soundtesting
acoustic consultancy & air leakage specialists

Document E Design Report

Proposed Residential Apartments
Bank Street
Cheadle
Staffordshire

Date of Report: Thursday 15th October 2015

Reference: 8350D Rev 2

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1.0 General Information

1.1 Site Address

Proposed Residential Apartments
Bank Street
Cheadle
Staffordshire

1.2 Client Instructing Survey

J. Harper & Sons (Leominster) Limited
Beeches Road
Rowley Regis
West Midlands
B65 0BB

1.3 Date of Survey

Friday 29th April 2016

1.4 Acoustic Consultant

	Name	Position	Signature	Date
Report Prepared By	M S Hamer MIOA	Acoustic Consultant		
For and on behalf of: Sound Testing.Co.Uk Ltd				

2.0 Introduction

The proposal is the redevelopment of redundant allotment land and buildings to affordable housing, consisting of 42 dwellings consisting of 30 new builds and conversion of 5-7 Bank Street into 12 flats, and including demolition of redundant workshops.

2.1 A Sound Insulation Assessment

Soundtesting.co.uk Ltd have carried out a site survey of the current building and discussed the proposals with the client. The site survey was focused on assessing the current building elements and associated construction details which will become separating elements needing to meet the requirements of Building Regulations Document E 2003. A number of airborne sound insulation tests were carried out between the existing ground floor commercial and the proposed first floor flats to assess the performance of the existing constructions.

This report will state the current construction elements and required improvements, and will refer to guidance contained within Approved Document E Resistance to the passage of sound.

3.0 Assumptions & Limitations

a. All suggested specifications require a good level of workmanship and for materials to be installed as the manufacture intends. Any poor workmanship may lead to weaknesses in the sound insulation provided by the building elements.
b. All diagrams within this report are not to scale.

4.0 Criteria

4.1. Approved Document Part E The resistance to the passage of sound

Table 2: A summary of the guidance noise levels can be found below:

Approved Document Part E (ADE) Performance Standards			
Purpose built dwelling-houses and flats			
Separating walls:	Airborne	$D_{nT,w} + C_{tr}$	45dB or higher
Separating floors:	Airborne	$D_{nT,w} + C_{tr}$	45dB or higher
Separating floors:	Impact	$L'_{nT,w}$	62dB or lower
Dwelling- houses and flats formed by material change of use			
Separating walls:	Airborne	$D_{nT,w} + C_{tr}$	43dB or higher
Separating floors:	Airborne	$D_{nT,w} + C_{tr}$	43dB or higher
Separating floors:	Impact	$L'_{nT,w}$	64dB or lower
Purpose built rooms for residential purposes			
Separating walls:	Airborne	$D_{nT,w} + C_{tr}$	43dB or higher
Separating floors:	Airborne	$D_{nT,w} + C_{tr}$	45dB or higher
Separating floors:	Impact	$L'_{nT,w}$	62dB or lower
Rooms for residential purposes formed by material change of use			
Separating walls:	Airborne	$D_{nT,w} + C_{tr}$	43dB or higher
Separating floors:	Airborne	$D_{nT,w} + C_{tr}$	43dB or higher
Separating floors:	Impact	$L'_{nT,w}$	64dB or lower

4.2 Criteria Summary

The development will be required to meet the performances stated in Building Regulations Approved Document E 2003, for Dwelling houses and flats formed by material change of use.

5.0. Site Description

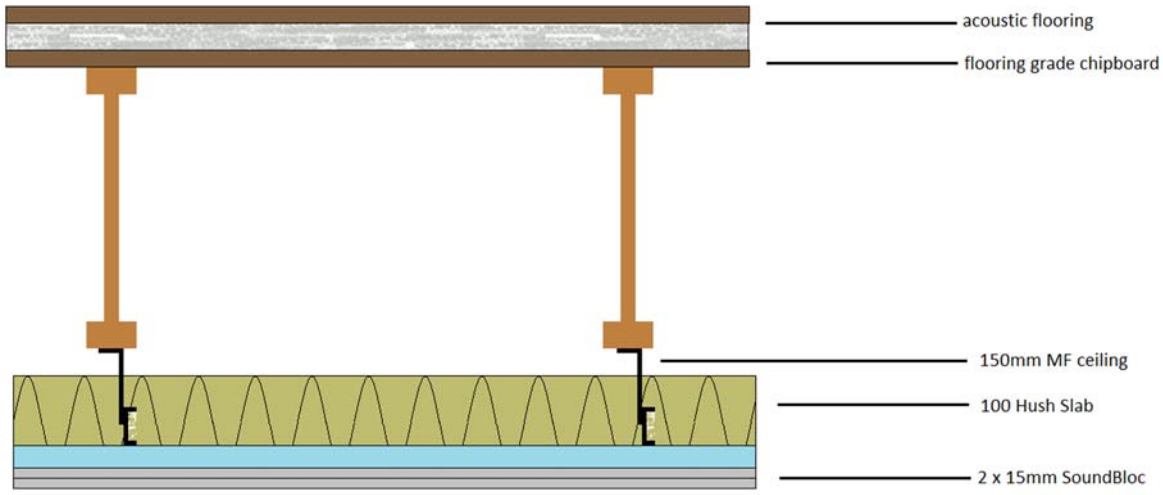
The existing building consists of mainly solid brick walls assumed to be 200mm thick; however in some areas the walls appear to be only 100mm. Some new walls are to be constructed. The architect's drawings initially showed that these wall are to be constructed of twin stud, however a number of masonry cavity walls are being introduced instead. There are currently timber joist floors. We understand that the external walls will be lined for thermal improvement. We are informed that all timber joists are to be removed and new separating floors will constructed consisting of 241mm engineered timber 'I' joists on wall hangers.

6.0 Recommendations

6.1 Separating Floors

We recommend that an MF ceiling should be installed beneath the new joists on acoustic hangers. 2 x 15mm SoundBloc plasterboard should be installed to the hangers to create the ceiling. 100mm Hush Slab 45kg/m3 or similar should be installed in the ceiling void. An acoustic floor should be installed to the floor above, in this situation, we would suggest the use of Hush-panel 28 or similar.

Please note that the below diagram is not to scale.



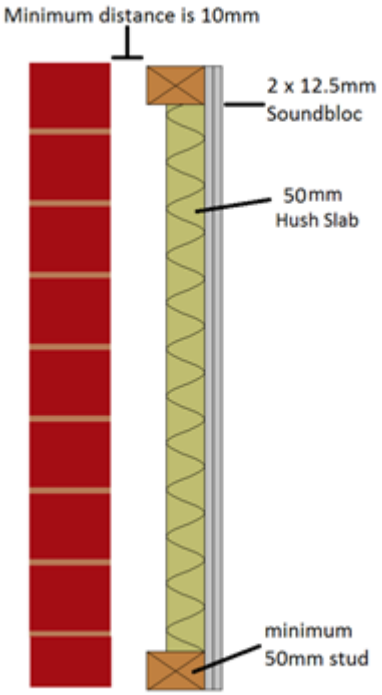
Do:

1. Seal the perimeter of the independent ceiling with sealant.
2. Stagger the joints of the Soundbloc layers on the new ceiling detail

6.2 Separating Walls

6.2.1 Separating Wall Type 1

The existing 100mm masonry brick walls across the development which are to become separating walls need to be independently lined on one side as per the below diagram when they are being upgraded. If the walls are less than 100mm thick the lining should be on both sides

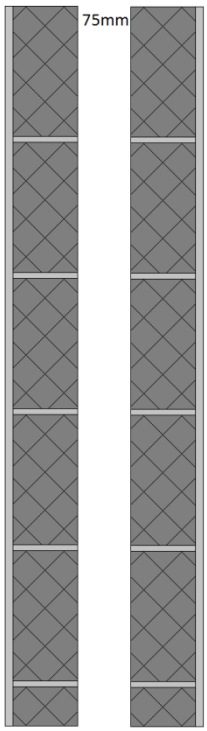


Do:

1. Apply remedial work to the existing construction
2. Block up any existing doorways with brick; consisting of the same approximate mass as the existing wall. Use high density concrete blocks.
3. Stagger the plasterboard joints on the new independent wall.
4. Seal the perimeter of the independent studs with sealant.

6.2.2 Separating Wall Type 2 - Concrete Walls E-WM-4

We understand that the new separating walls may consist of dense block as the detail in Robust Detail E-WM-4. The wall is to run continuously through the building.



section

Block Density: at least 1600kg/m3

Wall ties: Approved Document E 'Tie type A'

Cavity width: 75mm

Block thickness: 100mm (min) each leaf

Do:

1. Keep cavity wall ties (and insulation) free from mortar droppings and debris

2. Fully fill all blockwork joints with mortar.

3. Make sure there is no connection between the two leaves except for wall ties and foundation

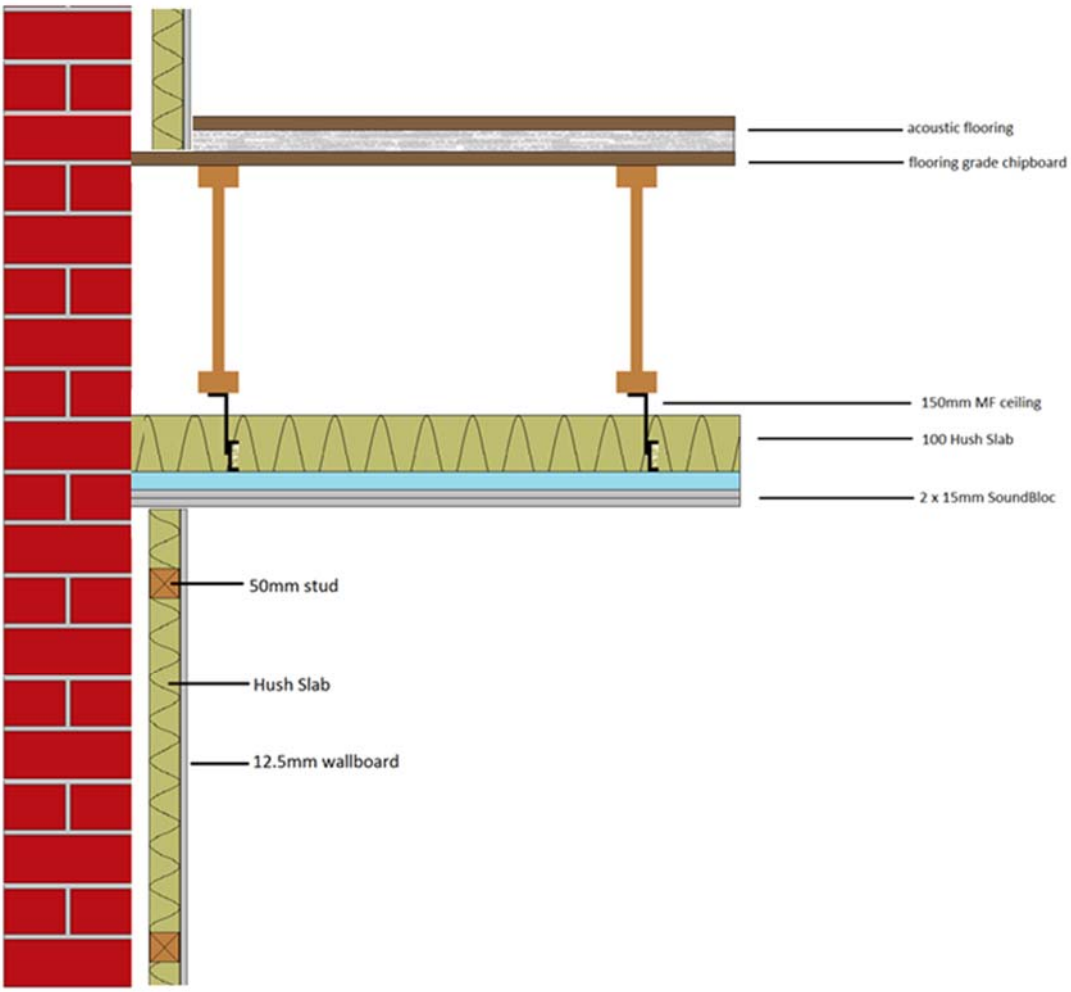
4. Keep any chases for services to a minimum and fill well with mortar. Stagger chases on each side of the wall to avoid them being back to back.

5. Ensure that render is applied to the complete face of each leaf with a scratch finish (it may be omitted within the floor joist zone).

6.3 Critical Junctions

6.3.1 Separating Floor junction with external wall or single brick separating wall

The below diagram demonstrates how the new ceilings for the separating floor, junction with the external walls and single existing brick walls. It is critical to install the MF ceiling before the wall linings. Please note we have detailed Hush-Slab 50 as the insulation on the wall lining, which in the case of the external wall can be substituted for a rigid foam thermal product.



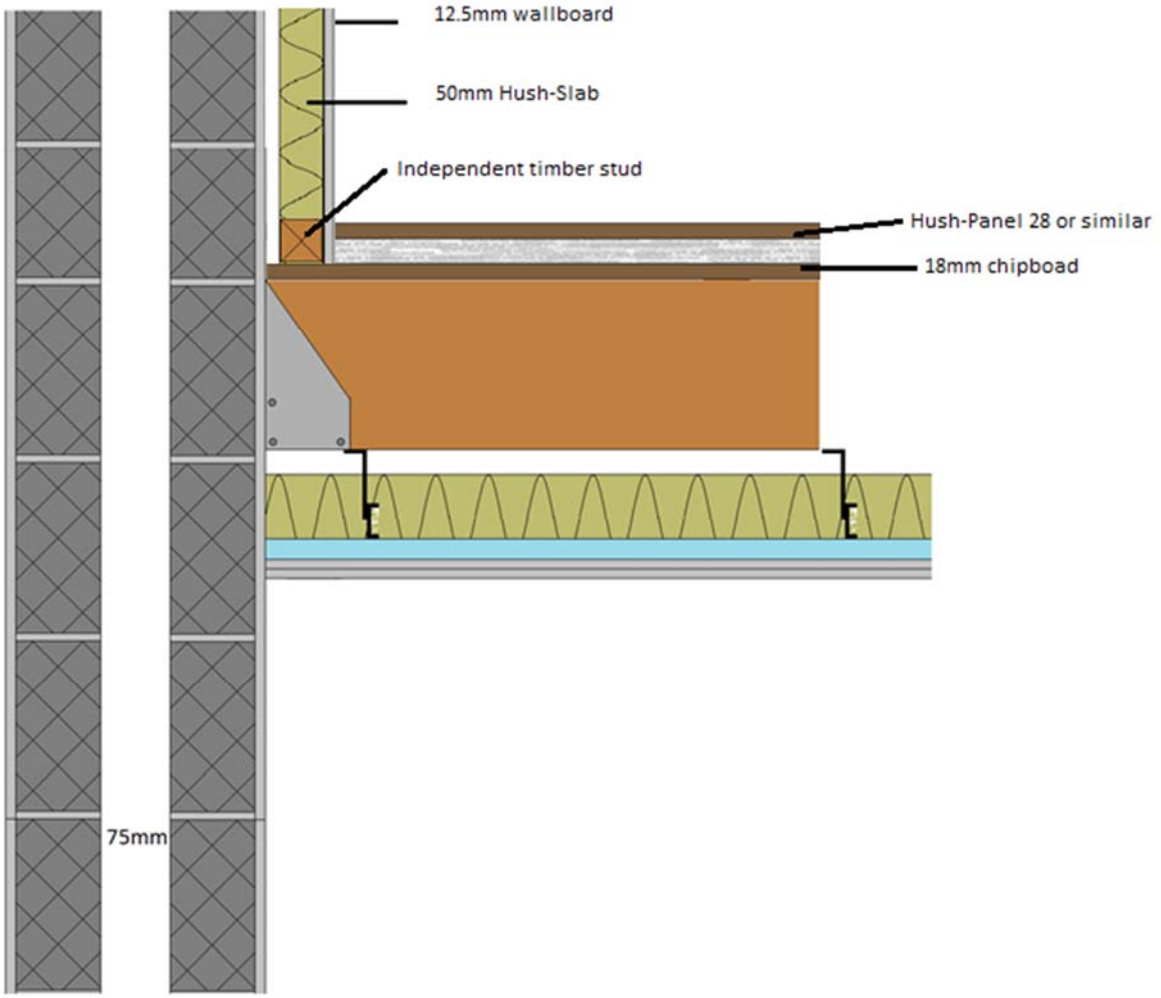
Do:

1. Stagger the plasterboard joints on the new independent wall.
2. Seal the perimeter of the independent studs with sealant.

6.3.2 Flanking Issues for new separating wall type 2.

There is a potential issue for flanking sound transmission from floor to floor through the new concrete block wall. The following drawing shows a detail of treatment to the first floor only.

An independent stud should be installed to the block walls on the first floor only and should consist of a 50mm timber or metal stud at least 10mm away from the block wall. The stud should be tightly filled with 50mm Hush Slab 45kg/m3 or similar making sure not to bridge the void. A layer of 12.5mm plasterboard should be fixed to the outer side of the stud.



The following drawing shows where the independent stud should be built on the first floor. Independent walls marked in Red.

8.0 Summary

When working to the specifications detailed in the recommendations section, they should provide the basis of good sound insulation performance.

The above details should be constructed to a good level of workmanship and for materials to be installed as the manufacture intends. The specified materials should be used at all times, however; if a similar product is chosen for any reason the material should be of the same or better specification and performance.

9.0 Conclusions

The construction details and comments within this report have been aimed at achieving the requirements set out in the criteria summary, which sets a target of achieving the requirements of Building Regulations Document E 2003.

Appendix

Good Working Practice

Always apply remedial work to the existing construction before installing new elements.

When installing Soundbloc make sure that the joints are staggered and always seal the perimeter of the independent ceiling and walls with sealant.

Always maintain a good standard of workmanship with care to detail.

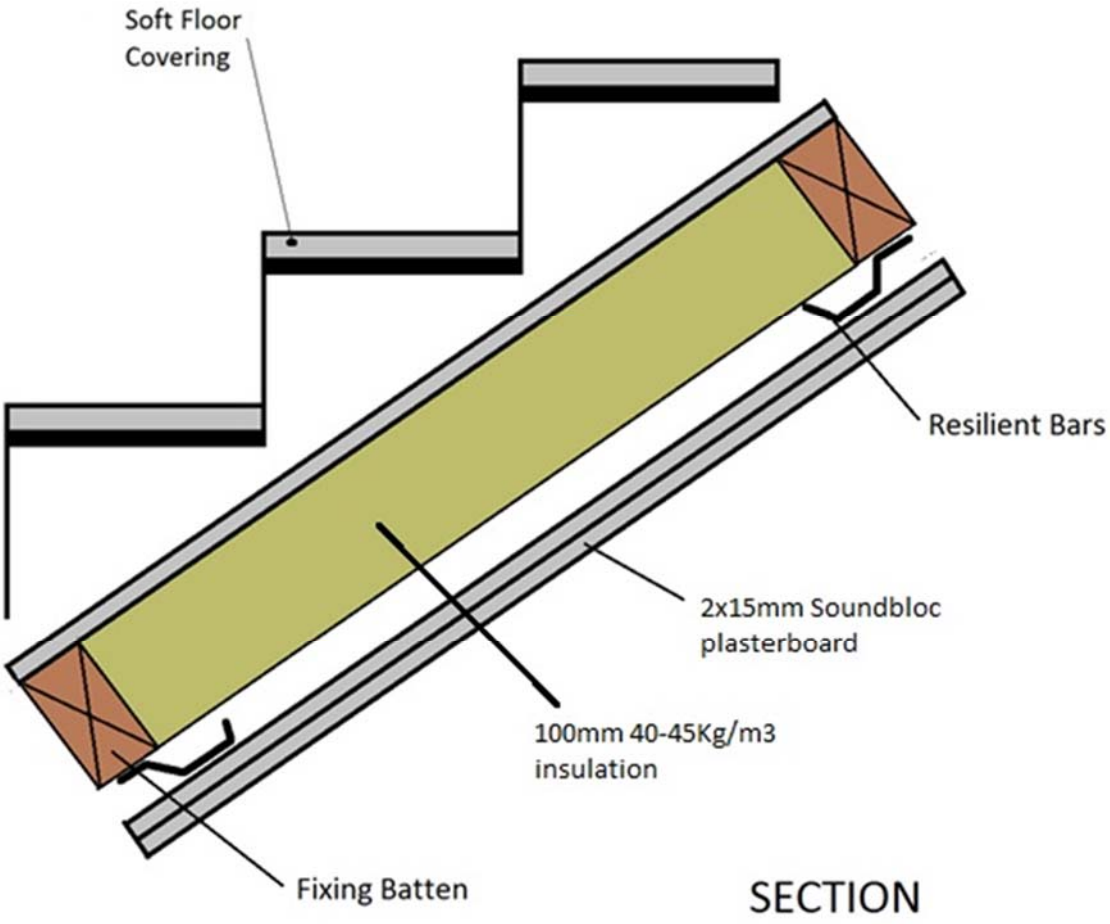
Always tightly fit the insulation between the studs; so not to bridge between the stud and wall.

Avoid installing electrical sockets, switches etc. on separating partitions. If sockets are to be installed; stagger the position of the sockets on opposite sides of the existing walls and use a similar thickness of cladding to form a box behind the socket box.

Always install the acoustic flooring to the manufacturer's instructions and always use perimeter seal where the flooring meets a wall.

Staircases

Stairs are subject to the same sound insulation as floors where they perform a separating function.



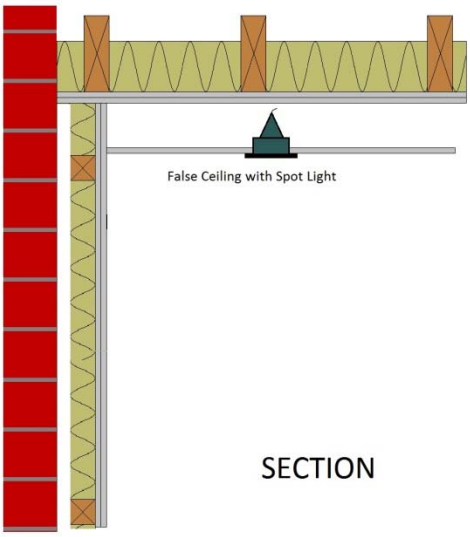
We would suggest the continuous use of the floating floor for the separating floor to be used in the place of the soft floor covering for “best practice” across the development. However were this is not practical, the minimum that should be used is the 6mm thick soft floor covering over the stair treads, as suggested in Approved Document E 2003. The 6mm soft floor covering should be bonded to the stair tread. Examples of a 6mm soft floor covering may include 6mm Hushmat.

Downlighters and Recessed Lighting

Naturally we would encourage you to avoid the use of downlighters and recessed light, however if you wish to add these to your development please inform us, and we will be happy to advise if it is possible on your development and specified constructions.

Here are two example options that could be compatible for your situation:

1. The use of a false ceiling. This is more common in kitchen areas and avoids penetrating the separating floor detail above.



1. Downlighters and recessed lighting can potentially be used within the ceiling layers of the separating floor. However the chosen separating floor must be capable of allowing this.

   Typically the downlighters and recessed lighting must be installed:
   - In accordance with the manufacturer's instructions.
   - at no more than one light per $2m^2$ of ceiling area in each room.
   - at centres not less than 0.75m
   - into openings not exceeding 100mm diameter or 100mm x 100mm.

   Particular attention should also be paid to Building Regulations Part B – Fire safety.

If it is the intention to use this form of lighting, please advise and we will be happy to comment if it is compatible with the proposed construction details for your particular development.

Floors Service Penetrations

Approved Document Part E gives guidance where pipes and ducts penetrate a floor separating habitable spaces.

It states that, pipes and ducts should be isolated from the separating floor construction and enclosed for their full height (length) in each space on either side of the separating partition using:

- Board of at least 15kg/m2. Please see the information below for a single product providing this mass or two layers to provide the mass.
- The enclosure should be lined or pipes should be lagged with 25mm mineral wool insulation
- The enclosure, joints or gaps should be sealed with acoustic mastic.

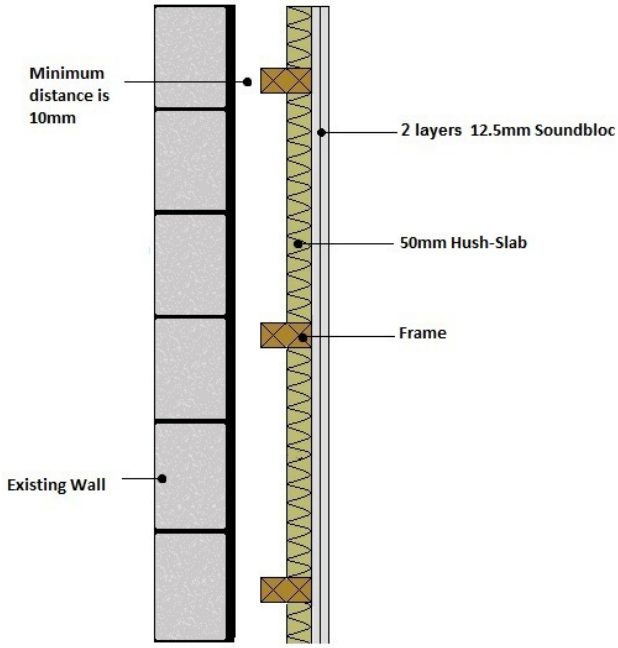
Mass per unit area data for wall and ceiling products

	Knauf (Kg/m2)	British Gypsum (Kg/m2)
9.5mm Wallboard	6.2	6.3
12.5mm Wallboard	8.3	8.0
15mm Wallboard	10.2	9.8
19mm Plasterboard Plank	14	15.0
12.5mm Fireline / Firepanel	10	9.8
15mm Fireline / Firepanel	12	11.7
12.5mm Soundshield Plus / Soundbloc	11.5	10.6
15mm Soundshield Plus / Soundbloc	12.8	12.6

	(Kg/m2)
10mm Fermacell	11.5
12.5mm Fermacell	15
15mm Fermacell	18
18mm Fermacell	21
13mm Hush-Multipanel	19
27mm SRS Maxiboard	24

Fireplaces & Chimneys

Where fireplaces are not remaining as a feature; they should be blocked to ensure noise cannot transmit up and down. An independent stud should be installed around the chimney breast.



Where fireplaces are to remain as a feature; the fireplace should be blocked within the chimney.

Reverberation in Common Areas

Section 7 of ADE describes methods to determine the amount of absorption required in corridors, hallways, stairwells and entrance halls that give access to flats and rooms for residential purposes to ensure reverberation in these spaces is adequately controlled.

Method A involves covering a specified area with an appropriate class of absorptive material. Method B involves the calculation of the amount of absorption within corridors, hallways and entrance halls based on the proposed material finishes with in the space.

Method A

For Entrance halls, corridors or hallways cover an area equal to or greater than the floor area with Class C absorber or better. Typically the ceiling is treated by installing a suspended ceiling with mineral fibre tiles.

For stairwells, the combined area of the stair treads, the upper surface of intermediate landings, the upper surface of the landings (excluding ground floor) and the ceiling area on the top floor should be calculated and either cover at least an area equal to the calculated area with Class D absorber or cover an area equal to at least 50% of the calculated area with Class C absorber or better.

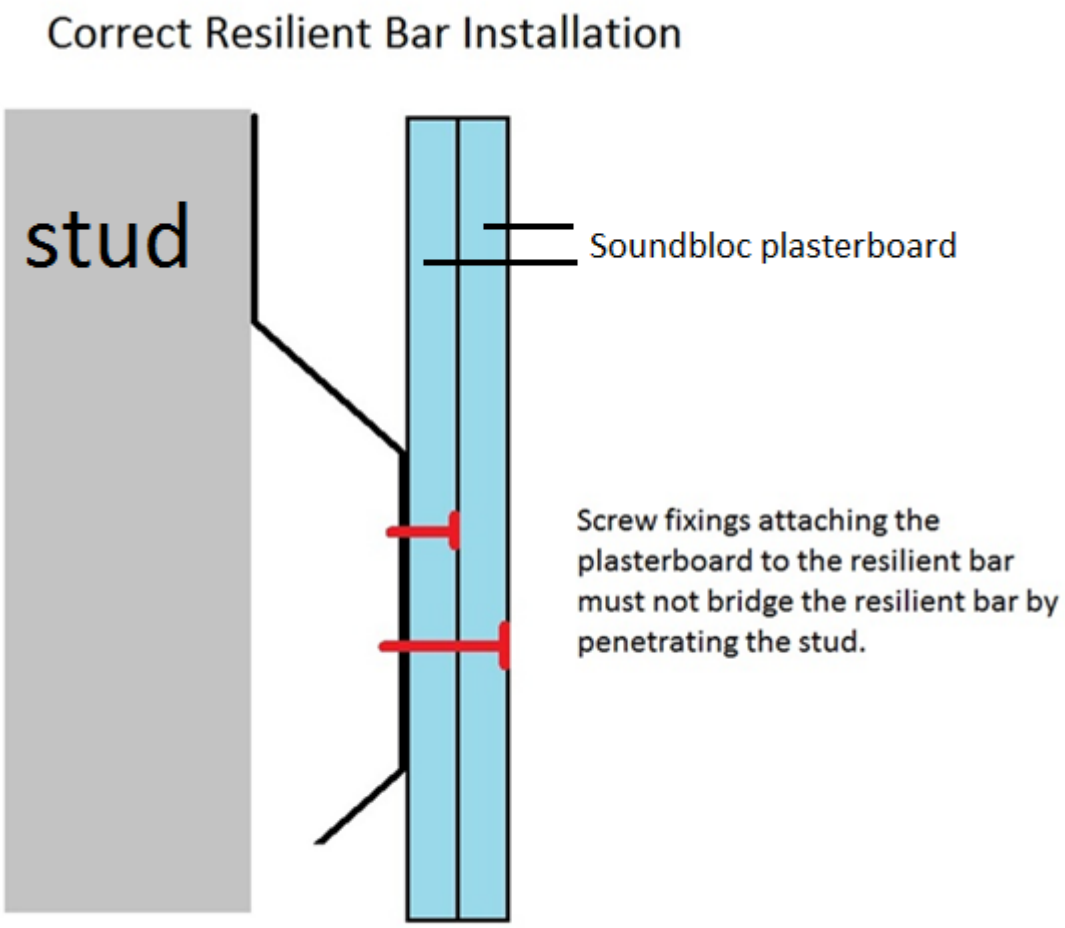
All material should be equally distributed within the space and on all levels. Typically the underside of the landings and the top floor ceiling are treated.

Method B

Method B is a calculation process to determine the total absorption within the space based on the proposed material finishes. The calculation result is to establish whether any additional absorption is required from the material finishes in the space being assessed.

Resilient Bar Installation

Always make sure that resilient bars are fitted correctly. The below diagrams show both correct and in-correct



Incorrect Resilient Bar Installation