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NOISE WITHIN DWELLINGS

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INTRODUCTION

Guidance on the sound insulation of dwellings is given in both BS 8233 and Approved Document E1/2/3 of the Building Regulations, 1985. This paper addresses the following questions:

What does BS 8233 provide which the Regulations do not?
Are the two documents complementary or contradictory?
What else does BS 8233 provide?
What else could BS 8233 usefully provide?
What are the implications for the practical building designer?

SCOPE

STATUS:

Approved document E1/2/3
Guidance to meet the requirements of the Building Regulations. If you follow the guidance in the document, that will be evidence tending to show that you have complied with the Regulations.

BS 8233
Guidance for the use of designers and constructors of buildings. Compliance with BS 8233 does not confer immunity from the requirements of the Building Regulations.

BUILDING TYPES:

Approved document
New dwellings only, in England and Wales. (Scotland and Northern Ireland have deemed-to-satisfy provisions).

BS 8233
All buildings, including dwellings, but excluding buildings posing special problems requiring expert advice, e.g. acoustic test rooms, performing spaces, broadcasting and recording studios, buildings subject to aircraft noise, groundborne noise, low frequency noise or requiring active noise control.

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COVERAGE: **Approved document**
Guidance on the construction of separating walls, separating floors and the associated surrounding construction to achieve reasonable airborne sound insulation and, in the case of separating floors only, reasonable impact sound insulation.
Guidance on the evidence required to demonstrate that an alternative separating wall or floor construction will meet the requirements of the Building Regulations.
Guidance on the construction of refuse chutes in dwellings to control noise.

BS 8233
Recommendations for the control of noise in and around buildings. Definitions of acoustic terminology are given. General guidance on planning and design and more specific guidance on design criteria for various building types are given. Noise control techniques are covered and these include the design of building envelope and internal divisions and the control of services noise. A summary of the law of noise nuisance is provided and guidance given in appendices on noise calculations and noise surveys.

In summary, BS 8233 covers the subject matter of the Building Regulations - domestic separating walls and separating floors - and encompasses all other sound insulation and noise control matters in dwellings and in a variety of other building types. This is a very wide brief for a single British Standard.

SEPARATING WALLS AND SEPARATING FLOORS

BS 8233 refers the reader to the various national Building Regulations for the sound insulation requirements and methods to meet them. Though two paragraphs are devoted in the BS to the construction of separating walls and floors, the constructional options open to the designer are not set out and no detailed guidance is given on the constructional or numerical requirements. Outline constructional specifications are given in an appendix, but no attempt is made to relate any of these to the requirements of the Building Regulations. In consequence, the designer can neither obtain sufficient information from the BS to make an early decision on appropriate construction methods nor can he obtain advice on detailing to meet the requirements of the Building Regulations.

OTHER ASPECTS OF SOUND INSULATION AND NOISE REDUCTION FOR DWELLINGS COVERED BY BS 8233

Controlling internally-generated noise

BS 8233 recommends that dwellings should be planned to avoid an incompatible juxtaposition between rooms and between rooms and building services and that in each dwelling one protected room be provided to permit reading, studying, etc. Appropriate sound insulation standards are not given. For conversion properties, not currently covered by the Building Regulations 1985, the BS recommends that measures to ensure that separating walls and floors achieve sound insulation performance similar to those for new construction.

Selecting design criteria

BS 8233 recommends that steady intrusive noises should not exceed the following levels:

Bedrooms: $L_{Aeq,T}$ = 30 dB to 40 dB
Living areas (for conversation and listening to radio and television): $L_{Aeq,T}$ = 40 dB to 45 dB
(after BRE Digest 266)
Parks and gardens: 55 dB
(after GLC guidelines)

For guidance as to what constitutes a steady noise source, one must refer to Digest 266, where it clarifies that the recommendations apply to steady broad-band service noise but that they may also be used with more variable intrusive noises, such as road traffic if treated as a maximum value of L_{eq} over an appropriate period. Neither the Digest nor the BS give any guidance on the selection of an appropriate period of the day.

The recommendations appear consistent with those of the CIBS guide for steady mechanical services noise sources.

Controlling externally generated noise

Road traffic: No internal criteria are given. Reference is made to the entitlement for sound insulation under the Noise Insulation Regulations 1975 when a given level, expressed as $L_{A10,18h}$ is exceeded. The qualifying level is given elsewhere in the BS as 68 dB.

Aircraft: No internal criteria are given. Planning criteria are reproduced from DoE Circular 10/73. These imply that development can be permitted up to a level corresponding to approximately

80 dB $L_{Aeq,12h}$ if appropriate sound insulation is provided. As sound insulation schemes providing secondary glazing and sound-attenuated room ventilators can typically achieve dB(A) level differences up to the order of 40 dB, this suggests that an internal level of the order of 40 dB $L_{Aeq,12h}$ can be tolerated, which appears consistent with the BS criteria for steady sources in living rooms. The BS advises that problems with aircraft noise should be dealt with by an expert.

Railways: No internal criteria are given. For external noise, the GLC guideline that sound insulation should be provided when the external level exceeds 65 dB $L_{Aeq,24h}$, is reproduced.

Industry: No internal criteria are given. The BS refers to BS 4142, which gives external noise criteria for mixed industrial and residential areas. For noise from construction and other open sites, the BS refers to BS 5228, which does not provide noise criteria.

Other: 15 other potential sources of environmental noise are listed, but no criteria or references are provided. Audible intruder alarms, model aircraft and ice cream van chimes are not mentioned, though codes of practice have been issued for each under the Control of Pollution Act.

In summary, internal criteria are given only for steady intrusive noises. No guidance is given on their applicability to non-steady intrusive noises, such as trains and aircraft. For external criteria, the BS gives the general advice that, for tolerable living conditions, land with a predicted $L_{Aeq,T}$ within 15 years of 65 dB should be avoided. The time period T is not stated. More specific external noise criteria are given by reference to external sources of information, where available.

CONCLUSION

The scope of BS 8233 is very wide and it is questionable whether the detailed subject matter can be covered satisfactorily in a single British Standard. Much of the guidance given for dwellings is by reference to other publications, such as the Building Regulations, 1985, DoE Circular 10/73, the Noise Insulation Regulations, BS 4142 etc. In the case of separating walls and floors, the guidance given does not provide the designer with sufficient information to make even the earliest design decision without first referring to the Building Regulations. Perhaps a comprehensive directory format would be a more appropriate form for the BS.

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If, alternatively, the purpose of the BS is to itself provide information for use by designers and planners on sound insulation and noise reduction for dwellings, then some development and expansion of the material should be considered.

Advice on the control of internally generated noise should include standards of sound insulation for partitions and partition floors for habitable rooms and quiet rooms. Minimum standards for separating walls and floors should be given and guidance as to when higher standards are appropriate.

Design criteria for environmental noise should be source-specific and should cover intermittent as well as steady noise sources. The relevant time periods should be stated. This will assist those responsible for environmental standards to specify realistic and unambiguous criteria.

In its present form BS 8233 contains much information which is useful to the expert. Some expansion and development of the contents is necessary if the subject matter is to become accessible to the non-expert.