



# SOUND INSULATION TEST REPORT

Sound Insulation testing in accordance with Test  
Standard BS EN ISO 140-4

Report Reference Number: 29579

Report Date: 20/07/2023

## Abstract

Sound Insulation Testing is the process of measuring how much noise a building element, normally a wall or a floor, stops from travelling through to a neighbouring property.

This report describes the process taken and the results obtained from the sound insulation testing at 5 Square Street,, Bury, BL0 9BE.

## Competent Tester

Testing was conducted by Sam Millard who is a member of the SITMA Sound Insulation Testing Registered Testers Scheme, Registration Number: 7295

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## The SITMA Registered Testers' Scheme

This report was conducted by a tester that is registered with the SITMA Registered Testers' Scheme for Sound Insulation Testers. More information on the scheme, the lodgement system, quality control and auditing are discussed below.

### Scheme Member Conducting this test

|                                             |                                                                                 |                                                                                    |
|---------------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| The tester that conducted your testing was: | Sam Millard                                                                     |  |
| Linked to:                                  | C80 Solutions,<br>Suite 2.1 Woodhead House,<br>Woodhead Road, Batley, WF17 9TD. |                                                                                    |

### Entry Requirements

In order to enter the SITMA Registered Testers' Scheme, testers are required to either:

- Have completed the Institute of Acoustics Certificate of Competence in Building Acoustics Measurements (CCBAM), or
- Have been assessed by SITMA to hold suitable, demonstrable evidence of competence in sound insulation testing

### Audit Requirements

Each tester is audited at least twice a year, completely unannounced. This is achieved by the tester logging their job onto the SITMA portal **in advance of testing taking place**.

Audits are carried out by independent SITMA employees who have been trained in accordance with BS EN ISO 19011:2018 and have extensive background in Sound Insulation Testing.

Each 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 take pre-calculated information, it takes the raw data from the sound level meter and calculates each individual test itself, before producing this report. This ensures that no test data has been amended by any tester prior to the information being uploaded.

### SITMA Accreditation

SITMA will shortly have achieved BS EN ISO/IEC 17024:2012 accreditation from UKAS (Application number 10579). SITMA has completed the Initial Audit and is awaiting final confirmation.

### Calibration Requirements

SITMA holds some of the strictest calibration requirements in the world for sound insulation testing, with each sound level meter and tapping machine requiring UKAS calibration every 2 years and the microphone calibrator requiring calibration every 12 months. If the tester does not hold correctly calibrated equipment, the SITMA portal will not let them produce this report.

### 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 registered testers' scheme in line with our complaints process PUS013.

## TO CHECK THIS REPORT IS VALID

1. Head to this site: <https://sitma.bcta.group/>
2. Use these credentials:
  - a. Report Reference Number:
    - i. 29579
  - b. Job Postcode:
    - i. BL0 9BE

## Simplified Test Results

| Certificate Number | Plot & Source Room                    | Plot & Receive Room                     | Target $D_{nT,w}+C_{tr}$ | Result $D_{nT,w}+C_{tr}$ | Pass / Fail |
|--------------------|---------------------------------------|-----------------------------------------|--------------------------|--------------------------|-------------|
| 122325             | Build No. 5<br>Square street<br>Other | Build No. 7<br>Square Street<br>Office  | 43                       | 56                       | PASS        |
| 122326             | Build No. 5<br>Square street<br>Other | Build No. 70<br>Bridge Street<br>Office | 43                       | 52                       | PASS        |

## 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 produces a steady spectrum of pink noise, in an external corner of the room but at least 0.5m away from any reflective surface.

The noise level was measured in both the source room and receive room, sampling as much of the room as possible. 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 average time of 30 seconds. The speaker was then moved to a corner junction on two internal walls and the measurements were repeated. The measurements in each room were arithmetically averaged. For separating walls the speaker should be in a corner opposite the test wall.

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

Where noise levels were measured in the receive room, the background noise level was also measured with the source room speaker turned off to ensure the background noise level did not influence the result. The background noise level is 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 ( $T_2$ , $T_{20}$ )**

A minimum of 6 reverberation time measurements were also taken in the receive room to accurately define the level of influence the diffuse field has on the microphone, ensuring that an increase in soft or hard surfaces does not impact the overall test result.

A minimum of 6 reverberation times were measured in each room using a minimum of 3 microphone positions at each of 2 loudspeaker positions in accordance with BS EN ISO 354:2003 (also complies with BS EN 20354:1993)

# Calculation Methodology

## *Airborne Sound Insulation Tests*

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

Any receive room noise measurements that are within 6dB of the background measurements are corrected by logarithmically averaging the difference to correct the receive room measurement. The correction is applied up to 10dB, where a maximum correction of 1.6dB is applied. Any background noise level greater than 10dB over the  $L_2$  measurement will appear to reduce the sound insulation at that frequency.

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

The difference between the source and 'corrected' receive room measurement is calculated for each speaker position and 2 differences 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 result is standardised by adding 10 times the logarithm of half the reverberation time at each frequency to give the standardized level difference ( $D_{nT}$ ) at each frequency. These are calculated separately for Speaker Position 1 and Speaker Position 2 and are arithmetically averaged to produce final  $D_{nT,S}$ .

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

The  $D_{nT,S}$  are then compared to the standard reference curve 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.

## *Impact Sound Insulation Tests*

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

Any receive room noise measurements that are within 6dB of the background measurements are corrected by logarithmically averaging the difference to correct the receive room measurement. The correction is applied up to 10dB, where a maximum correction of 1.6dB is applied. Any background noise level greater than 10dB over the  $L_2$  measurement will appear to reduce the sound insulation at that frequency.

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

The result is normalized by adding 10 times the logarithm of half the reverberation time at each frequency to the 'corrected'  $L_2$  to give the Standardized Impact Sound Pressure Level ( $L'_{nT}$ ) at each frequency.

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

The  $L'_{nT,w}$  are then compared to the standard reference curve as defined in BS EN ISO 717-2:1997 to give a single figure result.

### **Precision**

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

## 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.

ADE requires that sets of tests are carried out on one in ten of each construction type or sub-group. Each set of tests on houses is made up of two airborne sound insulation tests (Two Tests). Each set of tests on flats is made up of two airborne tests on walls and two airborne and two impact tests on floors (Six Tests).

The location of the sets of tests are selected at random by the tester except where specifically requested the Approved Inspector or specialist input from Robust Details.

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 testers 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 EN ISO 140-14:2004 which all testers hold a copy of as a mandatory entry requirement into the SITMA 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.

# Calibration

**Calibration**  
The calibration certificates are appended to this report under Appendix B. The summary of calibrated equipment used is shown below:

| Item       | Calibration from | Calibration expiry | Certificate Number |
|------------|------------------|--------------------|--------------------|
| NTi XL2    | 30 May 2023      | 30 May 2025        | U44364             |
| Calibrator | 30 May 2023      | 30 May 2024        | U44362             |

# Tester Site Notes:

Client changed old house into a bar council required sound tests to buildings either side.

## Test Results

### Airborne Wall Tests – Material Change of Use by Sam Millard

| Certificate Number | Plot & Source Room                         | Source Room Volume | Plot & Receive Room                      | Receive Room Volume | Target $D_{nT,w}+C_{tr}$ | Result $D_{nT,w}+C_{tr}$ | Pass / Fail |
|--------------------|--------------------------------------------|--------------------|------------------------------------------|---------------------|--------------------------|--------------------------|-------------|
| 122325             | <b>Build No. 5 Square street Other</b>     | 44.8m <sup>3</sup> | <b>Build No. 7 Square Street Office</b>  | 44.8m <sup>3</sup>  | >= 43 dB                 | >= 56 dB                 | <b>Pass</b> |
|                    | <b>Construction:</b><br>: Solid stone wall |                    |                                          |                     |                          |                          |             |
|                    | <b>Deviations:</b>                         |                    |                                          |                     |                          |                          |             |
| 122326             | <b>Build No. 5 Square street Other</b>     | 44.8m <sup>3</sup> | <b>Build No. 70 Bridge Street Office</b> | 44.8m <sup>3</sup>  | >= 43 dB                 | >= 52 dB                 | <b>Pass</b> |
|                    | <b>Construction:</b><br>: Solid stone wall |                    |                                          |                     |                          |                          |             |
|                    | <b>Deviations:</b>                         |                    |                                          |                     |                          |                          |             |

## Appendix A – Individual Certificates

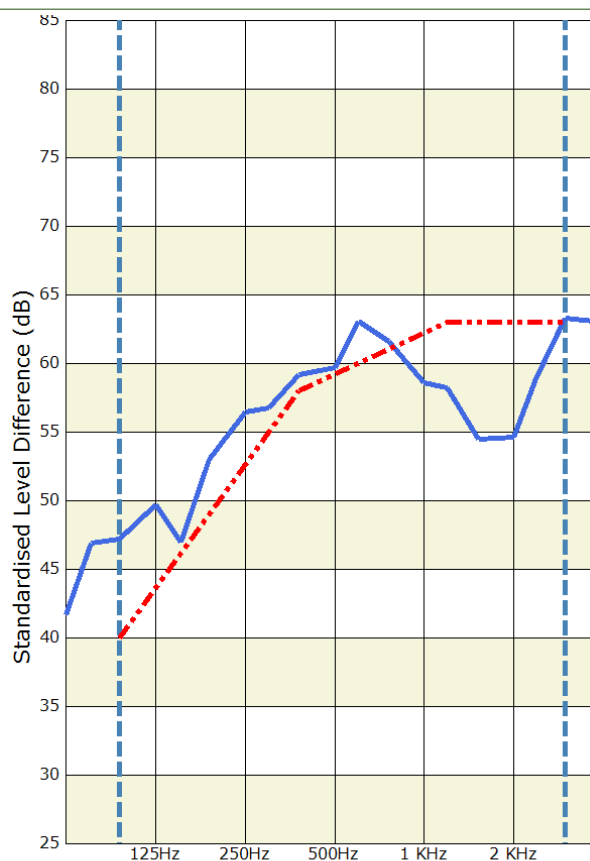
| Test Type                 | Source Room                     | Partition | Receiver Room                     |
|---------------------------|---------------------------------|-----------|-----------------------------------|
| Airborne sound insulation | Build No. 5 Square street Other |           | Build No. 7 Square Street Office  |
| Airborne sound insulation | Build No. 5 Square street Other |           | Build No. 70 Bridge Street Office |

## Registered Sound Insulation Test Certificate

|               |                                 |               |                          |                |                                  |
|---------------|---------------------------------|---------------|--------------------------|----------------|----------------------------------|
| Test No:      | 122325                          | Test Job Ref: | 29579                    | Test Org Name: | C80 Solutions                    |
| Customer:     | Mark Ainsworth                  |               |                          | Test Type:     | Airborne (Wall)                  |
| Address:      | 5 Square Street,, , Bury        | Job Address:  | 5 Square Street,, , Bury | Test Date:     | 20/07/2023                       |
|               |                                 |               |                          | Tester:        | Sam Millard                      |
|               |                                 |               |                          | Site type:     | Material Change of Use           |
| Postcode:     | BL0 9BE                         | Postcode:     | BL0 9BE                  | Site Build:    | Dwelling-House/Flat              |
| Source Room:  |                                 | Partition:    |                          | Receiver Room: |                                  |
| Description:  | Build No. 5 Square street Other |               |                          |                | Build No. 7 Square Street Office |
| Volume / Area | 44.8m <sup>3</sup>              |               | 10.9m <sup>2</sup>       |                | 44.8m <sup>3</sup>               |

| Frequency (Hz) | $D_{nT}$ 1/3 Octave (dB) | BGnd Correction |
|----------------|--------------------------|-----------------|
| 50 Hz*         | 27.8                     |                 |
| 63 Hz*         | 41.7                     |                 |
| 80 Hz*         | 46.9                     |                 |
| 100 Hz         | 47.2                     |                 |
| 125 Hz         | 49.7                     |                 |
| 160 Hz         | 47                       |                 |
| 200 Hz         | 53                       |                 |
| 250 Hz         | 56.5                     |                 |
| 315 Hz         | 56.8                     |                 |
| 400 Hz         | 59.2                     | X               |
| 500 Hz         | 59.7                     | X               |
| 630 Hz         | 63.1                     | X               |
| 800 Hz         | 61.6                     | X               |
| 1 KHz          | 58.6                     | X               |
| 1.25 KHz       | 58.2                     | X               |
| 1.6 KHz        | 54.5                     | X               |
| 2 KHz          | 54.6                     | X               |
| 2.5 KHz        | 58.9                     | X               |
| 3.15 KHz       | 63.3                     | X               |
| 4 KHz*         | 63                       | X               |
| 5 KHz*         | 62.1                     | X               |

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



1/3rd Octave Band Frequency (Hz)

\*Outside scope of accreditation

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]: 59 (-2, -3) dB  
 $D_{nT,w} + C_{tr}$  [dB]: 56 dB  
Minimum Pass Level [dB]: 43 dB

**PASS**  
Adverse Aggregated Deviations [dB]: 29.2

Partition Detail: Solid stone wall

Test Exceptions (if any):

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

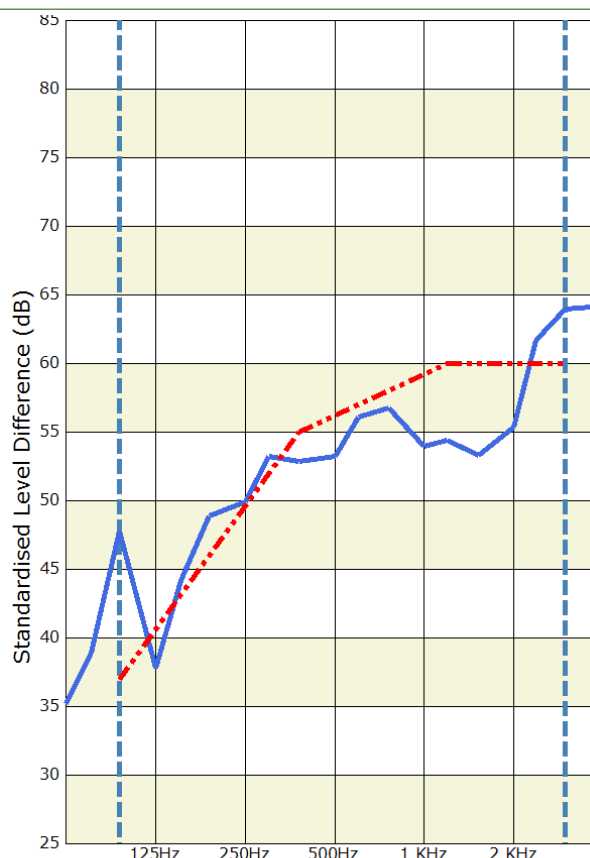
## Registered Sound Insulation Test Certificate

|           |                          |               |                          |                |                        |
|-----------|--------------------------|---------------|--------------------------|----------------|------------------------|
| Test No:  | 122326                   | Test Job Ref: | 29579                    | Test Org Name: | C80 Solutions          |
| Customer: | Mark Ainsworth           |               |                          | Test Type:     | Airborne (Wall)        |
| Address:  | 5 Square Street,, , Bury | Job Address:  | 5 Square Street,, , Bury | Test Date:     | 20/07/2023             |
|           |                          |               |                          | Tester:        | Sam Millard            |
|           |                          |               |                          | Site type:     | Material Change of Use |
| Postcode: | BL0 9BE                  | Postcode:     | BL0 9BE                  | Site Build:    | Dwelling-House/Flat    |

|               |                                 |                    |                                   |
|---------------|---------------------------------|--------------------|-----------------------------------|
|               | Source Room:                    | Partition:         | Receiver Room:                    |
| Description:  | Build No. 5 Square street Other |                    | Build No. 70 Bridge Street Office |
| Volume / Area | 44.8m <sup>3</sup>              | 10.9m <sup>2</sup> | 44.8m <sup>3</sup>                |

Frequency (Hz)  $D_{nT}$  1/3 Octave (dB) BGnd Correction

|          |      |   |
|----------|------|---|
| 50 Hz*   | 20.7 |   |
| 63 Hz*   | 35.2 |   |
| 80 Hz*   | 38.9 |   |
| 100 Hz   | 47.8 | X |
| 125 Hz   | 37.8 |   |
| 160 Hz   | 44.2 |   |
| 200 Hz   | 48.9 |   |
| 250 Hz   | 49.9 |   |
| 315 Hz   | 53.2 |   |
| 400 Hz   | 52.9 |   |
| 500 Hz   | 53.2 |   |
| 630 Hz   | 56.1 |   |
| 800 Hz   | 56.8 |   |
| 1 KHz    | 54   |   |
| 1.25 KHz | 54.4 |   |
| 1.6 KHz  | 53.3 | X |
| 2 KHz    | 55.4 | X |
| 2.5 KHz  | 61.7 | X |
| 3.15 KHz | 64   | X |
| 4 KHz*   | 64.2 | X |
| 5 KHz*   | 65.9 | X |



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

1/3rd Octave Band Frequency (Hz)

\*Outside scope of accreditation

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]: 56 (-2, -4) dB  
 $D_{nT,w} + C_{tr}$  [dB]: 52 dB  
Minimum Pass Level [dB]: 43 dB

**PASS**  
Adverse Aggregated Deviations [dB]: 31.1

Partition Detail: Solid stone wall

Test Exceptions (if any):

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



## Certificate of Calibration and Conformance

**Certificate number:** **U44364**

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

**Producer:** **NTi Audio**

**Type:** **XL2-TA**

**Serial number:** **A2A-16040-E0**

**Customer:** **C80 Solutions Ltd**

**Address:** **Suite 2.1, Woodhead House,  
 Centre 27 Business Park, Batley. WF17 9TD.**

**Contact Person:** **Sam Millard**

**Order No:** **PO-0001**

### 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     | NTi Audio       | MC230A      | A17316           | 44363                 |
| Calibrator*    | Larson Davis    | CAL200      | 16546            | U44362                |
| Preamplifier   | NTi Audio       | MA220       | 8357             | Included              |

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

Additional items that have also been submitted for verification:

Wind shield NTi Audio NTi Audio(50mm)

Attenuator N/A

Extension cable N/A

These items have been taken into account wherever appropriate.

Instruction Manual: NTi-Audio XL2 Operating Manual v3.11.02 August 2016 Firmware Version: v4.21 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 | 102.33 ±0.01        | 21.60 ±0.45           | 49.23 ±1.15         |

### Calibration Dates:

Received date: 24/05/2023 Reviewed date: 01/06/2023

Calibration date: 30/05/2023 Issued date: 01/06/2023

### Technicians: (Electronic certificate)

Calibrated by: *Palanivel Marappan B.Eng (Hons), M.Sc*

Reviewed by: *Jenny Crawford*

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.



## Certificate of Calibration and Conformance

**Certificate number:** U44362

**Test Object:** Sound Calibrator

**Producer:** Larson Davis

**Type:** CAL200

**Serial number:** 16546

**Customer:** C80 Solutions Ltd

**Address:** Suite 2.1, Woodhead House,  
Centre 27 Business Park, Batley. WF17 9TD.

**Contact Person:** Sam Millard

**Order No:** PO-0001

| Measurement Results      | Level<br>dB   | Level Stability<br>dB | Frequency<br>Hz | Distortion<br>% |
|--------------------------|---------------|-----------------------|-----------------|-----------------|
| Measurement 1            | 114.02        | 0.01                  | 1000.21         | 0.53            |
| Measurement 2            | 114.03        | 0.02                  | 1000.21         | 0.52            |
| Measurement 3            | 114.03        | 0.01                  | 1000.22         | 0.53            |
| <b>Result (Average):</b> | <b>114.03</b> | <b>0.01</b>           | <b>1000.21</b>  | <b>0.53</b>     |
| Expanded Uncertainty:    | 0.1           | 0.02                  | 1               | 0.1             |
| Degree of Freedom:       | >100          | >100                  | >100            | >100            |
| Coverage Factor:         | 2             | 2                     | 2               | 2               |

The stated level is relative to 20 $\mu$ Pa. 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 dB/kPa Temp:0 dB/°C Humi:0 dB/%RH Load volume: 0 dB/mm<sup>3</sup>

| Conditions             | Pressure kPa       | Temperature °C | Humidity %RH   |
|------------------------|--------------------|----------------|----------------|
| Reference conditions   | 101.325            | 23             | 50             |
| Measurement conditions | 102.37 $\pm$ 0.040 | 22.2 $\pm$ 0.1 | 46.3 $\pm$ 0.7 |

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\LDL200\_16546\_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:    | 24/05/2023 | Reviewed date: | 01/06/2023 |
| Calibration date: | 30/05/2023 | Issued date:   | 01/06/2023 |

### Technicians: (Electronic certificate)

Calibrated by: *Palanivel Marappan B.Eng(Hons), M.Sc*

Reviewed by: *Jenny Crawford*

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