Swan House
Manchester

Sound Insulation Test Report

25173/SIT3

14 May 2024

For:

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Hann Tucker Associates

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Sound Insulation Test Report
25173/SIT3

Contents

		Page
1.0	Introduction	2
2.0	Objectives	2
3.0	Requirements Of Approved Document E	2
4.0	Test Procedure	3
5.0	Results	8
6.0	Discussion	9
7.0	Conclusion	9

Attachments

Appendix A – Graphs

This report has been prepared by Hann Tucker Associates Limited (HTA) with all reasonable skill, care and diligence in accordance with generally accepted acoustic consultancy principles and the purposes and terms agreed between HTA and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by HTA unless expressly stated otherwise. This document contains confidential and commercially sensitive information and shall not be disclosed to third parties. Any third party relies upon this document at their own risk.

Sound Insulation Test Report
25173/SIT3

Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	14/05/2024	-		
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1.0 Introduction

Hann Tucker Associates visited Swan House on 08 May 2024 to undertake airborne and impact sound insulation tests on selected separating wall and floor constructions between residential dwellings.

The properties under test are new build rooms for residential purpose.

This report presents the results of the tests and compares them with recommended sound insulation standards described in the Building Regulations Approved Document E: 2003 Edition.

2.0 Objectives

To undertake airborne sound insulation tests on separating wall constructions between selected residential apartments at Swan House.

To undertake airborne and impact sound insulation tests on separating floor constructions between selected residential apartments at Swan House.

To compare the results of the tests with recommended sound insulation standards described in the Building Regulations Approved Document E: 2003 Edition.

3.0 Requirements Of Approved Document E

To satisfy Requirement E1 of Approved Document E: 2003 Edition, the following sound insulation values should be achieved:-

Table 1a: Dwellings – Performance Standards for Separating Walls, Separating Floors, and Stairs that have a Separating Function.

	Airborne Sound Insulation $D_{nT,w} + C_{tr}$ dB (Minimum Values)	Impact Sound Insulation $L'_{nT,w}$ dB (Maximum Values)
Purpose built dwellings		
Walls	45	-
Floors and stairs	45	62

Therefore the minimum value of weighted standardised level difference ($D_{nT,w}$) plus the spectrum adaptation curve (C_{tr}) as defined in BS EN ISO 717-1: 1997 specified in Approved Document E: 2003 Edition: Sound Insulation Standards for airborne sound tests is 45dB for purpose built dwellings.

The maximum values of weighted standardised impact sound pressure level ($L'_{nT,w}$) as defined in BS EN ISO 717-2: 1997 specified in Approved Document E: 2003 Edition: Sound Insulation Standards for impact sound tests on purpose built dwellings is 62dB.

4.0 Test Procedure

The testing was carried out by James Hardacre, BEng (Hons), AMIOA (Tester No.76) and assisted by Nick Mitchell, BSc (Hons), AMIOA.

4.1 Equipment

The equipment used during the testing is as follows:

Description	Manufacturer	Type	Serial Number	Calibration
Type 1 Data Logging Sound Level Meter	Bruel & Kjaer	2250	3007292	25/01/2024
Type 1 ½" Condenser Microphone	PCB	7052E	106753	25/01/2024
Preamp	Bruel & Kjaer	ZC0032	27782	25/01/2024
SLM Calibrator	Brüel and Kjær	4231	2271905	05/09/2023
Tapping Machine	Norsonic	277	2775527	01/11/2023
Noise Source - Custom made, un-ported sealed cabinet type	N/A	N/A	N/A	N/A

4.2 Airborne Sound Insulation Test Method (Separating Walls and Floors)

Hann Tucker Associates attended site on 08 May 2024, to undertake airborne sound insulation tests to selected separating floor and wall constructions. The tests were undertaken in full accordance with Approved Document E: 2003 Edition incorporating 2004 and 2010 amendments and BS EN ISO 140-4:1998 Acoustics – Measurement of airborne sound insulation in buildings and of building elements – Part 4: Field measurement of airborne sound insulation between rooms.

The sound level differences were determined by generating a broad band, random diffuse sound field within the source room. A spatial average of the resulting $^1/_3$ octave band noise levels was obtained within the source room from measurements undertaken over a time period of a least 30 seconds. The measurement procedure was repeated in the receive room. A second speaker position was then selected in the source room and the measurement procedure

was repeated.

The receive levels were corrected for background noise where necessary as follows:

Where the measured background noise level in each 1/3rd octave band was more than 6 dB but less than 10dB below the receive level, the following formula was applied:

$$L = 10\log\left(10^{\frac{L_{SB}}{10}} - 10^{\frac{L_B}{10}}\right) \text{ dB}$$

where

L is the adjusted signal level in decibels;

L_{SB} is the level of the signal and background noise levels combined, in decibels;

L_B is the background level in decibels.

Where the measured background noise level was less than 6 dB below the receive level, a correction of 1.3 dB was applied (corresponding to a level difference of 6 dB) and the ≥ symbol was added to the results to show that the reported values are the limit of measurement.

The corrected receive levels are subtracted from the source levels to determine the level differences over the frequency range 100-3150 Hz from each source position. The level differences for each source position are arithmetically averaged at each frequency band to give the level difference, D.

Reverberant decays were then recorded in the receive room to determine the reverberation times over the same frequency range using a broadband noise source. For each receiver room 6No. measurements were made, comprising of 2No. source positions and 3No. microphone positions per source position. The reverberation time, T, used in subsequent calculations is an average of the 2No. source positions.

Having established 1/3 octave band level differences and reverberation times over the frequency range 100-3150 Hz, the Standardised Level Difference, $D_{nT,}$ is calculated for each 1/3 octave band by applying the following formula:

$$D_{nT} = D + 10\log_{10}\left(\frac{T}{T_0}\right)$$

where T_0=0.5 seconds

The $^1/_3$ octave band results are 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, or $D_{nT,w}$.

The $^1/_3$ octave band results are also weighted using spectrum adaptation term No.2, C_{tr}, as detailed in BS EN ISO 717-1: 1997, to allow a more rigorous assessment of sound insulation performance with respect to low frequency noise.

The Weighted Standardised Level Difference and spectrum adaptation term are then added to give $D_{nT,w} + C_{tr}$, allowing comparison with the minimum airborne sound insulation requirements of Approved Document E.

4.3 Impact Sound Insulation Test Method (Separating Floors)

Hann Tucker Associates also undertook impact sound insulation tests on the selected separating floor constructions. The tests were undertaken in full accordance with Approved Document E: 2003 Edition incorporating 2004 and 2010 amendments and 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.

A tapping machine (meeting the requirements of BS EN ISO 140-7:1998, Annex A) was located at four positions in each source room. The machine generated a sound field in the room underneath (receive room) by means of dropping 5, ½kg hammers in sequence onto the floor at 0.1 second intervals.

A spatial average of the resulting $^1/_3$ octave band noise levels was obtained within the receive room from measurements undertaken over a time period of a least 30 seconds for each of the 4 source positions. The 4 No. resulting receive levels were logarithmically averaged at each $^1/_3$ octave frequency band to give the receive level L.

The receive levels were corrected for background noise where necessary as follows:

Where the measured background noise level in each 1/3rd octave band was more than 6 dB but less than 10 dB below the receive level, the following formula was applied:

$$L = 10 \log\left(10^{\frac{L_{SB}}{10}} - 10^{\frac{L_B}{10}}\right) \text{ dB}$$

where

L is the adjusted signal level in decibels;

L_{SB} is the level of the signal and background noise levels combined, in decibels;

L_B is the background level in decibels.

Where the measured background noise level was less than 6 dB below the receive level, a correction of 1.3 dB was applied (corresponding to a level difference of 6 dB) and the ≤ symbol was added to the results to show that the reported values are the limit of measurement.

Reverberant decays were then recorded in the receive room to determine the reverberation times over the same frequency range using a broadband noise source. For each receiver room 6No. measurements were made, comprising of 2No. source positions and 3No. microphone positions per source position. The reverberation time, T, used in subsequent calculations is an average of the 2No. source positions.

Having established the 1/3 octave impact sound pressure levels and reverberation times over the frequency range 100-3150Hz, the standardized Impact Sound Level is calculated for each 1/3 octave by applying the following formula:

$$L'_{nT} = L - 10\log_{10}\left(\frac{T}{T_0}\right)$$

where T_0 = 0.5 seconds

The 1/3 octave band results are 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, or $L'_{nT,w}$.

4.4 Background Noise

The background noise levels were measured in each receive room in order to correct the received noise measurements for the effect of the prevailing noise climate.

The prevailing background noise comprised nearby construction noise and intermittently road traffic noise from the surrounding roads.

4.5 Test Locations

All rooms tested had all doors and windows fitted and closed. The rooms were unfurnished.

The following airborne wall tests were undertaken:

Test	Source Room		Receive Room		Tested Construction Details
	Location	Approximate Volume (m^3)	Location	Approximate Volume (m^3)	
AW1	011-LKD*	79	012-LKD*	61	2x 15mm GTEC Fire Board 2x Braced C-Studs Min 25mm Mineral Wool Min Cavity 140mm 2x 15mm GTEC Fire Board
AW2	004-LKD*	62	005-LKD*	61	
AW3	1301-LKD*	59	1308-B	30	

*There were no cupboards present except where stated above.
**There were no step/staggers in the walls except where indicated above.

The following airborne floor tests were undertaken:

Test	Source Room		Receive Room		Tested Construction Details
	Location	Approximate Volume (m^3)	Location	Approximate Volume (m^3)	
AF1*	011-LKD	79	113-B	29	Linoleum Finish on 225mm Concrete Slab Plasterboard on MF
AF2*	004-LKD	62	107-B	34	
AF3	208-LKD	79	106-LKD	79	
AF4	208-B	30	106-B	28	
AF5	214-B	28	112-B	28	
AF6	214-LKD	98	112-LKD	98	

*There were no step/staggers on the floors except where indicated above.

The following impact tests were undertaken:

Test	Source Room		Receive Room		Tested Construction Details
	Location	Approximate Volume	Location	Approximate Volume	
IF1*	113-B	29	011-LKD	79	Linoleum Finish on 225mm Concrete Slab Plasterbaord on MF
IF2*	107-B	29	004-LKD	62	
IF3	208-LKD	79	106-LKD	79	
IF4	208-B	30	106-B	28	
IF5	214-LKD	98	112-LKD	98	
IF6	214-B	28	112-B	28	

*There were no step/staggers on the floors except where indicated above.

4.6 Annex B Test Procedures

All the test procedures within Annex B of Approved Document E: 2003 Edition have been followed.

5.0 Results

The results of the tests and analysis are given in the attached Certificates 25173/C1 to 25173/C15.

The following tables summarise our findings:

Airborne Tests Across Separating Walls	$D_{nT,w} + C_{tr}$ (dB)		Approved Document E Compliance
	Test Result*	Required	
AW1	≥ 47	≥ 45	Pass
AW2	≥ 47	≥ 45	Pass
AW3	≥ 53	≥ 45	Pass

*Tests results including the ≥ symbol are background limited

Airborne Tests Across Separating Floors	$D_{nT,w} + C_{tr}$ (dB)		Approved Document E Compliance
	Test Result*	Required	
AF1	≥ 63	≥ 45	Pass
AF2	≥ 61	≥ 45	Pass
AF3	≥ 48	≥ 45	Pass
AF4	≥ 51	≥ 45	Pass
AF5	≥ 57	≥ 45	Pass
AF6	≥ 51	≥ 45	Pass

*Tests results including the ≥ symbol are background limited

Impact Tests Across Separating Floors	$L'_{nT,w}$ (dB)		Approved Document E Compliance
	Test Result*	Required	
IF1	≤ 37	≤ 62	Pass
IF2	≤ 35	≤ 62	Pass
IF3	≤ 40	≤ 62	Pass
IF4	≤ 40	≤ 62	Pass
IF5	≤ 36	≤ 62	Pass
IF6	≤ 35	≤ 62	Pass

*Tests results including the ≤ symbol are background limited

6.0 Discussion

6.1 Airborne Tests

With reference to Section 4.0 and Section 5.0 the results for the floors and walls tested are equal to or greater than the minimum value for airborne sound insulation as stated in Approved Document E: 2003 Edition, and thus should be considered to satisfy the requirements.

6.2 Impact Tests

With reference to Section 4.0 and Section 5.0 the results for the floors tested are equal to or less than the maximum value for impact sound pressure level stated in Approved Document E: 2003 Edition, and thus should be considered to satisfy the requirements.

7.0 Conclusion

Hann Tucker Associates have undertaken airborne and impact sound insulation tests across separating wall and floor constructions between selected residential apartments at Swan House.

The results apply to the sample as provided or presented.

The airborne sound insulation performance ($D_{nT,w}$ + C_{tr}) of the separating wall constructions tested are greater than the minimum value stated in Approved Document E: 2003 Edition, and thus should be considered to satisfy the requirements.

The airborne sound insulation performance ($D_{nT,w}$ + C_{tr}) of the separating floor constructions tested are greater than the minimum value stated in Approved Document E: 2003 Edition, and thus should be considered to satisfy the requirements.

The Impact Sound Insulation Performance Level ($L'_{nT,w}$) of the separating floor constructions tested are less than the maximum value stated in Approved Document E: 2003 Edition, and thus should be considered to satisfy the requirements.

The results relate only to the floors tested. All data contained in this report (plot numbers, drawings etc.) has been provided by the client.

END OF REPORT

Appendix A

(Including 15No. Graphs)

25173/C1 to 25173/C15

Standardised level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

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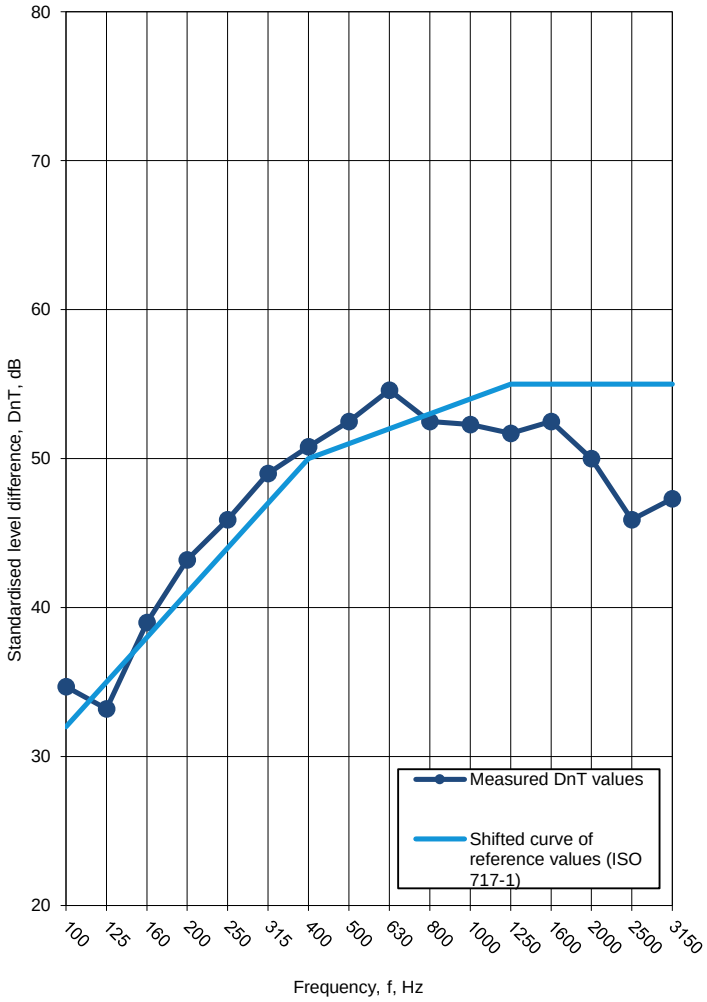
Airborne Wall Sound Insulation Test: AW1

Date of test: 08/05/2024

Source Room: 011-LKD Approximate Source Room Volume: 79m³

Receive Room: 012-LKD Approximate Receive Room Volume: 61m³

Frequency f Hz	DnT dB
100	34.7
125	33.2
160	39.0
200	43.2
250	45.9
315	49.0
400	50.8
500	52.5
630	54.6
800	52.5
1000	52.3
1250	51.7
1600	52.5
2000	50.0
2500	45.9
3150	47.3



Test Result

$D_{nT,w} + C_{tr} = \geq 47$ dB

Rating according to ISO 717-1:

$D_{nT,w}$ ($C;C_{tr}$) = ≥ 51 (-2 ; -4) dB; $C_{(100\text{-}3150)}$ = -2 dB

$D_{nT,w}$ = ≥ 51 dB $C_{tr\ (100\text{-}3150)}$ -4 dB

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

Certificate Ref: 25173/SIT3/C1

Test organisation: Hann Tucker Associates

Date of issue: 09/05/2024

Test Engineer: James Hardacre

Test Engineer No: 76

Test Engineer Signature:



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Standardised level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

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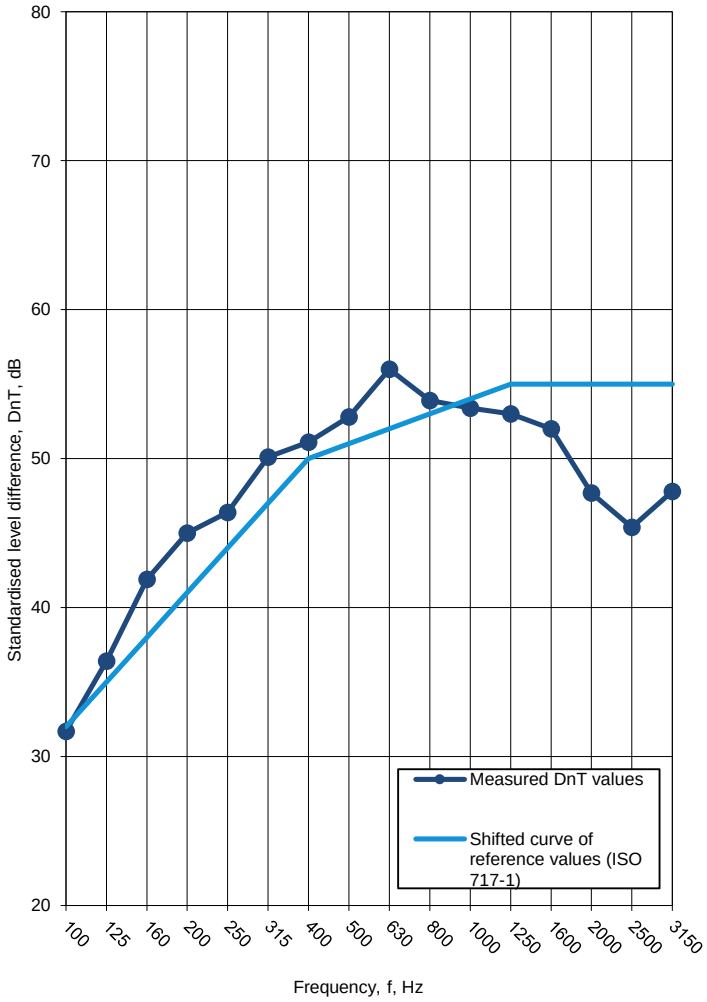
Airborne Wall Sound Insulation Test: AW2

Date of test: 08/05/2024

Source Room: 004-LKD Approximate Source Room Volume: 62m³

Receive Room: 005-LKD Approximate Receive Room Volume: 61m³

Frequency f Hz	DnT dB
100	31.7
125	36.4
160	41.9
200	45.0
250	46.4
315	50.1
400	51.1
500	52.8
630	56.0
800	53.9
1000	53.4
1250	53.0
1600	52.0
2000	47.7
2500	45.4
3150	47.8



Test Result

$D_{nT,w} + C_{tr} = \geq 47$ dB

Rating according to ISO 717-1:

$D_{nT,w}$ ($C;C_{tr}$) = ≥ 51 (-2 ; -4) dB; $C_{(100\text{-}3150)}$ = -2 dB

$D_{nT,w}$ = ≥ 51 dB $C_{tr\ (100\text{-}3150)}$ -4 dB

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

Certificate Ref: 25173/SIT3/C2

Test organisation: Hann Tucker Associates

Date of issue: 09/05/2024

Test Engineer: James Hardacre

Test Engineer No: 76

Test Engineer Signature:



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Standardised level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

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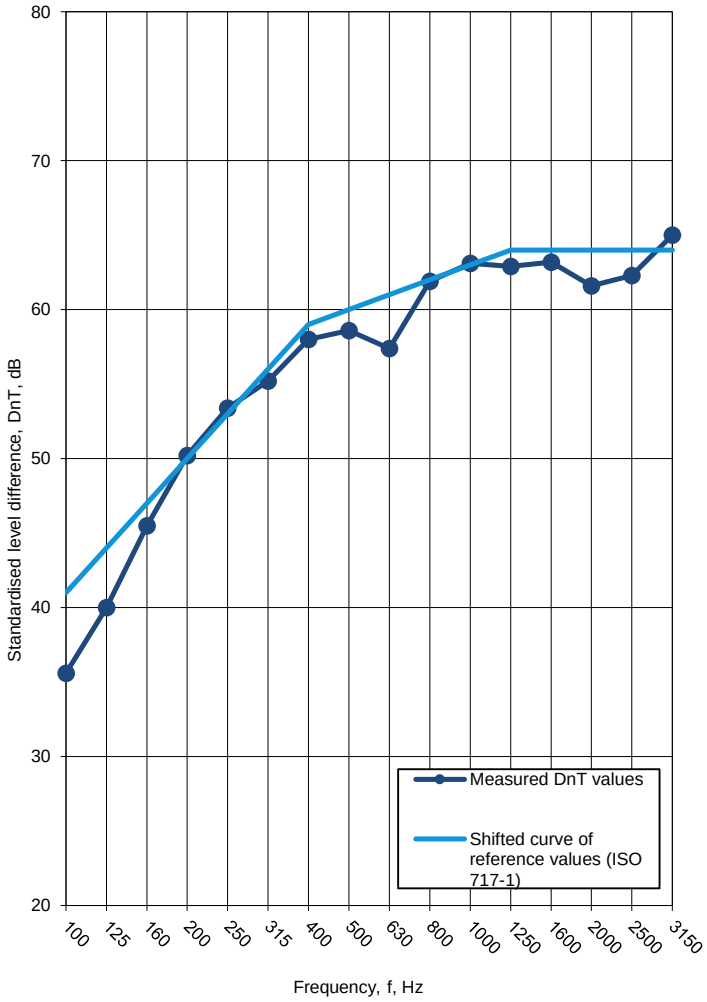
Airborne Wall Sound Insulation Test: AW3

Date of test: 08/05/2024

Source Room: 1301-LKD Approximate Source Room Volume: 59m³

Receive Room: 1308-B Approximate Receive Room Volume: 30m³

Frequency f Hz	DnT dB
100	35.6
125	40.0
160	45.5
200	50.2
250	53.4
315	55.2
400	58.0
500	58.6
630	57.4
800	61.9
1000	63.1
1250	62.9
1600	63.2
2000	61.6
2500	62.3
3150	65.0



Test Result

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

Rating according to ISO 717-1:

$D_{nT,w}$ ($C;C_{tr}$) = ≥ 60 (-2 ; -7) dB; $C_{(100\text{-}3150)}$ = -2 dB

$D_{nT,w}$ = ≥ 60 dB $C_{tr\ (100\text{-}3150)}$ -7 dB

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

Certificate Ref: 25173/SIT3/C3

Test organisation: Hann Tucker Associates

Date of issue: 09/05/2024

Test Engineer: James Hardacre

Test Engineer No: 76

Test Engineer Signature:



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Standardised level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

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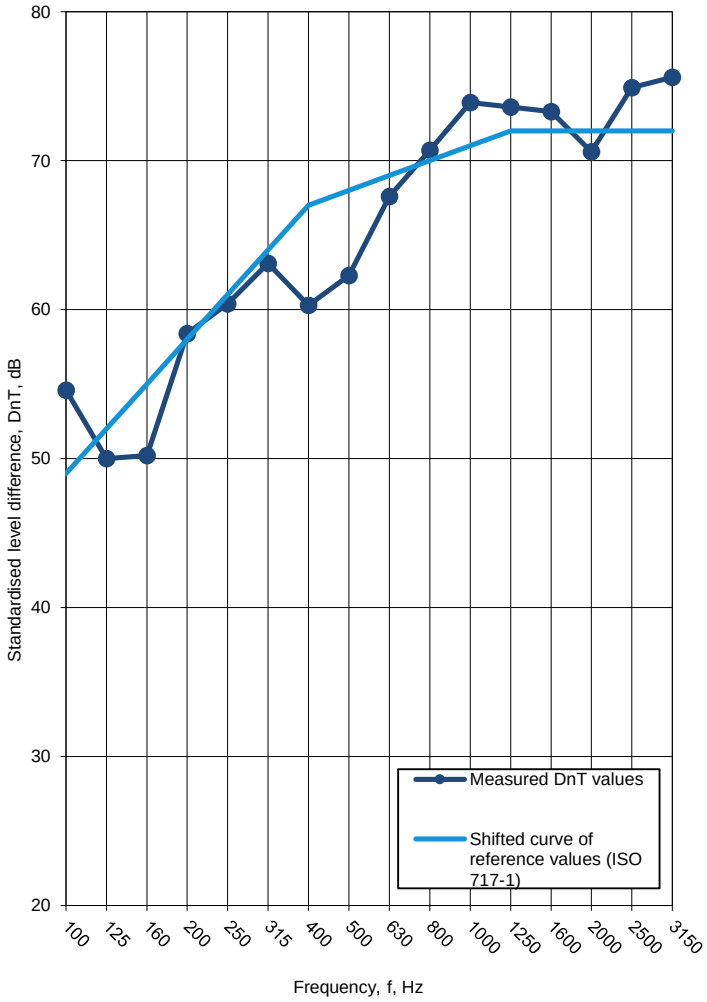
Airborne Floor Sound Insulation Test: AF1

Date of test: 08/05/2024

Source Room: 011-LKD Approximate Source Room Volume: 79m³

Receive Room: 113-B Approximate Receive Room Volume: 29m³

Frequency f Hz	DnT dB
100	54.6
125	50.0
160	50.2
200	58.4
250	60.4
315	63.1
400	60.3
500	62.3
630	67.6
800	70.7
1000	≥ 73.9
1250	≥ 73.6
1600	≥ 73.3
2000	70.6
2500	74.9
3150	75.6



Test Result

$D_{nT,w} + C_{tr} = \geq 63$ dB

≥ Results limited due to high background noise levels

Rating according to ISO 717-1:

$D_{nT,w}$ ($C;C_{tr}$) = ≥ 68 (-1 ; -5) dB; $C_{(100\text{-}3150)}$ = -1 dB

$D_{nT,w}$ = ≥ 68 dB $C_{tr\ (100\text{-}3150)}$ -5 dB

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

Certificate Ref: 25173/SIT3/C4

Test organisation: Hann Tucker Associates

Date of issue: 09/05/2024

Test Engineer: James Hardacre

Test Engineer No: 76

Test Engineer Signature:



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Standardised level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

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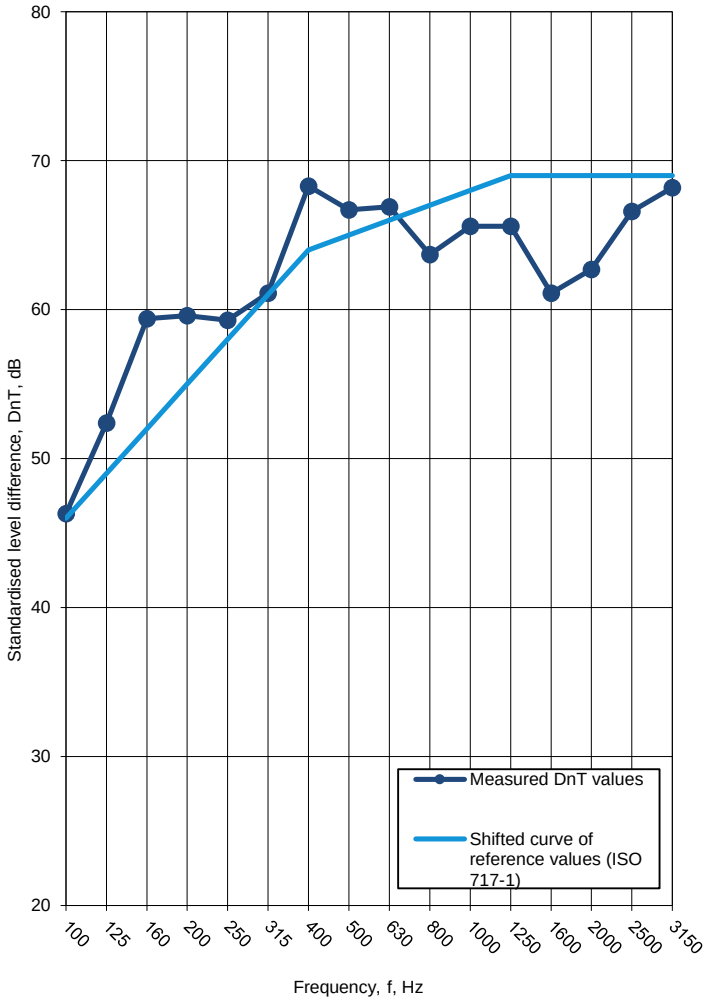
Airborne Floor Sound Insulation Test: AF2

Date of test: 08/05/2024

Source Room: 004-LKD Approximate Source Room Volume: 62m³

Receive Room: 107-B Approximate Receive Room Volume: 34m³

Frequency f Hz	DnT dB
100	46.3
125	52.4
160	≥ 59.4
200	59.6
250	≥ 59.3
315	≥ 61.1
400	≥ 68.3
500	≥ 66.7
630	≥ 66.9
800	63.7
1000	65.6
1250	65.6
1600	61.1
2000	62.7
2500	66.6
3150	68.2



Test Result

$D_{nT,w} + C_{tr} = \geq 61$ dB

≥ Results limited due to high background noise levels

Rating according to ISO 717-1:

$D_{nT,w}$ ($C;C_{tr}$) = ≥ 65 (-1 ; -4) dB; $C_{(100\text{-}3150)}$ = -1 dB

$D_{nT,w}$ = ≥ 65 dB $C_{tr\ (100\text{-}3150)}$ -4 dB

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

Certificate Ref: 25173/SIT3/C5

Test organisation: Hann Tucker Associates

Date of issue: 09/05/2024

Test Engineer: James Hardacre

Test Engineer No: 76

Test Engineer Signature:



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Standardised level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Project Details

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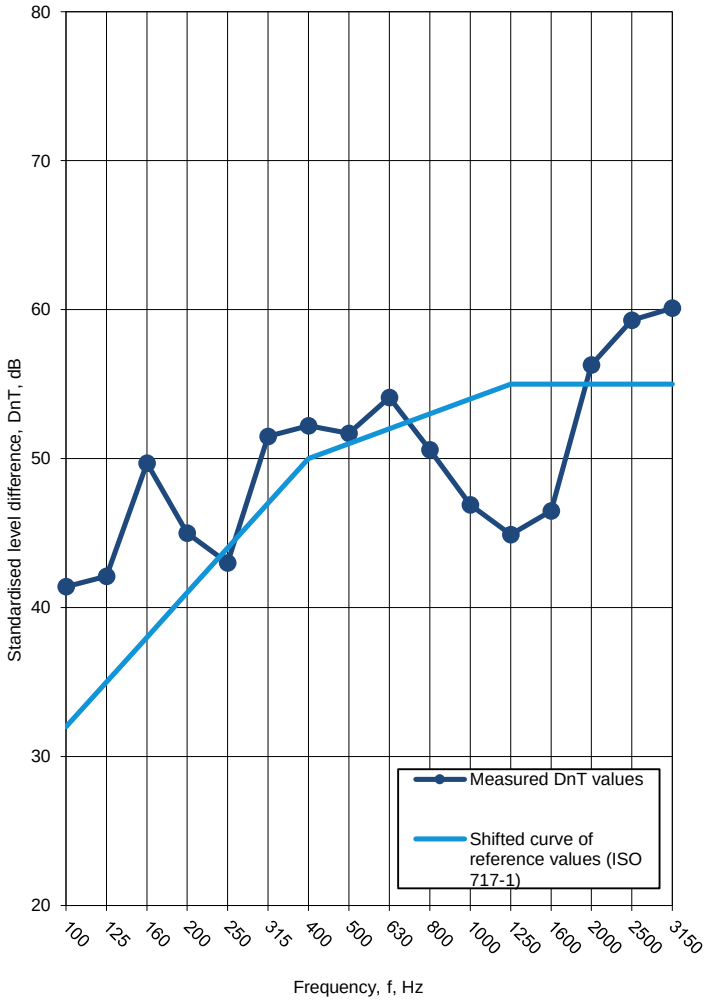
Airborne Floor Sound Insulation Test: AF3

Date of test: 08/05/2024

Source Room: 208-LKD Approximate Source Room Volume: 79m³

Receive Room: 106-LKD Approximate Receive Room Volume: 79m³

Frequency f Hz	DnT dB
100	41.4
125	42.1
160	49.7
200	45.0
250	43.0
315	51.5
400	52.2
500	51.7
630	54.1
800	50.6
1000	46.9
1250	44.9
1600	46.5
2000	56.3
2500	59.3
3150	60.1



Test Result

$D_{nT,w} + C_{tr} = \geq 48$ dB

Rating according to ISO 717-1:

$D_{nT,w}$ ($C;C_{tr}$) = ≥ 51 (-2 ; -3) dB; $C_{(100\text{-}3150)}$ = -2 dB

$D_{nT,w}$ = ≥ 51 dB $C_{tr\ (100\text{-}3150)}$ -3 dB

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

Certificate Ref: 25173/SIT3/C6

Test organisation: Hann Tucker Associates

Date of issue: 09/05/2024

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Standardised level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

UKAS TESTING
4083

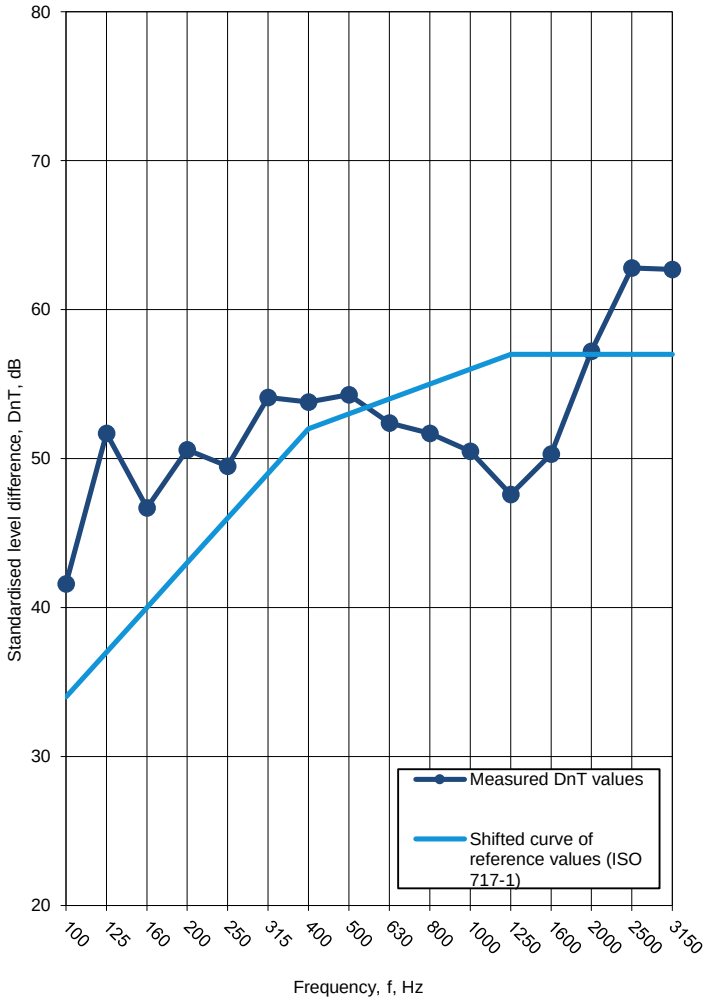
Airborne Floor Sound Insulation Test: AF4

Date of test: 08/05/2024

Source Room: 208-B Approximate Source Room Volume: 30m³

Receive Room: 106-B Approximate Receive Room Volume: 28m³

Frequency f Hz	DnT dB
100	41.6
125	51.7
160	46.7
200	50.6
250	49.5
315	54.1
400	53.8
500	54.3
630	52.4
800	51.7
1000	50.5
1250	47.6
1600	50.3
2000	57.2
2500	62.8
3150	62.7



Test Result

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

Rating according to ISO 717-1:

$D_{nT,w}$ ($C;C_{tr}$) = ≥ 53 (-1 ; -2) dB; $C_{(100\text{-}3150)}$ = -1 dB

$D_{nT,w}$ = ≥ 53 dB $C_{tr\ (100\text{-}3150)}$ -2 dB

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

Certificate Ref: 25173/SIT3/C7

Test organisation: Hann Tucker Associates

Date of issue: 09/05/2024

Test Engineer: James Hardacre

Test Engineer No: 76

Test Engineer Signature:



Hann Tucker Associates
Consultants in Acoustics Noise & Vibration
Head Office: Duke House, 1-2 Duke Street, Woking, Surrey GU21 5BA (t) +44 (0) 1483 770 595
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Standardised level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

UKAS TESTING
4083

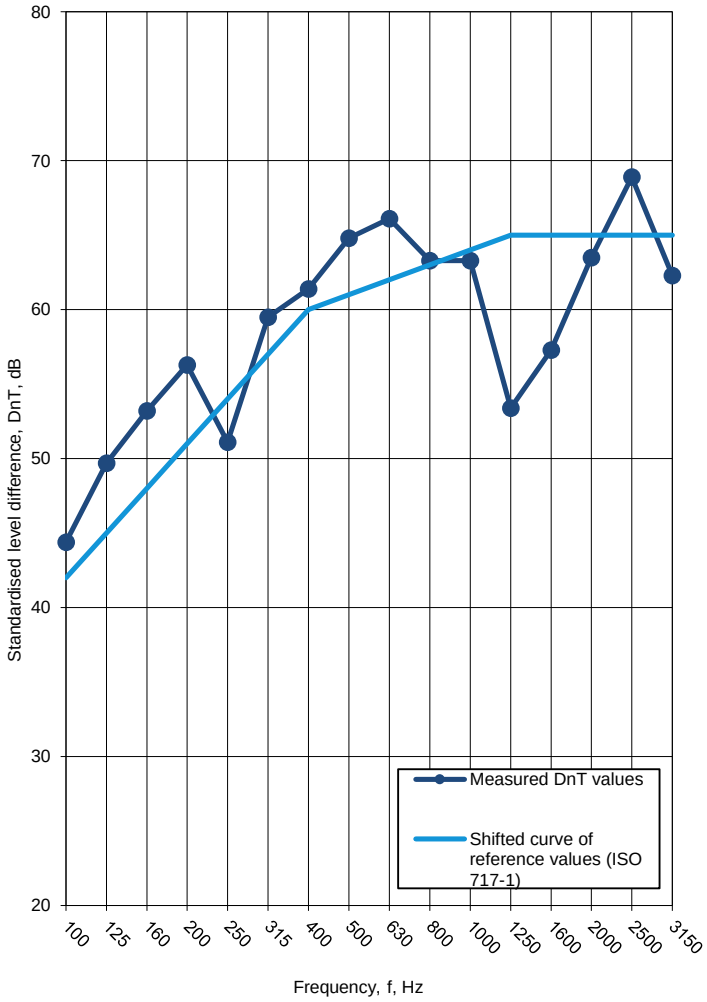
Airborne Floor Sound Insulation Test: AF5

Date of test: 08/05/2024

Source Room: 214-B Approximate Source Room Volume: 28m³

Receive Room: 112-B Approximate Receive Room Volume: 28m³

Frequency f Hz	DnT dB
100	44.4
125	49.7
160	53.2
200	56.3
250	51.1
315	≥ 59.5
400	≥ 61.4
500	≥ 64.8
630	≥ 66.1
800	≥ 63.3
1000	≥ 63.3
1250	53.4
1600	57.3
2000	≥ 63.5
2500	≥ 68.9
3150	≥ 62.3



Test Result

$D_{nT,w} + C_{tr} = \geq 57$ dB

≥ Results limited due to high background noise levels

Rating according to ISO 717-1:

$D_{nT,w}$ ($C;C_{tr}$) = ≥ 61 (-2 ; -4) dB; $C_{(100\text{-}3150)}$ = -2 dB

$D_{nT,w}$ = ≥ 61 dB $C_{tr\ (100\text{-}3150)}$ -4 dB

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

Certificate Ref: 25173/SIT3/C8

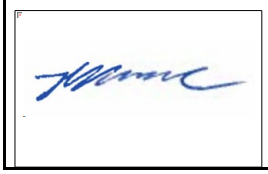
Test organisation: Hann Tucker Associates

Date of issue: 09/05/2024

Test Engineer: James Hardacre

Test Engineer No: 76

Test Engineer Signature:



Hann Tucker Associates
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Standardised level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

UKAS TESTING
4083

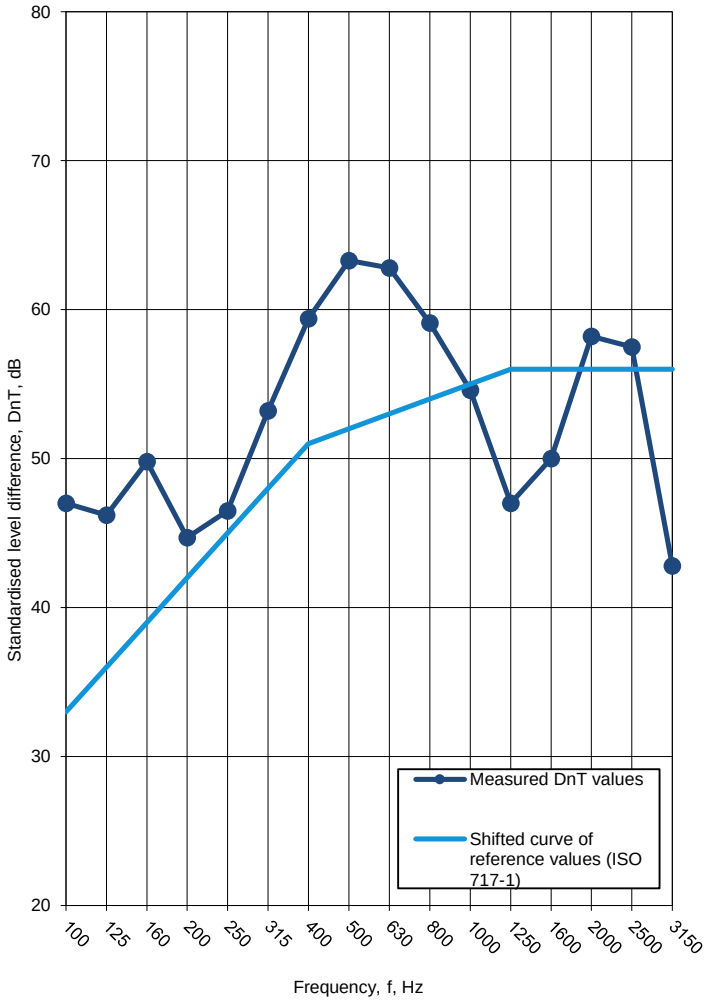
Airborne Floor Sound Insulation Test: AF6

Date of test: 08/05/2024

Source Room: 214-LKD Approximate Source Room Volume: 98m³

Receive Room: 112-LKD Approximate Receive Room Volume: 98m³

Frequency f Hz	DnT dB
100	47.0
125	46.2
160	49.8
200	44.7
250	46.5
315	53.2
400	59.4
500	63.3
630	62.8
800	59.1
1000	54.6
1250	47.0
1600	50.0
2000	58.2
2500	≥ 57.5
3150	≥ 42.8



Test Result

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

≥ Results limited due to high background noise levels

Rating according to ISO 717-1:

$D_{nT,w}$ ($C;C_{tr}$) = ≥ 52 (-3 ; -1) dB; $C_{(100-3150)}$ = -3 dB

$D_{nT,w}$ = ≥ 52 dB $C_{tr\ (100-3150)}$ -1 dB

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

Certificate Ref: 25173/SIT3/C9

Test organisation: Hann Tucker Associates

Date of issue: 09/05/2024

Test Engineer: James Hardacre

Test Engineer No: 76

Test Engineer Signature:

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Standardised impact sound pressure levels according to ISO 140-7
Field measurements of impact sound insulation of floors

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

UKAS TESTING
4083

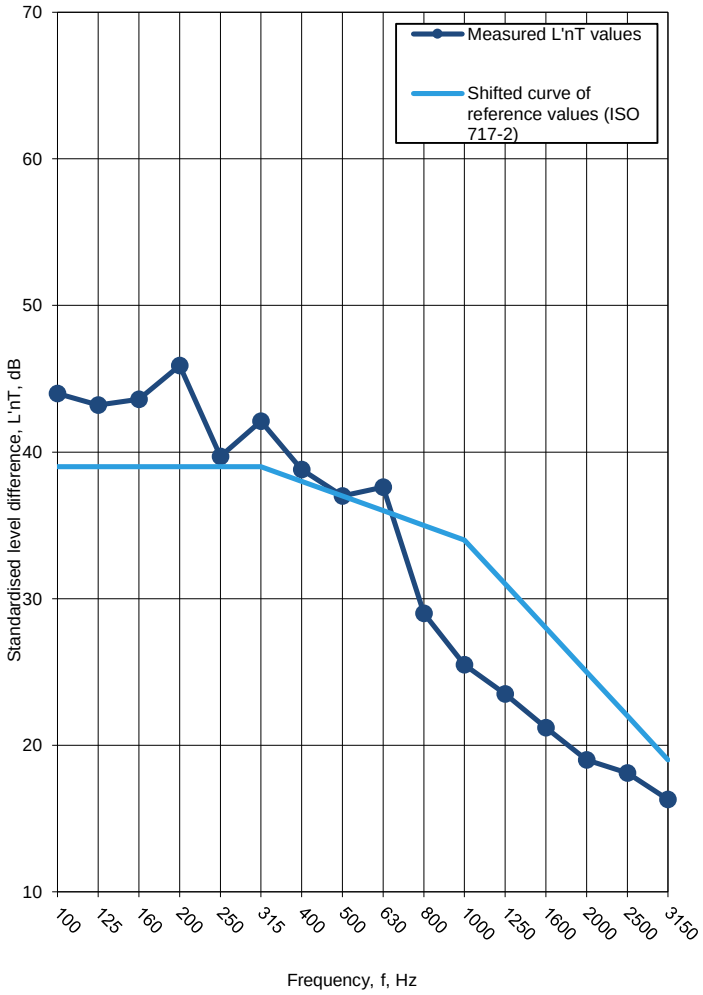
Impact Floor Sound Insulation Test: IF1

Date of test: 08/05/2024

Source Room: 113-B Approximate Source Room Volume: 29m³

Receive Room: 011-LKD Approximate Receive Room Volume: 79m³

Frequency f Hz	L'nT dB
100	44
125	43.2
160	43.6
200	45.9
250	39.7
315	42.1
400	38.8
500	37.0
630	37.6
800	29.0
1000	25.5
1250	≤ 23.5
1600	≤ 21.2
2000	≤ 19.0
2500	≤ 18.1
3150	≤ 16.3



Test Result

$L'_{nT,w} = \leq 37$ dB

≤ Results limited due to high background noise levels

Rating according to ISO 717-2:

$L'_{nT,w}$ (C_1) = ≤ 37 (0) dB; $C_{1\ (100\text{-}3150)}$ = 0 dB

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

Certificate Ref: 25173/SIT3/C10

Test organisation: Hann Tucker Associates

Date of issue: 09/05/2024

Test Engineer: James Hardacre

Test Engineer No: 76

Test Engineer Signature:



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Standardised impact sound pressure levels according to ISO 140-7
Field measurements of impact sound insulation of floors

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

UKAS TESTING
4083

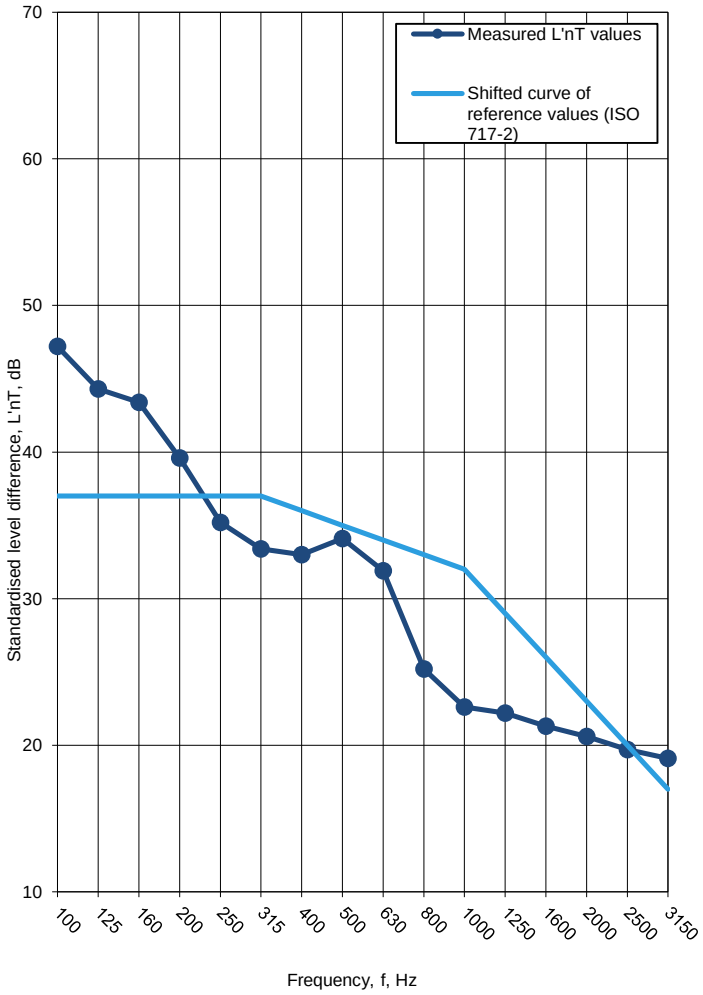
Impact Floor Sound Insulation Test: IF2

Date of test: 08/05/2024

Source Room: 107-B Approximate Source Room Volume: 29m³

Receive Room: 004-LKD Approximate Receive Room Volume: 62m³

Frequency f Hz	L'nT dB
100	47
125	44.3
160	43.4
200	39.6
250	35.2
315	33.4
400	33.0
500	34.1
630	31.9
800	25.2
1000	≤ 22.6
1250	≤ 22.2
1600	21.3
2000	≤ 20.6
2500	≤ 19.7
3150	≤ 19.1



Test Result

$L'_{nT,w} = \leq 35$ dB

≤ Results limited due to high background noise levels

Rating according to ISO 717-2:

$L'_{nT,w}$ (C_1) = ≤ 35 (1) dB; $C_{1\ (100\text{-}3150)}$ = 1 dB

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

Certificate Ref: 25173/SIT3/C11

Test organisation: Hann Tucker Associates

Date of issue: 09/05/2024

Test Engineer: James Hardacre

Test Engineer No: 76

Test Engineer Signature:



Hann Tucker Associates
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Standardised impact sound pressure levels according to ISO 140-7
Field measurements of impact sound insulation of floors

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

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4083

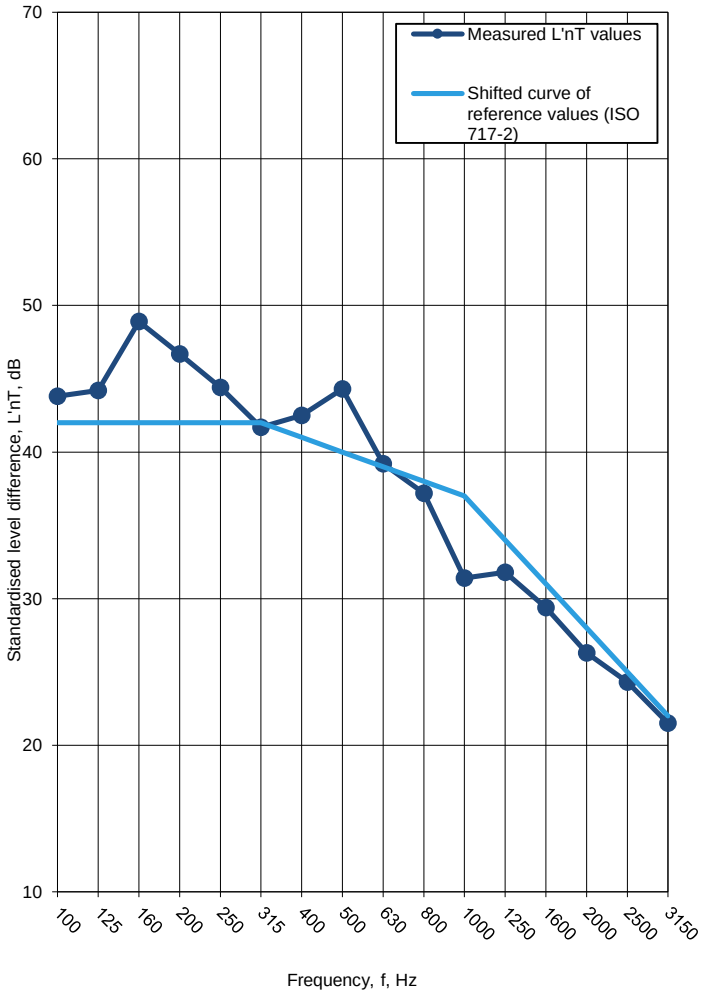
Impact Floor Sound Insulation Test: IF3

Date of test: 08/05/2024

Source Room: 208-LKD Approximate Source Room Volume: 79m³

Receive Room: 106-LKD Approximate Receive Room Volume: 79m³

Frequency f Hz	L'nT dB
100	44
125	44.2
160	48.9
200	46.7
250	44.4
315	41.7
400	42.5
500	44.3
630	39.2
800	37.2
1000	≤ 31.4
1250	≤ 31.8
1600	≤ 29.4
2000	≤ 26.3
2500	≤ 24.3
3150	≤ 21.5



Test Result

$L'_{nT,w} = \leq 40$ dB

≤ Results limited due to high background noise levels

Rating according to ISO 717-2:

$L'_{nT,w}$ (C_1) = ≤ 40 (-1) dB; $C_{1\ (100\text{-}3150)}$ = -1 dB

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

Certificate Ref: 25173/SIT3/C12

Test organisation: Hann Tucker Associates

Date of issue: 09/05/2024

Test Engineer: James Hardacre

Test Engineer No: 76

Test Engineer Signature:



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Standardised impact sound pressure levels according to ISO 140-7
Field measurements of impact sound insulation of floors

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

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4083

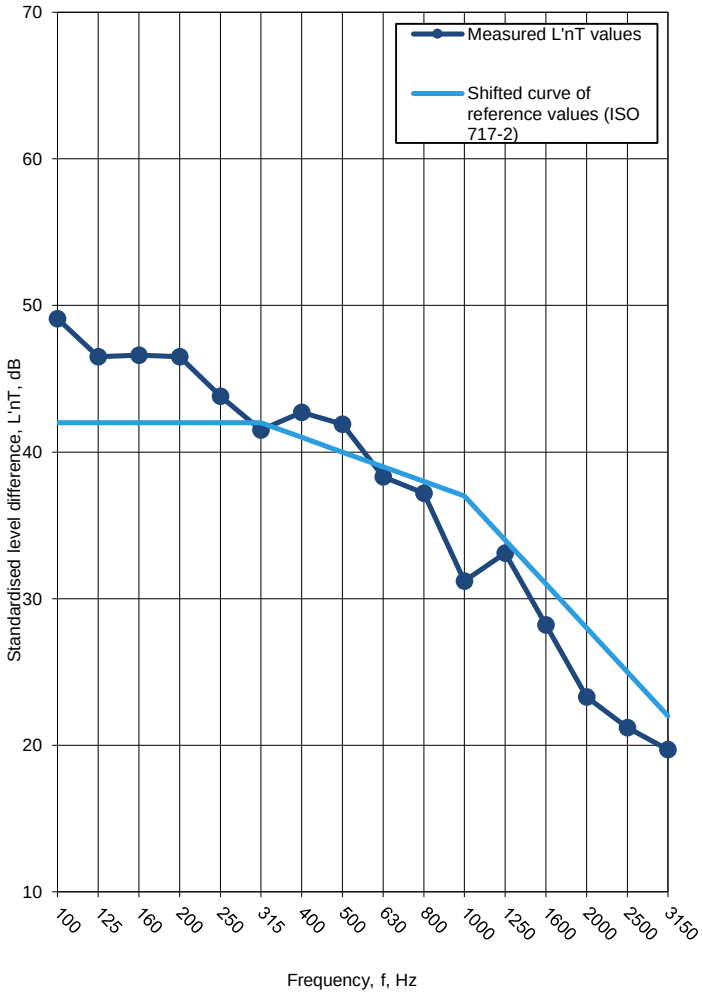
Impact Floor Sound Insulation Test: IF4

Date of test: 08/05/2024

Source Room: 208-B Approximate Source Room Volume: 30m³

Receive Room: 106-B Approximate Receive Room Volume: 28m³

Frequency f Hz	L'nT dB
100	49
125	46.5
160	46.6
200	46.5
250	43.8
315	41.5
400	42.7
500	41.9
630	38.3
800	37.2
1000	31.2
1250	≤ 33.1
1600	≤ 28.2
2000	≤ 23.3
2500	≤ 21.2
3150	≤ 19.7



Test Result

$L'_{nT,w} = \leq 40$ dB

≤ Results limited due to high background noise levels

Rating according to ISO 717-2:

$L'_{nT,w}$ (C_1) = ≤ 40 (0) dB; $C_{1\ (100\text{-}3150)}$ = 0 dB

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

Certificate Ref: 25173/SIT3/C13

Test organisation: Hann Tucker Associates

Date of issue: 09/05/2024

Test Engineer: James Hardacre

Test Engineer No: 76

Test Engineer Signature:



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Standardised impact sound pressure levels according to ISO 140-7
Field measurements of impact sound insulation of floors

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

UKAS TESTING
4083

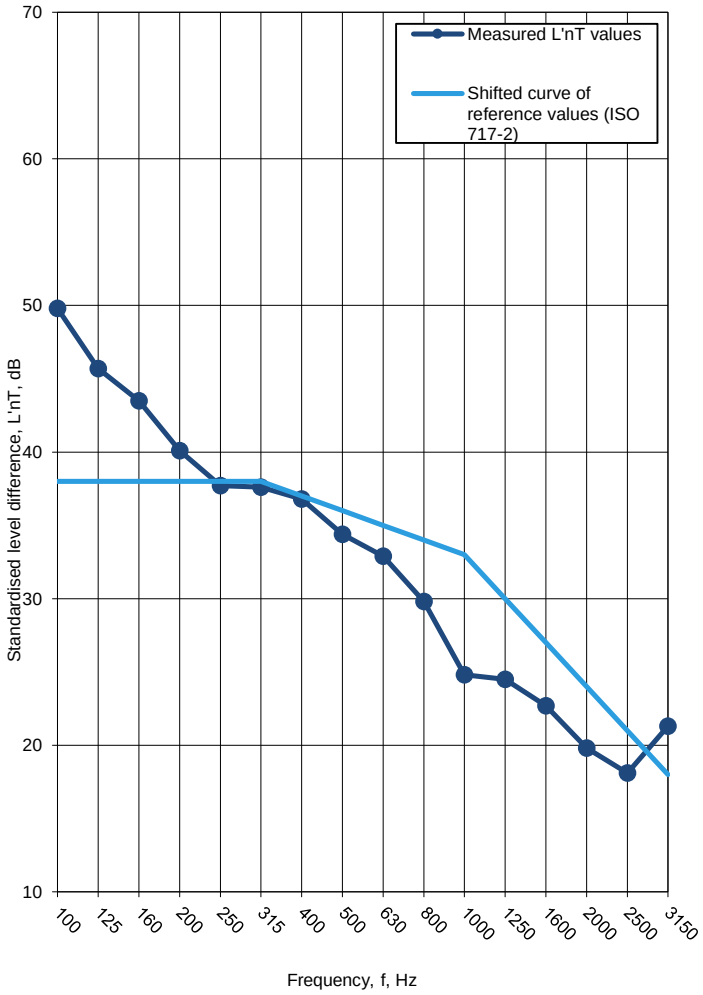
Impact Floor Sound Insulation Test: IF5

Date of test: 08/05/2024

Source Room: 214-LKD Approximate Source Room Volume: 98m³

Receive Room: 112-LKD Approximate Receive Room Volume: 98m³

Frequency f Hz	L'nT dB
100	50
125	45.7
160	≤ 43.5
200	40.1
250	37.7
315	37.6
400	36.8
500	34.4
630	32.9
800	29.8
1000	≤ 24.8
1250	≤ 24.5
1600	≤ 22.7
2000	19.8
2500	18.1
3150	21.3



Test Result

$L'_{nT,w} = \leq 36$ dB

≤ Results limited due to high background noise levels

Rating according to ISO 717-2:

$L'_{nT,w}$ (C_1) = ≤ 36 (2) dB; $C_{1\ (100\text{-}3150)}$ = 2 dB

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

Certificate Ref: 25173/SIT3/C14

Test organisation: Hann Tucker Associates
Date of issue: 09/05/2024
Test Engineer: James Hardacre
Test Engineer No: 76
Test Engineer Signature:



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Standardised impact sound pressure levels according to ISO 140-7
Field measurements of impact sound insulation of floors

Project Details

Development: Swan House, Manchester Client: RG Group Report Ref: 25173/SIT3

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4083

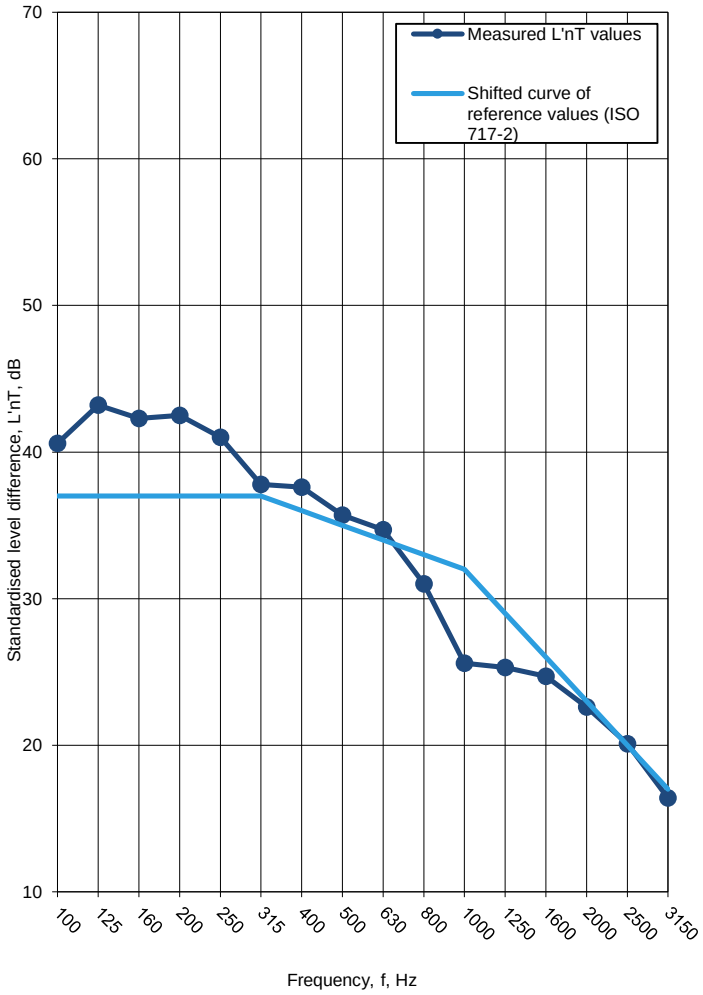
Impact Floor Sound Insulation Test: IF6

Date of test: 08/05/2024

Source Room: 214-B Approximate Source Room Volume: 28m³

Receive Room: 112-B Approximate Receive Room Volume: 28m³

Frequency f Hz	L'nT dB
100	41
125	43.2
160	≤ 42.3
200	≤ 42.5
250	41.0
315	37.8
400	37.6
500	35.7
630	34.7
800	31.0
1000	25.6
1250	25.3
1600	24.7
2000	22.6
2500	20.1
3150	16.4



Test Result

$L'_{nT,w} = \leq 35$ dB

≤ Results limited due to high background noise levels

Rating according to ISO 717-2:

$L'_{nT,w}$ (C_1) = ≤ 35 (0) dB; $C_{1\ (100\text{-}3150)}$ = 0 dB

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

Certificate Ref: 25173/SIT3/C15

Test organisation: Hann Tucker Associates
Date of issue: 09/05/2024
Test Engineer: James Hardacre
Test Engineer No: 76
Test Engineer Signature:



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