Schedule of Accreditation

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Accredited to ISO/IEC 17025:2017

Universal Instrument 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 Standards Laboratory 14 Rose Way, Blaby, Leicester LE8 6PA	**Local contact** Hazel Horn Tel: +44 (0)116-275 0123 Fax: +44 (0)116-275 0262 Email: sales@uiscal.co.uk Website: www.uiscal.com	Dimensional Electrical Pressure Temperature Humidity Torque	Permanent Laboratory

Site activities performed away from the locations listed above:

Location details		Activity	Location code
Calibrations may be performed in an air-conditioned vehicle taken to the customers' sites or in suitable areas within the customers' premises. The customers' 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.	Contact as above	Dimensional Electrical Pressure Temperature	Site Calibration

DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DIMENSIONAL CALIBRATION				Permanent Laboratory
RANGES IN MILLIMETRES AND UNCERTAINTIES IN MICROMETRES UNLESS STATED OTHERWISE				
LENGTH				
Plain plug gauges (parallel) Cylindrical setting standards and rollers	1 to 10 10 to 50 50 to 100 100 to 150 150 to 200	1.0 1.0 1.5 2.0 2.0	By comparison with reference standards	
Plain ring gauges (parallel)	2 to 10 10 to 50 50 to 100 100 to 200	1.2 1.5 2.0 3.0		
Length gauges, flat and spherical ended	0 to 1000	1.0 + (8.0 x length in m)		
Measuring Instruments				
Micrometers External	BS 870:2008 0 to 600	Heads: 2.0 between any points Setting and extension rods: 1.0 + (8.0 x length in m)		
Internal	BS 959:2008 0 to 900			
Depth	BS 6468:2008 0 to 300			
Micrometer heads	BS 1734:1951 0 to 50	1.0		
Bore micrometers (three points)	0 to 150 diameter	Overall performance 5.0		
Vernier/digital gauges Caliper,	BS 887:2008 0 to 1000	Overall performance 10 + (30 x length in m)		
Height	As ISO 13225:2012 BS 1643:2008 (withdrawn) 0 to 1000	15 + (10 x length in m)		
Depth	BS 6365:2008 0 to 600	10 + (30 x length in m)		
Dial gauges and dial test indicators	BS 907:2008 and BS 2795:1981 0 to 50	1.0		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RANGES IN MILLIMETRES AND UNCERTAINTIES IN MICROMETRES UNLESS STATED OTHERWISE				Permanent Laboratory
LENGTH (continued)				
Height setting micrometer	0 to 300	Heads 1.0 Stepped column 1.0 + (5.0 x length in m) Overall performance 3.0		
Riser blocks for above	150 300	2.5 3.0		
Protractors	BS 1685:2008 0º to 360º	2.0 minutes of arc 6.0 minutes of arc	1 minute of arc resolution instruments 5 minute of arc resolution instruments	
Feeler gauges	BS 957:2008 0.02 to 1.00	3.0		
Receiver, position and profile gauges, jigs and fixtures	0 to 500 x 400 x 400 0º to 360º	3.0 + (10 x length in m) µm 2 minutes of arc See Note 1	Notes 1. Features and associated parts of these gauges / fixtures can be measured to the uncertainties given for equivalent items listed in this schedule.	
Profile projectors	10 to 100 magnifications Angular Linear 0 to 50 Linear 50 to 300	125 at the screen, 5.0 minutes of arc 2.5 4.0		Site Calibration
TORQUE CALIBRATION				Permanent Laboratory
Wrenches and Screwdrivers	BS EN 6789-2:2017 0.1 N·m to 1000 N·m BS EN 6789:2003 (withdrawn) 0.1 N·m to 1000 N·m	1.0 % 1.6 %	The uncertainty quoted is for both the application of the calibration torque and the characteristics of the device being calibrated. Calibrations may also be given in lbf·in and lbf·ft.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL CALIBRATION				Permanent Laboratory
DC RESISTANCE				
Measurement	0 Ω to 20 Ω 20 Ω to 200 Ω 200 Ω to 2 kΩ 2 kΩ to 20 kΩ 20 kΩ to 200 kΩ 200 kΩ to 2 MΩ 2 MΩ to 20 MΩ 20 MΩ to 200 MΩ	25 ppm + 20 μΩ 16 ppm + 60 μΩ 15 ppm + 0.60 mΩ 15 ppm + 6.0 mΩ 16 ppm + 60 mΩ 27 ppm + 1.4 Ω 50 ppm + 80 Ω 0.040 % + 9.0 kΩ	Using digital multimeter.	
Generation			Known values of DC resistance for application to resistance measuring instruments, in a two terminal or four terminal configuration, as appropriate.	
Specific Values	100 μΩ 1 mΩ, 10 mΩ and 100 mΩ 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ	0.030 % 0.010 % 6.0 ppm 6.0 ppm 6.0 ppm 6.0 ppm 6.0 ppm 6.0 ppm 15 ppm 15 ppm 140 ppm		
	100 MΩ 1 GΩ 10 GΩ 100 GΩ 1 TΩ	0.050 % 0.50 % 0.50 % 2.0 % 3.0 %	Applied voltages in the range 100 V to 500 V	
	10 MΩ 100 MΩ 1 GΩ 10 GΩ	0.60 % 0.60 % 0.60 % 0.65 %	Applied voltages up to 5 kV	
DC VOLTAGE				
Voltage Reference Values	1 V 10 V	3.1 ppm 2.5 ppm	For calibration of voltage references of suitable stability	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC VOLTAGE (continued)				Permanent Laboratory
Measurement	0 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1000 V 1 kV to 15 kV 15 kV to 40 kV	12 ppm + 1.0 μV 9.0 ppm + 1.0 μV 8.0 ppm + 8.0 μV 13 ppm + 80 μV 13 ppm + 0.80 mV 0.30 % + 1.0 V 0.30 % + 10 V	Using digital multimeter. Using high voltage divider. Generation of DC voltages for this range can also be undertaken.	
Generation	0 mV to 220 mV 220 mV to 2.2 V 2.2 V to 22 V 22 V to 220 V 220 V to 1100 V	12 ppm + 1.0 μV 10 ppm+ 1.5 μV 10 ppm + 10 μV 10 ppm + 120 μV 12 ppm + 0.80 mV	Known values of DC voltage for application to voltage measuring instruments.	
DC CURRENT				
Measurement	0 mA to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 3 A 3 A to 10 A 10 A to 100 A	19 ppm + 0.16 nA 20 ppm + 13 nA 20 ppm + 0.16 μA 60 ppm + 13 μA 100 ppm + 16 μA 80 ppm + 160 μA	Using digital multimeter and current shunts	
Generation	10 μA to 220 μA 220 μA to 2.2 mA 2.2 mA to 22 mA 22 mA to 220 mA 220 mA to 2.2 A 2.2 A to 100 A	70 ppm + 11 nA 70 ppm + 12 nA 70 ppm + 120 nA 100 ppm + 1.2 μA 180 ppm + 32 μA 300 ppm + 21 mA	Known values of DC current for application to current measuring instruments.	
	100 A to 2 kA	0.030 % + 100 mA	Using multi-turn coil technique; for the calibration of clamp-on ammeters.	
AC RESISTANCE				
Specific Values	*50 Hz* 0.2 Ω, 0.5 Ω, 1 Ω, 5 Ω, 47 Ω, 100 Ω and 1 kΩ	0.10 % + 0.010 Ω	For the calibration of loop testers	
	1 Ω *100 Hz to 1 kHz* *10 kHz*	 0.40 % 0.60 %	 Resistance values available for the calibration of resistance measuring devices using four terminal pair connections.	
	10 Ω *100 Hz to 1 kHz* *10 kHz*	 0.25 % 0.40 %		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC RESISTANCE (continued)				Permanent Laboratory
Specific values (continued)	100 Ω			
	100 Hz to 1 kHz	0.15 %		
	10 kHz	0.40 %		
	1 kΩ			
	100 Hz to 1 kHz	0.15 %		
	10 kHz	0.20 %		
	10 kΩ			
	100 Hz to 1 kHz	0.15 %		
	10 kHz	0.20 %		
	100 kΩ			
	100 Hz to 10 kHz	0.20 %		
	1 MΩ			
	100 Hz to 10 kHz	0.30 %		
	10 MΩ			
	100 Hz to 1 kHz	1.3 %		
Other Values	10 mΩ to 1.1 Ω			
	50 Hz	0.10 % + 0.50 mΩ		
AC VOLTAGE				
Measurement	20 mV to 200 mV		Using digital multimeter.	
	50 Hz to 10 kHz	290 ppm + 4.0 μV		
	10 kHz to 30 kHz	530 ppm + 8.0 μV		
	30 kHz to 100 kHz	930 ppm + 20 μV		
	200 mV to 2 V			
	50 Hz to 10 kHz	200 ppm + 20 μV		
	10 kHz to 30 kHz	300 ppm + 40 μV		
	30 kHz to 100 kHz	620 ppm + 0.20 mV		
	2 V to 20 V			
	50 Hz to 10 kHz	190 ppm + 0.20 mV		
	10 kHz to 30 kHz	300 ppm + 0.40 mV		
	30 kHz to 100 kHz	620 ppm + 2.0 mV		
	20 V to 200 V			
	50 Hz to 10 kHz	200 ppm + 2.0 mV		
	10 kHz to 30 kHz	310 ppm + 4.0 mV		
	30 kHz to 100 kHz	650 ppm + 20 mV		
	200 V to 300 V			
	50 Hz to 10 kHz	200 ppm + 20 mV		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC VOLTAGE (continued)				Permanent Laboratory
Measurement (continued)	*50 Hz to 10 kHz* 300 V to 1000 V 500 V 1000 V	 0.15% + 20 mV 250 ppm 500 ppm		
	At 50 Hz: 1 kV to 5 kV 5 kV to 28 kV	 1.3 % + 10 V 1.2 % + 40 V	Using high voltage divider. Generation of AC voltages over these ranges can also be undertaken.	
Generation	100 mV to 2.2 V *40 Hz to 20 kHz* *20 kHz to 500 kHz*	 110 ppm + 9.0 μV 0.14 % + 410 μV	Known values of AC voltage for application to voltage measuring instruments.	
	2.2 V to 22 V *40 Hz to 20 kHz* *20 kHz to 500 kHz*	 110 ppm + 82 μV 0.20 % + 6.0 mV		
	22 V to 220 V *40 Hz to 20 kHz* *20 kHz to 50 kHz*	 120 ppm + 2.0 mV 0.030 % + 5.0 mV		
	220 V to 1000 V *50 Hz to 1 kHz*	 120 ppm + 5.0 mV		
AC CURRENT				
Measurement	20 μA to 1 mA *50 Hz to 1 kHz*	 0.040 % + 33 nA	Using digital multimeter and current shunts.	
	1 mA to 10 mA *50 Hz to 1 kHz*	 0.040 % + 0.33 μA		
	10 mA to 100 mA *50 Hz to 1 kHz*	 0.030 % + 3.3 μA		
	100 mA to 3 A *50 Hz to 1 kHz*	 0.030 % + 330 μA		
	3 A to 10 A *50 Hz to 1 kHz*	 0.030 % + 330 μA		
	10 A to 100 A *50 Hz to 400 Hz*	 0.030 % + 3.3 mA		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC CURRENT (continued)				Permanent Laboratory
Generation	100 μA to 220 μA *50 Hz to 1 kHz*	250 ppm + 20 nA	Known values of AC current for application to current measuring instruments.	
	220 μA to 2.2 mA *50 Hz to 1 kHz*	270 ppm + 40 nA		
	2.2 mA to 22 mA *50 Hz to 1 kHz*	200 ppm + 410 nA		
	22 mA to 220 mA *50 Hz to 1 kHz*	400 ppm + 4.0 μA		
	220 mA to 2.2 A *50 Hz to 1 kHz* *1 kHz to 5 kHz* *5 kHz to 10 kHz*	0.080 % + 40 μA 0.090 % + 100 μA 1.1 % + 200 μA		
	2.2 A to 100 A *50 Hz to 400 Hz*	0.050 %		
	100 A to 1 kA *50 Hz*	0.20 % + 120 mA	Using multi turn coil technique; for the calibration of clamp-on ammeters and Rogowski coils.	
AC POWER	1 W to 100 kW *50 Hz to 400 Hz*	0.15 %	Using phantom load technique. The capabilities are for unity power factor only. Voltages will be in the range 10 V to 1000 V and currents will be in the range 100 mA to 1000 A. The applied frequency is limited to 50 Hz at currents above 100 A.	
	100 kW to 1 MW *50 Hz*	0.25 %		
CAPACITANCE				
Generation	*At 1 kHz* 100 pF 1 nF 10 nF 100 nF 1 μF	 0.15 % 0.030 % 0.030 % 0.030 % 0.030 %	Known values of capacitance for application to capacitance measuring instruments.	
Measurement	*At 1 kHz, 1 V* 10 pF to 1 μF	0.68 % + 3 digits	Using capacitance meter with a 3½ digit display	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
INDUCTANCE	*At 1 kHz* 10 μH 100 μH 1 mH 10 mH 100 mH 1 H	 0.60 % 0.10 % 0.10 % 0.10 % 0.10 % 0.10 %	For the calibration of inductance measuring devices	Permanent Laboratory
FREQUENCY				
Measurement	0.1 Hz to 2 GHz	2.0 in 10^6	Using counter timer. The periodic time of repetitive waveforms may be expressed in terms of 1/f or as events per unit time such as RPM.	
Generation	0.01 Hz to 2.4 GHz	2.0 in 10^9	Using frequency synthesiser.	
TIME INTERVAL				
Single events	5 ms to 50 ms 50 ms to 2.2 s	0.20 ms 2.5 ms	For the calibration of RCD testers	
Stopwatches (Mechanical)	5 s to 3 hours 3 hours to 30 hours	0.25 s 0.50 s	By comparison with calibrated counter timer.	
Temperature indicators, calibration by electrical simulation				
Base metal thermocouples	-200 °C to +1600 °C	0.20 °C	including cold junction compensation	
Noble metal thermocouples	-50 °C to +1760 °C	0.25 °C	including cold junction compensation	
Resistance thermometers (Pt 100)	-200 °C to +800 °C	0.030 °C		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC RESISTANCE				Site Calibration
Measurement	0 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 300 MΩ	120 ppm + 4.6 mΩ 120 ppm + 15 mΩ 120 ppm + 150 mΩ 120 ppm + 1.5 Ω 120 ppm + 15 Ω 450 ppm + 500 Ω 950 ppm + 60 kΩ 2.1 % + 0.10 MΩ	Using digital multimeter.	
Generation				
Specific values	10 MΩ 100 MΩ 1 GΩ 10 GΩ	0.60 % 0.60 % 0.60 % 1.0 %	Applied voltages up to 5 kV	
Other values	0 Ω to 11 Ω 11 Ω to 33 Ω 33 Ω to 330 Ω 330 Ω to 3.3 kΩ 3.3 kΩ to 33 kΩ 33 kΩ to 330 kΩ 330 kΩ to 3.3 MΩ 3.3 MΩ to 11 MΩ 11 MΩ to 33 MΩ 33 MΩ to 110 MΩ	150 ppm + 6.2 mΩ 160 ppm + 12 mΩ 120 ppm + 12 mΩ 120 ppm + 72 mΩ 120 ppm + 0.72 Ω 150 ppm + 7.2 Ω 180 ppm + 67 Ω 650 ppm+ 670 Ω 0.13% + 10 kΩ 0.55% + 11 kΩ	Known values of DC resistance for application to resistance measuring instruments.	
DC VOLTAGE				
Measurement	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	60 ppm + 5.0 μV 50 ppm + 10 μV 50 ppm + 70 μV 60 ppm + 0.80 mV 60 ppm + 13 mV	Using digital multimeter.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC VOLTAGE (continued)				Site Calibration
Generation	0 mV to 330 mV 330 mV to 3.3 V 3.3 V to 33 V 33 V to 330 V 330 V to 1020 V	70 ppm + 4.0 μV 60 ppm + 6.0 μV 60 ppm + 60 μV 65 ppm + 0.60 mV 65 ppm + 2.0 mV	Known values of DC voltage for application to voltage measuring instruments.	
DC CURRENT				
Measurement	0 mA to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 3 A 3 A to 10 A 10 A to 100 A	0.015 % + 12 nA 0.010 % + 20 nA 0.010 % + 1.6 μA 0.010 % + 110 μA 0.012 % + 160 μA 0.012 % + 1.6 mA	Using digital multimeter.	
Generation	0 mA to 3.3 mA 3.3 mA to 33 mA 33 mA to 330 mA 330 mA to 2.2 A 2.2 A to 11 A 11 A to 100 A	160 ppm + 0.060 μA 130 ppm + 0.31 μA 130 ppm + 4.0 μA 400 ppm + 45 μA 710 ppm + 340 μA 300 ppm + 21 mA	Known values of DC current for application to current measuring instruments.	
	100 A to 1 kA	0.030 % + 21 mA	Using multi-turn coil technique; for the calibration of clamp-on ammeters.	
AC RESISTANCE	0.2 Ω to 1 kΩ *50 Hz*	0.10 % + 0.50 mΩ	For the calibration of loop testers	
AC VOLTAGE				
Measurement	10 mV to 100 mV *45 Hz to 20 kHz* *20 kHz to 50 kHz*	 0.080 % + 50 μV 0.30 % + 450 μV	Using digital multimeter.	
	100 mV to 1 V *45 Hz to 20 kHz* *20 kHz to 50 kHz*	 0.080 % + 60 μV 0.25 % + 100 μV		
	1 V to 10 V *45 Hz to 20 kHz* *20 kHz to 50 kHz*	 0.080 % + 4.0 mV 0.14 % + 6.0 mV		
	10 V to 100 V *45 Hz to 20 kHz* *20 kHz to 50 kHz*	 0.080 % + 35 mV 0.25 % + 210 mV		
	200 V to 750 V *45 Hz to 1 kHz*	 0.080 % + 250 mV		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC VOLTAGE (continued)				Site Calibration
Generation	3 mV to 33 mV *50 Hz to 10 kHz*	0.18 % + 24 μV	Known values of AC voltage for application to voltage measuring instruments.	
	33 mV to 330 mV *50 Hz to 10 kHz*	0.065 % + 24 μV		
	330 mV to 3.3 V *50 Hz to 10 kHz* *10 kHz to 50 kHz*	0.045 % + 80 μV 0.18 % + 0.40 mV		
	3.3 V to 33 V *50 Hz to 10 kHz* *10 kHz to 50 kHz*	0.055 % + 0.80 mV 0.23 % + 7.0 mV		
	33 V to 330 V *50 Hz to 1 kHz* *1 kHz to 10 kHz*	0.065 % + 9.0 mV 0.10 % + 18 mV		
	330 V to 1020 V *50 Hz to 1 kHz*	0.065 % + 90 mV		
AC CURRENT				
Measurement	*50 Hz to 100 Hz* 3 mA to 30 mA 30 mA to 100 mA 100 mA to 1 A 1 A to 3 A	 0.60 % + 12 μA 0.60 % + 120 μA 0.19 % + 0.46 mA 0.24 % + 0.66 mA	Using digital multimeter.	
	100 mA to 2 A *50 Hz to 100 Hz* *100 Hz to 1 kHz*	 0.60 % + 1.0 mA 0.50 % + 1.0 mA		
	2 A to 10 A *50 Hz to 60 Hz*	1.1 % + 12 mA		
	10 A to 100 A *50 Hz to 60 Hz*	0.13 % + 40 mA		
Generation	0.3 mA to 3.3 mA *50 Hz to 1 kHz*	0.14 % + 0.32 μA	Known values of AC current for application to current measuring instruments.	
	3.3 mA to 33 mA *50 Hz to 1 kHz*	0.13 % + 3.2 μA		
	33 mA to 330 mA *50 Hz to 1 kHz*	0.13 % + 32 μA		
	330 mA to 2.2 A *50 Hz to 1 kHz*	0.14 % + 320 μA		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC CURRENT (continued)				Site Calibration
Generation (continued)	2.2 A to 11 A *50 Hz to 400 Hz*	0.14 % + 2.1 mA		
	11 A to 100 A *50 Hz to 400 Hz*	0.30 %		
	100 A to 1 kA *50 Hz*	0.20 % + 120 mA	Using multi turn coil technique; for the calibration of clamp-on ammeters and Rogowski coils.	
FREQUENCY				
Measurement and generation	0.1 Hz to 160 MHz	3.0 in 10^6	Using counter timer. The periodic time of repetitive waveforms may be expressed in terms of 1/f or as events per unit time such as RPM.	
Generation	0.02 Hz to 500 MHz	0.010 %		
TIME INTERVAL				
Single events	5 ms to 50 ms 50 ms to 2.2 s	0.20 ms 2.5 ms	For the calibration of RCD testers	
Stopwatches (Mechanical)	0 s to 3 hours 3 hours to 30 hours	0.25 s 0.50 s	By comparison with calibrated counter timer.	
Temperature indicators, calibration by electrical simulation				
Base metal thermocouples	-200 °C to +1600 °C	0.57 °C	Including cold junction compensation	
Noble metal thermocouples	-50 °C to +1760 °C	1.4 °C	Including cold junction compensation	
Resistance thermometers (Pt 100)	-200 °C to 800 °C	0.15 °C		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
PRESSURE CALIBRATION			Methods consistent with EURAMET CG17. Calibrations of devices with an electrical output may be undertaken	Permanent Laboratory
Gas pressure (gauge)				
Calibration of pressure indicating instruments and gauges.	-100 kPa to -7 kPa -7 kPa to -250 Pa -250 Pa to +250 Pa 250 Pa to +7 kPa 7 kPa to 70 kPa 70 kPa to 700 kPa 700 kPa to 4.3 MPa 4.3 MPa to 10 MPa	58 ppm + 10 Pa 68 ppm + 5.0 Pa 0.81 Pa 68 ppm + 5.0 Pa 58 ppm + 11 Pa 66 ppm 0.013 % + 33 Pa 0.15 % + 6.5 kPa		
Gas pressure (absolute)				
Calibration of pressure indication instruments and gauges.	30 Pa to 75 kPa 75 kPa to 120 kPa 120 kPa to 170 kPa 170 kPa to 800 kPa 800 kPa to 4.3 MPa	58 ppm + 16 Pa 12 Pa 58 ppm + 16 Pa 66 ppm + 12 Pa 0.013 % + 35 Pa		
Hydraulic pressure (gauge)				
Calibration of pressure indicating instruments and gauges.	0 kPa to 54 kPa 54 kPa to 60 kPa 60 kPa to 600 kPa 600 kPa to 6 MPa 6 MPa to 70 MPa	0.030 % + 110 Pa 0.032 % + 220 Pa 0.0066 % + 29 Pa 0.013 % 0.012 %		
Hydraulic Pressure (absolute)				
Calibration of pressure indicating instruments and gauges.	170 kPa to 800 kPa 800 kPa to 6.1 MPa 6.1 MPa to 70 MPa	0.0066 % + 40 Pa 0.013 % + 11 Pa 0.013 % + 11 Pa		
Gas pressure (gauge)				Site Calibration
Calibration of pressure indicating instruments and gauges.	-100 kPa to -2.5 kPa -2.5 kPa to -200 Pa -200 Pa to +200 Pa 200 Pa to 2.5 kPa 2.5 kPa to 200 kPa 200 kPa to 2 MPa 2 MPa to 7 MPa	110 Pa 12 Pa 2.7 Pa 12 Pa 95 Pa 1.5 kPa 0.013% + 7.0 kPa	Absolute pressures within these ranges can also be generated, subject to an additional uncertainty of 90 Pa.	
Hydraulic pressure (gauge)				
Calibration of pressure indicating instruments and gauges.	0 MPa to 20 MPa 20 MPa to 70 MPa	14 kPa 0.053 % + 22 kPa		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
TEMPERATURE CALIBRATION				
Liquid-in-glass thermometers	Ice-point (0 °C) -80 °C to +5 °C 5 °C to 50 °C 50 °C to 250 °C	0.013 °C 0.020 °C 0.016 °C 0.024 °C	In stirred liquid bath	
Resistance thermometers	Nitrogen boiling point (-196 °C) Ice point (0 °C) Triple point of water (0.01 °C) -80 °C to 5 °C 5 °C to 50 °C 50 °C to 250 °C 250 °C to 660 °C	0.013 °C 0.012 °C 0.005 °C 0.010 °C 0.015 °C 0.014 °C 0.095 °C	-196 & 0 FP up to 650 in stirred bath Above 650 in Furnace	
Platinum thermocouples	-50 °C to 0 °C 0 °C to 80 °C 80 °C to 250 °C 250 °C to 650 °C 650 °C to 1100 °C	0.81 °C 0.62 °C 0.62 °C 0.63 °C 1.6 °C	In stirred liquid bath Above 650 in Furnace	
Base metal thermocouples	Nitrogen boiling point (-196 °C) -80 °C to 0 °C 0 °C to 250 °C 250 °C to 350 °C 350 °C to 650 °C 650 °C to 1100 °C	0.19 °C 0.16 °C 0.18 °C 0.19 °C 0.21 °C 1.5 °C	-196 & 0 FP up to 650 in stirred bath Above 650 in Furnace	
Electronic Thermometers with probes	Nitrogen boiling point (-196 °C) -80 °C to +250°C Ice point (0 °C) 250 °C to 650 °C 650 °C to 1100 °C	0.014 °C 0.013 °C 0.014 °C 0.12 °C 1.7 °C	-196 & 0 FP up to 650 in stirred bath Above 650 in Furnace	
Calibration of Temperature Data loggers, Electronic Temperature Indicators and Recorders in Air	-40 °C to +40 °C 40 °C to 80 °C	0.35 °C 0.44 °C	In Air chamber	
Block calibrators	-50 °C to +660 °C	0.12 °C	By comparison using PRT reference	
Cold Junction Compensation	Ice-point (0 °C) 15 °C to 25 °C	0.12 °C 0.15 °C	In stirred liquid bath	
HUMIDITY CALIBRATION	In the temperature range 0 °C to 60 °C 5 %rh to 50 %rh 50 %rh to 90 %rh In the temperature range 20 °C to 40 °C 90 %rh to 95 %rh	 2.1 %rh 3.0 %rh 2.3 %rh	By comparison with reference in controlled chamber	
Temperature in air	0 °C to 60 °C	0.50 °C		

Permanent Laboratory

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
TEMPERATURE CALIBRATION				Site Calibration
Liquid-in-glass thermometers	-20 °C to 0 °C 0 °C to 50 °C 50 °C to 100 °C 100 °C to 150 °C 150 °C to 200 °C	0.031 °C 0.029 °C 0.036 °C 0.046 °C 0.059 °C	In stirred liquid bath	
	-40 °C to +80 °C 80 °C to 250 °C	0.030 °C 0.037 °C	In customer's stirred liquid bath	
Temperature sensors with indicators	-20 °C to +50 °C 50 °C to 100 °C 100 °C to 150 °C 150 °C to 200 °C	0.028 °C 0.023 °C 0.044 °C 0.059 °C	In stirred liquid bath	
	-25 °C to +140 °C 140 °C to 250 °C 250 °C to 350 °C	0.037 °C 0.15 °C 0.21 °C	In block calibrator	
Liquid baths				
Temperature measurement	-40 °C to 250 °C	0.049 °C		
Gradient measurement	-40 °C to +80 °C 80 °C to 250 °C	0.011 °C 0.015 °C		
Temperature controlled chambers, ovens, fridges/refrigerators and freezers	-80 °C to +300 °C 300 °C to 1100 °C	0.84 °C 3.7 °C	Single and multipoint time dependent temperature profiling, also referred to as spatial temperature surveying or mapping	

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 uncertainty of measurement 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 CIPM-ILAC definition of the CMC is as follows:

A CMC is a calibration and measurement capability available to customers under normal conditions:
(a) as published in the BIPM key comparison database (KCDB) of the CIPM MRA; or
(b) as described in the laboratory's scope of accreditation granted by a signatory to the ILAC Arrangement.

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 CMC is calculated according to the procedures given in M3003 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 CMC in certificates issued under its accreditation.

The CMC may be described using various methods in the Schedule of Accreditation:

As a single value that is valid throughout the range.
As an explicit function of the measurand or of a parameter (see below).
As a range of values. The range is stated such that the customer can make a reasonable estimate of the likely uncertainty at any point within the range.
As a matrix or table where the CMCs depend on the values of the measurand and a further quantity.
In graphical form, providing there is sufficient resolution on each axis to obtain at least two significant figures for the CMC.

Expression of CMCs - symbols and units

In general, only units of the SI and those units recognised for use with the SI are used to express the values of quantities and of the associated CMCs. Nevertheless, other commonly used units may be used where considered appropriate for the intended audience. For example, the term "ppm" (part per million) is frequently used by manufacturers of test and measurement equipment to specify the performance of their products. Terms like this may be used in Schedules of Accreditation where they are in common use and understood by the users of such equipment, providing their use does not introduce any ambiguity in the capability that is being described.

When the CMC is expressed as an explicit function of the measurand or of a parameter, this often comprises a relative term (e.g., percentage) and an absolute term, i.e. one expressed in the same units as those of the measurand. This form of expression is used to describe the capability that can be achieved over a range of values. Some examples are shown below. It should be noted that these expressions are *not* mathematical formulae but are instead written in a commonly used shorthand for expressing uncertainties - therefore, for purposes of clarity, an indication of how they are to be interpreted is also provided below.

DC voltage, 100 mV to 1 V: 0.0025 % + 5.0 µV

Over the range 100 mV to 1 V, the CMC is 0.0025 %·V + 5.0 µV, where V is the measured voltage.

Hydraulic pressure, 0.5 MPa to 140 MPa: 0.0036 % + 0.12 ppm/MPa + 4.0 Pa

Over the range 0.5 MPa to 140 MPa, the CMC is $0.0036\ \%\cdot p + (0.12\cdot 10^{-6}\cdot p\cdot 10^{-6}) + 4.0$ Pa, where p is the measured pressure in Pa.

It should be noted that the percentage symbol (%) simply represents the number 0.01. In cases where the CMC is stated only as a percentage, this is to be interpreted as meaning percentage of the measured value or indication.

Thus, for example, a CMC of 1.5 % means $1.5 \cdot 0.01 \cdot i$, where i is the instrument indication.