Acoustic performance

A well-sealed secondary window, with a cavity of at least 100mm can provide noise reduction in excess of 45dB. Combined with double glazed windows, up to 56dB is achievable. The result is a more peaceful living or working environment.

Why improve?

Most traditional single glazed windows with poorly sealed frames offer little defence against unwelcome noise and even modern double glazed windows fare little better against high sound levels.

Noise is unwanted sound and a form of pollution that can be detrimental to health.

A significant reduction in noise level will:
- create a quieter less stressful environment
- reduce sleep disturbance
- help improve concentration and productivity
- protect hearing

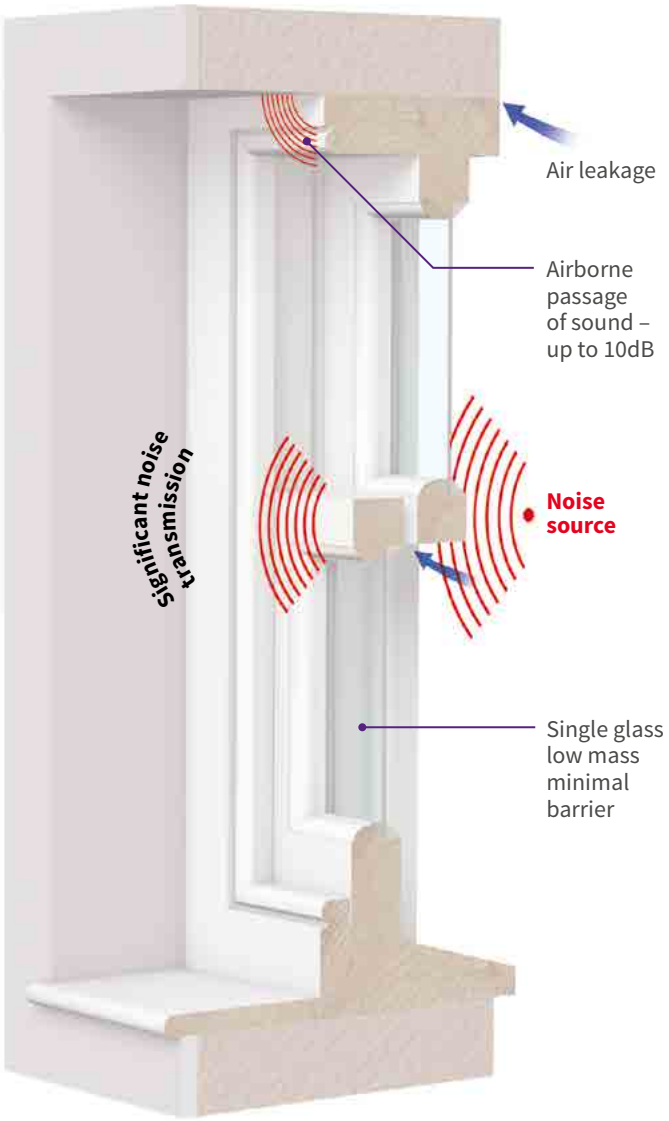
World Health Organisation 'Guidelines for Community Noise' and **BS 8233** set out guidelines for acceptable sound levels in a range of environments. An acceptable sound pressure level (SPL) is 30 to 35dBA for a bedroom, 35 to 50dBA for a classroom or meeting room and 45 to 50dBA for a typical open office. Traffic noise close to the façade of a building on fairly busy roads will be 70 to 80dBA and hence sound reductions in the range 30 to 50dBA are required.

National Planning Policy Framework: 2012 assesses the impact of noise in new developments. Brownfield sites will often be located in areas with very challenging noise levels and window designs involving an additional secondary window to produce acoustic triple glazing can be pivotal in meeting acoustic requirements.

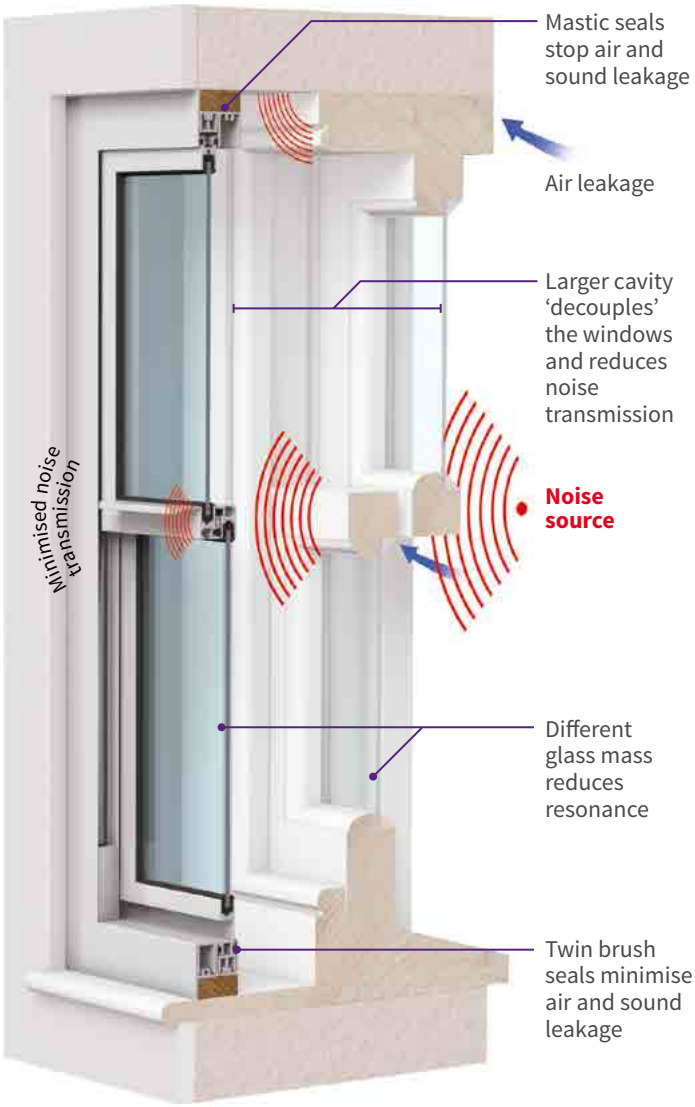
Building Bulletin 93, Acoustic Design of Schools Feb 2015 sets out minimum standards for ambient noise levels in school rooms.

How secondary glazing improves acoustic performance

Original window...



...with secondary glazing

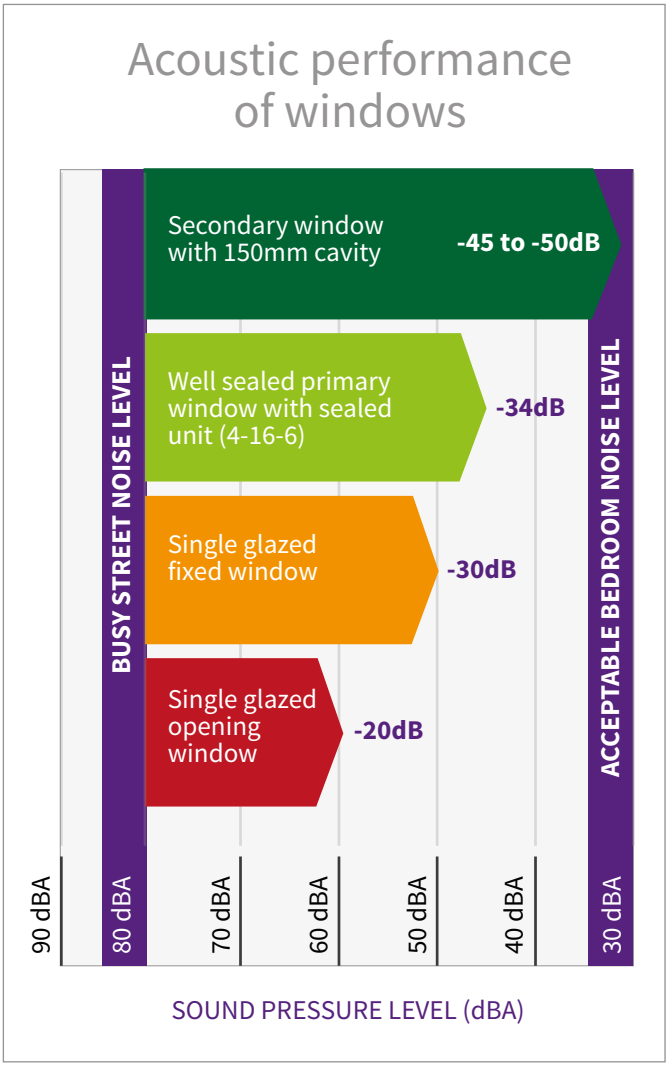


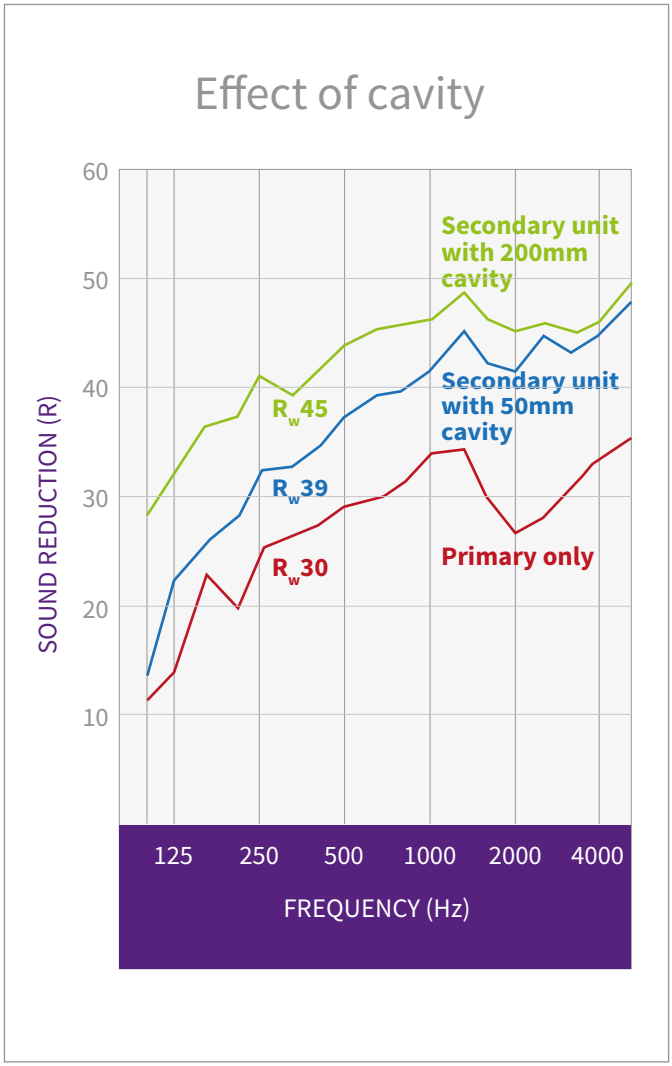
Sound is transmitted through a window by direct vibration of the glass. The larger air space created by secondary glazing decouples the movement of the inner and outer glass, which means they act as separate barriers, thereby reducing resonance.

By contrast, a typical sealed glass unit, where the two panes of glass are rigidly connected and have a minimal cavity, performs little better than a single pane.

Airborne sound is also a major problem with ill-fitting windows – a 1% gap in the total window area can reduce sound insulation by as much as 10dB. A purpose-made secondary window seals the whole of the external window with frames bedded on an acrylic sealant and opening panels fitted with high performance seals.

Optimising performance





Notes

Sound is measured as a pressure and expressed in dB (decibels) which is a logarithmic scale. 0dB represents the threshold of hearing and 120 dB the onset of pain. To the human ear a change of 3dB is just about noticeable whereas an increase of 10dB approximates to a doubling of loudness.

Cavity is the space between the existing primary windows and the secondary glazing. Performance improves as the cavity increases with an optimum of about 200mm.

Glass type and thickness have a direct impact on performance. Thicker glass has greater mass, so will provide better acoustic results. Ideally the secondary glass should be of different thickness to the primary window glass to avoid sympathetic resonance which will increase noise transmission. Acoustic laminate glass helps improve performance at higher frequencies.

Reveal linings are acoustic absorbent lining materials which can be fitted to the reveals, normally at the head and jambs. These raise insulation levels by 1 to 2dB and are used when external sound levels are very high.

Testing and certification

The product range has been tested against single glazed primary windows with 50mm, 100mm, 150mm and 200mm cavities. Testing was carried out by Taylor Woodrow Technology in accordance with Standard BS EN ISO 140-3: 1995 'Laboratory measurement of air-borne sound insulation of building elements'. Results were reviewed and interpolated by acousticians Hann Tucker Associates

Please visit our website for performance figures.
Summary tables are on page 50.

Case study: Christchurch, 35 Cosway Street

Christchurch is a Grade II* Listed distinctive deconsecrated church in the Lisson Grove Conservation Area. Greenhouse Sports Ltd, a sports coaching charity for deprived young people, acquired the building in 2017 to set up their corporate headquarters.

A radical and sensitive transformation was required to turn the church into a sports centre, providing first-rate facilities for the coaches to deliver high-quality sports programmes, for the local community and beyond. In the heart of a residential area, it was imperative that the noise was contained; a reduction of at least 46dB was required.

In total 88 units were manufactured and installed, which were a combination of Series 42 fixed lights with curved and standard heads, as well as Series 80 3HS contra sliding units. Some of the Series 80 were 1.9m (h) x 2.3m (w) and weighed over 130kg when all assembled.

The transformation is breath taking and has given the space a new lease of life, which will benefit the local residents for years to come.