

CUSTOMER

Name: Adviesburo XXX
Address: Voorbeeldstraat 11
Zip code & City : 2800 AS Gouda
Country: Netherlands

CALIBRATION OF

Device: Acoustical Calibrator Class: 1
Brand & type: Larson Davis CAL200
Serial number: 100411
Customers Instrument tag N/A

SPECIFICATIONS

Calibrated in accordance IEC 60942:2003-01 Class: 1
with: Microphone method, sound calibration comparison method
Method used: IEC-60942 Annex B, Periodic tests
Traceability: The results are traceability to the international units system SI.

**CALIBRATION
CONDITIONS**

Preconditioning: 4 hours at 23° [C] ± 3° [C]
Environmental conditions: Pressure Unit Humidity Unit Temperature Unit
1017,90 [hPa] 46,0 [%] 22,5 [°C]

**UNCERTAINTY
OF
MEASUREMENT**

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2$, which for a normal distribution provides a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from standards, calibration method, effects of environmental conditions and any short time contribution from the device under calibration.

RESULT **PASS**

DATE

Date of calibration : *Date of issue :*
Calibration Engineer: *Approved Signatory:*
A.Vreeswijk January 28, 2020 January 28, 2020

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VISUAL INSPECTION

	Yes	No
The equipment / device is in serviceable condition.	x	
There is no visible damage.	x	
The appropriate documentation accompanied the equipment.	x	
Calibration tags / CE tags are present and correct.	x	
The equipment is suitable to use for official testing and/or calibration.	x	

COMMENTS

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.

CALIBRATION EQUIPMENT

Device	Type	Brand	Serial no.
Digital Voltmeter 8½ digits	3458A	Keysight	MY545053464
Conditioning Amplifier	2691	Bruel & Kjaer	2079137
Electroacoustical Calibrator	4231	Bruel & Kjaer	1000577
Band Pass Filter	SR650	Stanford RS	3232
Pistonphone	4228	Bruel & Kjaer	1570765
Laboratory Microfoon	4192	Bruel & Kjaer	2580340
Puls system	3560C	Bruel & Kjaer	2331790
Audio FFT Analyzer	XL2	NTI-Audio	A2A06359EO

DEVICE UNDER TEST

Device	Type	Brand	Serial no.
Calibrator	CAL200	Larson Davis	100411
Pattern Approval	DE-19-M-PTB-0051	PTB	IEC-60942-2018
Barometer	N/A		

MEASUREMENTS

0. PRELIMINARY INSPECTION

Annex B2 Prior to any measurements, the sound calibrator and all accessories shall be visually inspected, and any controls operated to ensure that they are in working order. It shall be established that the power supply of the instrument is within the operating limits specified in the instruction manual, by using the method specified in the instruction manual.

	Adaptor	Coupler Clean	Controls	Battery comp.	Accessories	Other elements
Visual inspection / Proper working order	Ok	Ok	Ok	Ok	Ok	Ok

1. ENVIRONMENTAL CONDITIONS PRIOR TO CALIBRATION

Annex B.3.2.1 All tests in Clause B.3 shall be carried out within the following ranges of environmental conditions: 80 kPa to 105 kPa, 20 °C to 26 °C and 25 % to 70 % relative humidity

	Measured	Unit
Barometric pressure	1017,9	[hPa]
Relative humidity	46,0	[%]
Air temperature	22,5	[°C]

2. REFERENCE INFORMATION

Annex B.3.3. If a barometer is provided with the sound calibrator, prior to making any measurements of the sound pressure level generated by the sound calibrator, the indication of the barometer shall be checked by comparison with that of a calibrated precision barometer at the prevailing static pressure. The reading of the barometer under test shall be recorded, and the tolerances for the indicated static pressure shall be within the limits of the tolerances given in the instruction manual.

	Expected	Measured	Accept -Limit	Accept +limit	Deviation	Uncertainty
Barometric pressure, barometer	[hPa]	[hPa]	[hPa]	[hPa]	[hPa]	[hPa]
						5,00

3. MEASURED RESULT VALUES

The stated result values are valid at the following environmental reference conditions:

	Measured	Unit
Barometric pressure	101,3	[kPa]
Relative humidity	50,0	[%]
Air temperature	23,0	[°C]

4. SOUND PRESSURE LEVEL

Annex B.3.4.1 Following coupling of the microphone to the sound calibrator, the time specified in the instruction manual shall be allowed for the microphone and sound calibrator to stabilize. The sound pressure level generated by the sound calibrator shall then be measured, as an average over 20 s of operation, at the principal sound pressure level and principal frequency. For class LS sound calibrators the microphone shall be a laboratory standard microphone as specified in IEC 61094-1. For class 1 and class 2 sound calibrators the microphone shall be a working standard microphone as specified in IEC 61094-4 (or IEC-61094-1).

The sound pressure level generated by the sound calibrator under test shall be measured using a calibrated microphone or microphone system (comparison method). Limits include uncertainty.

Nominal level	Accept limit lower Class-LS	Accept limit upper Class-LS	Accept limit lower Class 1	Accept limit upper Class 1	Measured level actual conditions	Corrections reference conditions	Result at reference conditions §3	Measurement uncertainty
[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
94	93,89	94,11	93,69	94,31	93,88	0,0054	93,88	0,09
114	113,89	114,11	113,69	114,31	113,90	0,0054	113,90	0,09

5. FREQUENCY

Annex B.3.5. The frequency of the sound generated by the sound calibrator coupled to the microphone used in B.3.4 shall be measured, at the principal sound pressure level, for each frequency setting of the sound calibrator for which the instruction manual states that the instrument conforms to the requirements of this standard. Limits include uncertainty.

Nominal level	Accept limit lower Class-LS	Accept limit upper Class-LS	Accept limit lower Class 1	Accept limit upper Class 1	Measured level	Measurement uncertainty
[Hz]	[Hz]	[Hz]	[Hz]	[Hz]	[Hz]	[Hz]
1000	990,10	1009,90	990,10	1009,90	1000,10	0,10

6. TOTAL DISTORTION

Annex B.3.5. The frequency of the sound generated by the sound calibrator coupled to the microphone used in B.3.4 shall be measured, at the principal sound pressure level, for each frequency setting of requirements of this standard. Limits include uncertainty.

Calibration level	Frequency	Total distortion	Accept limit Class LS	Accept limit Class 1	Measurement uncertainty
[dB]	[Hz]	[%]	[%]	[%]	[%]
94	1000	0,70	2,25	2,75	0,25
114	1000	0,41	2,25	2,75	0,25

Note : Accept limits are reduced by measurement uncertainty to assure result value, expanded by the actual expanded uncertainty does not exceed the specified limits as stated in the standard IEC-61094.

7. ENVIRONMENTAL CONDITIONS FOLLOWING THE CALIBRATION

Actual environmental conditions following calibration

	Measured	Unit
Barometric pressure	1018,2	[hPa]
Relative humidity	46,0	[%]
Air temperature	22,6	[°C]

8. SUMMARY

0. PRELIMINARY INSPECTION	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL
1. ENVIRONMENTAL CONDITIONS PRIOR TO CALIBRATION	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL
2. REFERENCE INFORMATION	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL
4. SOUND PRESSURE LEVEL	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL
5. FREQUENCY	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL
6. TOTAL DISTORTION	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL
7. ENVIRONMENTAL CONDITIONS FOLLOWING THE CALIBRATION	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL