Schedule of Accreditation

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United Kingdom Accreditation Service

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Accredited to ISO/IEC 17025:2017

PASS (Portable Appliance Safety Services) Ltd

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Calibration performed by the Organisations at the locations specified below

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
Address 1 Wilson Street Thornaby Stockton-On-Tees TS17 7AR United Kingdom **Local contact** Ibrahim Ibrahim	Temperature, Electrical and Pressure	A
Address Parkburn Court Burnbank Hamilton Scotland ML3 0QQ **Local contact** Barry Atkins	Dimensional and Electrical	B

Site activities performed away from the locations listed above:

Location details	Activity	Location code
At customer's premises The customer's site or premises must be suitable for the nature of the particular calibrations undertaken and will be the subject of contract review arrangements between the laboratory and the customer.	Dimensional	C

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL			All electrical calibrations are performed as a comparison against a reference standard	A
DC RESISTANCE				
Fixed value sources for the calibration of measuring instruments	0.1 Ω 0.2 Ω 0.3 Ω 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ 1 GΩ	5.8 mΩ 41 mΩ 41 mΩ 6.0 mΩ 8.2 mΩ 490 µΩ 4.8 mΩ 49 mΩ 980 mΩ 33 Ω 3.1 kΩ 210 kΩ 12 MΩ		
For generating a stimulus that can be applied to measuring instruments also for measuring a stimulus provided by the device being calibrated	0 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 kΩ 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ 100 MΩ to 1 GΩ	17 µΩ/Ω + 59 µΩ 14 µΩ/Ω + 590 µΩ 12 µΩ/Ω + 740 µΩ 12 µΩ/Ω + 6.6 mΩ 12 µΩ/Ω + 76 mΩ 17 µΩ/Ω + 3.3 Ω 58 µΩ/Ω + 130 Ω 580 µΩ/Ω + 2.8 kΩ 0.58 % + 94 kΩ		
DC VOLTAGE				
Values can be generated for the calibration of measuring instruments	0 mV to 202 mV 202 mV to 1 V 1 V to 2.02 V 2.02 V to 10 V 10 V to 20.2 V 20.0 V to 100 V 100 V to 202 V 202 V to 1020 V	17 µV/V + 2.5 µV 10 µV/V + 3.6 µV 10 µV/V + 7.6 µV 9.8 µV/V + 43 µV 9.8 µV/V + 72 µV 14 µV/V + 430 µV 14 µV/V + 720 µV 14 µV/V + 2.8 mV		
For measurement of instrument Outputs	0 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	5.8 µV/V + 390 nV 4.6 µV/V + 430 nV 4.6 µV/V + 1.2 µV 6.9 µV/V + 54 µV 15 µV/V + 1.3 mV		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
DC CURRENT				A
Values can be generated for the calibration of measuring instruments	0 µA to 202 µA	120 µA/A + 12 nA		
	202 µA to 1 mA	58 µA/A + 35 nA		
	1 mA to 2.02 mA	58 µA/A + 49 nA		
	2.02m A to 10 mA	58 µA/A + 230 n		
	10 mA to 20.2 mA	58 µA/A + 440 nA		
	20.2 mA to 100 mA	58 µA/A + 2.3 µA		
	100 mA to 202 mA	58 µA/A + 9.0 µA		
	202 mA to 1 A	150 µA/A + 36 µA		
	1 A to 2.02 A	150 µA/A + 100 µA		
	2.02 A to 10 A	350 µA/A + 590 µA		
	10 A to 20.2 A	350 µA/A + 760 µA		
	20.2 A to 30 A	580 µA/A + 4.4 mA		
	20 A to 1500 A	0.26 % + 13 mA	Simulation with coil	
For measurement of instrument outputs	0 µA to 1 µA	24 µA/A + 48 pA		
	1 µA to 10 µA	23 µA/A + 130 pA		
	10 µA to 100 µA	23 µA/A + 950 pA		
	100 µA to 1 mA	23 µA/A + 6.0 nA		
	1 mA to 10 mA	23 µA/A + 60 nA		
	10 mA to 100 mA	40 µA/A + 630 nA		
	100 mA to 1 A	130 µA/A + 13 µA		
	1 A to 3 A	0.23 % + 750 µA		
	3 A to 5 A	0.14 % + 2.6 mA		
	5 A to 10 A	0.27 % + 4.4 mA		
AC VOLTAGE				A
Values can be generated for the calibration of measuring instruments	20 mV to 202 mV			
	10 Hz to 44 Hz	920 µV/V + 62 µV		
	45 Hz to 1 kHz	190 µV/V + 62 µV		
	1 kHz to 20 kHz	230 µV/V + 56 µV		
	20 kHz to 100 kHz	0.12 % + 84 µV		
	100 kHz to 500 kHz	0.46 % + 2.5 mV		
	202 mV to 2.02 V			
	10 Hz to 44 Hz	580 µV/V + 320 µV		
	45 Hz to 1 kHz	180 µV/V + 280 µV		
	1 kHz to 20 kHz	240 µV/V + 450 µV		
	20 kHz to 100 kHz	750 µV/V + 530 µV		
	2.02 V to 20.2 V			
	10 Hz to 44 Hz	580 µV/V + 3.0 mV		
	45 Hz to 1 kHz	180 µV/V + 2.7 mV		
	1 kHz to 20 kHz	240 µV/V + 4.4 mV		
	20 kHz to 100 kHz	690 µV/V + 5.3 mV		
	20.2 V to 202 V			
	30 Hz to 44 Hz	580 µV/V + 33 mV		
	45 Hz to 1 kHz	170 µV/V + 28 mV		
	1 kHz to 10 kHz	270 µV/V + 30 mV		
	10 kHz to 40 kHz	350 µV/V + 53 mV		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Generation (continued)	202 V to 1020 V			A
	30 Hz to 44 Hz	640 µV/V + 250 mV		
	45 Hz to 1 kHz	230 µV/V + 110 mV		
	1 kHz to 10 kHz	290 µV/V + 200 mV		
For measurement of instrument outputs	10 µV to 10 mV			
	40 Hz to 1 kHz	230 µV/V + 2.6 µV		
	1 kHz to 20 kHz	350 µV/V + 2.6 µV		
	20 kHz to 100 kHz	0.12 % + 2.6 µV		
	10 mV to 100 mV			
	40 Hz to 1 kHz	82 µV/V + 3.3 µV		
	1 kHz to 20 kHz	160 µV/V + 3.3 µV		
	100 mV to 1 V			
	20 Hz to 40 Hz	82 µV/V + 48 µV		
	40 Hz to 1 kHz	82 µV/V + 27 µV		
	1 kHz to 20 kHz	160 µV/V + 28 µV		
	20 kHz to 50 kHz	350 µV/V + 30 µV		
	50 kHz to 100 kHz	920 µV/V + 31 µV		
	1 V to 10 V			
	10 Hz to 40 Hz	82 µV/V + 510 µV		
	40 Hz to 1 kHz	82 µV/V + 270 µV		
	1 kHz to 20 kHz	160 µV/V + 270 µV		
	20 kHz to 50 kHz	350 µV/V + 310 µV		
	50 kHz to 100 kHz	920 µV/V + 320 µV		
	100 kHz to 300 kHz	0.35 % + 1.2 mV		
	300 kHz to 1 MHz	1.2 % + 3.2 mV		
	10 V to 100 V			
	10 Hz to 40 Hz	230 µV/V + 4.9 mV		
	40 Hz to 1 kHz	230 µV/V + 2.8 mV		
	1 kHz to 20 kHz	230 µV/V + 2.9 mV		
	20 kHz to 50 kHz	400 µV/V + 3.2 mV		
	50 kHz to 100 kHz	0.14 % + 3.8 mV		
	100 V to 700 V			
	10 Hz to 40 Hz	460 µV/V + 52 mV		
	40 Hz to 1 kHz	460 µV/V + 26 mV		
	1 kHz to 20 kHz	690 µV/V + 28 mV		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
AC CURRENT				A
Values can be generated for the calibration of measuring Instruments	20 µA to 202 µA *40 Hz to 1 kHz*	580 µA/A + 180 nA		
	202 µA to 2.02 mA *40 Hz to 1 kHz*	460 µA/A + 460 nA		
	2.02 mA 20.2 mA *40 Hz to 1 kHz*	400 µA/A + 4.6 µA		
	20.2 mA to 202 mA *40 Hz to 1 kHz*	400 µA/A + 46 µA		
	202 mA to 2.02 A *40 Hz to 1 kHz*	460 µA/A + 550 µA		
	2.02 A to 20 A *40 Hz to 100 Hz*	650 µA/A + 6.0 mA		
	20 A to 30 A *40 Hz to 100 Hz*	650 µA/A + 13 mA		
	20 A to 1500 A *40 Hz to 60 Hz*	0.26 % + 13 mA	Simulation using coil	
For measurement of instrument outputs	50 nA to 100 µA *100 Hz to 5 kHz*	700 µA/A + 46 nA		
	100 µA to 1 mA *100 Hz to 5 kHz*	350 µA/A + 230 nA		
	1 mA to 10 mA *10 Hz to 20 Hz* 20 Hz to 45 Hz 45 Hz to 5 kHz	 0.46 % + 2.3 µA 0.17 % + 2.3 µA 690 µA/A + 2.3 µA		
	10 mA to 100 mA *10 Hz to 20 Hz* 20 Hz to 45 Hz 45 Hz to 5 kHz	 0.17 % + 24 µA 690 µA/A + 24 µA 350 µA/A + 24 µA		
	100 mA to 1 A *10 Hz to 20 Hz* 20 Hz to 45 Hz 45 Hz to 5 kHz	 0.46 % + 240 µA 920 µA/A + 240 µA 0.12 % + 240 µA		
	1 A to 3 A *10 Hz to 5 kHz*	0.27 % + 580 µA		
	3 A to 5 A *10 Hz to 5 kHz*	0.27 % + 11 mA		
	5 A to 10 A *10 Hz to 5 kHz*	0.29 % + 11 mA		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
CAPACITANCE				A
Values can be generated for the calibration of measuring Instruments	*At 1 kHz:* 1 nF 10 nF 20 nF 50 nF 100 nF 1 µF 10 µF	 3.5 pF 31 pF 64 pF 150 pF 290 pF 4.6 nF 69 nF		
These range values can also be measured	1 pF to 100 pF 100 pF to 1000 pF 1 nF to 10 nF 10 nF to 100 nF 0.1 µF to 1 µF 1 µF to 10 µF	0.12 % + 0.12 pF 0.12 % + 0.33 pF 0.12 % + 3.1 pF 0.12 % + 31 pF 0.12 % + 310 pF 0.12 % + 0.31 nF	Comparison against LCR bridge	
INDUCTANCE Values can be generated for the calibration of measuring instruments	*At 1 kHz:* 1 mH 10 mH 100 mH 1 H	 5.9 µH 58 µH 580 µH 5.8 mH		A
These range values can also be measured	0.1 mH to 1 mH 1 mH to 10 mH 10 mH to 100 mH 0.1 H to 1 H	0.12 % + 0.39 µH 0.27 % + 3.9 µH 0.12 % + 35 µH 0.12 % + 300 µH	Comparison against LCR bridge	
FREQUENCY Value can be generated for the calibration of measuring instruments	10 MHz reference	1.0 part in to 10^{12}	Frequency may also be expressed as time; 1/f for repetitive signals, in terms of seconds or other units such as RPM.	A
For generating a stimulus that can be applied to measuring instruments also for measuring a stimulus provided by the device being calibrated	1 Hz to 30 MHz 30 MHz to 4 GHz	1.5 parts in to 10^{12} + 0.60 µHz 2.0 parts in to 10^{12}		
Rotational speed - Optical				
Measurement	10 RPM to 99.99 RPM 100 RPM to 999.9 RPM 1000 RPM to 99999 RPM	2.3 RPM 2.4 RPM 3.3 RPM		
Generation	60 RPM to 3000 RPM 3000 RPM to 60000 RPM	0.12 RPM 1.2 RPM		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
TEMPERATURE SIMULATION				A
PT 100	-200 ˚C to +800 ˚C	0.065 ˚C		
Ambient	17 ˚C to 23 ˚C	0.20 ˚C	Calibration of Cold Junction	
Reference (CJC) juncton compensation INCLUDED				
Base Thermocouples				
Type E	-200 °C to -100 °C -100 °C to 0 °C 0 °C to 1000 °C	0.22 °C 0.21 °C 0.22 °C		
Type J	-200 °C to -100 °C -100 °C to 0 °C 0 °C to 1200 °C	0.24 °C 0.21 °C 0.22 °C		
Type K	-200 °C to -100 °C -100 °C to 0 °C 0 °C to 1372 °C	0.27 °C 0.22 °C 0.24 °C		
Type N	-200 °C to -100 °C -100 °C to 0 °C 0 °C to 1300 °C	0.35 °C 0.24 °C 0.24 °C		
Type T	-200 °C to -100 °C -100 °C to 0 °C 0 °C to 400 °C	0.27 °C 0.23 °C 0.21 °C		
Noble thermocouples				
Type B	600 °C to 1820 °C	0.52 °C		
Type R	-50 °C to 0 °C 0 °C to 400 °C 400 °C to 1767 °C	0.78 °C 0.57 °C 0.36 °C		
Type S	-50 °C to 0 °C 0 °C to 400 °C 400 °C to 1767 °C	0.65 °C 0.55 °C 0.40 °C		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Temperature indicators and calibrators by electrical simulation Reference (CJC) junction compensation EXCLUDED				A
Base Thermocouples				
Type E	-200 °C to -100 °C -100 °C to 0 °C 0 °C to 1000 °C	0.22 °C 0.19 °C 0.20 °C		
Type J	-200 °C to -100 °C -100 °C to 0 °C 0 °C to 1200 °C	0.24 °C 0.19 °C 0.20 °C		
Type K	-200 °C to -100 °C -100 °C to 0 °C 0 °C to 1372 °C	0.26 °C 0.21 °C 0.22 °C		
Type N	-200 °C to -100 °C -100 °C to 0 °C 0 °C to 1300 °C	0.35 °C 0.22 °C 0.22 °C		
Type T	-200 °C to -100 °C -100 °C to 0 °C 0 °C to 400 °C	0.26 °C 0.21 °C 0.20 °C		
Noble thermocouples				
Type B	600 °C to 1820 °C	0.52 °C		
Type R	-50 °C to 0 °C 0 °C to 400 °C 400 °C to 1767 °C	0.77 °C 0.56 °C 0.35 °C		
Type S	-50 °C to 0 °C 0 °C to 400 °C 400 °C to 1767 °C	0.65 °C 0.55 °C 0.39 °C		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
EQUIPMENT FOR IEE 17TH / 18TH EDITION WIRING TESTING				
LOOP TESTERS				A
	Nominal applied resistances			
AC Resistance at 50 Hz	0.05 Ω	4.7 mΩ		
	0.10 Ω	4.8 mΩ		
	0.21 Ω	4.9 mΩ		
	0.32 Ω	5.1 mΩ		
	0.5 Ω	5.6 mΩ		
	1 Ω	8.6 mΩ		
	5 Ω	31 mΩ		
	10 Ω	59 mΩ		
	100 Ω	580 mΩ		
	1 kΩ	5.9 Ω		
CONTINUITY TESTERS				**A**
DC Resistance	20 mΩ	29 mΩ		
	200 mΩ to 2 Ω	29 mΩ		
	4 Ω	31 mΩ		
	6 Ω	34 mΩ		
	8 Ω	37 mΩ		
	10 Ω	41 mΩ		
	20 Ω	65 mΩ		
	100 Ω	290 mΩ		
	1 kΩ	2.9 Ω		
Continuity Current Measurement	10 mA	1.1 mA		
	100 mA	1.7 mA		
	200 mA	3.1 mA		
	300 mA	4.6 mA		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
INSULATION TESTERS				A
DC Resistance	10 kΩ 20 kΩ 30 kΩ 40 kΩ 60 kΩ 100 kΩ 200 kΩ 400 kΩ 600 kΩ 1 MΩ 2 MΩ 3 MΩ 4 MΩ 5 MΩ 6 MΩ 7 MΩ 8 MΩ 9 MΩ 10 MΩ 20 MΩ 30 MΩ 40 MΩ 50 MΩ 60 MΩ 70 MΩ 80 MΩ 90 MΩ 100 MΩ 200 MΩ 400 MΩ 600 MΩ 800 MΩ 1 GΩ 10 GΩ	12 Ω 23 Ω 35 Ω 46 Ω 69 Ω 120 Ω 230 Ω 460 Ω 690 Ω 1.2 kΩ 2.3 kΩ 3.5 kΩ 4.6 kΩ 58 kΩ 69 kΩ 81 kΩ 92 kΩ 100 kΩ 120 kΩ 230 kΩ 350 kΩ 460 kΩ 580 kΩ 690 kΩ 810 kΩ 930 kΩ 1.0 MΩ 1.2 MΩ 2.8 MΩ 5.6 MΩ 8.5 MΩ 11 MΩ 14 MΩ 580 MΩ			
DC Voltage	50 V 100 V 150 V 200 V 250 V 500 V 1000 V	1.1 V 1.5 V 2.0 V 2.5 V 3.0 V 5.9 V 12 V		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
EARTH BOND TESTERS				A
AC Resistance at 50 Hz	Nominal applied resistance			
	0.04 Ω	4.7 mΩ		
	0.1 Ω	4.8 mΩ		
	0.15 Ω	4.8 mΩ		
	0.27 Ω	5.0 mΩ		
	0.38 Ω	5.2 mΩ		
	0.55 Ω	5.8 mΩ		
	1 Ω	7.8 mΩ		
	5 Ω	30 mΩ		
	10 Ω	59 mΩ		
	100 Ω	580 mΩ		
	1 kΩ	5.8 Ω		
AC Current at 50 Hz	100 mA	7.3 mA		
	200 mA	7.9 mA		
	400 mA	9.9 mA		
	4 A	100 mA		
	8 A	160 mA		
	10 A	190 mA		
	20 A	440 mA		
LEAKAGE TESTERS				A
DC Current	2 mA	36 µA		
	5 mA	82 µA		
	10 mA	130 µA		
RCD TESTERS				A
RCD Trip Time	20 ms	680 µs		
	40 ms	680 µs		
	100 ms	680 µs		
	200 ms	680 µs		
	390 ms	680 µs		
	900 ms	8.1 ms		
RCD Trip Current at 50 Hz	10 mA	620 µA		
	30 mA	1.7 mA		
	90 mA	5.2 mA		
	100 mA	5.8 mA		
	110 mA	6.4 mA		
	150 mA	17 mA		
	300 mA	17 mA		
	1 A	58 mA		
	2 A	120 mA		
AC Voltage Source at 50 Hz	100 V	0.37 V		
	200 V	0.45 V		
	230 V	0.65 V		
	300 V	0.82 V		
	400 V	0.99 V		
Line Voltage Measurement	200 V to 260 V	2.4 V		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
PRESSURE			Methods consistent with EURAMET CG17. Calibration of devices with an electrical output may be undertaken.	A
Gas Pressure (Gauge)				
Calibration of pressure indicating instruments and gauges	-95 kPa to -3.5 kPa 3.5 kPa to 100 kPa 100 kPa to 2.5 MPa 2.5 MPa to 12 MPa	0.0073 % 0.0044 % 0.0044 % 0.0057 %	Calibration using deadweight testers. Absolute pressures can be generated over these ranges attracting an additional uncertainty of 7.5 Pa.	
Calibration of pressure indicating instruments and gauges	-2.4 kPa to +2.4 kPa 3.5 kPa to 100 kPa 100 kPa to 2.1 MPa -95 kPa to 0 Pa 0 Pa to 21 MPa	0.078 % + 1.3 Pa 0.004 6 % + 13 Pa 0.002 5 % + 90 Pa 0.018% + 1.9 kPa 0.014 % + 1.9 kPa	Calibration using pressure controllers.	
Gas Pressure (Absolute)				
Calibration of pressure indicating instruments and gauges	75 kPa to 115 kPa 3.5 kPa to 100 kPa 3.5 kPa to 200 kPa 3.5 kPa to 800 kPa 3.5 kPa to 2.1 MPa 3.5 kPa to 7 MPa 100 kPa to 41.4 MPa	7.5 Pa 0.0034 % + 9.5 Pa 0.0034 % + 10 Pa 0.0031 % + 140 Pa 0.0030 % + 77 Pa 0.0030 % + 840 Pa 0.0041 % + 4.8 kPa	Calibration using pressure controllers.	
Hydraulic Pressure (Gauge)				
Calibration of pressure indicating instruments and gauges	0.6 MPa to 6.0 MPa 6 MPa to 70 MPa 70 MPa to 138 MPa 138 MPa to 344 MPa	0.0062 % 0.0075 % 0.0073 % 0.0086 %	Calibration using deadweight testers. Absolute pressures can be generated over these ranges attracting an additional uncertainty of 7.5 Pa.	
TEMPERATURE				A
PRTs and Sensors with indicators	-95 ˚C to 140 ˚C 140 °C to 660 °C 140 ˚C to 660 ˚C	0.056 ˚C 0.15 °C 0.10 ˚C	Calibrations performed in a Metal block	
	-80 ˚C to 100 ˚C 100 ˚C to 150 ˚C 150 °C to 250 °C	0.019 ˚C 0.031 ˚C 0.040 °C	Calibrations performed in liquid bath	
	0 °C	0.010 °C	Ice point	
	0.01 ˚C	0.0050 ˚C	Triple point of water	
Metal block calibrators and portable liquid baths	-95 ˚C to +660 ˚C	Uncertainty as for sensor and indicator		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
HUMIDITY				A
Dew point	-20 °C to 60 °C	0.20 °C	By comparison with a chilled mirror hygrometer	
Relative humidity	Example conditions	Corresponding to dew-point and temperature range and uncertainties	By comparison with a chilled mirror hygrometer and PRTs	
	At 0 ˚C			
	5 %rh	0.16 %rh		
	50 %rh	0.85 %rh		
	90 %rh	1.5 %rh		
	At 23 ˚C			
	5 %rh to 10 %rh	0.15 %rh		
	10 %rh to 50 %rh	0.72 %rh		
	50 %rh to 95 %rh	1.2 %rh		
Relative humidity	At 60 ˚C			
	5 %rh	0.14 %rh		
	50 %rh	0.61 %rh		
	90 %rh	1.0 %rh		
TEMPERATURE IN AIR	0 ˚C to 60 ˚C	0.15 ˚C		A

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
DIMENSIONAL CALIBRATIONS	RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED			
LENGTH			NOTES 1 All linear calibrations may be given in inch units.	
Plain Plug Gauges (Parallel)	1 to 50 diameter 50 to 100 100 to 200 200 to 300	0.80 1.5 2.0 3.0 on diameter.	Comparison to gauge blocks using a length measuring machine.	B
Length Gauges, Flat and Spherical Ended (excluding Length Bars)	25 to 1000	1.0 + (8.0 x length in m)	Comparison to gauge blocks using a length measuring machine.	B
ANGLE			2 The uncertainty quoted is for the departure from flatness, straightness, parallelism or squareness, i.e., the distance separating the two parallel planes which just enclose the surface under consideration.	
Squares Blade Type	50 to 300 300 to 450	3.0 on squareness 5.0 *See* Note 2	BS 939:2007 Comparison to master square.	B
MEASURING INSTRUMENTS AND MACHINES				
Micrometers			Comparison to length standards	
External	0 to 1000	Heads 2.0 between any two points	BS 870:2008	B
Internal Micrometers	0 to 900	Setting and extension rods 1.0 + (8.0 x length in m)	BS 959:2008	B
Depth Micrometers	0 to 300		BS 6468:2008	B
Vernier, dial and digital type gauges			Comparison to length standards.	B
Calliper	0 to 1000	Overall performance 10 + (30 x length in m)	As BS 887:2008	
Height	0 to 1000	Overall performance 10 + (10 x length in m)	ISO13225:2012 and BS 1643:2008	
Depth	0 to 600	Overall performance 10 + (30 x length in m)	As BS 6365:2008	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
MEASURING INSTRUMENTS AND MACHINES (continued)				
Dial Gauges and Dial Test Indicators	0 to 50	1.0	BS 907:2008 and BS 2795:1981 using a length measuring machine.	B
Surface Plates Granite Cast Iron	160 x 100 to 4000 x 4000 Flatness of working surface: Local variation of working surface:	 1.5 + (0.80 x diagonal in m) See Note 2 2.7	BS 817:2008 and above using an electronic level and variation gauge.	B and C
Feeler Gauges	0.025 to 1.0	2.0	BS 957:2008 using a length measuring machine.	B
ELECTRICAL CALIBRATION				
DC RESISTANCE Specific values				B
Measurement	10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ 1 GΩ 10 GΩ 100 GΩ 1 T Ω	14 μΩ/Ω 9.6 μΩ/Ω 8.0 μΩ/Ω 8.8 μΩ/Ω 9.6 μΩ/Ω 24 μΩ/Ω 110 μΩ/Ω 440 μΩ/Ω 0.40 % 0.59 % 2.0 % 1.4 %	Using digital multimeter.	
Other values Measurement	0 Ω to 1 Ω 1 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 kΩ 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ 100 MΩ to 1 GΩ	66 μΩ/Ω + 2.0 μΩ 73 μΩ/Ω + 2.0 μΩ 200 μΩ/Ω + 2.0 μΩ 13 μΩ/Ω + 2.0 μΩ 14 μΩ/Ω 76 μΩ/Ω 37 μΩ/Ω 150 μΩ/Ω 0.13 % 0.14 %	Using digital multimeter.	B

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
DC RESISTANCE (continued)				B
Generation			Using multifunction calibrator or decade resistance box.	
Specific values	10 Ω	6.2 mΩ		
	100 Ω	8.0 mΩ		
	1 kΩ	28 mΩ		
	10 kΩ	160 mΩ		
	100 kΩ	2.9 Ω		
	1 MΩ	45 Ω		
	10 MΩ	1.3 kΩ		
	100 MΩ	260 kΩ		
DC VOLTAGE				B
Measurement				
Specific values	100 mV	11 µV/V	Using digital multimeter.	
	1 V	9.4 µV/V		
	10 V	9.4 µV/V		
	100 V	12 µV/V		
	1000 V	12 µV/V		
Other values	0 mV to 100 mV	72 µV/V + 2.0 µV	Using digital multimeter.	
	100 mV to 1 V	10 µV/V + 2.0 µV		
	1 V to 10 V	9.5 µV/V + 2.0 µV		
	10 V to 100 V	19 µV/V		
	100 V to 1000 V	12 µV/V		
	1 kV to 20 kV	0.47 kV	Using high voltage divider.	
	20 kV to 30 kV	0.35 %		
Generation	0 mV to 200 mV	18 µV/V + 3.0 µV	Using multifunction calibrator.	
	200 mV to 2 V	11 µV/V + 5.0 µV		
	2 V to 20 V	10 µV/V + 50 µV		
	20 V to 200 V	14 µV/V + 530 µV		
	200 V to 1025 V	14 µV/V + 4.0 mV		
DC CURRENT				B
Measurement				
Specific values	1 µA	45 µA/A	Using digital multimeter.	
	10 µA	25 µA/A		
	100 µA	24 µA/A		
	1 mA	24 µA/A		
	10 mA	24 µA/A		
	100 mA	41 µA/A		
	1 A	87 µA/A		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
DC CURRENT (continued)				B
Measurement (continued)				
Other values	0 μA to 1 μA	470 pA	Using digital multimeter.	
	1 μA to 10 μA	120 μA/A		
	10 μA to 100 μA	96 μA/A		
	100 μA to 1 mA	63 μA/A		
	1 mA to 10 mA	64 μA/A		
	10 mA to 100 mA	71 μA/A		
	100 mA to 1 A	180 μA/A		
Generation	0 μA to 200 μA	0.020 % + 12 nA	Using multifunction calibrator.	B
	200 μA to 2 mA	0.010 % + 1.2 μA		
	2 mA to 20 mA	0.010 % + 12 μA		
	20 mA to 200 mA	0.040 % + 3.3 μA		
	200 mA to 2 A	0.020 % + 120 μA		
	2 A to 20 A	0.040 % + 2.0 mA		
	20 A to 30 A	0.060 % + 2.0 mA		
	30 to 1000 A	0.75 % + 1.4 mA	For the calibration of clamp on ammeters and similar devices, using multi-turn method.	
AC VOLTAGE				B
Measurement			Using digital multimeter.	
Specific values	*At 1 kHz*			
	10 mV	190 μV/V		
	100 mV	73 μV/V		
	40 Hz to 1 kHz			
	1 V	64 μV/V		
	10 V	65 μV/V		
	100 V	160 μV/V		
	700 V	310 μV/V		
	1 kHz to 100 kHz			
	1 V	620 μV/V		
	10 V	620 μV/V		
	100 V	930 μV/V		
Other values	*At 1 kHz*		Using digital multimeter.	B
	1 mV to 10 mV	0.090 %		
	10 mV to 100 mV	0.020 %		
	100 mV to 1 V	0.020 %		
	40 Hz to 1 kHz			
	1 mV to 10 mV	0.13 %		
	10 mV to 100 mV	0.025 %		
	100 mV to 1 V	0.025 %		
	1 V to 10 V	0.025 %		
	10 V to 100 V	0.033 %		
	100 V to 700 V	0.052 %		
	1 kHz to 100 kHz			
	1 V to 10 V	0.095 %		
	10 V to 100 V	0.14 %		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
AC VOLTAGE (continued)				B
Measurement (continued)	*At 50 Hz*			
	700 V to 20 kV	1.2 kV	Using high voltage divider.	
	20 kV to 28 kV	1.6 kV		
Generation	*45 Hz to 20 kHz*			
	10 mV to 200 mV	0.023 % + 20 µV	Using multifunction calibrator.	
	200 mV to 2 V	0.024 % + 260 µV		
	2 V to 20 V	0.024 % + 2.2 mV		
	20 V to 200 V	0.035 % + 37 mV		
	200 V to 1020 V	0.35 % + 250 mV		
AC CURRENT				B
Measurement Specific Values	*At 1 kHz*		Using digital multimeter.	
	100 µA	0.056 %		
	1 mA	0.051 %		
	45 Hz to 1 kHz			
	10 mA	0.050 %		
	100 mA	0.050 %		
	1 A	0.080 %		
Other values	*At 1 kHz*		Using digital multimeter.	
	5 µA to 100 µA	0.24 %		
	100 µA to 1 mA	0.16 %		
	45 Hz to 1 kHz			
	5 µA to 100 µA	0.36 %		
	100 µA to 1 mA	0.25 %		
	1 mA to 10 mA	0.24 %		
	10 mA to 100 mA	0.24 %		
	100 mA to 1 A	0.26 %		
Generation			Using multifunction calibrator.	
	45 Hz to 1 kHz			
	20 µA to 200 µA	0.090 % + 180 nA		
	200 µA to 2 mA	0.070 % + 490 µA		
	2 mA to 20 mA	0.50 % + 4.0 µA		
	20 mA to 200 mA	0.50 % + 36 µA		
	200 mA to 2 A	0.070 % + 340 µA		
	2 A to 30 A	0.35 % + 6.8 mA		
	30 A to 1000 A	0.83 % + 6.8 mA	For the calibration of clamp on ammeters and similar devices, using multi-turn method.	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
FREQUENCY				
	1 Hz to 1 MHz	21 in 10^8 + 2.0 mHz	Using frequency counter.	B
	1 MHz to 2.1 GHz	21 in 10^8		
Tachometer calibration	10 rpm to 50000 rpm	1.2 rpm	Using optical technique.	
Elapsed time	0 ms to 390 ms	1.0 ms	Using counter timer.	B
	391 ms to 100 s	8.0 ms		
17TH EDITION TYPE EQUIPMENT				
Earth Loop	0.05 Ω	10 mΩ	Using dedicated calibrator.	B
	0.1 Ω	11 mΩ		
	0.22 Ω	8.0 mΩ		
	0.33 Ω	8.0 mΩ		
	0.5 Ω	8.0 mΩ		
	1 Ω	10 mΩ		
	5 Ω	30 mΩ		
	10 Ω	59 mΩ		
	100 Ω	580 mΩ		
	1 kΩ	5.8 mΩ		
RCD testers				B
Trip current	*At 50 Hz*			
	3 mA to 10 mA	620 µA	Up to 5 seconds.	
	10 mA to 100 mA	5.8 mA		
	100 mA to 1 A	59 mA		
	1 A to 3 A	120 mA		
Trip Time	*At 30 mA, 50 Hz*			
	10 ms to 390 ms	1.0 ms		
	390 ms to 1 s	8.1 ms		
Earth leakage current	0.2 mA to 7.7 mA	15 µA		B
PAT Testers				
Earth bond current	*At 50 Hz*			
	100 mA	8.0 mA		B
	100 mA to 10 A	190 mA		
	10 A to 30 A	520 mA		
Earth Bond resistance				B
Nominal values	0.05 Ω	7.5 mΩ		
	0.1 Ω	7.5 mΩ		
	0.22 Ω	7.6 mΩ		
	0.33 Ω	7.7 mΩ		
	0.5 Ω	8.0 mΩ		
	1 Ω	9.5 mΩ		
	5 Ω	30 mΩ		
	10 Ω	58 mΩ		
	100 Ω	580 mΩ		
	1 kΩ	5.8 Ω		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
17TH EDITION TYPE EQUIPMENT (continued)				B
Insulation resistance Nominal source values	100 kΩ 500 kΩ 1 MΩ 5 MΩ 10 MΩ 20 MΩ 50 MΩ 100 MΩ	12 kΩ 12 kΩ 12 kΩ 21 kΩ 37 kΩ 72 kΩ 180 kΩ 350 kΩ		
Load Tests	3 kVA	2.5 %		B
Flash tests	*At 50 Hz* 700 V to 1.9 kV	 1.5 % + 5.0 V		
ELECTRICAL SIMULATION OF TEMPERATURE				B
Ambient temperature CJC source CJC measurement	 17 °C to 23 °C	 0.11 °C 0.32 °C	In support of cold junction measurements.	
Temperature simulators and indicators, calibration by electrical simulation				
Base metal thermocouples				
Type K	-200 °C to -100 °C -100 °C to +1300 °C	0.32 °C 0.30 °C	Excluding cold junction compensation.	
	-200 °C to -100 °C -100 °C to +1300 °C	0.39 °C 0.38 °C	Including cold junction compensation.	
Type J	-210 °C to -100 °C -100 °C to +1200 °C	0.32 °C 0.32 °C	Excluding cold junction compensation.	
	-210 °C to -100 °C -100 °C to +1200 °C	0.37 °C 0.39 °C	Including cold junction compensation.	
Type N	-200 °C to -100 °C -100 °C to +1300 °C	0.49 °C 0.29 °C	Excluding cold junction compensation.	
	-200 °C to -100 °C -100 °C to +1300 °C	0.54 °C 0.37 °C	Including cold junction compensation.	
Type T	-250 °C to -150 °C -150 °C to +400 °C	0.71 °C 0.14 °C	Excluding cold junction compensation.	
	-250 °C to -150 °C -150 °C to +400 °C	0.75 °C 0.27 °C	Including cold junction compensation.	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Noble metal thermocouples	-			
Type B	600 °C to 800 °C 800 °C to 1820 °C	0.85 °C 0.76 °C	Excluding cold junction compensation.	
	600 °C to 800 °C 800 °C to 1820 °C	0.88 °C 0.79 °C	Including cold junction compensation.	
Type R, Type S	0 °C to 250 °C 250 °C to 1760 °C	0.93 °C 0.60 °C	Excluding cold junction compensation.	
	0 °C to 250 °C 250 °C to 1760 °C	0.96 °C 0.64 °C	Including cold junction compensation.	
END				

Appendix - Calibration and Measurement Capabilities

Introduction

The definitive statement of the accreditation status of a calibration laboratory is the Accreditation Certificate and the associated Schedule of Accreditation. This Schedule of Accreditation is a critical document, as it defines the measurement capabilities, ranges and boundaries of the calibration activities for which the organisation holds accreditation.

Calibration and Measurement Capabilities (CMCs)

The capabilities provided by accredited calibration laboratories are described by the Calibration and Measurement Capability (CMC), which expresses the lowest measurement uncertainty that can be achieved during a calibration. If a particular device under calibration itself contributes significantly to the uncertainty (for example, if it has limited resolution or exhibits significant non-repeatability) then the uncertainty quoted on a calibration certificate will be increased to account for such factors.

The CMC is normally used to describe the uncertainty that appears in an accredited calibration laboratory's schedule of accreditation and is the uncertainty for which the laboratory has been accredited using the procedure that was the subject of assessment. The measurement uncertainty is calculated according to the procedures given in the GUM and is normally stated as an expanded uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of $k = 2$. An accredited laboratory is not permitted to quote an uncertainty that is smaller than the published measurement uncertainty in certificates issued under its accreditation.

Expression of CMCs - symbols and units

It should be noted that the percentage symbol (%) represents the number 0.01. In cases where the measurement uncertainty is stated as a percentage, this is to be interpreted as meaning percentage of the measurand.
Thus, for example, a measurement uncertainty of 1.5 % means $1.5 \times 0.01 \times q$, where q is the quantity value.

The notation Q[a, b] stands for the root-sum-square of the terms between brackets: $Q[a, b] = [a^2 + b^2]^{1/2}$