



CERTIFICATE OF CALIBRATION

CERTIFICATE NUMBER	2007-250
ORGANISATION	UNIVERSITY OF PRETORIA
ORGANISATION ADDRESS	P.O. BOX 14679, HATFIELD, 0028
CALIBRATION OF	INTEGRATING SOUND LEVEL METER with built-in 1/3-OCTAVE/OCTAVE FILTERS and 1/2" MICROPHONE
CALIBRATED BY	M.W. DE BEER
MANUFACTURERS	LARSON DAVIS
MODEL NUMBERS	824A and 2541
SERIAL NUMBERS	824A3133 & 7938
DATE OF CALIBRATION	22 MARCH 2007
RECOMMENDED DUE DATE	MARCH 2008

This certificate is issued in accordance with the conditions of approval granted by the South African National Accreditation System (SANAS). This Certificate may not be reproduced without the consent of SANAS and De Beer Calibration Services.

Calibrations performed by this laboratory are in terms of standards, the accuracies of which are traceable to national measuring standards as maintained by the CSIR.

The values in this certificate are correct at the time of calibration. It is recommended that recalibration should be performed on or before the recalibration due date, to ensure that the instrument's accuracy remains within the desired specification.

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M.W. DE BEER (SANAS AUTHORIZED SIGNATORY)

23 March 2007
DATE OF ISSUE

1. **PROCEDURE**

The UUT was calibrated according to procedures 1002/P/003 to 1002/P/007 and to the IEC 60651, 60804 and 1260 specifications for Sound Level Meters, Integrating Sound Level Meters, Octave and 1/3-Octave Filters respectively as well as the manufacturer's specifications.

2. **MEASURING EQUIPMENT**

HP	33120A	Function Generator	1999-034
HP	3465A	Multimeter	1863605
HP	8116A	Pulse/Function Generator	2334G02898
JFW	50BR-022	50 Ohm Step Attenuator	3157070043
B&K	2610	Measuring Amplifier	145076
B&K	2627	1" Pre-Amplifier	10022165
B&K	UZ0001	Barometer	LS-71
Quest	CA-15	Multi-Frequency Calibrator	H9120002

3. **RESULTS**

3.1 The following parameters of the Integrating Sound Level Meter were calibrated:

Input sensitivity	Manufacturer's specification
Amplitude linearity (40,0 dB to 120,0 dB for 31,5 Hz, 1 kHz and 8 kHz)	IEC 60651: sections 7.9 & 7.10
Weighting networks A & C (31,5 Hz to 20 kHz)	IEC 60651: section 6.1
Linear (31,5 Hz to 20 kHz)	Manufacturer's specification
Detector network (Fast, Slow & Impulse)	IEC 60651: sections 7.2 & 7.3
Integrating (Time Averaging)	IEC 60804: section 9.3.2
Integrating (Pulse Range)	IEC 60804: section 9.3.4
SEL	Manufacturer's specification
Min.\Max. level	Manufacturer's specification
AC Output Level	Manufacturer's specification
DC Output Level	Manufacturer's specification



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Conclusion: The Integrating Sound Level Meter complies with the above-specified clauses of the IEC 60651 and 60804 specifications, Type 1.

3.2 The following parameters of the ½" Microphone were calibrated:

Output sensitivity at 250 Hz
Frequency response (125 Hz to 2 kHz)

Conclusion: The parameters measured for the ½" Microphone, complies with the manufacturer's specification.

3.4 The following parameters of the ⅓-Octave/Octave Filter were calibrated:

Octave Frequency response (31,5 Hz to 16 kHz)	IEC 1260: sections 4.7 & 5.6
⅓-Octave Frequency response (25 Hz to 20 kHz)	IEC 1260: sections 4.7 & 5.6

Conclusion: The ⅓-Octave/Octave Filter complies with the above-specified clauses of the IEC 1260 specification, Class 2.

4. **REMARKS**

- 4.1 The reported uncertainties of measurements were calculated and expressed in accordance with the R R Cook document entitled "Assessment of Uncertainties of Measurement for Calibration and Testing Laboratories" second edition dated 2002.
- 4.2 The reported uncertainties of measurements are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.



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- 4.3 The environmental conditions were: Temperature: $(23 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 15) \%$.
- 4.4 Calibration labels bearing cal date, due date (if requested), certificate number and serial number have been affixed to the instrument.
- 4.5 The uncertainties of the measurements were taken into account when the above statements of compliance to the relevant specifications are made.
- 4.6 The uncertainties of measurements were estimated as follows:
- | | |
|--------------------------------------|----------------------|
| Integrating Sound Level Meter: | $\pm 1,7 \text{ dB}$ |
| $\frac{1}{2}$ " Microphone: | $\pm 0,9 \text{ dB}$ |
| $\frac{1}{3}$ -Octave/Octave Filter: | $\pm 0,5 \text{ dB}$ |
- 4.7 The Peak Function fails and should not be used.


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