

CALIBRATION CERTIFICATE

client Politie Oost Nederlands
TLO/HR O.Lentink
Zonnehorst 1
7207 BT Zutphen
Netherlands

order no. 00535

measure	Sound Level Meter:	Brüel & Kjær	2250	No: 3027993
	Microphone:	Brüel & Kjær	4950	No: 3177875
	Preamplifier:	Brüel & Kjær	ZC-0032	No: 28567
	Supplied Calibrator:	Brüel & Kjær	4231	No: 3024008

	Software version:	BZ7130 Version 4.7.5	Instruction manual:	BE1853-11
	Pattern Approval:	PTB	1.63-4093057	
date of receipt	2019-11-13	inventory number		

result

Details are given in chapter **Summary**.

date of calibration

2019-11-14

performed by
Franc Celestina

Digitally Signed By:Franc Celestina
Date:14.11.2019



certificate issued

2019-11-14

approved by
Luka Dolenc

Digitally Signed By:Luka Dolenc
Date:14.11.2019



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LK-008

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calibration method	The Sound Level Meter Brüel & Kjær 2250 has been calibrated in accordance with the requirements as specified in IEC 61672-1:2013 class 1 and internal manual ML10N60. Procedures from IEC 61672-3:2013 were used to perform the periodic tests and the tolerances were taken from IEC 61672-1:2013.
calibration	LOTRIC Meroslovje d.o.o., Selca 163, 4227 Selca, QS Lab IMS, Cesta Ljubljanske brigade 23a, Ljubljana.
environmental conditions	Preconditioning: 4 hours at 23 °C ± 3°C See actual values in Environmental conditions sections.
traceability	The reported measurement values are traceable to national measurement standards and thus to internationally supported realizations of the SI-units.
state of measure before calibration	Calibration as received
statement	The measurement results and uncertainties quoted refer only to the measured value at the time of measurement and carry no implication regarding the long term stability.
uncertainty	The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95 %. The standard uncertainty of measurement has been determined in accordance with EA Publication EA-4/ 02 M:2013.

Summary

Preliminary inspection	<u>Passed</u>
Environmental conditions, Prior to calibration	<u>Passed</u>
Reference information	<u>Passed</u>
Indication at the calibration check frequency	<u>Passed</u>
Acoustical signal tests of a frequency weighting, C weighting	<u>Passed</u>
Self-generated noise, Electrical	<u>Passed</u>
Electrical signal tests of frequency weightings, A weighting	<u>Passed</u>
Electrical signal tests of frequency weightings, C weighting	<u>Passed</u>
Electrical signal tests of frequency weightings, Z weighting	<u>Passed</u>
Frequency and time weightings at 1 kHz	<u>Passed</u>
Long-term stability, Reference	<u>Passed</u>
Level linearity on the reference level range, Upper	<u>Passed</u>
Level linearity on the reference level range, Lower	<u>Passed</u>
Toneburst response, Time-weighting Fast	<u>Passed</u>
Toneburst response, Time-weighting Slow	<u>Passed</u>
Toneburst response, LAE	<u>Passed</u>
C-weighted peak sound level, 8 kHz	<u>Passed</u>
C-weighted peak sound level, 500 Hz	<u>Passed</u>
Overload indication	<u>Passed</u>
Long-term stability, 1. relative	<u>Passed</u>
High-level stability	<u>Passed</u>
Long-term stability, 2. relative	<u>Passed</u>
Environmental conditions, Following calibration	<u>Passed</u>
RPM Mesured with Acoustic Calibrator	<u>Passed</u>

The sound level meter submitted for testing 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 organization 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.

Conformance to a performance specification is demonstrated when the following criteria are both satisfied: (a) a measured deviation from a design goal does not exceed the applicable acceptance limit and (b) the corresponding uncertainty of measurement does not exceed the corresponding maximum-permitted uncertainty of measurement given in IEC 61672-1:2013 for the same coverage probability of 95 %.

Instruments

<u>Category:</u>	<u>Type:</u>	<u>Manufacturer:</u>	<u>Serial No.:</u>
Generator	Pulse Generator	Brüel & Kjær	2423619
Voltmeter	DMM34970A	Agilent	MY44025017
Calibrator	4226	Brüel & Kjær	2141972
Amplifier/Divider	3111 Output Module	Brüel & Kjær	2334521
Adaptor	WA0302A, 12 pF	Brüel & Kjær	2358776

Preliminary inspection

Visually inspect instrument, and operate all relevant controls. (section 5)

	Result
Visual inspection	OK

Environmental conditions, Prior to calibration

Actual environmental conditions prior to calibration. (section 7)

	Measured [°C / kPa / %RH]
Air temperature	23.20
Air pressure	97.68
Relative humidity	40.40

Reference information

Information about reference range, level and channel. (section 22.h + 22.m)

	Value [dB SPL]
Reference sound pressure level	94
Reference level range	140
Channel number	1

Indication at the calibration check frequency

Measure and adjust sound level meter using the supplied calibrator. (section 10 + 22.m)

	Expected [dB SPL / Hz]	Measured [dB SPL / Hz]	Uncertainty [dB / Hz]
Initial indication (supplied calibrator)	94.00	93.92	0.14
Calibration check frequency (supplied calibrator)	1000.00	1000.02	1.00
Adjusted indication (supplied calibrator)	94.00	93.85	0.14

Acoustical signal tests of a frequency weighting, C weighting

Frequency weightings measured acoustically with a calibrated multi-frequency sound calibrator. Averaging time is 10 seconds, and the result is the average of 2 measurements. (section 12)

	Coupler Pressure Lc [dB SPL]	Mic. Correction C4226 [dB]	Body Influence [dB]	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
1000Hz, Ref. (1st)	94.02	0.15	-0.09	93.96	93.88	-0.7	0.7	-0.08	0.25
1000Hz, Ref. (2nd)	94.02	0.15	-0.09	93.96	93.88	-0.7	0.7	-0.08	0.25
1000Hz, Ref. (Average)	94.02	0.15	-0.09	93.96	93.88	-0.7	0.7	-0.08	0.25

125.89Hz (1st)	94.02	0.00	0.00	93.83	93.99	-1.0	1.0	0.16	0.25
125.89Hz (2nd)	94.02	0.00	0.00	93.83	93.99	-1.0	1.0	0.16	0.25
125.89Hz (Average)	94.02	0.00	0.00	93.83	93.99	-1.0	1.0	0.16	0.25
7943.3Hz (1st)	93.21	3.85	-0.17	86.54	86.08	-2.5	1.5	-0.46	0.52
7943.3Hz (2nd)	93.21	3.85	-0.17	86.54	86.10	-2.5	1.5	-0.44	0.52
7943.3Hz (Average)	93.21	3.85	-0.17	86.54	86.09	-2.5	1.5	-0.45	0.52

Self-generated noise, Electrical

Self-generated noise measured in most sensitive range, with electrical substitution for microphone, according to manufactures specifications. The level of self-generated noise is reported for information only and is not used to assess conformance to a requirement. (section 11.2)

	Max [dB SPL]	Measured [dB SPL]	Uncertainty [dB]
A weighted	13.70	12.42	0.30
C weighted	15.00	12.62	0.30
Z weighted	20.40	18.05	0.30

Electrical signal tests of frequency weightings, A weighting

Frequency response measured with electrical signal relative to level at 1 kHz in reference range. (section 13)

	Input Level [dBV]	Expected [dB SPL]	Measured [dB SPL]	El.+Acous. Resp. [dB]	Body Influence [dB]	Corr. Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
1000Hz, Ref.	-24.35	95.00	95.00	-0.04	-0.09	94.87	-0.5	0.5	-0.13	0.12
63.096Hz	1.85	95.00	95.07	0.21	0.00	95.28	-1.0	1.0	0.28	0.12
125.89Hz	-8.25	95.00	95.04	0.10	0.00	95.14	-1.0	1.0	0.14	0.12
251.19Hz	-15.75	95.00	94.98	0.01	0.06	95.05	-1.0	1.0	0.05	0.12
501.19Hz	-21.15	95.00	94.98	-0.03	0.22	95.17	-1.0	1.0	0.17	0.12
1995.3Hz	-25.55	95.00	95.00	-0.03	-0.01	94.96	-1.0	1.0	-0.04	0.12
3981.1Hz	-25.35	95.00	94.91	0.05	-0.06	94.90	-1.0	1.0	-0.10	0.12
7943.3Hz	-23.25	95.00	94.69	0.34	-0.17	94.86	-2.5	1.5	-0.14	0.12
15849Hz	-17.75	95.00	95.59	-0.54	-0.01	95.04	-16.0	2.5	0.04	0.12

Electrical signal tests of frequency weightings, C weighting

Frequency response measured with electrical signal relative to level at 1 kHz in reference range. (section 13)

	Input Level [dBV]	Expected [dB SPL]	Measured [dB SPL]	El.+Acous. Resp. [dB]	Body Influence [dB]	Corr. Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
1000Hz, Ref.	-24.35	95.00	95.00	-0.04	-0.09	94.87	-0.5	0.5	-0.13	0.12
63.096Hz	-23.55	95.00	95.03	0.21	0.00	95.24	-1.0	1.0	0.24	0.12
125.89Hz	-24.15	95.00	95.06	0.10	0.00	95.16	-1.0	1.0	0.16	0.12
251.19Hz	-24.35	95.00	95.01	0.01	0.06	95.08	-1.0	1.0	0.08	0.12
501.19Hz	-24.35	95.00	95.04	-0.03	0.22	95.23	-1.0	1.0	0.23	0.12
1995.3Hz	-24.15	95.00	95.03	-0.03	-0.01	94.99	-1.0	1.0	-0.01	0.12
3981.1Hz	-23.55	95.00	94.93	0.05	-0.06	94.92	-1.0	1.0	-0.08	0.12

7943.3Hz	-21.35	95.00	94.69	0.34	-0.17	94.86	-2.5	1.5	-0.14	0.12
15849Hz	-15.85	95.00	95.56	-0.54	-0.01	95.01	-16.0	2.5	0.01	0.12

Electrical signal tests of frequency weightings, Z weighting

Frequency response measured with electrical signal relative to level at 1 kHz in reference range. (section 13)

	Input Level [dBV]	Expected [dB SPL]	Measured [dB SPL]	El.+Acous. Resp. [dB]	Body Influence [dB]	Corr. Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
1000Hz, Ref.	-24.35	95.00	95.00	-0.04	-0.09	94.87	-0.5	0.5	-0.13	0.12
63.096Hz	-24.35	95.00	95.05	0.21	0.00	95.26	-1.0	1.0	0.26	0.12
125.89Hz	-24.35	95.00	95.02	0.10	0.00	95.12	-1.0	1.0	0.12	0.12
251.19Hz	-24.35	95.00	95.01	0.01	0.06	95.08	-1.0	1.0	0.08	0.12
501.19Hz	-24.35	95.00	95.01	-0.03	0.22	95.20	-1.0	1.0	0.20	0.12
1995.3Hz	-24.35	95.00	95.00	-0.03	-0.01	94.96	-1.0	1.0	-0.04	0.12
3981.1Hz	-24.35	95.00	94.95	0.05	-0.06	94.94	-1.0	1.0	-0.06	0.12
7943.3Hz	-24.35	95.00	94.69	0.34	-0.17	94.86	-2.5	1.5	-0.14	0.12
15849Hz	-24.35	95.00	95.62	-0.54	-0.01	95.07	-16.0	2.5	0.07	0.12

Frequency and time weightings at 1 kHz

Frequency and time weighting measured at 1 kHz with electrical signal in reference range. Measured relative to A-weighted and Fast response. (section 14)

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
LAF, Ref.	94.00	94.00	-0.5	0.5	0.00	0.12
LCF	94.00	94.00	-0.2	0.2	0.00	0.12
LZF	94.00	94.00	-0.2	0.2	0.00	0.12
LAS	94.00	93.95	-0.1	0.1	-0.05	0.12
LAeq	94.00	94.00	-0.1	0.1	0.00	0.12

Long-term stability, Reference

Long-term stability over 25 to 35 minutes, with steady 1kHz signal at reference level. (section 15)
Adjusting to reference level indication.

	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Timestamp	Uncertainty [dB]
Reference	94.00	-0.5	0.5	0.00	2019-11-14 09:42:07	0.10

Level linearity on the reference level range, Upper

Level linearity in reference range, measured at 8 kHz until overload. (section 16)

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
94 dB	94.00	94.00	-0.5	0.5	0.00	0.13
99 dB	99.00	99.00	-0.8	0.8	0.00	0.13
104 dB	104.00	104.00	-0.8	0.8	0.00	0.13

109 dB	109.00	109.01	-0.8	0.8	0.01	0.13
114 dB	114.00	114.02	-0.8	0.8	0.02	0.13
119 dB	119.00	119.02	-0.8	0.8	0.02	0.13
124 dB	124.00	124.02	-0.8	0.8	0.02	0.13
129 dB	129.00	129.03	-0.8	0.8	0.03	0.13
134 dB	134.00	134.02	-0.8	0.8	0.02	0.13
135 dB	135.00	135.03	-0.8	0.8	0.03	0.13
136 dB	136.00	136.02	-0.8	0.8	0.02	0.13
137 dB	137.00	137.02	-0.8	0.8	0.02	0.13
138 dB	138.00	138.02	-0.8	0.8	0.02	0.13
139 dB	139.00	139.02	-0.8	0.8	0.02	0.13

Level linearity on the reference level range, Lower

Level linearity in reference range, measured at 8 kHz down to lower limit, or until underrange. (section 16)

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]	
94 dB	94.00	94.00	-0.5	0.5	0.00	0.13	
89 dB	89.00	89.00	-0.8	0.8	0.00	0.13	
84 dB	84.00	84.00	-0.8	0.8	0.00	0.13	
79 dB	79.00	79.00	-0.8	0.8	0.00	0.13	
74 dB	74.00	73.99	-0.8	0.8	-0.01	0.13	
69 dB	69.00	68.99	-0.8	0.8	-0.01	0.13	
64 dB	64.00	63.99	-0.8	0.8	-0.01	0.13	
59 dB	59.00	58.99	-0.8	0.8	-0.01	0.13	
54 dB	54.00	54.00	-0.8	0.8	0.00	0.13	
49 dB	49.00	49.01	-0.8	0.8	0.01	0.13	
44 dB	44.00	44.03	-0.8	0.8	0.03	0.13	
39 dB	39.00	39.06	-0.8	0.8	0.06	0.24	
34 dB	34.00	34.16	-0.8	0.8	0.16	0.24	
30 dB	30.00	30.35	-0.8	0.8	0.35	0.24	
29 dB	29.00	29.43	-0.8	0.8	0.43	0.24	
28 dB	28.00	28.54	-0.8	0.8	0.54	0.24	
27 dB	27.00	27.70	-0.8	0.8	0.70	0.24	
26 dB	26.00	26.83	-0.8	0.8	0.83	0.24	Failed

Toneburst response, Time-weighting Fast

Response to 4 kHz toneburst measured in reference range, relative to continuous signal. (section 18)

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Continuous, Ref.	137.00	137.00	-0.5	0.5	0.00	0.12
200 ms Burst	136.00	136.00	-0.5	0.5	0.00	0.12
2 ms Burst	119.00	118.92	-1.5	1.0	-0.08	0.12
0.25 ms Burst	110.00	109.87	-3.0	1.0	-0.13	0.12

Toneburst response, Time-weighting Slow

Response to 4 kHz toneburst measured in reference range, relative to continuous signal. (section 18)

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
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Continuous, Ref.	137.00	137.00	-0.5	0.5	0.00	0.12
200 ms Burst	129.60	129.62	-0.5	0.5	0.02	0.12
2 ms Burst	110.00	110.01	-3.0	1.0	0.01	0.12

Toneburst response, LAE

Response to 4 kHz toneburst measured in reference range, relative to continuous signal. (section 18)

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Continuous, Ref.	137.00	137.00	-0.5	0.5	0.00	0.12
200 ms Burst	130.00	129.99	-0.5	0.5	-0.01	0.12
2 ms Burst	110.00	109.96	-1.5	1.0	-0.04	0.12
0.25 ms Burst	101.00	100.86	-3.0	1.0	-0.14	0.12

C-weighted peak sound level, 8 kHz

Peak-response to a 8 kHz single-cycle sine measured in least-sensitive range, relative to continuous signal. (section 19)

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Continuous, Ref.	135.00	135.00	-0.5	0.5	0.00	0.09
Single Sine	138.40	138.72	-2.0	2.0	0.32	0.12

C-weighted peak sound level, 500 Hz

Peak-response to a 500 Hz half-cycle sine measured in least-sensitive range, relative to continuous signal. (section 19)

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Continuous, Ref.	135.00	135.00	-0.5	0.5	0.00	0.09
Half-sine, Positive	137.40	137.11	-1.0	1.0	-0.29	0.12
Half-sine, Negative	137.40	137.11	-1.0	1.0	-0.29	0.12

Overload indication

Overload indication in the least sensitive range determined with a 4 kHz positive/negative half-cycle signal. (section 20)

	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Continuous	140.00	-0.5	0.5	0.00	0.20
Half-sine, Positive	140.95	-10.0	10.0	0.95	0.20
Half-sine, Negative	141.05	-10.0	10.0	1.05	0.20
Difference	141.05	-1.5	1.5	0.10	0.24

Long-term stability, 1. relative

Long-term stability over 25 to 35 minutes, with steady 1kHz signal at reference level. (section 15)
Relative to prior adjustment to reference level indication.

	Measured	Accept - Limit	Accept + Limit	Deviation	Timestamp	Uncertainty
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	[dB SPL / Min]	[dB / Min]	[dB / Min]	[dB / Min]		[dB]
Measurement	94.00	-0.1	0.1	0.00	2019-11-14 10:04:26	0.10
Time passed	22.19	0.0	35.0	22.19		0.00

High-level stability

High-level stability over 5 minutes, with steady 1kHz signal, 1dB below upper boundary. (section 21)

	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
High-level, Ref.	139.00	-0.5	0.5	0.00	0.10
High-level, after 5min	139.00	-0.1	0.1	0.00	0.10

Long-term stability, 2. relative

Long-term stability over 25 to 35 minutes, with steady 1kHz signal at reference level. (section 15)
Relative to prior adjustment to reference level indication.

	Measured [dB SPL/ Min]	Accept - Limit [dB / Min]	Accept + Limit [dB / Min]	Deviation [dB / Min]	Timestamp	Uncertainty [dB]
Wait	28.28	25.0	120.0	28.28		0.00
Measurement	94.00	-0.1	0.1	0.00	2019-11-14 10:10:57	0.10

Environmental conditions, Following calibration

Actual environmental conditions following calibration. (section 7)

	Measured [°C / kPa / %RH]
Air temperature	23.50
Air pressure	97.92
Relative humidity	39.90

RPM Measured with Acoustic Calibrator

RPM Measured with Acoustic Calibrator at 10 different RPM steps. Noise inspector is set-up with the following properties: 1 cylinder; 2 stroke 1000 rpm.

	Expected [RPM]	Measured [RPM]	Accept - Limit [RPM]	Accept + Limit [RPM]	Deviation [RPM]	Uncertainty [RPM]
1897.368 RPM	1897.37	1897.0	-19.0	19.0	-0.4	0.25
2128.878 RPM	2128.88	2128.0	-21.3	21.3	-0.9	0.25
2388.642 RPM	2388.64	2388.0	-23.9	23.9	-0.6	0.25
2680.104 RPM	2680.10	2680.0	-26.8	26.8	-0.1	0.25
3007.122 RPM	3007.12	3007.0	-30.1	30.1	-0.1	0.25
3374.046 RPM	3374.05	3374.0	-33.7	33.7	-0.1	0.25
3785.742 RPM	3785.74	3785.0	-37.9	37.9	-0.7	0.25
4247.676 RPM	4247.68	4247.0	-42.5	42.5	-0.7	0.25
4765.968 RPM	4765.97	4766.0	-47.7	47.7	0.0	0.25

5347.506 RPM	5347.51	5347.0	-53.5	53.5	-0.5	0.25
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No Disclaimer

CALIBRATION CERTIFICATE

client Politie Oost Nederlands TLO/HR O.Lentink
Zonnehorst 1
7207 BT Zutphen
Netherlands

order no. 00535

measure Acoustic calibrator
manufacturer Bruel & Kjaer
type 4231
IEC Class IEC 1
serial no. 3024008
½ inch adaptor ½ UC-0210
pattern approval PTB-1.61-4057176

date of receipt 2019-11-13 **inventory number**

adjustment Details are given in chapter state of measure before calibration. **result** Details are given in chapter Measurement results.

date of calibration **certificate issued**

2019-11-14

2019-11-14

performed by
Franc Celestina

approved by
Luka Dolenc

Digitally Signed By:Franc Celestina
Date: 14.11.2019



Digitally Signed By:Luka Dolenc
Date: 14.11.2019



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calibration procedure	Calibration was performed according to the standard IEC 60942:2003 Annex B and internal manual ML10N60.								
calibration location	LOTRIC Meroslovje d.o.o., Selca 163, 4227 Selca, QS Lab IMS, Cesta Ljubljanske brigade 23a, Ljubljana.								
environmental conditions	<table><tr><td>Preconditioning:</td><td>4 hours at 23 °C ± 3°C</td></tr><tr><td>Temperature</td><td>23.18 °C</td></tr><tr><td>Humidity</td><td>37.1 % RH</td></tr><tr><td>Pressure</td><td>97.62 kPa</td></tr></table>	Preconditioning:	4 hours at 23 °C ± 3°C	Temperature	23.18 °C	Humidity	37.1 % RH	Pressure	97.62 kPa
Preconditioning:	4 hours at 23 °C ± 3°C								
Temperature	23.18 °C								
Humidity	37.1 % RH								
Pressure	97.62 kPa								
traceability	The reported measurement values are traceable to national measurement standards and thus to internationally supported realizations of the SI-units.								
state of measure before calibration	Calibration as received								
statement	The measurement results and uncertainties quoted refer only to the measured value at the time of measurement and carry no implication regarding the long term stability.								
uncertainty	The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95 %. The standard uncertainty of measurement has been determined in accordance with EA Publication EA-4/ 02 M: 2013.								

Measurement results

All stated values are valid at the following environmental reference conditions

Pressure	101,3 kPa
Temperature	23,0 °C
Relative Humidity	50,0 %

Sound Pressure Levels

All stated values are valid at environmental reference conditions

Nominal Level [dB]	Accept Limit Lower [dB]	Accept Limit Upper [dB]	Measured Level [dB]	Measurement Uncertainty [dB]
94	93.80	94.20	93.99	0.11
114	113.80	114.20	113.99	0.11

Frequency

Nominal Frequency [Hz]	Accept Limit Lower [Hz]	Accept Limit Upper [Hz]	Measured Frequency [Hz]	Measurement Uncertainty [Hz]
1000	990.00	1010.00	1000.02	0.10

Total Distortion

Distortion mode: TD THD

Calibration Level [dB]	Accept Limit [%]	Measured Distortion [%]	Measurement Uncertainty [%]
94	2.50	0.42	0.13
114	2.50	0.10	0.13

Instrument List

Instrument model	Instrument name	Serial no.
3560	PULSE Analyzer	2387695
4228	Reference Sound Source	2350136
4192	Transfer Microphone	2360360

Comments

If none of the measurements is marked as Failed the following statement is valid:

As public evidence was available, from a testing organization responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

CERTIFIKAT O KALIBRACIJI / CERTIFICATE OF CALIBRATION

Certifikat St. / Certificate No: IMS-208-19

Stran / Page 1 od/ of 4

MERILO / CALIBRATION OF:

Merilnik vrtljajev / Tachometer: IMS MM-0435 No: 190302119R
Sistem/ System: IMS Noise Patrol 3665 No: DB19010371
Datum prejema / Date of receipt: 2019-10-14
Certifikat / Certificate No: IMS-182-19

NAROCNIK / CLIENT:

Politie Oost Nederlands
TLO/HR O.Lentink
Zonnehorst 1
7207 BT Zutphen
Nederlands

Narocilo St. / Order No: 00535

POGOJI OKOLJA / CALIBRATION CONDITIONS:

Priprava / Preconditioning: 6 hours at 23 °C
Temperatura: 23.0 °C ± 3°C
Zr. Tlak: 101.3 ± 3 kPa
kPa
Relativna vlaga: 50.0 %RH ± 20 %RH

KALIBRACIJSKI POSTOPEK / PROCEDURE:

Kalibracija je bila izvedena skladno s specifikacijami proizvajalca in delovnih pogojev.
Calibration was performed according manufacturer's specification and operation requirements.

REZULTATI / RESULTS:

Rezultati in merilna negotovost so navedeni na strani 2. / Results with uncertainty are stated from the page 2 onward.

Datum Kalibracije / Date of Calibration: 2019-11-14

Certifikat izdan / Certificate issued: 2019-11-14



Franc Celestina
Calibration Technician

Digitally Signed By: Franc Celestina
Date: 14.11.2019



Luka Dolenc
Approved signatory

Digitally Signed By: Luka Dolenc
Date: 14.11.2019

Summary

Visual inspection **Passed**
RPM Measured with Tachometer **Passed**

V oceni "Passed/Failed" ni upostevana merilna negotovost. Zato certifikat o kalibraciji ni izjava o skladnosti. Izraz "Passed" le zagotavlja, da je izmerjena vrednost v mejah toleranc podanih na certifikatu (V vecini primerov so tolerance in negotovosti enake tistim, ki so podane v IEC standardu).

The verdict "Passed/Failed" does not take the calibration uncertainty into consideration; therefore this certificate is not a conformance statement. "Passed" only means that the measured value is within the limits stated on the certificate (in most cases tolerances and uncertainties are equal to the ones in IEC standards).

Merilna negotovost / Measurement uncertainty

Podana razširjena merilna negotovost je podana kot standardna negotovost pomnožena s faktorjem pokritja $k=2$, kar za normalno porazdelitev ustreza intervalu verjetnosti približno 95%. Standardno negotovost smo določili v skladu z EA vodilom EA-4/02.

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA Publication EA-4/02.

Podani merilni rezultati in pripadajoca negotovost se nanašajo na izmerjene vrednosti v času kalibracije in ne zagotavljajo dolgotrajne stabilnosti instrumenta.

The results and uncertainties quoted refer only to the measured value at the time of measurement and carry no implication regarding the long term stability of the instrument.

Kraj kalibracije/Place of Calibration:

IMS Merilni Sistemi d.o.o., Cesta Ljubljanske brigade 23a, Ljubljana.

Instruments

<u>Category:</u>	<u>Type:</u>	<u>Manufacturer:</u>	<u>Serial No.:</u>
Voltmeter	DMM34970A	Agilent	MY44025017
Burst Generator	AFG 3102	Tektronix	C010417

Visual inspection

The unit is visually inspected to check the suitability for calibration.

Result

Visual inspection **OK**

RPM Mesured with Tachometer

RPM Mesured with Tachometer

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[RPM]	[RPM]	[RPM]	[RPM]	[RPM]	[RPM]
1897.368 RPM	1897.37	1890.0	-19.0	19.0	-7.4	0.25
2128.878 RPM	2128.88	2130.0	-21.3	21.3	1.1	0.25
2388.642 RPM	2388.64	2400.0	-23.9	23.9	11.4	0.25
2680.104 RPM	2680.10	2670.0	-26.8	26.8	-10.1	0.25
3007.122 RPM	3007.12	3000.0	-30.1	30.1	-7.1	0.25
3374.046 RPM	3374.05	3390.0	-33.7	33.7	15.9	0.25
3785.742 RPM	3785.74	3780.0	-37.9	37.9	-5.7	0.25
4247.676 RPM	4247.68	4260.0	-42.5	42.5	12.3	0.25
4765.968 RPM	4765.97	4770.0	-47.7	47.7	4.0	0.25
5347.506 RPM	5347.51	5370.0	-53.5	53.5	22.5	0.25

No Disclaimer

CERTIFIKAT O KALIBRACIJI / CERTIFICATE OF CALIBRATION

Certifikat St.: / Certificate No: IMS-209-19

Stran / Page 1 od/ of 4

MERILO / CALIBRATION OF:

Merilnik vrtljajev / Tachometer: AVL Tachometer

No: 9437

Datum prejema / Date of receipt: 2019-11-13

Certifikat / Certificate No: IMS-209-19

NAROCNIK / CLIENT:

Politie Oost Nederlands
TLO/HR O.Lentink
Zonnehorst 1
7207 BT Zutphen
Nederlands

Narocilo St. / Order No: 00535

POGOJI OKOLJA / CALIBRATION CONDITIONS:

Priprava / Preconditioning:: 6 hours at 23 °C
Temperatura: 23.0 °C ± 3°C
Zr. Tlak: 101.3 ± 3 kPa
kPa
Relativna vlaga: 50.0 %RH ± 20 %RH

KALIBRACIJSKI POSTOPEK / PROCEDURE:

Kalibracija je bila izvedena skladno s specifikacijami proizvajalca in delovnih pogojev.
Calibration was performed according manufacturer's specification and operation requirements.

REZULTATI / RESULTS:

Rezultati in merilna negotovost so navedeni na strani 2. / Results with uncertainty are stated from the page 2 onward.

Datum Kalibracije / Date of Calibration: 2019-11-14

Certifikat izdan / Certificate issued: 2019-11-14



Franc Celestina
Calibration Technician

Digitally Signed By:Franc Celestina
Date:14.11.2019



Luka Dolenc
Approved signatory

Digitally Signed By:Luka Dolenc
Date:14.11.2019

Summary

Visual inspection **Passed**
RPM Measured with AVL Probe attached **Passed**

V oceni "Passed/Failed" ni upostevana merilna negotovost. Zato certifikat o kalibraciji ni izjava o skladnosti. Izraz "Passed" le zagotavlja, da je izmerjena vrednost v mejah toleranc podanih na certifikatu (V vecini primerov so tolerance in negotovosti enake tistim, ki so podane v IEC standardu).

The verdict "Passed/Failed" does not take the calibration uncertainty into consideration; therefore this certificate is not a conformance statement. "Passed" only means that the measured value is within the limits stated on the certificate (in most cases tolerances and uncertainties are equal to the ones in IEC standards).

Merilna negotovost / Measurement uncertainty

Podana razširjena merilna negotovost je podana kot standardna negotovost pomnožena s faktorjem pokritja $k=2$, kar za normalno porazdelitev ustreza intervalu verjetnosti približno 95%. Standardno negotovost smo določili v skladu z EA vodilom EA-4/02.

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA Publication EA-4/02.

Podani merilni rezultati in pripadajoca negotovost se nanašajo na izmerjene vrednosti v casu kalibracije in ne zagotavljajo dolgotrajne stabilnosti instrumenta.

The results and uncertainties quoted refer only to the measured value at the time of measurement and carry no implication regarding the long term stability of the instrument.

Kraj kalibracije/Place of Calibration:

IMS Merilni Sistemi d.o.o., Cesta Ljubljanske brigade 23a, Ljubljana.

Instruments

<u>Category:</u>	<u>Type:</u>	<u>Manufacturer:</u>	<u>Serial No.:</u>
Voltmeter	DMM34970A	Agilent	MY44025017
Burst Generator	AFG 3102	Tektronix	C010417

Visual inspection

The unit is visually inspected to check the suitability for calibration.

Result

Visual inspection OK

RPM Mesured with AVL Probe attached

RPM Mesured with Tachometer

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[RPM]	[RPM]	[RPM]	[RPM]	[RPM]	[RPM]
1897.368 RPM	1897.37	1899.0	-19.0	19.0	1.6	0.25
2128.878 RPM	2128.88	2140.0	-21.3	21.3	11.1	0.25
2388.642 RPM	2388.64	2382.0	-23.9	23.9	-6.6	0.25
2680.104 RPM	2680.10	2695.0	-26.8	26.8	14.9	0.25
3007.122 RPM	3007.12	3002.0	-30.1	30.1	-5.1	0.25
3374.046 RPM	3374.05	3370.0	-33.7	33.7	-4.1	0.25
3785.742 RPM	3785.74	3790.0	-37.9	37.9	4.3	0.25
4247.676 RPM	4247.68	4250.0	-42.5	42.5	2.3	0.25
4765.968 RPM	4765.97	4790.0	-47.7	47.7	24.0	0.25
5347.506 RPM	5347.51	5355.0	-53.5	53.5	7.5	0.25

No Disclaimer