Appendix 10.3: Calibration certificates of noise instruments

MTS Calibration Ltd,
The Grange Business Centre,
Belasis Avenue,
Billingham TS23 1LG,
England
Telephone: 01642 876 410

CERTIFICATE OF CALIBRATION

Approved Signatory:

Tony Sherris

Issued by: MTS Calibration Ltd

Date of Issue: 10 April 2024 Certificate Number: 39529

Sound Level Meter

Sound Level Meter Periodic Tests to EN 61672-3: 2013 Class 1

Client: Environmental Measurements
Unit 12, Tallaght Business Centre
Whitestown Business Park
Co.Dublin 24, Ireland

Instrument Make: Larson Davis
Instrument Model: LxT1L
Serial Number: 0007030

831 Proxy LxT 7030

Associated Equipment	Make	Model	Serial number
Preamplifier	Larson Davis	PRMLxT1L	077596
Microphone	PCB	377B02	125944
Calibrator	Larson Davis	CAL200	9175
Calibrator supplied by	MTS for this calibration		

The measurements were performed at The Grange Business Centre, Belasis Avenue, TS23 1LD. The results only apply to the items tested.

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 Class 1

MTS Work procedure WP21 issue C3 test results summary, detailed results are shown on subsequent pages.

Tests performed	Section	Results of test	Page	Comments
Calibration Certificate	22		1	
Additional information			2	
Indication with Calibrator Supplied	10	No Limit	3	
Self-Generated Noise	11	No Limit	3	
Frequency and Time-weightings at 1kHz	14	Complies	3	
Long term stability	15	Complies	3	
High stability	21	Complies	3	
Acoustic Tests	12	Complies	4	
Frequency Weighting A	13	Complies	5	
Frequency Weighting C	13	Complies	6	
Frequency Weighting Z	13	Complies	7	
Level Linearity	16	Complies	8	
Level Linearity Range Control	17		n/a	SLM only has one range
Tone-burst Response	18	Complies	9	
Peak C sound level	19	Complies	10	
Overload indication	20	Complies	11	

The instrument was within the above specification as received - no modifications were made

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3: 2013 for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2: 2013, to demonstrate that the model of sound level meter fully conformed to the Class 1 specifications in IEC 61672-1: 2013, the sound level meter submitted for testing conforms to the Class 1 specifications of IEC 61672-1: 2013

Additional tests performed	Reference	
Microphone full frequency response	39531	See additional certificate
Filter calibration, third octave or octave	39529F	See additional certificate

MTS Calibration Ltd,
The Grange Business Centre,
Belasis Avenue,
Billingham TS23 1LG,
England
Telephone: 01642 876 410

CERTIFICATE OF CALIBRATION

Approved Signatory:

Tony Sherris

ssued by: MTS Calibration Ltd

ate of Issue: 10 April 2024 Certificate Number: 39532

Sound Level Meter

Sound Level Meter Periodic Tests to EN 61672-3: 2013 Class 1

lient: Environmental Measurements
Unit 12, Tallaght Business Centre
Whitestown Business Park
Co.Dublin 24, Ireland

3A

Instrument Make: Larson Davis
Instrument Model: LxT1L
Serial Number: 0007038

Associated Equipment	Make	Model	Serial number
Preamplifier	Larson Davis	PRMLxT1L	077600
Microphone	PCB	377B02	336072
Calibrator	Larson Davis	CAL200	9175
Calibrator supplied by	MTS for this calibration		

The measurements were performed at The Grange Business Centre, Belasis Avenue, TS23 1LD. The results only apply to the items tested.

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 Class 1

MTS Work procedure WP21 issue C3 test results summary, detailed results are shown on subsequent pages.

ests performed	Section	Results of test	Page	Comments
Calibration Certificate	22		1	
Additional information			2	
Indication with Calibrator Supplied	10	No Limit	3	
Self-Generated Noise	11	No Limit	3	
Frequency and Time-weightings at 1kHz	14	Complies	3	
Long term stability	15	Complies	3	
High stability	21	Complies	3	
Acoustic Tests	12	Complies	4	
Frequency Weighting A	13	Complies	5	
Frequency Weighting C	13	Complies	6	
Frequency Weighting Z	13	Complies	7	
Level Linearity	16	Complies	8	
Level Linearity Range Control	17		n/a	SLM only has one range
Tone-burst Response	18	Complies	9	
Peak C sound level	19	Complies	10	
Overload indication	20	Complies	11	

The instrument was within the above specification as received - no modifications were made

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3: 2013 for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2: 2013, to demonstrate that the model of sound level meter fully conformed to the Class 1 specifications in IEC 61672-1: 2013, the sound level meter submitted for testing conforms to the Class 1 specifications of IEC 61672-1: 2013

dditional tests performed	Reference	
Microphone full frequency response	39534	See additional certificate
Filter calibration, third octave or octave	39532F	See additional certificate

MTS Calibration Ltd,
The Grange Business Centre,
Belasis Avenue,
Billingham TS23 1LG,
England
Telephone: 01642 876 410

CERTIFICATE OF CALIBRATION

Approved Signatory:

Tony Sherri

Issued by: MTS Calibration Ltd

Date of Issue: 02 August 2023 **Certificate Number:** 38648

Sound Level Meter

Sound Level Meter Periodic Tests to EN 61672-3: 2013 Class 1

Client: Brendan Oreilly

Instrument Make: Larson Davis
Instrument Model: LxT1L
Serial Number: 0005660

1

Associated Equipment	Make	Model	Serial number
Preamplifier	Larson Davis	PRMLxT1L	055684
Microphone	PCB	377B02	305875
Calibrator	Larson Davis	CAL200	9175
Calibrator supplied by	MTS for this calibration		

The measurements were performed at The Grange Business Centre, Belasis Avenue, TS23 1LD. The results only apply to the items tested.

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 Class 1

Test results summary, detailed results are shown on subsequent pages.

Tests performed	Section	Results of test	Page	Comments
Calibration Certificate	22		1	
Additional information			2	
Indication with Calibrator Supplied	10	No Limit	3	
Self-Generated Noise	11	No Limit	3	
Frequency and Time-weightings at 1kHz	14	Complies	3	
Long term stability	15	Complies	3	
High stability	21	Complies	3	
Acoustic Tests	12	Complies	4	
Frequency Weighting A	13	Complies	5	
Frequency Weighting C	13	Complies	6	
Frequency Weighting Z	13	Complies	7	
Level Linearity	16	Complies	8	
Level Linearity Range Control	17		n/a	SLM only has one range
Tone-burst Response	18	Complies	9	
Peak C sound level	19	Complies	10	
Overload indication	20	Complies	11	

The instrument was within the above specification as received - no modifications were made

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3: 2013 for the environmental conditions under which the tests we performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2: 2013, to demonstrate that the model of sound level meter fully conformed to the Class 1 specifications in IEC 61672-1: 2013, the sound leve meter submitted for testing conforms to the Class 1 specifications of IEC 61672-1: 2013

Additional tests performed	Reference	
Microphone full frequency response	38650	See additional certificate
Filter calibration, third octave or octave	38648F	See additional certificate

MTS Calibration Ltd,
The Grange Business Centre,
Belasis Avenue,
Billingham TS23 1LG,
England
Telephone: 01642 876 410

0607

CERTIFICATE OF CALIBRATION

Approved Signatory:

Tony Sherris

Issued by: MTS Calibration Ltd

Performed by Tony Sherris

Date of Issue: 08 April 2024 **Certificate Number:** 39535U

Sound Calibrator

Client: Environmental Measurements
Unit 12, Tallaght Business Centre
Whitestown Business Park
Co.Dublin 24, Ireland

The Device calibrated was:

Larson Davis **Model CA250** **Serial Number 1405**

The measurements were performed at Elvington Close, Billingham, TS23 3YS and the measured values were as follows:

Output Level 1:	114.07	dB re 20µPa	± 0.14 dB (k= 2)
Fundamental Frequency 1:	249.83	Hz	± 0.11 Hz (k= 2)
Total Harmonic Distortion 1:	0.79	%	± 0.021 % (k= 2)

This measurement is valid only for the above device configured for calibration of a WS-2 microphone under the stated environmental conditions. For deviation of prevailing conditions, the manufacturer's literature for the calibrator should be referred to.

Date of Measurements: 08 April 2024 *Date of Receipt:* 03 April 2024

Method of calibration **MTS Calibration Ltd work procedure WP01 issue U3-1**

A Reference Calibrator was used to establish the sensitivity of the measurement chain. The same measurement chain is then used to determine the output level of the Object Calibrator by the difference between its output and that of the nominated Reference Calibrator. Four independent measurements of the third-octave band sound pressure levels produced by the Reference Calibrators and the Object Calibrator are averaged to minimise uncertainties of the calibration. The measurement chain consists of a calibrated, Reference Microphone, Reference Preamplifier and Reference Analyser.

As well as providing a traceable measurement of the sound pressure level in the cavity of the Object Calibrator, the Calibrator's frequency and total harmonic distortion are also measured. Frequency is determined from the average of four independent measurements using a multimeter. The total harmonic distortion is measured from the average of three independent measurements by third octave analysis, subtracting the level of the fundamental frequency from the sum of the combined harmonics in the frequency band to 20kHz. The complete procedure is detailed in the MTS Calibration Ltd work procedure WP01.

The sound pressure level generated by the calibrator in its WS2 configuration was measured by reference to the reference Sound Calibrator as shown in the Test Equipment section below.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k (individually calculated as above), providing a coverage probability of approximately 95%. The uncertainty evaluation has been calculated in accordance with the current version of UKAS publication M3003. The uncertainty quoted for the Distortion Measurement is the Distortion Percentage as measured, multiplied by our Uncertainty as calculated for the individual measurement or our CMC, whichever is the larger.

Measurement Conditions:

Temperature	21	°C	± 1 °C
Atmospheric Pressure	1001	mBar	± 2 mBar
Relative Humidity	47	%	± 5 %

Test Equipment used during this calibration:

Equipment	Manufacturer	Model	Serial No.	Traceability Ref.	Calibration Due
Reference Calibrator	Larson Davis	CA 250	0695	TE 103	Jun-26
Multimeter	HP	34401A	36146A63804	TE 105	Dec-24
Microphone	B&K	4133	810486	TE 155	Sep-24
Real-Time Analyser (set 1)	Larson Davis	2900	0492	TE 108	Aug-24