

Building Acoustic Test

Internal Sound Insulation Desktop Assessment

In Compliance with Building Regulation Approved Document Part E



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Site Address:	185a Oxford Road, Reading, RG1 7UZ
Client / Performed for:	Butts Properties Limited
Report Date:	30/10/2023
Issued by:	Suresh Babariya
Report No:	10830102023-01
Report Issued Date:	01/11/2023
Discharge Condition:	CONDITION N24
Planning Reference:	EP /760996
Report Approved by and position:	 Suresh Babariya – Laboratory Manager

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Desk Top Report Summary

Airtight Building Solutions Ltd has been requested to carry out a sound insulation assessment of the floors between **185a Oxford Road, Reading, RG1 7UZ**. The scheme includes removal of existing floor finish and installation of timber floor and achieve building regulations compliances.

The building is required to achieve the sound insulation performance criteria within Approved Document E (ADE) 'Resistance to the passage of sound' of the Building Regulations with additional improvement of at least 55dB(Dntw + Ctr).

The purpose of this design note is to provide a review of the sound insulation performance for the separating walls and floors within the development.

Desktop audit showed that the Floor(S) is likely to MEET and exceed at least the requirements of Approved Document E with respect to Airborne sound insulation provided that all works are undertaken as per specification and manufactures guideline as below:

ABOVE floor

- Removal of the floorboards.
- Insert 100mm RWA45 Acoustic insulations between existing Joist.
- Install floorboards.

BELOW Ceiling/Joists

- Install a secondary layer of Sound block plaster board on existing ceiling
- Install independent joists below existing ceiling with a minimum drop of 125mm from existing ceiling
- Insert 100mm RWA45 Acoustic insulations between new independent ceiling joists.
- Install 2x15mm Sound block plaster board to ceiling and skim.

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CONDITION N24: Separation of noise sensitive rooms in neighboring flats.

No development shall commence on site until a detailed scheme for protecting the dwellings from noise emissions from the commercial use hereby approved and informed by an assessment of the likely noise emissions from the approved commercial use, has been submitted to and approved in writing by the Local Planning Authority. The scheme itself shall be designed, specified and constructed so that the sound insulation performance of the separating floor/ceiling between the uses achieves a minimum airborne sound insulation performance of greater than or equal to 55 dB (Dntw +Ctr) and ensures that the noise levels within the property do not exceed the values specified in BS8233:2014 with appropriate penalties and adjustments for the character of the noise. The scheme shall make suitable provision for insulation from structure borne noise.

Thereafter, the development shall not be carried out other than fully in accordance with the approved scheme which shall be completed before any part of the accommodation hereby approved is first occupied and shall be retained and maintained as such at all times thereafter.

REASON: In order to safeguard the amenity of occupiers of the residential accommodation in accordance with Policies CC8 and EN16 of the Reading Borough Local Plan 2019.

This desk top analysis only relates to the Sound Insulation between floors at **185a Oxford Road, Reading, RG1 7UZ** the analysis and subsequent report were carried out in accordance with the required Building Regulation Approved Document PART E and with the improvement of 55dB (Dntw + Ctr) required for the condition above.

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1 OBJECTIVES

- 1.1 To carry out Desk top Internal Sound Insulation Report to comply to **CONDITION N24** of planning permission number **EP /760996** at the following property: **185a Oxford Road, Reading, RG1 7UZ**

2 ASSESSMENT DETAILS

- | | | |
|-----|---|--|
| 2.1 | Type of property: | Flat conversion |
| 2.2 | Age of property: | N/A |
| 2.3 | Tests carried out by: | Airtight Building Solutions Ltd. |
| | | 11 Imperial Drive
North Harrow
HA2 7BP |
| 2.4 | Test Technician / Engineer: | Suresh Babariya |
| 2.5 | Laboratory Manager: | Suresh Babariya |
| 2.6 | Client: | Butts Properties Limited |
| 2.7 | Description of Background Noise: | Light vehicular traffic noise |
| 2.8 | Desk top audit has been carried in full accordance with the procedures set out in Approved Document E [1], and the following standard(s): | BS EN ISO 140-4: 1998 [2]
BS EN ISO 140-7: 1998 [3] |
| 2.9 | The sound insulation ratings were calculated in full accordance with: | BS EN ISO 717-1: 1997 [4]
BS EN ISO 717-2: 1997 [5] |

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3 PERFORMANCE STANDARDS AND RESULTS

- 3.1 The table below is taken from Building Regulations Approved Document E. Table 3.1 shows the required performance standard needed to pass a sound insulation test for separating walls and floors for dwelling houses and flats.

Table 3.1		
	Airborne Sound Insulation $D_{nT,w} + C_{tr}$	Impact Sound Insulation $L'_{nT,w}$
Purpose built dwelling houses and flats		
Walls	45dB	-
Floor	45dB	62dB
Dwelling houses and flats formed by material change of use		
Walls	43dB	-
Floors	43dB	64dB

- 3.2 The table below is taken from Building Regulations Approved Document E. Table 3.2 shows the required performance standard needed to pass a sound insulation test for separating walls and floors for Rooms for residential purpose.

Table 3.2		
	Airborne Sound Insulation $D_{nT,w} + C_{tr}$	Impact Sound Insulation $L'_{nT,w}$
Purpose built Rooms for Residential Purpose		
Walls	43dB	-
Floor	45dB	62dB
Rooms for residential purpose formed by material change of use		
Walls	43dB	-
Floors	43dB	64dB

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- 3.3 Predicted Desk top analysis results of the sound insulation tests are documented below in Table 3.3 – If all materials used in accordance with strictly manufactures specifications

Table 3.3					
Predictive Desk top analysis Test Results					
KEY WORD: ABW = Airborne Wall($D_{nT,w}$); ABF = Airborne Floor($D_{nT,w}$); IMP = Impact($L'_{nT,w}$)					
Test Number / Test Type / Chart No	Source Room	Receive Room	Required dB	Predictive dB Dntw + Ctr	Pass / Fail
01ABF(Floor)	GF – Commercial Unit	1st F – Flat - Studio	≥43dB	55dB	Pass

3.4 The Building Regulations Approved Document E

Approved Document E (2003) edition which incorporates 2004, October 2010 and April 2013, amendments. Sets out guideline sound transmission values for separating walls and floors that should be achieved under test if, acoustical performance is to be deemed acceptable. This document provides information on construction details, flanking details, testing and sampling methods as well as the criteria for both new build and converted buildings.

Approved Document E states airborne tests should be undertaken for both partition floors and walls between dwellings. For airborne performance, converted dwellings the partition walls and floor between dwellings and between dwellings and communal areas should achieve a minimum of 43 dB $D_{nT,w} + Ctr$, and purpose built dwellings should achieve a minimum of 45 dB $D_{nT,w} + Ctr$.

Approved Document E states impact tests should be undertaken for partition floors between dwellings. For impact performance, converted dwellings the partition floor between dwellings and between dwellings and communal areas should achieve a maximum of 64 dB $D_{nT,w} + Ctr$, and purpose built dwellings should achieve a maximum of 62 dB $D_{nT,w} + Ctr$.

Internal walls and floors within dwelling are required to meet minimum construction standards, these will not however be tested. Section 0.2 of the Building Regulations Part E states that internal walls and floor need to provide a minimum of R_w 40 dB.

Reverberation within communal spaces is also required to meet minimum standards, these will not however be tested.

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To allow the reader to better understand the predicted acoustic performances stated for the proposed partition walls and floors, we have applied the following subjective scale. This scale is based on our opinion of best achieving our client's expectations. We will only design to achieve a 'Good' performance or better.

Table 3.4 Subjective Scale of Acoustic Performance				
Predicted Performance Range for Airborne Sound		Predicted Performance Range for Impact Sound		Subjective Ratings
Conversion	New Build	Conversion	New Build	
43-46	45-48	61-64	59-62	Poor/Average
47-50	49-52	57-60	55-58	Good
50-53	53-56	53-56	51-54	Very Good
54-57	57-60	49-52	47-50	Excellent

3.5 Sound Insulation Specification

Sound Insulation Criteria – Requirement E1

Requirement E1 of Approved Document E requires protection against sound from other parts of the building and adjoining buildings as follows:

E1 – Dwelling-houses, flats and rooms for residential purposes shall be designed and constructed in such a way that they provide reasonable resistance to sound from other parts of the same building and from adjoining building.

The table below shows the criteria for sound insulation of the party walls and floors. The sound insulation requirements are taken from Part E.

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Table 3.5 Design Sound Insulation Specification – Requirements E1		
Element	Minimum Performance Standard	Minimum Design Standard
Party Walls	Airborne – 45dB $D_{nT,w}$ + C _{tr} (43dB for Material Change of Use)	Airborne – 50dB $D_{nT,w}$ + C _{tr}
Party Floors	Airborne – 45dB $D_{nT,w}$ + C _{tr} (43dB for Material Change of Use)	Airborne – 50dB $D_{nT,w}$ + C _{tr}
Party Floors	Impact – 62 dB L_{nTw} (64dB for Material Change of Use)	Impact – 57 dB L_{nTw}

4 INTERNAL SOUND INSULATION

4.1 Design Targets

To comply with Planning **CONDITION N24** a sound insulation assessment of floors has been carried out to ensure future habitants are not unduly affected by noise and activities within adjoining flats or commercial premises.

Planning **CONDITION N24** requires separating floors to achieve a minimum of 55dB (D_{ntw} + C_{tr}) improvement above the performance standards within the Building Regulations.

Table 4.1.1 – Design Targets in compliance with CONDITION N24			
Sound Insulation Performance	ADE Requirements	Design Tolerance	On-site Requirement
Airborne Floors	$\geq 43\text{dB } D_{nT,w} + C_{tr}$	+ 12dB	$\geq 55\text{dB } D_{nT,w} + C_{tr}$

Note that the values within Table 6.1 are on-site performance targets. The sound insulation of various construction elements are normally measured and rated in acoustic test laboratories, and quoted in terms of the sound reduction index, R_w . Using a minimum sensible design tolerance, we calculate that the following laboratory measure of sound insulation is required:

Table 4.1.2 – Laboratory Sound Insulation Performance Requirements		
Sound Insulation Performance	On-site Requirement	Laboratory Tested Values
Floor- Airborne	$\geq 55 \text{ dB } D_{nT,w} + C_{tr}$	$\geq 60 \text{ dB } R_w + C_{tr}$

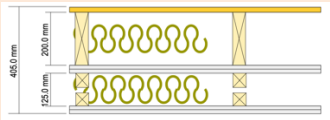
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4.2 Separating Floor Construction

It is understood the existing floors are based on a timber joist construction. To achieve the airborne sound insulation performance value in Table 4.2 the following construction specification is provided:

Table 4.3 – Main separating floor construction		
Section View	Construction Specification	Acoustic Rating
	Cavity: Solid joist(timber or Twinplate): Stud spacing 600 mm , Infill Fibreglass (10kg/m³) Thickness 100 mm (?:10 kg/m³, Rf:4000 Pa.s/m²) Panel 2 + 2 x 15.0 mm Gyproc SoundBloc 15mm (?:840 kg/m³,E:3.1GPa,?:0.01) Cavity: Separate joists: Stud spacing 600 mm , Infill Fibreglass (10kg/m³) Thickness 100 mm (?:10 kg/m³, Rf:4000 Pa.s/m²) Panel 3 + 2 x 15.0 mm Gyproc SoundBloc 15mm (?:840 kg/m³,E:3.1GPa,?:0.01)	60 dB R_w + C_{tr}

Calculations show that the proposed floor construction will achieve the design targets set out in Table 4.3 above once constructed correctly. It is seen as the responsibility of the main designer and contractor to ensure all junctions and interfaces are detailed correctly.

Sound insulation data sheets for the proposed constructions are provided in Appendix D.

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[1]The Building Regulations 2010

Approved Document E: Resistance to the Passage of Sound (2003 Edition incorporating 2004 and 2010 amendments)
1.ISBN 978 1 85946 204 1

[2]BS EN ISO 140-4: 1998

Acoustics – Measurement of sound insulation in buildings and of building elements
2.Part 4: Field measurements of airborne sound insulation between rooms

[3]BS EN ISO 140-7: 1998

Acoustics – Measurement of sound insulation in buildings and of building elements
3.Part 7: Field measurements of impact sound insulation of floors

[4]BS EN ISO 717-1: 1997

Acoustics – Rating of sound insulation in buildings and of building elements
Part 1: Airborne sound insulation

[5]BS EN ISO 717-2: 1997

Acoustics – Rating of sound insulation in buildings and of building elements
Part 2: Impact sound insulation

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6 APPENDIX 1 – GLOSSARY OF TERMS

Airborne Sound : Sound propagating through the air

Airborne Sound Insulation : Sound insulation which reduces the amount of airborne sound passing between buildings or parts of buildings

C_{tr} : The correction applied to a sound insulation rating (such as D_{nT,w}) to take into account specific sound spectra

Decibel (dB) : The unit used in acoustic measurement to describe one level with respect to a pre-defined reference level

D_{nT,w} : The weighted standardised level difference – a single number figure used to characterise the airborne sound insulation between rooms

Hertz (Hz) : The unit of measurement of frequency (cycles per second)

Impact Noise : Sound (generally from foot-falls) propagating through the material of the building

Impact Noise Insulation : Sound insulation which reduces the amount of structure-borne sound passing between buildings or parts of buildings

L'_{nT,w} : The weighted standardised impact sound pressure level – a single number figure used to characterise the impact sound insulation of floors

Noise : Unwanted sound

Reverberation Time (RT₆₀) : An indication of the amount of absorption in a room. The time (in seconds) taken for the noise level in a room to decay by 60dB

Types of Separating Walls

Wall Type 1: Solid Masonry

Wall Type 2: Cavity Masonry

Wall Type 3: Masonry between independent panels

Wall Type 4: Framed walls with absorbent material

Types of Separating Floors covering

Floor Type 1: Concrete base with ceiling and soft floor

Floor Type 2: Concrete base with ceiling and floating

floor

Floor Type 3: Timber frame base with ceiling and

platform floor

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7 APPENDIX 2 – TEST CHART(S) and Drawings

As Attached below

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Sound Insulation Prediction (v8.0.7)

Program copyright Marshall Day Acoustics 2015



- Key No. 1548

Margin of error is generally within $R_w \pm 3$ dB

Job Name:

Job No.:

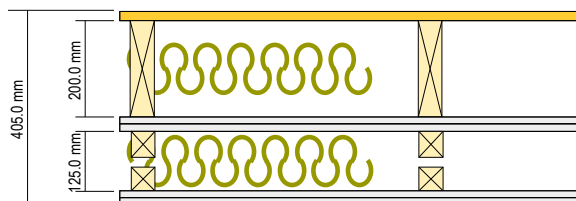
Page No.:

Notes:

Date: 30 Oct 23

Initials: dhesn

File Name: insul



R_w 79 dB

C -10 dB

C_{tr} -19 dB

D_{nTw} 81 dB

[V:50m3]
[A:11m2]

System description

Panel 1 : 1 x 20.0 mm Flooring Particle Board (?710 kg/m3,E:3.4GPa,?:0.03)

Cavity: Solid joist(timber or Twinplate): Stud spacing 600 mm , Infill Fibreglass (10kg/m3) Thickness 100 mm (?10 kg/m3, Rf:4000 Pa.s/m2)

Panel 2 + 2 x 15.0 mm Gyproc SoundBloc 15mm (?840 kg/m3,E:3.1GPa,?:0.01)

Cavity: Separate joists: Stud spacing 600 mm , Infill Fibreglass (10kg/m3) Thickness 100 mm (?10 kg/m3, Rf:4000 Pa.s/m2)

Panel 3 + 2 x 15.0 mm Gyproc SoundBloc 15mm (?840 kg/m3,E:3.1GPa,?:0.01)

Mass-air-mass resonant frequency =35 Hz , 55 Hz

Panel Size 2.7x4 m; Mass 66.6 kg/m2

frequency (Hz)	R(dB)	R(dB)
50	17	
63	28	22
80	35	
100	40	
125	58	45
160	63	
200	68	
250	72	71
315	76	
400	80	
500	84	83
630	87	
800	90	
1000	93	93
1250	102	
1600	105	
2000	103	104
2500	106	
3150	115	
4000	123	119
5000	129	

