass is available in a range of thicknesses and typically thicker glasses reduce more noise. Domestic windows usually use 4mm - 6mm thick glass. Some panes are comprised of two or more pieces of glass which have been bonded together (see figure 8); these glasses are known as laminates. Specialised acoustic laminate glass is available from many glass manufactures.

Different thicknesses of glass are effective at reducing noise at different frequencies, therefore including different thicknesses of glass with a sealed unit i.e. 4mm and 6mm will be effective at reducing noise across a wider range of frequency. The different thicknesses of glass will reduce sympathetic vibration (resonance) (see figure 9).

In addition to reduced thermal losses triple glazed units can provide a reduction in noise. By increasing the combined thickness of the glass within the unit, the mass is increased. A reduction in noise transmission will result from the additional mass.

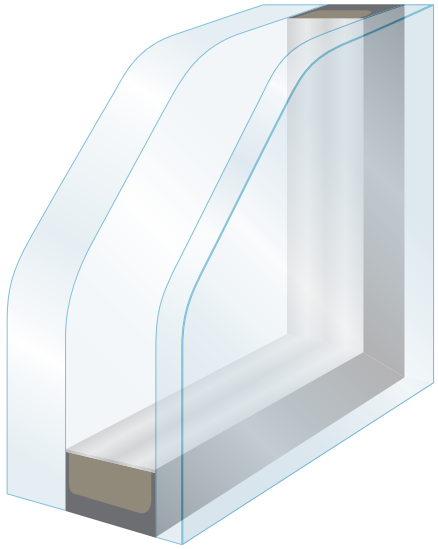

Fig. 9 – Asymmetric unit

The size of the air gap between the panes of glass in either a double / triple glazed window or a secondary glazing system makes a significant difference to the level of noise insulation. Typically a large air gap will improve noise insulation.

Secondary glazing comprises of a primary window, often the original, and then another window or glazed screen is positioned within the window reveal (see figure 10), in some cases noise reduction can be improved by lining the window reveal with sound insulation material.

Glass and Glazing Federation members will be able to advise you on the most suitable glazing option to reduce noise in your home.

The dB reductions possible using the various glazing methods can be supplied by your glazing contractor. Any claim of noise reduction should be backed up by test evidence. In many cases noise reduction will form part of a windows CE Marking – Declaration of Performance (CE marking is not applicable for secondary glazing).

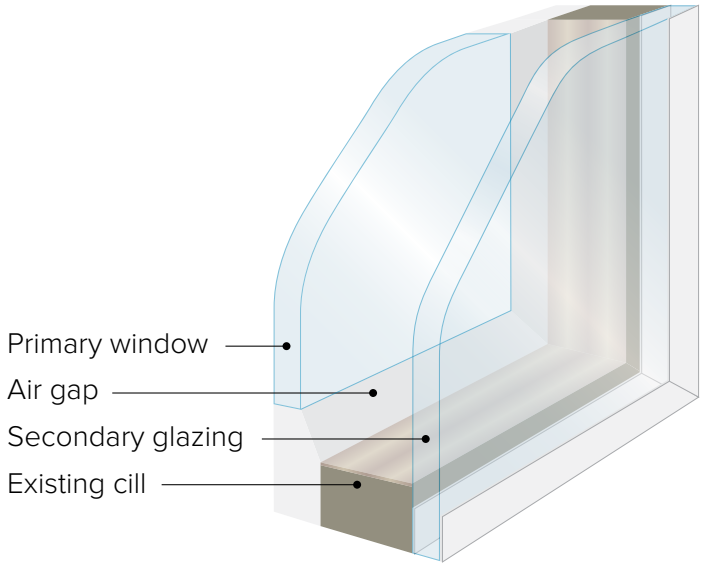

Fig. 10 – Secondary glazing

Notes

KJM Windows & Conservatories
9 Mylen Business Centre
Andover
Hampshire
SP10 3HR

Tel 01264 359355
e-mail sales@kjmgroup.co.uk

Glass and Glazing Federation
54 Ayres Street
London SE11EU

T: 020 7939 9100
E: info@ggf.org.uk
www.ggf.org.uk
Follow us on Twitter: @GGF_News

Glass and Glazing Federation