Technical Note No 38

Acoustic performance of windows

This Technical Note is one of four on building envelope acoustics. The series comprises:

TN 37 Introduction to building envelope acoustics
TN 38 Acoustic performance of windows
TN 39 Sound transmission through building envelopes
TN40 Sound environment behind a building envelope

Introduction

This Technical Note deals with the acoustic performance of windows in heavyweight walls. For this type of construction the windows are the dominant paths for sound transmission from outside the building to inside.

This Note deals with the sound reduction of different forms of glazing, performance of the whole range of glazing from single glazing, through double glazing to double windows. The effects of window ventilators are also considered.

For walls of light weight construction and those containing larger areas of glazing TN 39 'Sound transmission through building envelopes' applies.

General principles

In general the achieved noise reduction to external noise is controlled by the weakest component in the envelope. If the sound insulation of the solid or opaque wall of a facade is at least 15 dB higher than that of the glazing, noise transfer through the wall can be ignored and transmission through the windows, and other openings, alone may be considered. This is most common as typical single brick walls have an R_m of 45 dB and cavity brick walls of better than 50 dB.

Whilst the window will be the weakest component in a heavy weight wall, the presence of openings in or around a window may completely dominate its performance.

Glazing performance

Data on the acoustic performance of glazing is widely available but needs to be used with caution. The acoustic data in the public domain tends to relate to the performance of a standard pane size of 1480mm x 1230mm fitted and sealed directly to the acoustic test chamber. In practice, if a window is of similar dimensions the framing normally has only a nominal effect on the acoustic performance if all joints are tight fitting. However, if there is a marked increase in the pane size or rigidity of the frame, a significant worsening of the acoustic performance is likely. Thus specifiers and architects are cautioned against taking acoustic data for standard pane sizes and applying them to large elements of a building's facade.

Single panes

The Sound Reduction Index for a pane of monolithic glass depends on the glass thickness, Values for a pane of monolithic glass 1480mm x 1230mm are given in Table 1 but these exclude any framing effects. This table lists sound reduction according to three frequency weighting schemes: mean value, R_m, the weighted value, R_w, and