



Airborne Sound Insulation testing in accordance with Test Standards BS EN ISO 140-4:1998

Report Reference Number: 33271

Test Date: 25/03/2024

Report Compilation Date: 26/03/2024

### Abstract

Pre-completion Sound Insulation Testing is the process of measuring how much noise a building element, normally a separating wall or a separating floor, prevents from travelling through to a neighbouring dwelling

This report describes the test procedure and the results obtained from the pre-completion sound insulation testing at 93 Watford Way, Barnet, NW4 4RS.

### Competent Tester

Testing in this report was conducted by Joe Smith (Registration Number: 7226), who is a Certified tester in the SITMA Certification Scheme for Sound Insulation Testers, which is a UKAS Accredited Certification Body No. 10579.

SITMA operates solely as a personal certification body. Its accredited function is limited to certifying individuals and their ability to follow the test standards. SITMA does not conduct these tests itself, nor does it participate in or influence the testing process in any way, neither is any tester an employee of SITMA.

*The certification and reporting of tests falls outside the scope of the accredited scheme.*

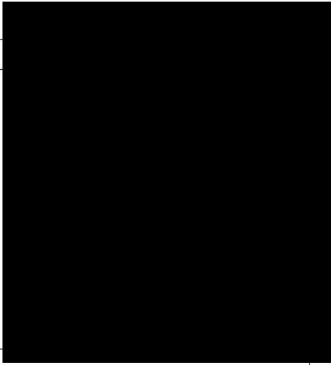
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# The SITMA Certified Testers' Scheme

This testing described within this report was conducted by a certified tester of the Non-UKAS SITMA Certification Scheme for Sound Insulation Testers. The report was generated using the SITMA Portal, which testers are required to use as part of the requirements for certified testers (as per PUS006 - Lodgement Process, Rules & Guidance) in the SITMA Certification Scheme for Sound Insulation Testers. Further information on the certification scheme, its lodgement system, quality control and auditing requirements are discussed below.

## Certified Tester Conducting this test:

<b>Certified Tester:</b>	Joe Smith	
<b>Associated Company:</b>	JosTec, Suite 107 Moda Business Centre, Stirling Way, Borehamwood, WD6 2BW.	
<b>Live Certification Status</b>	<a href="https://www.bcta.group/sitma/members">https://www.bcta.group/sitma/members</a>	

## SITMA Certification Scope

The Non-UKAS SITMA Certification Scheme for Sound Insulation Testers operates to the principals BS EN ISO/IEC 17024:2012 <sup>1</sup>.

Testers are certified in accordance with the SITMA Scope of Accreditation<sup>2</sup>, accessible here: <https://www.bcta.group/sitma/sitma-certification-scheme-scope/>

## Audit Requirements

Each tester is audited annually, which may be unannounced, in accordance with [SITMA Document PUS012 – Audit Process & Outcomes](#). This is achieved by the tester logging their job onto the SITMA portal **in advance of testing taking place**.

Each certified tester will be able to issue you with their SITMA audit documentation from their last audit alongside this report, if requested.

## SITMA Portal

The SITMA Portal, besides logging every job for every tester, is used to generate reports, just like this one. The portal does not accept pre-calculated information, it takes the raw data from the sound level meter and calculates each individual test result before producing this report, ensuring no test data has been amended by any tester prior to being uploaded.

## Calibration Requirements

SITMA calibration requirements can be found here: <https://www.bcta.group/sitma/equipment/usable-equipment>.

## Complaints

You should speak directly with the tester if you wish to make a complaint. If your complaint is not handled to your satisfaction, you are then welcome to make a complaint directly to the SITMA certified tester's scheme in line with our complaints process. [SITMA Document PUS013 – Complaints & Appeals](#).

## TO CHECK THIS REPORT IS VALID

1. Head to this site:	<a href="https://www.sitma.bcta.group/">https://www.sitma.bcta.group/</a>
2. Use these credentials:	Report Reference Number: 33271 Job Postcode: NW4 4RS

<sup>1</sup> BS EN ISO/IEC 17024:2012 Conformity assessment — General requirements for bodies operating certification of persons (2018)

<sup>2</sup> United Kingdom Accreditation Service (UKAS) SITMA accreditation No. 10579

## Report Revisions

Report Version:	Change(s) made
1.0	This document is the initial issue

## Simplified Test Results

Certificate Number	Plot & Source Room	Plot & Receive Room	Target $D_{nT,w}+C_{tr}$ (dB)	Result $D_{nT,w}+C_{tr}$ (dB)	Result
147774	Room 13 Room	Room 12 Room	≥ 43	46	PASS
147775	Room 13 Room	Room B Room	≥ 43	47	PASS
147776	Room 11 Room	Room 10 Room	≥ 43	43	PASS

\* Results shown with an asterisk have a deviation which is discussed on the certificate and in the Detailed Test Results section.

# Testing Methodology

## *Airborne Sound Insulation Tests*

Measurements of Standardised Level Difference ( $D_{nT}$ ) were conducted in accordance with BS EN ISO 140-4:1998.

### **Level measurements in the Source & Receive Rooms ( $L_1$ & $L_2$ )**

The noise was generated in the source room by placing an active loudspeaker, which produced a steady spectrum of noise, in an external corner of the room, opposite the wall being tested (where walls are being tested) at least 0.5m away from any reflective surface.

The sound pressure level was measured in both the source room and receive room, sampling as much of the room as possible, for each of two loudspeaker positions. The sound level meter was always kept 0.7m away from any reflective surface as to not artificially increase or decrease noise levels into the microphone.

The measurements were taken at one-third octave band intervals from 100 to 3150 Hertz using an averaging time of at least 30 seconds. The speaker was moved at least 1.4m horizontally and 0.3m vertically and the measurements were repeated. The measurements in each room were logarithmically averaged.

### **Background Measurements in Receive Room ( $L_b$ )**

Background noise levels were measured in the receive room with the source room speaker turned off to ensure the background noise level did not influence the result. Corrections are applied when the background noise level is within 10dB of the signal and background noise level combined.

The background noise level was measured over a time period that accurately reflects the background noise measurement at the time of the test. This is normally between 6 & 30 seconds and can vary between the first and second background measurements.

### **Reverberation Time Measurements (RT)**

The reverberation measurements were carried out following the guidance in BS EN ISO 140-7: 1998 and BS EN ISO EN 354:2003<sup>3</sup>.

A minimum of 6 reverberation time measurements were carried out in the receive room to accurately define the amount of influence the diffuse field has on the microphone, ensuring that the soft or hard surfaces within the room do not impact the overall test result.

These 6 reverberation time measurements were measured in the receive room using a minimum of 3 microphone positions in accordance with Section 6.5 of BS EN ISO 140-4:1998.

The noise was generated in the receive room by placing an active loudspeaker, which produced a steady spectrum of noise, in a corner of the room at least 0.5m away from any reflective surface.

The  $T_{20}$  RT measurements are used in the calculation as a minimum. Where  $T_{30}$  RT measurements are available, these are used where the sound level meter can do so.

<sup>3</sup> BS EN ISO 354:2003 Acoustics – Measurement of sound absorption in a reverberation room

# Calculation Methodology

## Uniform Requirements

### Background Noise Correction ('Corrected $L_2$ ')

Any receive room measurements that are within 6dB of the background measurements are corrected by adding 1.3 dB to the receive room measurement.

If the difference in levels is smaller than 10dB but greater than 6dB, the signal is corrected as per BS EN ISO 140-4:1998 Section 6.6 for airborne tests and BS EN ISO 140-7:1998 Section 5.6 for impact tests.

### Precision

All measurements are taken to 0.1dB precision, except reverberation times which are taken to 0.01 second precision. Measurements are calculated without rounding until the single number rating calculation, following guidance from BS EN ISO 717-1:1997<sup>4</sup> and BS EN ISO 717-2:1997<sup>5</sup>

## Airborne Sound Insulation Tests

### Level Difference (' $D$ ')

The difference between the source and 'corrected' receive room measurement is calculated for each speaker position and 2 differences arithmetically averaged to obtain ' $D$ ' for each frequency measured. These are calculated separately for Speaker Position 1 and Speaker Position 2.

### Standardised Level Difference (' $D_{nT}$ ')

The results at each third octave band frequency are standardised by adding 10 times the logarithm of the reverberation time at each frequency, divided by 0.5 (reference reverberation time), to give the standardized level difference ( $D_{nT}$ ) at each frequency.

### Weighted Standardized Level Difference (' $D_{nT,w}$ ')

The individual  $D_{nT}$  are then compared to the standard reference curve, with the sum of unfavourable deviations measured and adjusted, as defined in BS EN ISO 717-1:1997 to give a single figure result of  $D_{nT,w}$ .

### Weighted Standardized Level Difference with Spectrum Adaption (' $D_{nT,w} + C; C_{tr}$ ')

The spectrum adaptation terms ( $C; C_{tr}$ ) are then calculated in accordance with BS EN ISO 717-1:1997.

### Precision

All measurements are taken to 0.1dB precision, except reverberation times which are taken to 0.01 seconds precision.

<sup>4</sup> BS EN ISO 717-1:1997 Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation

<sup>5</sup> BS EN ISO 717-2:1997 Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation

### ***Impact Sound Insulation Tests***

#### **Standardized Impact Sound Pressure Level (' $L'_{nT}$ ')**

The results at each third octave band frequency are standardized by subtracting 10 times the logarithm of half the reverberation time at each frequency, divided by 0.5, to the 'corrected' L2 to give the Standardized Impact Sound Pressure Level ( $L'_{nT}$ ) at each frequency.

#### **Weighted Standardized Impact Sound Pressure Level (' $L'_{nT}$ ').**

The  $L'_{nT}$  are then compared to the standard reference curve, with the sum of unfavourable deviations measured and adjusted, as defined in BS EN ISO 717-2:1997 to give a single figure result of  $L_{nT,w}$

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<sup>4</sup> BS EN ISO 717-1:1997 Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation

<sup>5</sup> BS EN ISO 717-2:1997 Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation



## Sampling Regime

Testing was conducted using a sampling regime in accordance with Approved Document E 2003 [as amended] (ADE), ensuring each construction type was tested on the project, not necessarily each plot. It is assumed that each construction type is constructed consistently. If this is not the case, and deviations of the construction type occur, further testing will be required to comply with the requirements of Approved Document E 2003 [as amended] to the Building Regulations.

The location of the sets of tests were selected at random by the tester except where specifically requested by the Local Authority Building Control officer, Approved Inspector or by specialist input from Robust Details Limited.

Rooms were tested unfurnished unless testing is specifically requested in a furnished room.

Testing is conducted using the larger room as the source room, with a tolerance of 10% of volume being acceptable either way. Doors, windows, and trickle vents must be closed and kitchen units, cupboard doors, wardrobes etc shall be open for the duration of the test when they have been installed against the separating wall under test.

For impact testing, the tests are always conducted on the separating floor that has received Building Control Approval. It is only ever acceptable to test on a soft floor covering where that covering is an integral part of a Type 1 concrete floor as defined by ADE and cannot physically be lifted by the tester's own hands.

Occasionally, rooms may have an awkward layout, such as a stagger, be significant in length (>10m) or contain internal barriers. These requirements are defined in BS EN ISO 140-14:2004<sup>6</sup> which all testers hold a copy of as a mandatory entry requirement into the SITMA Certified Testers' Scheme. Where a test has an awkward layout, the testing method from BS EN ISO 140-14:2004 will be defined in the report and sketches held internally.

## Deviations

### Background Noise Levels

Background noise levels are often an unavoidable part of testing as testing must take place on a live building site. Though a correction is applied within the calculation, high background noise levels may result in the wall/floor under test not achieving its full potential.

Situations can occur where background noise levels are not high, but the sound insulation performance of the separating floor or wall is so good that the measured levels are close to the prevailing background levels. The equipment used cannot distinguish between background noise levels and the noise from the speaker.

### Deviations Related to the test

If any deviation from the testing method was necessary, details of the deviation are indicated on each individual test certificate (appended to this report). Where deviations were avoidable, or tests have been conducted on a 'trial' basis, these will be highlighted at the bottom of each certificate.

<sup>6</sup> BS EN ISO 140-14:2004 Acoustics – Measurement of sound insulation in buildings and of building elements – Part 14: Guidelines for special situations in the field



# Calibration

## Calibration

The calibration certificates can be requested from the SITMA Certified Tester at any time.

Item Category	Standard	Calibration From	Calibration Expiry	Certificate Number
Tapper Machine	BS EN ISO 140-7:1998	29 Nov 2023	29 Nov 2025	U46093
Sound Level Meter (SLM)	IEC 61260-1:2014	21 Nov 2023	21 Nov 2025	U46013
Calibrator	IEC 60942:2017	21 Nov 2023	21 Nov 2024	U46011
Calibrator	IEC 60942:2017	11 Sep 2023	11 Sep 2024	U45326
Tapper Machine	BS EN ISO 140-7:1998	02 Sep 2022	02 Sep 2024	U41854
Sound Level Meter (SLM)	IEC 61260-1:2014	31 Aug 2022	31 Aug 2024	U41831
Speaker( Directivity )	SITMA PUS007	01 Mar 2024	31 May 2024	123456
Speaker( Directivity )	SITMA PUS007	01 Mar 2024	31 May 2024	123456

## Detailed Test Results

Airborne Wall Tests – Material Change of Use by Joe Smith

Certificate Number	Plot & Source Room	Source Room Volume (m <sup>3</sup> )	Plot & Receive Room	Receive Room Volume (m <sup>3</sup> )	Target $D_{nT_{3w}}+C_{tr}$ (dB)	Result $D_{nT_{3w}}+C_{tr}$ (dB)	Result
147774	<b>Room 13 Room</b>	39.0m <sup>3</sup>	<b>Room 12 Room</b>	29.1m <sup>3</sup>	≥ 43 dB	46 dB	<b>Pass</b>
	<b>Construction:</b> Generic Metal Frame: Metal stud wall with insulation between and 2x plasterboard either side. Added resilient bars to one side and another layer of plasterboard.						
	<b>Deviations:</b>						
147775	<b>Room 13 Room</b>	39.0m <sup>3</sup>	<b>Room B Room</b>	23.0m <sup>3</sup>	≥ 43 dB	47 dB	<b>Pass</b>
	<b>Construction:</b> Generic Metal Frame: Metal stud wall with insulation between and 2x plasterboard either side. Added resilient bars to one side and another layer of plasterboard.						
	<b>Deviations:</b> Receive Room under 25m <sup>3</sup> , Insulation stuffed under both source and receive room doors (This test only) as they were very close together. This is because the seal at the bottom of the door had not yet turned up.						
147776	<b>Room 11 Room</b>	39.1m <sup>3</sup>	<b>Room 10 Room</b>	27.2m <sup>3</sup>	≥ 43 dB	43 dB	<b>Pass</b>
	<b>Construction:</b> Generic Metal Frame: Metal stud wall with insulation between and 2x plasterboard either side. Added resilient bars to one side and another layer of plasterboard.						
	<b>Deviations:</b>						

## Appendix A – Individual Certificates

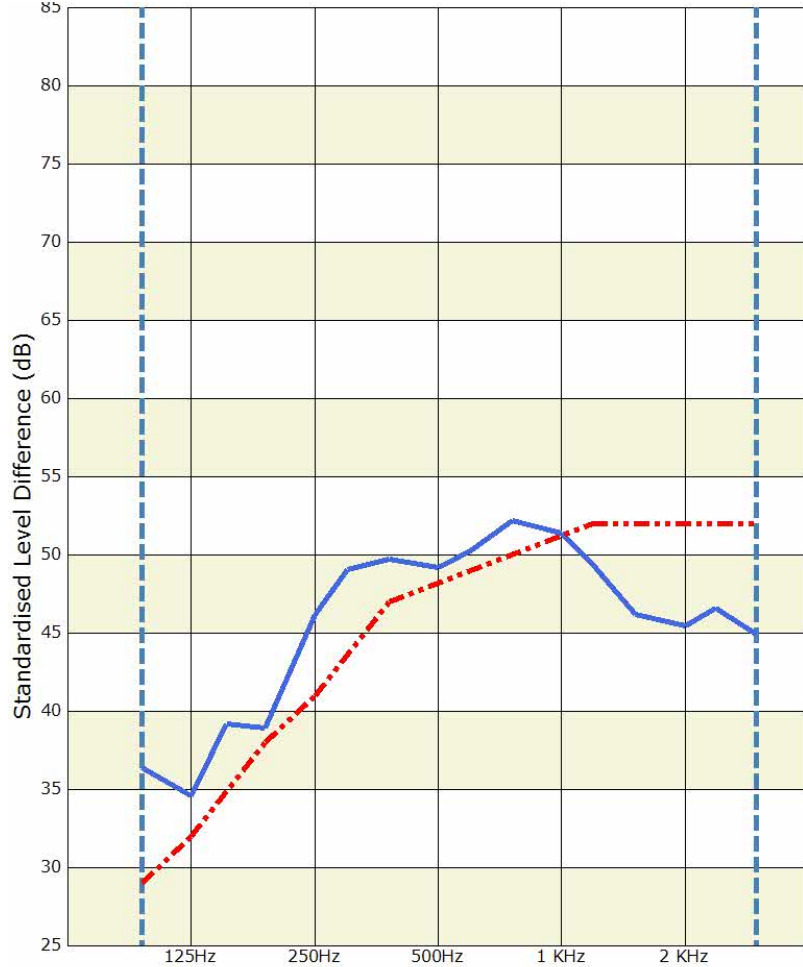
Test Type	Source Room	Partition	Receiver Room
Airborne sound insulation	Room 13 Room	WM0001**	Room 12 Room
Airborne sound insulation	Room 13 Room	WM0001**	Room B Room
Airborne sound insulation	Room 11 Room	WM0001**	Room 10 Room

## Registered Sound Insulation Test Certificate

Test No:	147774	Test Job Ref:	33271	Test Org Name:	JosTec
Customer:	Saks Property	Test Type:	Airborne (Wall)		
Address:	74 Brent Street, Barnet	Job Address:	93 Watford Way, Barnet	Test Date:	25/03/2024
				Tester:	Joe Smith
				Site type:	Material Change of Use
Postcode:	NW4 2ES	Postcode:	NW4 4RS	Site Build:	Rooms for Residential Use
	Source Room:	Partition:	Receiver Room:		
Description:	Room 13 Room	WM0001**	Room 12 Room		
Volume / Area	39.0m <sup>3</sup>	75.0m <sup>2</sup>	29.1m <sup>3</sup>		

Frequency (Hz)	$D_{nT}$	Correction
50*	0	
63*	0	
80*	0	
100	36.4	X
125	34.6	X
160	39.2	X
200	38.9	X
250	46.2	X
315	49.1	X
400	49.7	X
500	49.2	X
630	50.3	X
800	52.2	X
1	51.4	X
1.25	49.4	
1.6	46.2	
2	45.5	
2.5	46.6	
3.15	44.9	
4K*	0	
5K*	0	

Evaluation based on field measurement using results obtained by an engineering method



1/3rd Octave Band Frequency (Hz)

\*Outside scope of Certification

Above graph shows frequency range according to the curve of reference values within BS EN ISO 717-1

$D_{nT,w}$  (C;  $C_{tr}$ ) [dB]: 48 (-1, -2) dB  
 $D_{nT,w} + C_{tr}$  [dB]: 46 dB  
 Minimum Pass Level [dB]: 43 dB

**PASS**  
 Adverse Aggregated Deviations [dB]: 27.4

Partition Detail: Metal stud wall with insulation between and 2x plasterboard either side. Added resilient bars to one side and another layer of plasterboard.

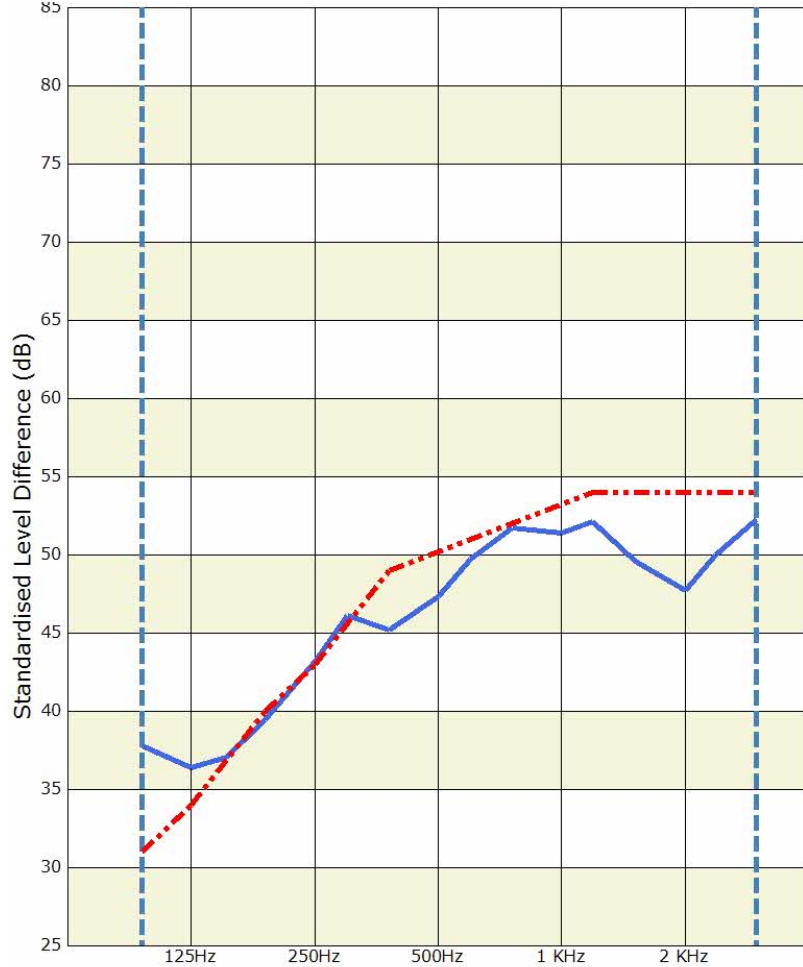
Test Exceptions (if any): None Declared by Tester

AIRBORNE SOUND INSULATION TEST: Approved Document E (2003) including 2004, 2010, 2013, and 2015 Amendments  
 BS EN ISO 140 - Part 4:1998: Acoustics - measurement of sound in buildings and of building elements  
 BS EN ISO 717 - Part 1:1997: Acoustics - rating of sound in buildings and of building elements

## Registered Sound Insulation Test Certificate

Test No:	147775	Test Job Ref:	33271	Test Org Name:	JosTec
Customer:	Saks Property	Test Type:	Airborne (Wall)		
Address:	74 Brent Street, Barnet	Job Address:	93 Watford Way, Barnet	Test Date:	25/03/2024
				Tester:	Joe Smith
				Site type:	Material Change of Use
Postcode:	NW4 2ES	Postcode:	NW4 4RS	Site Build:	Rooms for Residential Use
	Source Room:	Partition:	Receiver Room:		
Description:	Room 13 Room	WM0001**	Room B Room		
Volume / Area	39.0m <sup>3</sup>	75.0m <sup>2</sup>	23.0m <sup>3</sup>		

Frequency (Hz)	$D_{nT}$	Correction
50*	0	
63*	0	
80*	0	
100	37.8	
125	36.4	
160	37.1	
200	39.5	
250	43.2	
315	46.1	
400	45.2	
500	47.3	
630	49.7	
800	51.7	
1	51.4	
1.25	52.1	
1.6	49.6	
2	47.7	
2.5	50	
3.15	52.3	
4K*	0	
5K*	0	



Evaluation based on field measurement using results obtained by an engineering method

1/3rd Octave Band Frequency (Hz)

\*Outside scope of Certification

Above graph shows frequency range according to the curve of reference values within BS EN ISO 717-1

$D_{nT,w}$  (C;  $C_{tr}$ ) [dB]: 50 (-1, -3) dB  
 $D_{nT,w} + C_{tr}$  [dB]: 47 dB  
 Minimum Pass Level [dB]: 43 dB

**PASS**  
 Adverse Aggregated Deviations [dB]: 28.5

Partition Detail: Metal stud wall with insulation between and 2x plasterboard either side. Added resilient bars to one side and another layer of plasterboard.

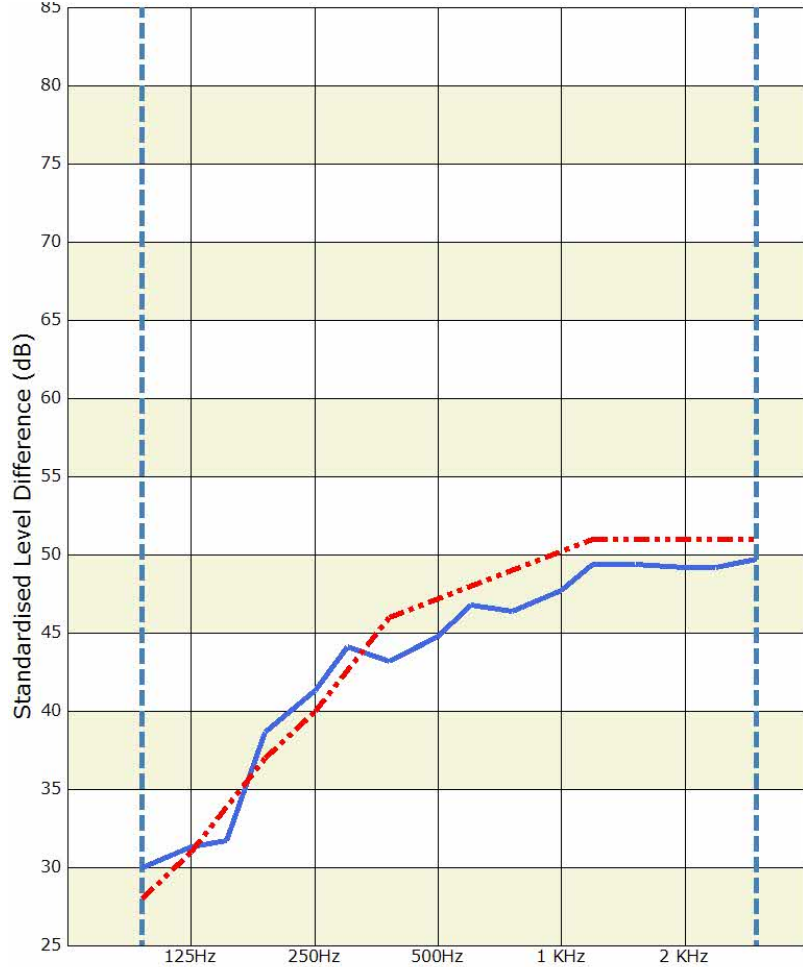
Test Exceptions (if any): Receive Room under 25m<sup>3</sup>, Insulation stuffed under both source and receive room doors (This test only) as they were very close together. This is because the seal at the bottom of the door had not yet turned up.

AIRBORNE SOUND INSULATION TEST: Approved Document E (2003) including 2004, 2010, 2013, and 2015 Amendments  
 BS EN ISO 140 - Part 4:1998: Acoustics - measurement of sound in buildings and of building elements  
 BS EN ISO 717 - Part 1:1997: Acoustics - rating of sound in buildings and of building elements

## Registered Sound Insulation Test Certificate

Test No:	147776	Test Job Ref:	33271	Test Org Name:	JosTec
Customer:	Saks Property	Test Type:	Airborne (Wall)		
Address:	74 Brent Street, Barnet	Job Address:	93 Watford Way, Barnet	Test Date:	25/03/2024
				Tester:	Joe Smith
Postcode:	NW4 2ES	Postcode:	NW4 4RS	Site type:	Material Change of Use
				Site Build:	Rooms for Residential Use
	Source Room:	Partition:	Receiver Room:		
Description:	Room 11 Room	WM0001**	Room 10 Room		
Volume / Area	39.1m <sup>3</sup>	75.0m <sup>2</sup>	27.2m <sup>3</sup>		

Frequency (Hz)	$D_{nT}$	Correction
50*	0	
63*	0	
80*	0	
100	30	
125	31.3	
160	31.7	
200	38.7	
250	41.3	
315	44.1	
400	43.2	
500	44.8	
630	46.8	
800	46.4	
1	47.7	
1.25	49.4	
1.6	49.4	
2	49.2	
2.5	49.2	
3.15	49.7	
4K*	0	
5K*	0	



Evaluation based on field measurement using results obtained by an engineering method

1/3rd Octave Band Frequency (Hz)

\*Outside scope of Certification

Above graph shows frequency range according to the curve of reference values within BS EN ISO 717-1

$D_{nT,w}$  (C;  $C_{tr}$ ) [dB]: 47 (-1, -4) dB  
 $D_{nT,w} + C_{tr}$  [dB]: 43 dB  
 Minimum Pass Level [dB]: 43 dB

**PASS**  
 Adverse Aggregated Deviations [dB]: 21.5

Partition Detail: Metal stud wall with insulation between and 2x plasterboard either side. Added resilient bars to one side and another layer of plasterboard.

Test Exceptions (if any): None Declared by Tester

AIRBORNE SOUND INSULATION TEST: Approved Document E (2003) including 2004, 2010, 2013, and 2015 Amendments  
 BS EN ISO 140 - Part 4:1998: Acoustics - measurement of sound in buildings and of building elements  
 BS EN ISO 717 - Part 1:1997: Acoustics - rating of sound in buildings and of building elements

## Appendix B – UKAS Calibration Certificates



Laboratory Location

## Campbell Associates Ltd

5b Chelmsford Road Industrial Estate  
GREAT DUNMOW, Essex, GB-CM6 1HD  
Phone 01371 871030



## Certificate of Calibration and Conformance

**Certificate number:** U41831

**Test Object:** Sound Level Meter, BS EN IEC 61672-1:2013 Class 1  
Associated Frequency Analyser to BS EN IEC 61260:1996 Class 0

**Producer:** Brüel & Kjær

**Type:** 2250

**Serial number:** 3000156

**Customer:** JosTec Ltd

**Address:** Suite 107, Moda Business Centre,  
Stirling Way. Borehamwood. WD6 2BW.

**Contact Person:** Robert Joselyn

**Order No:**

### Introduction:

Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

<b>Tested:</b>	<i>Producer</i>	<i>Type</i>	<i>Serial No</i>	<i>Certificate No</i>
Microphone	Brüel & Kjær	4189	2775009	41830
Calibrator*	Brüel and Kjær	4231	3001014	U41829
Preamplifier	Brüel & Kjær	ZC0032	14653	Included

\* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:

Wind shield N/A

Attenuator N/A

Extension cable N/A

These items have been taken into account wherever appropriate.

Instruction Manual: BE1712-23 Firmware Version: BZ7222 v4.7.5 / BZ7223 v4.7.5 The test object is a single channel instrument.

<b>Conditions</b>	<i>Pressure kPa</i>	<i>Temperature °C</i>	<i>Humidity %RH</i>
Reference conditions	101.325	23	50
Measurement conditions	101.80 ±0.03	22.75 ±0.35	43.08 ±1.65

### Calibration Dates:

Received date: 22/08/2022 Reviewed date: 31/08/2022

Calibration date: 31/08/2022 Issued date: 31/08/2022

### Technicians: (Electronic certificate)



This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Laboratory Location

**Campbell Associates Ltd**  
5b Chelmsford Road Industrial Estate  
GREAT DUNMOW, Essex, GB-CM6 1HD  
Phone 01371 871030



## Certificate of Calibration

**Certificate number:** U41854

**Test Object:** Floor Tapping Machine

**Producer:** Brüel & Kjær

**Type:** 3207

**Serial number:** 2715380

**Customer:** JosTec Ltd

**Address:** Suite 107 Moda Business Centre  
Stirling Way Borehamwood WD6 2BW

**Contact Person:** Robert Joselyn

**Order No:**

### Method :

This certificate is issued against the requirements of Annex A of both BS EN ISO 16283-2:2015 and BS EN ISO 140-6/7:1998 in respect of regular verification and also meet the requirements of UKAS publication LAB23 covering the verification of floor tapping machines used for building acoustics applications.

The machine was inspected for mechanical soundness and tested for electrical safety. It was cleaned and lubricated in accordance with the manufacturers instructions where necessary. The cams and hammer guides were inspected to ensure a free fall of the hammers. The mass of each of the hammers was determined either by measurement or reference to historical data (see Statements overleaf) along with their curvature and diameter of the impact face. The machine was set up as per the manufacturers specification using the calibration gauge provided (where applicable) and checked for level, then the direction of fall of the hammer set was checked against the requirements of the standard. The time between successive hammer impacts was measured over a 30 second period and the mean and range of successive values calculated.

### Statements:

A successful calibration indicates that this Tapping Machine meets the requirements of BS EN ISO 16283-2:2015 and BS EN ISO 140 parts 6, 7 & 8 annex A and is therefore suitable for the measurement of impact sound transmission following the procedures set out in their associated standards.

Expanded measurement uncertainties are:- Impact rate 0.25 ms, Hammer mass (mounted) 0.79 g, Hammer mass (dismounted) 0.19 g, Hammer diameter 0.03 mm, Radius of curvature 11.0 mm, Hammer impact velocity 0.01 m/s and Hammer angle of fall 0.07 degree.

The mass of each individual hammer was measured in situ and the resulting data has been used in the calculation of the momentum of impact.

Environmental Conditions	Temperature	Relative Humidity
Reference Conditions:	23 °C	50 %RH
Measurement Conditions:	23.1 °C	55.0 %RH

### Calibration Dates:

Received date:	22/08/2022	Reviewed date:	02/09/2022
Calibration date:	02/09/2022	Issued date:	02/09/2022

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at a recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

# Speaker Stability

## 90 Day Extension

Laboratory Location

### Campbell Associates Ltd

5b Chelmsford Road Industrial Estate  
GREAT DUNMOW, Essex, GB-CM6 1HD  
Phone 01371 871030



## Certificate of Calibration and Conformance

**Certificate number:** U45326

**Test Object:** Sound Calibrator

**Producer:** Brüel & Kjær

**Type:** 4231

**Serial number:** 3001014

**Customer:** Jostec Ltd

**Address:** Suite 107, Moda Business Centre,  
Stirling Way, Borehamwood. WD6 2BW.

**Contact Person:** Toby Robinson.

**Order No:**

Measurement Results	Level dB	Level Stability dB	Frequency Hz	Distortion %
Measurement 1	94.06	0.02	1000.02	0.55
Measurement 2	94.05	0.02	1000.02	0.52
Measurement 3	94.06	0.02	1000.01	0.52
<b>Result (Average):</b>	<b>94.06</b>	<b>0.02</b>	<b>1000.02</b>	<b>0.53</b>
Expanded Uncertainty:	0.1	0.02	1	0.25
Degree of Freedom:	>100	>100	>100	>100
Coverage Factor:	2	2	2	2

The stated level is relative to 20µPa. The level is traceable to National Standards. The stated level is valid at reference conditions. The following correction factors have been applied during the measurement

Pres:0.0008 dB/kPa Temp:0.0015 dB/°C Humi:0.001 dB/%RH Load volume: 0.0003 dB/mm3

Conditions	Pressure kPa	Temperature °C	Humidity %RH
Reference conditions	101.325	23	50
Measurement conditions	100.689 ±0.042	22.4 ±0.1	42 ±1.1

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\Current Year\BNK4231\_3001014\_M1.nmf

### Preconditioning

The equipment was preconditioned for more than 4 hours in the specified calibration environment.

### Method

Calibration has been performed as set out in the current version of CA Technical procedure TP01

### Calibration Dates:

Received date:	31/08/2023	Reviewed date:	11/09/2023
Calibration date:	11/09/2023	Issued date:	11/09/2023

### Technicians: (Electronic certificate)



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