Building Regulations, 1991

TECHNICAL GUIDANCE DOCUMENT E
SOUND

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BUILDING REGULATIONS, 1991

TECHNICAL GUIDANCE DOCUMENT E SOUND

INTRODUCTION

This document has been published by the Minister for the Environment under article 5 of the Building Regulations, 1991, for the purpose of providing guidance with regard to compliance with the requirements of Part E of the First Schedule to the Regulations. Where works are carried out in accordance with this guidance, this will, prima facie, indicate compliance with these requirements.

This document should be read in conjunction with the Regulations.

Guidance contained in this document with respect to the use of a particular material, method of construction, standard or other specification does not preclude the use of any other suitable material, method of construction, standard or specification.

TECHNICAL SPECIFICATIONS

Building Regulations are made for specific purposes i.e. health, safety and welfare of persons, energy conservation and the special needs of disabled people. Technical Specifications (including Harmonised European Standards, European Technical Approvals, National Standards and Agrément Certificates) are relevant to the extent that they relate to these considerations. Technical Specifications may also address other aspects of performance not covered by the Regulations.

The references in this document to named Technical Specifications, or to materials and methods which are likely to be suitable for the purposes of the Regulations, are not exclusive and other materials and methods may be suitable in particular circumstances. A reference to a Technical Specification is to the latest edition (including any amendments, supplements or addenda) current at the date of publication of this Technical Guidance Document

MATERIALS AND WORKMANSHIP

Under Part D of the First Schedule to the Regulations, building work must be carried out with proper materials and in a workmanlike manner. Relevant guidance is contained in Technical Guidance Document D.

Part D of the First Schedule to the Regulations defines "proper materials" as materials which are fit for the use for which they are intended and for the conditions in which they are to be used, and includes materials which:

(a) bear a CE Mark in accordance with the provisions of the Construction Products Directive (89/106/EEC); or

(b) comply with an appropriate harmonized standard, European technical approval or national technical specification as defined in article 4(2) of the Construction Products Directive (89/106/EEC); or

(c) comply with an appropriate Irish Standard or Irish Agrément Board Certificate or with an alternative national technical specification of any Member State of the European Community, which provides in use an equivalent level of safety and suitability.

Building Regulations - The Requirement

Part E of the First Schedule to the Building Regulations, 1991 provides as follows:

Airborne sound (walls).	E1	(1)	A wall which - (a) separates a dwelling from another dwelling or from another building, or (b) separates a habitable room within a dwelling from another part of the same building which is not used exclusively with the dwelling, shall have reasonable resistance to airborne sound.
		(2)	The requirement of sub-paragraph (1) shall not apply to a wall falling within the description in sub-paragraph (1)(b) which separates a habitable room within a dwelling from another part of the same building if such part is used only occasionally for the inspection, maintenance or repair of the building, or of its services, fixed plant or machinery.
Airborne sound (floors).	E2	(1)	A floor which separates a dwelling from another dwelling, or from another part of the same building which is not used exclusively with the dwelling, shall have reasonable resistance to airborne sound.
		(2)	The requirement of sub-paragraph (1) shall not apply to a floor which separates a dwelling from another part of the same building if such part is used only occasionally for the inspection, maintenance or repair of the building, or of its services, fixed plant or machinery.
Impact sound (floors).	E3	(1)	A floor above a dwelling which separates it from another dwelling or from another part of the same building which is not used exclusively with the dwelling, shall have reasonable resistance to impact sound.
		(2)	The requirement of sub-paragraph (1) shall not apply to a floor which separates a dwelling from another part of the same building if such part is used only occasionally for the inspection, maintenance or repair of the building, or of its services, fixed plant or machinery.
Definitions for this Part.	E4		In this Part- "habitable room" means a room used for living or sleeping purposes but does not include a kitchen having a floor area of less than 6.5 m^2 in area; "kitchen" means any room used primarily for the preparation or cooking of food or drink or the cleansing of utensils or appliances used in such preparation or cooking.

This Technical Guidance Document is divided into four sections.

Section 1 gives general information on sound.
Section 2 relates to the requirement in E1.
Section 3 relates to the requirements in E2 and E3
Section 4 relates to requirements on similar construction.

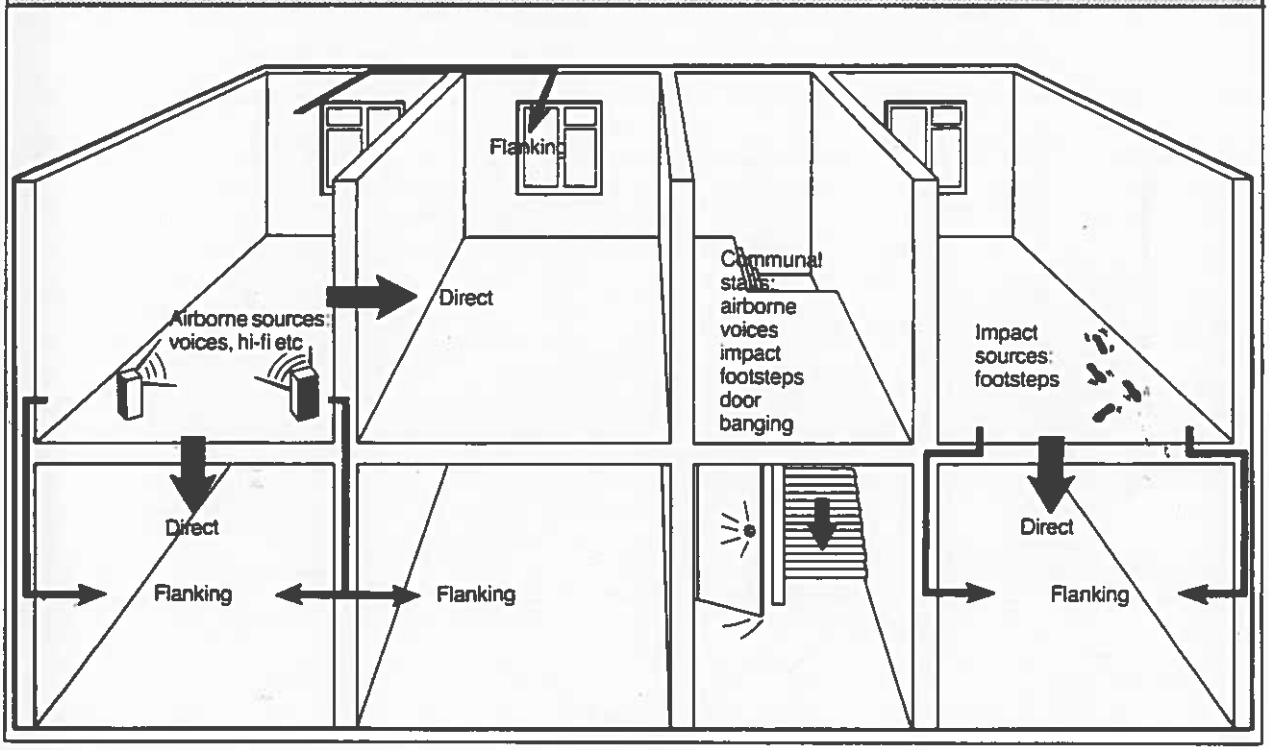
Section 1

GENERAL

SOUND

Sound is a form of energy which can be transmitted over a distance from its source through a medium, such as air or a solid element of construction e.g. a wall or a floor. For the purposes of Part E of the Regulations, the types of sound to be considered are airborne and impact sounds. In each case the sound may be transmitted directly or indirectly (flanking transmission) - See Diagram 1.

Diagram 1 Sound transmission



The principal methods of isolating the receiver from the source of the sound are:

(a) eliminating pathways along which the sound can travel, and

(b) using barriers formed of materials of sufficiently high mass which will not easily vibrate.

In practice, sound insulation is usually achieved by using a combination of both methods.

This document gives some guidance in relation to the achievement of reasonable sound insulation insofar as it relates to non complex buildings of normal design and construction.

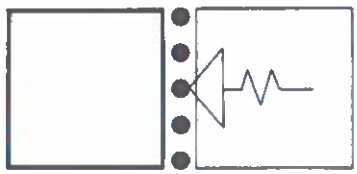
WALLS AND FLOORS

The location of walls and floors which are required by Regulations to have good sound insulation are indicated in Diagrams 2 and 3.

Diagram 2 Sound resisting walls

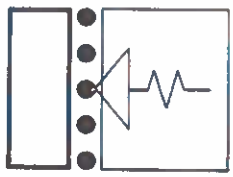
● ● ● ● ● **Sound resisting wall** (airborne sound only)

Dwelling



another dwelling
another building

Habitable room

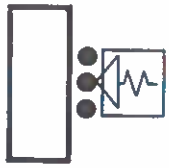


another part of the same building which is not part of the dwelling
machinery room or tank room
place for any other purpose **except** if only used occasionally for maintenance or repair

Habitable room

refuse chute
in same building
(see paragraph 2.5)

Non-habitable room

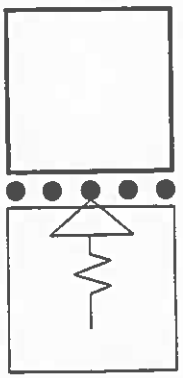


refuse chute
in same building
(see paragraph 2.5)

Diagram 3 Sound resisting floors

● ● ● ● ● **Sound resisting floor**

floor to resist airborne sound only



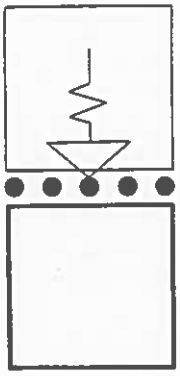
Dwelling above

another part of the same building which is not part of the dwelling above

machinery room or tank room

place for any other purpose **except** if only used occasionally for maintenance or repair

floor to resist both airborne and impact sound



another dwelling

another part of the same building which is not part of the dwelling below

machinery room or tank room

place for any other purpose **except** if only used occasionally for maintenance or repair

Dwelling below

DIRECT TRANSMISSION OF SOUND

Direct transmission means the transmission of sound directly through a wall or floor from one of its sides to the other.

Walls should reduce the level of airborne sound. A solid masonry wall depends on its mass - being heavy it is not easily set into vibration. Walls with two or three leaves depend partly on their mass and partly on structural isolation between the leaves.

With masonry walls the mass is the main factor but stiffness and damping (which turns sound energy into heat) are also important. Cavity masonry walls need at least as much mass as solid walls because their lower degree of stiffness offsets the benefit of isolation.

Floors should reduce airborne sound and also, if they are above a dwelling, impact sound. A heavy solid floor depends on its mass to reduce airborne sound and on a soft covering to reduce impact sound at source. A floating floor uses a resilient layer to isolate the walking surface from the base and this isolation contributes to both airborne and impact insulation. The resilient layer is only effective if it is not too stiff and so it is important to choose a suitable material and to make sure that it is not bypassed with rigid bridges such as fixings and pipes.

Air paths must be avoided - porous materials and gaps at joints in the structure must be sealed. Resonances must also be avoided; these may occur if some part of the structure (such as a dry lining) vibrates strongly at a particular sound frequency (pitch) and transmits more energy at this pitch.

FLANKING TRANSMISSION

Flanking transmission means the indirect transmission of sound from one side of a wall or floor to the other side.

Because a solid element may vibrate when exposed to sound waves in the air it may cause sound waves in the air on both sides. Flanking transmission happens when there is a path along which sound can travel between elements on opposite sides of a wall or floor. This path may be through a continuous solid structure or through an air space (such as the cavity of an external wall). Usually paths through structure are more important with solid masonry elements, while paths through an air space are more important with thin panels (such as studwork and ceilings) in which structural waves do not travel as freely.

The junction of a sound resisting element and a flanking element provides resistance to structural waves, but it may not be enough unless the flanking element is heavy or is divided by windows or similar openings into small sections which do not vibrate freely. Usually a minimum mass is also needed for thin panels connected by paths through air spaces (such as ceilings connected by air in roof spaces and over the ridge of the separating wall). The mass which is needed will be less if the path is blocked by non-porous material.

SPECIAL FACTORS

In addition to the details of construction, matters such as the layout of rooms in a dwelling or the presence of steps or staggers between dwellings and adjoining dwellings or buildings are important factors to be considered. These must be taken into account when considering similar construction (see Section 4).

Section 2

WALLS

TYPES OF WALL

2.1 This Section describes two widely used wall constructions as shown in Diagram 4.

Type 1

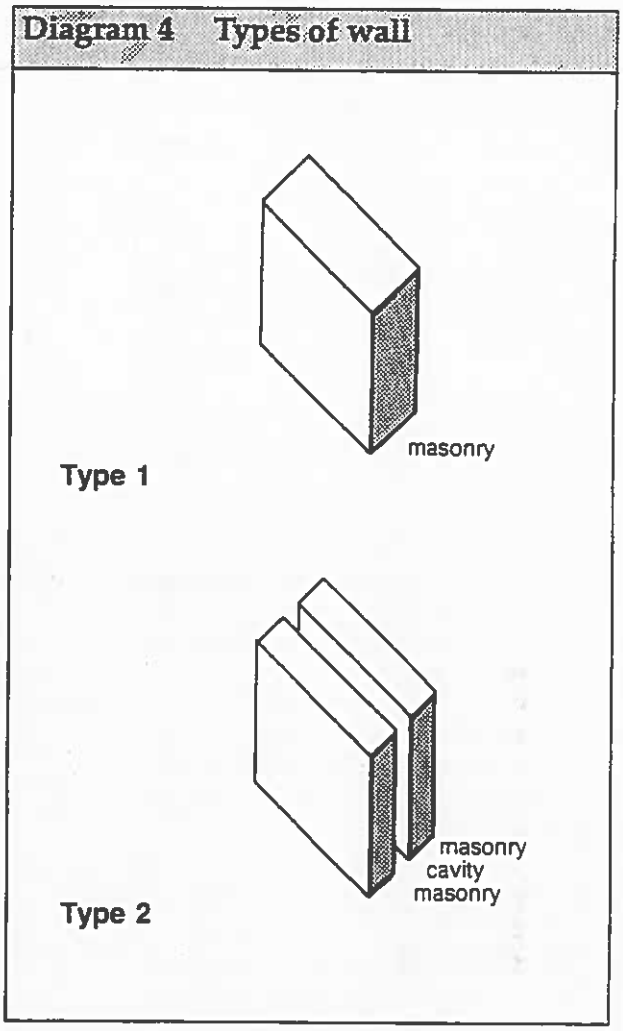
Solid masonry wall - The resistance to airborne sound depends mainly on the mass of the wall.

Type 2

Cavity masonry wall - The resistance to airborne sound depends mainly on the mass of the leaves and the degree of isolation provided by the cavity.

2.2 For both types, a selection of specifications for the wall itself is given and features identified to which special attention should be paid if the sound resistance is not to be greatly reduced. The page opposite the specifications shows where the junctions between the wall and other parts of the construction are important and details some of the ways in which these junctions can be made.

Diagram 4 Types of wall



MASS OF MASONRY WALLS

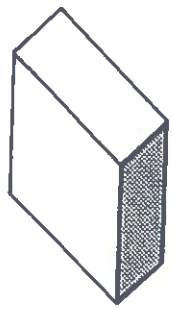
2.3 The mass of a wall is expressed in kilograms per square metre [kg/m²].

2.4 The density of the materials used (and on which the mass of the wall depends) is expressed in kilograms per cubic metre [kg/m³].

REFUSE CHUTES

2.5 A wall separating a habitable room and a refuse chute should have a mass (including any plaster finishes) of at least 1320 kg/m². A wall separating a non-habitable room which is in a dwelling from a refuse chute should have a mass (including any plaster finishes) of at least 220 kg/m².

Wall type 1 Solid masonry



The resistance to airborne sound depends mainly on the mass of the wall.

Points to watch

Fill the joints between the bricks or blocks with mortar, and seal the joints between the wall and the other parts of the construction (to achieve the mass and to avoid air paths).

Limit the pathways between the walls and opposite sides of the sound resisting wall (to reduce flanking transmission).

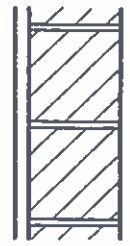
Specifications

Specifications for common types of walls which will give suitable insulation against direct sound transmission are given opposite.

Constructional details showing how to limit flanking transmission between elements on opposite sides of the wall are given on the opposite page.

Wall specifications

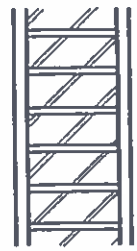
A Concrete blockwork or concrete brickwork plastered on both faces



the average mass of the wall (including the plaster) should be at least 415 kg/m².
the thickness of the plaster should be at least 12.5 mm on each face
use blocks which extend to the full thickness of the wall

Example:
215 mm concrete block, 112.5 mm coursing, lightweight plaster; block density of 1860 kg/m³ gives the required mass.

B Clay brickwork plastered on both faces



the average mass of the wall (including the plaster) should be at least 375 kg/m²
the thickness of the plaster should be at least 12.5 mm on each face
lay the bricks with the frogs upwards and in a bond which includes headers

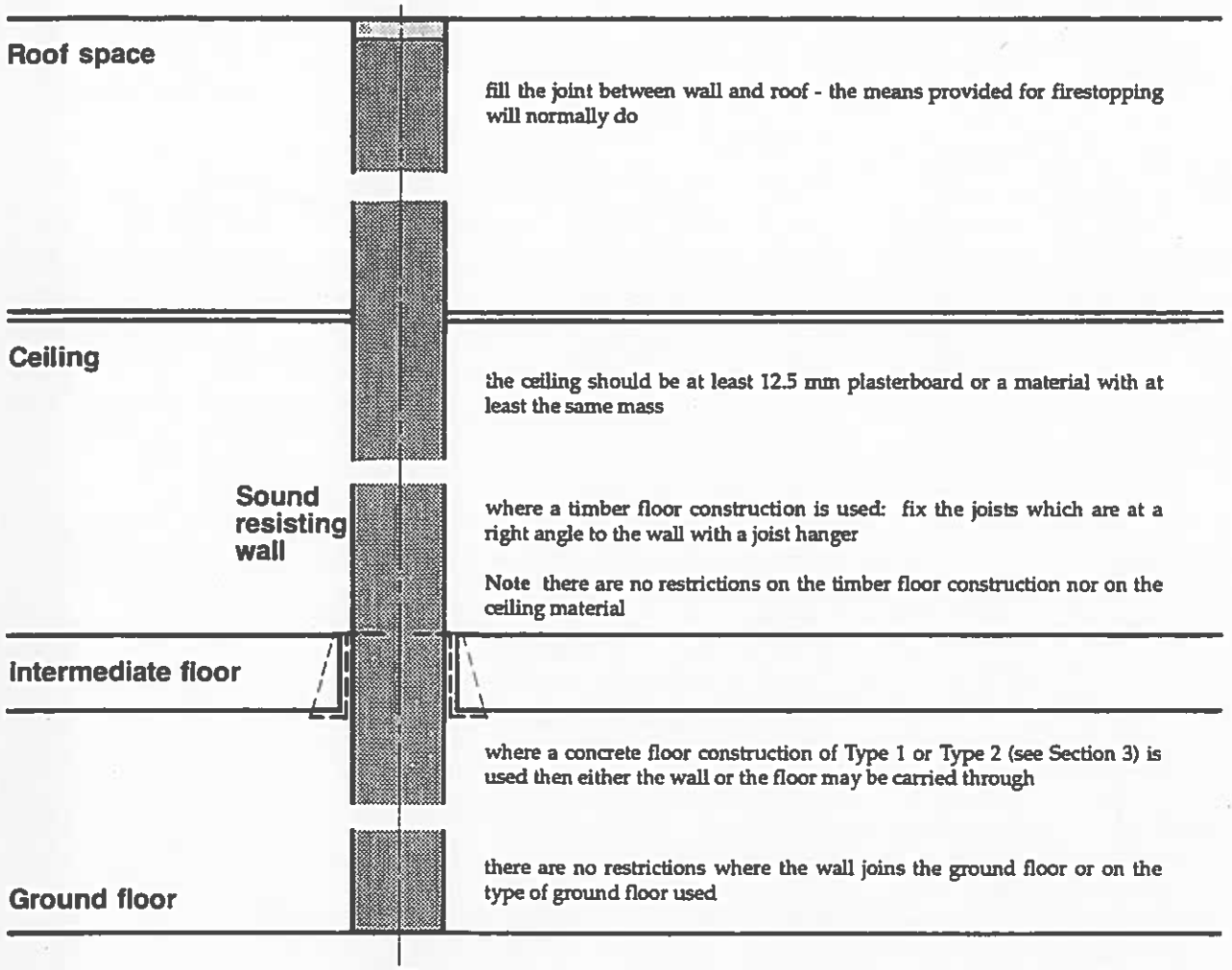
Example:
215 mm brick, 75 mm coursing, lightweight plaster; brick density of 1674 kg/m³ gives the required mass.

C Dense concrete - minimum density 1500 kg/m³ (in-situ or large panels)

the average mass of the wall (including the plaster if used) should be at least 415 kg/m²
fill joints between panels with mortar.

Example:
an unplastered wall of density 2200 kg/m³;
190 mm thickness gives the required mass.

Key junctions in the construction Wall Type 1



fill the joint between wall and roof - the means provided for firestopping will normally do

the ceiling should be at least 12.5 mm plasterboard or a material with at least the same mass

where a timber floor construction is used: fix the joists which are at a right angle to the wall with a joist hanger

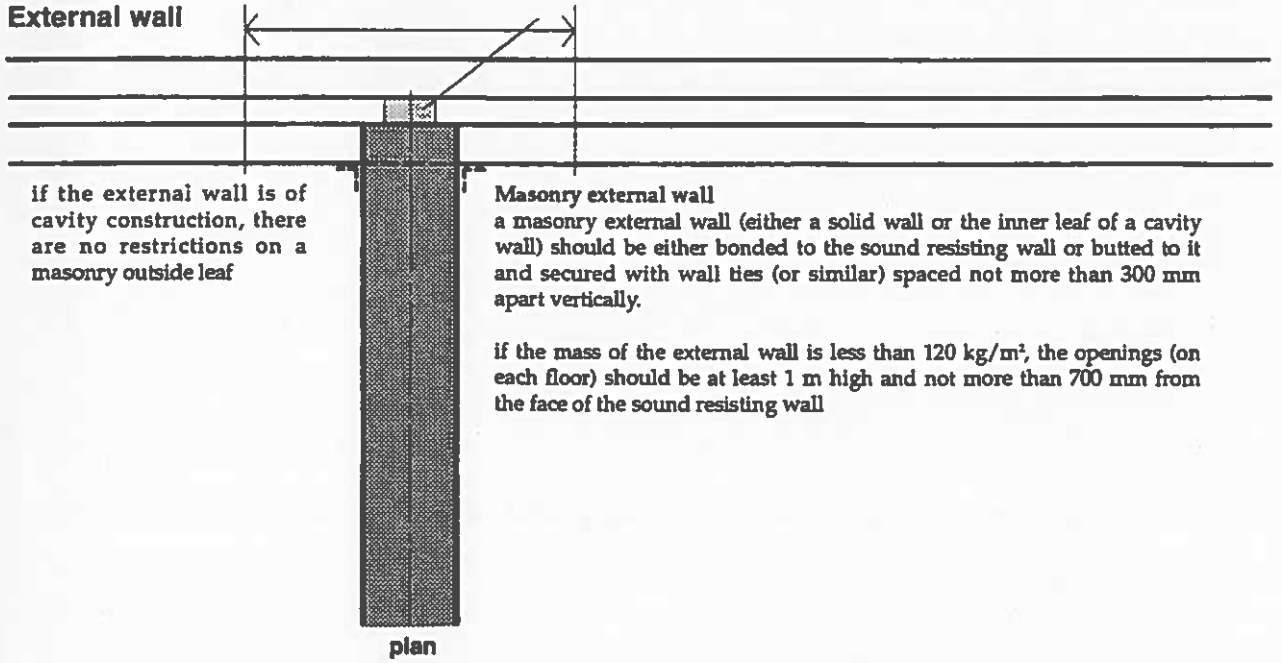
Note there are no restrictions on the timber floor construction nor on the ceiling material

where a concrete floor construction of Type 1 or Type 2 (see Section 3) is used then either the wall or the floor may be carried through

there are no restrictions where the wall joins the ground floor or on the type of ground floor used

section

there should be at least 650 mm between openings in the external wall unless it is a cavity wall and the cavity is closed



if the external wall is of cavity construction, there are no restrictions on a masonry outside leaf

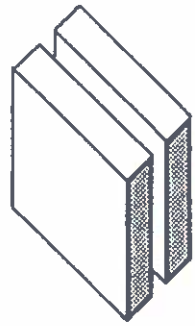
Masonry external wall

a masonry external wall (either a solid wall or the inner leaf of a cavity wall) should be either bonded to the sound resisting wall or butted to it and secured with wall ties (or similar) spaced not more than 300 mm apart vertically.

if the mass of the external wall is less than 120 kg/m², the openings (on each floor) should be at least 1 m high and not more than 700 mm from the face of the sound resisting wall

plan

Wall type 2 Cavity masonry



The resistance to airborne sound depends mainly on the mass of the leaves and the degree of isolation provided.

In general, a cavity wall does not perform better than a solid wall of similar materials and mass.

Points to watch

Fill the joints between the bricks or blocks with mortar, and seal the joints between the wall and the other parts of the construction (to achieve the mass and to avoid air paths).

Maintain the separation of the leaves and space them at least 50 mm apart. Connect the leaves with butterfly pattern wall ties.

If a cavity in an external wall is completely filled with an insulating material other than loose fibre, care should be taken that the insulating material does not enter the cavity in the separating wall

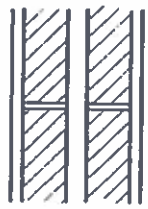
Specifications

Specifications for common types of wall are shown at A and B opposite.

Constructional details showing how to limit flanking transmission are given on the opposite page.

Wall specifications

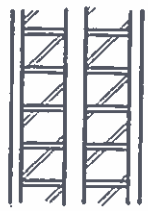
A Two leaves of concrete blockwork or concrete brickwork plastered on the room faces



the width of the cavity should be at least 50 mm
the average mass of the wall (including the plaster) should be at least 415 kg/m²
the thickness of the plaster should be at least 12.5 mm on each face

Example:
102 mm leaves of concrete, 225 mm coursing, lightweight plaster; block density of 1961 kg/m³ gives the required mass.

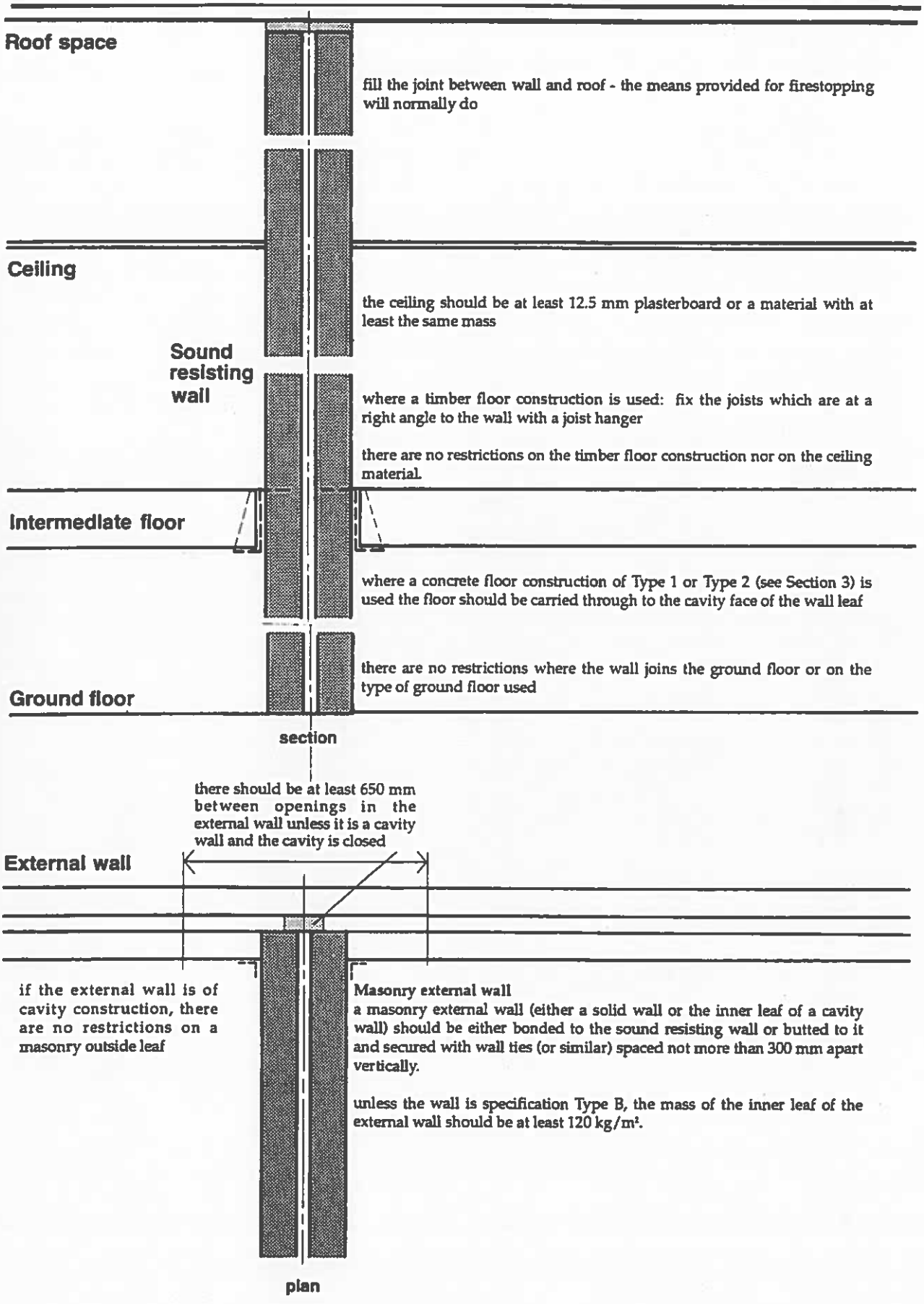
B Two leaves of clay brickwork plastered on the room faces



the width of the cavity should be at least 50 mm
the average mass of the wall (including the plaster) should be at least 415 kg/m²
the thickness of the plaster should be at least 12.5 mm on each face

Example:
102 mm leaves, 75 mm coursing, lightweight plaster; brick density of 1961 kg/m³ gives the required mass.

Key junctions in the construction Wall Type 2



Section 3

FLOORS

TYPES OF FLOOR

3.1 This section describes some of the more widely used floor constructions.

They are grouped into three main types, as shown in **Diagram 5.**

Type 1

Concrete base with a soft covering - The resistance to airborne sound depends on the mass of the concrete base. The soft covering reduces the impact sound at source.

Type 2

Concrete base with a floating layer - The resistance to airborne sound depends mainly on the mass of the concrete base and partly on the mass of the floating layer.

The floating layer also reduces the transmission of impact sound to the base and to the surrounding construction.

Type 3

Timber base with a floating layer - The resistance to airborne sound depends partly on the mass of the base with its pugging or absorbent blanket and partly on the mass of the floating layer.

The floating layer also reduces the transmission of impact sound to the base and to the surrounding construction.

A timber floor needs less mass than a concrete floor because the material is softer and radiates sound less efficiently.

3.2 For each type, a selection of specifications for the floor base and for the floating layer is given. Also identified are features to which special attention should be paid if the resistance is not to be greatly reduced.

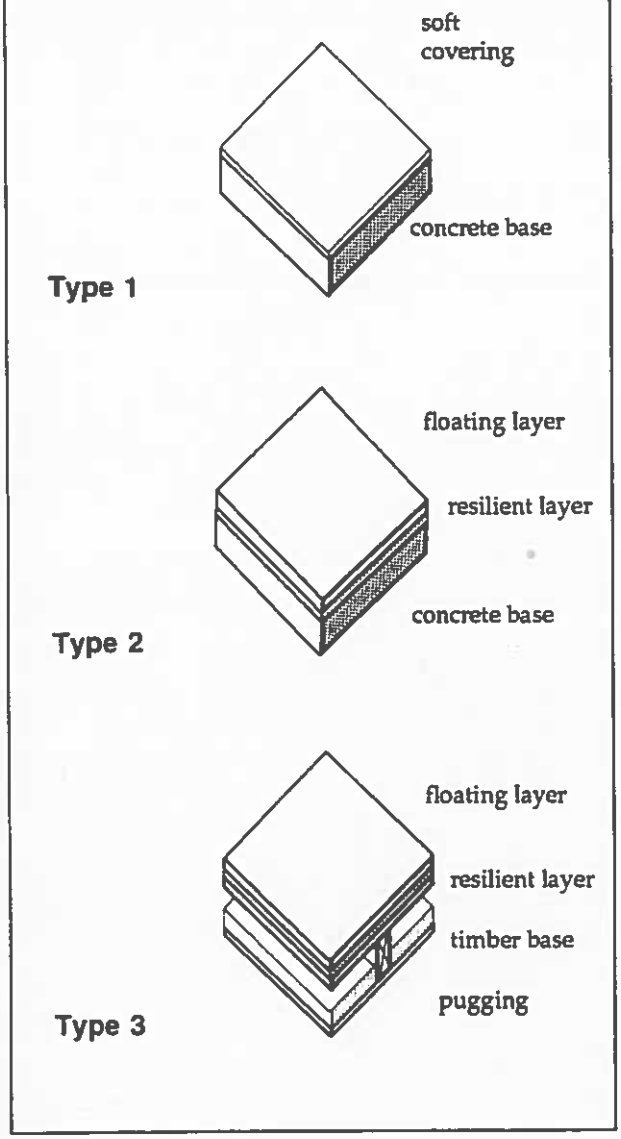
The page facing the specifications shows where the junctions between the floor and the other parts of the construction are important and details how these junctions can be made.

MASS OF CONCRETE FLOORS

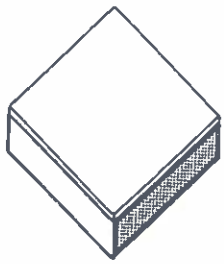
3.3 The mass of a concrete floor is expressed in kilograms per square metre [kg/m^2].

3.4 The density of the materials used (and on which the mass of the wall depends) is expressed in kilograms per cubic metre [kg/m^3]. The density of a particular material may be taken from a current Agrément Certificate or from the manufacturer's trade literature.

Diagram 5 Types of floor



Floor type 1 Concrete base (with soft covering)



The resistance to airborne sound depends on the mass of the concrete base. The soft covering reduces the impact sound at source.

The mass of the floor should be calculated from the mass of the components and materials being used.

For insulation against airborne sound only, the soft covering may be omitted and any floor finish used. Leaving out any other part of the construction will make the insulation value inadequate.

Points to watch
Limit the pathways between elements on opposite sides of the sound resisting floor (to avoid flanking transmission).

Floor base specifications

A Solid concrete slab *(in situ)*

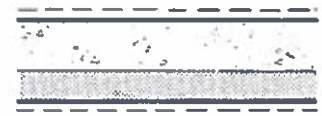
floor screed if used

ceiling finish if used

the average mass of the base (including any floor screed and any ceiling finish bonded to the concrete) should be at least 365 kg/m².

B Solid concrete slab with permanent shuttering

floor screed if used



ceiling finish if used

the average mass of the base (including the shuttering if it is solid concrete or metal, any floor screed and any ceiling finish bonded to the shuttering) should be at least 365 kg/m².

C Concrete beams with infilling blocks

floor screed

ceiling finish if used

the average mass of the base (including the blocks if they are clay or concrete, floor screed, and any ceiling finish bonded to the beams or blocks) should be at least 365 kg/m².

fill all joints between beams and blocks

D Concrete planks (solid or hollow)

floor screed

ceiling finish if used

the average mass of the base (including floor screed, and ceiling finish if bonded to the beams) should be at least 365 kg/m².

fill all joints between beams.

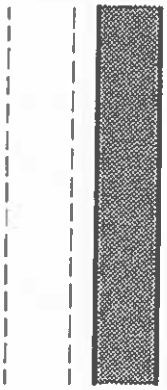
Soft covering specifications

resilient material or a material with a resilient base
the thickness of the material (including any backing) should be at least 4.5 mm
a material is resilient if it returns to its original thickness after it has been compressed

suitable resilience will also be provided by a floor covering with a weighted impact sound improvement (ΔLw) of not less than 17 as calculated in Annex A to BS 5821: Part 2: 1984. The soft covering should be bonded to the floor base.

Key junctions in the construction Floor Type 1

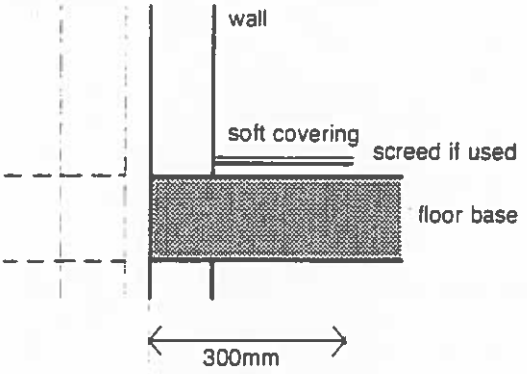
External wall all types of floor base



if the area of the openings is 20 per cent or less of the external wall area, the average mass of the external wall (or inner leaf of cavity wall) should be at least 120 kg/m² (including any plaster but not dry lining)

if the area of the openings is more than 20 per cent, there are no requirements

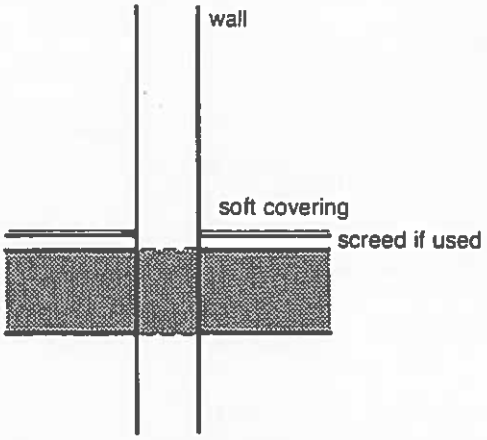
Junction of floor with external wall or cavity separating wall



if the floor base is Type C or D the first joint should be at least 300mm from the face of the wall

where the floor meets an external wall or a cavity separating wall, pass the floor base through (but not the screed) whether it spans parallel with or at right angles to the wall.

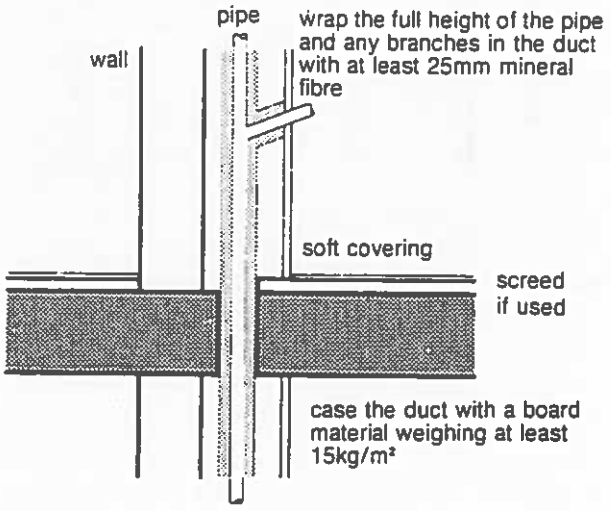
Junction of floor with sound resisting or internal solid wall



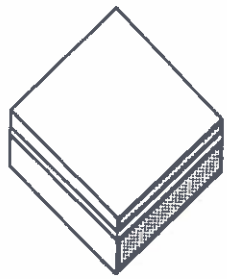
if the wall is a sound resisting or internal solid wall, with an average mass of less than 355 kg/m² (including any plaster finishes) pass the floor base through (but not the screed)

if the wall is a sound resisting or internal solid wall, with an average mass of 355 kg/m² or more, (including any plaster finishes) either the wall or the floor base (but not the screed) may pass through. If the wall is passed through, tie the floor base to the wall and grout the joint

Pipe penetrating floor



Floor type 2 Concrete base (with floating layer)



The resistance to airborne sound depends mainly on the mass of the concrete base and partly on the mass of the floating layer.

The floating layer also reduces the transmission of impact sound to the base and to the surrounding construction.

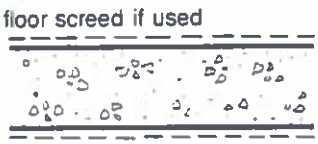
The mass of the floor should be calculated from the mass of the components and materials being used.

Any of the bases can be combined with either of the resilient layers and either of the floating layers.

Points to watch
Limit the pathways between elements on opposite sides of the floor (to avoid flanking transmission).

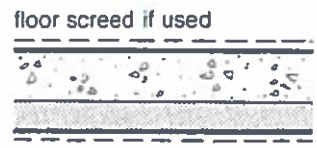
Floor base specifications

A Solid concrete slab *(in situ)*



the average mass of the base (including floor screed and ceiling finish bonded to the concrete) should be at least 220 kg/m².

B Solid concrete slab with permanent shuttering

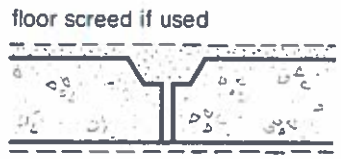


the average mass of the base (including the shuttering if it is solid concrete or metal, floor screed and ceiling finish bonded to the concrete) should be at least 220 kg/m².

C Concrete beams with infilling blocks

the average mass of the base (including the blocks if they are clay or concrete, floor screed, and any ceiling finish bonded to the beams or blocks) should be at least 220 kg/m².
fill all the joints between beams and blocks

D Concrete planks (solid or hollow)



the average mass of the base (including floor screed, and ceiling finish if bonded to the beams) should be at least 220 kg/m².
fill all joints between beams.

Floating floor specifications

E Timber raft

timber boarding or wood-based board

the boarding or boards should be at least 18 mm thick

fix the boards to 45 x 45 mm battens so that the nails do not go through the batten (to maintain isolation)
use tongued and grooved boards (to avoid air paths)

F Screed

65 mm cement sand screed with mesh underlay to protect the resilient layer while the screed is being laid

Resilient layer specifications

G Flexible material

mineral fibre with a thickness of at least 13 mm and a density of at least 36 kg/m³

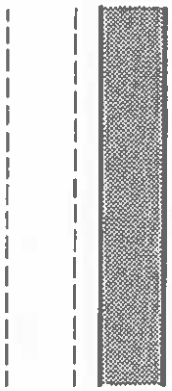
lay with rolls tightly butted (to avoid air paths)

H Board material (only for floor specification F)

pre-compressed expanded polystyrene (impact sound duty grade)

lay boards tightly butted (to avoid air paths)

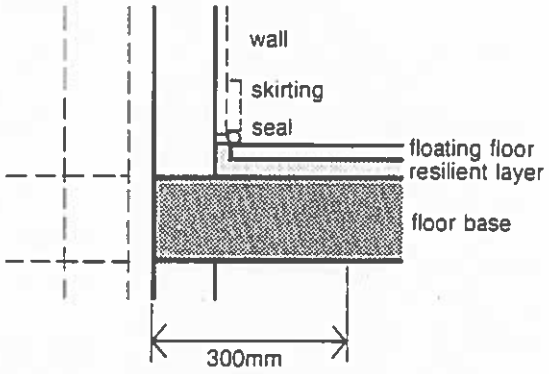
External wall all types of floor base



if the area of the openings is 20 per cent or less of the external wall area, the average mass of the external wall (or inner leaf of cavity wall) should be at least 120 kg/m² (including any plaster but not dry lining)

if the area of the openings is more than 20 per cent, there are no requirements

Junction of floor with external wall or cavity separating wall



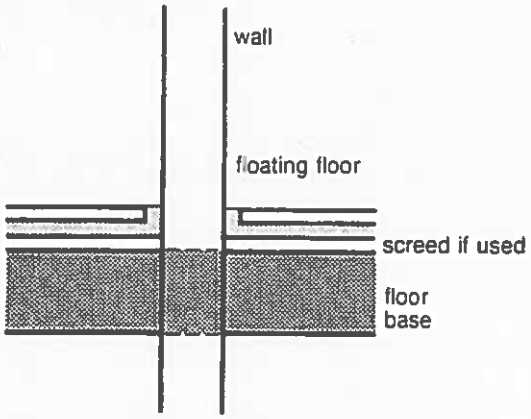
if the floor base is Type C or D the first joint should be at least 300mm from the face of the wall

carry the resilient layer up against the wall to isolate the floating floor.

leave at least 3mm gap between floating floor and skirting

where the floor meets an external wall or a cavity sound resisting wall pass the floor base through (but not the screed whether it spans parallel with or at right angles to the wall

Junction of floor with sound resisting or internal solid wall

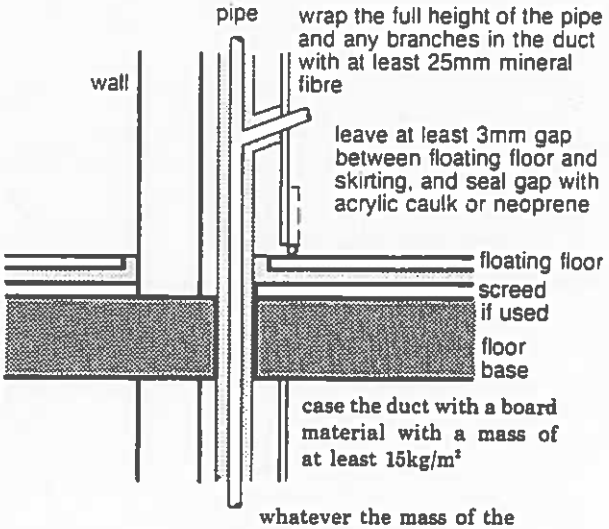


if the wall is a sound resisting or internal solid wall, with an average mass of less than 355 kg/m² (including any plaster finishes) pass the floor base through (but not the screed)

if the wall is a sound resisting or internal solid wall with an average mass of 355 kg/m² or more, either the wall or the floor base (but not the screed) may pass through,

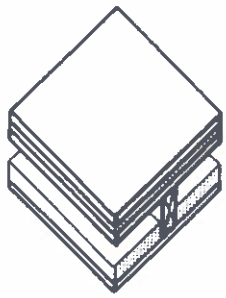
if the wall is passed through, tie the floor base to the wall and grout the joint

Pipe penetrating floor



whatever the mass of the wall, pass the floor base through

Floor type 3 Timber base (with floating layer)



This type of floor is similar in concept to Floor Type 2 but the construction is entirely of timber.

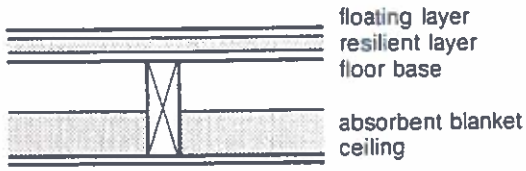
Timber floors need less mass than concrete floors because the materials used radiate sound less efficiently.

The reduction of airborne sound depends partly on the structural floor and the absorbent blanket or pugging, and partly on the floating layer which reduces the transmission of impact sound to the floor and the surrounding construction.

Points to watch
Limit the pathways between elements on opposite sides of the sound resisting floor (to avoid flanking transmission).

Floor specifications

A Platform floor with absorbent blanket



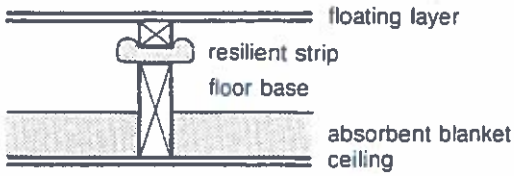
floating layer of at least 18 mm thick t & g timber or wood-based board on substrate of at least 19 mm thick plasterboard, or material with at least the same mass on.

resilient layer of at least 25 mm thick mineral fibre on

floor base of at least 12 mm thick timber or wood-based board deck nailed to timber joists with ceiling of at least 30 mm plasterboard in two layers with joints staggered and with

an absorbent blanket of at least 100 mm thick mineral fibre laid on the ceiling

B Ribbed floor with absorbent blanket



floating layer of at least 18 mm thick t & g timber or wood-based board (with joints glued) on substrate of at least 19 mm thick plasterboard or material with at least the same mass nailed to 45 x 45 mm timber battens on

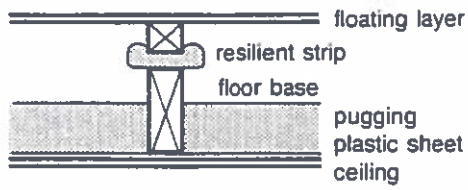
resilient strip of at least 25 mm thick mineral fibre on

floor base of timber joists at least 50 mm (nominal) wide with ceiling of at least 30 mm plasterboard in two layers with joints staggered and with

an absorbent blanket of at least 100 mm thick mineral fibre laid on the ceiling

Note
Take care that the nails fixing the timber of wood-based board layer do not go through the timber battens and pierce the resilient strip

C Ribbed floor with heavy pugging



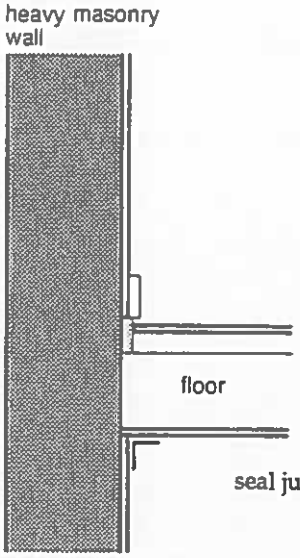
floating layer of at least 18 mm thick t & g timber or wood-based board (with joints glued) nailed to 45 x 45 mm timber battens on

resilient strip of at least 25 mm thick mineral fibre on

floor base of timber joists at least 50 mm (nominal) wide with ceiling of at least 19 mm of dense plaster on expanded metal, and with

pugging of dry sand or fine gravel with a mass at least 80 kg/m² laid on the ceiling

Junction of floor with heavy solid masonry
(mass 355 kg/m³ or more)
external, internal or separating wall



the wall finish may be plaster or dry lining

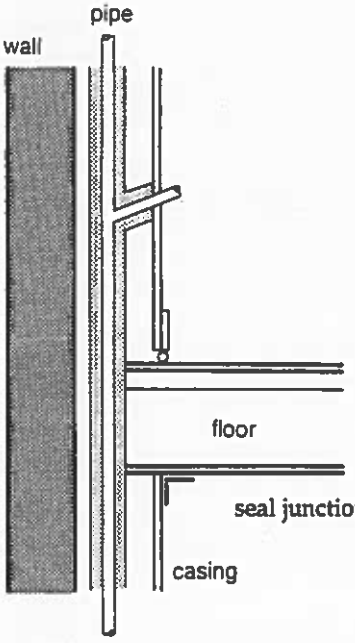
seal the gap between wall and floating layer with mineral fibre or plastics foam strip

leave at least 3 mm gap between skirting and floating layer

use any method of connecting floor to the wall

seal junction of ceiling and wall lining with tape

Pipe penetrating floor



wrap the full height of the pipe and any branches in the duct with at least 25 mm mineral fibre

case the duct with a board material with a mass of at least 15 kg/m²

leave at least 3 mm gap between skirting and floating layer (or, alternatively, the floor base if the floor is Type A) and seal gap with acrylic caulk or neoprene

seal junction of ceiling and duct casing, for example with tape

Section 4

SIMILAR CONSTRUCTION

4.1 This section describes methods which repeat a construction which has already been built.

4.2 It will be necessary to show that the performance of the existing wall or floor is reasonable and that the existing and proposed design have sufficiently similar features.

PERFORMANCE OF THE EXISTING CONSTRUCTION

4.3. The existing wall or floor should achieve the values given in Table 1 when the following test programme is carried out:

(a) test each wall or floor between at least four pairs of rooms. Each pair should include at least one habitable room, and

(b) take only one set of measurements between the rooms in each pair, and

(c) if both rooms in a pair are habitable rooms and one is larger, the sound source should be put in that room, and

(d) if one room in a pair is a non-habitable room the sound source should be put in that room and

(e) carry out the tests in accordance with the method given in BS 2750 Methods of measurement of sound insulation in buildings and of building elements, Part 4: 1980 Field measurements of airborne sound insulation between rooms and Part 7: 1980 Field measurements of impact sound insulation of floors and determine the Standardised Level Differences Dnt for airborne sound transmission and Standardised Impact Sound Pressure Levels Lnt for impact sound transmission, and

(f) calculate the Weighted Standardised Level Difference Dnt.w for airborne sound and the Weighted Standardised Sound Pressure Level Lnt.w for impact sound as defined in BS 5821: Method for rating the sound insulation in buildings and of building elements, Part 1: 1984 Method for rating the airborne sound insulation in buildings and of building elements, Part 2: 1984 Method for rating the impact sound insulation.

4.4 Table 1 gives the sound transmission values which should be achieved.

SIMILAR FEATURES

4.5 The sound insulation between walls on either side of a sound resisting wall or floor depends not only on the wall or floor specification but also on other factors, including the size and shape of the rooms. For buildings made from masonry, the positions of doors and windows may also be important in reducing flanking transmission.

4.6 For walls and floors, the following features in the proposed building should be similar to those in the existing building, but they do not need to be identical:

(a) the specification of the sound resisting walls and floors,

(b) the construction of other walls and floors adjacent to the sound resisting walls and floors,

(c) the general arrangement of windows and doors adjacent to the sound resisting wall or floor when in an external wall with a masonry inner leaf,

(d) the general shape and size of the rooms adjacent to the sound resisting wall.

4.7 For walls only, the extent of any step or stagger should be similar to that in the existing building. Where there is none in the existing building, one may be provided in the new building.

Table 1 Sound transmission values

Type of performance	Individual values	Mean values	
		Test in at least 4 pairs of rooms	Test in at least 8 pairs of rooms
Airborne sound (minimum values)*	49 (walls) 48 (floors)	53 (walls) 52 (floors)	52 (walls) 51 (floors)
Impact sound (maximum values)**	65	61	62

Notes
* Airborne sound - Weighted Standardised Level Difference (Dnt.w)
** Impact sound - Weighted Standardised Sound Pressure Level (Lnt.w)

ALLOWABLE DIFFERENCES

4.8 For **walls and floors**, the differences in the following can be allowed when considering paragraph 4.6:

(a) the construction of the outer leaf of a masonry cavity wall, and

(b) the construction of the inner leaf of a masonry cavity wall provided that the construction is of the same general type and that the mass of the inner leaf is not reduced.

4.9 For **walls only**, differences in the following can be allowed:

(a) the material and thickness of the flooring of a floor with a concrete base and a floating layer (Type 2) or a timber floor (Type 3) and

(b) a small reduction in the size of step or stagger between dwellings in the proposed dwelling may be acceptable and an increase will be beneficial and

(c) the type of timber floor where it is not a sound resisting floor.

LIMITS ON THE USE OF TEST EVIDENCE

4.10 The values in Table 1 are provided to enable an existing construction to be assessed before similar new construction is undertaken. A failure of new construction to achieve the values in the Table is not in itself evidence of a failure to comply with the requirements of the Regulations.

Standards and other references

BS 2750 Methods of measurement of sound insulation in buildings and of building elements,
Part 4: 1980 Field measurements of airborne sound insulation between rooms,
Part 7: 1980 Field measurements of impact sound insulation of floors.

BS 5821 Method for rating the sound insulation in buildings and building elements,
Part 1: 1984 Method for rating the airborne sound insulation in building and of internal building elements,
Part 2: 1984 Method for rating the impact sound insulation.

BS 8233: 1987 Sound insulation and noise reduction for buildings AMD 6470