


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines Upon Thames. TW18 3HR, UK

 <p>0789</p> <p>Accredited to ISO/IEC 17025:2005</p>	<h3>Campbell Associates Ltd</h3> <p>Issue No: 014 Issue date: 06 March 2018</p>	
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<p>Calibration performed at the above address only</p>		

DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k=2$)	Remarks
ACOUSTICS			
<u>Pistonphones & sound calibrators</u>			
Sound pressure level	250 Hz 1000 Hz	0.10 dB	Using Norsonic 1504 with NOR-1018 Software
Sound pressure level of multi-frequency calibrator	31.5 Hz to 63 Hz	0.13 dB	
	>63 to 5 kHz	0.10 dB	
	>5 kHz to 8 kHz	0.15 dB	
	>8 kHz to 12.5 kHz	0.21 dB	
	>12.5 kHz to 16 kHz	0.30 dB	
Amplitude stability	Dependent on instrument	0.02 dB	With WS2P microphone
Frequency	63 Hz to 16 kHz	0.10 % of reading	
Distortion	Dependent on instrument	14 % of reading	
Periodic testing of sound calibrators in accordance with IEC 60942:2003	90 to 140 dB	Uncertainties as listed above See also remarks	Periodic testing of sound calibrators Class LS, 1 or 2 using Insert voltage technique using WS2P or LS2P microphone as
<u>Sound level meters</u>			
Verification of Sound Level Meters	BS 7580:Part 1:1997	See remarks	Verification of Type 0, 1 & 2 SLMs originally manufactured in accordance with BS EN 60651:1994 BS EN 60804:1994 and for which appropriate correction



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ACOUSTICS (cont'd)			
<u>Sound level meters</u>			factors are known and agreed
Verification of Sound Level Meters	BS EN 61672-3:2006 as modified by UKAS TPS 49 Edition 2. June 2009.	See remarks	Verification of Class 1 & 2 SLMs originally manufactured in accordance with IEC 61672- 3:2006 and for which required correction factors are known and agreed, including measurement of self generated noise with microphone fitted at customers request.
Filters - sound level meter based octave band filters one-third octave band filters	16 Hz to 16 kHz 16 Hz to 20 kHz	0.13 dB 0.13 dB	Filters originally manufactured in accordance with IEC 61260:1995 (BS EN 61260:1996) or IEC 60225 in combination with a sound level meter
Reverberation time One- third octave bands	50 Hz to 10 kHz For R_t times of 0.1, 0.2, 0.5, 1 and 2 seconds 5 and 10 seconds	0.01 s 0.06 s	Verification of specific RT modules on sound level meters using transfer reference audio files i.e. computer generated multi-sine files to give the required decay curves
Microphones Pressure sensitivity of 1", 1/2" & 1/4" microphones @ reference frequency	250 Hz	0.1 dB	WSM type microphones
Electrostatic actuator response of 1" microphones	100 Hz – 4 kHz >4 kHz – 8 kHz >8 kHz to 12.5 kHz	0.21 dB 0.24 dB 0.48 dB	By electrostatic actuator methods
Electrostatic actuator response of 1/2" microphones	100 Hz – 4 kHz >4 kHz – 8 kHz >8 kHz to 16 kHz >16 kHz to 20 kHz >20 kHz to 50 kHz	0.21 dB 0.24 dB 0.48 dB 0.7 dB 0.9 dB	By electrostatic actuator methods The upper frequency limit for high sensitivity 1/2" microphones is 20 kHz



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Microphones (cont'd) Electrostatic actuator response of 1/4" microphones	100 Hz – 4 kHz	0.21 dB	By electrostatic actuator methods
	>4 kHz – 8 kHz	0.24 dB	
	>8 kHz to 16 kHz	0.48 dB	
	>16 kHz to 20 kHz	0.7 dB	
	>20 kHz to 50 kHz	0.9 dB	
	> 50 kHz to 100 kHz	1.2 dB	
	Polarised self-capacitance of 1", 1/2" & 1/4" microphones @ 250 Hz	1 pF to 100 pF	
Low frequency response of 1/2" microphones (with pressure equalisation vent exposed to sound field)	2 Hz to 100 Hz	0.8 dB	Using microphone test chamber
Tapping Machines - verification	In support of BS EN ISO 140-7: 1998		
	Velocity 0.70 m/s to 1.00 m/s	0.01 m/s	
	Mass 480 g to 520 g	0.17 g	
	Time 50 ms to 150 ms	0.25 ms	
	Diameter 25 mm to 35 mm	0.03 mm	
	Radius of curvature 300 mm to 700 mm	11 mm	
	Angle of fall 0° to 0.6°	0.07°	



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<p>ACCELEROMETRY</p> <p><u>Portable vibration field calibrators</u></p> <p>Acceleration: 10 Hz to 20 Hz 20 Hz to 80 Hz 80 Hz 80 Hz to 1 kHz 1 kHz to 2 kHz</p> <p>Frequency: 8 Hz to 1280 Hz</p> <p>Distortion (percentage of reading)</p>	<p>1 ms⁻² to 100 ms⁻² 1 ms⁻² to 100 ms⁻² 1 ms⁻² to 100 ms⁻² 1 ms⁻² to 100 ms⁻² 1 ms⁻² to 100 ms⁻²</p> <p>1 ms⁻² to 100 ms⁻²</p> <p>1 ms⁻² to 100 ms⁻²</p>	<p>1.11 % 0.72 % 0.56 % 0.75 % 1.50 %</p> <p>0.17 %</p> <p>1.05 %</p>	<p>Portable vibration field calibrators to documented in-house procedure TP-15 "Calibration of Vibration Calibrators"</p> <p>Certificate of Conformance to BS EN ISO 8041:2005 Annex A for devices with matching specification by periodic verification</p>
END			