

GGF Datasheet: Windows and Doorsets - Sound - Dwellings

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1. Introduction

This datasheet provides background, guidance and direction related to the Statutory Regulations and Standards which must be complied with when placing windows and doorsets on the UK and ROI markets.

It is also important to recognise that customers may need, or expect performance and/or functionality in addition to these requirements. The relationship between statutory obligations and customer desires has to be understood when aiming to provide products and installations that result in satisfied customers.

The background and supplementary information in this datasheet should assist in understanding these issues and provide the necessary information to support negotiations and agreements.

It should be noted that the requirements for windows and doorsets can be quite different when being supplied for replacement within an existing building aperture than those for windows and doorsets in an extension to an existing dwelling or for a complete new-build.

This datasheet is not a comprehensive set of instructions of how to meet all obligations, statutory or regulatory, and should not be relied upon as such. The responsibility lies with the building owner to ensure that the work carried out is safe and complies with the relevant regulations. A risk assessment should be carried out prior to works starting. GGF member

companies will be able to assist with additional guidance on safe working practices and regulation compliance.

There is no intent to reproduce here all the data contained in standards, statutes or regulations as these are subject to regular review and amendment and are easily accessible. The user is advised to ensure that they are always referring to the most up-to-date version of any document being relied upon.

2. Scope

This document describes aspects of performance of windows and doors relating to the passage of sound entering the building.

It applies to windows and doors made from any material and intended for installation within the building envelope of dwellings.

3. Definitions

Building envelope - All elements of the outer shell of a building that maintain a dry, heated or cooled indoor environment.

Sound attenuating/mitigation - The action of reducing sound.

Rw-Weighted reduction - The average amount of noise reduction over a range of frequencies.

Sound reduction index - A calculation to determine the level of decibel reduction.

4. Guidance

Sound reduction is a benefit associated with windows and doors with multiple pane glazing but there are some aspects that require some understanding when a customer has a specific sound reduction requirement.



4.1 Measurement of sound reduction

The assessment of the sound reducing/attenuating properties of a building element is done by installing the element between two specially designed rooms. Sound of several different frequencies is generated in one of the rooms by a loudspeaker and the sound penetrating into the adjacent room is picked up by microphones and measured.

Because this means there are different measurements across many frequencies and we want to know the result as one number R_w (expressed in decibels dB) a calculation is done to create a weighted average number designed to correlate with the response of the human ear. There are also different averaging calculations dependent upon the sound frequencies of interest such as traffic noise called spectrum adaptations.

A laboratory test provides a result which can be used to fairly compare products or set a specification requirement.

4.2 Product design to improve sound reduction

In order to stop sound being transmitted through a building element such as a window, we need to remove pathways for airborne sound to travel in and find ways to block the energy of the sound.

As sound travels through the air, good seals and sealing helps reduce transmission. Components such as background ventilators will be a pathway for sound to travel through.

There are many types of sound blocking mechanisms and strategies, but in general the following apply to aspects of good window design.

- High density materials block more sound transmission. Light structures may transmit more sound.
- The use of laminated glass, especially those with a special acoustic interlayer, dampens sound.
- Sound intensity reduces with distance so increasing the space between glass panes improves reduction.

4.3 Sound reduction issues

Sound is transmitted into a building through many elements of the envelope and so modifying only one element may not have significant impact upon the performance of the building as a whole.

The sound reduction performance measured during a test is an objective result. Unfortunately, the sound experienced by an individual is going to be subjective.

This can make for some complicated discussions.

Changing the balance of what we hear by modifying the sound reduction of the building we inhabit can result in us hearing things we didn't hear before or concentrating upon what we used to hear to the point we cannot tell if anything has changed.

If a customer has a specific sound reduction requirement then it is always advised to seek an expert opinion. Windows and doors alone may not provide the solution to a particular problem. Other aspects of the building can also have an effect on the amount of sound that is audible inside the building.

Annex A – Additional information

Measurement of sound reduction

Acoustic window and door testing is carried out in accordance with BS EN ISO 10140-2. On completion of testing the result is given as a table, the table will include the accredited frequency range of the test lab, usually around 50hz up to 5000hz. A calculation is carried out to give the weighted average of sound reduction given as R_w . In some cases it is a specific type of noise that the sound mitigation is required for e.g. traffic. In these circumstances a more specific rating may be asked for. R_w+C and R_w+C_{tr} are other common measurements of specific frequency sound reduction. Calculations, including C & C_{tr} are carried out in accordance with BS EN ISO 717-1. The sound reduction index is calculated in accordance with BS EN ISO 10140-2. An alternative, more cost effective way is to use the tabulated values contained within Annex B of BS EN 14351-1, although there are some restrictions on these values and the results are averaged and conservative in most cases.

Product Design to improve sound reduction.

Similar to energy ratings it is important that a claimed acoustic reduction value is for a whole window or door assembly, including glass and not just for the glass itself.

Some key components of a window or door may be designed specifically for sound reduction. As mentioned above the glass will be the main factor in reducing the travel of sound through the window or door. It is reasonable to expect a decent improvement by changing a standard 4-20-4 double glazed unit to a 6-12-10.8 unit using a specialist acoustic interlayer within the laminate pane. It should be noted that while improving acoustic performance a glass interlayer could cause issues if the glass needs to be broken in case of the need to escape.

Specialist trickle ventilators are available that offer enhanced acoustic performance. Special care should be taken to select the correct acoustic trickle ventilator to match the performance of the window and door make up. It is also important to consider that a glass make up when installed into a door will not

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necessarily give the same acoustic performance as it will when fitted into a window. A general rule of thumb is that the window will perform slightly better. It is recommended to check with the system supplier or manufacturer.

Triple glazed units do not always guarantee a better acoustic performance. Data from testing shows a double glazed unit with two different pane thicknesses spaced further apart can perform just as well and in some cases better than triple glazed units.

Sound reduction issues.

By introducing thicker and heavier glass types for sound reduction there may be instances where the allowable weight limits for hardware will be exceeded. The safety of the occupants should always be given priority and another method of sound reduction or window style should be considered. Similarly, by changing the glass make up it may become difficult to achieve some U values and Window Energy Ratings (WER). The installer should communicate these conflicts as they arise and agree a suitable compromise.

Bibliography

The latest edition of the referenced document applies.

BS EN ISO 10140-2 - Acoustics. Laboratory measurement of sound insulation of building elements-Part 2: Measurement of airborne sound insulation.

BS EN ISO 717-1 - Acoustics. Rating of sound insulation in buildings and of building elements.

BS EN 14351-1 - Windows and doors. Product standard performance characteristics. Windows and external pedestrian doorsets.