



UNITE, KINCARDINE
COURT, MANCHESTER

Sound Insulation Test Report

Reference: 9226.RP03.PCT.0

Prepared: 15 September 2022

Revision Number: 0

Bowmer & Kirkland

1st Floor Altitude Building

Atlas Business Park

Manchester

M22 5PR

Sound Insulation Test Report



UNITE, KINCARDINE COURT, MANCHESTER

Reference: 9226.RP03.PCT.0

Prepared: 15 September 2022

Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	15 September 2022	James Melville	Helen Sheldon

Terms of contract:

RBA Acoustics Ltd have prepared this report in accordance with our Acoustic Consultancy Brief 22nd June 2021. RBA Acoustics Ltd shall not be responsible for any use of the report or its contents for any purpose other than that for which it was provided. Should the Client require the distribution of the report to other parties for information, the full report should be copied. No professional liability or warranty shall be extended to other parties by RBA Acoustics Ltd without written agreement from RBA Acoustics Ltd.

The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and will need to be developed into full working drawings by the lead designer to incorporate all other design disciplines.



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Notice to Building Control Officer

Certification of Test Results

ANC operates an online, secure, paperless certification system for sound insulation tests.

The online verification (certification) system means that Building Control Bodies will need to follow the steps below to verify the results quoted in the relevant test report:

1. Go to the ANC secure server at www.theanc.co.uk
2. Navigate to the ADvANCE page which links to the ANC site available for use by BCOs.
3. Enter the following in the spaces provided:

Task Number: 75215

Task Password: NA8074

4. Select role "Building Control Officer" and press "Login"
5. You will then see a summary list of results of all the Tests undertaken to date for this project (Task) as held on the secure primary server and you can print this table for your records.

1. GENERAL DETAILS

Testing undertaken for:	Bowmer & Kirkland 1st Floor Altitude Building Atlas Business Park Manchester M22 5PR
Site Address:	UNITE, Kincardine Court Kincardine Road Manchester M13 9SY
Principal Tester:	James Melville
Additional Tester:	Helen Sheldon
Test Date:	7th September 2022 14 th September 2022
Building type:	New build student accommodation, as cluster flats and studios
Areas Tested:	Separating walls between cluster flats & studios (see Section 4) Separating floors between cluster flats & studios (see Section 4)
<i>Constructions Tested:</i>	
Separating Floors:	Lino Floor Finish 180mm concrete slab MF suspended ceiling with void 12.5mm dense plasterboard (12.5kg/m ²)
Separating Walls:	2No. Layers 15mm Fireline Plasterboard (12.5kg/m ²); 100mm Structural Metal Stud; 100mm Isover Acoustic Partition roll (10-36kg/m ³); 50mm Cavity; 50mm 'C' Stud2No. Layers; 15mm Fireline Plasterboard (12.5kg/m ²)
Accreditation:	RBA Acoustics Limited are registered with the Association of Noise Consultants (ANC) Registration Scheme. This is an ANC Registered Report with the unique registration number 113/75215. The results detailed within this report should be verified online.

2. ACOUSTIC TESTS

2.1 General

Acoustic testing of separating floor and wall structures at UNITE, Kincardine Court, Manchester was undertaken on 7th September 2022 and 14th September 2022. Six separating floors were tested for both airborne and impact sound insulation, and seven separating walls were tested for airborne sound insulation.

The site measurements and analyses were undertaken in full accordance with the following British Standards as required by Approved Document E of the Building Regulations:

Airborne Sound: BS EN ISO 140-4:1998 "Acoustics – Measurement of sound insulation in buildings and of building elements – Part 4: Field measurements of airborne sound insulation between rooms"

Impact Sound: BS EN ISO 140-7:1998 "Acoustics – Measurement of sound insulation in buildings and of building elements – Part 7: Field measurements of impact sound insulation of floors"

The results of the measurements have subsequently been analysed and presented in accordance with the following:

Airborne Sound: BS EN ISO 717-1:1997 "Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation"

Impact Sound: BS EN ISO 717-2:1997 "Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation"

All the procedures in Annex B of Approved Document E of the Building Regulations have been followed and carried out in full accordance with ISO 140-4 and/or ISO 140-7. Commonly encountered deviations from the standards are described in the notifications detailed in Section 2.5.

2.2 Instrumentation

The following equipment was used for the measurements.

Table 1 – Equipment Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Valid Until
Norsonic Type 1 Sound Level Meter	Nor140	1405945	U38055	2 June 2023
Norsonic Pre Amplifier	1209	15314		
Norsonic ½" Microphone	1225	208218	38054	2 June 2023
Norsonic Sound Calibrator	1251	34057	U38053	2 June 2023
Norsonic Type 1 Sound Level Meter	Nor140	1406969	U38863	01 September 2023
Norsonic Pre Amplifier	1209	21204		
Norsonic ½" Microphone	1225	285599	38862	01 September 2023
Norsonic Sound Calibrator	1251	34966	U38861	01 September 2023
Opera Loudspeaker	715DX	L511005967	N/A	N/A
NTI Minirator	MR2	G2L-RAANA-F2	N/A	N/A
ANV Tapping Machine	TM02	TM02027	U39608	30 November 2023

The equipment was calibrated prior to and on completion of the testing. No calibration drifts were observed.

2.3 Airborne Sound Insulation Test Method

The airborne sound insulation test method used was undertaken in general accordance with Airborne test procedure 2 as described in the Association of Noise Consultants (2018) *Practice Guidance for sound insulation testing in dwellings*.

The airborne sound insulation performance of the structures was determined by generating a broadband, random diffuse sound field in the source room and measuring the spatially averaged 1/3 octave band sound pressure levels in both the source and receive areas. The receive room levels were corrected for background noise in accordance with the procedure detailed in BS EN ISO 140-4 and then subtracted from the source levels to determine the level difference, D , over the frequency range 100-3150 Hz. These 1/3 octave band values were then standardised to a reference of 0.5 seconds using the measured reverberation time of the receive room.

For each test two separate source positions were used and spatially averaged noise levels within both the source and receive room were measured by means of a moving microphone over a sample period of 30 seconds for each source position. A single background noise level was measured in the receive room using the same procedure.

Reverberant decays were also recorded in the receive room using the interrupted noise method, with the sound source at a single position, to determine the reverberation times, T , over the same frequency range. Six decays in total were recorded at three different positions within the receive room and subsequently averaged.

The 1/3 octave band results were then compared with a standard curve, using the method described in BS EN ISO 717-1: 1997 to determine the single-figure descriptor of airborne sound insulation, the Weighted Standardised Level Difference, $D_{nT,w}$, and the spectrum adaptation term, C_{tr} .

Our methodology allows for one representative background noise measurement to be made in the receive room, with this used to correct both receive room measurements. In the event that background noise levels

change noticeably between the first and second receive measurements, testing is repeated once the background levels have stabilised and can be considered representative.

2.4 Impact Sound Insulation Test Method

The impact sound insulation test method used was undertaken in general accordance with Impact test procedure 6 as described in the Association of Noise Consultants (2018) *Practice Guidance for sound insulation testing in dwellings*.

A tapping machine (meeting the requirements of BS EN ISO 140-7) was located within the source room. The machine generated a sound field in the room beneath (receive room) by means of dropping five 500g hammers in sequence onto the floor at 0.1 second intervals. The machine was positioned at 45 degrees to the direction of any floor beams or ribs.

The resultant spatially averaged sound pressure levels in the receive room were recorded in 1/3 octaves over the frequency range 100-3150Hz. The levels were corrected for background noise where applicable and the receive room reverberation time.

For each test four separate source positions were used and spatially averaged noise levels within the receive room were measured by means of a moving microphone over a sample period of 30 seconds for each source position. A single background noise level was measured in the receive room using the same procedure.

Reverberant decays were also recorded in the receive room using the interrupted noise method, with the sound source at a single position, to determine the reverberation times, T_r , over the same frequency range. Six decays in total were recorded at three different positions within the receive room and subsequently averaged.

The 1/3 octave band results were then compared with a standard curve using the method described in BS EN ISO 717-2: 1997 to determine the single figure descriptor of impact sound insulation, the Weighted Standardised Impact Sound Pressure level, $L'_{nT,w}$.

The comments in Section 2.3 regarding background noise measurements also apply to the impact sound insulation test method.

2.5 Notifications

All efforts were made to ensure procedures in the above standards and regulations were followed. The following sections describe any deviations from the guidance and provide a commentary on our procedures in relation to each.

Background Noise Levels

BS EN ISO 140-4:1998 and BS EN ISO 140-7: 1998 expect the following correction to be made if the difference between the background noise and receive room noise levels are less than 10dB or more than or equal to 6dB in any frequency band:

$$L = 10\log(10^{L_R/10} - 10^{L_B/10})$$

Where

L is the adjusted signal level, in dB

L_R is the receive noise level, in dB

L_B is the background noise level, in dB

If the difference between the background and receive room noise levels are less than 6dB then the above calculation is replaced by a 1.3dB correction which is subtracted from the receive level. These values are considered the limit of measurement (i.e. limited by high background noise levels on site).

Background noise during testing was dominated by DESCRIBE. Every effort was made to minimise the effect of background noise, however in some cases background noise corrections have been made. Such corrections are indicated on the attached Figures 1-19 and in Table 5, Table 6 and Table 7. The actual performance of the structure is likely to be better than that measured and shown in the applicable graphs.

We consider the notifications described above to have had an insignificant effect on pass or fail results presented within this report.

3. SOUND INSULATION CRITERIA

3.1 Building Regulations

Approved Document E (2003 edition incorporating 2004, 2010, 2013 and 2015 amendments) sets the following requirements for the sound insulation performance of separating walls and floors within new build student accommodation developments.

Table 2 – Building Regulations Criteria

Room Type	Walls	Floors	
	Airborne $D_{nT,w} + C_{tr}$ (dB)	Airborne $D_{nT,w} + C_{tr}$ (dB)	Impact $L'_{nT,w}$ (dB)
Studios	43	45	62
Cluster Flats	45	45	62

3.2 BREEAM

We understand it is desirable to achieve one BREEAM credit for sound insulation. In order to achieve this, it is necessary to achieve results for airborne and impact sound insulation, which improve on the requirements of Approved Document E by at least 3dB.

The following sound insulation criteria should therefore be met:

Table 3 – BREEAM Criteria

Room Type	Walls	Floors	
	Airborne $D_{nT,w} + C_{tr}$ (dB)	Airborne $D_{nT,w} + C_{tr}$ (dB)	Impact $L'_{nT,w}$ (dB)
Studios	46	48	59
Cluster Flats	48	48	59

4. MEASUREMENTS

Measurements were undertaken between the following rooms:

Table 2 – Separating Wall Measurement Room Details (Airborne)

Test	Test Type	Source Room			Receive Room			Structure Tested
		Plot	Room	Vol (m³)	Plot	Room	Vol (m³)	
1	Airborne	D32	Studio	46	D31	Studio	46	Wall
2	Airborne	D11.6	Cluster Bedroom	26	D12.1	Cluster Bedroom	26	Wall
3	Airborne	D11.K	Cluster Kitchen	66	D13	Studio	46	Wall
4	Airborne	D13	Studio	46	D14	Studio	46	Wall
5	Airborne	D15	Studio	46	D16.1	Cluster Bedroom	26	Wall
6	Airborne	D4.6	Cluster Bedroom	26	D5.1	Cluster Bedroom	26	Wall
7	Airborne	D8	Studio	46	D9.1	Cluster Bedroom	26	Wall

Table 3 – Separating Floor Measurement Room Details (Airborne)

Test	Test Type	Source Room			Receive Room			Structure Tested
		Plot	Room	Vol (m³)	Plot	Room	Vol (m³)	
8	Airborne	D31	Studio	46	D26	Studio	46	Floor
9	Airborne	D23.1	Cluster Bedroom	26	D16.1	Cluster Bedroom	26	Floor
10	Airborne	D19.1	Cluster Bedroom	26	D12.1	Cluster Bedroom	26	Floor
11	Airborne	D12.1	Cluster Bedroom	26	D5.1	Cluster Bedroom	26	Floor
12	Airborne	D15	Studio	46	D16.1	Studio	46	Floor
13	Airborne	D16.1	Cluster Bedroom	26	D9.1	Cluster Bedroom	26	Floor

Table 4 – Separating Floor Measurement Room Details (Impact)

Test	Test Type	Source Room			Receive Room			Structure Tested
		Plot	Room	Vol (m³)	Plot	Room	Vol (m³)	
14	Impact	D31	Studio	46	D26	Studio	46	Floor
15	Impact	D23.1	Cluster Bedroom	26	D16.1	Cluster Bedroom	26	Floor
16	Impact	D19.1	Cluster Bedroom	26	D12.1	Cluster Bedroom	26	Floor
17	Impact	D12.1	Cluster Bedroom	26	D5.1	Cluster Bedroom	26	Floor
18	Impact	D15	Studio	46	D16.1	Studio	46	Floor
19	Impact	D16.1	Cluster Bedroom	26	D9.1	Cluster Bedroom	26	Floor

5. RESULTS

The results of the airborne sound insulation and impact sound transmission measurements made are presented on the attached Figures 1-19.

For summary purposes the single figure $D_{nT,w} + C_{tr}$ and $L'_{nT,w}$ values are given below:

Table 5 – Separating Wall Airborne Sound Insulation

Test	Source Room		Receive Room		$D_{nT,w} + C_{tr}$ (dB)	Minimum Requirement	Comment
	Plot	Room	Plot	Room			
1	D32	Studio	D31	Studio	46*	43	Pass
2	D11.6	Cluster Bedroom	D12.1	Cluster Bedroom	49	45	Pass
3	D11.K	Cluster Kitchen	D13	Studio	53*	45	Pass
4	D13	Studio	D14	Studio	51*	43	Pass
5	D15	Studio	D16.1	Cluster Bedroom	46*	45	Pass
6	D4.6	Cluster Bedroom	D5.1	Cluster Bedroom	50*	45	Pass
7	D8	Studio	D9.1	Cluster Bedroom	50	45	Pass

Table 6 – Separating Floor Airborne Sound Insulation

Test	Source Room		Receive Room		$D_{nT,w} + C_{tr}$ (dB)	Minimum Requirement	Comment
	Plot	Room	Plot	Room			
8	D31	Studio	D26	Studio	55*	45	Pass
9	D23.1	Cluster Bedroom	D16.1	Cluster Bedroom	52*	45	Pass
10	D19.1	Cluster Bedroom	D12.1	Cluster Bedroom	55	45	Pass
11	D12.1	Cluster Bedroom	D5.1	Cluster Bedroom	52*	45	Pass
12	D15	Studio	D16.1	Studio	51	45	Pass
13	D16.1	Cluster Bedroom	D9.1	Cluster Bedroom	56*	45	Pass

Table 7 – Separating Floor Impact Sound Transmission

Test	Source Room		Receive Room		$L'_{nT,w}$ (dB)	Maximum Requirement	Comment
	Plot	Room	Plot	Room			
14	D31	Studio	D26	Studio	49*	62	Pass
15	D23.1	Cluster Bedroom	D16.1	Cluster Bedroom	52	62	Pass
16	D19.1	Cluster Bedroom	D12.1	Cluster Bedroom	52	62	Pass
17	D12.1	Cluster Bedroom	D5.1	Cluster Bedroom	56	62	Pass
18	D15	Studio	D16.1	Studio	53	62	Pass
19	D16.1	Cluster Bedroom	D9.1	Cluster Bedroom	53	62	Pass

* Results at the limit of measurement, i.e. limited by high background noise levels on site. The actual performance of the structure is likely to be greater than that measured and shown in the attached graph.

6. BREEAM RETEST

The levels of airborne sound insulation measured across the separating wall as indicated in Test 5 failed to meet the enhanced BREEAM requirement for sound insulation. All other walls tested met the required enhancement above requirements of Approved Document E and therefore its highly likely that the performance shortfall with this wall is isolated.

Following discussions with site we understand that the wall had not been mastic sealed, not had the insulation in the wall installed properly and finally putty pads had not installed properly within the wall sockets.

Further to the completion of remedial works we re-attended site on Wednesday 14th September in order to retest the airborne sound insulation performance of the wall outlined in Test 5. The result of the measurement for this is given below:

Table 8 – Separating Wall Airborne Sound Insulation

Test	Source Room		Receive Room		$D_{nT,w} + C_{tr}$ [dB]	BREEAM Minimum Requirement	Comment
	Plot	Room	Plot	Room			
5 ¹	D15	Studio	D16.1	Cluster Bedroom	51	48	Pass

¹Retest

* Results at the limit of measurement, i.e. limited by high background noise levels on site. The actual performance of the structure is likely to be greater than that measured and shown in the attached graph.

As can be seen in Table 8 the airborne sound insulation performance of the wall now meets the minimum requirements for the one credit under BREAAAM Hea05.

The results of the above airborne sound insulation measurement is presented on the attached Figure 20.

7. DISCUSSION

The levels of airborne sound insulation measured across the separating walls and floors meet and exceed the requirements of the Building Regulations and the enhanced project requirements and, as such, should be considered acceptable.

Similarly, the levels of impact sound insulation measured across the separating floors meet and exceed the requirements of the Building Regulations and the enhanced project requirements and, as such, should be considered acceptable.

8. CONCLUSIONS

RBA Acoustics have undertaken sound insulation testing of the separating wall and floor constructions at UNITE, Kincardine Court, Manchester This report details the results of the measurements and provides comparisons with the performance standards for new build student accommodation, as cluster flats and studios within Approved Document E (2003 Edition incorporating 2004, 2010 and 2015 amendments) and the enhanced project requirements.

We are pleased to conclude that all tests meet and exceed the airborne and impact sound insulation standards detailed within Approved Document E and the enhanced project requirements.

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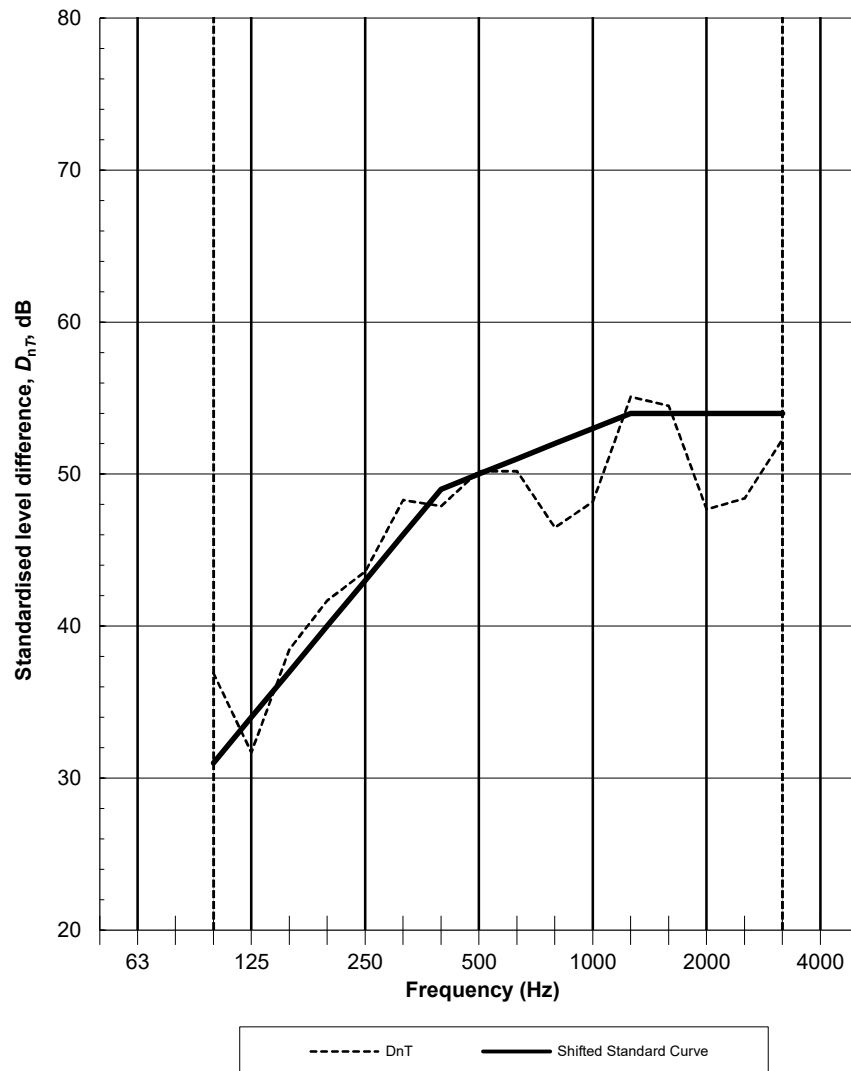
UNITE, Kincardine Court
D32 Studio to D31 Studio

Standardised Level Difference According to ISO 140-4
Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test:

2No. Layers 15mm Fireline Plasterboard (12.5kg/m²); 100mm Structural Metal Stud; 100mm Isover Acoustic Partition roll; 50mm Cavity; 50mm 'C' Stud2No. Layers; 15mm Fireline Plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D</i> _{nT} (dB)
50	
63	
80	
100	36.9
125	31.7
160	38.5
200	41.7
250	43.6
315	48.3
400	47.9
500	50.2
630	50.2
800	46.5
1000	48.2
1250	55.1
1600	≥54.5
2000	47.7
2500	48.4
3150	52.3
4000	
5000	



* Performance limited
by background noise level

Rating according to
BS EN ISO 717-1

*D*_{nT,w} (*C*; *C*_{tr}) 50 (-2; -4) dB

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

Test undertaken by:

Source Room Volume: 46 m³

Receiving Room Volume: 46 m³

Client: Bowmer and Kirkland

Test Date: 07/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

Figure 1

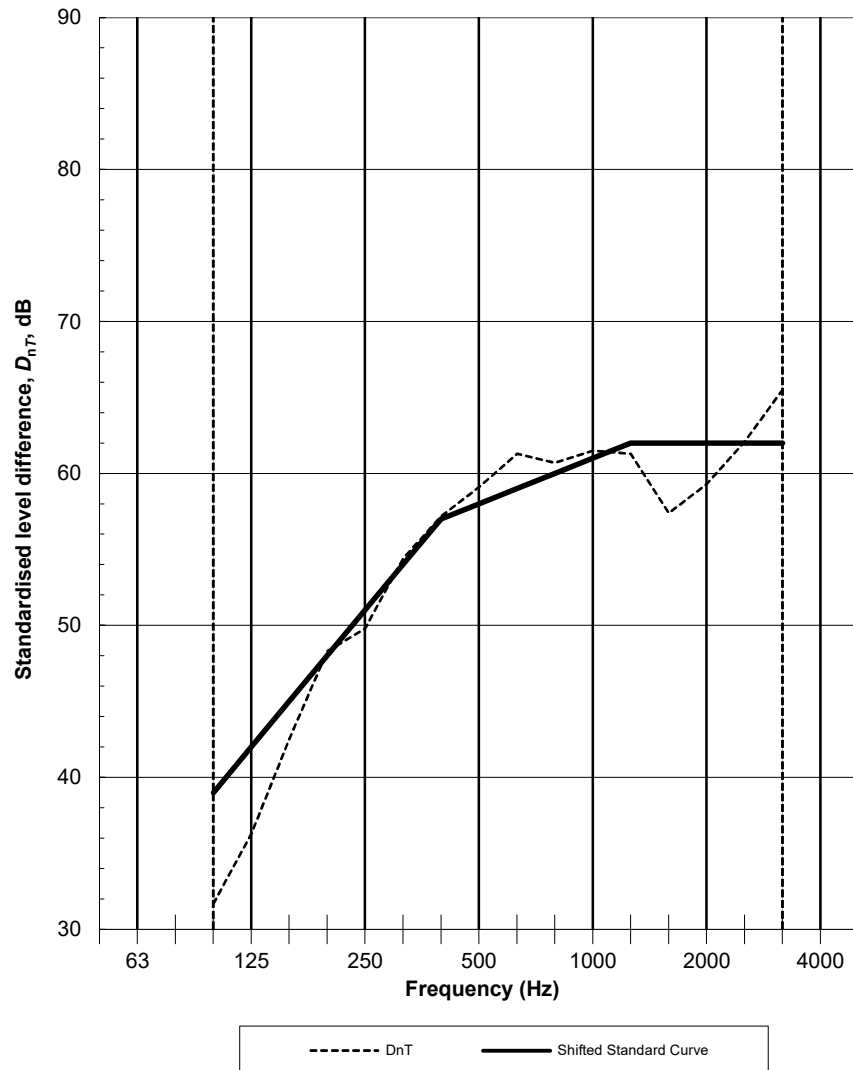
UNITE, Kincardine Court
D11.6 Cluster Bedroom to D12.1 Cluster Bedroom

Standardised Level Difference According to ISO 140-4
Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test:

2No. Layers 15mm Fireline Plasterboard (12.5kg/m²); 100mm Structural Metal Stud; 100mm Isover Acoustic Partition roll; 50mm Cavity; 50mm 'C' Stud 2No. Layers; 15mm Fireline Plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D</i> _{nT} (dB)
50	
63	
80	
100	31.7
125	36.3
160	42.5
200	48.3
250	49.8
315	54.4
400	57.2
500	59.1
630	61.3
800	60.7
1000	61.5
1250	61.3
1600	57.4
2000	59.3
2500	62.1
3150	65.5
4000	
5000	



Rating according to
BS EN ISO 717-1

***D*_{nT,w} (*C*; *C*_{tr}) 58 (-3; -9) dB**

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

Test undertaken by:

Source Room Volume: 26 m³

Receiving Room Volume: 26 m³

Client: Bowmer and Kirkland

Test Date: 07/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

Figure 2

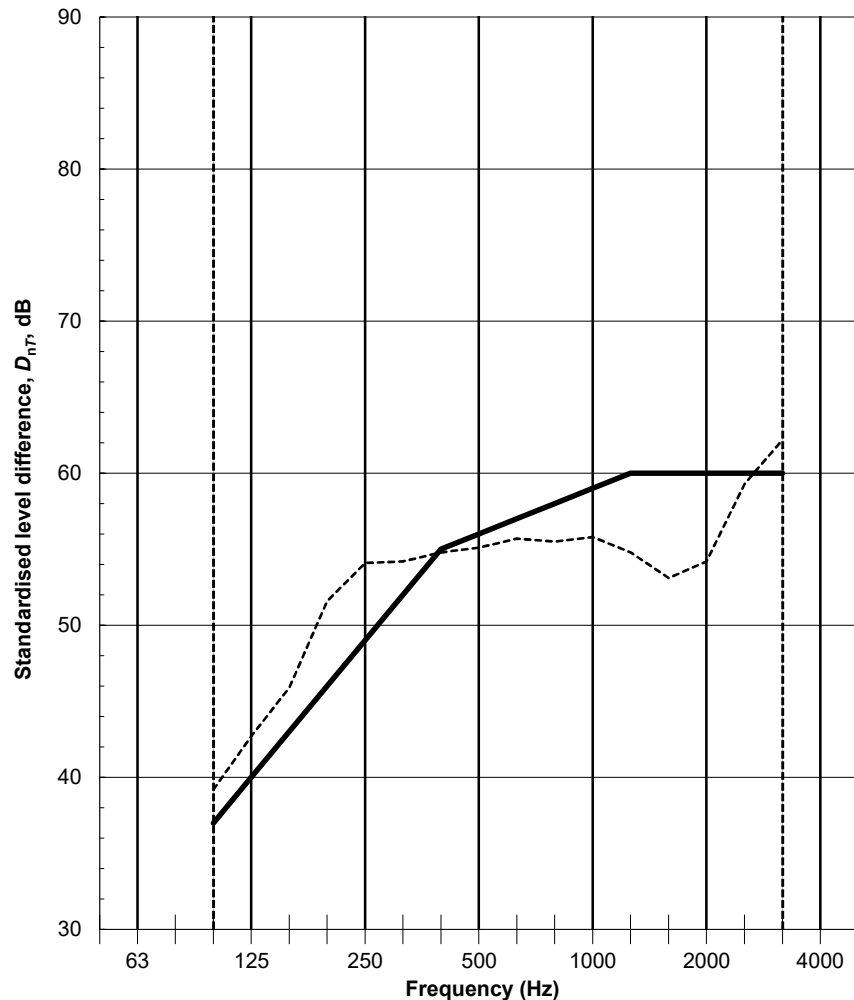
UNITE, Kincardine Court D11.K Cluster Kitchen to D13 Studio

Standardised Level Difference According to ISO 140-4 Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test:

2No. Layers 15mm Fireline Plasterboard (12.5kg/m²); 100mm Structural Metal Stud; 100mm Isover Acoustic Partition roll; 50mm Cavity; 50mm 'C' Stud2No. Layers; 15mm Fireline Plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D_{nT}</i> (dB)
50	
63	
80	
100	39.2
125	42.7
160	45.9
200	51.6
250	≥54.1
315	≥54.2
400	≥54.8
500	≥55.1
630	≥55.7
800	≥55.5
1000	≥55.8
1250	≥54.8
1600	≥53.1
2000	≥54.2
2500	≥59.3
3150	≥62.2
4000	
5000	



* Performance limited
by background noise level

Rating according to
BS EN ISO 717-1

***D_{nT,w}* (C; C_{tr}) 56 (-1; -3) dB**

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

Test undertaken by:

Source Room Volume: 66 m³

Receiving Room Volume: 46 m³

Client: Bowmer and Kirkland

Test Date: 07/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

Figure 3

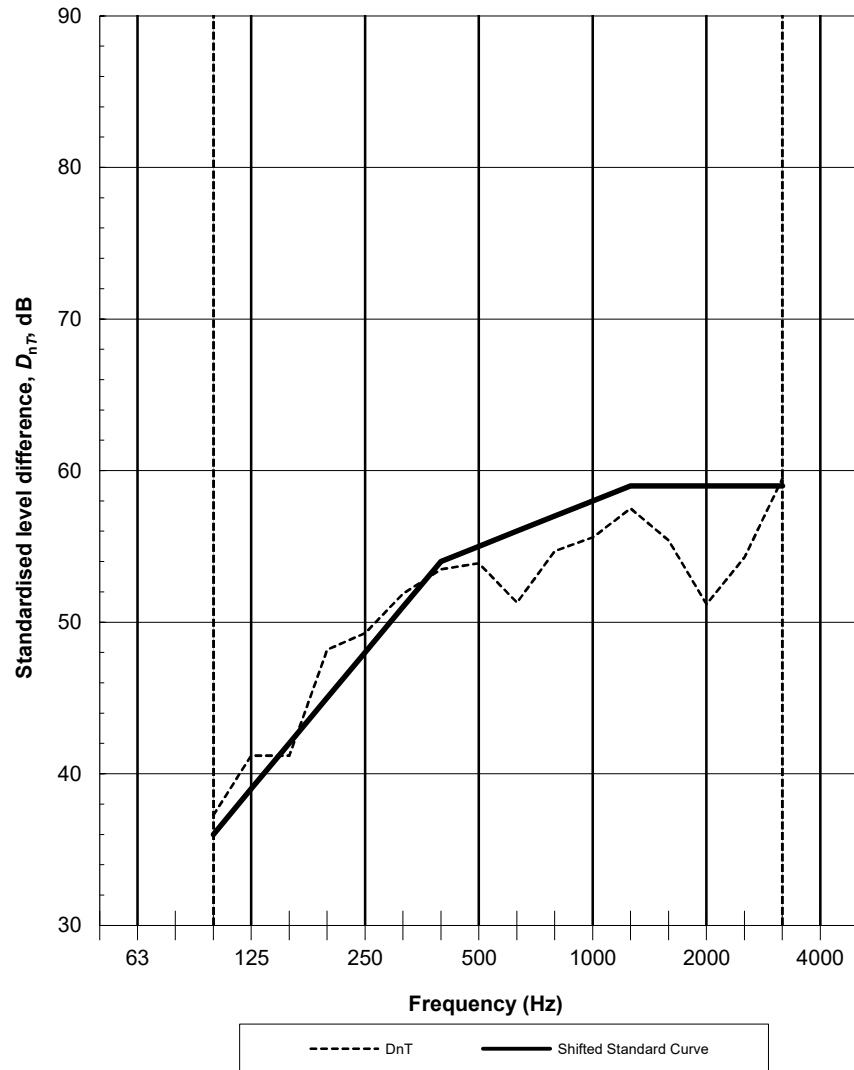
UNITE, Kincardine Court D13 Studio to D14 Studio

Standardised Level Difference According to ISO 140-4 Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test:

2No. Layers 15mm Fireline Plasterboard (12.5kg/m²); 100mm Structural Metal Stud; 100mm Isover Acoustic Partition roll; 50mm Cavity; 50mm 'C' Stud2No. Layers; 15mm Fireline Plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D_{nT}</i> (dB)
50	
63	
80	
100	37.3
125	41.2
160	41.2
200	48.2
250	49.3
315	51.9
400	53.5
500	53.9
630	51.3
800	≥54.7
1000	≥55.6
1250	≥57.5
1600	≥55.4
2000	51.2
2500	≥54.3
3150	≥59.5
4000	
5000	



* Performance limited
by background noise level

Rating according to
BS EN ISO 717-1

***D_{nT,w}* (C; C_{tr}) 55 (-2; -4) dB**

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

Test undertaken by:

Source Room Volume: 46 m³

Receiving Room Volume: 46 m³

Client: Bowmer and Kirkland

Test Date: 07/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

Figure 4

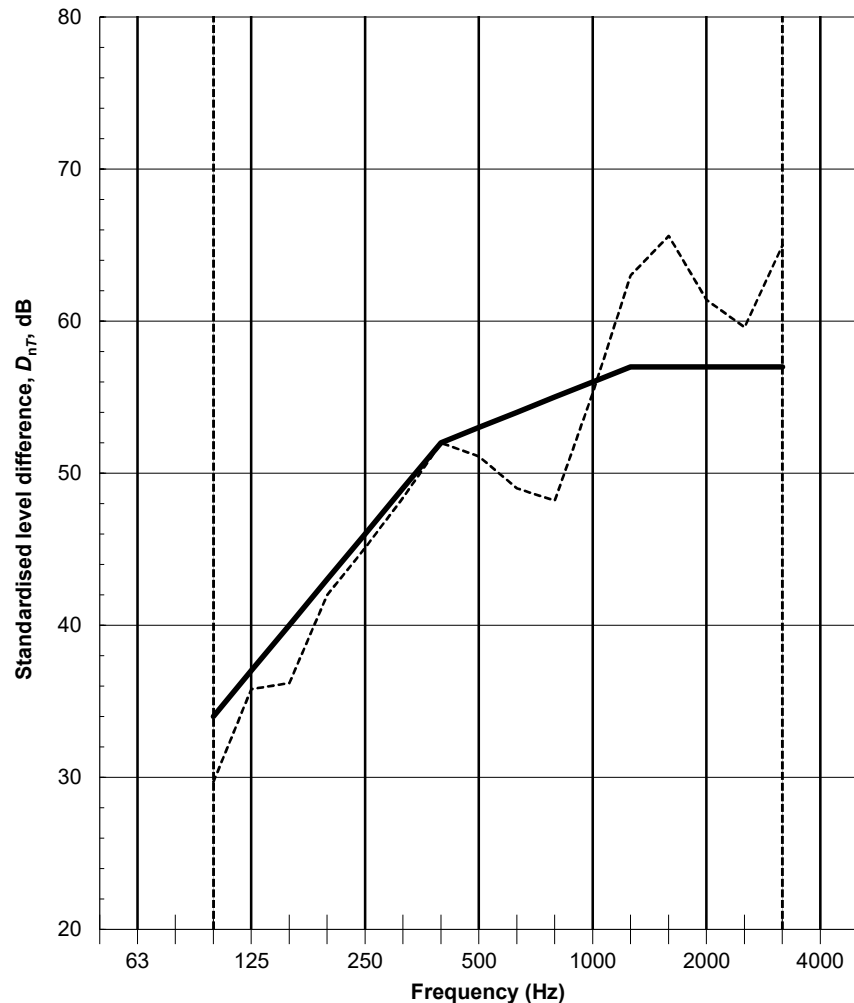
UNITE, Kincardine Court D15 Studio to D16.1 Cluster Bedroom

Standardised Level Difference According to ISO 140-4 Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test:

2No. Layers 15mm Fireline Plasterboard (12.5kg/m²); 100mm Structural Metal Stud; 100mm Isover Acoustic Partition roll; 50mm Cavity; 50mm 'C' Stud 2No. Layers; 15mm Fireline Plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D_{nT}</i> (dB)
50	
63	
80	
100	29.7
125	35.8
160	36.2
200	42.0
250	45.1
315	48.4
400	52.0
500	51.1
630	49.0
800	48.2
1000	55.3
1250	63.0
1600	≥65.6
2000	≥61.4
2500	59.6
3150	65.0
4000	
5000	



* Performance limited
by background noise level

Rating according to
BS EN ISO 717-1

***D_{nT,w}* (C; C_{tr}) 53 (-2; -7) dB**

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

Test undertaken by:

Source Room Volume: 46 m³

Receiving Room Volume: 26 m³

Client: Bowmer and Kirkland

Test Date: 07/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

Figure 5

UNITE, Kincardine Court
D4.6 Cluster Bedroom to D5.1 Cluster Bedroom

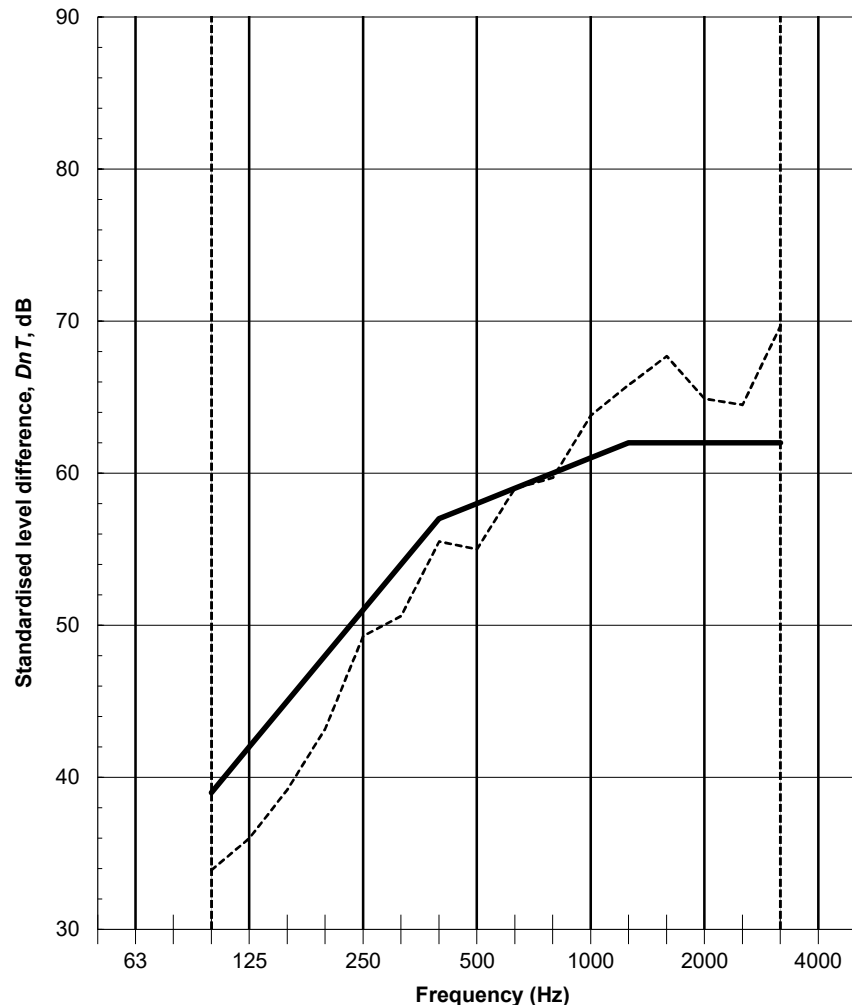
Standardised Level Difference According to ISO 140-4
Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test:

2No. Layers 15mm Fireline Plasterboard (12.5kg/m²); 100mm Structural Metal Stud; 100mm Isover Acoustic Partition roll; 50mm Cavity; 50mm 'C' Stud 2No. Layers; 15mm Fireline Plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D_{nT}</i> (dB)
50	
63	
80	
100	33.9
125	36.0
160	39.2
200	43.2
250	49.3
315	50.6
400	55.5
500	55.0
630	59.0
800	59.7
1000	63.8
1250	65.8
1600	≥67.7
2000	64.9
2500	64.5
3150	69.7
4000	
5000	

*



* Performance limited
by background noise level

Rating according to
BS EN ISO 717-1

***D_{nT,w}* (C; C_{tr}) 58 (-3; -8) dB**

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

Test undertaken by:

Source Room Volume: 26 m³

Receiving Room Volume: 26 m³

Client: Bowmer and Kirkland

Test Date: 07/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

Figure 6

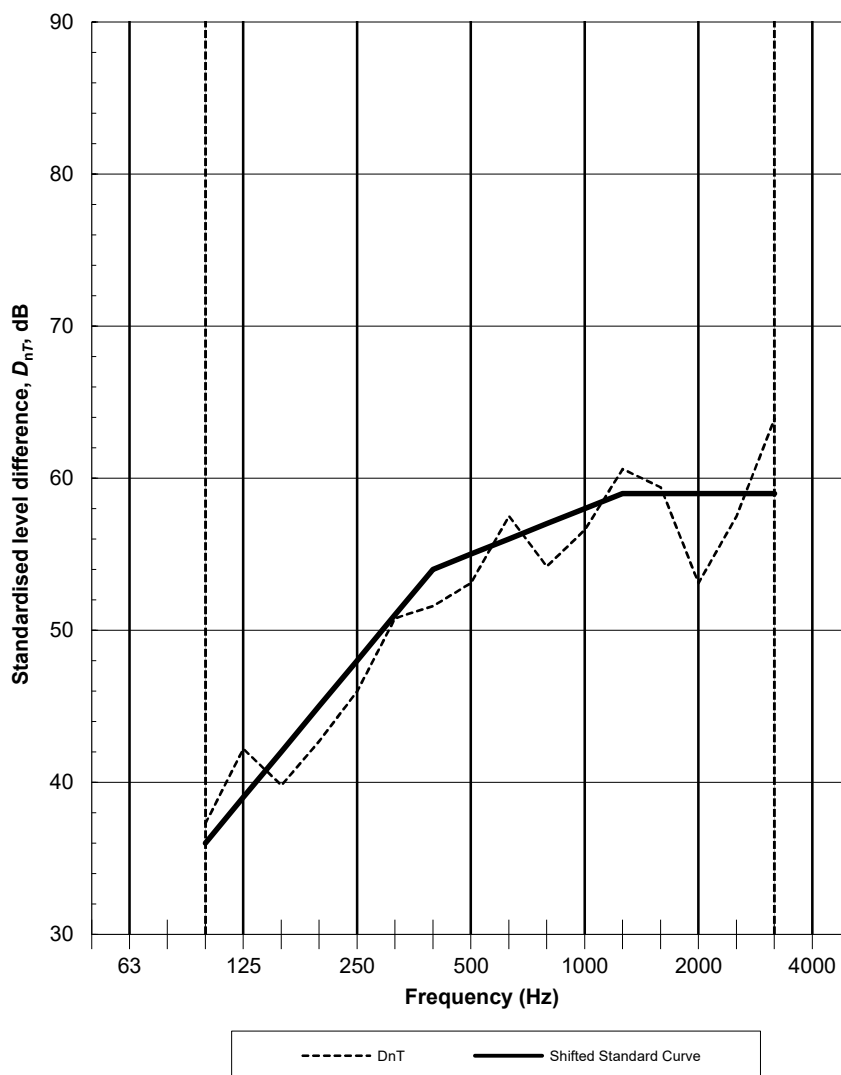
UNITE, Kincardine Court
D8 Studio to D9.1 Cluster Bedroom

Standardised Level Difference According to ISO 140-4
Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test:

2No. Layers 15mm Fireline Plasterboard (12.5kg/m²); 100mm Structural Metal Stud; 100mm Isover Acoustic Partition roll; 50mm Cavity; 50mm 'C' Stud2No. Layers; 15mm Fireline Plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D</i> _{nT} (dB)
50	
63	
80	
100	37.3
125	42.2
160	39.8
200	42.7
250	46.0
315	50.8
400	51.6
500	53.1
630	57.5
800	54.2
1000	56.6
1250	60.6
1600	59.4
2000	53.1
2500	57.5
3150	63.9
4000	
5000	



Rating according to
BS EN ISO 717-1

***D*_{nT,w} (*C*; *C*_{tr}) 55 (-1; -5) dB**

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

Test undertaken by:

Source Room Volume: 46 m³

Receiving Room Volume: 26 m³

Client: Bowmer and Kirkland

Test Date: 07/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

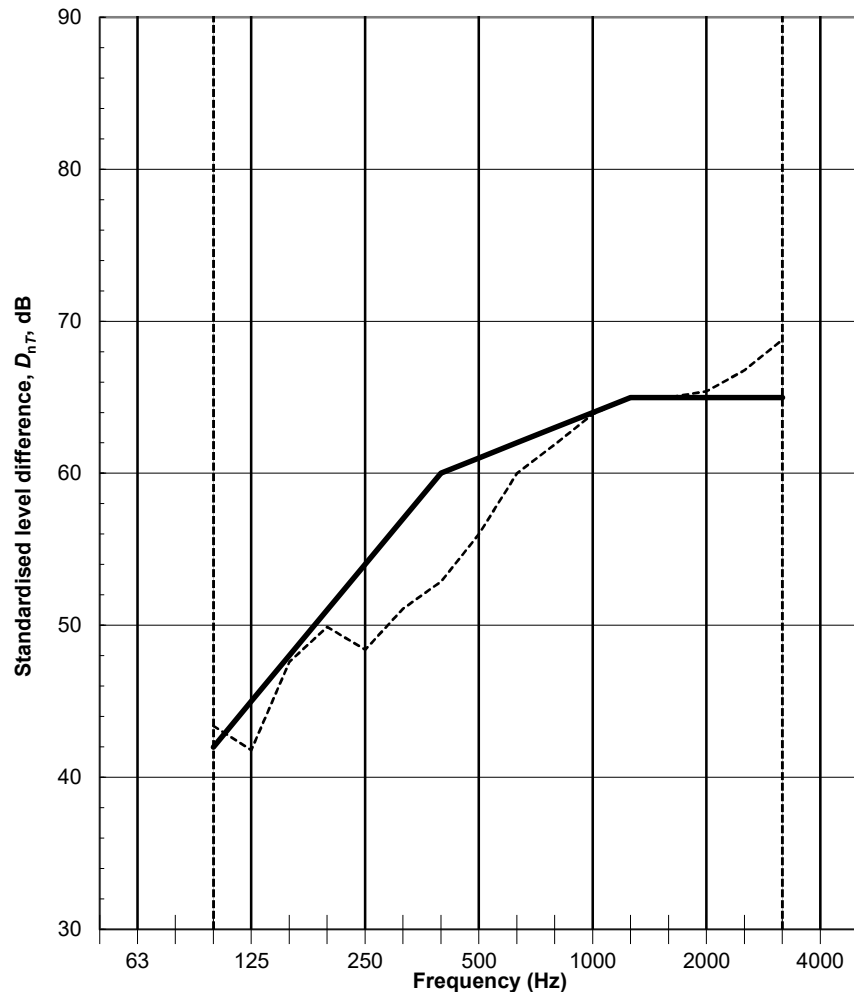
Figure 7

UNITE, Kincardine Court D31 Studio to D26 Studio

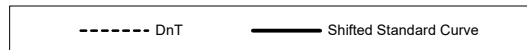
Standardised Level Difference According to ISO 140-4 Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test: Lino Floor Finish; 180mm concrete slab; MF suspended ceiling with void; 12.5mm dense plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D_{nT}</i> (dB)
50	
63	
80	
100	43.4
125	41.8
160	47.6
200	49.9
250	48.4
315	51.1
400	52.9
500	56.0
630	60.0
800	61.9
1000	≥63.9
1250	≥65.0
1600	≥65.0
2000	≥65.4
2500	≥66.8
3150	≥68.8
4000	
5000	



* Performance limited
by background noise level



Rating according to
BS EN ISO 717-1

***D_{nT,w}* (C; C_{tr}) 61 (-2; -6) dB**

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

Test undertaken by:

Source Room Volume: 46 m³

Receiving Room Volume: 46 m³

Client: Bowmer and Kirkland

Test Date: 07/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

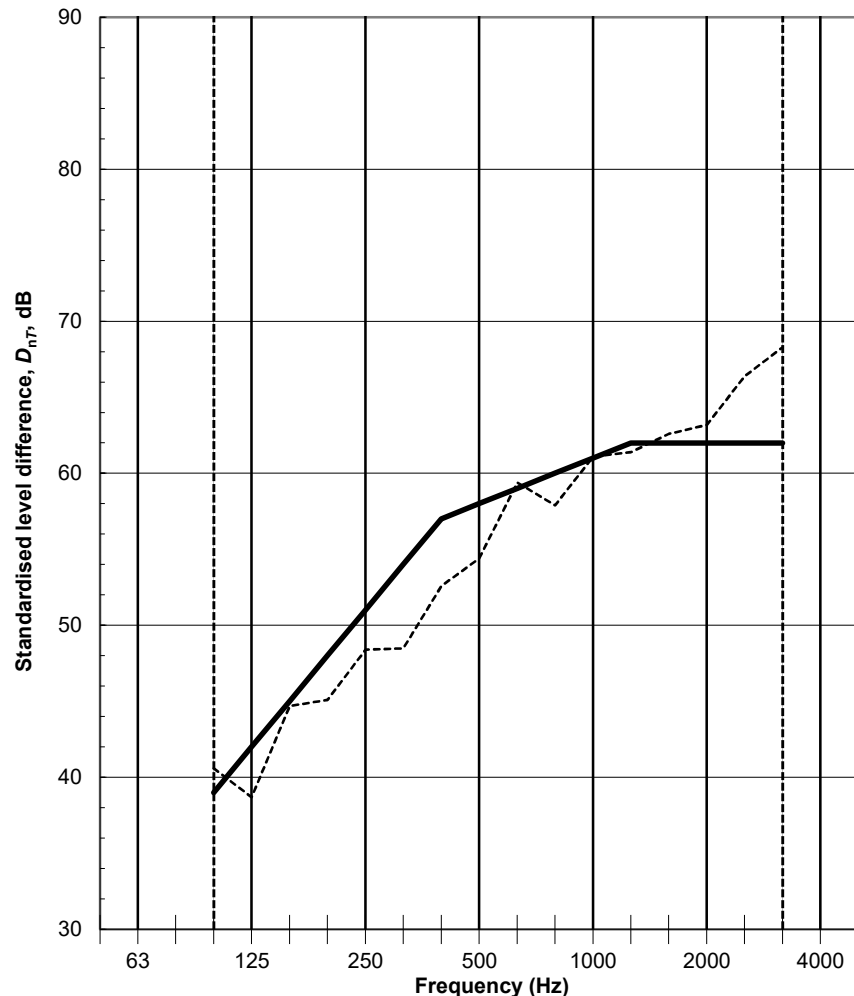
Figure 8

UNITE, Kincardine Court
D23.1 Cluster Bedroom to D16.1 Cluster Bedroom

Standardised Level Difference According to ISO 140-4
Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test: Lino Floor Finish; 180mm concrete slab; MF suspended ceiling with void; 12.5mm dense plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D</i> _{nT} (dB)
50	
63	
80	
100	40.6
125	38.7
160	44.7
200	45.1
250	48.4
315	48.5
400	52.6
500	54.4
630	59.4
800	57.9
1000	61.1
1250	61.4
1600	62.6
2000	63.2
2500	≥66.4 *
3150	≥68.3 *
4000	
5000	



* Performance limited
by background noise level

Rating according to
BS EN ISO 717-1

***D*_{nT,w} (*C*; *C*_{tr}) 58 (-1; -6) dB**

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

Test undertaken by:

Source Room Volume: 26 m³

Receiving Room Volume: 26 m³

Client: Bowmer and Kirkland

Test Date: 07/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

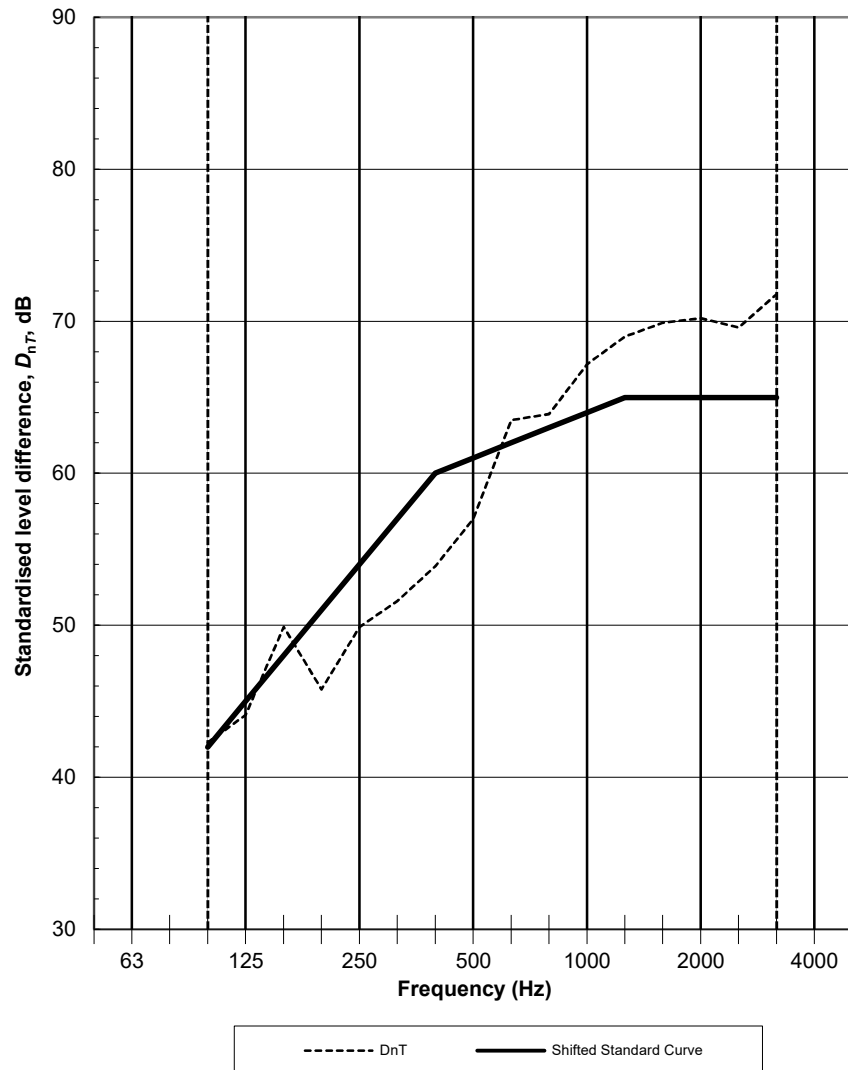
Figure 9

UNITE, Kincardine Court
D19.1 Cluster Bedroom to D12.1 Cluster Bedroom

Standardised Level Difference According to ISO 140-4
Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test: Lino Floor Finish; 180mm concrete slab; MF suspended ceiling with void; 12.5mm dense plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D</i> _{nT} (dB)
50	
63	
80	
100	42.3
125	44.1
160	49.9
200	45.8
250	49.9
315	51.6
400	53.9
500	57.0
630	63.5
800	63.9
1000	67.2
1250	69.0
1600	69.9
2000	70.2
2500	69.6
3150	71.8
4000	
5000	



Rating according to
BS EN ISO 717-1

***D*_{nT,w} (*C*; *C*_{tr}) 61 (-1; -6) dB**

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

Test undertaken by:

Source Room Volume: 26 m³

Receiving Room Volume: 26 m³

Client: Bowmer and Kirkland

Test Date: 07/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

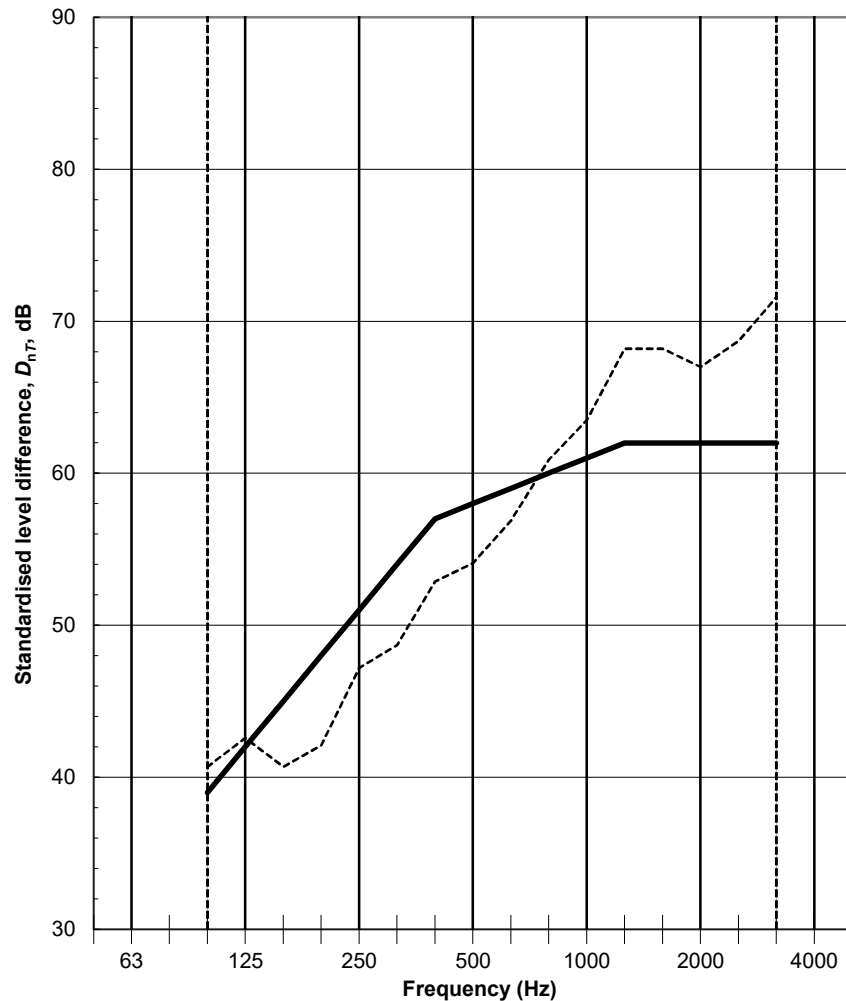
Figure 10

UNITE, Kincardine Court
D12.1 Cluster Bedroom to D5.1 Cluster Bedroom

Standardised Level Difference According to ISO 140-4
Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test: Lino Floor Finish; 180mm concrete slab; MF suspended ceiling with void; 12.5mm dense plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D_{nT}</i> (dB)
50	
63	
80	
100	40.7
125	42.6
160	40.7
200	42.1
250	47.2
315	48.7
400	52.9
500	54.1
630	56.9
800	60.9
1000	63.5
1250	≥68.2
1600	≥68.2
2000	≥67.0
2500	≥68.7
3150	≥71.6
4000	
5000	



* Performance limited
by background noise level

Rating according to
BS EN ISO 717-1

***D_{nT,w}* (*C*; *C_{tr}*) 58 (-2; -6) dB**

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

Test undertaken by:

Source Room Volume: 26 m³

Receiving Room Volume: 26 m³

Client: Bowmer and Kirkland

Test Date: 07/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

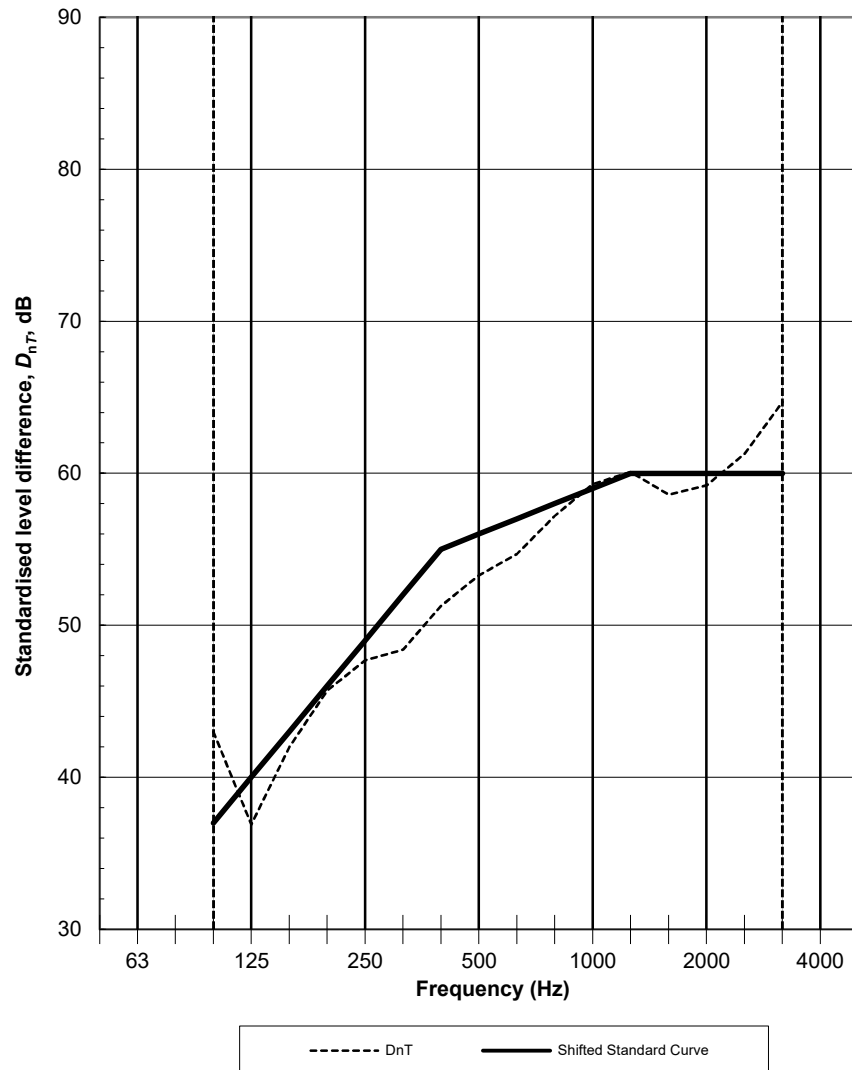
Figure 11

UNITE, Kincardine Court D15 Studio to D16.1 Studio

Standardised Level Difference According to ISO 140-4 Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test: Lino Floor Finish; 180mm concrete slab; MF suspended ceiling with void; 12.5mm dense plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D</i> _{nT} (dB)
50	
63	
80	
100	43.0
125	36.9
160	42.0
200	45.7
250	47.7
315	48.4
400	51.3
500	53.3
630	54.7
800	57.2
1000	59.3
1250	60.1
1600	58.6
2000	59.2
2500	61.3
3150	64.7
4000	
5000	



Rating according to
BS EN ISO 717-1

***D*_{nT,w} (*C*; *C*_{tr}) 56 (-1; -5) dB**

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

Test undertaken by:

Source Room Volume: 46 m³

Receiving Room Volume: 46 m³

Client: Bowmer and Kirkland

Test Date: 07/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

Figure 12

UNITE, Kincardine Court

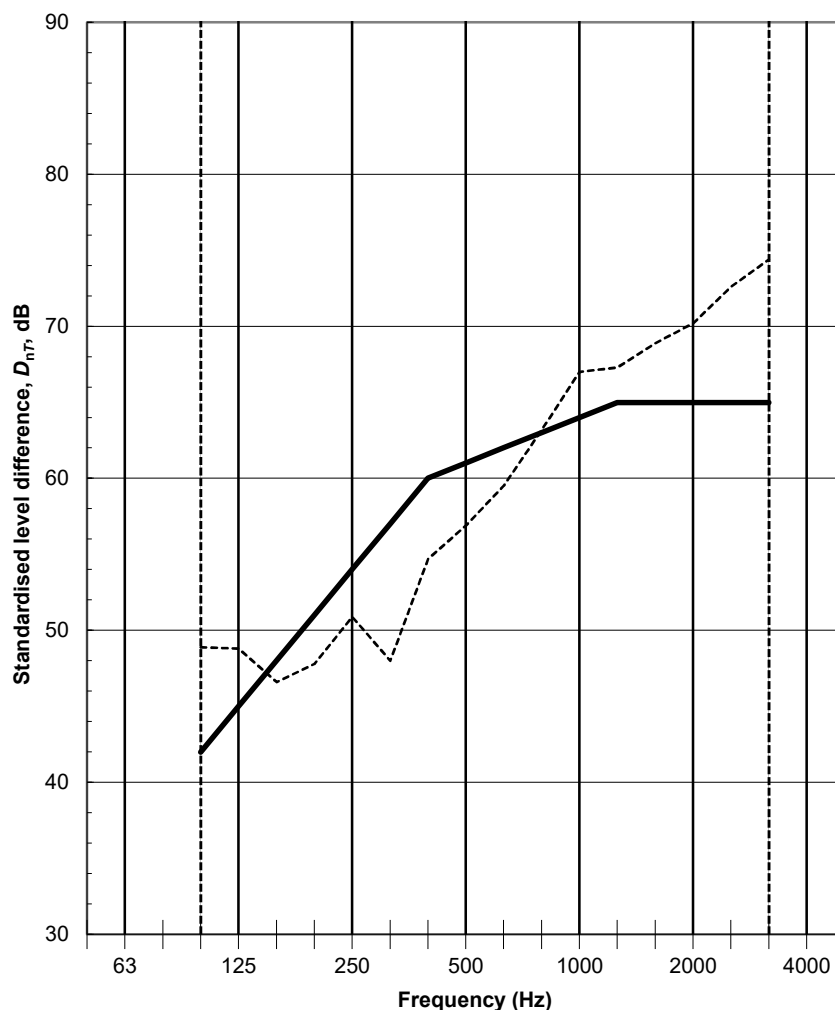
D16.1 Cluster Bedroom to D9.1 Cluster Bedroom

Standardised Level Difference According to ISO 140-4

Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test: Lino Floor Finish; 180mm concrete slab; MF suspended ceiling with void; 12.5mm dense plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D_{nT}</i> (dB)
50	
63	
80	
100	48.9
125	48.8
160	46.6
200	47.8
250	50.9
315	48.0
400	54.7
500	56.9
630	59.5
800	63.2
1000	67.0
1250	≥67.3 *
1600	≥68.9 *
2000	≥70.2 *
2500	≥72.6 *
3150	≥74.4 *
4000	
5000	



* Performance limited
by background noise level

Rating according to
BS EN ISO 717-1

***D_{nT,w}* (*C*; *C_{tr}*) 61 (-1; -5) dB**

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

Test undertaken by:

Source Room Volume: 26 m³

Receiving Room Volume: 26 m³

Client: Bowmer and Kirkland

Test Date: 07/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

Figure 13

UNITE, Kincardine Court

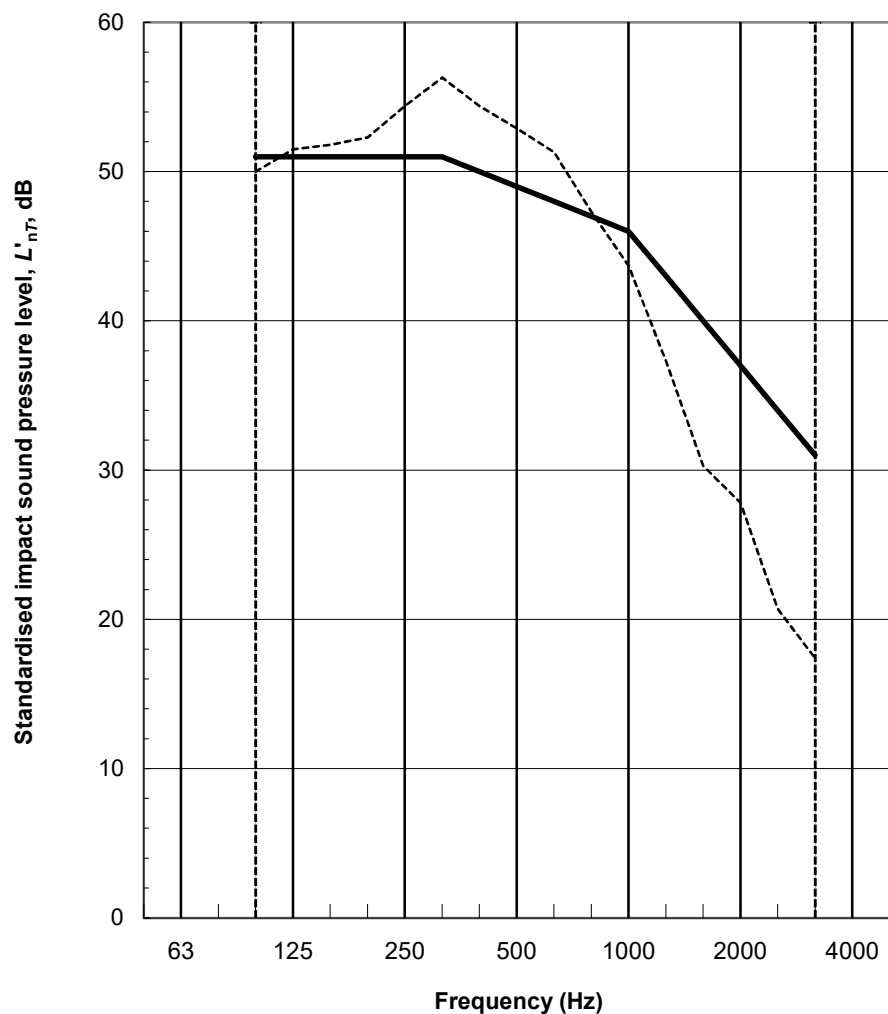
D31 Studio to D26 Studio

Standardised Impact Sound Pressure Levels According to ISO 140-7

Field Measurements of Impact Sound Insulation of Floors

Construction Under Test: Lino Floor Finish; 180mm concrete slab; MF suspended ceiling with void; 12.5mm dense plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>L'</i> _{nT} (dB)
50	
63	
80	
100	50.0
125	51.5
160	51.8
200	52.3
250	54.4
315	56.3
400	54.4
500	52.9
630	51.3
800	47.3
1000	43.7
1250	37.3
1600	30.3
2000	27.8
2500	≤20.7
3150	≤17.4
4000	
5000	



* Performance limited
by background noise level

Rating according to
BS EN ISO 717-2

***L'*_{nT,w} (C_I) 49* (-1) dB**

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

Test undertaken by:

Client: Bowmer
Test Date: 07/09/2022
ANC Task No.: 113/75215

[Signature]

RBA Acoustics

Receiving Room Volume: 46 m³

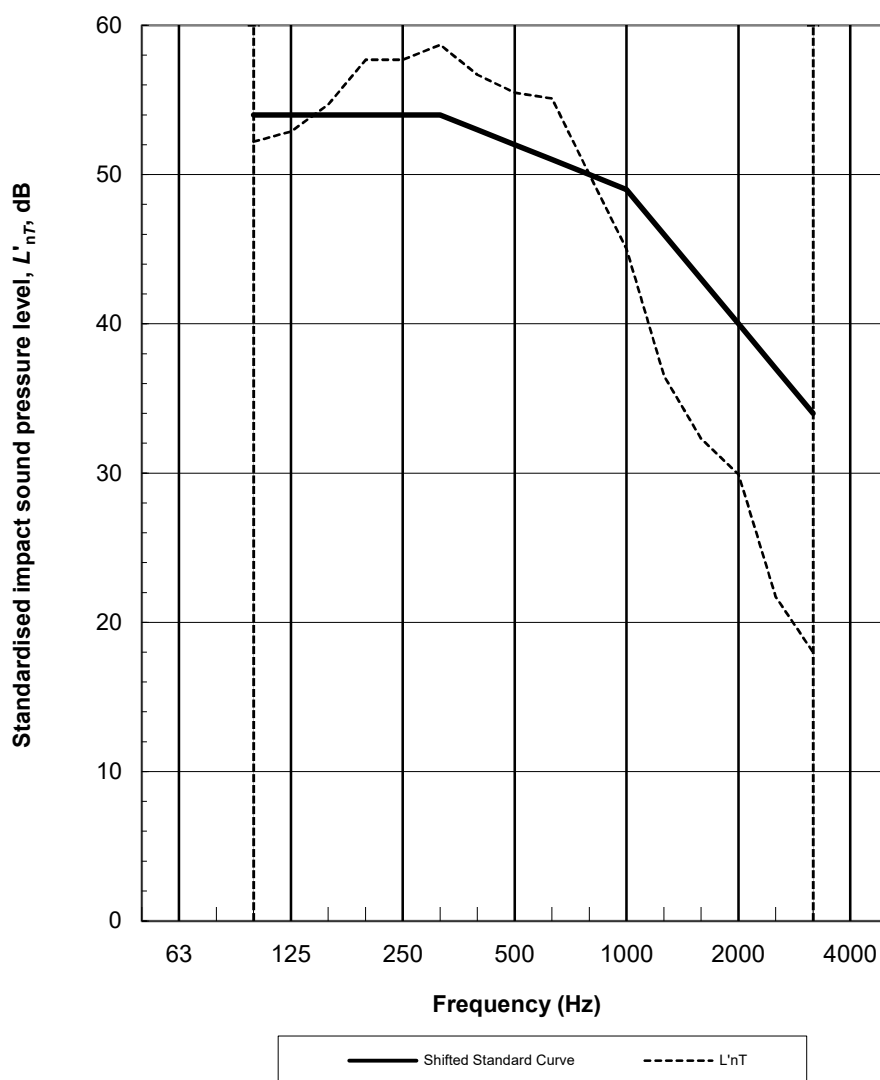
Project 9226
Figure 14

UNITE, Kincardine Court
D23.1 Cluster Bedroom to D16.1 Cluster Bedroom

Standardised Impact Sound Pressure Levels According to ISO 140-7
Field Measurements of Impact Sound Insulation of Floors

Construction Under Test: Lino Floor Finish; 180mm concrete slab; MF suspended ceiling with void; 12.5mm dense plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>L'</i> _{nT} (dB)
50	
63	
80	
100	52.2
125	52.9
160	54.7
200	57.7
250	57.7
315	58.7
400	56.7
500	55.5
630	55.1
800	50.0
1000	45.0
1250	36.5
1600	32.3
2000	29.9
2500	21.7
3150	18.0
4000	
5000	



Rating according to
BS EN ISO 717-2

***L'*_{nT,w} (C_I) 52 (-1) dB**

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

Test undertaken by:

Client: Bowmer
 Test Date: 07/09/2022
 ANC Task No.: 113/75215

Receiving Room Volume: 26 m³

RBA Acoustics

Project 9226
 Figure 15

UNITE, Kincardine Court

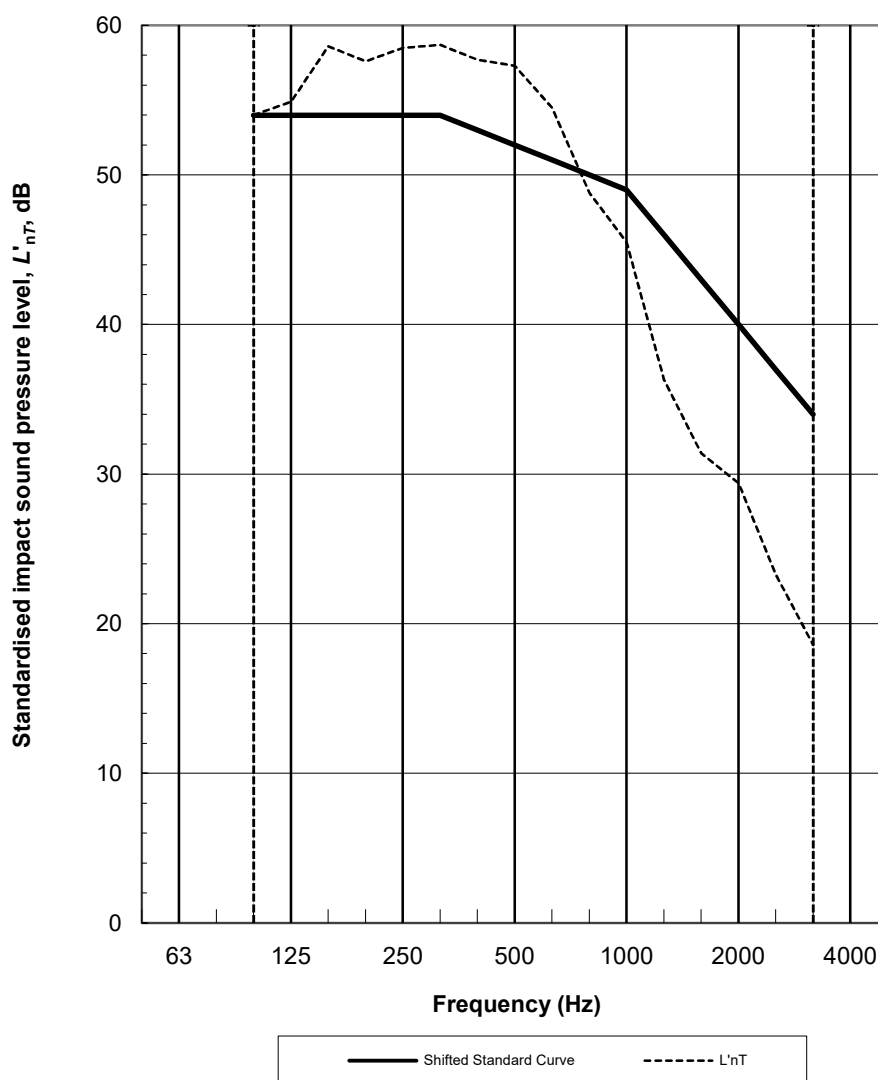
D19.1 Cluster Bedroom to D12.1 Cluster Bedroom

Standardised Impact Sound Pressure Levels According to ISO 140-7

Field Measurements of Impact Sound Insulation of Floors

Construction Under Test: Lino Floor Finish; 180mm concrete slab; MF suspended ceiling with void; 12.5mm dense plasterboard (12.5kg/m²)

Frequency f (Hz)	L'_{nT} (dB)
50	
63	
80	
100	54.0
125	54.9
160	58.6
200	57.6
250	58.5
315	58.7
400	57.7
500	57.3
630	54.5
800	48.8
1000	45.5
1250	36.3
1600	31.4
2000	29.4
2500	23.3
3150	18.6
4000	
5000	



Rating according to
BS EN ISO 717-2

$L'_{nT,w}$ (C_I) 52 (0) dB

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

Test undertaken by:

Client: Bowmer
Test Date: 07/09/2022
ANC Task No.: 113/75215

Receiving Room Volume: 26 m³

RBA Acoustics

Project 9226
Figure 16

UNITE, Kincardine Court

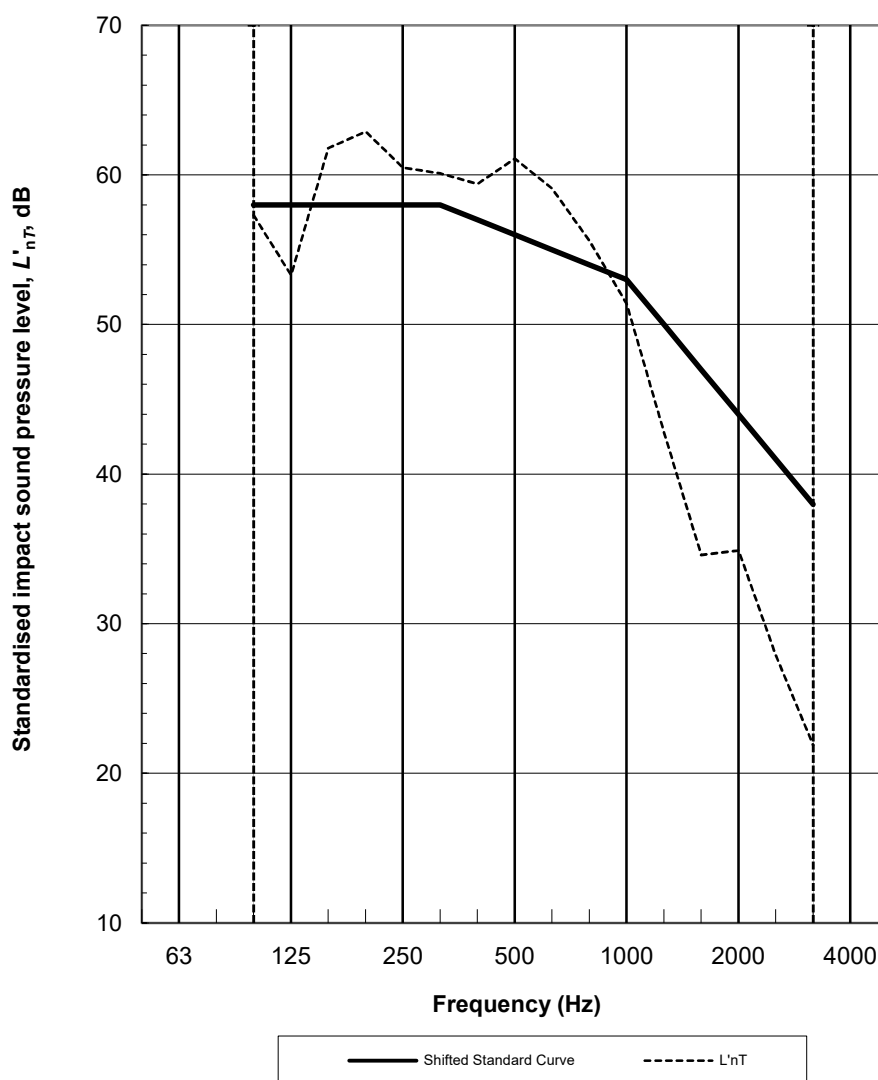
D12.1 Cluster Bedroom to D5.1 Cluster Bedroom

Standardised Impact Sound Pressure Levels According to ISO 140-7

Field Measurements of Impact Sound Insulation of Floors

Construction Under Test: Lino Floor Finish; 180mm concrete slab; MF suspended ceiling with void; 12.5mm dense plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>L'</i> _{nT} (dB)
50	
63	
80	
100	57.3
125	53.3
160	61.8
200	62.9
250	60.5
315	60.1
400	59.4
500	61.1
630	59.1
800	55.6
1000	51.4
1250	42.8
1600	34.6
2000	34.9
2500	27.9
3150	21.9
4000	
5000	



Rating according to
BS EN ISO 717-2

***L'*_{nT,w} (C_I) 56 (-1) dB**

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

Test undertaken by:

Client: Bowmer
Test Date: 07/09/2022
ANC Task No.: 113/75215

Receiving Room Volume: 26 m³

RBA Acoustics

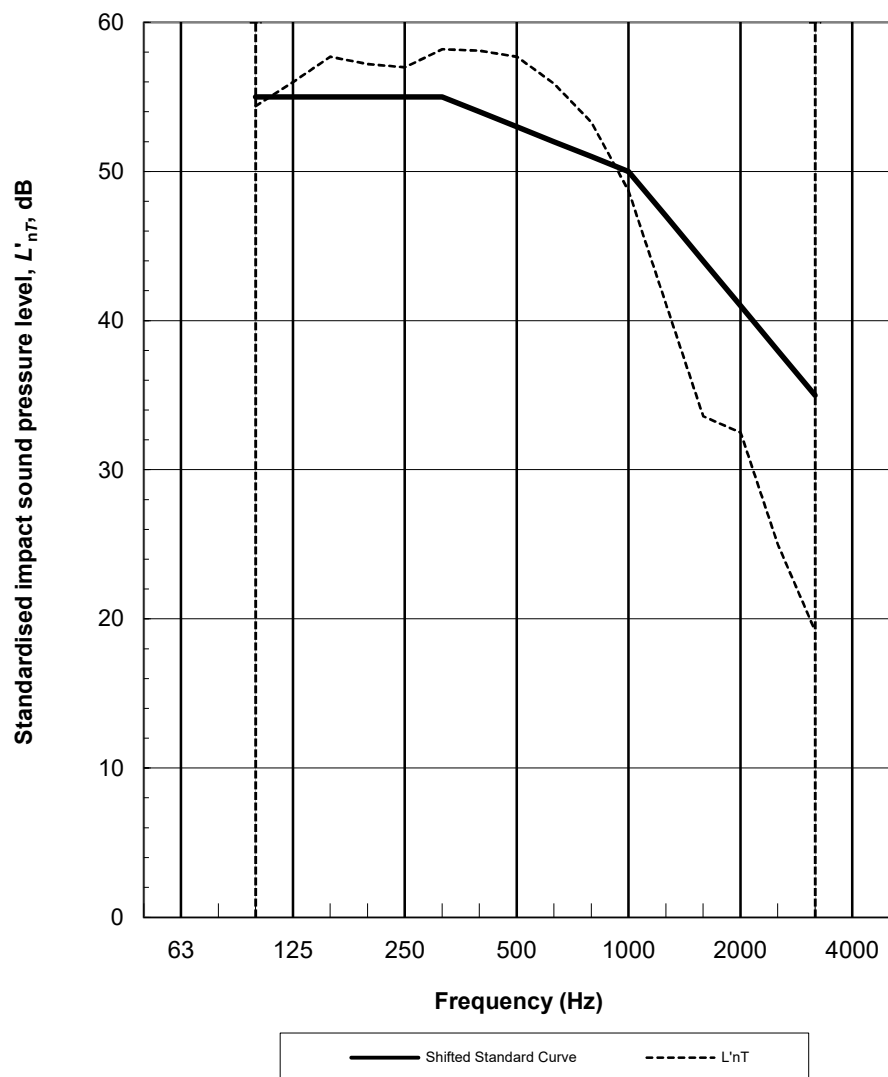
Project 9226
Figure 17

UNITE, Kincardine Court D15 Studio to D16.1 Studio

Standardised Impact Sound Pressure Levels According to ISO 140-7 Field Measurements of Impact Sound Insulation of Floors

Construction Under Test: Lino Floor Finish; 180mm concrete slab; MF suspended ceiling with void; 12.5mm dense plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>L'</i> _{nT} (dB)
50	
63	
80	
100	54.4
125	56.0
160	57.7
200	57.2
250	57.0
315	58.2
400	58.1
500	57.7
630	55.9
800	53.3
1000	48.7
1250	41.1
1600	33.6
2000	32.5
2500	25.0
3150	19.2
4000	
5000	



Rating according to
BS EN ISO 717-2

***L'*_{nT,w} (C_I) 53 (-1) dB**

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

Test undertaken by:

Client: Bowmer
Test Date: 07/09/2022
ANC Task No.: 113/75215

Receiving Room Volume: 46 m³

RBA Acoustics

Project 9226
Figure 18

UNITE, Kincardine Court

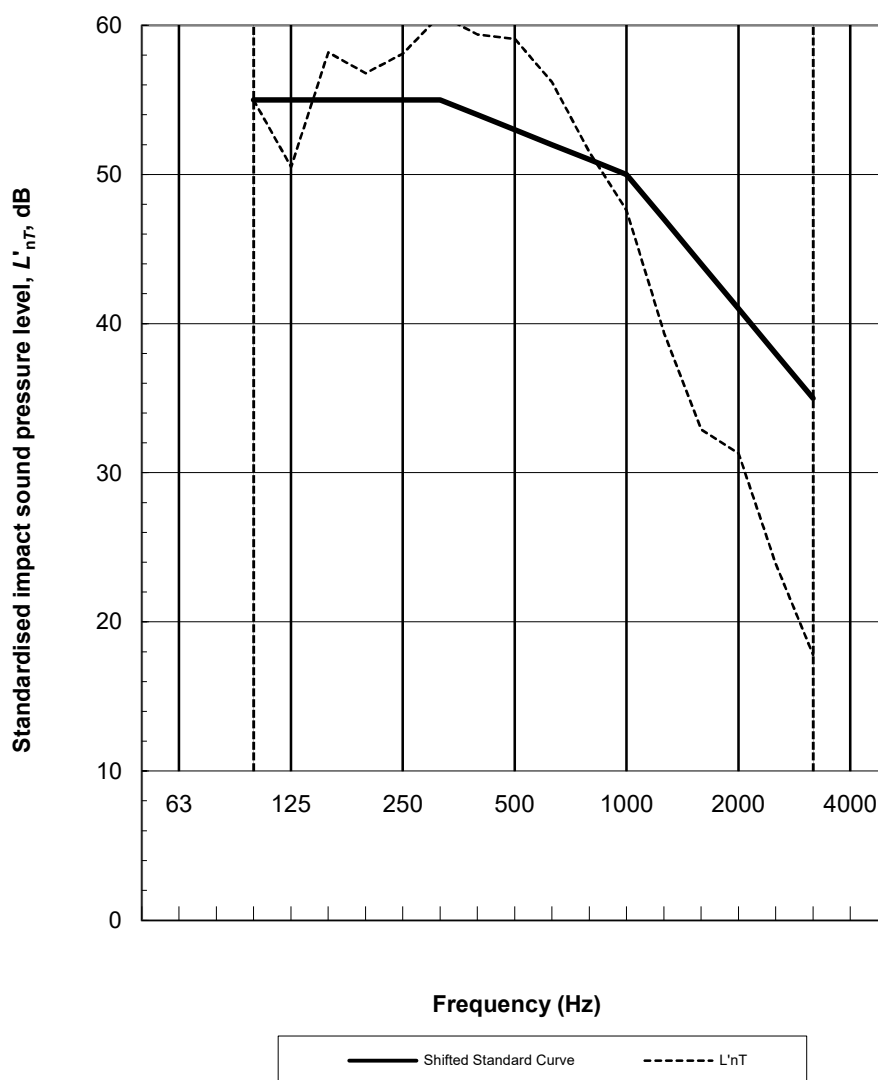
D16.1 Cluster Bedroom to D9.1 Cluster Bedroom

Standardised Impact Sound Pressure Levels According to ISO 140-7

Field Measurements of Impact Sound Insulation of Floors

Construction Under Test: Lino Floor Finish; 180mm concrete slab; MF suspended ceiling with void; 12.5mm dense plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>L'</i> _{nT} (dB)
50	
63	
80	
100	55.0
125	50.5
160	58.2
200	56.8
250	58.1
315	60.7
400	59.4
500	59.1
630	56.2
800	51.5
1000	47.6
1250	39.4
1600	32.9
2000	31.3
2500	23.9
3150	17.8
4000	
5000	



Rating according to
BS EN ISO 717-2

***L'*_{nT,w} (C_I) 53 (0) dB**

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

Test undertaken by:

Client: Bowmer
Test Date: 07/09/2022
ANC Task No.: 113/75215

Receiving Room Volume: 26 m³

RBA Acoustics

Project 9226
Figure 19

UNITE, Kincardine Court
D15 Studio to D16.1 Cluster Bedroom

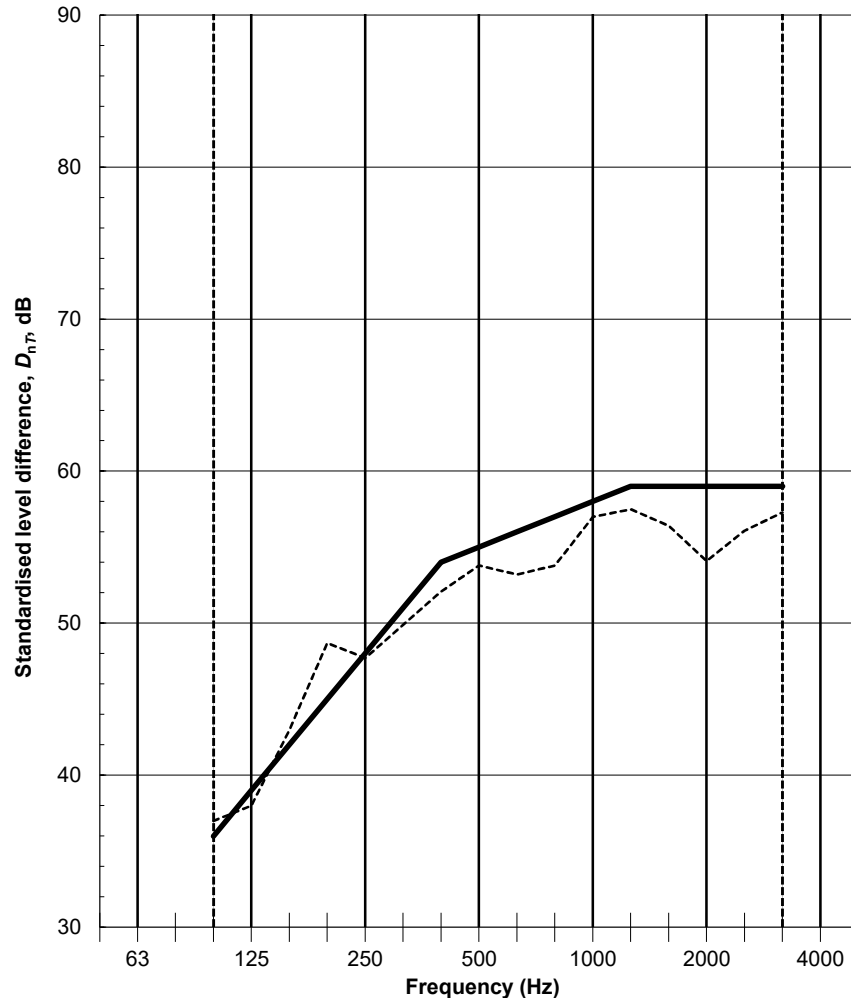
Standardised Level Difference According to ISO 140-4
Field Measurement of Airborne Sound Insulation Between Rooms

Construction Under Test:

2No. Layers 15mm Fireline Plasterboard (12.5kg/m²); 100mm Structural Metal Stud; 100mm Isover Acoustic Partition roll; 50mm Cavity; 50mm 'C' Stud2No. Layers; 15mm Fireline Plasterboard (12.5kg/m²)

Frequency <i>f</i> (Hz)	<i>D_{nT}</i> (dB)
50	
63	
80	
100	37.0
125	38.0
160	43.0
200	48.7
250	47.7
315	49.9
400	52.1
500	53.8
630	53.2
800	53.8
1000	57.0
1250	≥57.5
1600	≥56.4
2000	≥54.1
2500	≥56.1
3150	≥57.3
4000	
5000	

*
*
*
*
*



* Performance limited
by background noise level

Rating according to
BS EN ISO 717-1

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

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

Test undertaken by:

Source Room Volume: 46 m³

Receiving Room Volume: 26 m³

Client: Bowmer and Kirkland

Test Date: 14/09/2022

ANC Task No.: 113/75215 RBA Acoustics

Project 9226

Figure 20