

Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

Page 1 of 3

APPROVED SIGNATORIES

Claire Lomax [x] Sean Furlong []
Gary Phillips [] Daniel Wong-McSweeney []



acoustic calibration laboratory

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0801

University of
Salford
MANCHESTER

Certificate Number: 06292/3

Date of Issue: 10 July 2023

PERIODIC TEST OF A SOUND LEVEL METER to IEC 61672-3:2006

FOR:	Cundall 4th Floor, Partnership House Regent Farm Road Gosforth Newcastle Upon Tyne NE3 3AF
FOR THE ATTENTION OF:	Ben Evans
DATE RECEIVED:	4 July 2023
PERIODIC TEST DATE:	7 July 2023
LOCATION OF CALIBRATION:	Acoustic Calibration Laboratory, Newton G31, University of Salford
TEST PROCEDURE:	CTP12 (Laboratory Manual)

Sound Level Meter Details-

Manufacturer	CASELLA CEL
Model	CEL-63X
Serial number	1211404
Class	1
Firmware version	129-09

Associated Items:-

Type	Manufacturer	Model	Serial Number
Microphone	CASELLA CEL	CEL-251	02626
Preamplifier	CASELLA CEL	CEL-495	001211

Test Engineer (initial):	GP	Name:	Gary Phillips
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Results in this certificate relate only to instruments tested.

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.

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Certificate Number: 06292/3

Date of Issue: 10 July 2023

Procedures from IEC 61672-3: 2006 and TPS 49 Edition 2 June 2009 were used to perform the periodic tests.

The manufacturer's instruction manual was marked as follows: CEL-63x HB3356-02.

Adjustment data used to adjust the sound levels indicated in response to the application of a multi-frequency sound calibrator to sound levels equivalent to those that would be indicated in response to plane, progressive sound waves were obtained from the manufacturer's instruction manual referred to in this certificate.

The sound level meter calibration check frequency is 1000 Hz, the reference sound pressure level was 114 dB. As this instrument only has a single range, this range is the reference level range.

The environmental conditions in the laboratory at the start of the test were:

Static pressure 100.999 kPa $\pm$ 0.013 kPa; air temperature 23.4 °C $\pm$ 0.3 °C; relative humidity 47.3 % $\pm$ 2.6 %.

The initial response of the instrument to application of the suitable laboratory sound calibrator was 113.9 dB (Z). The instrument was then adjusted to indicate 114.0 dB (Z). This indication was obtained from the calibration certificate of the calibrator and information in the manufacturer's instruction manual specified in this certificate when the instrument Response is set to Freefield. The instrument was calibrated without a windshield. Consult manufacturer's instructions if using a windshield.

With the microphone installed the level of self-generated noise was:

A: 18.5 dB*

*Under-range indicated.

With the microphone replaced by the electrical input device specified in the manufacturer's instruction manual, the levels of self-generated noise were:

A: 14.1 dB*

C: 18.6 dB*

Z: 25.6 dB*

*Under-range indicated.

The environmental conditions in the laboratory at the end of the test were:

Static pressure 101.022 kPa $\pm$ 0.013 kPa; air temperature 23.5 °C $\pm$ 0.3 °C; relative humidity 38.6 % $\pm$ 2.6 %.

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Certificate Number: 06292/3

Date of Issue: 10 July 2023

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

The microphone corrections applied as specified in 12.6 of IEC 61672-3:2006 were obtained from a frequency response measured by this Laboratory using the electrostatic actuator method. This response in isolation is not covered by our UKAS accreditation.

Instruments used in the verification procedure were traceable to *National Standards*. The multi-frequency calibrator method was employed in the acoustical tests of a frequency weighting.

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.

-----END OF CERTIFICATE-----

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APPROVED SIGNATORIES

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0801

University of
Salford
MANCHESTER

Certificate Number: 06292/4

Date of Issue: 10 July 2023

PERIODIC TEST OF A SOUND LEVEL METER to IEC 61672-3:2006

FOR:	Cundall 4th Floor, Partnership House Regent Farm Road Gosforth Newcastle Upon Tyne NE3 3AF
FOR THE ATTENTION OF:	Ben Evans
DATE RECEIVED:	4 July 2023
PERIODIC TEST DATE:	7 th and 10th July 2023
LOCATION OF CALIBRATION:	Acoustic Calibration Laboratory, Newton G31, University of Salford
TEST PROCEDURE:	CTP12 (Laboratory Manual)

Sound Level Meter Details-

Manufacturer	CASELLA CEL
Model	CEL-63X
Serial number	1211405
Class	1
Firmware version	129-02.17

Associated Items:-

Type	Manufacturer	Model	Serial Number
Microphone	CASELLA CEL	CEL-251	03357
Preamplifier	CASELLA CEL	CEL-495	001180

Test Engineer (initial):	GP	Name:	Gary Phillips
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Issued by University of Salford (Acoustics Calibration Laboratory)
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Certificate Number: 06292/4

Date of Issue: 10 July 2023

Procedures from IEC 61672-3: 2006 and TPS 49 Edition 2 June 2009 were used to perform the periodic tests.

The manufacturer's instruction manual was marked as follows: CEL-63x HB3356-02.

Adjustment data used to adjust the sound levels indicated in response to the application of a multi-frequency sound calibrator to sound levels equivalent to those that would be indicated in response to plane, progressive sound waves were obtained from the manufacturer's instruction manual referred to in this certificate.

The sound level meter calibration check frequency is 1000 Hz, the reference sound pressure level was 114 dB. As this instrument only has a single range, this range is the reference level range.

The environmental conditions in the laboratory at the start of the test were:

Static pressure 100.999 kPa $\pm$ 0.013 kPa; air temperature 23.7 °C $\pm$ 0.3 °C; relative humidity 40.4 % $\pm$ 2.6 %.

The initial response of the instrument to application of the suitable laboratory sound calibrator was 114.0 dB (Z). No adjustment of the instrument was required. This indication was obtained from the calibration certificate of the calibrator and information in the manufacturer's instruction manual specified in this certificate when the instrument Response is set to Freefield. The instrument was calibrated without a windshield. Consult manufacturer's instructions if using a windshield.

With the microphone installed the level of self-generated noise was:

A: 17.8 dB

With the microphone replaced by the electrical input device specified in the manufacturer's instruction manual, the levels of self-generated noise were:

A: 13.7 dB

C: 18.0 dB

Z: 24.7 dB

The environmental conditions in the laboratory at the end of the test were:

Static pressure 101.281 kPa $\pm$ 0.013 kPa; air temperature 22.6 °C $\pm$ 0.3 °C; relative humidity 51.6 % $\pm$ 2.6 %.

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Certificate Number: 06292/4

Date of Issue: 10 July 2023

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

The microphone corrections applied as specified in 12.6 of IEC 61672-3:2006 were obtained from a frequency response measured by this Laboratory using the electrostatic actuator method. This response in isolation is not covered by our UKAS accreditation.

Instruments used in the verification procedure were traceable to *National Standards*. The multi-frequency calibrator method was employed in the acoustical tests of a frequency weighting.

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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University of
Salford
MANCHESTER

Certificate Number: 06850/1

Date of Issue: 31 July 2024

CALIBRATION OF A SOUND CALIBRATOR

FOR: Cundall
Fourways House
57 Hilton Street
Manchester
M1 2EJ

FOR THE ATTENTION OF: Michael Pimlott

DESCRIPTION: Sound calibrator with housing for half-inch microphones.

MANUFACTURER: CEL

TYPE: 120/1

SERIAL NUMBER: 3574169

DATE RECEIVED: 17/07/2024

DATE OF CALIBRATION: 18/07/2024

LOCATION OF CALIBRATION: Acoustic Calibration Laboratory,
Newton G31, University of Salford.

TEST PROCEDURE: CTP06 (Laboratory Manual)

Test Engineer (initial): *GP*

Name: Gary Phillips

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Certificate Number: 06850/1

Date of Issue: 31 July 2024

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 reported results are valid at the environmental conditions at the time of calibration. Corrections to the stated level may be required depending on the actual environmental conditions at the time of use. Consult the manufacturer's instruction manual for further information.

RESULTS

Coupler configuration: Half-inch

Microphone type: B&K 4192

Output level (dB re 20 μ Pa): 114.20 dB $\pm$ 0.09 dB

Frequency (Hz): 1000.00 Hz $\pm$ 0.12 Hz

Total Distortion (%): 0.22 % $\pm$ 0.25 %*

*Negative values of distortion are not realistic and are not included in the confidence interval.

Average environmental conditions at the time of measurement were:

Pressure: 101.414 kPa $\pm$ 0.014 kPa

Temperature: 22.9 °C $\pm$ 0.3 °C

Relative humidity: 49.3 % $\pm$ 3.9 %

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

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

-----END OF CERTIFICATE-----

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Certificate Number: 06850/3

Date of Issue: 31 July 2024

CALIBRATION OF A SOUND CALIBRATOR

FOR: Cundall
Fourways House
57 Hilton Street
Manchester
M1 2EJ

FOR THE ATTENTION OF: Michael Pimlott

DESCRIPTION: Sound calibrator with housing for half-inch microphones.

MANUFACTURER: CEL

TYPE: 120/1

SERIAL NUMBER: 4921893

DATE RECEIVED: 23 July 2024

DATE OF CALIBRATION: 24 July 2024

LOCATION OF CALIBRATION: Acoustic Calibration Laboratory,
Newton G31, University of Salford.

TEST PROCEDURE: CTP06 (Laboratory Manual)

Test Engineer (initial): GP Name: Gary Phillips

Results in this certificate relate only to instruments tested.

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Certificate Number: 06850/3

Date of Issue: 31 July 2024

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 reported results are valid at the environmental conditions at the time of calibration. Corrections to the stated level may be required depending on the actual environmental conditions at the time of use. Consult the manufacturer's instruction manual for further information.

RESULTS

Coupler configuration: Half-inch

Microphone type: B&K 4192

Output level (dB re 20 μ Pa): 114.14 dB $\pm$ 0.09 dB

Frequency (Hz): 1000.00 Hz $\pm$ 0.12 Hz

Total Distortion (%): 0.22 % $\pm$ 0.25 % *

*Negative values of distortion are not realistic and are not included in the confidence interval.

Average environmental conditions at the time of measurement were:

Pressure: 101.515 kPa $\pm$ 0.014 kPa

Temperature: 23.2 °C $\pm$ 0.3 °C

Relative humidity: 52.4 % $\pm$ 3.9 %

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

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

-----END OF CERTIFICATE-----