



Ref: P4183/L07b/PJK

08 June 2022

Mr N Mussarat
Property Hub
Universal Square
Suite 2
Ground Floor, Building 3
Devonshire Street North
Manchester
M12 6JH

Dear Nabeel,

Commercial Unit, Wilmslow Road, Fallowfield – Noise Impact Assessment

Introduction

Acoustic & Engineering Consultants Limited (AEC) has been instructed by Property Hub to review the potential impact on nearby residents due to noise generated within the proposed German Donor Kebab restaurant at 311-313 Wilmslow Road, Fallowfield. The assessment is required to demonstrate compliance with two planning conditions placed on the scheme by Manchester City Council (MCC).

It is understood that the restaurant will play low level background music and will have the following opening times:

Sunday to Thursday	1100 to 0100h
Friday and Saturday	1100 to 0300h

The acoustic terminology used throughout this report is described in brief in Appendix A at the back of the report.

The equipment used during the sound insulation is presented in Appendix B along with the calibration certificates.

Background And Site Description

The restaurant will be located on the ground floor of 311-313 Wilmslow Road, Fallowfield, which is a 3-storey building in Fallowfield, Manchester, as identified on the attached Figure 1.

The site is located within an area of commercial units, including take-aways, restaurants and public houses on Wilmslow Road. Wilmslow Road is a busy arterial road, with numerous bus routes, linking Manchester city centre and the south of the city.

The building was formerly a public house and has recently been converted to include residential properties on the ground, first and second floors. These properties will be the nearest noise sensitive receptors (NNSR) to the restaurant. A noise assessment report, ref. P4183/R1a/RDC, was submitted by AEC during the planning stage of the residential part of the scheme in August 2020. The measured background noise levels presented in the noise assessment report have been used in this assessment.

The proposed layout of the restaurant is presented in Figure 2.

The existing external envelope of the restaurant includes solid masonry walls and single pane glazing. The weakest elements are the windows which have been assumed to have a sound insulation performance of around 30dB_{Rw}, which is typical for a standard single glazed unit.

To determine the sound insulation performance of the separating wall and floor between the ground floor commercial unit and the ground and first-floor apartments, airborne sound insulation tests were carried out on the existing constructions. The performance of the wall and floor are discussed below.

Noise Measurements

Environmental Noise Measurements

As stated above, AEC undertook noise levels on-site for the residential apartments in 2020. Unattended long term noise levels were measured external to the first-floor flat, overlooking Wilmslow Road, between 1100h on Thursday 23 July 2020 to 0700h on Monday 27 July 2020.

The typical free-field ambient and background noise level measured around the proposed closing times on the Thursday, Friday, Saturday and Sunday are presented in Table 1, below.

Table 1 – Free-field Ambient and Background Noise Levels

Day and Time	Noise Level, dB	
	Ambient, $L_{Aeq,T}$	Background, $L_{A90,T}$
Thursday 0100h	60	52
Friday 0300h	60	49
Saturday 0300h	59	49
Sunday 0100h	58	48

The noise climate in the area was dominated by road traffic on Wilmslow Road.

Sound Insulation Measurements

The airborne sound insulation performance of the separating wall and floor between the restaurant and the adjacent apartments was measured by AEC. The results are summarised in Table 2 below; details of all measured data and equipment calibration are held on file by AEC.

Table 2 – Summary of Sound Insulation Achieved by the Existing Separating Structures

Source Room	Receiving Room	Structure	Sound Level Difference, dBD							
			At Octave Band Centre Frequency, Hz							D_w
			63	125	250	500	1k	2k	4k	
Restaurant	Apartment 1, Living Room	Wall	35	37	48	55	54	49	50	52
	Apartment 3, Bedroom	Floor	38	43	51	52	70	70	73	63
	Apartment 3, Living Room		41	42	50	58	64	65	71	60

Noise Levels in Restaurant

AEC has previously measured noise levels in city centre restaurants on a busy Friday / Saturday evening with low level background music playing. Based on these measurements, it is anticipated that ambient and maximum noise levels would be similar to those presented in Table 3, below.

Table 3 – Anticipated Ambient and Maximum Noise Level in the Restaurant

Noise Level	dBA	Octave Band Centre Frequencies, Hz						
		63	125	250	500	1k	2k	4k
Ambient	73	60	65	70	70	70	65	60
Maximum	85	70	75	75	80	80	80	75

Basis Of Assessment

There are two planning conditions relating to noise generated within the venue and these are reproduced below.

“Condition 5 (Acoustic Insulation) – You have not completed a study regarding break out noise from the commercial premises. This condition cannot be discharged at the current time.

Condition 6 (Acoustic Insulation residential) – The applicant has addressed the noise from the road traffic, but no consideration has been given to noise from the commercial premises below. Where entertainment noise is proposed the L_{Aeq} (entertainment noise) shall be controlled to 10dB below the L_{A90} (without entertainment noise) in each octave band at the facade of the nearest noise sensitive location, and internal noise levels at structurally adjoined residential properties in the 63Hz and 125Hz octave frequency bands shall be controlled so as not to exceed (in habitable rooms) 47dB and 41dB, respectively. Noise from the mechanical ventilation system should also be considered. This condition cannot be discharged at the current time.”

The above noise conditions are in line with MCC document ‘*Planning & Noise – Technical Guidance*’ (2015) (PNTG). However, it should be noted that in PNTG “entertainment noise” appears to relate to amplified music noise at entertainment venues. As the restaurant will not be playing loud amplified music, the above criteria are not considered applicable.

It is proposed that to minimise the potential for an adverse impact from the restaurant that ambient and maximum noise levels breaking out of the venue are controlled as to not exceed the existing background and ambient noise levels, respectively. This would result in noise breaking out of the restaurant being barely perceptible but would not typically result in an adverse impact on the occupants of the residential apartments.

Based on the external baseline noise levels presented in Table 1, free-field ambient and maximum noise levels breaking out from the restaurant would need to be controlled to no greater than 48dB $L_{Aeq,T}$ and 58dB $L_{Amax,F}$, respectively, outside the windows of the residential receptors.

In relation to noise transfer into the apartments, it is proposed that maximum noise levels are controlled to no greater than NR25 $_{max}$ in bedrooms and NR30 $_{max}$ in living rooms. An NR noise limit has been proposed as this allows for a more defined limit of sound pressure across the frequency spectrum.

Noise from the mechanical ventilation system has been addressed in a separate report by others.

Assessment of Proposed Development

Noise Breakout via Glazing

As identified above, the windows to restaurant are standard single pane glazing, with an assumed sound insulation performance of around 30dB_{Rw}.

Calculations, based on the external baseline ambient and maximum noise levels presented in Table 1 above, the size and the sound insulation performance of the restaurant windows on both elevations and distance attenuation, indicate that the free-field ambient and maximum noise levels outside the windows of the first-floor residential apartments would be around 33dB_{LAeq,T} and 46dB_{LAmax,F}, respectively.

The calculated ambient and maximum noise levels outside the windows on the Cargill Drive elevation would be around 36dB_{LAeq,T} and 48dB_{LAmax,F}, respectively. A comparison between the calculated noise levels due to noise breaking out of the restaurant and the proposed noise level limits of 48dB_{LAeq,T} and 58dB_{LAmax,F} indicates that noise break out would be suitably controlled.

Internal Noise Transfer

The maximum noise level has been calculated in the living room of Apartment 1 and the bedroom and living room of Apartment 3, based on the anticipated maximum noise level in the restaurant and the measured sound insulation performance of the existing wall and floor.

The results are presented in Tables 4, 5 and 6, below. The proposed NR level limit for each room is also provided in Tables 4 and 5 for comparison purposes.

Table 4 – Comparison of Maximum Noise Level in Apartment 1 Living Room with Max NR30

Assessment Step	dB	Octave Band Centre Frequency's, Hz						
		63	125	250	500	1k	2k	4k
Maximum Noise Level, L _{Amax}	85	70	75	75	80	80	80	75
Measured Sound Insulation of the separating wall D _w	52	35	37	48	55	54	49	58
Resultant Maximum Noise Level in the Apartment	-	35	38	27	25	26	31	17
Max NR25 Spectrum	-	59	48	40	34	30	27	25
Difference	-	-24	-10	-13	-9	-4	4	-8

Table 5 – Comparison of Maximum Noise Level in Apartment 3 Bedroom with Max NR25

Assessment Step	dB	Octave Band Centre Frequency's, Hz						
		63	125	250	500	1k	2k	4k
Maximum Noise Level, L _{Amax}	85	70	75	75	80	80	80	75
Measured Sound Insulation of the separating floor D _w	63	38	43	51	52	70	70	73
Resultant Maximum Noise Level in the Apartment	-	32	32	24	28	10	10	2
Max NR25 Spectrum	-	55	44	35	29	25	22	20
Difference	-	-23	-12	-11	-1	-15	-12	-18

Table 6 – Comparison of Maximum Noise Level in Apartment 3 Living Room with Max NR30

Assessment Step	dB	Octave Band Centre Frequency's, Hz						
		63	125	250	500	1k	2k	4k
Maximum Noise Level, L_{Amax}	85	70	75	75	80	80	80	75
Measured Sound Insulation of the separating floor D_w	60	41	42	50	58	64	65	71
Resultant Maximum Noise Level in the Apartment	-	29	33	25	22	16	15	5
Max NR25 Spectrum	-	59	48	40	34	30	27	25
Difference	-	-30	-15	-15	-12	-14	-12	-20

Tables 5 and 6 indicate that AEC's proposed noise level limit would be achieved in the first-floor apartments.

In relation to the ground floor apartment, there is an exceedance in the 2kHz centre octave frequency band only. However, this is based on the maximum noise level of 85dB $L_{Amax,F}$ being generated adjacent to Apartment 1. As shown on Figure 2, the separating wall to Apartment 1 forms a corridor to and includes the disabled WC.

The nearest table is acoustically screened from the separating wall and located around 3m away and based on this, it is considered that maximum noise levels in the restaurant adjacent to Apartment 1 are unlikely to be as high 85dB $L_{Amax,F}$. A 5dB reduction is likely, particularly at 2kHz, hence the criteria would be achieved inside Apartment 1. Therefore, the existing arrangement could be considered acceptable. However, this will need to be confirmed by MCC.

Other Considerations

AEC understand that all items of plant, including kitchen extracts, have been correctly installed on resilient mounts to control structure borne noise. In addition, it is understood that a low noise hand drier has been installed in the WC and all speakers have been resiliently mounted to the walls.

I trust the above is clear and of assistance at this stage, if you require further information, please get in contact.

Yours sincerely



Paul Knowles

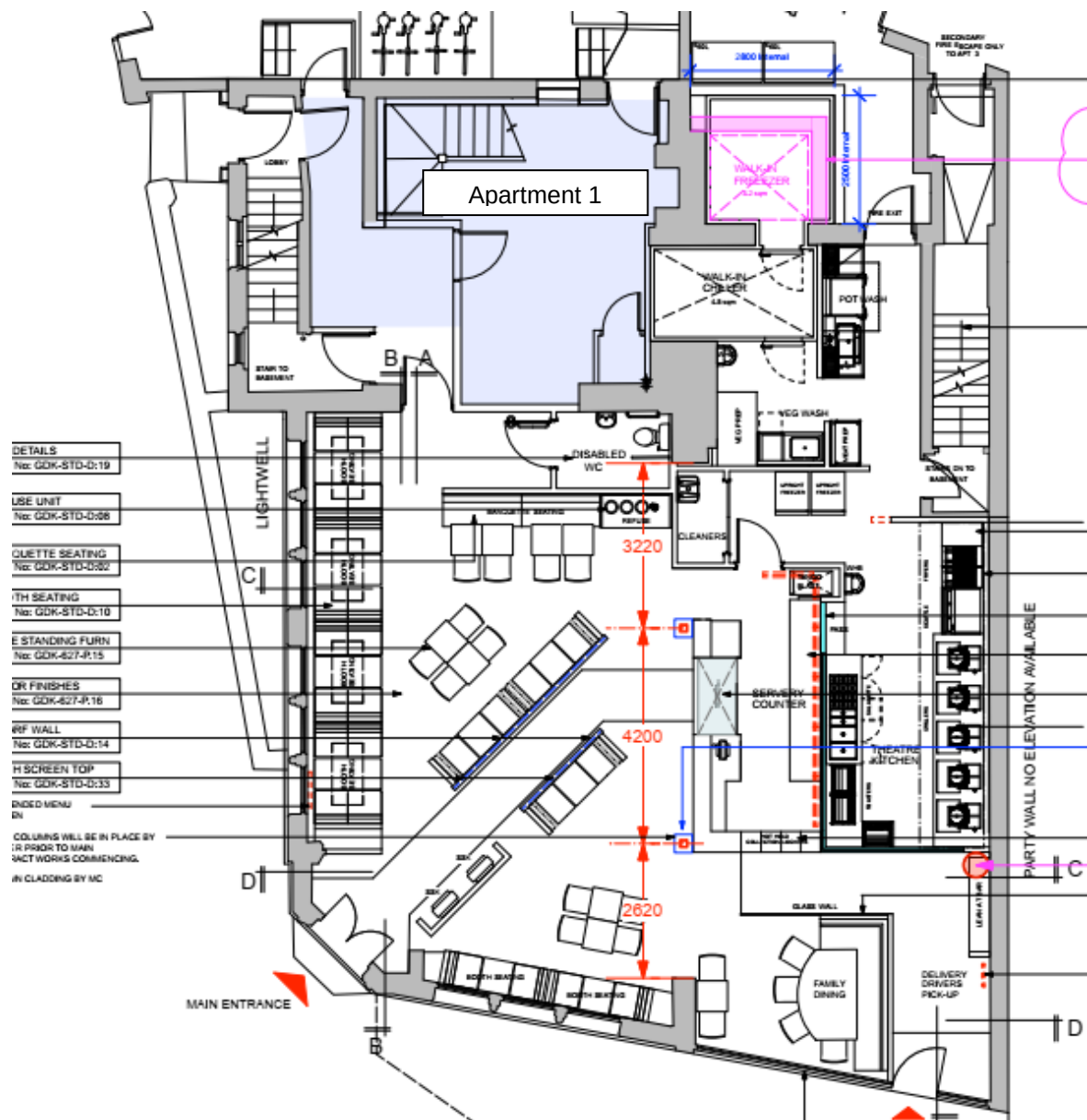
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Figure 1 – Site Location



Map data @2019 Google United Kingdom

Figure 2 – Ground Floor Layout



APPENDIX A – Acoustic Terminology in Brief

Sound Description

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz (*Hz*), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hertz to 20,000 Hertz. Although sound can be of one discrete frequency - a 'pure tone' - most sound is made up of many different frequencies.

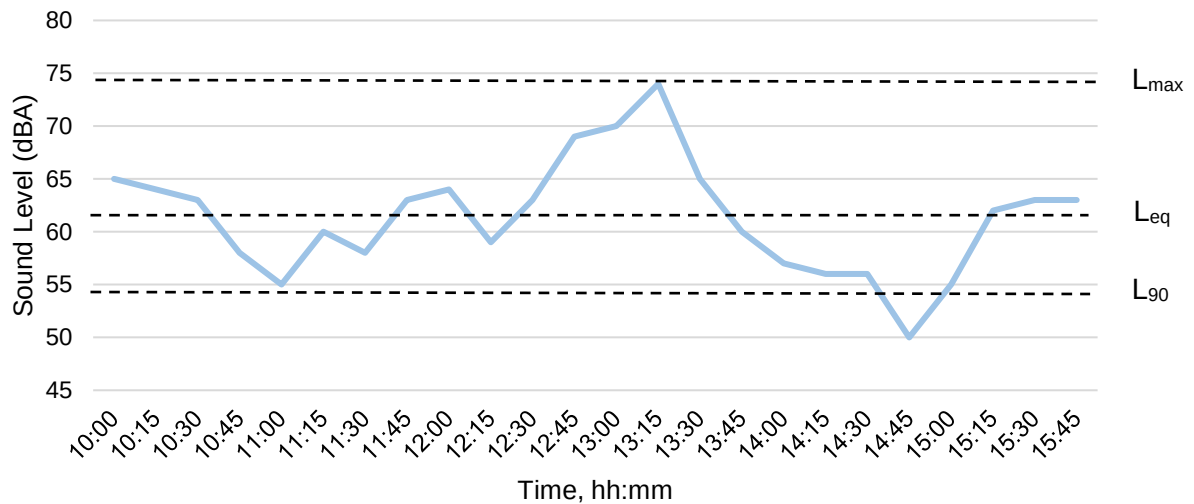
The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same subjective way. This is the basis of the A-weighted sound pressure level *dBA*, normally used to assess the effect of noise on people. The *dBA* weighting emphasises or reduces the importance of certain frequencies within the audible range.

Sound Units

In order to assess environmental noise, measurements are carried out by sampling over specific periods of time, such as fifteen minutes or one hour, the statistically determined results being used to quantify various aspects of the sound.

The figure below shows an example of sound level varying with time. Because of this time variation, the same period of sound can be described by several different levels. The most common of these are described below. It should be noted that in many instances in the main body of text, the unit will be preceded by a dB descriptor in the report e.g. $L_{Aeq,T}$ could be written $dB L_{Aeq,T}$.

Example of Sound Varying with Time



Unit Type	Acoustic Unit	Description
Ambient Sound Level	$L_{Aeq, T}$	The equivalent continuous (A-weighted) sound level. It may be thought of as the “average” sound level over a given time, T. It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises and can be considered as the “ambient” noise level.
Background Sound Level	L_{A90}	The (A-weighted) sound level exceeded for 90% of a measurement period. It is the value often used to describe background noise.
Maximum Sound level	L_{Amax}	The maximum (A-weighted) sound level measured during a given time. ‘Fast’ or ‘Slow’ meter response should be cited.
Free-field Level	-	This refers to the sound level measured outside, away from reflecting surfaces.
Façade Level	-	This refers to the sound level measured outside, at 1m from a hard-reflecting surface, typically 3dB greater than the free-field level.
Noise reduction coefficient	NRC	A single figure number sometimes used to describe the performance of sound absorbing materials based on a combination of its absorption coefficient at various frequencies.
Sound reduction index	R_w	Single number rating used to describe the <u>laboratory</u> airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
Weighted Level Difference	D_w	Single number rating used to describe the on-site airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.

APPENDIX B – Equipment Used

The equipment used during the pre-completion testing is presented below. The sound level meter was calibrated before and after use and no drift was noted.

AEC Kit	Make	Model	Description	Serial No.	Calibration Company	Certificate Number	Calibration	
							Last	Due
2	B&K	2260	Modular Precision Sound Analyser	2305157	University of Salford Manchester	05490/2	14/10/2021	14/10/2023
	B&K	4189	½" Falcon Range Pre-polarised Free Field Microphone	2573885	University of Salford Manchester	05490/2	14/10/2021	14/10/2023
	B&K	ZC 0026	Preamp	3630	University of Salford Manchester	05490/2	14/10/2021	14/10/2023
	B&K	4231	Sound Level Calibrator	2588816	University of Salford Manchester	05490/1	14/10/2021	14/10/2023
--	B&K	BZ5503 Measurement Partner Suite	Building Acoustics System software	N/A	N/A	N/A	N/A	N/A
--	Mackie	SRM350	Powered Loudspeaker	21(JU)61268	N/A	N/A	N/A	N/A
--	Tapco	T231	31 Band Graphic Equaliser	(21)JX13021	N/A	N/A	N/A	N/A
-	NTI	Minirator MR2	Digital Noise Generator	N/A	N/A	N/A	N/A	N/A

Certificate of Calibration Issued by University of Salford (Acoustics Calibration Laboratory) UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801		
Page 1 of 2		
APPROVED SIGNATORIES Claire Lomax [x] Andy Moorhouse [] <i>C. Lomax</i> Gary Phillips [] Danny McCaul []		
acoustic calibration laboratory The University of Salford, Salford, Greater Manchester, M5 4WT, UK http://www.acoustics.salford.ac.uk T 0161 295 3030/0161 295 3319 F 0161 295 4456 E c.lomax1@salford.ac.uk		

Certificate Number: 04460/2/R1
 Replaces Certificate 04460/2

Date of Issue: 25 October 2019

VERIFICATION OF A TYPE 1 SOUND LEVEL METER to BS7580 Part 1

FOR:	AEC Lockside 1 Stockport Road Marple Stockport, Cheshire SK6 6BD
FOR THE ATTENTION OF:	Ross Chamberlain
CALIBRATION DATE:	14/10/2019
TEST PROCEDURE:	CTP08 (Laboratory Manual)

Sound Level Meter				
Manu:	Brüel & Kjær	Model:	2260	Serial No: 2305157
Microphone				
Manu:	Brüel & Kjær	Model:	4189	Serial No: 2573885
Preamp				
Manu:	Brüel & Kjær	Model:	ZC 0026	Serial No: 3630
Associated Calibrator				
Manu:	Brüel & Kjær	Model:	4231	Serial No: 2588816 Adaptor Type: UC0210

Test Engineer: GP Name: Gary Phillips

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 the 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

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UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

Page 2 of 2

Certificate Number: 04460/2/R1

Replaces Certificate 04460/2

Date of Issue: 25 October 2019

SET-UP INFORMATION

The instrument was running software module BZ7202 Version 2.0. The reference range, reference SPL, primary indicator range, pulse range and linearity range as specified by the manufacturer have been used. The instrument was adjusted to read 94.1 dB (A) in response to the associated calibrator. This reading was obtained from the calibration certificate of the calibrator, 04460/3 and information in the manufacturer's instruction manual, when the instrument is fitted with the supplied UA0237 windscreen and the instrument Sound Incidence Correction filter is set to Frontal.

MEASUREMENTS

The levels of self-generated noise were:

A: 13.7 dB

C: 16.2 dB

Lin: 23.4 dB

At the end of the tests the indication of the sound level meter in response to the associated sound calibrator was 94.2 dB (A) which corresponds to the following level at 101.325 kPa:

Sound Pressure Level 94.2 dB (A)

This reading should be used henceforth to set up the sound level meter for field use.

THE SOUND LEVEL METER WAS VERIFIED ACCORDING TO THE PROCEDURE GIVEN IN BS7580: Part 1 1997 WITH THE FOLLOWING EXCEPTIONS:

A stricter test than that specified in 5.5.10 and 5.5.11 of BS 7580 has been used by not applying the low level signal.

The microphone corrections applied as specified in BS 7580: Part 1: 1997 were obtained from a frequency response measurement by this Laboratory using the electrostatic actuator method. The response in isolation is not covered by our UKAS accreditation.

STATEMENT OF RESULT:

THE SOUND LEVEL METER CONFORMS TO THE TYPE 1 REQUIREMENTS OF BS7580: PART1 1997.

Instruments used in the verification procedure were traceable to National Standards. The method of acoustic calibration employed a standard sound pressure calibrator for the 1 kHz test whilst the tests at 125 Hz and 8 kHz were performed by the electrostatic actuator method. The uncertainty of the Laboratory's 1 kHz calibrator was ± 0.11 dB. The uncertainty of the standard calibrator is not included in the applied tolerances. It is assumed that the sound level meter was manufactured in accordance with BS EN60651: 1994 Type 1, and BS EN60804: 1994 Type 1.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements. All measurement results are retained at the acoustic calibration laboratory for at least four years.

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Certificate of Calibration Issued by University of Salford (Acoustics Calibration Laboratory) UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801		
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APPROVED SIGNATORIES Claire Lomax [x] Andy Moorhouse [] <i>C. Lomax</i> Gary Phillips [] Danny McCaul []		0801 University of Salford MANCHESTER
acoustic calibration laboratory The University of Salford, Salford, Greater Manchester, M5 4WT, UK http://www.acoustics.salford.ac.uk t 0161 295 3030/0161 295 3319 f 0161 295 4456 e c.lomax1@salford.ac.uk		

Certificate Number: 04460/3

Date of Issue: 16 October 2019

CALIBRATION OF A SOUND CALIBRATOR

FOR: AEC
Lockside
1 Stockport Road
Marple
Stockport
Cheshire
SK6 6BD

FOR THE ATTENTION OF: Ross Chamberlain

DESCRIPTION: Calibrator with housing for one-inch microphones and adaptor type UC 0210 for half-inch microphones.

MANUFACTURER: Bruel & Kjaer

TYPE: 4231

SERIAL NUMBER: 2588816

DATE OF CALIBRATION: 11/10/2019

TEST PROCEDURE: CTP06 (Laboratory Manual)

Test Engineer (initial): *GP*

Name: Gary Phillips

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 the 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

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Page 2 of 2

Certificate Number: 04460/3

Date of Issue: 16 October 2019

MEASUREMENTS

The sound pressure level generated by the calibrator was measured using a calibrated, WS2P condenser microphone as specified in this certificate. The calibration was carried out with the calibrator in the half-inch configuration.

Five determinations of the sound pressure level, frequency and total distortion were made.

The results have been corrected to the reference pressure of 101.325 kPa using manufacturer's data.

RESULTS

Coupler configuration: Half-inch
Microphone type: GRAS 40AG
Output level (dB re 20 μ Pa): 93.94 dB $\pm$ 0.11 dB
Frequency (Hz): 999.98 Hz $\pm$ 0.12 Hz
Total Distortion (%): 0.33 % $\pm$ 0.32 %

Average environmental conditions at the time of measurement were:

Pressure: 99.541 kPa $\pm$ 0.015 kPa
Temperature: 23.0 °C $\pm$ 0.4 °C
Relative humidity: 48.6 % $\pm$ 2.4 %

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

All measurement results are retained at the acoustic calibration laboratory for at least four years.

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 the 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.