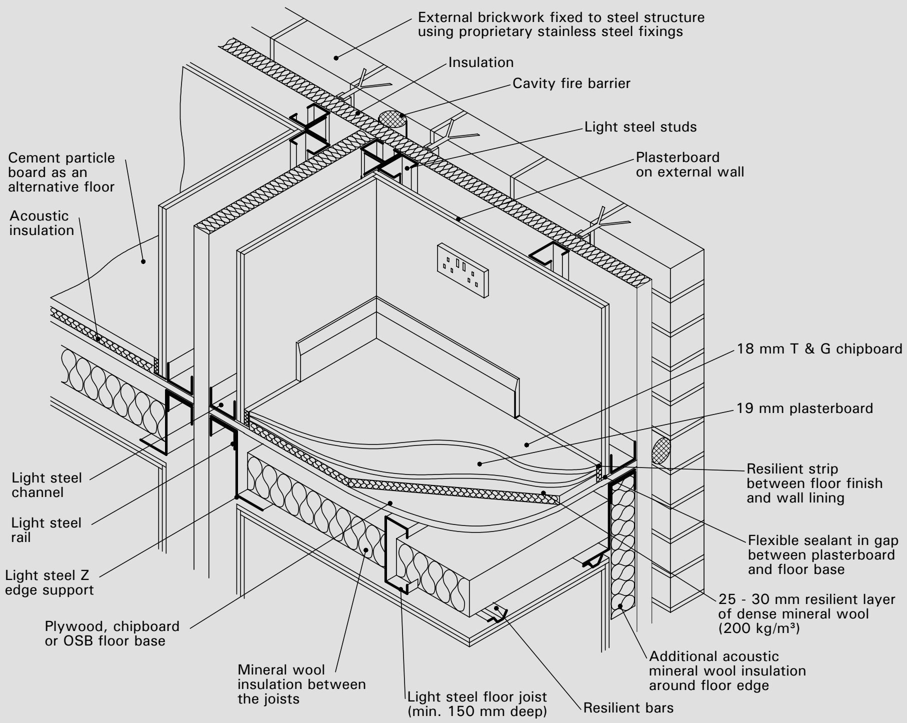
The Steel Construction Institute

Acoustic Performance of Light Steel Framed Systems

Meeting the new requirements of Part E of the Building Regulations (2003)

Technical Information Sheet



Typical isometric view of light steel wall and floor joists

M T Gorgolewski
BSc MSc PhD Dip Arch
G H Couchman
MA PhD CEng, MICE

- Acoustic performance is increasing in importance in residential buildings as developers and occupants demand higher standards.
- Amendments to Part E of the Building Regulations came into effect in July 2003. The new Regulations set more demanding requirements for the design of separating walls and floors between dwellings. This Technical Information Sheet sets out how the requirements can be satisfied in light steel framing.
- Light steel framing offers an efficient and effective way of constructing walls and floors with good acoustic performance.
- Light steel framing relies on the use of layers of mass with minimal rigid connections between them to achieve good acoustic performance.
- There are a variety of solutions for separating walls and floors that have repeatedly shown good performance when tested on site.
- For good acoustic performance in any construction, appropriate site practices are essential to ensure that details are correctly constructed, and that no unnecessary air paths are created through a wall or floor.
- The detailing of junctions between separating walls, separating floors and external walls is important to avoid flanking sound transmission.

INSIDE

Introduction to light steel framing

Steel construction is increasingly being used in residential apartment buildings and mixed-use developments where the benefits of speed, quality and off-site prefabrication are important.

Steel is a quality assured, accurate, high strength, long life, adaptable, recycled and recyclable material, manufactured to tight specifications. It does not suffer from twisting, warping or movement due to changes in moisture content. This results in easier fixing of linings and higher quality finishes, avoiding problems such as cracking around door architraves and skirtings, both initially and throughout the life of the building.

Structure

Light steel frames typically comprise C and Z shaped, galvanized cold-formed steel sections, usually 0.9 mm to 3.2 mm thick, produced by roll forming. For walls, C-sections are generally 75 mm to 150 mm deep, at 600 mm centres. Where necessary, back to back sections can be used for strengthening. For floors, 150 mm to 300 mm deep C-sections can typically span from 4 m to 6 m. These sections can also be fabricated into longer span trusses. On site, connections between the light steel elements may be made by self drilling, self tapping screws or bolts. In the factory, rivets and welding are also used.

Useable roof spaces and clear span internal spaces can be easily created without the need for internal load bearing walls, allowing for future adaptability and change of use.

Alternative construction methods include:

- Individual light steel components, assembled on site (stick build).
- Panels or sub-frames prefabricated in a factory and assembled together on site to create whole building structures (panel construction).
- Volumetric production of whole rooms with internal finishes and services fitted in the factory (modular construction).

Fire resistance

Fire resistance is achieved by the use of gypsum lining boards such as plasterboard or gypsum fibreboard. Generally, one layer of fire resistant plasterboard can achieve 30 minutes fire resistance, suitable for internal walls and envelope walls within individual dwellings. Two layers of plasterboard can achieve 60 minutes fire resistance, for separating walls and the ceilings of separating floors. Higher levels of fire resistance can be achieved with additional or thicker layers. Plasterboard linings are attached using bugle-headed self-drilling self-tapping screws to minimise the risk of popping of the fixings.

Thermal performance

Modern light steel frame construction in the UK incorporates a significant proportion of the insulation on the outside of the steel frame, leading to a 'warm frame' construction. This reduces the thermal bridging of the steel elements, minimising the risk of cold spots occurring on the internal surface of the wall. It also maintains the steel above the dew point temperature, avoiding interstitial condensation. Light steel framed buildings can readily meet and exceed the standards in Part L (2002) of the Building Regulations, and Robust Details are available to address the issues of thermal bridges at junctions.

Claddings

Light steel framing is suitable for use with a variety of claddings. For a traditional finish, an external leaf of brickwork (or other masonry finish) with a 50 mm clear cavity is used. The brickwork is tied back to the light steel structure using stainless steel wall ties located in vertical runners, fixed back to the light steel studs through insulation which is placed on the outside of the studs (Figure 1).

Alternatively, a variety of other claddings can be used, such as render, metal cladding, T&G timber boarding or tiling.

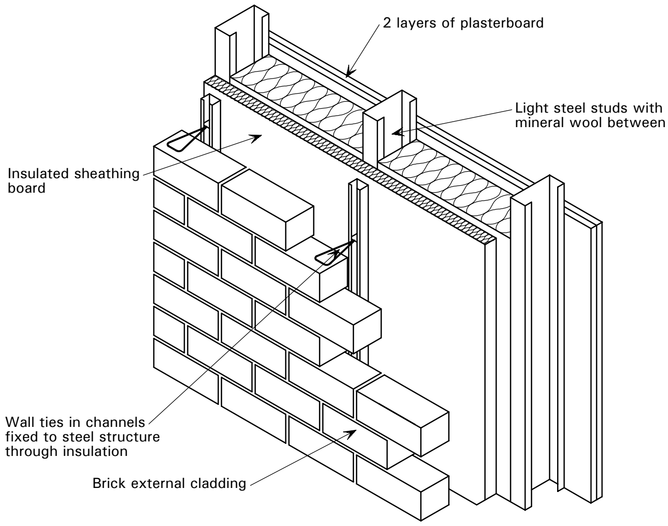


Figure 1 Typical external wall detail

Foundations

Light steel framing can be located on a variety of foundations. Strip or trench footings are most commonly used, with suitable levelling and locating devices to achieve the tighter tolerances for attaching the steel components. Mini-pile foundations are particularly suited for poor ground conditions and can achieve high levels of accuracy for line and level. The light steel framing is fixed through the bottom track to the concrete, or is restrained by straps fixed to the studs and concrete footings.

Acoustic design of lightweight construction

Lightweight constructions achieve very good acoustic performance using the following basic features of design:

- Several layers of mass provided by board materials such as plasterboard and chipboard
- Maximum structural separation between layers
- Decoupling of the structure as far as possible, using resilient bars and resilient layers
- Mineral quilt within spaces
- Sealed air paths through the construction

Light steel frame construction uses multiple layer constructions with minimal rigid connection between them, and with absorbent materials within the cavities between layers.

Figure 2 illustrates the importance of acoustic separation. Two single skin walls with relatively poor acoustic performance can be brought very close together and the overall acoustic insulation will be equivalent to roughly the sum of the insulation of the two walls. If however they are brought into contact with each other such that there are rigid connections, the acoustic performance drops considerably.

Thus, in light steel frame separating walls, a double leaf construction is usually used with a cavity between and minimum structural connection across it. The two layers act to a large extent as two independent walls, minimising the transfer of sound vibration across the structure. Mineral wool is used within the construction to act as an absorbent layer. As a result, acoustic insulation is nearly double that of each single stud construction. The gap between the two rows of studs can be as little as 25 mm.

Separating floors use board materials interspaced with resilient layers to achieve maximum decoupling and minimise transfer of sound vibration. Resilient bars are used to connect the ceiling plasterboard to the light steel joists. These reduce the rigidity of the connection and so reduce sound vibration transfer between the structure and plasterboard lining.

Lightweight construction uses dry assembly processes. Thus, it is important to ensure efficient sealing of possible air paths, which can otherwise lead to local sound transfer.

Low frequency sound

The sound insulation properties of walls or floors vary with the frequency of the noise. Generally, high frequencies are likely to be attenuated (reduced) more effectively than low frequencies. This gives the typical frequency curve shown in Figure 3. This curve is used to arrive at the single figure acoustic rating quote in the Building Regulations ($D_{nT,w}$).

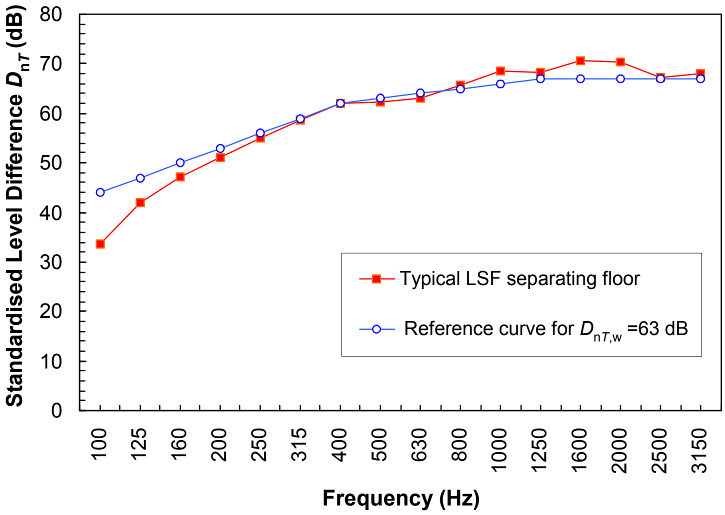


Figure 3 Graph of the airborne sound insulation of a light steel frame separating floor in one third octave bands

To maximise the benefit of double leaf construction, it is important that the cavity is sufficiently wide that the frequency at which performance diminishes is below the frequency range where the source of noise has most energy. It is generally recommended that a distance of 200 mm is maintained between the plasterboard layers in adjacent rooms.

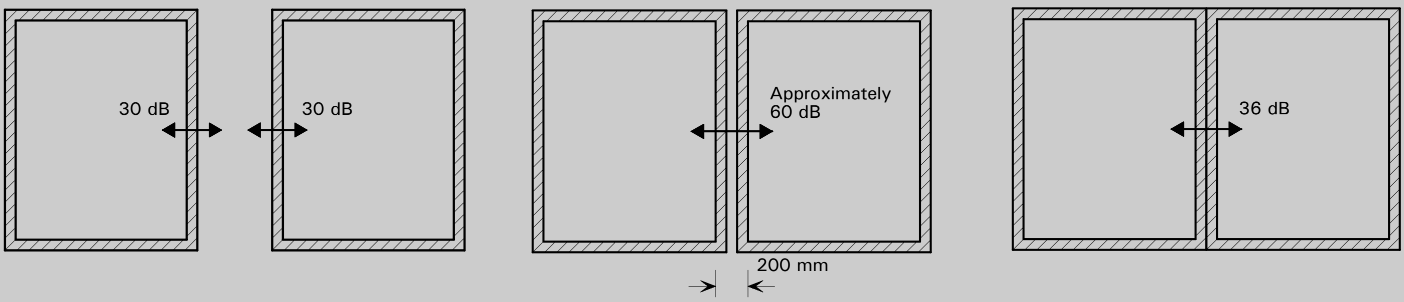


Figure 2 Schematic showing the principle of double layer construction with associated acoustic benefits

Requirements of Part E of the Building Regulations

Approved Document E (2003 Edition) sets out minimum standards of acoustic performance for walls and floors between dwellings (separating walls and floors) that satisfy the requirements of Part E of the Building Regulations. The 2003 amendments impose more demanding standards for the control of noise in buildings. These mainly concern residential buildings, both dwellings and other building which contain 'rooms for residential purposes' such as hotels, hostels and buildings where people may sleep. School buildings are also affected by the new requirements.

Approved Document E, which also provides guidance on how the requirements can be met, came into effect in July 2003. The requirements for site testing of dwellings have been delayed until January 2004.

The requirements cover:

- Acoustic insulation of separating walls and floors between newly built dwellings, and dwellings formed by a material change of use.
- Acoustic insulation between hotel rooms, boarding house rooms, and other rooms used for residential purposes such as student halls of residence and key worker accommodation, formed by new-build or by a material change of use.
- Acoustic insulation between rooms within a dwelling formed by new-build or by a material change of use.
- Acoustic characteristics of common parts of apartment buildings.
- Acoustic characteristics of schools.

Single figure ratings

The performance standards include airborne sound insulation of walls between dwellings (separating walls), and both airborne sound insulation and impact sound transmission for floors between dwellings (separating floors). These are set out in Table 1. The performance standard for walls and floors within dwellings should have a minimum laboratory value (not site tested) for airborne sound insulation (R_w) of at least 40 dB.

Until 2003, the Standardised Weighted Level Difference $D_{nT,w}$ was used as the single figure index for airborne sound insulation in the Building Regulations. The 2003 Approved Document E introduced a new measurement index, $D_{nT,w} + C_{tr}$ to replace the existing $D_{nT,w}$ for airborne sound. The C_{tr} term is a spectrum adaptation term, which adjusts the index taking additional account of the noise spectrum in residential buildings. The C_{tr} term is generally negative and reflects particularly the performance at the low frequency end of the spectrum. Thus, a $D_{nT,w} + C_{tr}$ rating is generally lower than the $D_{nT,w}$ rating for the same construction. Due to the difference in performance over the spectrum, the $D_{nT,w} + C_{tr}$ index is likely to be more demanding for lightweight constructions.

Impact sound transmission is measured by $L'_{nT,w}$, the Standardised Weighted Impact Sound Pressure Level.

Site testing

Approved Document E (2003 Edition) introduced a requirement for pre-completion site testing of acoustic performance. At least 1 in 10 of every type of separating wall and floor at all residential construction sites are to be tested to show that the minimum performance standards in Table 1 have been met. The requirement for testing applies to residential buildings of all kinds, both purpose built and formed by a material change of use. However, for new-build houses and flats only, there may be an alternative option to use Robust Standard Details.

Robust Standard Details

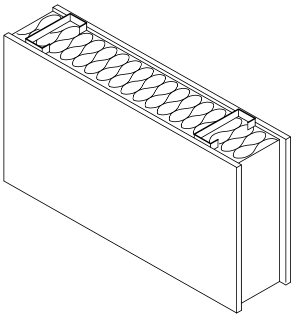
Robust Standard Details (RSDs) are being developed as an alternative way of showing compliance for new houses and flats only, which avoids site testing. They comprise standard details that have undergone a thorough development and testing procedure and have been shown to have acoustic performance considerably in excess of the minimum standards of the Building Regulations. A range of light steel frame Robust Standard Details are currently under development. An announcement about the possibility of using RSDs instead of site testing is expected in late 2003.

Table 1 Minimum performance standards of Approved Document E (2003) for site measurement

Building type	Separating walls	Separating floors	
	$D_{nT,w} + C_{tr}$	$D_{nT,w} + C_{tr}$	$L'_{nT,w}$
Purpose built dwellings	≥45 dB	≥45 dB	≤ 62 dB
Dwellings formed by material change of use	≥43 dB	≥43 dB	≤ 64 dB
Purpose built rooms for residential purposes	≥43 dB	≥45 dB	≤ 62 dB
Rooms for residential purposes formed by material change of use	≥43 dB	≥43 dB	≤ 64 dB

The Steel Construction Institute

Walls - typical constructions and performance

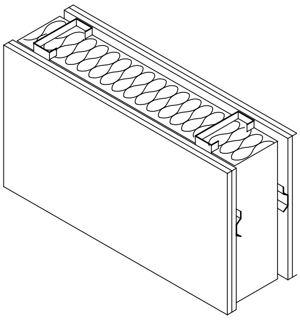


Suitable for an internal wall within a dwelling

- One layer of gypsum board (≥ 10 kg/m^2)
- Light steel studs
- 25 mm (min) unfaced mineral wool quilt or slab (10 to 60 kg/m^3)
- One layer of gypsum board (≥ 10 kg/m^2)
- *R_w = 42 to 45 dB   Fire rating = 30 minutes*

- 2 layers of gypsum board
- Light steel studs
- 25 mm (min) unfaced mineral wool quilt or slab (10 to 60 kg/m^3)
- 2 layers of gypsum board

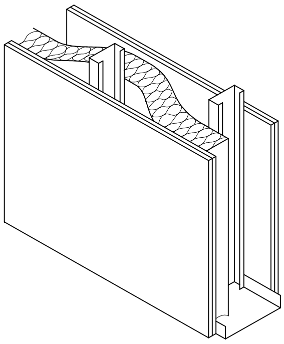
R_w = 48 to 53 dB   Fire rating = 60 minutes



May be suitable for a separating wall (depending on flanking conditions)

- 2 layers of gypsum board (≥ 23 kg/m2)
- Proprietary resilient bars
- Light steel studs (min 100 mm)
- 50 mm (min) unfaced mineral wool quilt or slab (10 to 60 kg/m^3)
- Proprietary resilient bars
- 2 layers of gypsum board (≥ 23 kg/m^2)

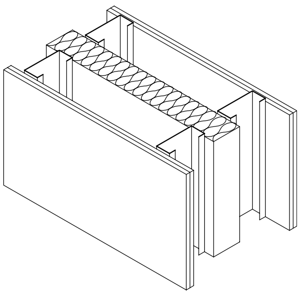
$D_{nT,w} + C_{tr}$ = 50 dB   Fire rating = 60 minutes



May be suitable for a separating wall (depending on flanking conditions)

- 2 layers of gypsum board (≥ 23 kg/m^2)
- Staggered stud light steel frame system with every second stud connected to the lining on one side
- 50 mm (min) unfaced mineral wool quilt or slab (10 to 60 kg/m^3) around the studs
- 2 layers of gypsum board (≥ 23 kg/m^2)

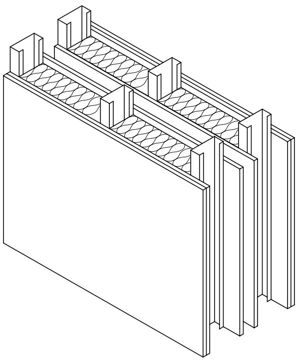
$D_{nT,w} + C_{tr}$ = 48 to 50 dB   Fire rating = 60 minutes



Suitable for a separating wall

- 2 layers of gypsum board (≥23 kg/m^2)
- Light steel studs
- 50 mm (min) unfaced mineral wool slab (30 to 60 kg/m^3) between the studs (with minimal structural fixings between studs)
- Light steel studs
- 2 layers of gypsum board (≥23 kg/m^2)

$D_{nT,w} + C_{tr}$ = 52 to 56 dB   Fire rating = 60 minutes



Suitable for a separating wall

- 2 layers of gypsum board (≥23 kg/m^2)
- Light steel studs with 50 mm (min) unfaced mineral wool quilt or slab (10 to 60 kg/m^3)
- Optional inner sheathing of 10 mm plasterboard or OSB
- 25 mm (min) space between the leaves
- Optional inner sheathing of 10 mm plasterboard or OSB
- Light steel studs with 50 mm (min) unfaced mineral wool quilt or slab (10 to 60 kg/m^3)
- 2 layers of gypsum board (≥23 kg/m^2)

$D_{nT,w} + C_{tr}$ = 52 to 58 dB   Fire rating = 60 minutes

Separating walls

Separating walls must meet the requirement for airborne sound insulation only. The most common separating walls using light steel framing have two skins structurally and physically independent of each other in order to provide the necessary acoustic separation. In effect, two walls are constructed along side one another and structural or rigid links between them that could transmit acoustic vibrations are avoided.

The essential requirements for good acoustic insulation of separating or party walls in lightweight dry construction are:

- A double leaf separating wall construction with a gap between the frames of at least 25 mm.
- An independent structure for each leaf with minimal connections between.
- A minimum weight of 23 kg/m^2 in each leaf (e.g. two layers of 15 mm firecheck or soundcheck plasterboard, with staggered joint to avoid air paths).
- A minimum of 200 mm separation between the two plasterboard inner surfaces.
- Good sealing of all joints and junctions to avoid air paths.
- A minimum 50 mm thick unfaced mineral fibre quilt (10 to 60 kg/m^3) within both of the leaves or between the leaves.
- No back to back service penetrations.
- Electrical sockets and switch boxes should be staggered and backed with two layers of plasterboard of density 23 kg/m^2 (see page 11).
- Where the separating wall meets a floor (including ground floor) the floor structure should not be continuous across the separating wall.

Resilient bars used to attach the plasterboard to the light steel framing can reduce the direct transfer of sound into the structure further, and lead to enhancement of acoustic insulation.

Increasing the mass of each plasterboard layer by increasing density or thickness will further improve acoustic insulation.

In some applications, single stud separating walls with two layers of 15 mm soundcheck plasterboard fixed to both sides using resilient bars, or staggered stud walls can be used (see page 5) However, care needs to be taken at all junctions, as flanking transmission is more difficult to avoid. This construction is used more often in non load-bearing applications.

See also the Section on flanking details.

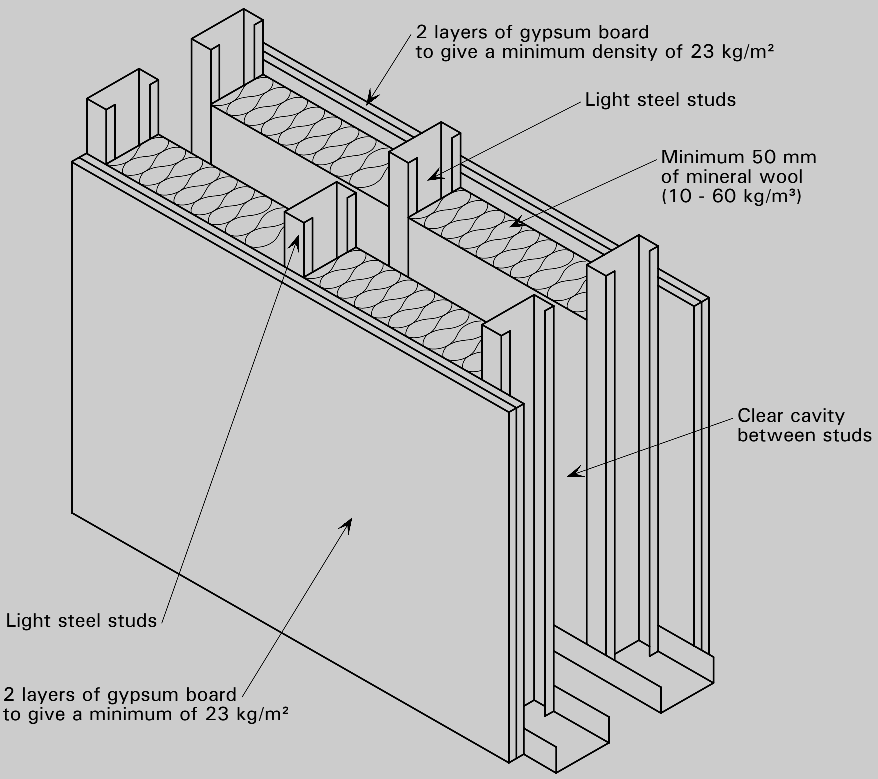
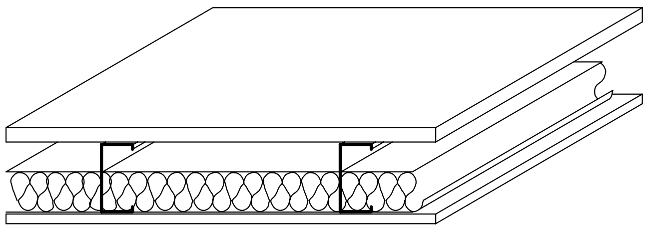


Figure 4 Typical double leaf separating wall construction

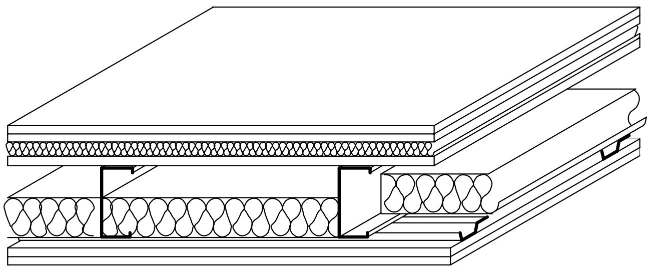
Floors - typical constructions and performance



Suitable for internal floors within a dwelling

- 18 – 22 mm chipboard (or similar) to give 15 kg/m^2
- Light steel joists
- 100 mm of unfaced mineral wool quilt (10 to 30 kg/m^3) between the joists
- 12 mm gypsum board (≥10 kg/m^2)

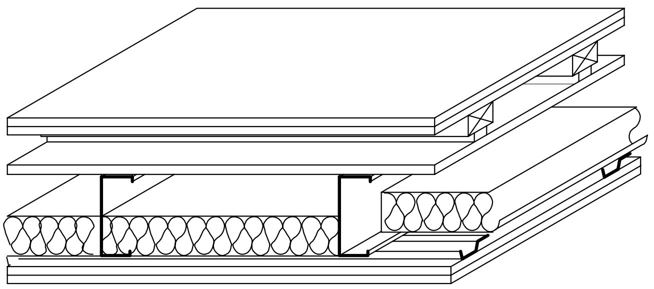
R_w = 42 dB
Fire rating = *30 minutes*



Suitable for use as a separating floor

- 18 mm chipboard or similar
- 19 mm gypsum board
- 25 mm to 30 mm of resilient layer (mineral wool 120 to 200 kg/m^3)
- Chipboard or OSB base
- Light steel joists (min 150 mm deep)
- 100 mm of unfaced mineral wool quilt (10 to 30 kg/m^3) between the joists
- Proprietary resilient bars
- 2 layers of gypsum board (≥23 kg/m^2)

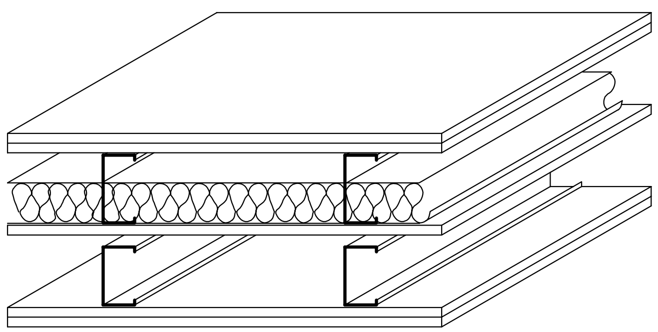
$D_{nT,w} + C_{tr}$ = 48 to 52 dB $L'_{nT,W}$ = 54 to 57 dB
Fire rating = *60 minutes*



Suitable for use as a separating floor

- 18 mm chipboard or similar
- 19 mm gypsum board
- Proprietary timber batten bonded to foam strip (with insulation between – not beneath batten)
- Chipboard or OSB base
- Light steel joists (min 150 mm deep)
- 100 mm of unfaced mineral wool quilt (10 to 30 kg/m^3) between the joists
- Proprietary resilient bars
- 2 layers of gypsum board (≥23 kg/m^2)

$D_{nT,w} + C_{tr}$ = 50 to 52 dB $L'_{nT,W}$ = 54 to 57 dB
Fire rating = *60 minutes*



Suitable for use as a separating floor

- 18 mm chipboard or similar
- 19 mm gypsum board
- Light steel floor joists
- 100 mm of unfaced mineral wool quilt (10 to 30 kg/m^3) between the joists
- 10 mm OSB or similar
- Air space between floor and ceiling joists
- Light steel ceiling joists
- 2 layers of gypsum board (≥23 kg/m^2)

$D_{nT,w} + C_{tr}$ = 46 to 54 dB $L'_{nT,W}$ = 56 to 60 dB
Fire rating = *60 minutes*

Separating floors

For separating floor constructions between dwellings, both airborne and impact sound transmission must be addressed. High levels of acoustic insulation are achieved in lightweight floors by using a similar approach as outlined for walls. This involves separating the floor and ceiling finish layers from the underlying structure as far as possible with resilient layers that reduce the transfer of sound vibration.

The resilient layer beneath the floor finish contributes to insulation against both airborne and impact sound. The resilient bars fixed to the underside of the steel joists partially isolate the dry lining layer from the structure. A mineral wool quilt in the cavity between the steel joists provides sound absorption.

A typical floor will consist of light steel joists (generally over 150 mm deep), with a mineral wool quilt (10 to 30 kg/m^3) between to act as an absorption layer. A structural floor deck is laid on the joists comprising either a timber based board (chipboard, OSB or plywood) or a profiled steel deck.

On the structural deck, an acoustic platform or raft floor is usually installed:

A *platform floor* consists of a dense mineral wool (120 to 200 kg/m^3) resilient layer, usually 30 to 50 mm thick, covered by a sheet of plasterboard (to provide additional mass) and the final floor finish board (usually chipboard).

A *raft floor* consist of proprietary timber battens which have a resilient foam bonded to them, and may have a thin (20 mm) mineral wool quilt between.

They are covered by a sheet of plasterboard and the final floor finish board (usually chipboard). Care should be taken that screws do not penetrate through the resilient layer.

Alternatively, it may be possible to use a lightweight screed on a resilient layer such as mineral wool or a thin proprietary foam.

The ceiling usually consists of two layers of plasterboard with a minimum overall mass of 23 kg/m^2 (such as 2 layers of 15 mm sound-check plasterboard), fixed to resilient bars that are fixed to the underside of the steel floor joists. The resilient bars reduce the rigidity of the connection between the plasterboard and the structure above, reducing the acoustic vibration that is transmitted.

Impact sound transmission in lightweight floors is reduced by:

- Specifying an appropriate resilient layer with correct dynamic stiffness under imposed loadings.
- Ensuring that the resilient layer has adequate durability.
- Isolating the floating floor surface from the surrounding structure at the floor edges. This can be achieved by returning the resilient layer up the edges of the walking surface (see Section on flanking transmission).

Further improvements in the design of lightweight floors can be achieved by separation of the floor structure from the ceiling structure, using separate floor and ceiling joists.

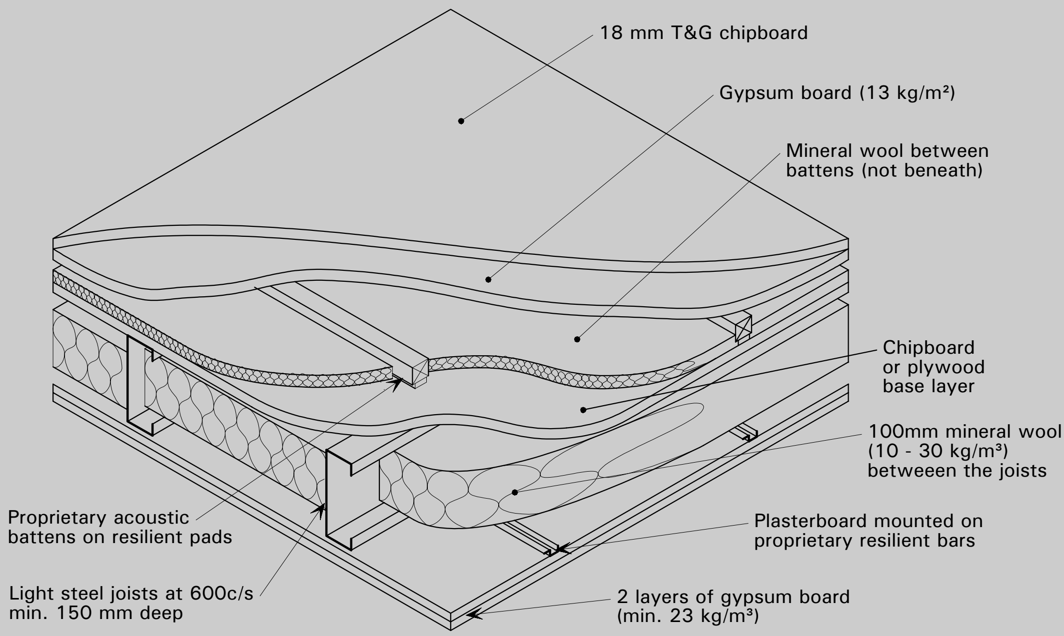


Figure 5 Typical separating floor using a built up platform floor

Flanking transmission

Flanking transmission occurs when airborne sound travels around the separating element of structure through adjacent building elements such as external walls. Flanking transmission is difficult to predict because it depends on the details of the floor and wall junction and the quality of construction on site. It is possible for a building to have separating walls and floors built to a high specification but for considerable sound to be transmitted through flanking elements that are continuous across the separating elements.

To avoid flanking transmission the following measures are suggested:

- The light steel frame structure of an external wall should not be continuous across junctions with a separating wall. A physical break should be maintained, and any sheathing board should also be discontinuous at this point (Figure 6).
- Where a separating floor meets an external or party wall, the void within the wall between the studs should be filled with mineral wool to at least 300 mm above and below the separating floor (Figure 7).
- Direct contact between the wall lining and floor finish board should be avoided, to reduce vibration transfer. Wall plasterboard linings should be stopped about 5 mm above the floor decking. The gap should be filled with acoustic sealant (Figure 7).
- Internal non-load bearing walls within an apartment should, if possible, not break through the ceiling of a separating floor, and should not touch the steel floor joists.
- Where insulation is placed in the thickness of the steel studs in a separating wall, additional mineral wool insulation should be placed in the cavity between the frames at intersections with external walls and separating floors (Figure 8).
- Avoid any air paths through separating elements. Seal at junctions and at service openings.
- The joints in successive layers of lining board should be staggered.
- Any gaps should be sealed with acoustic sealant.

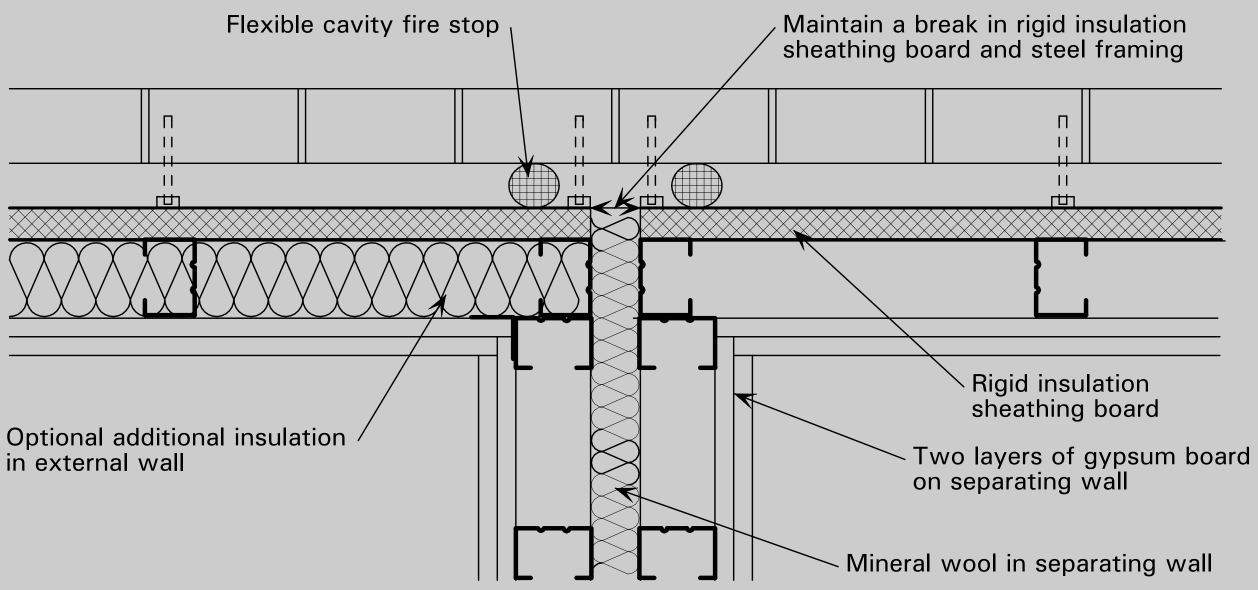


Figure 6 Typical junction of separating wall and external wall

Flanking details

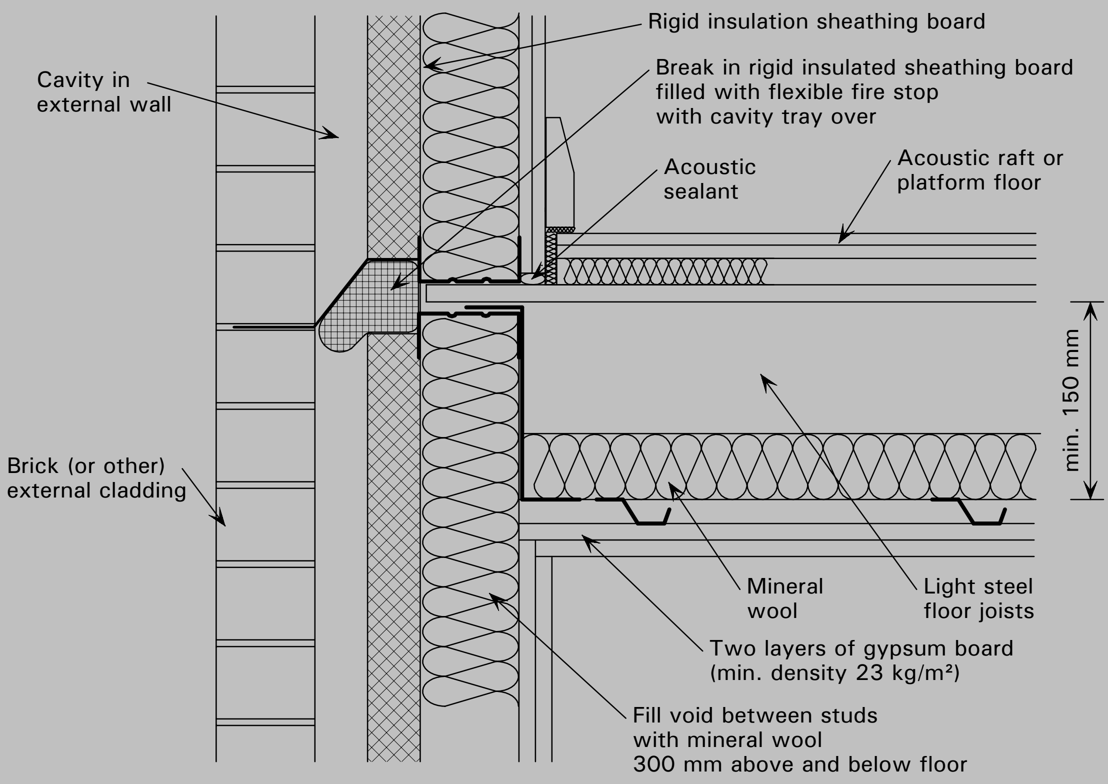


Figure 7 Typical separating floor to external wall detail

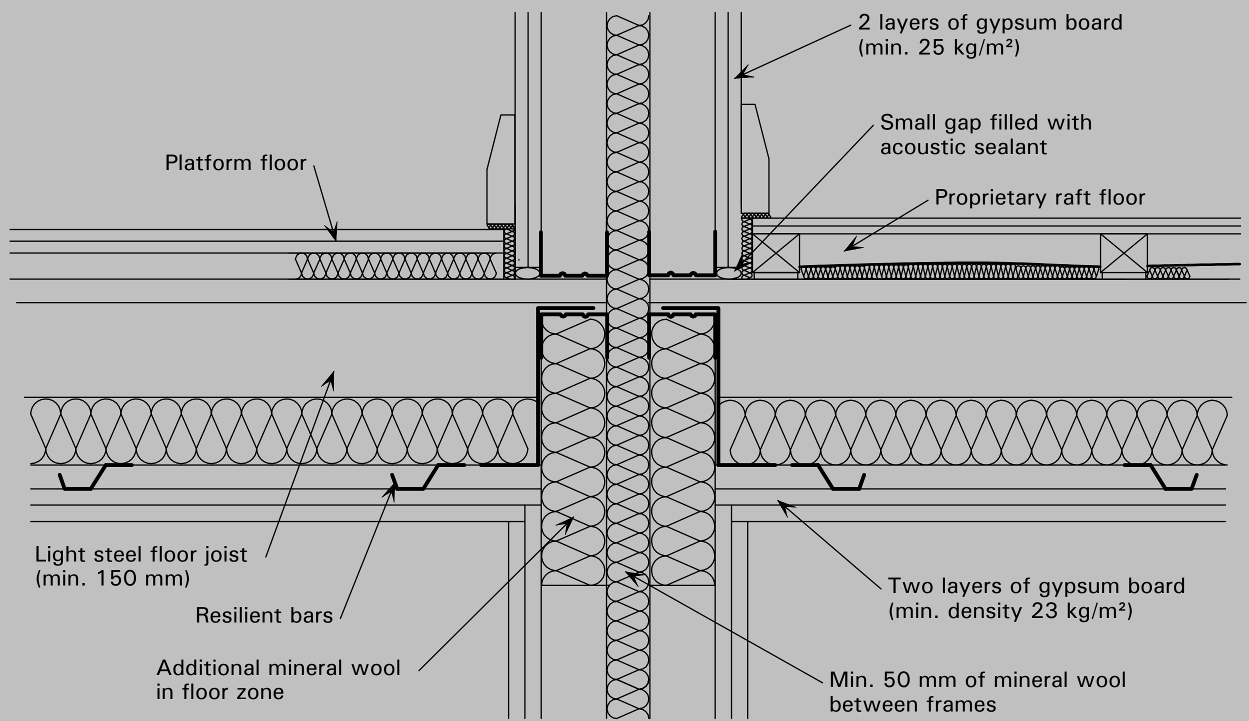


Figure 8 Typical separating wall to separating floor detail

Service penetrations

The Building Regulations allow wall and ceiling linings to be penetrated so that services can pass through provided that fire and acoustic integrity is maintained. Since acoustic performance can be particularly affected by air paths through the construction, special care is required around service penetrations.

The following aspects should be considered:

- The location of electrical sockets and switches should be carefully considered and back to back installations should be avoided, in separating walls.
- Where electrical sockets in separating walls cannot be avoided they should be backed by two layers of plasterboard and mineral wool (see Figure 9).
- Seals, acoustic quilts, and cavity barriers should be used where appropriate to seal air gaps.
- Down-lighters in separating floors should be avoided as they create a significant penetration through the plasterboard lining causing acoustic, fire and air-ightness problems.
- Where down-lighters cannot be avoided they should be backed by 2 layers of gypsum board (>23 kg/m^2).
- Services in the floor can be accommodated in a raft floor, between the acoustic floor battens.
- Services within the resilient material of a platform floor should be avoided.

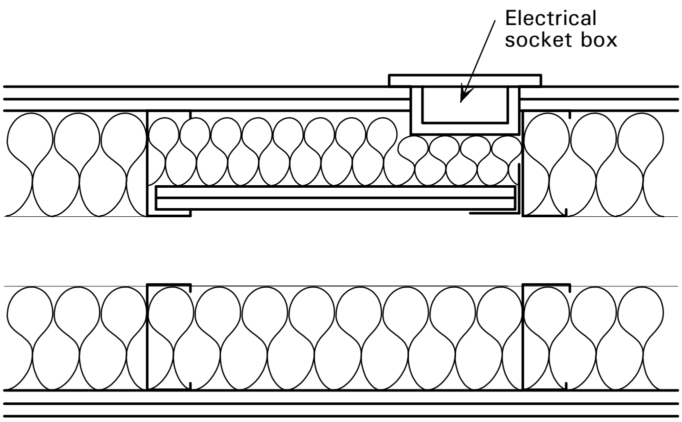


Figure 9 Integration of electrical socket and switch boxes in separating walls

Site acoustic tests

Following the 2003 revisions of Part E of the Building Regulations, pre-completion site testing is required for all constructions unless Robust Standard Details are accepted, and used, in newly built houses and apartments. These tests must be carried out when the building is largely complete, with doors, skirting boards, electrical sockets and switches in place, but unfurnished and without a carpet (except with certain concrete and composite floors). Cupboards and kitchen units should have their doors open and be unfilled. The site must be reasonably quiet during the tests.

Site measurements should be carried out in accordance with BS EN ISO 140-4-1998 for airborne sound and BS EN ISO 140-7-1998 for impact sound.

For airborne sound measurements, a steady sound of a particular frequency is generated in the source room and the sound pressure level in the source and receiving rooms are compared to ascertain the reduction.

For impact sound measurements a standard impact sound source (tapping machine) is used to strike the floor and the impact sound pressure level is measured in the room below.

For both airborne and impact measurements, the receiving room levels must be corrected to 0.5 s reverberation time before comparison with the performance standard. Measurements are taken at 16 one third-octave frequency bands across the hearing spectrum from 100 Hz to 3150 Hz.

To convert the site measurements into a single figure rating, the method set out in EN ISO 717 (Parts 1 and 2) compares the set of 16 measured results with a reference curve. The rating is made by considering only those measured values which fall short of the reference curve and choosing a reference curve where the sum of the negative deviations (over the 16 measured third-octave bands) is as large as possible but not greater than 32 dB. The value of the reference curve at 500 Hz gives the single figure rating. For rating measurements of airborne insulation C_{tr} must also be calculated from the measured figures.

Light steel framing checklist

Acoustic performance

- A variety of proven, efficient, lightweight separating wall and floor constructions can be built.
- Good acoustic insulation is achieved through the use of several layers of mass provided by board materials such as plasterboard and chipboard with minimal rigid connections between them.
- Decoupling of the structure is achieved using double leaf construction, resilient bars and resilient layers.
- Double leaf separating walls with mineral wool quilt between and two layers of plasterboard either side have an established record of good acoustic performance.
- Separating floors require plasterboard ceilings to be fixed on resilient bars to increase decoupling.
- Acoustic raft or platform floors should be used on the separating floors to deal with impact sound transmission.
- Details have been developed for junctions between separating walls and floors and external walls to avoid flanking transmission.
- Good site practice is important to ensure that details are correctly constructed.

Sustainability

- Low waste in construction.
- Less materials used.
- Steel is highly recycled and recyclable at end of life.
- Adaptability for changing future requirements.
- Benefits of off-site manufacture.

Energy efficiency

- High levels of insulation easily included.
- Low U-values easily achieved.
- Thermal bridging avoided.
- Potential for air-tight construction.
- Robust standard details developed.
- Lower operating costs for the owner.

Rethinking Construction

- Greater speed of construction.
- Increased value to client.
- Increased productivity.
- Less ‘call backs’ for making good.
- Increased rate of return for the builder.
- Predictability of process.
- Increased quality.

Sources of information

The Steel Construction Institute
Tel: 01344 623345
www.steel-sci.org

Corus Construction Centre
Construction Advisory Service
Tel: 01724 405060
www.corusconstruction.com

Corus Colors
Cladding Advisory Service
Tel: 01244 892434
www.colorcoat-online.com

Relevant publications

Building design using cold formed steel sections: Light steel framing in residential construction (P301), SCI, 2001

Building design using cold formed steel sections: Acoustic insulation (P128), SCI, 1993

Limiting thermal bridging and air leakage: Robust construction details for dwellings and similar buildings
DTLR/DEFRA, TSO, 2001

Energy efficient housing using light steel framing (P307)
SCI, 2002

Case studies on light steel framing (P176), SCI, 1997

U-values for light steel frame construction (BRE Digest 465)
Building Research Establishment 2002

This project was supported by Corus Colors

Web sites:

For information on light steel: www.steel-sci.org/lightsteel

For 24x7 information on steel construction : www.steelbiz.org

For information on Robust Standard Details: www.rsd.napier.ac.uk

The Steel Construction Institute
Silwood Park, Ascot,
Berks, SL5 7QN
Tel: 01344 623345 Fax: 01344 622944

SCI P320 *Acoustic performance of light steel framing* ISBN 1 85942 143 1