Acoustic Insulation Regulations - England & Wales - Part E

Resistance to the passage of sound (England and Wales) 2003

Key requirements

Part E Regulations focus on four main items:

- E1 Protection against sound from other parts of the building and adjoining buildings
- E2 Protection against sound within a dwelling house etc
- E3 Reverberation in the common internal parts of buildings containing flats or rooms for residential purposes
- E4 Acoustic conditions in schools

July 2002 'the initial Government proposal'

Details of the new Part E rules for building construction were released in July 2002 and included requirements for:

Measures to improve sound insulation between adjoining dwellings by use of higher performance standards which also take better account of the transmission of low frequency sound. This included "rooms for residential purposes" eg hotels and hostels, whether purpose-built or formed by conversion of other buildings.

Post-construction testing of sound insulation between new dwellings at a 10% sampling rate by type. (Also applies to dwellings formed by change of use of a building).

Protection against sound within a dwelling based on current good practice (not testing) ie requirements for partition walls.

January 2003 'the building industry response'

Accepting the rationale for the changes, the construction industry agreed that the new Part E1 regulations could partially become effective on 1 July 2003 for new hostel and hotel types of accommodation and houses, flats, hostel and hotel accommodation formed by conversion of other building types.

However, for new houses and flats the implementation of new requirements was deferred to 1st July 2004 based on representations from the House Builders Federation (HBF) arguing that the scheme would lead to delays and higher costs. Ministers asked for an alternative solution and the HBF and building material suppliers proposed new 'high performance designs', now referred to as Robust Details (RDs). As sound insulation is dependent on the quality of workmanship, it was proposed that RDs should be generally over-engineered.

How to comply

There are two routes to compliance

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1. Robust Details

- Pre-approved details achieving sound insulation standards higher than those required by Part E.
- For new build houses and new build apartments only.
- No pre-completion testing required.

Robust Details are an alternative to constructions that require pre-completion sound testing in England and Wales.

The main benefit of using Robust Details is there is no need to carry out pre-completion sound testing. This eliminates the risk and uncertainty of remedial action being required on completed separating walls and floors, which may lead to potential delays in completing the property.

The Robust Details are designed to achieve higher sound insulation standards than the minimum requirements in Part E. Each approved Robust Detail contains a checklist which must be completed on site. This is a quality control check to confirm that all the critical factors that affect sound performance have been built correctly.

Robust Details are administered by Robust Details Ltd. Every dwelling built using Robust Details needs to be registered with Robust Details Ltd and a plot registration fee paid. Further information on the Robust Details scheme is available on the Robust Details website at:

www.robustdetails.com

All floating floor and ceiling treatments for separating floors, where stipulated, are to have a proven level of performance from laboratory tests before they can be used in a Robust Detail.

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2. Pre-completion testing

- Details designed to meet or exceed Part E minima.
- For all new build, refurbishment, remedial and extension work in buildings with rooms for residential purposes.

- Minimum of 1 in 10 dwellings of same type to be tested.

Part E calls for sample pre-completion testing of separating walls and floors prior to handover. The testing is required to ensure that the level of performance specified in Part E is being achieved.

Tests are to be performed to the ISO 140 series of standards. Pre-completion sound insulation tests should be carried out by independently accredited organisations.

A minimum of one in every 10 dwellings of the same dwelling type are required to be tested prior to completion. Depending on the mix of dwelling types in a development, testing will usually be required on 10-30% of the units.

Tests should be conducted in completed but unfurnished rooms or available spaces in the case of properties sold before fitting out.

Table 11: Performance standards for separating walls, floors and stairs with separating function

	airborne sound insulation		Impact sound insulation
	Dn T,w + Ctr dB* (min. values)	Rw dB (min. values)	L'n Tw dB (max. values)
Purpose built dwellings, flats and rooms for residential purposes			
Internal walls and floors	-	40‡	-
Separating walls	45†	-	-
Separating floors and stairs	45	-	62
Dwellings, homes and flats formed from material change of use			
Internal walls and floors	-	40‡	-
Separating walls	43	-	-
Separating floors and stairs	43	-	64

** Weighted average sound reduction index modified by the addition of a factor to take into account problematic low frequency sound*

† 43 dB for separating walls in 'Rooms for residential purposes'

‡ This is allowed to be qualified by laboratory rather than field testing

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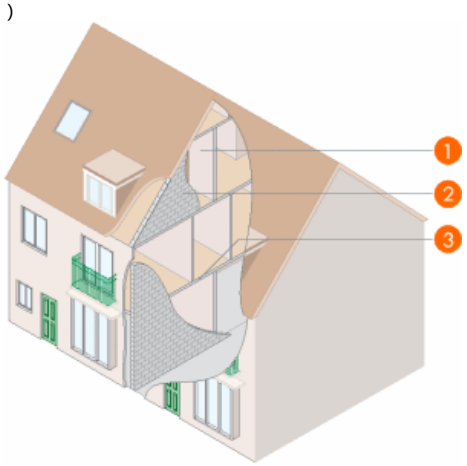


New build semi-detached and terraced housing

1) Internal wall

R_w = min. 40db

2) Separating wall

$D_{n\ T,w}$ + C_{tr} = min. 45db airborne

3) Internal floor

R_w = min. 40db

New build flats and apartments

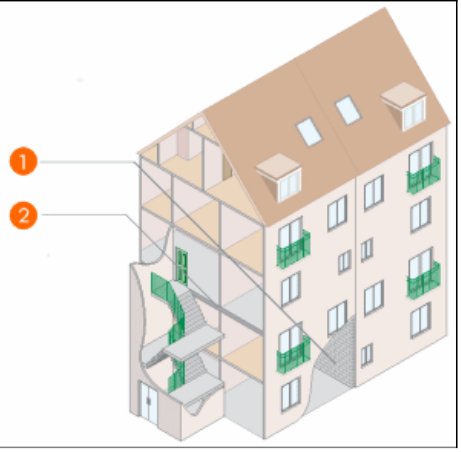
1) Separating wall

$D_{n\ T,w}$ + C_{tr} = min. 45db airborne

2) Separating floor

$D_{n\ T,w}$ + C_{tr} = min. 45db airborne

$L'_{n\ Tw}$ = max. 62dB impact



What do the terms mean?

dB (decibel)	- indicates the loudness of sound.
R	- laboratory measure of airborne sound transmission.
$D_{n\ T,w}$ + Ctr	- site measure of airbourne sound with low frequency correction applied (higher figure = better performance).

L_{nw}	- laboratory measure of the impact sound level (lower figure = better performance).
$L'_{n\,Tw}$	- site measure of the impact sound level (lower figure = better performance).

The elements of noise control

When approaching a noise control problem, the difference between sound absorption and sound insulation should be appreciated.

Sound Absorption

Sound Absorption refers to the attenuation of reverberant noise within the same room or area as the noise source. This normally involves lining all or part of the room surfaces with a material which absorbs sound. In most houses and flats, the soft furnishings provide a good degree of sound absorption. Adding additional sound absorbent material is unlikely to lower the noise level in the room significantly and will not produce a corresponding reduction in the noise being transmitted to neighbouring premises.

Sound Insulation

Sound Insulation, otherwise known as sound reduction, is the prevention of noise being transmitted from one part of a building to another, for example by erecting a partition or wall.

Improving the sound insulation of walls and floors between dwellings is the main way in which the noise transmission between dwellings can be reduced.

When considering sound insulation in existing buildings, three methods of sound transmission need to be considered:

- **airborne sound**
- **impact sound**
- **flanking sound**

Airbourne Sound

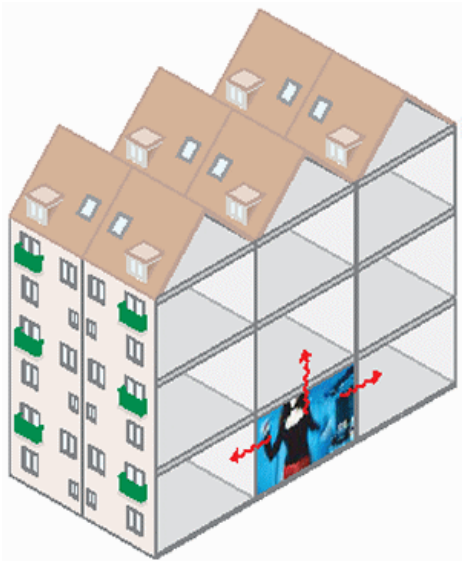
Airborne sound sources produce noise by vibrating the air immediately around them. Typical sources include the human voice, musical instruments, home entertainment systems and noisy dogs.

The ability of an element of construction to resist the passage of airborne sound energy through it is largely determined by three factors:

1. The sound absorbency of any cavities in the construction
2. The structural isolation between the two outer surfaces
3. Its mass

The airtightness of the construction is also important.

Increasing the mass of a wall or floor will improve its sound insulation. However, the amount of extra weight that can be safely supported by an existing construction is often limited so other design approaches are usually employed in remedial work ie, isolation, absorbent materials and resilient layers.



Impact Sound

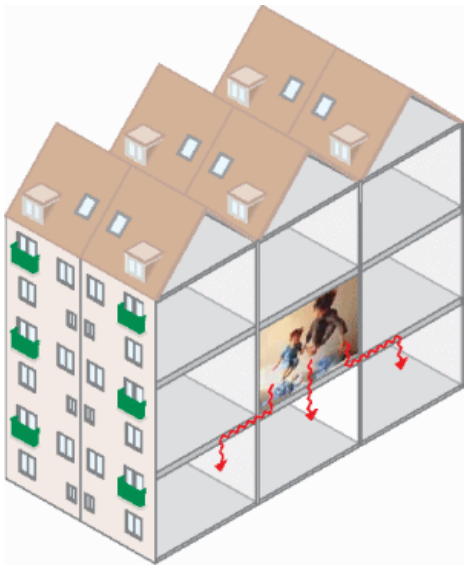
Impact noise sources produce noise by direct physical excitation of part of a building.

Examples include slamming doors, stamping on the floor and vibrating washing machines.

With impact noise, a relatively small noise source can result in a loud sound being transmitted through the structure, often over long distances.

Impact noise can be controlled by:

- providing a resilient layer at the point of impact - such as a carpet
- structural isolation - such as adding a resilient layer between the floor deck and the floor structure



Flanking Sound

Flanking sound transmission usually refers to sound that travels through ‘flanking’ structural elements, such as the external wall that flanks a separating wall between two dwellings.

Flanking sound can also include sound that travels along unintended airpaths, such as unsealed gaps in the structure and around service penetrations.

Flanking transmission can be reduced by:

- extending the separating wall to the underside of the roof
- sealing open airpaths
- forming a lining backed by a resilient layer to prevent sound energy entering the flanking element