


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

 <p>UKAS CALIBRATION</p> <p>0331</p> <p>Accredited to ISO/IEC 17025:2005</p>	<p>EMICS Ltd</p> <p>Issue No: 021 Issue date: 03 August 2009</p>	
	<p>248 Radford Blvd Radford Nottingham NG7 5QG</p>	<p>Contact: Mr S Tingey Tel: +44 (0)115-9424748 Fax: +44 (0)115-9424746 E-Mail: stevetingey@emics.co.uk Website: www.emics.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 248 Radford Blvd Radford Nottingham NG7 5QG</p>	<p>Local contact Mr S Tingey</p>	<p>Dimensional Electrical Pressure</p>	<p>A</p>

Site activities performed away from the locations listed above:

Location details		Activity	Location code
<p>At customers premises</p>	<p>Mr S Tingey</p>	<p>Dimensional Electrical</p>	<p>B</p>



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DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Best Measurement Capability Expressed as an Expanded Uncertainty ($k=2$)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
LENGTH			NOTES	
Plain plug gauges (parallel), cylindrical setting standards and rollers	From 1 up to 50 diameter Above 50 up to 100 100 up to 150 150 up to 200 200 up to 300	0.5 0.8 1 1.2 1.6	1 All calibrations must be carried out in accordance with procedures agreed by UKAS.	A
Thread measuring cylinders	As BS 5590	0.5	2 In addition to specified items, other similar items, including parts of Measuring instruments and machines, may be calibrated (see Note 1) to the uncertainties stated. Where the item or part calibrated is of lower quality due to wear, errors in geometry or form, poor surface texture, or where any other factor that adversely affects the measurement capability, greater uncertainties must be quoted.	A
Length gauges, flat and spherical ended	Up to 600	1 + (8 x length in m)		A
Plain gap gauges (parallel)	From 0.5 up to 100 Above 100 up to 200 200 up to 300	3 5 8		A
Screw plug gauges (parallel) including check and setting plugs See Note 5	From 1 up to 100 diameter Above 100 up to 150 150 up to 200	2.5 5 8] on pitch diameter	A
Screw plug gauges (taper) including check plugs See Note 4	From 5 up to 100 diameter	5 By check plugs		A
Screw ring gauges (parallel) See Note 5	From 3 up to 14 diameter From 5 up to 75 diameter Above 75 up to 150 150 up to 250	5 7 10 pitch: 1.5 flank angle: $2+(800/(M \times P))$ Minutes of arc Where M is the projector magnification and P is pitch in mm	3 The uncertainty quoted is for the departure from flatness, straightness, parallelism, or squareness, i.e. the distance separating the two parallel planes which just enclose the surface under consideration.	A
Screw ring gauges (taper) See Note 4	From 6 up to 150 diameter	7	4. Single start, symmetrical thread forms only.	A
Parallels	As BS906:1972 up to 50 x 100 x 400	Dependent on size and grade From 1.5 up to 5	5. Single and multi-start symmetrical and asymmetrical thread forms.	A
Vee blocks	As BS 3731:1987 up to 150	Dependent on size and grade From 2.5 up to 5		A



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RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
LENGTH (Cont'd)				
Receiver, position and profile gauges, jigs, fixtures	Maximum dimensions Up to 1 m x 750 x 500	Dependent on size and grade Minimum per co- ordinate: $3 + (10 \times \text{length in m})$		A
ANGLE				
Squares Blade type	As BS 939:1977 up to 300 Above 300 up to 600	3 <input type="checkbox"/> On squareness 5 <input type="checkbox"/> See Note 3		A
Angle plates and box angle plates	As BS 5535:1978	Squareness: <input type="checkbox"/> $3 + (1 \text{ per } 100 \text{ mm})$ Parallelism: $1 + (1 \text{ per } 100 \text{ mm})$ <input type="checkbox"/> See Note 3		A
Sine bars and tables	As BS 3064:1978 and up to 500 length	Linear dimensions: $1 + (10 \times \text{length in m})$ Overall performance: 3 seconds of arc		A
Sine centres	Up to 500 length or between centres	Linear dimensions: $1 + (10 \times \text{length in m})$ Overall performance: 5 seconds of arc		A
Spirit levels	As BS 3509:1962 and BS 958:1968	Mean sensitivity 10% of nominal Minimum 0.5 seconds or arc		A
FORM				
Surface plates Granite Cast iron	<input type="checkbox"/> As BS 817:1988 and above	$1.5 + (0.8 \text{ diagonal in m})$ See Note 3		A,B
Steel balls	From 1 up to 25 diameter	0.5 on diameter		A



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RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
MEASURING INSTRUMENTS AND MACHINES				
Micrometers				
External Internal Depth	As BS 870:1950 As BS 959:1950 As BS 6468:1984	Heads: 2.0 between any two points Setting and extension rods $1 + (8 \times \text{length in m})$		A
Micrometer heads	As BS 1734:1951		1.0	A
Bench micrometer		Overall performance 1.0		A
Vernier caliper, height and depth gauges	As BS 887:1982 and BS 1643:1983	Overall performance $10 + (30 \times \text{length in m})$		A
Dial gauges and dial test indicators	As BS 907:1965 and BS 2795:1981	1.0		A
Height setting micrometer	Up to 300	Heads 1.0 Stepped column 1.6 Overall performance 2.0		A
Riser blocks for above	150 300	1.0 2.0		A
Comparators (external)	As BS 1054:1975 up to 10 000 magnifications	1% of range Minimum 0.2		A
Graduated rules	As BS 4372:1968	$5 + (10 \times \text{length in m})$		A
Bevel protractors	As BS 1685:1951	1 min of arc + 1 vernier division		A
Bench centres	Up to 1 m between centres	Linear dimensions $1 + (10 \times \text{length in m})$		A
Electronic height gauges with microprocessor control	Up to 1 m	$2 + (5 \times \text{length in m})$		A,B
ELECTRICAL				
DC VOLTAGE				
Generation	Up to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1000 V 1kV to 30 kV 30 kV to 50kV	11 ppm + 3 μ V 9 ppm + 6 μ V 7 ppm + 47 μ V 8 ppm + 0.5 mV 10 ppm + 5 mV 0.4% + 7 V 0.4% + 65 V		A



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Measured Quantity Instrument or Gauge	Range	Best Measurement Capability Expressed as an Expanded Uncertainty ($k=2$)	Remarks	Location Code
ELECTRICAL				
DC VOLTAGE				
Measurement	Up to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1000 V 1kV to 30 kV 30 kV to 50kV	10 ppm + 2 μ V 9 ppm + 4 μ V 9 ppm + 26 μ V 14 ppm + 0.4 mV 14 ppm + 4 mV 0.4% + 7 V 0.4% + 65 V		A
DC RESISTANCE				
Sourcing	10 Ω 100 Ω 1 k Ω 10 k Ω 100 k Ω 1 M Ω 10 M Ω 100 M Ω 1 G Ω	52 ppm 23 ppm 15 ppm 14 ppm 18 ppm 35 ppm 115 ppm 0.1% 1.5%		A
Measurement	Up to 20 Ω 20 Ω to 200 Ω 200 Ω to 2 k Ω 2 k Ω to 20 k Ω 20 k Ω to 200 k Ω 200 k Ω to 2 M Ω 2 M Ω to 20 M Ω 20 M Ω to 200 M Ω 200 M Ω to 1 G Ω	18 ppm + 150 $\mu\Omega$ 13 ppm + 0.75 m Ω 11 ppm + 6 m Ω 11 ppm + 60 m Ω 11 ppm + 1 Ω 17 ppm + 20 Ω 60 ppm + 320 Ω 350 ppm + 18 k Ω 0.35% + 1.1 M Ω		A
DC CURRENT				
Generation	Up to 200 μ A 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	60 ppm + 12 nA 45 ppm + 16 nA 60 ppm + 100 mA 45 ppm + 2 μ A 150 ppm + 28 μ A 0.03% + 0.5 mA		A
Measurement	Up to 200 μ A 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	120 ppm + 4 nA 120 ppm + 21 nA 120 ppm + 210 nA 120 ppm + 3 μ A 230 ppm + 40 μ A 860 ppm + 5 mA		A



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Measured Quantity Instrument or Gauge	Range	Best Measurement Capability Expressed as an Expanded Uncertainty ($k=2$)	Remarks	Location Code
AC VOLTAGE				
Generation	<i>50 Hz to 1 kHz</i> Up to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1000 V <i>1 kHz to 20 kHz</i> Up to 2 V 2 V to 20 V <i>50 Hz</i> 1 kV to 30 kV 30 kV to 50 kV	0.03% + 36 μ V 0.02% + 120 μ V 0.02% + 1.2 mV 0.02% + 14 mV 0.02% + 120 mV 0.035% + 0.2 mV 0.035% + 2 mV 0.75% + 75 V 0.75% + 290 V		A
Measurement	<i>50 Hz to 10 kHz</i> Up to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1000 V <i>10 kHz to 30 kHz</i> up to 2 V 2 V to 20 V <i>50 Hz</i> 1 kV to 30 kV 30 kV to 50 kV	150 ppm + 20 μ V 150 ppm + 80 μ V 150 ppm + 0.7 mV 150 ppm + 8 mV 160 ppm + 80 mV 0.03% + 80 μ V 0.03% + 0.8 mV 0.75% + 75 V 0.75% + 290 V		A
AC CURRENT				
Generation	<i>50 Hz to 1 kHz</i> Up to 200 μ A 200 μ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A 2 A to 20 A	0.06% + 520 nA 0.06% + 0.6 μ A 0.06% + 1.7 μ A 0.06% + 17 μ A 0.07% + 0.6 mA 0.08% + 5 mA		A
Measurement	<i>50 Hz to 1 kHz</i> Up to 200 μ A 200 μ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A <i>50 Hz to 60 Hz</i> 2A to 30 A	0.04% + 0.03 μ A 0.04% + 0.25 μ A 0.04% + 2.5 μ A 0.04% + 25 μ A 0.07% + 0.5 mA 0.77% + 16 mA		A



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AC CURRENT				
Electrical calibration of temperature indicators for the following sensors:				A
Noble metal thermocouples	0 °C to 1600 °C	0.5 °C	Including cold junction compensation	
Base metal thermocouples	-200 °C to 1300 °C	0.35 °C	Including cold junction compensation	
Resistance sensors	-200 °C to 850 °C	0.2 °C		
Electrical calibration of temperature indicators for the following sensors:				B
Noble metal thermocouples	0 °C to 1600 °C	0.9 °C	Including cold junction compensation	
Base metal thermocouples	-200 °C to 1300 °C	0.7 °C	Including cold junction compensation	
Resistance sensors	-200 °C to 850 °C	0.3 °C		
FREQUENCY	Up to 160 MHz	1.2 in 10 ⁹ + 0.3 MHz		A
PERIOD	10 ns to 17000 s	1.5 in 10 ⁹		A
TIME INTERVAL	1 s to 8 x 10 ⁵ s	8 in 10 ⁹		A
PRESSURE				
<u>Gas Pressure Gauge</u>				A & B
Calibration of pressure indicating instruments and gauges	-90 kPa to 0 0 to 20 kPa 20 kPa to 2 MPa	0.06 % + 20 Pa 0.02 % + 20 Pa 0.06 % + 20 Pa		
<u>Gas Pressure Absolute</u>				A & B
Calibration of pressure indicating instruments and gauges	10 kPa to 80 kPa 80 kPa to 115 kPa 115 kPa to 2.1 MPa	0.06 % + 32 Pa 25 Pa 0.06 % + 32 Pa		
<u>Hydraulic Pressure Gauge</u>				A & B
Calibration of pressure indicating instruments and gauges	0 to 14 MPa 14 MPa to 70 MPa	0.01 % + 17 kPa 0.1 % + 10 kPa		

END