



4340

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Sound Insulation Test Report

Building Regulations Part E

Pre-completion testing at: 5-7 Station Road
Hayling Island
Hampshire
PO11 0EA

Report for:	HOP Architects Ltd Cell 12, Cell Block Studios Main Rod H M Naval Base Portsmouth, PO1 3LJ		
Testing By:	Air Pressure Testing Ltd Sayells Farm, 7 Harlington Road Upper Sundon Beds, LU3 3PE Tel: 07967 233836 E-mail: info@airpressuretesting.net		
APT Contract Number:	APT-07730 - 01	Date:	16/08/2023
Authorisations & Signatures			
Report Prepared By:	Janet Kelly	OFFICE MANAGER	
Report Approved By:	Malcolm Fish	TECHNICAL MANAGER	

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1. INTRODUCTION

This report records the results of pre-completion sound insulation testing undertaken under the provisions of Approved Document E to the Building Regulations 2010.

Date of testing: 16/08/2023

An explanation of the acoustic terminology used in this report and the relevant provisions of the Building Regulations are given in Appendix A.

1.1. The Development

Name and address of Client: HOP Architects Ltd
Cell 12, Cell Block Studios
Main Rod, H M Naval Base
Portsmouth
PO1 3LJ

Address of properties tested: 5-7 Station Road
Hayling Island
Hampshire
PO11 0EA

Approved Document classification:

- Approved Document E of the Building Regulations – For New Dwellings.

Features of the development:

The project contains a new apartment block containing 19 flats and 2 commercial units at 5-7 Station Rd, Hayling Island, Hampshire, PO11 0EA. Flats 1-5 are located on the ground floor, Flats 6 - 13 on the 1st floor and Flats 14 - 19 on the 2nd floor

1.2. The Test Organisation

Name of test organisation: Air Pressure Testing Ltd

Personnel undertaking test: Darren Helliwell & Lukasz Lipka

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2. METHODOLOGY

2.1. Test Standards

The tests detailed in this report were undertaken in accordance with BS EN ISO 140-4:1998 "Field measurements of airborne sound insulation between rooms" and BS EN ISO 140-7:1998 "Field measurements of impact sound insulation of floors."

There was a significant amount of background noise, from the ongoing site works observed during the tests. The background noise levels in the receiving rooms were measured during the tests and the receiving room levels corrected in accordance with the standard.

The results of the tests were rated in accordance with BS EN ISO 717-1: 1997 *"Rating of sound insulation in buildings and of building elements. Part 1 Airborne sound insulation"*.

The Test Procedures detailed in Annex B of Approved Document E of the Building Regulations were followed in the tests.

2.2. Instrumentation

Item	Serial No	Date of last calibration	Calibration Certificate No	Expiry date
Norsonic 140 Investigator, modular precision sound analyser, loaded with Building Acoustics Module	1403184	21 April 2023	U44076	30 APRIL 2025
Norsonic Type 1225 Microphone	168290	21 April 2023	U44075	30 APRIL 2025
Nor 270 Dodecahedron Loudspeaker – 200W, 120dB	31812	N/A	N/A	N/A
Nor 280 Power Amplifier with noise generator	2803769	N/A	N/A	N/A
Norsonic type 1251 calibrator	31970	21 April 2023	U44074	30 April 2025
Norsonic 277 Tapping Machine	2775967	21 April 2023	U44073	30 APRIL 2025

2.3. Testing Procedure

See Appendix B.

3. RESULTS

3.1. Detailed Results

The results, including data and graphs are recorded in detail on data sheets in Appendix C. The results only relate to the plots tested.

3.2. Summary – Airborne Tests for Dividing Walls

Partition	Source Room		Receiving Room		$D_{nT,w} + C_{tr}$ dB		Pass / Fail	ISO 140 Diagram
	Details	Vol (m3)	Details	Vol (m3)	Result	Required (Min)		
A	Commercial Unit	183	Flat 5 Kitchen	70	66	45	PASS	EX.5
B	Flat 4 Lounge	67	Flat 3 Bedroom	29	54	45	PASS	EX.5
C	Flat 9 Lounge	65	Flat 8 Bedroom	31	50	45	PASS	N/A
D	Flat 11 Lounge	60	Flat 10 Bedroom	41	50	45	PASS	N/A
E	Flat 19 Lounge	60	Flat 18 Bedroom	41	56	45	PASS	N/A

3.3. Summary – Airborne Tests for Dividing Floors

Partition	Source Room		Receiving Room		$D_{nT,w} + C_{tr}$ dB		Pass / Fail	ISO 140 Diagram
	Details	Vol (m3)	Details	Vol (m3)	Result	Required (Min)		
E	Commercial Unit	174	Flat 12 Lounge	50	52	45	PASS	EX.21
F	Commercial Unit	174	Flat 12 Bedroom	24	55	45	PASS	EX.21
G	Flat 11 Lounge	60	Flat 5 Bedroom	43	59	45	PASS	N/A
H	Flat 11 Lounge	60	Flat 19 Lounge	60	56	45	PASS	N/A
I	Flat 8 Bedroom	31	Flat 3 Bedroom	29	51	45	PASS	N/A
J	Flat 8 Bedroom	31	Flat 16 Bedroom	31	56	45	PASS	N/A

3.4. Summary – Impact Tests for Separating Floors

Partition	Source Room		Receiving Room		L' _{nT,w} dB		Pass / Fail	ISO 140 Diagram
	Details	Vol (m3)	Details	Vol (m3)	Result	Required (Min)		
K	Flat 11 Lounge	60	Flat 5 Bedroom	43	42	62	PASS	N/A
L	Flat 19 Lounge	60	Flat 11 Lounge	60	41	62	PASS	N/A
M	Flat 8 Bedroom	31	Flat 3 Bedroom	29	48	62	PASS	N/A
N	Flat 16 Bedroom	31	Flat 8 Bedroom	31	55	62	PASS	N/A

This Test Report shall not be reproduced except in full, without written approval of the laboratory.

APPENDIX A: ACOUSTICAL TERMINOLOGY & NUMERICAL PERFORMANCE STANDARDS

The Decibel, dB

The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of 2×10^{-5} Pascal's) and the threshold of pain is around 120 dB.

The sound energy radiated by a source can also be expressed in decibels. The sound power is a measure of the total sound energy radiated by a source per second, in watts. The sound power level, L_w is expressed in decibels, referenced to 10^{-12} watts.

Frequency, Hz

Frequency is analogous to musical pitch. It depends upon the rate of vibration of the air molecules which transmit the sound and is measure as the number of cycles per second or Hertz (Hz). The human ear is sensitive to sound in the range 20 Hz to 20,000 Hz (20 kHz). For acoustic engineering purposes, the frequency range is normally divided up into discrete bands. The most commonly used bands are octave bands, in which the upper limiting frequency for any band is twice the lower limiting frequency, and one-third octave bands, in which each octave band is divided into three. The bands are described by their centre frequency value and the ranges which are typically used for building acoustics purposes are 63 Hz to 4 kHz (octave bands) and 100 Hz to 3150 Hz (one-third octave bands).

White Noise and Pink Noise

Noise sources, which provide a continuous spectrum over a wide frequency range, are normally used for test purposes. White noise contains constant energy per unit of frequency. Pink noise contains constant energy per octave or one-third octave band.

Reverberation Time

Sound wave fronts are repeatedly reflected from room surfaces and, as a result of absorption, gradually grow weaker and weaker. The reverberation time (RT) of a space is a measure of the rate at which the sound dies away. It is defined as the time taken for the reverberant sound energy to decay to one millionth of its original intensity (corresponding to a 60 dB reduction). The reverberation time is proportional to the volume of the room and inversely proportional to the quantity of absorption present.

Airborne Sound Insulation

Voices, hi-fi systems, television and radio sound and musical instruments are all sources of airborne sound. They excite the air around them and the vibration in the air is transmitted to surrounding surfaces, such as walls, ceilings and floors. This sets these constructions into vibration and this vibration is radiated in neighbouring rooms as sound. Energy is lost in the transmission path and this is referred to as transmission loss or, more generally, sound insulation. The most simple measure of sound insulation is the sound level difference, D , which is the arithmetic

difference between the sound level, in dB, in the source room and the sound level in the receiving room.

Other measures of sound insulation include the sound reduction index, R , which is a measure of the acoustical performance of a partition, obtained in a laboratory, and the standardised level difference, D_{nT} , which is used mainly in the sound insulation of domestic separating walls and separating floors. The relevant test procedures are laid down in BS EN ISO 140-4. A single figure “weighted” result can be obtained from one-third octave band test results by using a curve-fitting procedure laid down in BS EN ISO 717. The subscript “w” is added to the relevant descriptor (e.g. $D_{nT,w}$).

The standardised sound level difference, D_{nT} (dB), was obtained in each one third octave band, according to the following formula:

$$D_{nT} = L_1 - L_2 + 10 \log_{10} \left(\frac{T}{0.5} \right)$$

Where L_1 is the average level in the source room
 L_2 is the average level in the receiving room
 T is the reverberation time in the receiving room (in seconds)
 0.5 is the reference reverberation time (in seconds)

The weighted standardised sound level difference, $D_{nT,w}$ was obtained using the curve-fitting procedure given in BS EN ISO 717-1. The standardised level difference values are plotted on a graph and compared with a reference curve. The reference curve is moved up and/or down until the sum of the unfavourable deviations is as large as possible, without exceeding 32.0 dB. The standard reference curve is shown on the graphs in Appendix C.

Impact Sound Insulation

In the case of impact sound, the building construction is caused to vibrate as a result of a physical impact. Footsteps on floors are the most obvious example. The vibration is radiated as sound in neighbouring rooms. Impact insulation is measured using a standard tapping machine, which drops weights cyclically onto a floor. The sound pressure level is measured in the receiving room below and the result is known as the impact level, L_i for laboratory tests and L'_i for field tests. The test procedures are set out in BS EN ISO 140-7 and the single figure weighting is described BS EN ISO 717-2.

The standardised impact level, L'_{nT} (dB), was obtained in each one third octave band, according to the following formula:

$$L'_{nT} = L_i - 10 \log_{10} \left(\frac{T}{0.5} \right)$$

Where L_i is the average impact sound pressure level
 T is the reverberation time in the receiving room (in seconds)
 0.5 is the reference reverberation time (in seconds)

The weighted standardised impact sound pressure level, $L'_{nT,w}$ was obtained using the curve fitting procedure given in BS EN ISO 717-2. The standardised level difference values are plotted on a graph and compared with a reference curve. The reference curve is moved up and/or down until the sum of the unfavourable deviations is as large as possible, without exceeding 32.0 dB. The standard reference curve is shown on the graphs in Appendix C.

The Building Regulations

The Building Regulations of 1965 were the first to cover the sound insulation of separating walls and floors. They required the provision of “adequate sound insulation” in new dwellings and offered

several deemed-to-satisfy constructions. In 1972, the Regulations were revised and, in addition to deemed-to-satisfy constructions, they introduced deemed-to-satisfy numerical performance requirements for airborne and impact sound. Minor revisions were made in the 1976 Regulations.

In 1985 a major revision was made to the Regulations. Approved Document E gave more detailed constructional specifications for separating walls and separating floors and new numerical performance standards were given, though the requirements were commensurate with the former deemed-to-satisfy provisions. These Regulations were the first to govern building in Inner London. Prior to this the London Building Act of 1939 was in force, but, as this did not include provisions for sound insulation, reference was usually made to the Building Regulations.

In 1991 the Building Regulations were further revised to include constructional provisions and numerical performance standards for conversion properties. Some of the new-build constructional provisions were altered at this time.

In 2003 further amendments were made to Part E. This includes the introduction of new requirements for the sound insulation of partitions within dwellings, for the control of reverberation in the common parts of residential buildings and for the control of acoustic conditions in schools. The requirements for separating walls and separating floors are proposed to apply to both dwellings and rooms for residential purposes, which include hotels, hostels, care homes and student accommodation.

For domestic separating walls, separating floors and stairs, the normal way of satisfying the requirement is to meet given numerical standards, which are to be demonstrated by pre-completion testing.

Numerical Performance Standards

The current (2003) Approved Document numerical performance standards are tabulated below. Note that the better the airborne sound insulation, the higher the value, conversely the better the impact sound insulation, the lower the value.

DWELLING HOUSES AND FLATS		Airborne standard $D_{nT,w} + C_{tr}$ dB	Impact Standard $L'_{nT,w}$ dB
Purpose built dwellings	Walls	at least 45	N/A
	Floors and Stairs	at least 45	up to 62
Dwelling formed by material change of use	Walls	at least 43	N/A
	Floors and Stairs	at least 43	up to 64

ROOMS FOR RESIDENTIAL PURPOSES		Airborne standard $D_{nT,w} + C_{tr}$ dB	Airborne standard $L'_{nT,w}$ dB
Purpose-built rooms	Walls	at least 43	N/A
	Floors and Stairs	at least 45	up to 62
Rooms formed by material change of use	Walls	at least 43	N/A
	Floor and Stairs	at least 43	up to 64

APPENDIX B: TESTING PROCEDURES

Airborne sound insulation

The loudspeaker was placed in the source room in a position to generate an even distribution of sound throughout the room. The sound analyser was used to generate a steady random noise signal (pink noise) which was reproduced via the loudspeaker source. The sound pressure level was measured in the source room and receiving room over the one-third octave band frequency range 100 Hz to 3150 Hz. Measurements were made at five positions in each room using a measurement period of ten seconds at each position. After the first measurement in the source room the source spectrum was reviewed and the output from the analyser modified if required to eliminate differences of more than 6 dB between adjacent third-octave bands. If a modification was required a repeat measurement(s) were made and possibly further modification(s) until a suitable spectrum was obtained. The full set of measurements was then undertaken.

The source was then moved to a new position in the source room and the foregoing tests were repeated. Again after the first measurement in the source room the source spectrum was reviewed and the output from the analyser modified if required as discussed above. The source and receiving room levels were obtained by logarithmically averaging the five values for each source position obtained in each room and then arithmetically averaging the mean values for the source positions.

The source was moved to the receiving room and the sound analyser used to measure the reverberation time in each of the one-third octave bands between 100 Hz and 3150 Hz. The internal programme of the meter was used to generate and cut off the random noise signal, which was reproduced in the room by the active loudspeaker source, and to measure the decay rate of the sound in the room.

The background noise level was measured in the receiving room. Measurements were made at two positions using a measurement period of ten seconds.

Impact sound insulation

The tapping machine was placed on the floor in the source room and the drop distance of the hammers was checked and adjusted, as necessary, using the spacer provided. The machine was set into operation to generate cyclic impacts on top of the floor. The sound pressure level was measured in the receiving room over the one-third octave band frequency range 100 Hz to 3150 Hz by averaging over two measurement positions for each of four tapping machine locations, to give a total of eight measurements, with each measurement period being ten seconds.

The loudspeaker and the sound analyser were used to measure the reverberation time in each of the one-third octave bands between 100 Hz and 3150 Hz. The internal programme of the meter was used to generate and cut off the random noise signal, which was reproduced in the room by the loudspeaker, and to measure the decay rate of the sound in the room.

The background noise level was measured in the receiving room. Measurements were made at two positions using a measurement period of ten seconds.

APPENDIX C

TEST RESULTS SHEETS

Standardized level difference according to BS EN ISO 140-4

Field measurements of airborne sound insulation between rooms

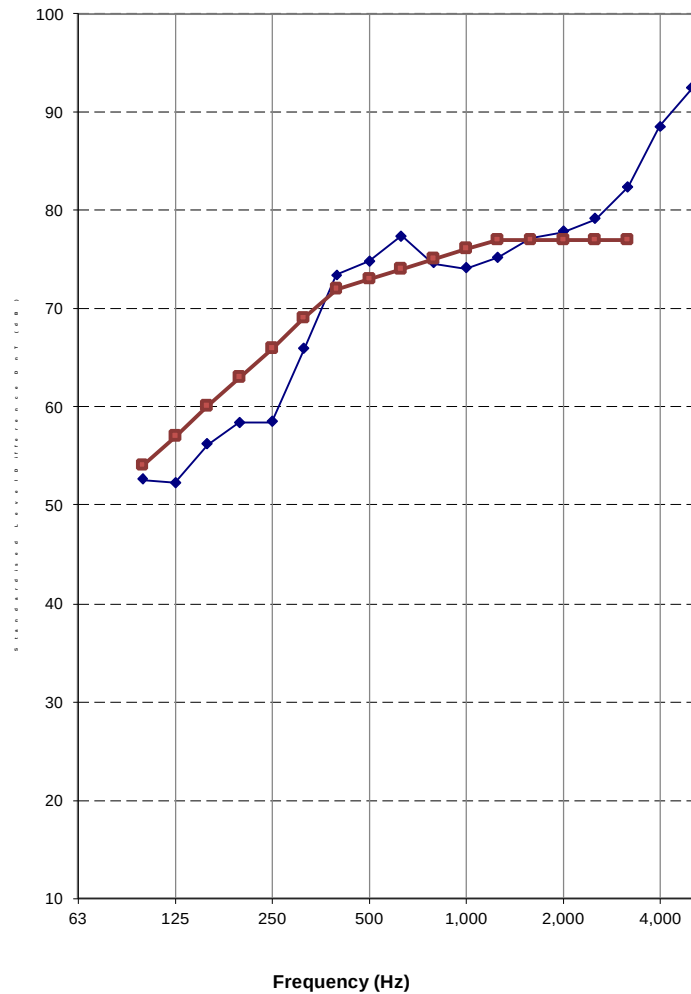
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Commercial Unit - Receiving Room = Flat 5 Kitchen

Source Room Vol: 183 m³
Receiving Room Vol: 70 m³

Frequency f (Hz)	D _{nT} 1/3 Octave (dB)
100	52.6
125	52.3
160	56.2
200	58.4
250	58.5
315	65.9
400	73.4
500	74.8
630	77.4
800	74.6
1,000	74.1
1,250	75.2
1,600	77.1
2,000	77.8
2,500	79.1
3,150	82.4
4,000	88.5
5,000	92.4



Rating according to ISO 717-1

$D_{nT,w}(C;C_{tr}) = 73 (-3;-7)$ dB

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

$C_{50-3150} =$ dB

$C_{50-5000} =$ dB

$C_{100-5000} = -3$ dB

$C_{tr,50-3150} =$ dB

$C_{tr,50-5000} =$ dB

$C_{tr,100-5000} = -7$ dB

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka

Standardized level difference according to BS EN ISO 140-4

Field measurements of airborne sound insulation between rooms

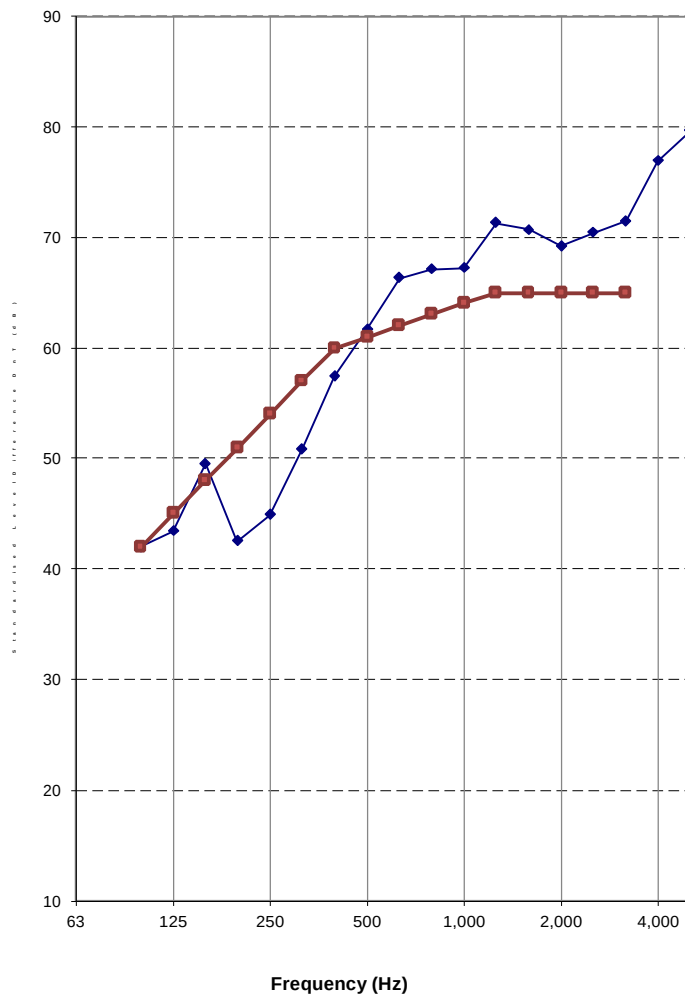
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Flat 4 Lounge - Receiving Room = Flat 3 Bedroom

Source Room Vol: 67 m³
Receiving Room Vol: 29 m³

Frequency f (Hz)	D _{nT} 1/3 Octave (dB)
100	42.0
125	43.4
160	49.5
200	42.5
250	44.9
315	50.9
400	57.4
500	61.7
630	66.3
800	67.1
1,000	67.2
1,250	71.3
1,600	70.7
2,000	69.2
2,500	70.4
3,150	71.5
4,000	76.9
5,000	79.6



Rating according to ISO 717-1

$D_{nT,w}(C;C_{tr}) = 61 (-3;-7) \text{ dB}$

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

$C_{50-3150} = \text{dB}$

$C_{50-5000} = \text{dB}$

$C_{100-5000} = -3\text{dB}$

$C_{tr,50-3150} = \text{dB}$

$C_{tr,50-5000} = \text{dB}$

$C_{tr,100-5000} = -7\text{dB}$

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka



Standardized level difference according to BS EN ISO 140-4

Field measurements of airborne sound insulation between rooms

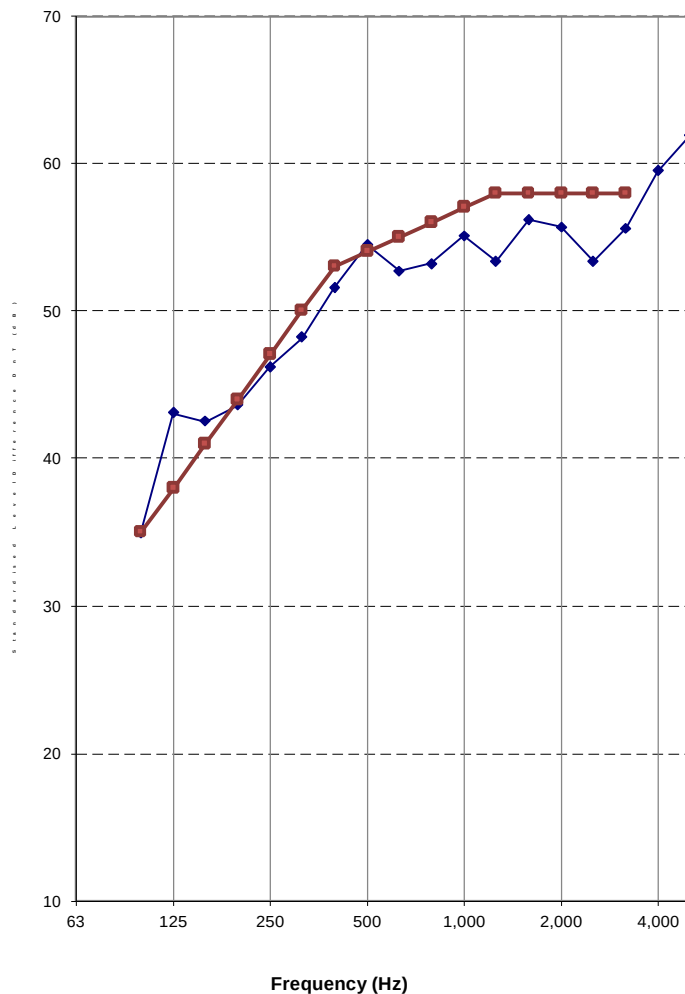
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Flat 9 Lounge - Receiving Room = Flat 8 Bedroom

Source Room Vol: 65 m³
Receiving Room Vol: 31 m³

Frequency f (Hz)	D _{nT} 1/3 Octave (dB)
100	34.9
125	43.1
160	42.5
200	43.6
250	46.2
315	48.2
400	51.6
500	54.5
630	52.7
800	53.2
1,000	55.1
1,250	53.4
1,600	56.2
2,000	55.7
2,500	53.4
3,150	55.6
4,000	59.5
5,000	61.9



Rating according to ISO 717-1

$D_{nT,w}(C;C_{tr}) = 54 (-1; -4)$ dB

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

$C_{50-3150} =$ dB

$C_{50-5000} =$ dB

$C_{100-5000} = -1$ dB

$C_{tr,50-3150} =$ dB

$C_{tr,50-5000} =$ dB

$C_{tr,100-5000} = -4$ dB

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka

Standardized level difference according to BS EN ISO 140-4

Field measurements of airborne sound insulation between rooms

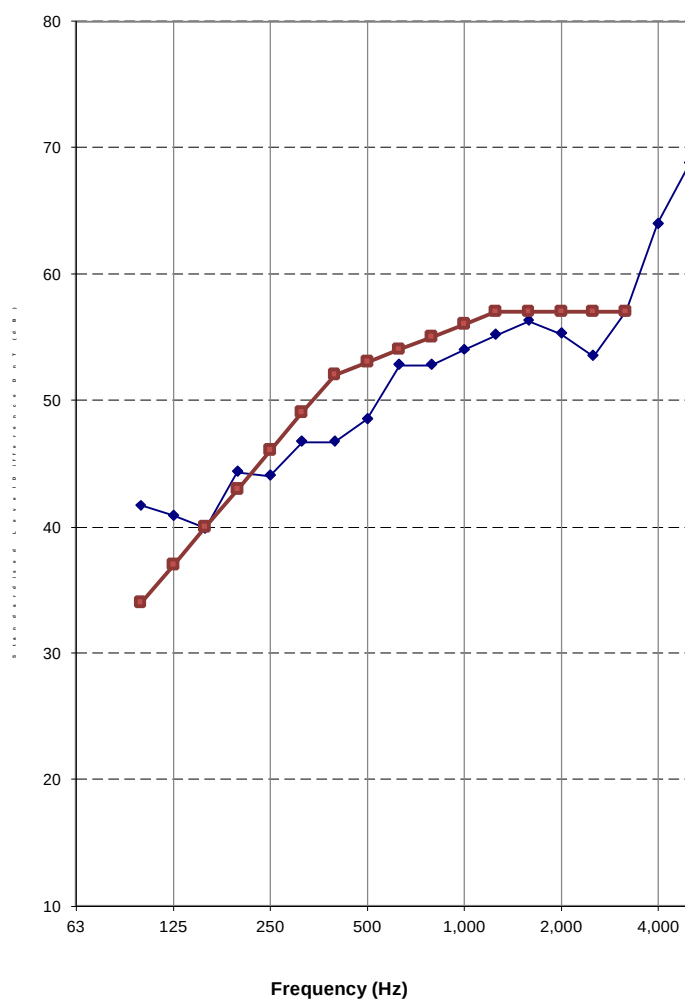
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Flat 11 Lounge - Receiving Room = Flat 10 Bedroom

Source Room Vol: 60 m³
Receiving Room Vol: 41 m³

Frequency f (Hz)	D _{nT} 1/3 Octave (dB)
100	41.7
125	40.9
160	39.9
200	44.3
250	44.0
315	46.7
400	46.7
500	48.5
630	52.8
800	52.8
1,000	54.0
1,250	55.2
1,600	56.3
2,000	55.3
2,500	53.5
3,150	57.0
4,000	64.0
5,000	68.8



Rating according to ISO 717-1

$D_{nT,W}(C;C_{tr}) = 53 (-1;-3)$ dB

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

$C_{50-3150} =$ dB

$C_{50-5000} =$ dB

$C_{100-5000} = -1$ dB

$C_{tr,50-3150} =$ dB

$C_{tr,50-5000} =$ dB

$C_{tr,100-5000} = -3$ dB

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka

Standardized level difference according to BS EN ISO 140-4

Field measurements of airborne sound insulation between rooms

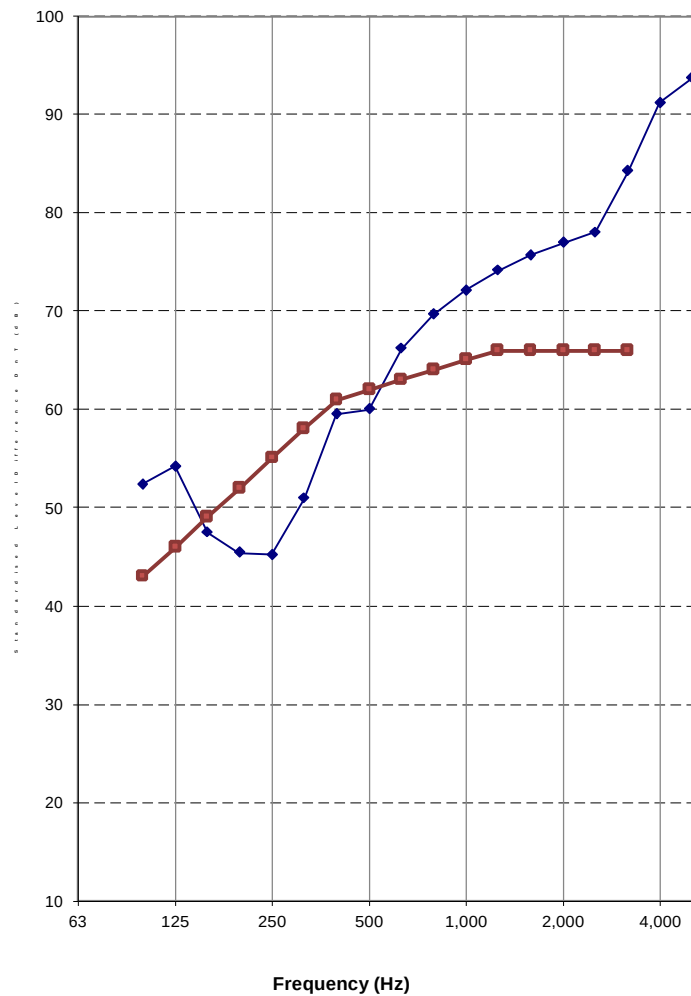
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Flat 19 Lounge - Receiving Room = Flat 18 Bedroom

Source Room Vol: 60 m³
Receiving Room Vol: 41 m³

Frequency f (Hz)	D _{nT} 1/3 Octave (dB)
100	52.4
125	54.2
160	47.5
200	45.4
250	45.2
315	50.9
400	59.5
500	60.0
630	66.2
800	69.6
1,000	72.1
1,250	74.1
1,600	75.7
2,000	76.9
2,500	78.0
3,150	84.2
4,000	91.2
5,000	93.7



Rating according to ISO 717-1

$D_{nT,w}(C;C_{tr}) = 62 (-2; -6)$ dB

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

$C_{50-3150} =$ dB

$C_{50-5000} =$ dB

$C_{100-5000} = -2$ dB

$C_{tr,50-3150} =$ dB

$C_{tr,50-5000} =$ dB

$C_{tr,100-5000} = -6$ dB

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka

Standardized level difference according to BS EN ISO 140-4

Field measurements of airborne sound insulation between rooms

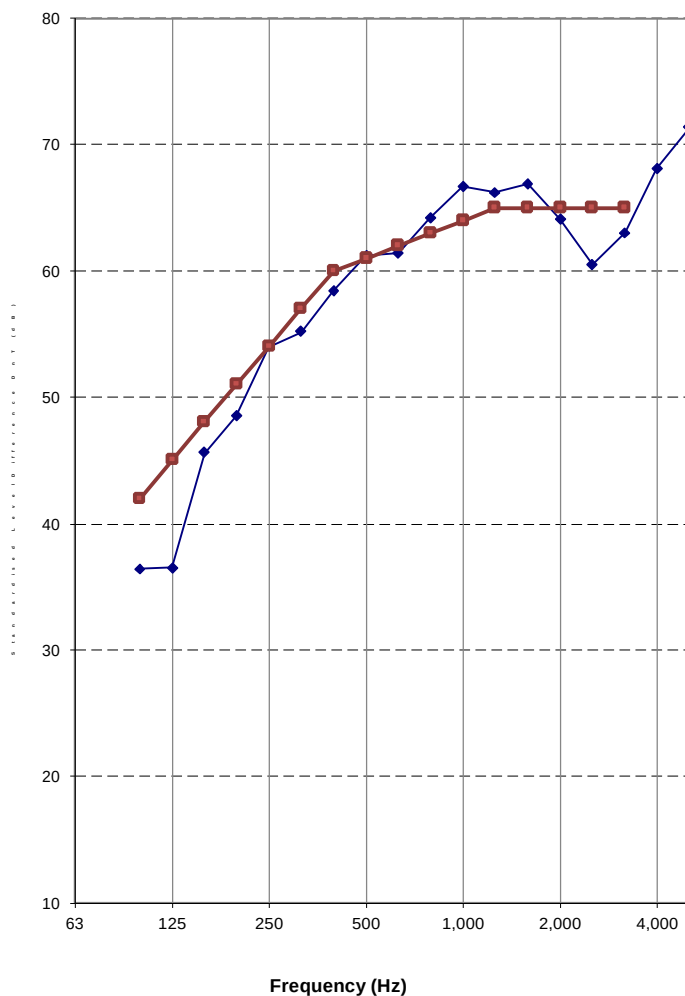
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Commercial Unit - Receiving Room = Flat 12 Lounge

Source Room Vol: 174 m³
Receiving Room Vol: 50 m³

Frequency f (Hz)	D _{nT} 1/3 Octave (dB)
100	36.4
125	36.5
160	45.6
200	48.5
250	54.0
315	55.2
400	58.4
500	61.2
630	61.4
800	64.2
1,000	66.7
1,250	66.2
1,600	66.9
2,000	64.1
2,500	60.5
3,150	63.0
4,000	68.1
5,000	71.3



Rating according to ISO 717-1

$$D_{nT,W}(C;C_{tr}) = 61 (-3;-9) \text{ dB}$$

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

$$C_{50-3150} = \text{dB}$$

$$C_{50-5000} = \text{dB}$$

$$C_{100-5000} = -3\text{dB}$$

$$C_{tr,50-3150} = \text{dB}$$

$$C_{tr,50-5000} = \text{dB}$$

$$C_{tr,100-5000} = -9\text{dB}$$

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka



Standardized level difference according to BS EN ISO 140-4

Field measurements of airborne sound insulation between rooms

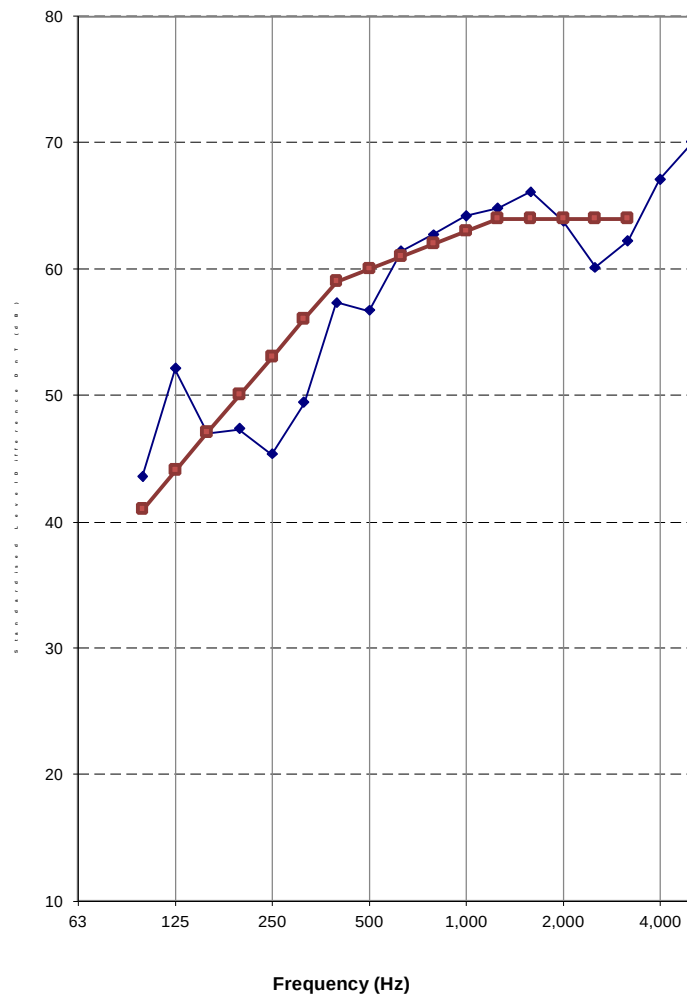
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Commercial Unit - Receiving Room = Flat 12 Bedroom

Source Room Vol: 174 m³
Receiving Room Vol: 24 m³

Frequency f (Hz)	D _{nT} 1/3 Octave (dB)
100	43.6
125	52.1
160	47.0
200	47.3
250	45.3
315	49.4
400	57.3
500	56.7
630	61.4
800	62.7
1,000	64.2
1,250	64.8
1,600	66.1
2,000	63.8
2,500	60.1
3,150	62.2
4,000	67.1
5,000	70.0



Rating according to ISO 717-1

$D_{nT,W}(C;C_{tr}) = 60 (-2;-5)$ dB

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

$C_{50-3150} =$ dB

$C_{50-5000} =$ dB

$C_{100-5000} = -2$ dB

$C_{tr,50-3150} =$ dB

$C_{tr,50-5000} =$ dB

$C_{tr,100-5000} = -5$ dB

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka

Standardized level difference according to BS EN ISO 140-4

Field measurements of airborne sound insulation between rooms

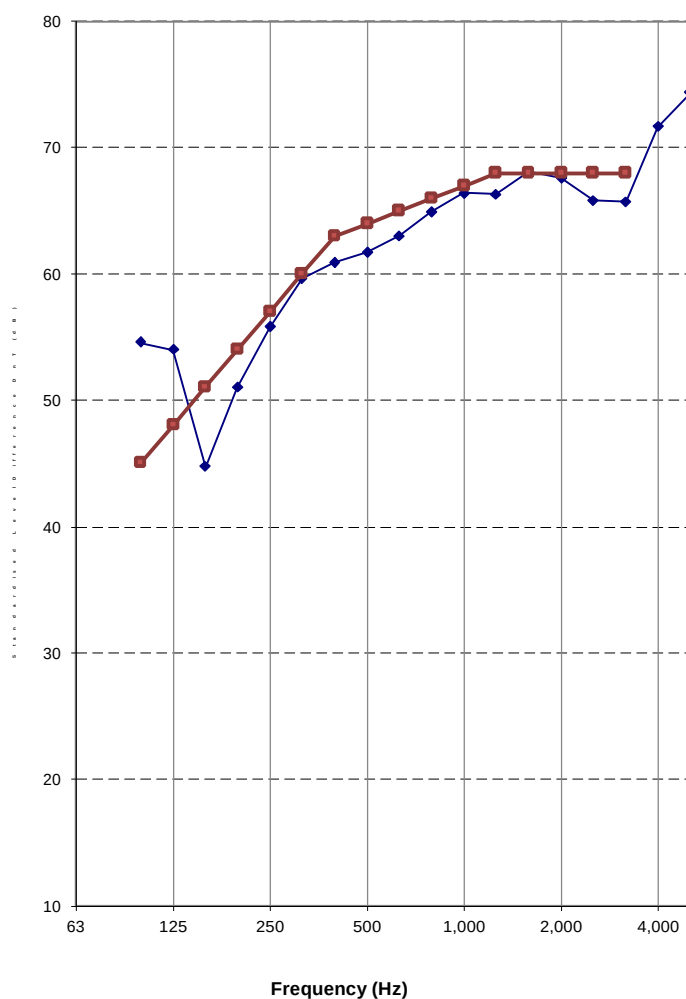
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Flat 11 Lounge - Receiving Room = Flat 5 Bedroom

Source Room Vol: 60 m³
Receiving Room Vol: 43 m³

Frequency f (Hz)	D _{nT} 1/3 Octave (dB)
100	54.6
125	54.0
160	44.7
200	51.0
250	55.8
315	59.6
400	60.9
500	61.7
630	63.0
800	64.9
1,000	66.4
1,250	66.3
1,600	68.1
2,000	67.6
2,500	65.8
3,150	65.7
4,000	71.6
5,000	74.3



Rating according to ISO 717-1

$D_{nT,W}(C;C_{tr}) = 64 (-2;-5)$ dB

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

$C_{50-3150} =$ dB

$C_{50-5000} =$ dB

$C_{100-5000} = -2$ dB

$C_{tr,50-3150} =$ dB

$C_{tr,50-5000} =$ dB

$C_{tr,100-5000} = -5$ dB

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka

Standardized level difference according to BS EN ISO 140-4

Field measurements of airborne sound insulation between rooms

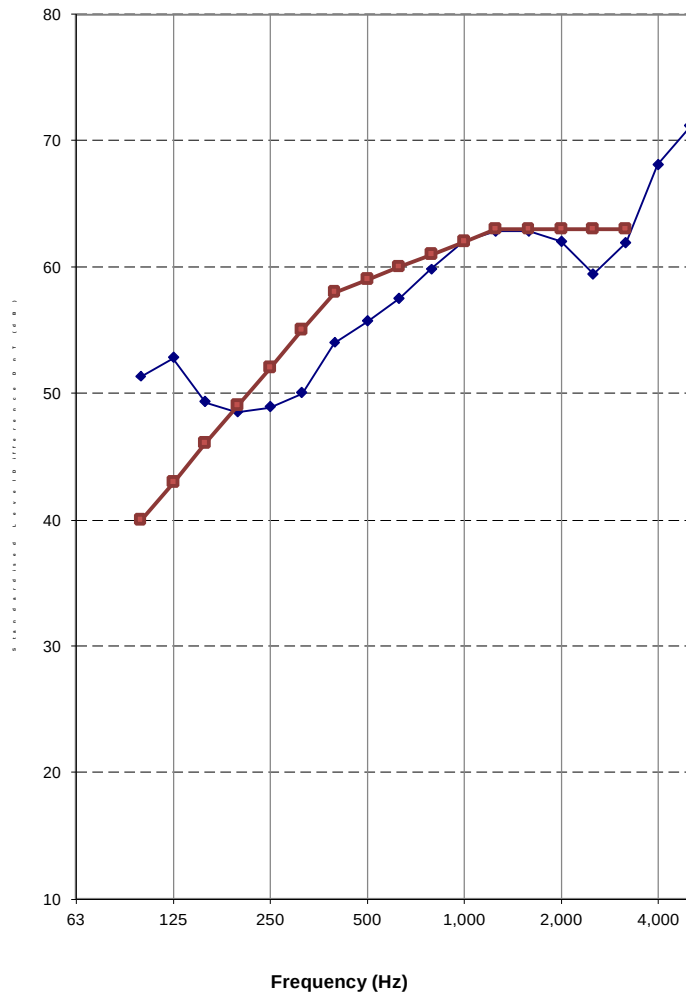
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Flat 11 Lounge - Receiving Room = Flat 19 Lounge

Source Room Vol: 60 m³
Receiving Room Vol: 60 m³

Frequency f (Hz)	D _{nT} 1/3 Octave (dB)
100	51.3
125	52.8
160	49.3
200	48.5
250	48.9
315	50.0
400	54.0
500	55.7
630	57.5
800	59.8
1,000	62.0
1,250	62.8
1,600	62.8
2,000	62.0
2,500	59.4
3,150	61.9
4,000	68.1
5,000	71.1



Rating according to ISO 717-1

$D_{nT,W}(C;C_{tr}) = 59 (-1;-3)$ dB

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

$C_{50-3150} =$ dB

$C_{50-5000} =$ dB

$C_{100-5000} = -1$ dB

$C_{tr,50-3150} =$ dB

$C_{tr,50-5000} =$ dB

$C_{tr,100-5000} = -3$ dB

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka

Standardized level difference according to BS EN ISO 140-4

Field measurements of airborne sound insulation between rooms

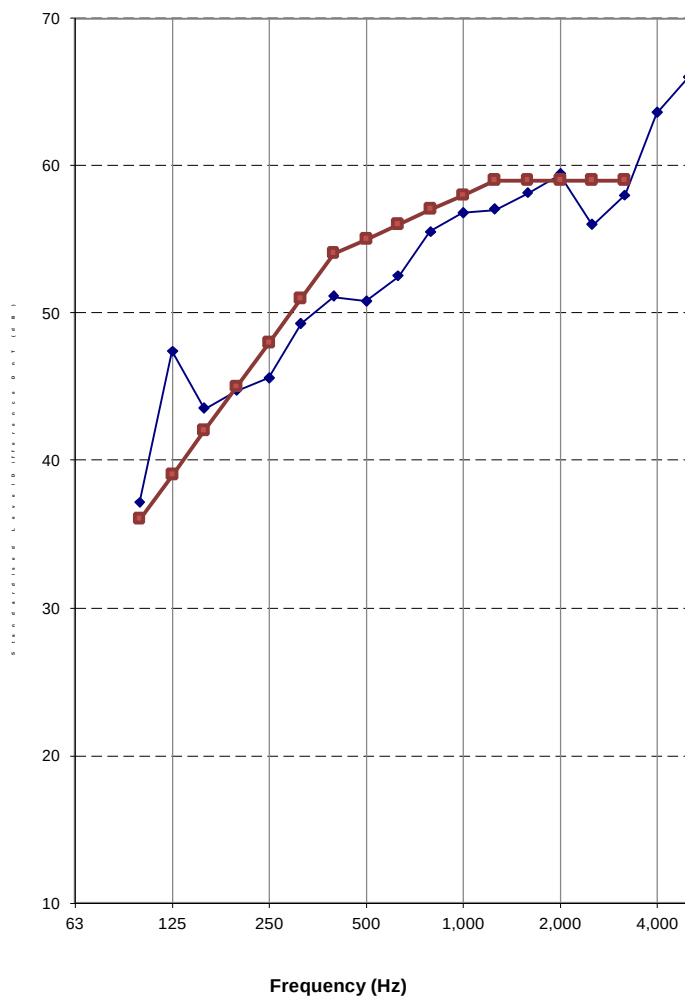
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Flat 8 Bedroom - Receiving Room = Flat 3 Bedroom

Source Room Vol: 31 m³
Receiving Room Vol: 29 m³

Frequency f (Hz)	D _{nT} 1/3 Octave (dB)
100	37.1
125	47.4
160	43.5
200	44.7
250	45.6
315	49.3
400	51.1
500	50.8
630	52.5
800	55.5
1,000	56.8
1,250	57.0
1,600	58.1
2,000	59.4
2,500	56.0
3,150	58.0
4,000	63.6
5,000	66.0



Rating according to 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.

$C_{50-3150} =$ dB

$C_{50-5000} =$ dB

$C_{100-5000} = -1$ dB

$C_{tr,50-3150} =$ dB

$C_{tr,50-5000} =$ dB

$C_{tr,100-5000} = -4$ dB

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka

Standardized level difference according to BS EN ISO 140-4

Field measurements of airborne sound insulation between rooms

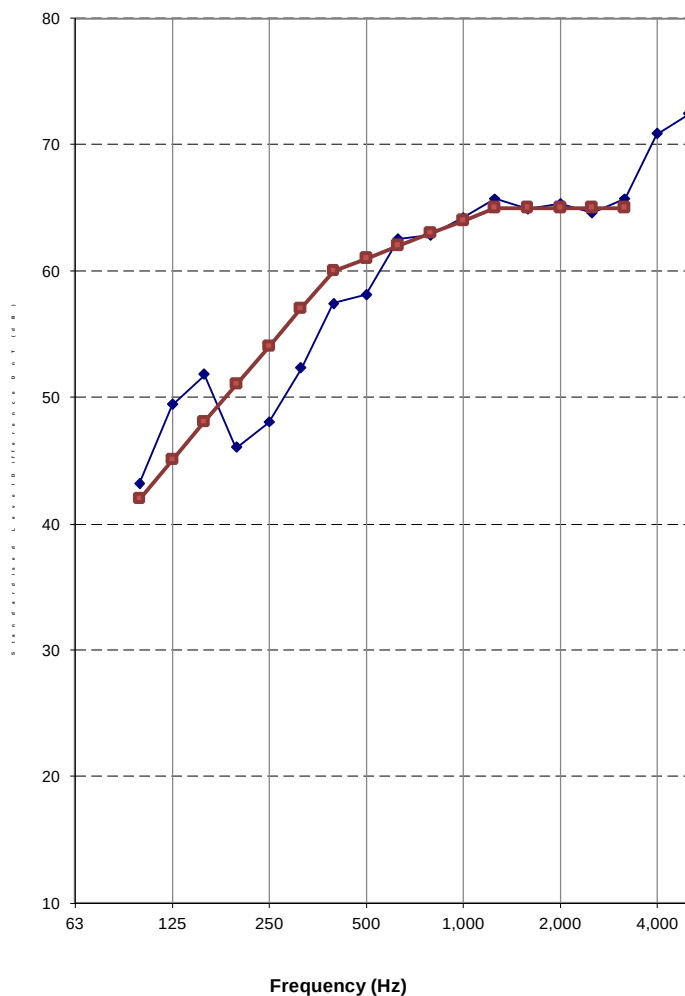
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Flat 8 Bedroom - Receiving Room = Flat 16 Bedroom

Source Room Vol: 31 m³
Receiving Room Vol: 31 m³

Frequency f (Hz)	D _{nT} 1/3 Octave (dB)
100	43.2
125	49.4
160	51.8
200	46.0
250	48.0
315	52.3
400	57.4
500	58.1
630	62.5
800	62.8
1,000	64.2
1,250	65.7
1,600	64.9
2,000	65.3
2,500	64.6
3,150	65.7
4,000	70.8
5,000	72.4



Rating according to 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.

$C_{50-3150} =$ dB

$C_{50-5000} =$ dB

$C_{100-5000} = -1$ dB

$C_{tr,50-3150} =$ dB

$C_{tr,50-5000} =$ dB

$C_{tr,100-5000} = -5$ dB

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka

Standardized impact sound pressure levels according to ISO 140-7

Field measurements of impact sound insulation of floors

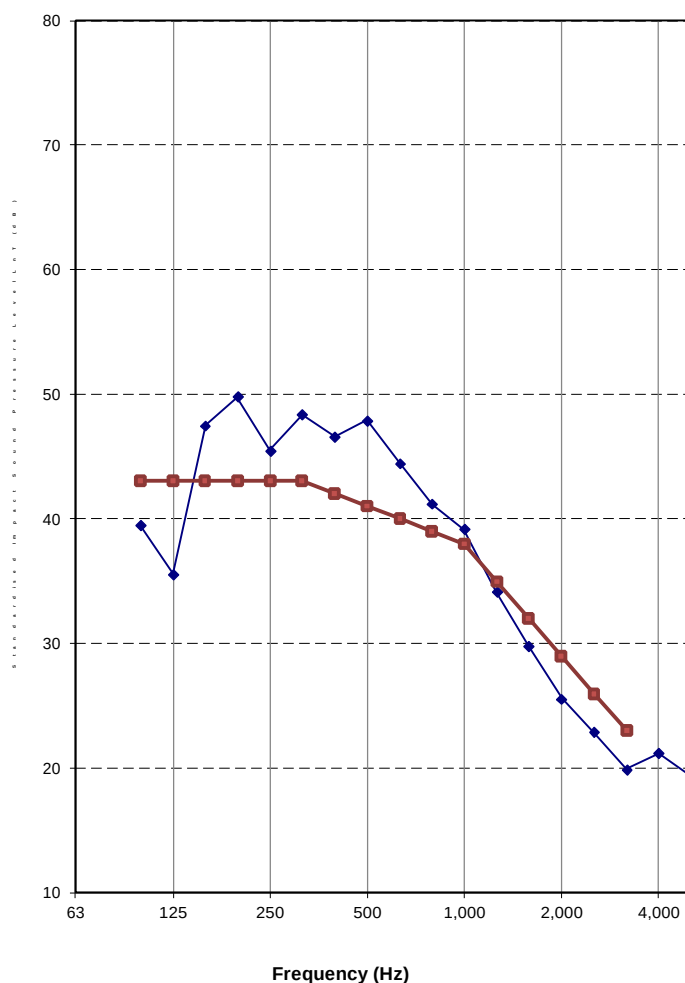
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Flat 11 Lounge - Receiving Room = Flat 5 Bedroom

Source Room Vol: 60 m³
Receiving Room Vol: 43 m³

Frequency f (Hz)	L' _{nT} 1/3 Octave (dB)
100	39.5
125	35.6
160	47.5
200	49.8
250	45.5
315	48.4
400	46.6
500	47.9
630	44.5
800	41.2
1,000	39.2
1,250	34.1
1,600	29.8
2,000	25.6
2,500	22.9
3,150	19.9
4,000	21.2
5,000	19.3



Rating according to ISO 717-2

$$L'_{nT,w}(C_i) = 42(-1) \text{ dB}$$

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

$$C_{l,50-2500} = \text{dB}$$

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka



Standardized impact sound pressure levels according to ISO 140-7

Field measurements of impact sound insulation of floors

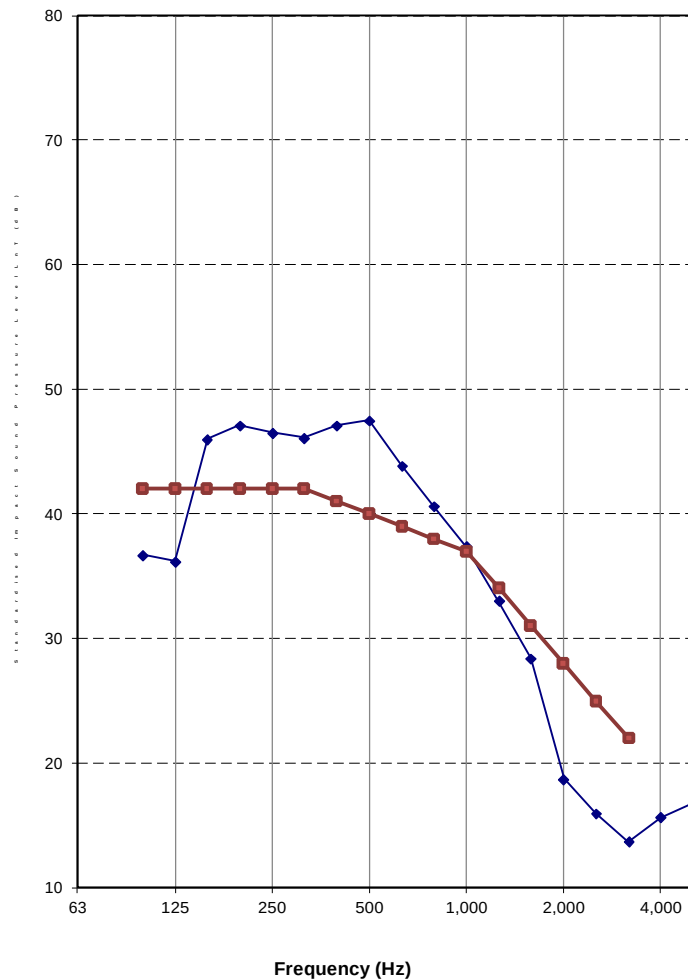
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Flat 19 Lounge - Receiving Room = Flat 11 Lounge

Source Room Vol: 60 m³
Receiving Room Vol: 60 m³

Frequency f (Hz)	L' _{nT} 1/3 Octave (dB)
100	36.7
125	36.2
160	46.0
200	47.1
250	46.5
315	46.1
400	47.1
500	47.5
630	43.9
800	40.6
1,000	37.4
1,250	33.0
1,600	28.4
2,000	18.7
2,500	16.0
3,150	13.7
4,000	15.6
5,000	16.8



Rating according to ISO 717-2

$$L'_{nT,w}(C_i) = 41(-1) \text{ dB}$$

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

$$C_{i,50-2500} = \text{dB}$$

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka

Standardized impact sound pressure levels according to ISO 140-7

Field measurements of impact sound insulation of floors

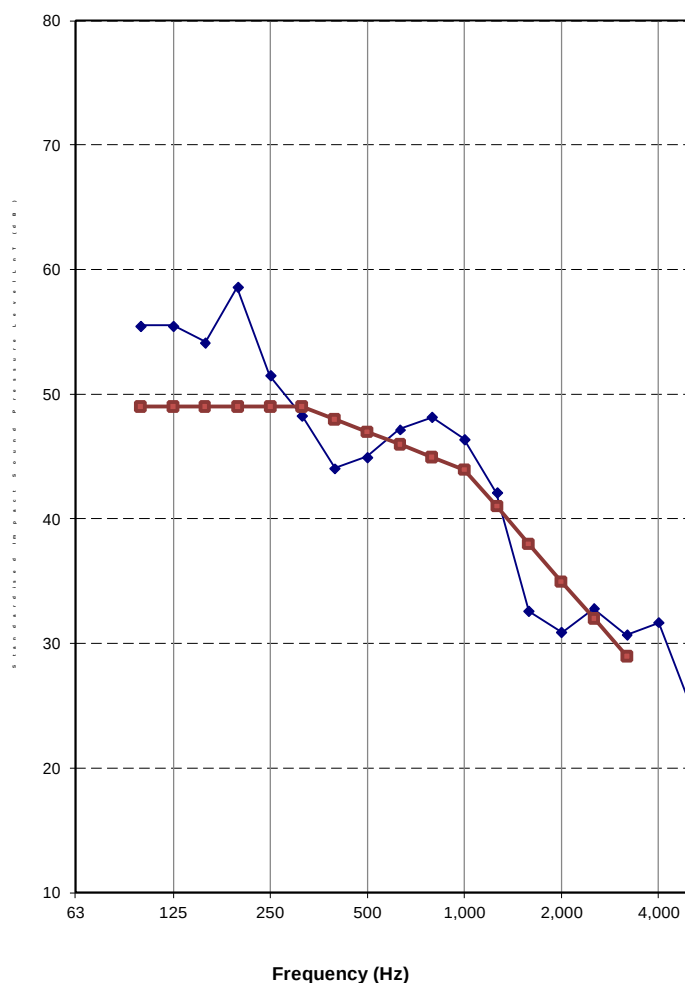
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Flat 8 Bedroom - Receiving Room = Flat 3 Bedroom

Source Room Vol: 31 m³
Receiving Room Vol: 29 m³

Frequency f (Hz)	L' _{nT} 1/3 Octave (dB)
100	55.5
125	55.5
160	54.2
200	58.6
250	51.5
315	48.3
400	44.1
500	45.0
630	47.2
800	48.2
1,000	46.4
1,250	42.1
1,600	32.6
2,000	30.9
2,500	32.8
3,150	30.7
4,000	31.7
5,000	24.8



Rating according to ISO 717-2

L'_{nT,w} (C_i) = 48() dB

C_{i,50-2500} = dB

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

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka

Standardized impact sound pressure levels according to ISO 140-7

Field measurements of impact sound insulation of floors

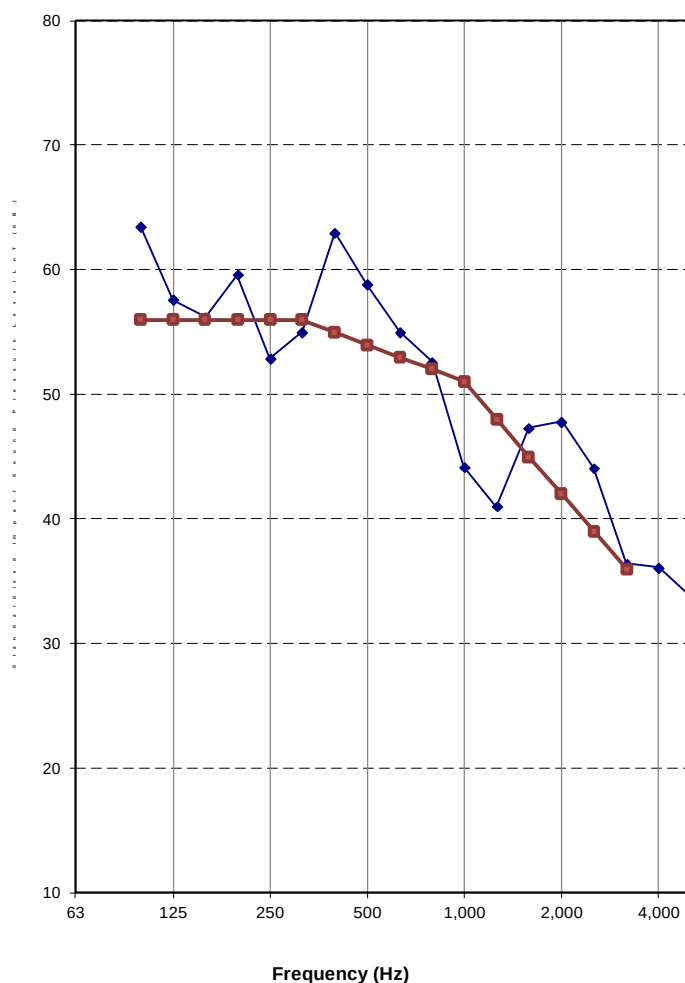
Client: HOP Architects Ltd
Description: 5-7 Station Road, Hayling Island, Hampshire, PO11 0EA

Date of test: 16 August 2023

Object: Source Room = Flat 16 Bedroom - Receiving Room = Flat 8 Bedroom

Source Room Vol: 31 m³
Receiving Room Vol: 31 m³

Frequency f (Hz)	L' _{nT} 1/3 Octave (dB)
100	63.5
125	57.6
160	56.2
200	59.6
250	52.9
315	55.0
400	63.0
500	58.8
630	55.0
800	52.6
1,000	44.2
1,250	41.0
1,600	47.3
2,000	47.8
2,500	44.1
3,150	36.4
4,000	36.1
5,000	33.7



Rating according to ISO 717-2

$$L'_{nT,w}(C_i) = 55(-1) \text{ dB}$$

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

$$C_{i,50-2500} = \text{dB}$$

Company: Air Pressure Testing Ltd.

Date: 16 August 2023

Prepared by: Lukasz Lipka

END OF TEST REPORT