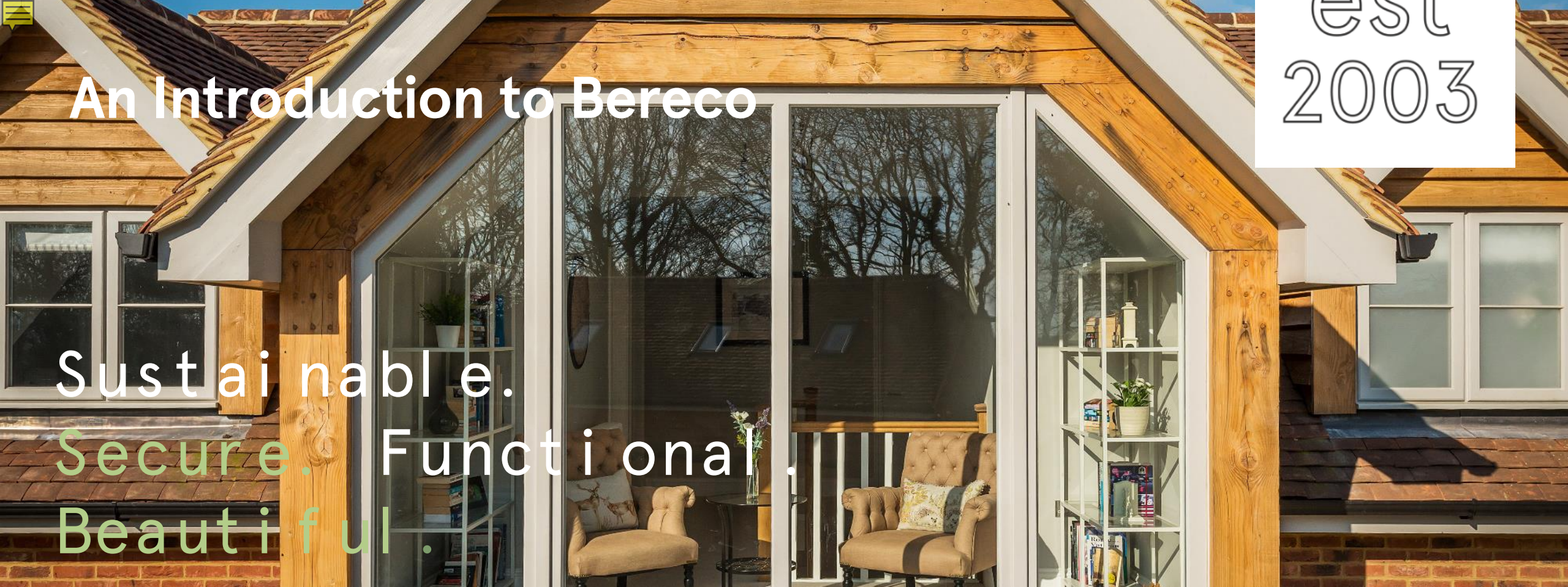


Noise & Health in the Built Environment

We discuss the problem with noise and how to address acoustics in the built environment.





An Introduction to Bereco

est
2003

Sustainable.
Secure. Functional.
Beautiful.

202,509

Timber windows & doors
supplied

97%

of customers would
recommend Bereco

865

Countdown to saving
1,000 acres of rainforest

51,152,301

CO2e Saved In Kg



Choose Sustainable



By choosing Bereco FSC® 100% certified timber windows and doors you are helping to fight deforestation



Reduce your Carbon Footprint



160 kgs CO2e* is saved for each Bereco timber window and door you buy over uPVC equivalent.



Choose windows that don't cost the earth



£1 for every window and door is donated to World Land Trust to save acres of rainforest.

Save threatened wildlife



A 60 year life expectancy (more than double that of uPVC) ensures that you can enjoy your windows for years to come.



Enjoy the beauty of timber

Specifying Bereco

Specifying Bereco is easy...

- RIBA product selector . com profile
- RIBA NBS Plus
- RIBA CPD
- The Bereco Resource Centre
- The Bereco Technical & Specification Guide





Learning Aims

- To develop an understanding of the effects that noise has on our health
- To detail the ways in which to design out noise
- Knowledge of the acoustic performance of glazing
- An understanding of the process of the acoustic testing of windows and doors
- An overview of how sound reduction is measured.
- An introduction to the acoustic test standard BS EN10140-2





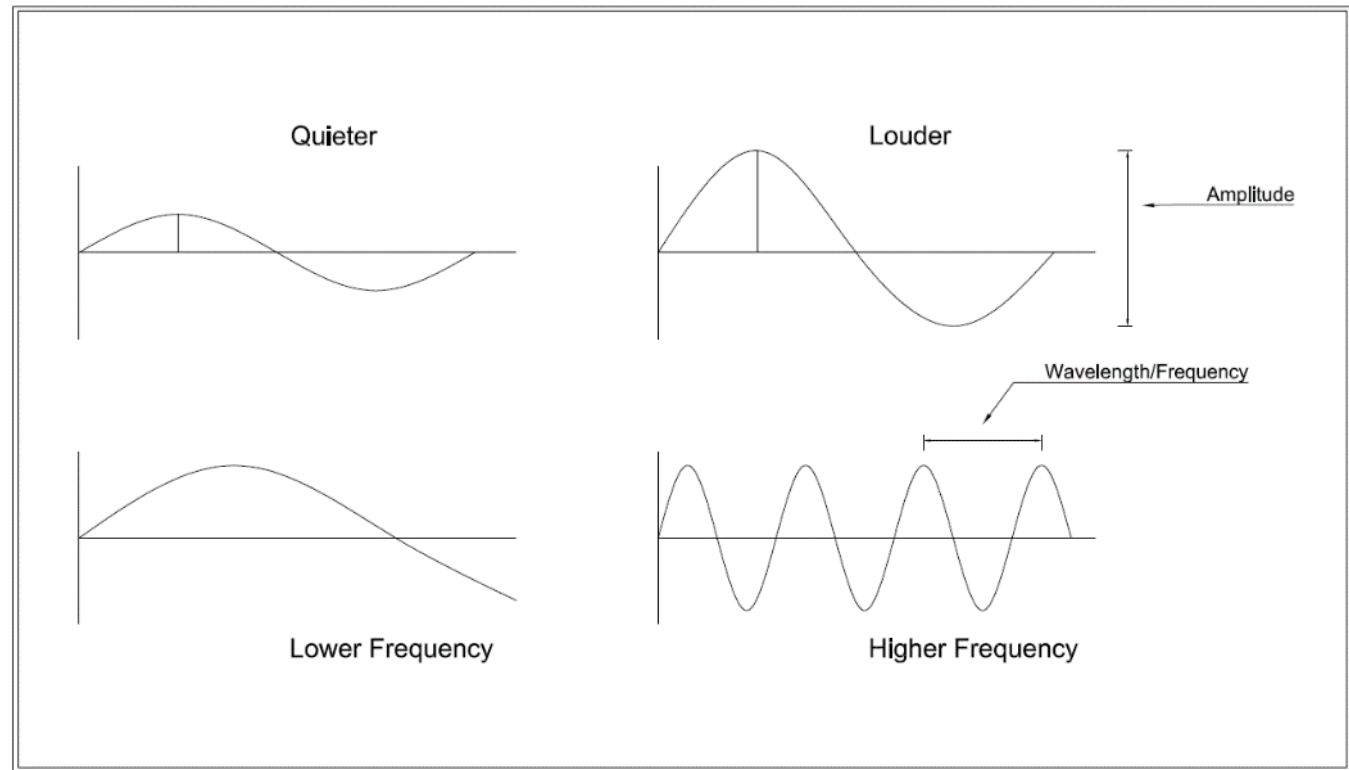
The Problem with Noise

Exploring the problem with noise and how this affects health

What is Noise?

Noise is derived from the Latin word 'nausea', meaning sickness.

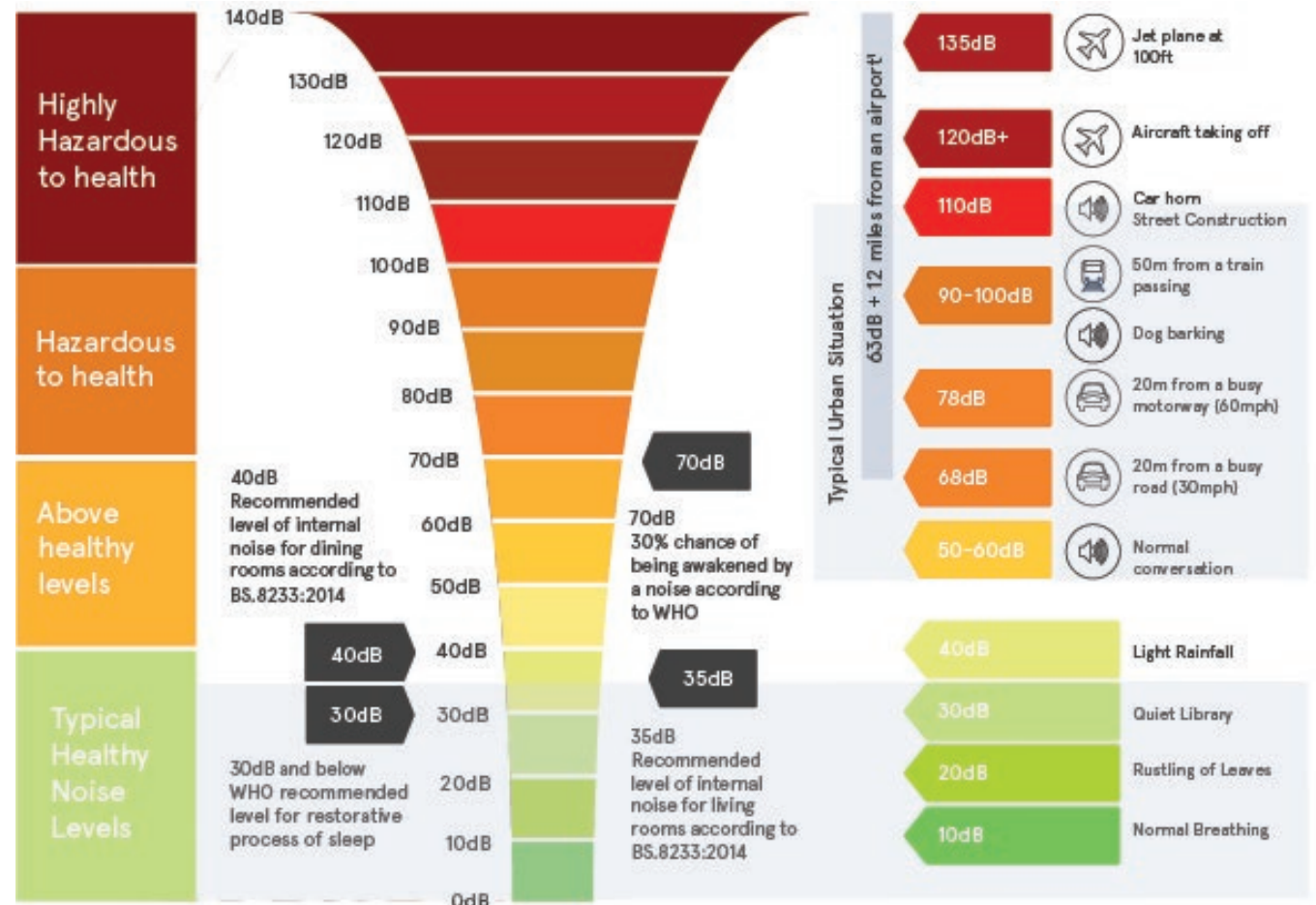
- **Sound vs Noise**
- Sound is vibrations that travel through the air or another medium (e.g. a window) and can be heard when reaching a person's ear.
- Noise is a sound, however it is sound that is especially loud or unpleasant or that causes disturbance.



Typical Sound Levels

Noise Pollution

- Modern housing policy has resulted in a dramatic increase in the density of people occupying spaces in cities.
- Houses are close to transportation networks such as flight paths, train lines and roads.
- It is estimated that 54% of the UK population is exposed to daytime noise pollution greater than the recommended levels.





Noise & Health



Thousands

of people in Britain may be dying because of a lack of peace and quiet.³

1 in 5

exposed to noise at night could be significantly damaging their health.²

3 in 100

deaths in the UK are caused by exposure to noise.¹

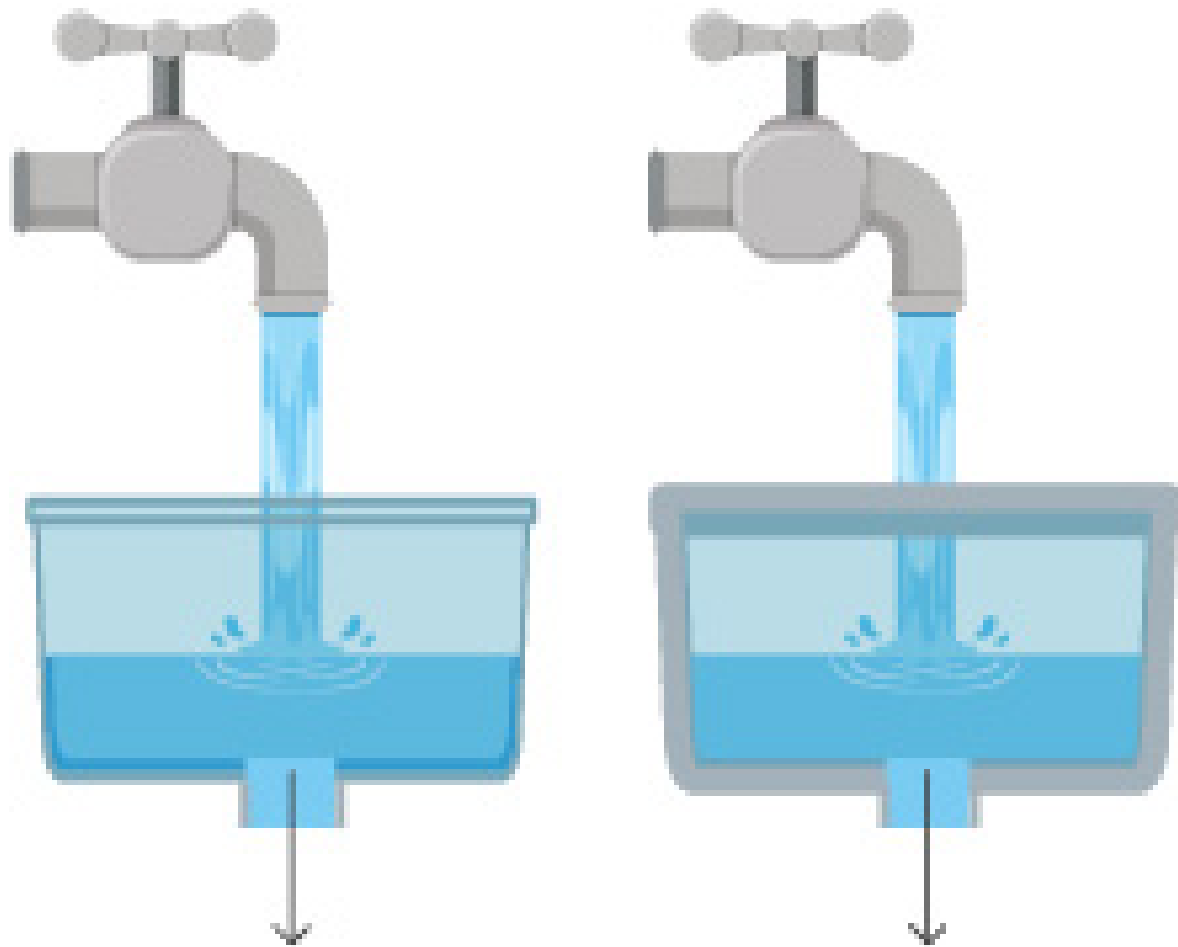


Designing out Noise

We explore what to consider when designing out noise and how to determine the sound reduction required to build comfortable living spaces.



Noise & Buildings



Noise and Regulations

Building Regulations

The Building Regulation for sound is Part E Resistance to Sound.

- **E1** = Protection from noise from adjoining buildings (flats, terraces, semis).
- **E2** = Sound transmission within the home itself.

When is a noise survey and report required?

A noise survey and report may be required at the application stage or once planning permission has been granted if:

- The proposed development will be sensitive to noise and is likely to be affected by existing noise sources.
- The proposed development will create noise which may affect nearby noise sensitive properties.



Government Guidelines

BS8233 – Residential Development

“Guidance on sound insulation and noise reduction for buildings” deals with the control of noise from outside the building. BS8233 is regularly referred to by Local Authority Planning departments in order to assess noise impact upon residential development.

Description

BS8233:2014 Desirable Internal Noise Levels

L_{Aeq} (dB)

Daytime noise level (07:00 – 23:00) – Living Room	35 dB $L_{Aeq. 16hour}$
Daytime noise level (07:00 – 23:00) – Bedrooms	35 dB $L_{Aeq. 16hour}$
Daytime noise level (07:00 – 23:00) – Dining	40 dB $L_{Aeq. 16hour}$
Night time noise level (23:00 – 07:00) – Bedrooms	30 dB $L_{Aeq. 8hour}$

Understanding Sound Reduction (Rw)



How is Sound Reduction Calculated?

Medium – High Frequencies

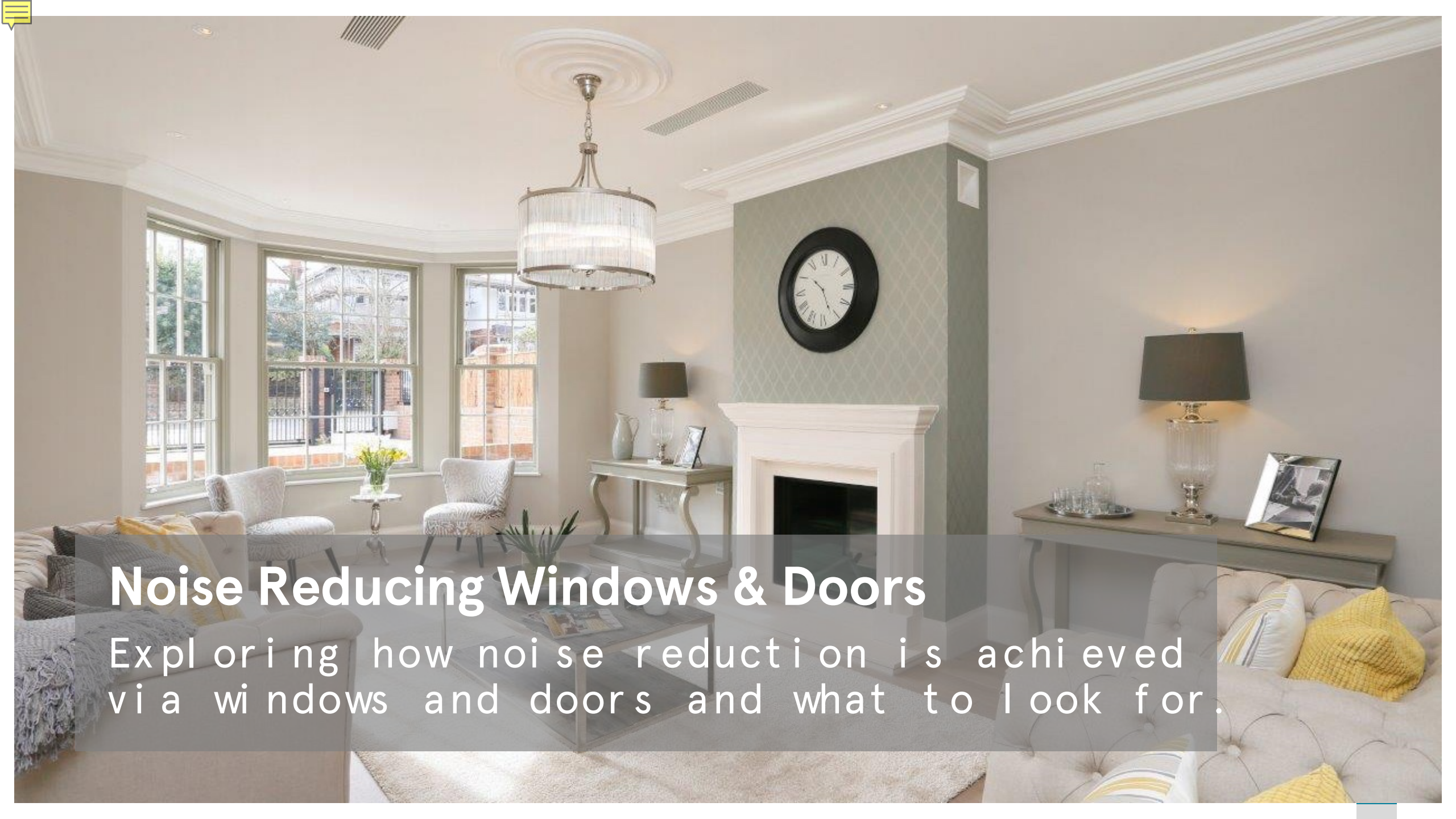
$R_a = R_w + C$ (Outside Noise = Sound Reduction (Acoustic Window) of a train which is suitable for the human ear. This is the most commonly used in the UK.

Traffic Noise Reduction Adaptation Factor

$R_{atr} = R_w + C_{tr}$ - outside noise = sound reduction (acoustic window) of a road traffic which is suitable for the human ear. This is generally the second most common reduction in the UK.

Determining Sound Reduction (Rw)

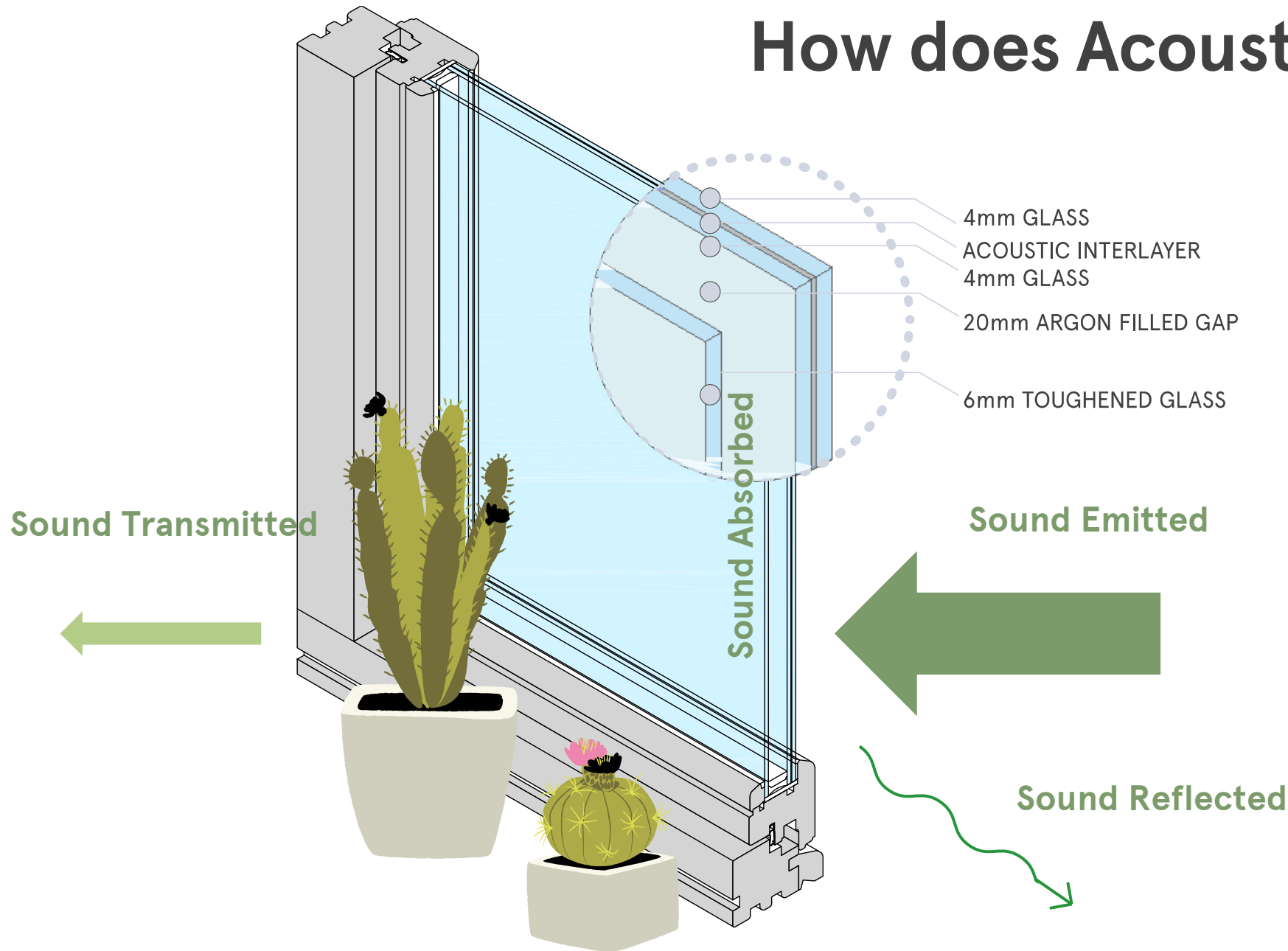
External Noise (Ra)	Sound Reduction (Rw)	C (High Frequency)	Internal Noise (C -1)	Ctr (Low Frequency)	Internal Noise	BS8233:2014 Standards L _{Aeq} (dB)
67 dB	42 dB	-1 dB	41dB Rw = 26dB	-5 dB	37dB Rw = 30dB	Bedr oom (Ni ght) 30 dB L _{Aeq. 8hour}
70 dB	41 dB	-1 dB	40dB Rw = 30dB	-6 dB	35dB Rw = 35dB	Bedr oom (Day) 35 dB L _{Aeq.}
69 dB	38 dB	-1 dB	37dB Rw = 33dB	-4 dB	34dB Rw = 36dB	Li vi ng 35 dB L _{Aeq. 16hour}
68 dB	33 dB	-1 dB	32dB Rw = 38dB	-5 dB	28dB Rw = 40dB	Di ni ng 40 dB L _{Aeq. 16hour}



Noise Reducing Windows & Doors

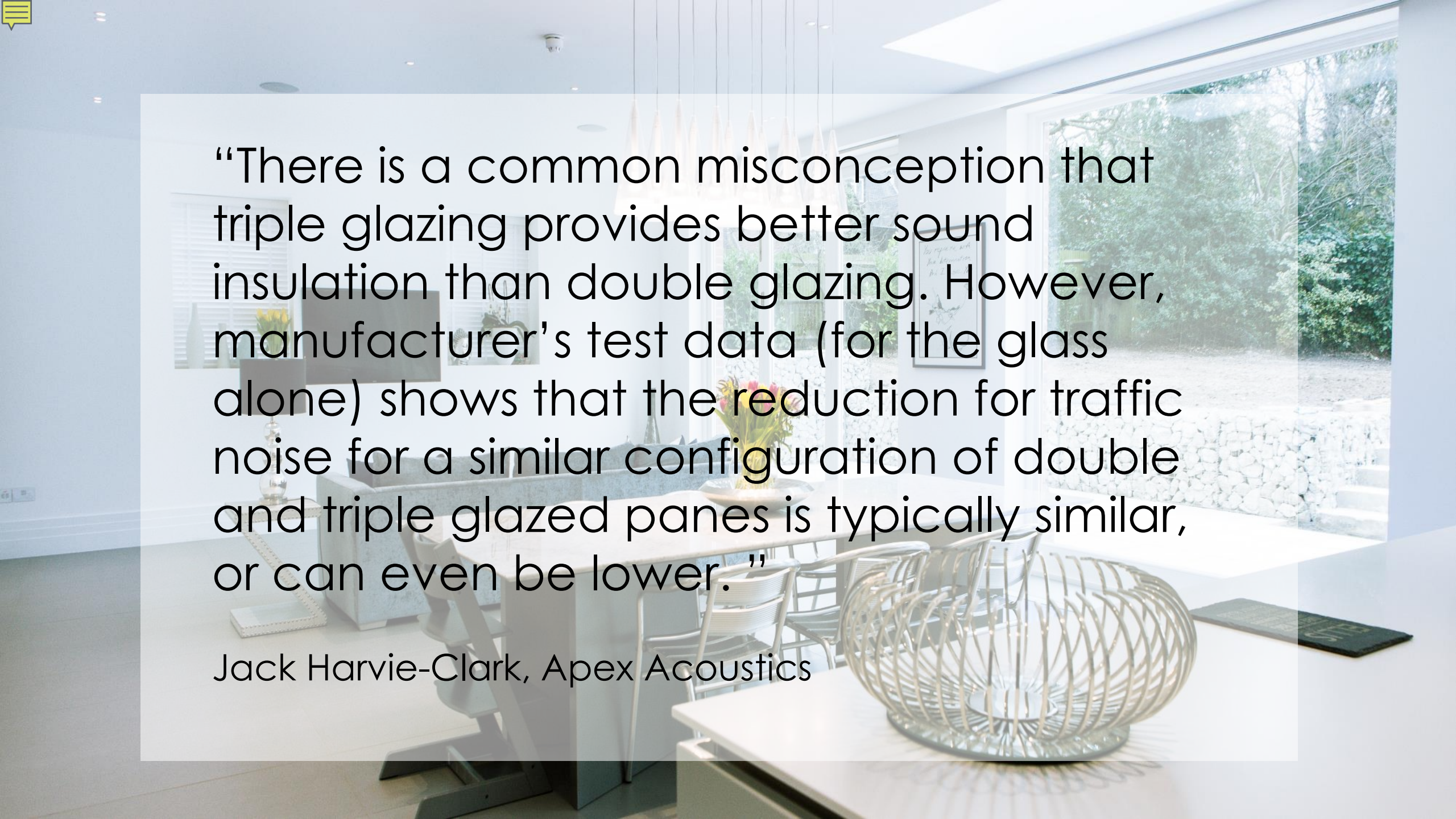
Exploring how noise reduction is achieved via windows and doors and what to look for.

How does Acoustic Glass work?



Acoustic glass works in two ways

1. **Reflecting** the noise back towards the source, and
2. **Absorbing** the noise energy within the glass.

A modern dining room with a white table, chairs, and a large window overlooking a garden. The room is bright and airy, with a white table and chairs. A large window on the right side of the room provides a view of a lush green garden. The text is overlaid on a semi-transparent white background.

“There is a common misconception that triple glazing provides better sound insulation than double glazing. However, manufacturer’s test data (for the glass alone) shows that the reduction for traffic noise for a similar configuration of double and triple glazed panes is typically similar, or can even be lower.”

Jack Harvie-Clark, Apex Acoustics

Assessing the overall Window



Many manufacturers will state the dB rating for the glazing only.

It is important to consider the whole window performance as sound can leak via various components such as:

- Joints in the frame, particularly at corners - Most acoustic performance is lost from weak points in corners. Air gaps and material breaks will reduce performance
- Weather seals - Having the correct seal arrangement for the type of sample will give maximum performance
- Hardware - Letter plates, handles and closers can all compromise performance if they are not correctly installed.



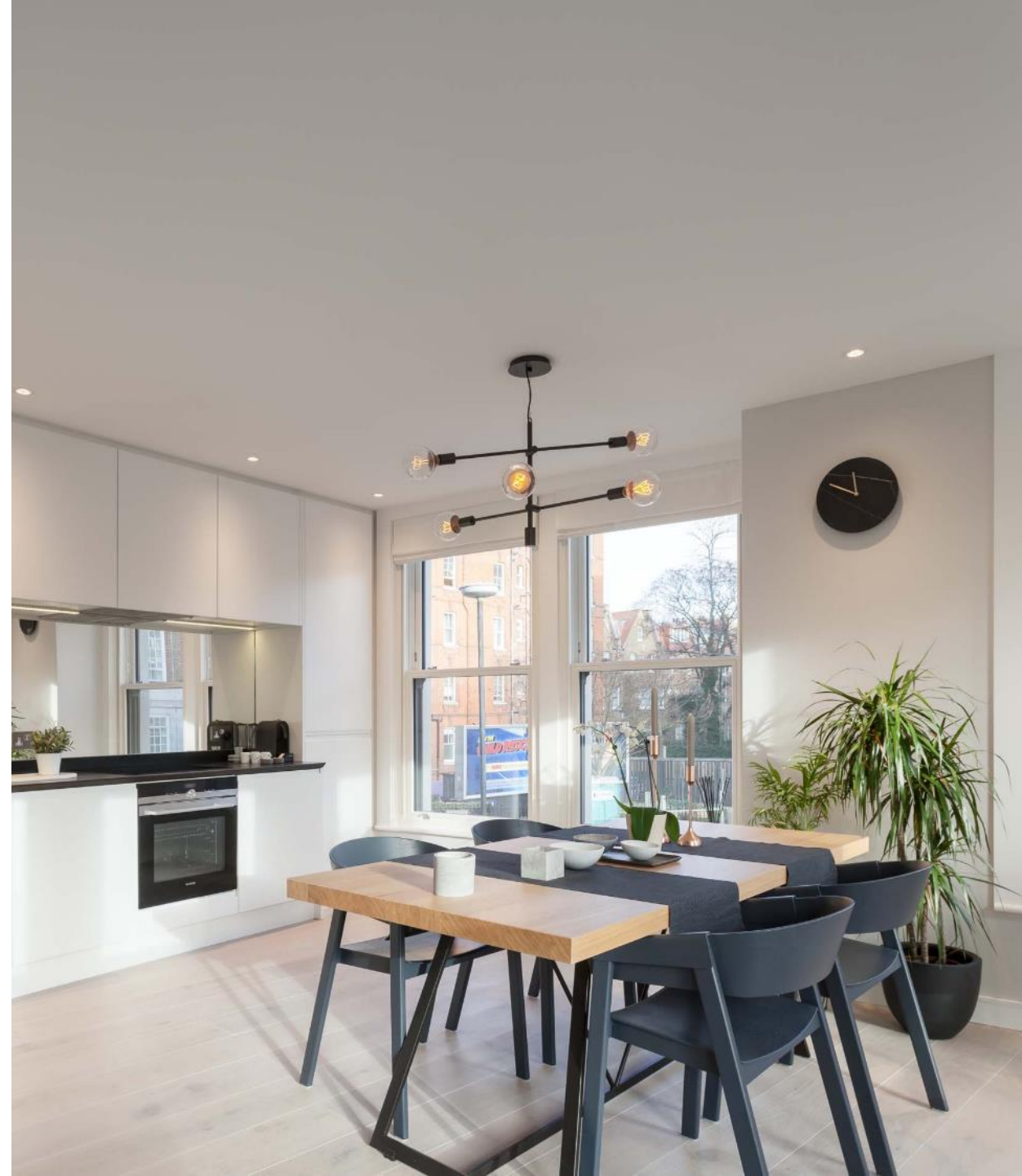
Window Acoustic Testing

We explore the process involved in acoustic testing and the certification process



Testing a window for sound reduction

- The performance of noise reducing windows should be determined through laboratory testing.
- A sample window is built and the sound reduction is measured over a range of frequencies, with the result given in decibels (dB).
- The higher the number the more sound is reduced.
- Most window designs on the market would be expected to achieve around 25 dB R_w (weighted sound reduction), whereas a window that has been designed to reduce noise is likely to achieve around 40 dB R_w .



Testing to BS EN ISO 1040-2: 2010

Acoustic testing measures the ability of a building product to reduce the transmission of sound.

Where you see this EN code written this demonstrates that the product has been tested under laboratory conditions.

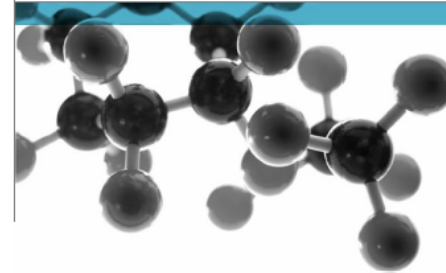
STEP 1

Noise generated on one side of test sample

STEP 2

Noise measured on the other side of the sample to calculate sound reduction

BS EN ISO 10140-2:2010



Test of: Vertical sliding sash window

Acoustics - Laboratory measurement of sound insulation of building elements. Measurement of airborne sound insulation

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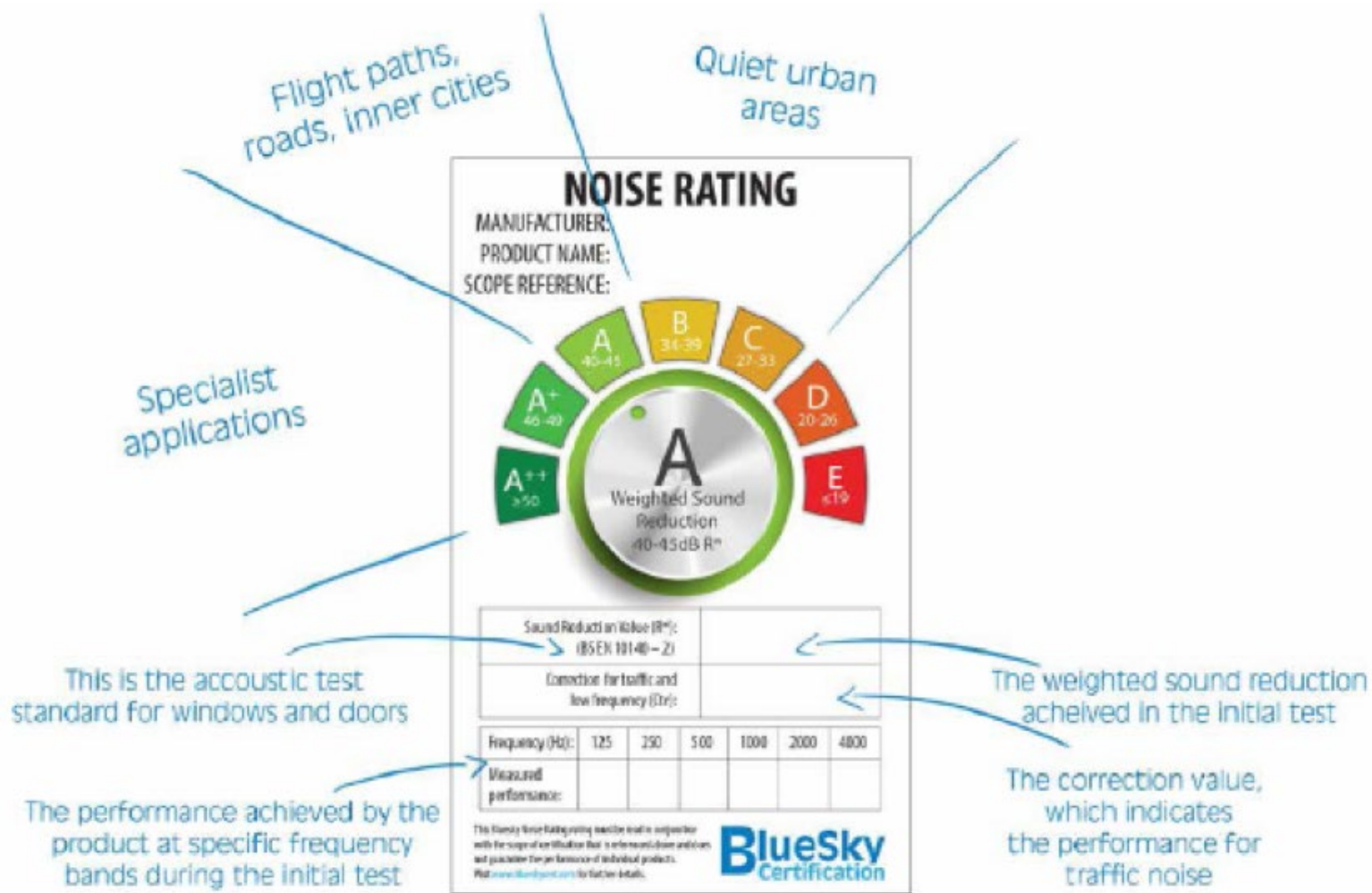
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The importance of certification

Bluesky Noise Ratings make it easy to choose noise reducing windows and doors.

Only companies that have joined the Bluesky scheme for acoustic windows and doors can use this label, giving you confidence that products with this rating have been checked by an independent certification company.



Learning Outcomes

- You will have developed an understanding of the effect of noise on health
- You will be aware of the building regulations relating to noise and when an acoustic report is required
- You will have an understanding of how acoustic glazing performs in terms of sound reduction
- You will be aware of the process of sound reduction testing of windows and doors in accordance with BS EN 1040-2.
- An overview of how sound reduction is measured.
- You will be aware of what to consider when specifying noise reducing windows and doors.



Silence is a
place of great
power and
healing

—Rumi (via @mattandkatie)





Thank you for your

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