

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

 0683 Accredited to ISO/IEC 17025:2017	Pullman Instruments (UK) Ltd	
	Issue No: 032	Issue date: 26 January 2024
	ESG House Chatsworth Road Harrogate North Yorkshire HG1 5HX	Contact: Tony Cox Tel: +44 (0)1423 720360 Fax: +44 (0)1423 720361 E-Mail: info@pullman.co.uk Website: www.pullman.co.uk
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 ESG House, Chatsworth Road, Harrogate, North Yorkshire, HG1 5HX. Local contact Mr Tony Cox Tel: +44 (0)1423 720360 Fax: +44 (0)1423 720361 Email: info@pullman.co.uk Website: www.pullman.co.uk	Electrical Temperature Pressure	A
Address Hindley Business Centre Platt Lane Hindley Wigan WN2 3PA Local contact Mr Tony Cox Tel: +44 (0)1942-526164 Fax: +44 (0)1942-525335 E-Mail: tonyc@pullman.co.uk Website: www.pullman.co.uk	Length	B

Site activities performed away from the locations listed above:

Location details	Activity	Location code
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.	Temperature	S



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Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
ELECTRICAL			Electrical calibrations are performed as a direct comparison against a reference standard	
DC Voltage Generation	20 mV to 200 mV	5.0 μ V	Values can be generated for the calibration of measuring instruments	A
Measurement	200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1 kV	25 μ V 220 μ V 4.5 mV 16 mV	For measurement of instrument outputs	
DC Current Generation	0 μ A to 200 μ A	15 nA	Values can be generated for the calibration of measuring instruments	A
Measurement	200 μ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A 2 A to 10 A 10 A to 30 A 30 A to 1500 A	120 nA 1.2 μ A 17 μ A 220 μ A 3.7 mA 16 mA 1.0 %	For the calibration of clamp meters only	
	0 μ A to 100 μ A	3.0 nA	For measurement of instrument outputs	
	100 μ A to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 10 A 10 A to 30 A	33 nA 250 nA 6.0 μ A 220 μ A 6.5 mA 22 mA		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
ELECTRICAL (cont'd)				
DC Resistance (cont'd)				A
Generation	1 Ω	7.0 m Ω	Values can be generated for the calibration of measuring instruments	
	10 Ω	6.0 m Ω		
	100 Ω	8.0 m Ω		
	1 k Ω	32 m Ω		
	10 k Ω	290 m Ω		
	100 k Ω	2.9 Ω		
	1 M Ω	80 Ω		
	10 M Ω	1.2 k Ω		
Measurement	0 Ω to 1 Ω	30 $\mu\Omega$	For measurement of instrument outputs	
	1 Ω to 10 Ω	210 $\mu\Omega$		
	10 Ω to 100 Ω	1.7 m Ω		
	100 Ω to 1 k Ω	15 m Ω		
	1 k Ω to 10 k Ω	600 m Ω		
	10 k Ω to 100 k Ω	2.0 Ω		
	100 k Ω to 1 M Ω	35 Ω		
	1 M Ω to 10 M Ω	470 Ω		
AC Voltage			Values can be generated for the calibration of measuring instruments	A
Generation	40 Hz to 1 kHz 10 mV to 200 mV	63 μ V		
	40 Hz to 50 kHz 200 mV to 2 V	800 μ V		
	40 Hz to 1 kHz 2 V to 20 V	5.0 mV		
	1 kHz to 20 kHz 2 V to 20 V	6.0 mV		
	40 Hz to 1 kHz 20 V to 200 V	48 mV		
	56 Hz to 1 kHz 200 V to 1000 V	240 mV		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
ELECTRICAL (cont'd)				
AC Voltage (cont'd)				A
Measurement	40 Hz to 20 kHz			
	10 mV to 100 mV	50 μ V	For measurement of instrument outputs	
	10 Hz to 50 kHz			
	100 mV to 1 V	1.2 mV		
	40 Hz to 50 kHz			
	1 V to 10 V	15 mV		
	40 Hz to 10 kHz			
	10 V to 100 V	56 mV		
	40 Hz to 1 kHz			
	100 V to 1 kV	500 mV		
AC Current				A
Generation	40 Hz to 1 kHz			
	10 μ A to 200 μ A	220 nA		
	200 μ A to 2 mA	1.2 μ A		
	2 mA to 20 mA	12 μ A		
	20 mA to 200 mA	110 μ A		
	200 mA to 2 A	1.2 mA		
	2 A to 30 A	33 mA		
	45 Hz to 100 Hz			
	30 A to 1500 A	1.0 %	For the calibration of clamp meters only	
Measurement	40 Hz to 1 kHz			
	1 μ A to 100 μ A	50 nA	For measurement of instrument outputs	
	100 μ A to 1 mA	500 nA		
	1 mA to 10 mA	5.0 μ A		
	10 mA to 100 mA	60 μ A		
	100 mA to 1 A	630 μ A		
	1 A to 10 A	14 mA		
	10 A to 30 A	37 mA		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
CAPACITANCE Generation fixed points	1 nF 10 nF 20 nF 50 nF 100 nF 1 μ F 10 μ F	25 pF 42 pF 76 pF 180 pF 360 pF 5.0 nF 84 nF	Values can be generated for the calibration of measuring instruments	A
FREQUENCY Measurement	100 Hz to 10 kHz 10 kHz to 100 kHz 100 kHz to 1 MHz	350 mHz 450 mHz 5.2 Hz	Frequency may also be reported as 1/f for repetitive events.	A
Generation	500 mHz to 1 kHz	240 mHz	Values can be generated for the calibration of measuring instruments	
	1 kHz to 10 kHz 10 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 1 MHz 1 MHz to 10 MHz	420 mHz 900 mHz 2.2 Hz 4.3 Hz 4.5 Hz 45 Hz		
RPM	600 RPM to 60000 RPM	0.50 RPM	Optical Tachometers	A



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TEMPERATURE			Calibration by comparison with reference thermometers	
Temperature indicators and recorders, with temperature sensor(s)	-100 °C to +150 °C 150 °C to 660 °C 660 °C to 1100 °C	0.10 °C 0.20 °C 4.0 °C	Calibration performed within Metal Block Baths	A & S
Block calibrators	-90 °C to -30 °C -30 °C to +450 °C	0.40 °C 0.65 °C		A & S
	-100 °C to +20 °C 20 °C to 660 °C	0.035 °C 0.019 °C	Calibration performed with High spec Standard Platinum Resistance Thermometers (SPRT's)	A
Temperature controlled fridges, freezers, autoclaves, ovens and environmental chambers	-90 °C to -30 °C -30 °C to +450 °C	0.30 °C 0.30 °C	Single monitoring probe. Time dependent temperature profiling	A & S
	-50 °C to +150 °C	0.70 °C	Multipoint monitoring probes. Time dependent temperature profiling	
Data Loggers	-30 °C to +120 °C	0.70 °C	Calibration performed within Air Chamber	A
PRESSURE			Methods consistent with EURAMET CG17.	A
Gas pressure (gauge)				
Calibration of pressure indicating instruments and gauges	-99.5 kPa to +700 kPa 700 kPa to 7 MPa	0.14 kPa 0.75 kPa		A
Gas pressure (absolute)				
Calibration of pressure indicating instruments and gauges	1 kPa to 800 kPa 800 kPa to 7.1 MPa	0.14 kPa 0.75 kPa		A



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
LENGTH				
Plain plug gauges (parallel) cylindrical setting standards and rollers	1 to 50 diameter 50 to 100 diameter 100 to 150 diameter	1.0 1.5 on diameter 2.0	By comparison with reference standards	B
Plain ring gauges (parallel) and setting standards	1 to 10 diameter 10 to 50 diameter 50 to 100 diameter 100 to 150 diameter	1.5 1.0 on diameter 1.5 2.0	By comparison with reference standards	B
Plain gap gauges (parallel)	0.5 to 100 diameter 100 to 150 diameter	3.0 5.0	By comparison with reference standards	B
Screw plug gauges (parallel) including check and setting plugs See Note 2	1 to 100 diameter	3.0 on pitch diameter	By comparison with reference standards	B
Screw pitch Screw flank angle	0.2 to 8 0° to 52°	1.5 5.0 minutes of arc	Mechanical and optical comparison	B
Screw thread adjustable caliper gauges (parallel)	1 to 150 diameter	See note 4	By use of setting plug	B
Length gauges, flat and spherical ended	0 to 600	1.0 + (8.0 x length in m)	By comparison with reference standards	B
Squares Blade type	BS 939:2007 50 to 300 300 to 450	3.0 See Note 1 5.0		



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MEASURING INSTRUMENTS AND MACHINES			All by comparison with reference standards	
Micrometers External (including ball and thread micrometers)	BS 870:2008 0 to 600	Heads: 2.0 Setting and extension rods: $1.0 + (8.0 \times \text{length in m})$		B
Internal	Flatness of anvils Parallelsim of anvils BS 959:2008 0 to 900	0.5 0.6		B
Depth	BS 6468:2008 0 to 300	Heads: 2.0 Setting and extension rods: $1.0 + (8.0 \times \text{length in m})$		B
Micrometer heads	BS 1734:1951 0 to 50	1.0		B
Bore micrometer (three point) and Bore Gauges	3 to 150 diameter	Overall performance 5.0		B
Bevel protractors	BS 1685:2008 0° to 360°	6.0 min of arc		B
Height gauges - (Simple) including vernier, dial and digital types (See note 3 and note 4)	BS EN ISO 13225:2012 0 to 1000	Length measurement error (E): $10 + (30 \times \text{length in m})$		B
Vernier caliper, height and depth gauges (including digital and dial instruments)	BS 887:2008 0 to 1000 BS 1643:2008 (withdrawn) 0 to 1000	Overall performance $10 + (30 \times \text{length in m})$		B
Dial gauges and dial test indicators	BS 6365:2008 0 to 600	1.0		B
Feeler gauges	BS 907:2008 and BS 2795:1981 0 to 50	3.0		B
Thickness Gauges (dial and digital types)	BS 957:2008 0.05 to 1 0 to 50	Dependent on size and performance Minimum 3.0		B
Spirit levels	BS 958:1968 5 seconds of arc to 60 minutes of arc nominal sensitivity	6.0 seconds of arc		B
Vee blocks	BS3731:1987 20 to 150	2.5 to 5.0		B



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
Notes: 1 The uncertainty quoted is for the departure from flatness, straightness, or squareness, i.e. the distance separating the two parallel planes which just enclose the surface under consideration 2. Single start, symmetrical thread forms only. 3. Simple height gauges - vernier, dial and digital instruments designed only for measuring distances parallel to the beam. 4. Conformance statements cannot be made against specifications whose magnitudes are smaller than the specified CMC values				
<p align="center">END</p>				



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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: $Q[a, b] = [a^2 + b^2]^{1/2}$