

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

 <p>UKAS CALIBRATION 0143</p> <p>Accredited to ISO/IEC 17025:2005</p>	<h3>Calmet Laboratory Services</h3> <p>Issue No: 026 Issue date: 25 May 2011</p>	
	<p>Calmet Laboratory Services 11b Upper Teddington Road Kingston-upon-Thames Surrey KT1 4DL</p>	<p>Contact: Mr R Griffiths Tel: +44 (0)20 8977 8455 Fax: +44 (0)20 8614 8048 E-Mail: sales@calmet.co.uk Website: www.calmet.co.uk</p>
<p>Calibration performed by the Organisations at the locations specified below</p>		

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
<p>Address 11b Upper Teddington Road Kingston-upon-Thames Surrey KT1 4DL</p> <p>Contact: Mr R Griffiths Tel: +44 (0)20 8977 8455 Fax: +44 (0)20 8614 8048 E-Mail: sales@calmet.co.uk</p>	<p>Dimensional, Electrical, Pressure and Torque.</p>	<p>A</p>

Site activities performed away from the locations listed above:

Location details	Activity	Location code
<p>At customers premises Mr R Griffiths</p>	<p>Dimensional and Electrical</p>	<p>B</p>



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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				
DIMENSIONAL			NOTES	
LENGTH				
Plain plug gauges (parallel) cylindrical setting standards and rollers	1 to 50 diameter 50 to 100 100 to 200 200 to 300	1.0 2.0 3.0 4.0	.1. All linear calibrations may be given in inch units.	A
Plain ring gauges (parallel)	1 to 10 diameter 10 to 50 50 to 100 100 to 200 200 to 300	2.0 1.5 2.0 3.5 5.0	2 The uncertainty quoted is for the departure from flatness, straightness, parallelism or squareness, ie the distance separating the parallel planes which just enclose the surface under consideration.	A
Screw plug gauges (parallel) including check and setting plugs See Note 4	1 to 100 diameter 100 to 200 200 to 300	3.0 4.0 5.0	3 Calibration results may also be given in units of lbf.in and lbf.ft.	A
Screw ring gauges (parallel) See Notes 4 and 5	1 to 50 50 to 150 150 to 300	5.0 6.0 8.0	4 Single and multi-start, symmetrical thread forms only.	A
Screw thread pitch	0.2 to 8	1.5	5. 1 mm to 12 mm diameter range relates to functional test of size using check plugs.	A
Screw thread flank angles	0° to 52°	5.0 minutes of arc		A
Length gauges, flat and spherical ended	25 to 600	1.0 + (8.0 x length in m)		A
Plain gap gauges (parallel)	0.5 to 100 100 to 200	3.0 5.0		A
Parallels	As BS 906:1972 5 to 50 x 100 x 400	From 1.5 up to 5.0		A
Vee blocks	As BS 3731:1987 20 to 150 diameter, vee capacity	From 2.5 up to 7.0		A



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ANGLE				
Square Blade type	As BS 939:2007 50 to 300 300 to 600	3.0 on squareness 5.0 (See Note 2)		A
Angle plates and box angle plates	As BS 5535:1978 50 to 600	Squareness: 3.0 + (1.0 per 100 mm) Parallelism: 1.0 + (1.0 per 100 mm) See note 2		A
FORM				
Straight edges Cast iron	As BS 5204:Part 1:1975 300 to 8000	1.0 + (2.0 x length in m) See note 2		A
Steel, Granite	As BS 5204:Part 2:1977 300 to 2000			
Surface plates Granite Cast iron	As BS 817:2008 160 x 100 to 4000 x 6000	1.5 + (0.80 x diagonal in m) See Note 2		A & B
MEASURING INSTRUMENTS AND MACHINES				
Micrometers External	As BS 870:2008 0 to 900			A
Internal	As BS 959:2008 0 to 900	Heads 2.0 between any two points. Setting and extension rods 1.0 + (8.0 x length in m)		
Depth	As BS 6468:2008 0 to 300			
Three point bore micrometers	3 to 100 100 to 150	Overall performance 5.0 Overall performance 8.0		A
Bore indicators	2 to 100 100 to 150	Overall performance 5.0 Overall performance 8.0		A
Micrometer heads	As BS 1734:1951 0 to 100	1.0		A
Vernier gauges Caliper / Dial	As BS 887:2008 0 to 1000 As BS 1643:2008 0 to 1000 As BS 6365:2008 0 to 600	Overall performance 10 + (30 x length in m)		A



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MEASURING INSTRUMENTS AND MACHINES (cont'd)				
Dial gauges and dial test indicators	As BS 907:2008 and BS 2795:1981 0 to 50	1.0		A
Electronic height gauges	0 to 1000	1.0 + (5.0 x length in m)		A
Profile projectors	10 to 100 magnifications	125 at the screen 5.0 linear 3.0 minutes of arc		A & B
Feeler gauges	As BS 957:2008 0.02 to 1.00	3.0		A
Spirit levels	As BS 3509:1962 and BS 958:1968 5 seconds of arc to 60 minutes of arc nominal sensitivity	Mean sensitivity 10 % of nominal Minimum of 0.50 seconds of arc		A
Electronic indicating levels	0 to 10 minutes of arc	1.0 % of range Minimum 0.50 seconds of arc		A
TORQUE				
Hand torque tools	As BS EN ISO 6789:2003 1 Nm to 1350 Nm	1.0 % of applied torque See Note 3		A
ELECTRICAL				
DC Resistance				
Sourcing	100 $\mu\Omega$ 1 m Ω 10 m Ω 100 m Ω 1 Ω 10 Ω 100 Ω 1 k Ω 10 k Ω 100 k Ω 1 M Ω 10 M Ω	70 ppm 35 ppm 15 ppm 12 ppm 6.0 ppm 5.0 ppm 4.0 ppm 4.0 ppm 3.0 ppm 3.0 ppm 6.0 ppm 10 ppm		A
Measurement	0 Ω to 100 Ω 100 Ω to 100 k Ω 100 k Ω to 1 M Ω 1 M Ω to 10 M Ω	10 ppm + 0.20 m Ω 10 ppm 15 ppm 20 ppm		A



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ELECTRICAL				
DC Resistance Measurement (cont'd)	0 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 100 k Ω 100 k Ω to 1 M Ω 1 M Ω to 10 M Ω	25 ppm + 1.0 m Ω 15 ppm 10 ppm 45 ppm 60 ppm		B
Generation	0.001 Ω to 10 Ω 10 Ω to 10 k Ω 10 k Ω to 1 M Ω 1 M Ω to 10 M Ω	100 ppm + 1.0 m Ω 25 ppm 120 ppm 250 ppm		B
DC Voltage Standard Cell Values		0.80 μ V	The stated uncertainty can be realised with cells only if they have their own temperature controlled enclosure of appropriate thermal stability	A
Other Values	1 μ V to 1.1 V 1.1 V to 11 V 11 V to 100 V 100 V to 1 kV 1 kV to 12 kV	0.80 ppm + 0.20 μ V 2.4 ppm + 0.20 μ V 2.5 ppm 2.5 ppm 0.50 %		A
Measurement	0 mV to 100 mV 100 mV to 100 V 100 V to 1000 V	25 ppm + 2.0 μ V 20 ppm 20 ppm		B
Generation	0 V to 1 V 1 V to 1000 V	25 ppm + 1.0 μ V 35 ppm		B
DC Voltage Ratio	0 to unity	0.10 ppm of input + 0.40 μ V	For input voltages in the range 1 to 100 V	A
DC Current Measurement and sourcing	1 μ A to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 3 A 3 A to 10 A 20 A 50 A and 100 A	15 ppm 20 ppm 25 ppm 25 ppm 45 ppm 80 ppm 0.020 %		A
Generation	Up to 100 mA 100 mA to 10 A	0.010 % 0.035 %		B



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AC Voltage	10 mV to 250 mV 40 Hz to 20 kHz	0.014%		A
	250 mV to 16 V 20 Hz to 50 kHz 50 kHz 100 kHz	40 ppm 30 ppm 35 ppm		
	16 V to 125 V 20 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz 100 kHz	30 ppm 25 ppm 25 ppm 25 ppm		
	125 V to 1000 V 20 Hz to 10 kHz 50 kHz	60 ppm 50 ppm		
	250 V 50 kHz	40 ppm		
	1 kV to 10 kV 50 Hz to 60 Hz	1.0 %		
Generation	40 Hz to 100 kHz 10 mV to 10 V 10 V to 1000 V	0.020 % 0.030 %		B
	AC Current			A
Specific Values	40 Hz to 1 kHz 1 μ A and 10 μ A 100 μ A 1 mA 10 mA 100 mA 200 mA, 500 mA and 1 A 2 A 5 A 10 A 20 A	40 ppm 20 ppm 10 ppm 15 ppm 10 ppm 55 ppm 60 ppm 65 ppm 75 ppm 100 ppm		
	1 kHz to 5 kHz 1 μ A and 10 μ A 100 μ A	130 ppm 25 ppm		
	5 kHz to 10 kHz 100 μ A	30 ppm		
	1 kHz to 10 kHz			



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AC Current				
Specific Values	1 mA 10 mA 100 mA 200 mA, 500 mA and 1 A 2 A 5 A 10 A 20 A	20 ppm 15 ppm 10 ppm 65 ppm 80 ppm 80 ppm 70 ppm 120 ppm		
Other Values	40 Hz to 1 kHz 1 μ A to 10 μ A 10 μ A to 100 mA 100 mA to 10 A 10 A to 20 A 1 kHz to 5 kHz 1 μ A to 10 μ A 1 kHz to 10 kHz 10 μ A to 100 mA 100 mA to 10 A 10 A to 20 A 45 Hz to 60 Hz 50 A to 100 A	40 ppm 20 ppm 75 ppm 100 ppm 130 ppm 30 ppm 80 ppm 120 ppm 150 ppm		
Generation	40 Hz to 10 kHz 10 μ A to 10 A	0.030 %		B
AC Resistance	40 Hz to 1 kHz 0.05 Ω 0.1 Ω 0.2 Ω 0.5 Ω 1 Ω 2 Ω 5 Ω 10 Ω 100 Ω 1 k Ω 10 k Ω 100 k Ω	120 ppm 90 ppm 80 ppm 75 ppm 70 ppm 70 ppm 70 ppm 45 ppm 45 ppm 45 ppm 50 ppm 65 ppm		A
AC/DC Voltage Transfer	250 mV to 16 V 20 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz 100 kHz	40 ppm 40 ppm 30 ppm 35 ppm		A



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AC/DC Voltage Transfer	16 V to 125 V 20 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz 100 kHz 250 V 20 Hz to 10 kHz 20 kHz 50 kHz 500 V to 1 kV 20 Hz to 10 kHz 20 kHz	35 ppm 25 ppm 25 ppm 25 ppm 60 ppm 35 ppm 40 ppm 85 ppm 120 ppm		
AC Power	47 Hz to 63 Hz Voltages 60 V to 240 V Currents 0.5 A to 5 A 15 W to 1200 W Voltages 60 V to 240 V Currents 5 A to 100 A 150 W to 24 kW Combination of specific voltage and current values: V = 75, 100, 150, 300 V I = 0.5, 1, 2, 5, 10, 20 A	90 ppm 150 ppm 0.035 %	Unity to 0.5 power factor lagging or leading Unity to 0.5 power factor lagging or leading. Calibrations at lower power factors can be carried out to greater uncertainties.	A
Frequency	0.2 Hz to 1 kHz 1 kHz to 500 MHz	2 in 10^8 2 in 10^8	Multi-period measurement Frequency measurement	A
Rise/Fall Time	160 ps to 500 ns	5.0 % + 20 ps		A
PRESSURE				
Gas pressure (gauge)				A
Calibration of pressure indicators and gauges	- 90 kPa to 0 kPa 0 kPa to 250 kPa 250 kPa to 2 MPa	390 Pa 600 Pa 940 Pa	Absolute pressure calibration can be carried out using associated barometric pressure measurement. The uncertainty will increase by 200 Pa.	A



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PRESSURE				
Hydraulic pressure (gauge)				A
Calibration of pressure indicators and gauges	690 kPa to 69 MPa	0.037 %	Calibration of devices with an electrical output may be undertaken.	A
For Calibrations undertaken on Water	0 MPa to 70 MPa	60 kPa		A
END				