Odin Metrology, Inc.
Calibration of Sound & Vibration Instruments

Certificate Number: **OM2024-5**

Certificate of Calibration for Brüel & Kjær Sound Level Calibrator

This calibration is performed by comparison with measurement reference standard pistonphones:

Type No.	4228	4228
Serial No.	1570748	1504084
Calibrated by	HL	HL
Cal Date	02 DEC 2024	02 DEC 2024
Due Date	02 DEC 2025	02 DEC 2025

a) Estimated uncertainty of comparison: ± **0.05** dB
b) Estimated uncertainty of calibration service for standard pistonphone: ± **0.06** dB
c) Total uncertainty: $\sqrt{a^2+b^2}$ = ± **0.08** dB
d) Expanded uncertainty (coverage factor *k* = 2 for 95% confidence level): = ± **0.16** dB

This acoustic calibrator has been calibrated using standards with values traceable to the National Institute of Standards and Technology. This calibration is traceable to NIST Test Number **683/289533-17.**

CONDITION OF TEST		
Ambient Pressure	**992.83**	hPa
Temperature	**23**	°C
Relative Humidity	**32**	%
Date of Calibration	**17 DEC 2024**	
Re-calibration due on	**17 DEC 2025**	

The calibration of this acoustic calibrator was performed using a test system conforming to the requirements of ANSI/NCSLZ540-1, 1994, ISO 17025, and ISO 9001:2015, Certification NQA No. 11252.

Calibration procedure: **OM-P-1001-Acoustic_Calibrator, Rev. 1.0 20130522.**

Calibration performed by

Harold Lynch, Service Manager

Calibrator type **4231**
Serial no. **3013812**
Submitted by **Odin Metrology, Inc.**
Thousand Oaks, CA 91320
Purchase order no. **N/A**
Asset no. **N/A**

This calibrator has been found to perform **within** the specifications listed below at the normalized conditions stated.

SPL produced in coupler terminated by a loading volume of 1.333 cm^3	94.0 ± 0.2 dB
Level Step	20 ± 0.1 dB
Frequency	1,000 Hz ± 0.1%
Distortion	< 1%
At 1,013 hPa, 23°C, and 65% relative humidity	

PERFORMANCE AS RECEIVED		
Frequency	**1000.0**	Hz
SPL	**94.03**	dB
SPL+20 dB	**113.99**	dB
Distortion	**0.3**	%
Battery Voltage	**1.30**	V

Was repair or adjustment performed? **No**
Were parts replaced? **No**
Were batteries replaced? **Yes**

FINAL PERFORMANCE		
Frequency	**1000.0**	Hz
SPL	**94.03**	dB
SPL+20 dB	**113.99**	dB
Distortion	**0.3**	%

Note: This calibrator was **within** manufacturer's specifications as received.

ODIN METROLOGY, INC.
3537 OLD CONEJO ROAD, SUITE 108
THOUSAND OAKS, CA 91320
PHONE: (805) 375-0830; FAX: (805) 375-0405

ODIN METROLOGY, INC.

Instrumentation used for calibration of pistonphones and calibrators

Instrument Type	Type no.	Serial no.	Cal. Date	Cal. Due	Cal. by
Precision Barometer	Druck 141	299/95-10	18 DEC 2023	18 DEC 2024	CMI
Band Pass Filer	1618	996467	17 JUN 2024	17 JUN 2025	HL
Measuring Amplifier	2636	1324114	28 MAY 2024	28 MAY 2025	HL
Transducer Assembly	9545	390093	28 OCT 2024	28 OCT 2026	HL
Pistonphone	4228	1570748	30 NOV 2023	30 NOV 2024	HL
Pistonphone	4228	1504084	30 NOV 2023	30 NOV 2024	HL
Sound Calibrator	4231	2402593	02 FEB 2024	02 FEB 2025	HL
Microphone	4134	1315901	15 FEB 2024	15 FEB 2025	HL
HP Multimeter	34401A	US36009807	05 SEP 2024	05 SEP 2025	PI
HP Multimeter	34401A	MY41031678	10 JAN 2024	10 JAN 2025	PI

Calibration of reference microphones 4160 serial numbers 991820, 991821, standard pistonphones 4220 serial numbers 1048473, 1510240, and 4228 serial numbers 1570748 and 1504084 are calibrated traceable to NIST with NIST test number **683/289533-17.**

The verification/calibration listed on page 1 of this document was performed on a test system which conforms to and operates under the requirements of **ANSI/NCSL Z540-1** which also covers the requirements for **MIL STD 45662A**, **ISO 17025**, and ISO 9001:2015 NQA certification no.: **11252**.

*Traceability to NIST by NIST calibration of Transfer Standard Microphone is used to verify consistency between DANAK/DPLA and NIST calibrations.

This page revised: Rev. 30.10, 20241028