Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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0789

Accredited to ISO/IEC 17025:2005

Campbell Associates Ltd

Issue No: 015 **Issue date**: 11 January 2019

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Calibration performed at the above address only

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 >63 to 5 kHz >5 kHz to 8 kHz >8 kHz to 12.5 kHz >12.5 kHz to 16 kHz	0.13 dB 0.10 dB 0.15 dB 0.21 dB 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 LS2Pmicrophone 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 factors are known and agreed

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k=2)	Remarks
ACOUSTICS (cont'd)			
Sound level meters			
Verification of Sound Level Meters	BS EN 61672-3:2006 (Withdrawn) as modified by UKAS TPS 49 Edition 2.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.
Verification of Sound Level Meters	BS EN 61672-3:2013	See remarks	Verification of Class 1 & 2 SLMs originally manufactured in accordance with IEC 61672-3:2013 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", ½" & ¼" 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

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (*k*=2)	Remarks
ACOUSTICS (cont'd)			
Microphones			
Electrostatic actuator response of ½" 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	The upper frequency limit for high sensitivity ½" microphones is 20 kHz
	>16 kHz to 20 kHz	0.7 dB	
	>20 kHz to 50 kHz	0.9 dB	
Electrostatic actuator response of ¼" 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", ½" & ¼" microphones @ 250 Hz	1 pF to 100 pF	0.3%	
Low frequency response of ½" microphones (with pressure equalisation vent exposed to sound field)	2 Hz to 100 Hz	0.8 dB	Using microphone test chamber

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k=2)	Remarks
ACOUSTICS (cont'd)			
Tapping Machines -verification	**In support of BS EN ISO 16283-2:2015 & BS EN ISO 140-7:1998 (Withdrawn)**		
	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 0º to 0.6º	0.07°	
ACCELEROMETRY			Portable vibration field calibrators to documented in-house procedure TP-15 "Calibration of Vibration Calibrators"
<u>Portable vibration field calibrators</u>			
Acceleration: 10 Hz to 20 Hz 20 Hz to 80 Hz 80 Hz 80 Hz to 1 kHz 1 kHz to 2 kHz	 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}	 1.11 % 0.72 % 0.56 % 0.75 % 1.50 %	Certificate of Conformance to BS EN ISO 8041:2005 Annex A for devices with matching specification by periodic verification
Frequency: 8 Hz to 1280 Hz	 1 ms^{-2} to 100 ms^{-2}	 0.17 %	
Distortion (percentage of reading)	1 ms^{-2} to 100 ms^{-2}	1.05 %	

END