Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

UKAS CALIBRATION **0373** **Accredited to ISO/IEC 17025:2017**	**Metrology and Quality Services Ltd** **Issue No:** 047 **Issue date:** 08 February 2021	
	23 Brindley Road **Bayton Road Ind Estate** **Exhall** **Coventry** **West Midlands** **CV7 9EP**	**Contact: Mr J Morris** **Tel: +44 (0) 2476 644661** **E-Mail: enquiries@mqs.co.uk** **Website: www.mqs.co.uk**
Calibration performed by the Organisation at the locations specified below		

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details		Activity	Location code
Address 23 Brindley Road Bayton Road Ind Estate Exhall Coventry West Midlands	**Local contact** Mr J Morris Tel: 01438 900080	Dimensional Electrical Force Torque Pressure	A
Address 37 Western Parkway Business Centre Lower Ballymount Road Dublin 12 Ireland	**Local contact** Mr P Roche Tel: +353 [0] 1 4502 666	Dimensional	B

Site activities performed away from the locations listed above:

Location details		Activity	Location code
At customer's premises	**Local contact** Mr G Wilson Tel: 01438 900080	Dimensional	C

DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
LENGTH			NOTES	
Gauge blocks Inch (Steel, Ceramic and tungsten carbide)	As BS 4311:Part 1 2007 0.05 Inch to 0.4 inch 0.4 Inch to 1 inch 2 inch 3 inch 4 inch	Class (see Notes) C 3.0 4.0 5.0 6.0 7.0 μ inch	**Class C** uncertainties apply to the measurement of steel, ceramic and tungsten carbide gauges by comparison with grade K standards of length of a similar material. Class C uncertainties apply to grade 0, 1 and 2 gauges to BS EN ISO 3650:1999 and BS 4311:Part 1:2007	A
Millimetre (Steel, Ceramic and tungsten carbide)	As BS EN ISO 3650: 1999 0.5 to 10 10 to 25 30, 40, 50 60, 70, 75 80, 90, 100	C 0.080 0.10 0.12 0.15 0.18	All linear calibrations may be given in inch units.	A
Thread measuring cylinders	0.1 to 5.0 diameter	0.25	As BS 16239:2013, or BS 5590:1978 or BS3777:1964 and specials. Calibration performed using a length measuring machine and length standards	A & B
Precision pin gauges (parallel)	0.1 to 10 diameter	0.25	Calibration performed using a length measuring machine and length standards	A & B
Plain plug gauges (parallel)	1 to 50 diameter 50 to 100 100 to 150 150 to 200 200 to 300	0.50 0.80 1.0 1.2 2.0	Calibration performed using a length measuring machine and length standards	A & B
Plain plug gauges (taper) including check plugs				
Taper up to 1 in 8 on diameter	5 to 50 diameter 50 to 100 100 to 200	3.0 on diameter 4.0 10	Calibration performed using a length measuring machine and length standards	A & B A A
Tapers above 1 in 8	5 to 50 diameter 50 to 100 100 to 200	5.0 on diameter 6.0 12	Calibration performed using a length measuring machine and length standards	A & B A A

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
LENGTH (cont'd)				
Plain ring gauges (parallel) and setting standards	1 to 10 diameter 10 to 25 25 to 50 50 to 100 100 to 150 150 to 250	0.80 0.50 0.80 1.0 1.5 2.5	Calibration performed using a length measuring machine and length standards	A
Plain ring gauges (parallel) and setting standards	2 to 10 diameter 10 to 25 25 to 50 50 to 100 100 to 150	1.2 1.0 1.2 1.5 2.0	Calibration performed using a length measuring machine and length standards	B
Plain ring gauges (taper)				
Taper up to 1 in 8 on diameter	2 to 5 diameter 5 to 50 50 to 100 100 to 200	4.0 on diameter 4.0 5.0 6.0	Calibration performed using a length measuring machine and length standards	A A & B A A
Tapers above 1 in 8 on diameter	5 to 50 diameter 50 to 100 100 to 200	6.0 on diameter 7.0 8.0	Calibration performed using a length measuring machine and length standards	A & B A A
Length gauges, flat and spherical ended	25 to 1000	1.0 + (8.0 x length in m)	Calibration performed by comparison to length standards	A & B
Plain gap gauges (parallel)	0.5 to 100 100 to 200 200 to 300	3.0 5.0 8.0	Calibration performed by comparison to length standards	A & B
Parallels	0 to 50 x 100 x 400	1.5 to 5.0	Calibration as BS 906:1972	A & B
Vee blocks	20 to 150 diameter, vee capacity	1.5 to 5.0	Calibration as BS 3731:1987	A & B
Screw plug gauges (parallel) including check and setting plugs diameter, pitch and flank angle See Note 2	1 to 100 100 to 150 150 to 300	2.5 on pitch diameter 5.0 on pitch diameter 8.0 on pitch diameter 1.5 on pitch 5.0 minutes of arc on flank angle	Note 2. Single & multi-start, symmetrical thread forms only. Calibration performed using screw thread diameter machine and thread measuring cylinders	A & B A A

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
LENGTH (cont'd)				
Screw plug gauges (taper) including check plugs but excluding API gauges See Note 10	5 to 100 diameter	5.0 on pitch diameter	Note 10. Single start, symmetrical thread forms only. Calibration performed using screw thread diameter machine and thread measuring cylinders	A
Screw ring gauges (parallel) See Note 2	1 to 12 10 to 100 100 to 150 150 to 250	See note 3 5.0 on pitch diameter 6.0 on pitch diameter 10.0 on pitch diameter 1.5 on pitch 5.0 minutes of arc on flank angle	Note 3. Functional test of size using check plugs. Note 2. Single & multi-start, symmetrical thread forms only. Calibration performed using length measuring machine and styli	A
	1 to 12	See note 3	Note 3. Functional test of size using check plugs.	B
	5 to 100	5.0 on pitch diameter	Note 2. Single & multi-start, symmetrical thread forms only. Calibration performed using length measuring machine and styli	B
Screw ring gauges (taper) - Ground Threads only and excluding API gauges See Note 10	6 to 75 diameter 75 to 150 diameter	5.0 on 7.0 pitch diameter	Note 10. Single start, symmetrical thread forms only. Calibration performed using length measuring machine and styli	A
Screw thread adjustable caliper gauges (parallel)	1 to 100 diameter	See note 11	Note 11. Functional test of size using setting plugs calibrated with a CMC of 2.5 µm	A
Receiver, position and profile gauges, jigs and fixtures	0 to 1000 x 750 x 500	3.0 + (10 x length in m) See note 7	Note 7. Features and associated parts of these gauges / fixtures can be measured to the uncertainties given for equivalent items and methods listed in this schedule.	A

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
LENGTH (cont'd)				
Orifice Plates	BS EN ISO 5167-1:2003	4.0 + (6.0 x length in m)	BS EN ISO 5167-1:2003 Calibration performed by comparison to length standards	A
ANGLE			Note 1. The uncertainty quoted is for the departure from flatness, straightness, parallelism or squareness, i.e. the distance separating the parallel planes which just enclose the surface under consideration.	
Squares				
Blade type	50 to 300 300 to 600 600 to 900	3.0 On 5.0 squareness 8.0 See Note 1	Calibration performed as BS 939:2007	A & B A A
Cylindrical type	0 to 300 300 to 600	2.0 On 4.0 squareness See Note 1	Calibration performed as BS 939:2007	A
Block type	0 to 600	3.0 On squareness See Note 1	Calibration performed as BS 939:2007	A
Angle plates and box angle plates	50 to 600	Squareness 3.0 + (1.0 per 100 mm) Parallelism 1.0 + (1.0 per 100 mm) See Note 1	Calibration performed as BS 5535:1978	A & B
Bevel protractors	0° to 360°	6.0 minutes of arc	Calibration performed as BS 1685:2008	A & B
Sine bars	100 to 300	1.0 + (10 x length in m) 3.0 Seconds of arc	Calibration performed as BS 3064:1978	A
Sine tables	100 to 500	1.0 + (10 x length in m) 3.0 Seconds of arc	Calibration performed as BS 3064:1978	A

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
FORM			Note 1. The uncertainty quoted is for the departure from flatness, straightness, parallelism or squareness, i.e. the distance separating the parallel planes which just enclose the surface under consideration.	
Surface plates Granite / Cast iron	160 x 100 to 4000 x 4000	1.5 + (0.80 x diagonal in m) See Note 1	Calibration performed as BS 817:2008	A & B & C
Straightedges				A
Cast iron	200 to 4000	1.0 + (2.0 x length in m) See Note 1	Calibration performed as BS 5204:Part 1:1975	
Steel / Granite	200 to 2000	1.0 + (2.0 x length in m) See Note 1	Calibration performed as BS 5204:Part 2:1977	
Straightedges				B
Cast iron	200 to 1000	2.0 + (2.0 x length in m) See Note 1	Calibration performed as BS 5204:Part 1:1975	
Steel / Granite	200 to 1000	2.0 + (2.0 x length in m) See Note 1	Calibration performed as BS 5204:Part 2:1977	
Steel balls	1 to 50 diameter	0.80 on diameter	Calibration performed using a length measuring machine and length standards	A
Roundness External Internal	1 to 350 diameter 3 to 350	0.050 on radius	Calibration performed as BS 3730 using a roundness machine	A
Surface texture (excluding measurement standards and roughness comparison specimens)	Ra 0.02 µm to 80 µm	10 % of measured value	Calibration performed as BS 1134:Part 1:1988 using a surface texture measuring instrument	A

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
MEASURING INSTRUMENTS AND MACHINES				
Micrometers				
External micrometer	0 to 1500 0 to 150	Heads 2.0 between any two points.	Calibrated as BS 870:2008	A B
Internal micrometer	0 to 900	Setting and extension rods 1.0 + (8.0 x length in m)	Calibrated as BS 959:2008	A & B
Depth	0 to 300		Calibrated as BS 6468:2008	A & B
Indicating micrometers	0 to 100	Indicators 0.50 Overall performance 1.5	Calibration performed using length standards	A & B
Bore micrometers (three- point)	1 to 5 5 to 100 100 to 250	3.0 3.0 8.0	Calibration performed by comparison to master setting ring gauges	A A & B A
Bench micrometer	0 to 100	Overall performance 2.0	Calibration as NPL MOY/SCMI 22	A
Combination sets	0° to 360° (Protractor) 0 to 500 (Rule)	30 minutes of arc 5.0 + (10 x length in m)	Calibration performed by comparison to length measuring machine and angle gauges	A
Calliper gauges including vernier, dial and digital types	0 to 2000 Length measurement error, E	Overall performance 10 + (20 x length in m)	Calibration as BS EN ISO 13385-1:2019	A
Height gauges - (Simple) including vernier, dial and digital types (See note 8 and note 9)	0 to 1000	Length measurement error (E): 5.0 + (10 x length in m)	Calibration as BS EN ISO 13225:2012 Note 8. Simple height gauges - vernier, dial and digital instruments designed only for measuring distances parallel to the beam	A & B

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
MEASURING INSTRUMENTS AND MACHINES (cont'd)				
Vernier type gauges including dial and digital				
Caliper	0 to 1000 1000 to 2000	Overall performance 10 + (30 x length in m)	Calibration as BS 887:2008	A & B
Height	0 to 1000	Overall performance 10 + (30 x length in m)	Calibration as BS 1643:2008 withdrawn	A & B
Depth	0 to 600	Overall performance 10 + (30 x length in m)	Calibration as BS 6365:2008	A & B
Dial gauges and dial test indicators	0 to 50	1.0	Calibration as BS 907:2008 and BS 2795:1981	A & B
Comparators (external)	250 to 20 000 magnifications	1.0 % of range Minimum 0.10	Calibration as BS 1054:1975	A
Displacement transducers	0 to 100	0.30 + (4.0 x length in m)	Calibration performed by comparison to length standards	A & B
Thread diameter measuring	0 to 300 capacity	Overall performance 1.5	Calibration as NPL MOY/SCMI/9	A
Plain taper diameter measuring	0 to 100	Overall performance on diameter 1.5	Calibration as NPL MOY/SCMI/48	A
Toolmakers Microscopes	Linear 0 to 150 x 150 Angular 0 to 360˚	3.0 3 minutes of arc	Calibration as NPL MOY/SCMI/2	A & C
Universal microscopes	Linear 0 to 300 x 300 Angular 0 to 360˚	3.0 3 minutes of arc	Calibration by comparison to reference scale	A & C
Air gauging units (See Note 5)	0 to 5000 magnifications	0.50 % of range	5. Brown & Sharpe PMI Ltd products only. Calibrated using length transducer	A
Radius Gauges	0 to 300 mm	10	By optical projection	A
Feeler Gauges	0.03 to 1.00	3.0	Calibration as BS 957:2008	A & B
Internal and External Caliper Gauges	0 to 150	1.0	Calibration performed by comparison to length standards	A & B

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
MEASURING INSTRUMENTS AND MACHINES (cont'd)				
Clinometers	0 to 360 degrees	10 seconds of arc	Calibration performed by comparison to a rotary table	A
Electronic indicating levels	0 to 20 minutes of arc	1.0 % of range Minimum 0.50 seconds of arc	Calibration performed by comparison to known angle deflection	A & B
Spirit levels	5 seconds of arc to 60 minutes of arc nominal sensitivity	Mean sensitivity: 10 % of nominal Minimum 0.50 seconds of arc	Calibration as BS 3509:1962 and BS 958:1968	A & B
Micrometer heads	0 to 100	1.0	Calibration as BS 1734:1951	A & B
Height setting micrometer	300	Heads 1.20 Stepped column 2.0 Overall performance 2.5	Calibration performed by comparison to length standards	A
Riser blocks for above	150 300	2.0 4.0	Calibration performed by comparison to length standards	A
Precision scales (linear)	0 to 300	1.5 + (3.0 x length in m)	Calibration performed by comparison to length measuring machine	A
Graticules	0 to 300	1.5 + (3.0 x length in m)	Calibration performed by comparison to length measuring machine	A
Steel rules	0 to 500 500 to 1000	5.0 + (10 x length in m) 10 + (10 x length in m)	Calibration as BS 4372:1968 performed by comparison to length measuring machine	A
Dividing heads Rotary tables Inclinable rotary tables	100 to 450 capacity 100 to 450 100 to 450	Overall angular performance 3.0 seconds of arc	Calibration performed by comparison to reference polygon	A & C A & C A & C
Profile projectors	10 to 100 magnifications	125 at the screen 2.5 linear scales 1.5 minutes of arc	Calibrated using reference scales	A & B & C

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
MEASURING INSTRUMENTS AND MACHINES (cont'd)				
Height gauges – (Complex) (See note 9)	0 to 1 m	Length measurement error (E): 1.0 + (5.0 x length in m) Length measurement error (B): 1.0 + (5.0 x length in m)	Calibration as BS EN ISO 13225:2012 performed by comparison to length standards	A & C
Electronic microprocessor controlled height gauges	0 to 1 m	1.0 + (5.0 x length in m)	Calibration performed by comparison to length standards	A & B & C
Horizontal & vertical measuring machines	0 to 100	0.30	Calibrated performed by comparison to length standards	A & C
Horizontal & vertical measuring machines	0 to 3 m	0.30 + (2.0 x length in m)	Calibrated performed by comparison to reference laser	A & C
Evaluation of electrical contact unit for internal measurement		Overall performance 1.0 on diameter.		A & C

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL			All electrical calibrations are performed as a direct comparison against a reference standard unless otherwise stated	
DC Voltage Generation	0 V to 300 mV 300 mV to 3 V 3 V to 30 V 30 V to 300 V 300 V to 1000 V	15 ppm + 2.0 μV 13 ppm + 3.0 μV 13 ppm + 0.030 mV 14 ppm + 0.30 mV 16 ppm + 3.0 mV	These values can be generated for the calibration of measuring instruments	A
Measurement	0 V to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	25 ppm + 1.5 μV 10 ppm + 2.6 μV 10 ppm + 12 μV 10 ppm + 230 μV 10 ppm + 2.4 μV	Outputs of instruments within these values can be measured to the stated uncertainties	A
DC Current Generation	0 μA to 300 μA 300 μA to 3 mA 3 mA to 30 mA 30 mA to 300 mA 300 mA to 1 A 1 A to 3 A 3 A to 11 A 11 A to 20 A 20 A to 100 A 100 A to 550 A	50 ppm + 24 nA 40 ppm + 0.060 μA 40 ppm + 0.40 μA 50 ppm + 4.0 μA 110 ppm + 0.050 mA 160 ppm + 0.050 mA 160 ppm + 0.60 mA 350 ppm + 1.8 mA 0.15 % 0.18 %	These values can be generated for the calibration of measuring instruments Simulated current using multi turn coil, for the calibration of clamp-on ammeters.	A A
Measurement	10 μA to 100 μA 100 μA to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 2 A	130 ppm + 2.4 nA 10 ppm + 0.024 μA 70 ppm + 0.24 μA 80 ppm + 2.4 μA 100 ppm + 47 μA	Outputs of instruments within these values can be measured to the stated uncertainties	A
AC Voltage Generation	*10 mV to 300 mV* 45 Hz to 1 kHz 1 kHz to 10 kHz *300 mV to 3 V* 45 Hz to 1 kHz 1 kHz to 10 kHz *3 V to 30 V* 45 Hz to 1 kHz 1 kHz to 10 kHz *30 V to 300 V* 45 Hz to 1 kHz 1 kHz to 10 kHz	 0.010 % + 10 μV 0.010 % + 10 μV 0.010 % + 75 μV 0.010 % + 75 μV 0.020 % + 0.75 mV 0.020 % + 0.75 mV 0.015 % + 3.0 mV 0.015 % + 8.0 mV	 These values can be generated for the calibration of measuring instruments	A

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
AC Voltage Generation (cont'd)	*300 V to 1000 V*			
	45 Hz to 1 kHz	0.025 % + 17 mV		
	1 kHz to 10 kHz	0.025 % + 17 mV		
Measurement				
	10 mV to 100 mV			A
	20 Hz to 1 kHz	0.025 % + 2.4 µV	Outputs of instruments within these values can be measured to the stated uncertainties	
	1 kHz to 10 kHz	0.025 % + 2.4 µV		
	100 mV to 1 V			
	20 Hz to 1 kHz	0.025 % + 12 µV		
	1 kHz to 10 kHz	0.025 % + 12 µV		
	1 V to 10 V			
	20 Hz to 1 kHz	0.025 % + 0.12 mV		
	1 kHz to 10 kHz	0.025 % + 0.12 mV		
	10 V to 100 V			
	20 Hz to 1 kHz	0.020 % + 1.2 mV		
	1 kHz to 10 kHz	0.020 % + 1.2 mV		
	100 V to 1000 V			
	55 Hz to 1 kHz	0.020 % + 24 mV		
	1 kHz to 10 kHz	0.070 % + 24 mV		
AC Current Generation				
	10 µA to 300 µA			A
	45 Hz to 1 kHz	0.10 % + 0.12 µA	These values can be generated for the calibration of measuring instruments	
	1 kHz to 5 kHz	0.11 % + 0.180 µA		
	300 µA to 3 mA			
	45 Hz to 1 kHz	0.040 % + 0.18 µA		
	1 kHz to 5 kHz	0.040 % + 0.24 µA		
	3 mA to 30 mA			
	45 Hz to 1 kHz	0.030 % + 2.4 µA		
	1 kHz to 5 kHz	0.040 % + 2.4 µA		
	30 mA to 300 mA			
	45 Hz to 1 kHz	0.050 % + 24 µA		
	1 kHz to 5 kHz	0.050 % + 58 µA		
	300 mA to 1 A			
	45 Hz to 1 kHz	0.050 % + 0.12 mA		
	1 kHz to 5 kHz	0.15 % + 1.2 mA		
	1 A to 3 A			
	45 Hz to 1 kHz	0.040 % + 0.12 mA		
	1 kHz to 5 kHz	0.15 % + 1.2 mA		
	3 A to 11 A			
	45 Hz to 1 kHz	0.080 % + 2.4 mA		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
	1 kHz to 5 kHz	0.85 % + 2.4 mA		
AC Current (contd.)	*11 A to 20 A*			
	45 Hz to 1 kHz	0.085 % + 5.8 mA		
	1 kHz to 5 kHz	0.80 % + 5.8 mA		
	20 A to 100 A		Simulated current using multi turn coil, for the calibration of clamp-on ammeters.	
	45 Hz to 1 kHz	0.30 %		
	100 A to 550 A			
	45 Hz to 65 Hz	0.30 %		
	65 Hz to 500 Hz	0.50 %		
Measurement				
	10 μA to 100 μA		Outputs of instruments within these values can be measured to the stated uncertainties	A
	55 Hz to 1 kHz	0.040 % + 0.012 μA		
	1 kHz to 5 kHz	0.10 % + 0.012 μA		
	100 μA to 1 mA			
	55 Hz to 1 kHz	0.030 % + 0.12 μA		
	1 kHz to 5 kHz	0.070 % + 0.12 μA		
	1 mA to 10 mA			
	55 Hz to 1 kHz	0.030 % + 1.2 μA		
	1 kHz to 5 kHz	0.070 % + 1.2 μA		
	10 mA to 100 mA			
	55 Hz to 1 kHz	0.040 % + 12 μA		
	1 kHz to 5 kHz	0.070 % + 12 μA		
	100 mA to 2 A			
	55 Hz to 1 kHz	0.070 % + 0.47 mA		
	1 kHz to 5 kHz	0.25 % + 1.2 mA		
DC Resistance Generation				
	0 Ω to 1Ω	0.050 % + 12 mΩ	These values can be generated for the calibration of measuring instruments	A
	1 Ω to 11 Ω	100 ppm + 1.2 mΩ		
	11 Ω to 33 Ω	120 ppm + 1.8 mΩ		
	33 Ω to 110 Ω	50 ppm + 1.7 mΩ		
	110 Ω to 330 Ω	25 ppm + 2.4 mΩ		
	330 Ω to 1.1 kΩ	20 ppm + 1.2 mΩ		
	1.1 kΩ to 3.3 kΩ	20 ppm + 24 mΩ		
	3.3 kΩ to 11 kΩ	20 ppm + 26 mΩ		
	11 kΩ to 33 kΩ	20 ppm + 0.26 Ω		
	33 kΩ to 110 kΩ	20 ppm + 0.26Ω		
	110 kΩ to 330 kΩ	20 ppm + 2.4 Ω		
	330 kΩ to 1.1 MΩ	80 ppm + 2.6 Ω		
	1.1 MΩ to 3.3 MΩ	100 ppm + 35 Ω		
	3.3 MΩ to 11 MΩ	240 ppm + 59 Ω		
	11 MΩ to 33 MΩ	300 ppm + 2.9 kΩ		
	33 MΩ to 110 MΩ	400ppm + 3.5 kΩ		
	110 MΩ to 330 MΩ	0.10 % + 120 kΩ		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
	330 MΩ to 1.100 GΩ	0.30 % + 580 kΩ		
DC Resistance Measurement				
	0 Ω to 1 Ω	20 ppm + 26 μΩ	Outputs of instruments within these values can be measured to the stated uncertainties	A
	1 Ω to 10 Ω	20 ppm + 26 μΩ		
	10 Ω to 100 Ω	20 ppm + 42 μΩ		
	100 Ω to 1 kΩ	20 ppm + 350 μΩ		
	1 kΩ to 10 kΩ	20 ppm + 3.5 mΩ		
	10 kΩ to 100 kΩ	20 ppm + 35 mΩ		
	100 kΩ to 1 MΩ	30 ppm + 810 mΩ		
	1 MΩ to 10 MΩ	40 ppm + 120 mΩ		
	10 MΩ to 100 MΩ	200 ppm + 5.2 Ω		
	100 MΩ to 1 GΩ	950 ppm + 520 kΩ		
Temperature indicators, calibration by electrical simulation				A
Base metal thermocouple				
	-200 °C to -100 °C	0.40 °C	excluding cold junction compensation	
	-100 °C to +120 °C	0.20 °C		
	120 °C to 1000 °C	0.35 °C		
	1000 °C to 1370 °C	0.50 °C		
Noble metal thermocouple				
	-200 °C to +1760 °C	0.25 °C	excluding cold junction compensation	
Cold junction compensation				
	At ambient temperature of 20 °C	0.20 °C		
Resistance sensors				
	-200 °C to 0 °C	0.15 °C		
	0 °C to 850 °C	0.050 °C		
Frequency				
	1 Hz to 1.35 GHz	5.0 in 10^8	Calibrated using a time counter	A
Time Interval				
	0.05 s to 60 min	0.050 s	Calibrated using an oscilloscope	
Tachometers (Optical)				
	100 rpm to 50000 rpm	2.0 rpm	Calibrated using a time counter	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
FORCE Calibration of force push pull devices in tension and compression				
	1 N to 500 N	0.12 % see note 12	12 The calibration may be performed in the following units: Newton (N) or kilogram-force (kgf)	A
TORQUE			13 Calibrations may also be given in units of electrical signal output 14 Calibration results may also be given in units of lbf in and lbf ft 15 The uncertainty quoted is for both the application of the calibration torque and the characteristics of the device being calibrated	
Torque Wrenches	0.5 N·m to 1000 N·m	1.0 % See Note 13, 14 and 15	BS EN ISO 6789-2:2017	A
Hand Torque Tools	1 N·m to 1000 N·m	1.6 % of maximum reading See Notes 14 and 15	BS EN ISO 6789:2003 (withdrawn)	A
PRESSURE				
Gas Pressure Gauge			By comparison with a pressure calibrator	A
Calibration of pressure indicating instruments and gauges	-95 kPa to 700 kPa 700 kPa to 7 MPa	0.03 % + 180 Pa 0.03 % + 1.7 kPa		

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.