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GUIDANCE FOR NOISE INSULATION IN AIRCRAFT NOISE ZONES

The States of Jersey have agreed that certain zones around the airport affected by Aircraft Noise should not be developed or developed for habitable accommodation with suitable construction/insulation protection to protect the occupants from excessive noise.

The Aircraft Noise Zones in Jersey can be viewed at:
http://maps.digimap.je/islandplan/show.aspx

Noise Zones 1- 3, associated noise levels in decibels (dB) and development restrictions

one	72 dB and above	Development permission should normally be refused.
two	66 dB - 72	Development permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available (in such instances of extensions to existing dwellings or conversions), conditions should be imposed to ensure a commensurate level of protection.
three	57 dB - 66	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.

Design Criteria

The design criteria for noise which must be met inside dwellings is as follows:

Indoor Ambient noise levels for dwellings

Activity	**Location**	**07:00 to 23:00**	**23:00 to 07:00**
Resting	Living room	35 dB *L*Aeq,16hour	
Dining	Dining room/area	40 dB LAeq,16hour	
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hour	30 dB LAeq,8hour

Ref: BS8233: 2014

Building insulation

Regard should be had to the document Planning and Noise PPG24 Annex 6 “Insulation of buildings against external noise”.

Notes:

a. Particular care must be taken where rooms are contained within the pitch of the roof. From Annex 6, it can be seen that acoustic secondary glazing can give about 35 dB(A) noise reduction. However, this will not be achieved unless the roof structure can give a similar reduction.

b. If skylights are to be used, it must be ensured that a high performance unit such as R_w 42 is used.

c. When trickle ventilation is required, this must be provided using attenuated passive wall ventilators. Eg Ventaxia fresh vent 100

d. Poor workmanship in installation can dramatically reduce noise reduction, generally because of poor sealing.

e. Sound reduction will be compromised if flanking sound paths exist, such as through doors or acoustically weak parts of window bays.

f. Lightweight materials for walls or roofs will compromise the noise reduction provided by other elements such as windows.

The final overall scheme for acoustic insulation of the building including the level of sound reduction achieved by all elements must be submitted to Environmental Health for approval prior to work commencement.

INSULATION OF BUILDINGS AGAINST EXTERNAL NOISE

1. Noise from outside a building can enter a room through windows, ventilators, walls, roof and doors. In most cases, however, windows provide the main path and it is therefore important to ensure that their insulation is specified correctly. This Annex summarises the main issues to be considered in specifying adequate sound insulation of windows. More detailed guidance is given in BRE Information Paper IP 6/94 "The sound insulation provided by windows".

2. The sound insulation of a window increases with the thickness (or mass) of glass subject to other limiting factors, such as air gaps. Therefore to provide good insulation a window must be fitted with effective seals.

3. Double windows can provide higher levels of sound insulation than single panes, and in general the wider the spacing between the panes the higher the insulation. However, the insulation over a band of frequencies can be seriously reduced by a resonance in the cavity between the panes. The frequency of this resonance is dependent on the cavity width and mass of the panes, and is usually in the range 50 to 300 Hertz (Hz). This should be considered when specifying windows to provide protection against low frequency noise such as traffic. For example, secondary window systems have a wider cavity (and a lower resonance frequency) than thermal double glazing; the effect of this is that secondary windows provide better insulation than thermal windows against noise with energy at high frequencies, such as electric trains, but may be only marginally better against noise with low frequency energy such as that from road traffic (see Table 1). Proprietary systems can be designed to optimise the performance.

4. Because the sound insulation of a window (and other components of the building envelope) varies with the frequency (or pitch) of the sound, the overall noise reduction provided by a window will depend, among other factors, on the spectrum of the external noise. Table I shows typical reductions in noise levels from common sources which would be expected from various types of window installations fitted in brick/block walls in a dwelling. For other buildings such as offices and schools the proportion of glazing to brickwork may be greater and this will result in a lower noise reduction. In addition, the type of furniture in these buildings will absorb less sound than domestic soft furnishings. The insulation provided by any type of window when partially open will be in the region of 10-15 dB(A).

Typical noise reduction of a dwelling facade with windows set in a brick/block wall.

Difference between dB(A) levels outside and inside

NOISE SOURCE	**Single glazing**	**Thermal double glazing**	**Secondary glazing**
Road Traffic	28	33	34

Civil Aircraft	27	32	35

Note: The values in the table above are the difference between dB(A) levels measured outside and inside typical dwellings; they have not been corrected for reverberation time or window area, and so cannot be compared with values obtained under other conditions. The table above is intended to give an idea of the insulation likely to be achieved in practice - not under ideal conditions. Secondary glazing systems in particular will perform better in installations where sound insulation is not limited by poor sealing or by flanking sound paths such as through doors or acoustically weak parts of window bays. The values for single glazing are representative of well sealed windows.

5. If the walls or roof are constructed from lightweight materials they may allow transmission of significant amounts of sound into the building. This could limit the overall improvement achieved by improving the performance of other elements such as the windows.

6. To provide adequate insulation against external noise it is necessary to keep closed those windows and ventilators which have not been designed to provide sound insulation (even when closed some ventilators may still not be adequately sealed). Therefore alternative methods of providing ventilation and control of summertime temperatures must be considered. Sound insulating ventilators may be "whole house" systems or individual units installed where necessary. Ventilators of the type specified in the Noise Insulation Regulations will limit the insulation against traffic noise to about 38 dB(A). Further guidance can be found in BRE Digests 338 "Insulation against external noise" and 379 "Double glazing for heat and sound insulation".

7. The sound insulation of building elements such as windows is often measured in a laboratory. The insulation is expressed in terms of R_w (BS 5821: Part 3: 1984). This is a single number that describes the insulation over a frequency range of 100 Hz to 3150 Hz. The value allows different products to be compared, but it cannot be used directly to determine the sound insulation that will be achieved when the element is installed in a building.

8. Guidance on suitable internal noise levels can be found in BS 8233: 2014.

Note: the transmission of airborne and impact noise between new or converted dwellings is controlled under the Building Byelaws.

Please see the frequently asked questions for Architects at www.pilkington.com

Please contact Environmental Health for further advice on Tel: 01534 445808