Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

UKAS CALIBRATION **0783** **Accredited to ISO/IEC 17025:2017**	**Construction Testing Solutions Ltd** **Trading as Calibration Testing Solutions** **Issue No:** 029 **Issue date:** 05 April 2024	
	M1 Commerce Park **Markham Lane** **Duckmanton** **Chesterfield** **S44 5HS**	**Contact: Luke Todd** **Tel: +44 (0)1246 828318** **Fax: +44 (0)1246 828319** **E-Mail: luke.todd@calibrationtesting.co.uk**
Calibration performed by the Organisation at the locations specified		

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details		Activity	Location code
Address M1 Commerce Park Markham Lane Duckmanton Chesterfield S44 5HS	**Local contact** Luke Todd	ELECTRICAL Dimensional	P
		MASS Weighing machines (non-automatic)	P
		TORQUE	P
		FORCE	P

Site activities performed away from the locations listed above:

Location details	Activity	Location code
Customers' sites or premises The customer's sites or premises must be suitable for the nature of the particular calibrations undertaken and will be subject of contract review arrangements between the laboratory and the customer	MASS Weighing machines (non-automatic)	S

Calibration and Measurement Capability (CMC

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (*k* = 2)	Remarks	Location Code
ELECTRICAL MEASUREMENTS				
DC VOLTAGE				P
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	4.5 µV/V + 0.47 µV 3.3 µV/V 3.2 µV/V 4.8 µV/V 4.9 µV/V	Using digital multimeter with 10 MΩ input resistance.	
	10 V to 100 V 100 V to 1000 V	12 µV/V 31 µV/V	Using digital multimeter with 1 MΩ input resistance.	
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 µV/V + 4.0 µV 58 µV/V + 6.0 µV 58 µV/V + 60 µV 67 µV/V 65 µV/V	Using multifunction calibrator	
DC CURRENT				P
Measurement	0 µA to 10 µA 10 µA to 100 µA 100 µA to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 20 A 10 A to 30 A	33 µA/A + 20 nA 17 µA/A 16 µA/A 21 µA/A 78 µA/A 270 µA/A 290 µA/A 810 µA/A	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	150 µA/A + 60 nA 120 µA/A + 0.40 µA 120 µA/A + 5.0 µA 350 µA/A + 60 µA 700 µA/A + 0.46 mA	Using multifunction calibrator	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (*k* = 2)	Remarks	Location Code
ELECTRICAL MEASUREMENTS (continued)				
DC RESISTANCE				P
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	12 µΩ/Ω + 26 µΩ 14 µΩ/Ω 11 µΩ/Ω 11 µΩ/Ω 11 µΩ/Ω 12 µΩ/Ω 14 µΩ/Ω 34 µΩ/Ω 250 µΩ/Ω 0.27 %	Using digital multimeter	
	0 MΩ to 10 MΩ 10 MΩ to 100 MΩ 100 MΩ to 1 GΩ 1 GΩ to 10 GΩ	20 µΩ/Ω + 15 Ω 92 µΩ/Ω 380 µΩ/Ω 0.27 %	At 200 V At 200 V At 200 V At 200 V	
Generation				
Specific Values				
Decade Values	1 mΩ 10 mΩ 100 mΩ 1 Ω 10 MΩ 100 MΩ 1 GΩ 10 GΩ	75 µΩ/Ω 59 µΩ/Ω 63 µΩ/Ω 63 µΩ/Ω 1.2 % 1.3 % 2.6 % 1.0 %	Known resistance values for application to resistance measuring instruments At 100 V, 500 V and 1000 V At 100 V, 500 V and 1000 V At 100 V, 500 V and 1000 V At 100 V and 500 V	
Decade and non-decade values	10 MΩ 20 MΩ 30 MΩ 40 MΩ 50 MΩ 60 MΩ 70 MΩ 80 MΩ 90 MΩ 100 MΩ 110 MΩ	23 µΩ/Ω 46 µΩ/Ω 69 µΩ/Ω 92 µΩ/Ω 120 µΩ/Ω 140 µΩ/Ω 160 µΩ/Ω 190 µΩ/Ω 210 µΩ/Ω 230 µΩ/Ω 250 µΩ/Ω	Known resistance values for application to resistance measuring instruments	
Other values	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	580 µΩ/Ω 120 µΩ/Ω 120 µΩ/Ω 120 µΩ/Ω 120 µΩ/Ω 150 µΩ/Ω	Known resistance values for application to resistance measuring instruments	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL MEASUREMENTS (continued)				
AC VOLTAGE				P
Measurement	10 mV to 100 mV		Using digital multimeter	
	10 Hz to 10 kHz	150 µV/V		
	10 kHz to 30 kHz	270 µV/V		
	30 kHz to 100 kHz	620 µV/V		
	100 kHz to 300 kHz	0.25 %		
	300 kHz to 1 MHz	1.3 %		
	100 mV to 1 V			
	10 Hz to 10 kHz	140 µV/V		
	10 kHz to 30 kHz	270 µV/V		
	30 kHz to 100 kHz	620 µV/V		
	100 kHz to 300 kHz	0.25 %		
	300 kHz to 1 MHz	1.2 %		
	1 V to 10 V			
	10 Hz to 10 kHz	140 µV/V		
	10 kHz to 30 kHz	270 µV/V		
	30 kHz to 100 kHz	620 µV/V		
	100 kHz to 300 kHz	0.25 %		
	300 kHz to 1 MHz	1.2 %		
	10 V to 100 V			
	20 Hz to 10 kHz	130 µV/V		
	10 kHz to 30 kHz	270 µV/V		
	30 kHz to 100 kHz	680 µV/V		
	100 V to 1000 V			
	40 Hz to 10 kHz	130 µV/V		
	10 kHz to 30 kHz	270 µV/V		
Generation	1 mV to 330 mV		Using multifunction calibrator	
	45 Hz to 10 kHz	0.10 %		
	10 kHz to 50 kHz	0.21 %		
	330 mV to 3.3 V			
	45 Hz to 10 kHz	0.036 %		
	10 kHz to 50 kHz	0.039 %		
	3.3 V to 33 V			
	45 Hz to 10 kHz	0.046 %		
	10 kHz to 50 kHz	0.22 %		
	33 V to 330 V			
	45 Hz to 20 kHz	0.10 %		
	330 V to 1100 V			
	45 Hz to 1 kHz	0.058 %		
	1 kHz to 20 kHz	0.23 %		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL MEASUREMENTS (continued)				
AC CURRENT				P
Measurement	1µA to 10 µA		Using digital multimeter	
	10 Hz to 10 kHz	0.24 % + 4.0 nA		
	10 µA to 100 µA			
	10 Hz to 2 kHz	340 µA/A		
	2 kHz to 10 kHz	620 µA/A		
	10 kHz to 30 kHz	870 µA/A		
	100 µA to 1 mA			
	10 Hz to 2 kHz	330 µA/A		
	2 kHz to 10 kHz	620 µA/A		
	10 kHz to 30 kHz	860 µA/A		
	1 mA to 10 mA			
	10 Hz to 2 kHz	330 µA/A		
	2 kHz to 10 kHz	620 µA/A		
	10 kHz to 30 kHz	860 µA/A		
	10 mA to 100 mA			
	10 Hz to 2 kHz	330 µA/A		
	2 kHz to 10 kHz	610 µA/A		
	10 kHz to 30 kHz	860 µA/A		
	100 mA to 1 A			
	10 Hz to 2 kHz	370 µA/A		
	2 kHz to 10 kHz	650 µA/A		
	1 A to 10 A			
	10 Hz to 10 kHz	980 µA/A		
	10 A to 30 A			
	10 Hz to 1 kHz	0.11 %		
Generation	30 µA to 3.3 mA		Using multifunction calibrator	
	10 Hz to 5 kHz	0.23 %		
	3.3 mA to 33 mA			
	10 Hz to 5 kHz	0.23 %		
	33 mA to 330 mA			
	10 Hz to 5 kHz	0.23 %		
	330 mA to 2.2 A			
	10 Hz to 1 kHz	0.23 %		
	1 kHz to 5 kHz	0.87 %		
	2.2 A to 11 A			
	45 Hz to 500 Hz	0.12 %		
	500 Hz to 1 kHz	0.38 %		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL TEMPERATURE SIMULATION				P
Temperature Indicators and Simulators (t/c Types) calibration by Electrical Simulation				
Base Metal Thermocouples	Type K -200°C to -100°C Type K -100°C to -25°C Type K -25°C to +120°C Type K 120°C to 1000°C Type K 1000°C to 1372°C	0.40 °C 0.24 °C 0.22 °C 0.32 °C 0.48 °C	Including Cold Junction Compensation	
	Type J -210°C to -100°C Type J -100°C to -30°C Type J -30°C to +150°C Type J 150°C to 760°C Type J 760°C to 1200°C	0.33 °C 0.22 °C 0.20 °C 0.23 °C 0.29 °C	Including Cold Junction Compensation	
	Type N -200°C to -100°C Type N -100°C to -25°C Type N -25°C to +120°C Type N 120°C to 410°C Type N 410°C to 1300°C	0.14 °C 0.12 °C 0.11 °C 0.11 °C 0.11 °C	Including Cold Junction Compensation	
	Type T -250°C to -150°C Type T -150°C to 0°C Type T 0°C to 120°C Type T 120°C to 400°C	0.74 °C 0.30 °C 0.22 °C 0.20 °C	Including Cold Junction Compensation	
Nobel Metal Thermocouples	Type B 600°C to 800°C Type B 800°C to 1000°C Type B 1000°C to 1550°C Type B 1550°C to 1820°C	0.59 °C 0.23 °C 0.21 °C 0.22 °C	Including Cold Junction Compensation	
	Type R 0°C to 250°C Type R 250°C to 400°C Type R 400°C to 1000°C Type R 1000°C to 1767°C	0.68 °C 0.42 °C 0.40 °C 0.48 °C	Including Cold Junction Compensation	
	Type S 0°C to 250°C Type S 250°C to 1000°C Type S 1000°C to 1400°C Type S 1400°C to 1767°C	0.56 °C 0.44 °C 0.44 °C 0.55 °C	Including Cold Junction Compensation	
	Type E -250°C to -100°C Type E -100°C to -25°C Type E -25°C to +350°C Type E 350°C to 650°C Type E 650°C to 1000°C	0.59 °C 0.22 °C 0.20 °C 0.22 °C 0.70 °C	Including Cold Junction Compensation	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL TEMPERATURE SIMULATION (continued)				P
Cold Junction Compensation	At ambient temperature of 21 °C ± 3 °C	0.20 °C		
Temperature Indicators and Simulators (PT100 Types) calibration by Electrical Simulation				
PT 100 Indicators	-200°C to 0°C 0°C to 100°C 100°C to 300°C 300°C to 400°C 400°C to 630°C 630°C to 800°C	0.077 °C 0.095 °C 0.12 °C 0.13 °C 0.15 °C 0.27 °C		
PT 100 Simulators	-200 °C to 0 °C 0 °C to 560 °C 560 °C to 850 °C	0.053 °C 0.050 °C 0.072 °C		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
DIMENSIONAL MEASUREMENTS NOTES In addition to these items, other similar items, including parts of measuring instruments and machines, may be calibrated in accordance with the stated best measurement uncertainty capability. Where the item or part calibrated is of lower quality due to wear, errors in geometry or form, or poor surface texture, or where any other factor adversely affects the measurement capability, greater uncertainties may be quoted. All linear calibrations may be given in inch units.				
LENGTH				P
Plain plug gauges (parallel)	1 to 50 diameter 50 to 100 diameter 100 to 200 diameter	1.0 on diameter 1.0 on diameter 1.5 on diameter	Comparison to end standards using a length measuring machine	
Plain ring gauges (parallel)	1 to 10 diameter 10 to 50 diameter 50 to 100 diameter 100 to 200 diameter	2.0 on diameter 2.0 on diameter 2.0 on diameter 2.4 on diameter	Comparison to master setting rings using a length measuring machine	
Length gauge, flat and spherical ended (excluding length bars)	0 to 1200	1.0 + (8.0 x length in m)	Comparison to end standards	
Plain gap gauges (parallel)	2 to 100 100 to 200 200 to 300	3.0 5.0 8.0	BS 969:2008 Comparison to end standards	
Feeler gauges	0.020 to 1	2.0	BS 957:2008 Comparison to end standards using a length measuring machine	
Paint thickness setting foils	0.020 to 1	2.0	Comparison to end standards using a length measuring machine	
Parallels	up to 5 to 50 x 100 x 400	Dependent on size and grade From 2.0 to 5.0	BS 906:Part 1:1972 Comparison to datum surfaces and end standards	
Rule – steel	0 to 1000 1000 to 2000	5.0 + (50 x length in m) 10 + (50 x length in m)	BS 4372:1968 Using a length measuring machine with microscope	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
DIMENSIONAL MEASUREMENTS (continued)				P
Thread measuring cylinders	0.1 to 5	0.5	As BS 3777, BS 5590 and specials. Comparison to end standards using a length measuring machine	
Screw plug gauges (parallel) including check and setting plugs	1 to 100 diameter 100 to 200 diameter	3.0 5.0	Single start symmetrical thread gauges only Comparison to cylindrical setting standards and thread measuring cylinders using a length measuring machine	
Screw ring gauges (parallel)	3 to 100 diameter 100 to 150 diameter	4.0 6.0	Single start symmetrical thread gauges only Comparison to master setting ring using a length measuring machine and T-shape ball probe method	
Screw pitch	0.2 to 8	1.5	Using a length measuring machine and pitch attachment	
Screw flank angle	0° to 52°	5.0 minutes of arc	Mechanical and optical comparison	
ANGLE NOTE The best measurement uncertainty capabilities are for the departure from flatness, straightness, or squareness, i.e. the distance separating the two parallel planes which just enclose the surface under consideration.				P
Squares Blade type	50 to 300 300 to 600	3.0 On squareness 5.0 On squareness	BS 939:2007 Comparison to cylindrical square and datum surfaces	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (*k* = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
DIMENSIONAL MEASUREMENTS (continued)				P
MEASURING INSTRUMENTS AND MACHINES				
Micrometers			Comparison to end standards and optical parallels	
External	0 to 1000	Heads 2.0 between any two points	As BS 870:2008 (and above)	
Internal	0 to 900		As BS 959:2008	
Depth	0 to 300	Setting and extension rods 1.0 + (8.0 x length in m)	As BS 6468:2008	
Vernier, dial and digital gauges			Comparison to end standards	
Calliper	0 to 1200	Overall performance 10 + (30 x length in m)	BS 887:2008 (and above)	
Height	0 to 1000	Overall performance 10 + (30 x length in m)	BS 1643:2008	
Depth	0 to 600	Overall performance 10 + (30 x length in m)	BS 6365:2008	
Dial gauges and dial test indicators	0 to 50	1.0	BS 907:2008 and BS 2795:1981 Comparison to length measuring machine and end standards	
Electronic indicators				
Lever type	0 to 5	1.0	Comparison to length measuring machine and end standards	
Linear type	0 to 50	0.7	Comparison to length measuring machine and end standards	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
MASS				
NON-AUTOMATIC WEIGHING MACHINES Digital (From 1 mg to 100 kg)	200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg 50 kg 100 kg	0.031 mg 0.038 mg 0.046 mg 0.061 mg 0.077 mg 0.09 mg 0.12 mg 0.16 mg 0.27 mg 0.54 mg 1.4 mg 2.7 mg 3.8 mg 9.6 mg 19.0 mg 39.0 mg 3.8 g 7.7 g	Note 1 Weights are available in OIML class: E2 1 mg to 1 kg. max grouped load 2 kg. F1 1 kg to 10 kg. Max grouped load 24 kg. M1 5 kg to 10 kg. Max grouped load 100 kg Note 2. Other loads within the overall listed range may also be used. Note 3. Method based on the requirements of Euramet guide cg-18	P & S
TORQUE			Notes 1 Calibrations may also be given in units of electrical signal output. 2 The uncertainty quoted is for both the application of the calibration torque and the characteristics of the device being calibrated. 3 Calibration results may also be given in units of lbf·in and lbf·ft. 4 Calibrated statically using un-supported beam and masses or torque measuring transducer. 5 Calibrated using masses. The calibration may be performed in the following units: Newton(N), ton-force(tonf), pound-force(lbf) or kilogram-force(kgf).	
Torque Wrenches	0.15 N·m to 2500 N·m to BS EN ISO 6789-2:2017	1.0 % See Notes 1 to 3		P
Torque Wrenches and Torque Drivers	0.15 N·m to 2500 N·m to BS EN ISO 6789:2003 (Withdrawn & superseded)	1.5 % See Notes 1 to 3		P
Static Torque Transducers in clockwise and/or anti-clockwise direction in increasing and/or decreasing Torque using Reference Transducer	0.20 N·m to 1500 N·m to BS 7882:2017	0.90 % of reading See Notes 1 to 4		P
Static Torque Transducers in clockwise and/or anti-clockwise direction in increasing and/or decreasing Torque using Beam / Wheel and Masses	0.005 N·m to 1500 N·m to BS 7882:2017	0.045 % of reading See Notes 1 to 4		P
Britool 8000 Torque Testing Machine	10 N·m to 550 N·m to BS 7882:2017	0.75 % of reading See Notes 1 to 4		P

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
FORCE Calibration of push pull force measuring devices in tension and compression	1 N to 2700 N	0.12 % see Note 5		P
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 × 0.01 × q, where q is the quantity value.

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