

CERTIFICATE OF CALIBRATION

Issued by:

Telephone: 01723 500779

Date of Issue: 12th March 2004

MTS Consultancy
16 Scardale Crescent
Scarborough
North Yorkshire YO12 6LA

Certificate Number: U 5556



Client: RPS Planning, Transport, and Environment
Wellfield House
33 New Hey Road
Huddersfield HD3 4AL

Sound Calibrator Bruel & Kjaer Type 4231

Serial Number 2393954

Two Reference Calibrators, each calibrated by the National Physical Laboratory, were 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. Six 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 an NPL-Calibrated Reference Microphone and internally calibrated Reference Pre-amplifier and Reference Analyser.

As well as providing a traceable measurement of the Sound Pressure Level in the Object Calibrator cavity, the Calibrator's Frequency and Total Harmonic Distortion are also measured. Frequency is determined from six measurements using a Multimeter with a current UKAS-accredited calibration. The Total Harmonic Distortion measurement is made from a third-octave analysis by 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 MTS Consultancy Work Procedure WP01 Issue 0 (Nov-2003).

The sound pressure level generated by the calibrator in its WS2 configuration was measured by reference to Bruel & Kjaer Type 4133 Microphone number 1093782, most recently calibrated by National Physical Laboratory in July 2003 and Bruel & Kjaer Type 4231 Sound Calibrator number 2326247, most recently calibrated by National Physical Laboratory in September 2003. The values measured were:

Output – Level 1:	93.96	dB re 20 μ Pa	+/- 0.14 dB (k=2.00)
Fundamental Frequency – Level 1:	999.96	Hz	+/- 0.11 Hz (k=2.00)
Total Harmonic Distortion – Level 1:	0.49	%	+/- 0.02% (k=2.00)

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k as shown in the table above to provide a level of confidence of approximately 95%. The uncertainty has been evaluated in accordance with UKAS publication M 3003 (December 1997).

Measurement Conditions:

Temperature	20.5	°C
Atmospheric Pressure	999	mBar
Relative Humidity	31	%

This measurement is valid only for the above device under the above environmental conditions. For deviation of prevailing conditions, the manufacturer's literature for the Calibrator should be referred to.

Date of Receipt: 10th March 2004
Date of Calibration: 12th March 2004
Date of Certificate Issue: 12th March 2004

Authorised Signatory:

David Marsh

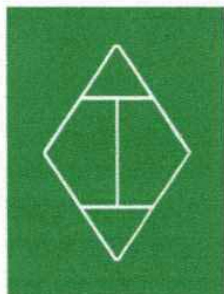
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CERTIFICATE OF CALIBRATION

ISSUED BY AV CALIBRATION LTD

Date of issue 12 July 2005

Certificate N° 01912



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Approved Signatory
R.G.Tyler

A handwritten signature in black ink, appearing to read 'R.G. Tyler'.

CLIENT RPS Planning, Transport & Environment
Unit 1, Lowfields Business Park,
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HX5 9DE

F.A.O. Gareth Oddy

REF. Order N° 02755 Job N° UKAS05/07163/01

DATE OF RECEIPT 1 July 2005

PROCEDURE AV Calibration Engineer's Handbook, Section 3: verification of sound level meters to BS 7580:Part 1:1997

IDENTIFICATION Sound level meter Larson•Davis type 824A [serial no. 824A0816] connected via a preamplifier type PRM902 [serial no. 3374] to a half-inch microphone type 2541 [serial no. 8039]. Associated calibrator B&K type 4231 [serial no. 2393954] with one-inch housing and adapter type UC 0210 for half-inch microphone

CALIBRATED ON 12 July 2005

PREVIOUS CALIBRATION Calibrated on 2 November 2004
Certificate N° 01507 issued by UKAS laboratory N° 0653

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