

Building Acoustic Test Reports

In Compliance with Building Regulation Approved Document Part E



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Site Address:	34, St Mary's Butt, Reading, RG1 2LQ
Client / Performed for:	RPS Builders Ltd
Year of Construction(age):	>30 Years
Test Date:	22/02/2022
Test Technician / Performed by:	Suresh Babariya
Report No:	1082450-01
Report Issued Date:	22/02/2022
Report Approved by and position:	 Suresh Babariya – Laboratory Manager



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Report Summary

Airborne and Impact sound insulation tests were carried out between rooms in the Storey residential flat conversion at 34, St Mary's Butt, Reading, RG1 2LQ, on behalf of RPS Builders Ltd.

No WALL(S) were required to be assessed. Testing showed that the FLOOR(S) assessed met the requirements of Approved Document E with respect to IMPACT sound insulation. Testing showed that the FLOOR(S) assessed met the requirements of Approved Document E with respect to AIRBORNE sound insulation.

Information related to construction of test specimen and sample room selection is supplied by client, Results apply to the samples as received.

This report only relates to the items tested, 34, St Mary's Butt, Reading, RG1 2LQ required under the building regulations Part E. The test and subsequent report were carried out in accordance with the required Building Regulation Approved Document PART E.

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1 **OBJECTIVES**

- 1.1 To carry out sound insulation tests at the following property:
34, St Mary's Butt, Reading, RG1 2LQ

2 **TEST DETAILS**

- 2.1 Type of property: Storey residential flat conversion
- 2.2 Age of property: >30 Years
- 2.3 Date of Test: 22/02/2022
- 2.4 Tests carried out by: Airtight Building Solutions Ltd.
11 Imperial Drive
North Harrow
HA2 7BP
- 2.5 Test Technician / Engineer: Suresh Babariya
- 2.6 Laboratory Manager: Suresh Babariya
- 2.7 Client: RPS Builders Ltd
50 Langley Crescent,
Hayes
UB3 5HN
- 2.8 Description of Background Noise: Light vehicular traffic noise
- 2.9 Testing 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]
- 2.10 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 The results of the sound insulation tests are documented below in Table 3.3

Table 3.3 Test Results KEY WORD: ABW = Airborne Wall($D_{nT,w} + C_{tr}$); ABF = Airborne Floor($D_{nT,w} + C_{tr}$); IMP = Impact($L'_{nT,w}$)					
Test Number / Test Type / Chart No	Source Room and Volume m ³	Receive Room and Volume m ³	Required dB	Measured dB	Pass / Fail
01ABF	SF Flat-34c, Kitchen/ Living/ Dining, 56m ³	FF Flat-34a, Kitchen/ Living/ Dining, 53m ³	≥43dB	53dB	Pass
02IMP	SF Flat-34c, Kitchen/ Living/ Dining, 56m ³	FF Flat-34a, Kitchen/ Living/ Dining, 53m ³	≤64dB	45dB	Pass
03ABF	SF Flat-34d, Bedroom 1, 28m ³	FF Flat-34b, Bedroom 1, 28m ³	≥43dB	51dB	Pass
04IMP	SF Flat-34d, Bedroom 1, 28m ³	FF Flat-34b, Bedroom 1, 28m ³	≤64dB	54dB	Pass

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4 ADDITIONAL INFORMATION

- 4.1 All the procedures in Annex B of the Approved Document E to the Building Regulations have been followed except for the items shown in table 4.1

Table 4.1 – Annex B

Section	Requirement	Non-Compliance	Resulting Action
B2.12	Tests should be conducted in completed but unfurnished rooms	Finishing and fit-out work in progress - contain building material and tools	Test condition noted and room were tested

- 4.2 Pink noise from the signal generator was amplified and reproduced in the source room using consecutively one of two loudspeaker positions, (SP1 and SP2). Where possible the output of the generator was set so that the sound pressure level in the receiving room was at least 10 dB higher than the background level in every frequency band between 100 Hz and 3150 Hz. Individual frequency bands where this was not possible are indicated on the graphs in 8. APPENDIX 2 – TEST CHART(S). In these situations, corrections are made to take account of the intruding background noise.
- 4.3 The speaker position and/or frequency spectrum in the source room were adjusted such that there was no difference greater than 6dB between any adjacent one-third octave bands. This adjustment also facilitated the warming of the voice coils of the speaker prior to taking level measurements.
- 4.4 The loudspeaker positions were towards the corners of the room away from the separating element such that the direct radiation on the separating element and its associated flanking elements was not dominant.
- 4.5 The sound pressure levels were measured using one-third octave band filters. Measurements covered all the one-third octave bands having centre frequencies in the range from 100 Hz to 3150 Hz.
- 4.6 Sound pressure levels were measured consecutively in the source and receive rooms using loudspeaker position SP1 and SP2.
- 4.7 A single 30-second background noise measurement was taken in the receive room then airborne measurements were recorded at five fixed microphone positions using an averaging time of at least six seconds, and the spatial average level in the room was calculated on an energy basis in each one-third octave frequency band.
- 4.8 In the source room, airborne measurements were recorded at five fixed microphone positions using an averaging time of at least six seconds, and the spatial average level in the room was calculated on an energy basis in each one-third octave frequency band. The source level and position were not varied between receiver and source room measurements.
- 4.9 The procedure was repeated with loudspeaker position SP2 as the sound source and the spatial averages derived from each speaker position were averaged arithmetically to achieve the final room average.
- 4.10 For each set of microphone / loudspeaker positions, the distances separating microphone positions from other microphone positions were greater than 0.7 m, the distances separating microphones and room boundaries were greater than 0.5 m and the distances separating microphones from the sound source were greater than 1 m. The two loudspeaker positions were greater than 1.4 m apart, and where the source room was above the receive room, the loudspeaker was placed on a stand to prevent direct radiation onto the floor.

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- 4.11 A single 30-second background noise measurement was taken in the receive room then Impact measurements were recorded in the receive room from two fixed microphone positions for each of four tapping machine positions using an averaging time of at least six seconds with a pre-run time of six seconds, and the average level in each room was calculated on an energy basis in each one-third octave frequency band.
- 4.12 For each set of microphone / tapping machine positions, the distances separating microphone positions from other microphone positions were greater than 0.7 m, the distances separating microphones and room boundaries were greater than 0.5 m and the distances separating microphones from the floor being tested were greater than 1 m
- 4.13 Reverberation Time measurements were made on the rate of decay of sound in the receiving room. The frequency range from 100 Hz to 3150 Hz was covered in one-third octave bands. An average reverberation time was taken from a single decay at each of six microphone positions using one loudspeaker position. The decays were produced by exciting the room with amplified pink noise and stopping the excitation once the room became saturated (four seconds). The resultant reverberation time was based primarily on T20 and secondarily on T30.
- 4.14 Calibration of the measuring equipment was checked prior to and immediately after testing using a 94 dB 1 kHz reference level. No significant difference was indicated.
- 4.15 All measurements were carried out using the equipment listed in below table no 4.2

Table 4.2 List of Equipment & Traceable Calibration Information

No	Equipment Name	Model No	Serial No	Calibration Certificate No	Re-Calibration Due Date
1	Sound Level Meter	Rion NA-28	30152104	UCRT21_1199	11/02/2023
2	Class 1 Measurement Microphone	Rion NH-23	42180	UCRT21/1199	11/02/2023
3	Preamplifier	Rion UC-59	7504	UCRT21_1199	11/02/2023
4	Class 1 Acoustic Calibrator	Rion NC-74	35168026	UCRT22/1213	10/02/2023
5	Standard Tapping Machine	Norsonic-277	2775871	UCRT21_1203	11/02/2023
6	Hemi -Dodecahedron	Norsonic-275	2755229	N.A	N.A
7	Power Amplifier	Norsonic-280	2804247	N.A.	N.A.
8	Rion NX-28 Building Acoustic Software	NX-28BA	Version 1.2	N.A.	N.A.

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5 REFERENCES

[1] The Building Regulations 2015

Approved Document E - Resistance to the passage of sound (2003 Edition incorporating 2004, 2010, 2013 and 2015 amendments)

1. ISBN 978 1 85946 616 2

[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 (RT_{60})	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

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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

Floor Type 1: *Concrete base with ceiling and soft floor covering*

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)

Test Chart(S)

Standardized level difference according to ISO 140-4

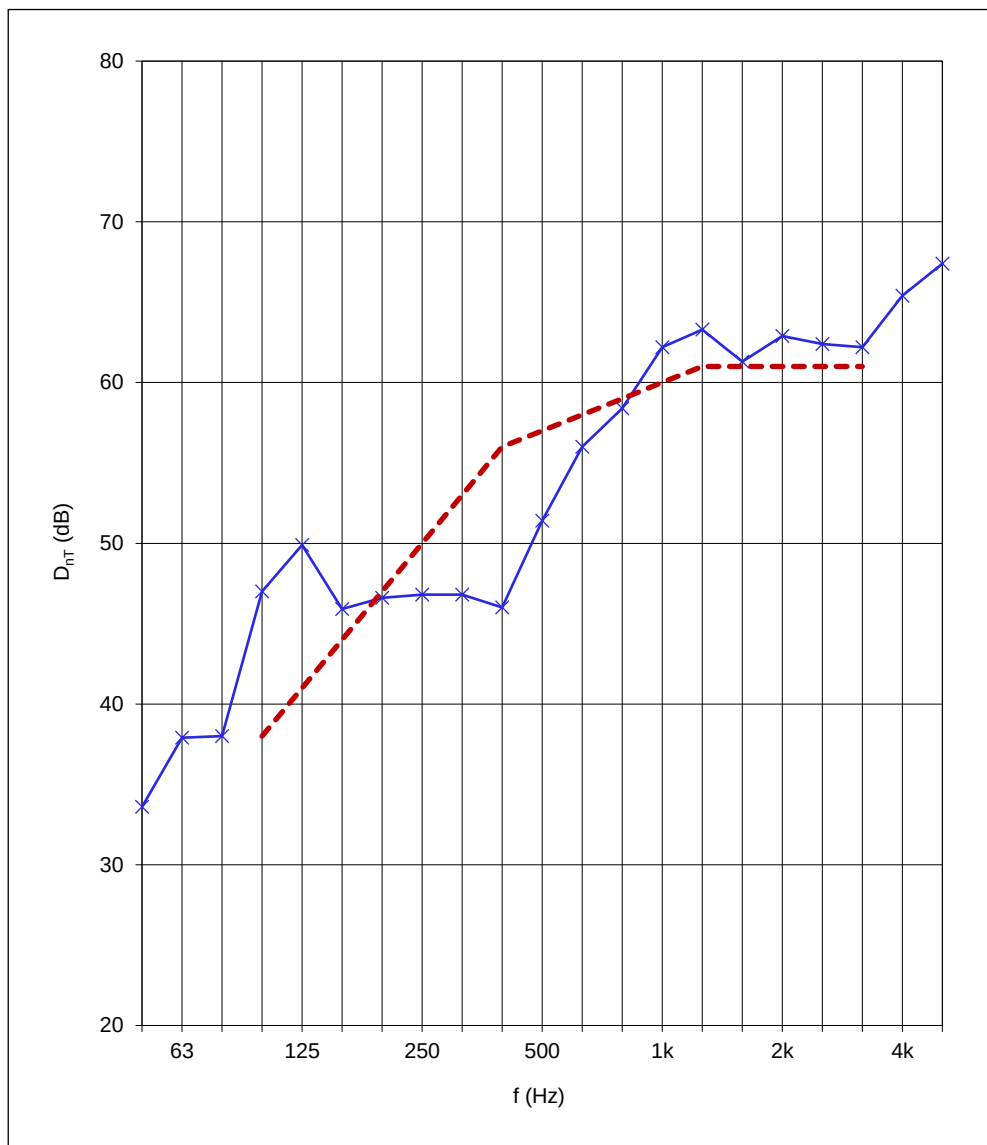
Field measurements of airborne sound insulation between rooms

Client: RPS Builders Ltd Date of test: 22/02/2022
 Source: SF Flat-34c, Kitchen/ Living/ Dining
 Receive: FF Flat-34a, Kitchen/ Living/ Dining
 Description: Party Floor between dwellings at the Storey residential flat conversion at 34, St Mary's Butt, Reading, RG1 2LQ (Age: >30 Years)

Construction: Floor Type 2 - Concrete base frame, floating floor, ceiling

Source room volume (m³): 56 - - - - - Shifted reference curve.
 Receiving room volume (m³): 53 ---X---X--- Measurement results (D_{nT} values).

Frequency f Hz	D _{nT} (1/3 octave) dB
50	
63	
80	
100	>= 47
125	>= 49.9
160	45.9
200	46.6
250	46.8
315	46.8
400	46.0
500	51.4
630	56.0
800	58.4
1000	>= 62.2
1250	63.3
1600	61.3
2000	>= 62.9
2500	>= 62.4
3150	>= 62.2
4000	
5000	



Rating according to ISO 717-1

D_{nT,w} (C; C_{tr}) = 57 (-2; -4) dB

No background noise influence on D_{nT,w}

D_{nT,w}+C_{tr} = 53 dB

Background noise influence on C and C_{tr}

Evaluation based on field measurement results obtained by an engineering method

Company: Airtight Building Solutions Ltd

Report No.: 1082450-01

Report Date: 22/02/22

Chart No.: 01ABF

Rion File: DD_0027

Signature:



Standardized impact sound pressure levels according to ISO 140-7

Field measurements of impact sound insulation of floors

Client: RPS Builders Ltd Date of test: 22/02/2022
 Source: SF Flat-34c, Kitchen/ Living/ Dining
 Receive: FF Flat-34a, Kitchen/ Living/ Dining
 Description: Party Floor between dwellings at the Storey residential flat conversion at 34, St Mary's Butt, Reading, RG1 2LQ (Age: >30 Years)

Construction: Floor Type 2 - Concrete base frame, floating floor, ceiling

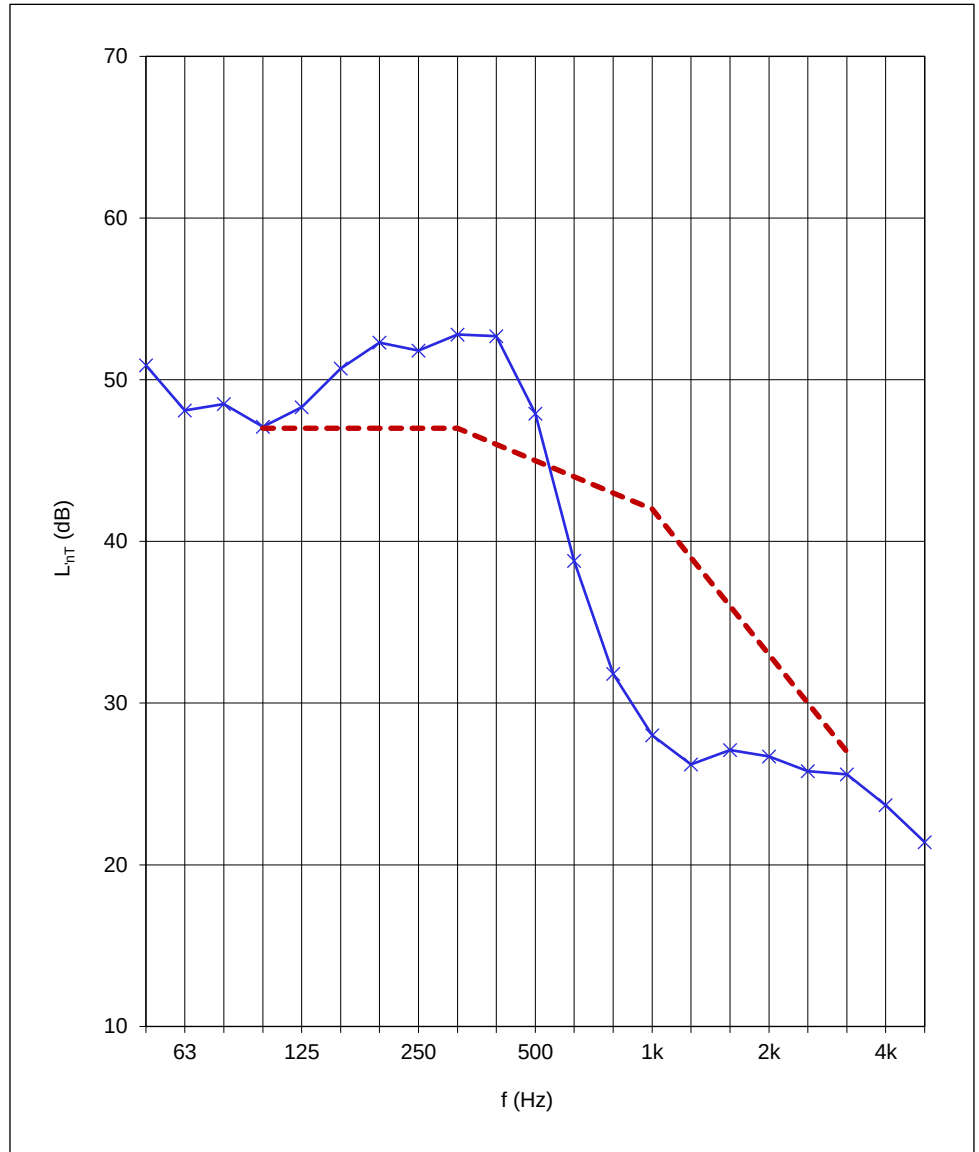
Source room volume (m³): 56

----- Shifted reference curve.

Receiving room volume (m³): 53

---X---X--- Measurement results (L'_{nT} values).

Frequency f Hz	L' _{nT} (1/3 octave) dB
50	
63	
80	
100	47.1
125	48.3
160	50.7
200	52.3
250	51.8
315	52.8
400	52.7
500	47.9
630	38.8
800	>= 31.8
1000	>= 28
1250	>= 26.2
1600	>= 27.1
2000	>= 26.7
2500	>= 25.8
3150	>= 25.6
4000	
5000	



Rating according to ISO 717-2

$$L'_{nT,w} (CI) = 45 (0) \text{ dB}$$

$$L'_{nT,w} = 45 \text{ dB}$$

Background noise influence on L'_{nT,w}

Background noise influence on CI

Evaluation based on field measurements results obtained in one-third-octave bands by an engineering method.

Company: Airtight Building Solutions Ltd

Report No.: 1082450-01

Report Date: 22/02/22

Chart No.: 02IMP

Rion File: LL_0027

Signature:



Standardized level difference according to ISO 140-4

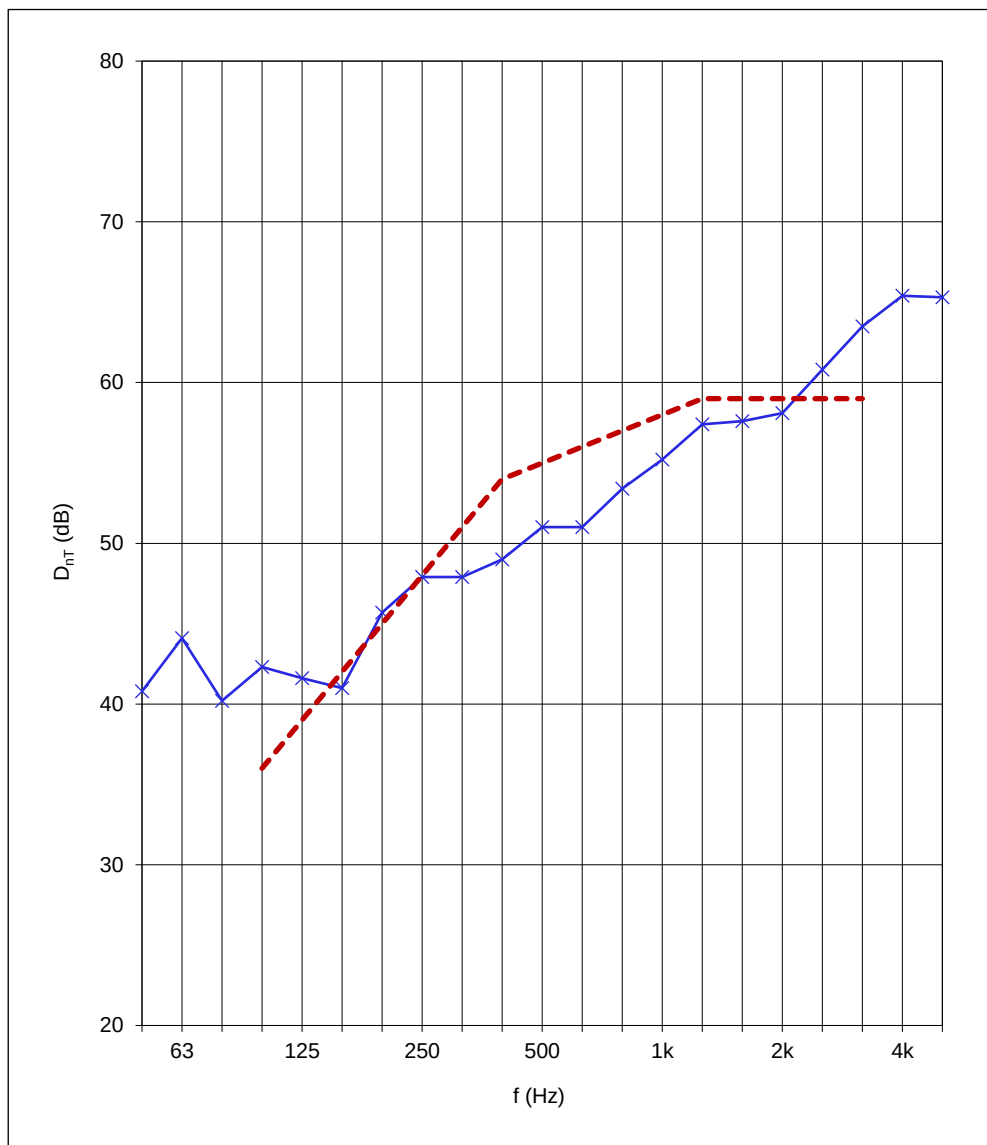
Field measurements of airborne sound insulation between rooms

Client: RPS Builders Ltd Date of test: 22/02/2022
 Source: SF Flat-34d, Bedroom 1
 Receive: FF Flat-34b, Bedroom 1
 Description: Party Floor between dwellings at the Storey residential flat conversion at 34, St Mary's Butt, Reading, RG1 2LQ (Age: >30 Years)

Construction: Floor Type 2 - Concrete base frame, floating floor, ceiling

Source room volume (m³): 28 - - - - - Shifted reference curve.
 Receiving room volume (m³): 28 ---X---X--- Measurement results (D_{nT} values).

Frequency f Hz	D _{nT} (1/3 octave) dB
50	
63	
80	
100	42.3
125	41.6
160	41.0
200	45.7
250	47.9
315	47.9
400	49.0
500	51.0
630	51.0
800	53.4
1000	55.2
1250	57.4
1600	57.6
2000	58.1
2500	60.8
3150	>= 63.5
4000	
5000	



Rating according to ISO 717-1

D_{nT,w} (C; C_{tr}) = 55 (-1; -4) dB

D_{nT,w} + C_{tr} = 51 dB

No background noise influence on D_{nT,w}

Background noise influence on C and C_{tr}

Evaluation based on field measurement results obtained by an engineering method

Company: Airtight Building Solutions Ltd

Report No.: 1082450-01

Report Date: 22/02/22

Chart No.: 03ABF

Rion File: DD_0028

Signature:



Standardized impact sound pressure levels according to ISO 140-7

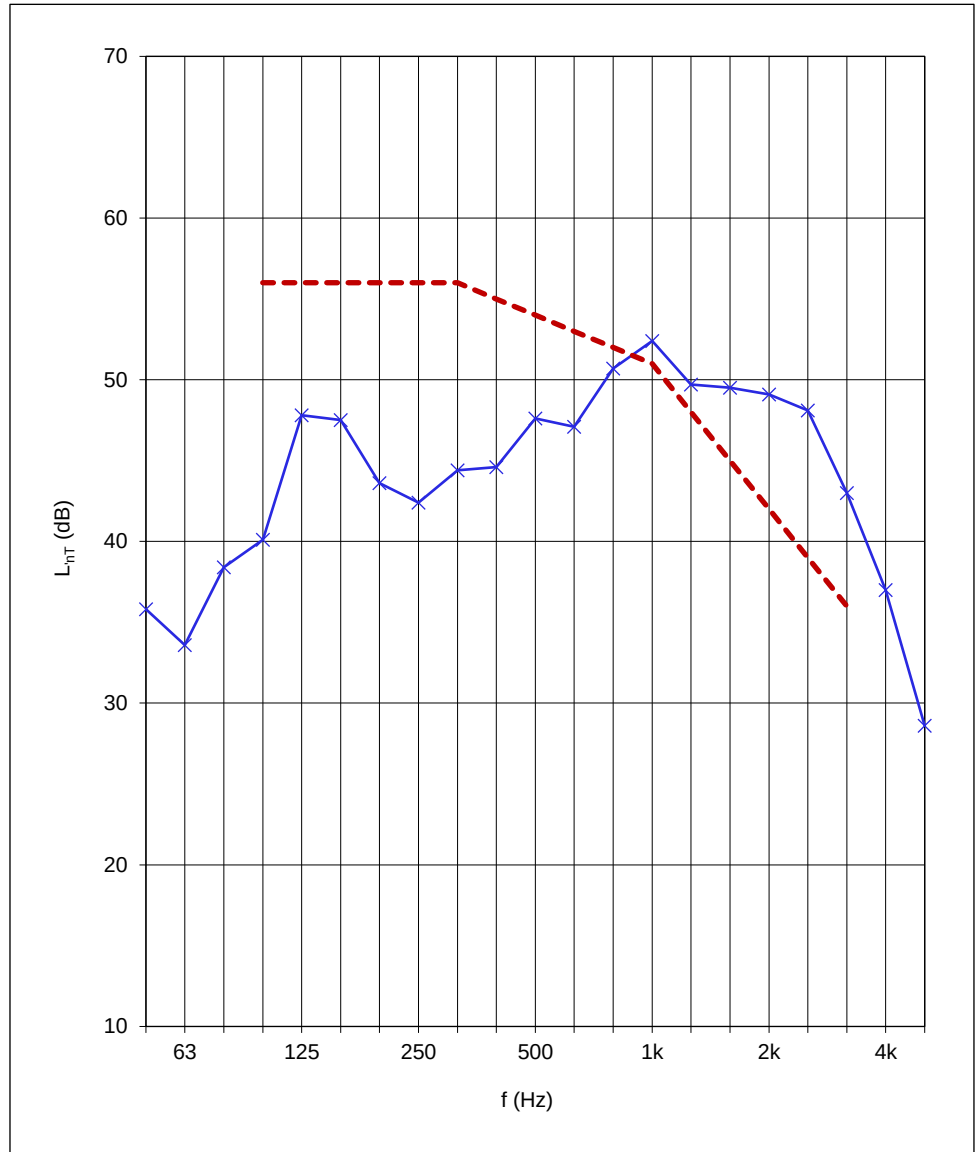
Field measurements of impact sound insulation of floors

Client: RPS Builders Ltd Date of test: 22/02/2022
 Source: SF Flat-34d, Bedroom 1
 Receive: FF Flat-34b, Bedroom 1
 Description: Party Floor between dwellings at the Storey residential flat conversion at 34, St Mary's Butt, Reading, RG1 2LQ (Age: >30 Years)

Construction: Floor Type 2 - Concrete base frame, floating floor, ceiling

Source room volume (m^3): 28 ----- Shifted reference curve.
 Receiving room volume (m^3): 28 ---X---X--- Measurement results (L'_{nT} values).

Frequency f Hz	L'_{nT} (1/3 octave) dB
50	
63	
80	
100	40.1
125	47.8
160	47.5
200	43.6
250	42.4
315	44.4
400	44.6
500	47.6
630	47.1
800	50.7
1000	52.4
1250	49.7
1600	49.5
2000	49.1
2500	48.1
3150	43.0
4000	
5000	



Rating according to ISO 717-2

$L'_{nT,w}$ (CI) = 54 (-9) dB

$L'_{nT,w}$ = 54 dB

No background noise influence on $L'_{nT,w}$

No background noise influence on CI

Evaluation based on field measurements results obtained in one-third-octave bands by an engineering method.

Company: Airtight Building Solutions Ltd

Report No.: 1082450-01

Report Date: 22/02/22

Chart No.: 04IMP

Rion File: LL_0028

Signature:

