


# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

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

 <b>0199</b> <b>Accredited to ISO/IEC 17025:2005</b>	<b>Avon-Dynamic Calibration</b> <b>Issue No: 026    Issue date: 16 June 2010</b>	
	<b>Unit 24</b> <b>Station Road Work Shops</b> <b>Station Road</b> <b>Kingswood</b> <b>Bristol</b> <b>BS15 4PJ</b>	<b>Contact: Mr R Stone</b> <b>Tel: +44 (0)117-9701 501</b> <b>Fax: +44 (0)117-9701 500</b> <b>E-Mail: info@avon-dynamic.co.uk</b> <b>Website: www.avon-dynamic.co.uk</b>

**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
<b>Address</b> Unit 24 Station Road Work Shops Station Road Kingswood Bristol BS15 4PJ	Dimensional	A
<b>Local contact</b> Mr R Stone  Mr P W Beamson	Electrical	A

#### Site activities performed away from the locations listed above:

Location details	Activity	Location code
At customers premises      Mr R Stone	Dimensional	B



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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	
Gauge blocks		Class (see notes)	<p><b>Class C</b> uncertainties apply to the measurement of length of steel gauges by comparison with grade K standards of length of a similar material. Class C uncertainties apply to new grade 0, 1 and 2 gauges to BS 4311:Part 1:1993 and represent the best capability for all grades of used gauges to BS 4311:Part 3:1993.</p> <p><b>Class D and E</b> uncertainties are the maximum applicable to the measurement of length of steel grade 3 and 4 gauges respectively to BS 4311:Part 3:1993, by comparison with grade K standards of length of a similar material.</p> <p>1 All calibrations must be carried out in accordance with Procedures agreed by UKAS</p> <p>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 lower quality due to wear, errors in geometry of form, poor surface texture, or where any other factor that adversely affects the measurement capability, greater uncertainties must be quoted.</p>	
Inch (steel)	As BS 4311:Parts 1 & 3:1993	C D E		A
	Up to 0.4 in	3 4 6		} $\mu$ in
	Above 0.4 in up to 1 in	4 5 8		
	Size 2 in	5 7 10		
	Size 3 in	6 8 12		
	Size 4 in	7 10 14		
Millimetre (steel)	As BS EN ISO 3650:1999			A
	Up to 10	0.08 0.10 0.15		
	Above 10 up to 25	0.1 0.13 0.20		
	Sizes 30, 40, 50,	0.12 0.17 0.25		
	60, 70, 75	0.15 0.21 0.30		
	80, 90, 100	0.18 0.25 0.35		
Gauge blocks accessories	As BS 888 and BS 4311:Part 2	0.3	A	
Length bar accessories	As BS 1790:1961 and BS 5317	0.3	A	
Thread measuring cylinders	As BS 5590:1978 and specials	0.5	A	
plain plug gauges (parallel), cylindrical standards and rollers	From 1 up to 50 diameter	0.8	} on diameter	
	From 50 up to 150 diameter	1		
	From 1 up to 50	1.5		
Plain ring gauges (parallel) and setting standards	Above 50 up to 100	2		
Steel balls - steel	Up to 50	1		
Plain gap gauges (parallel)	From 0.5 up to 100	3	A	
	Above 100 up to 200	5		
	Above 200 up to 300	8		



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RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
LENGTH (Cont'd)			NOTES (Cont'd)	
Screw plug gauges (parallel) including check and setting plugs See Note 5	From 1 up to 100 diameter	3 } on pitch diameter	3 The uncertainty quoted is for the departure from either flatness, straightness, parallelism planes, which just enclose the surface under consideration.	A
Screw plug gauges (taper) including check plugs See Note 4	From 1 up to 100 diameter			
Screw ring gauges (parallel) See Note 5	From 1 up to 6 diameter	By check plugs	4. Single start, symmetrical thread forms only.  5. Single start symmetrical and asymmetrical thread forms only.	
	From 6 up to 100 diameter	5 } on pitch diameter		
Screw ring gauges (taper) See Note 4	From 5 up to 50 diameter	By check plugs		
	Form 10 to 150	7 on pitch diameter		
		Pitch: 1.0 flank angle: $2 + (800/I(M \times P))$ Minutes of arc Where $M$ is projector magnification and $P$ is pitch in mm		
Screw thread adjustable caliper gauges (parallel) See Note 5	From 3 up to 50 diameter	By setting plugs		A
Length gauges, flat and spherical ended	Up to 1 m	$1 + (8 \times \text{length in m})$		A
Engineers parallels	As BS 906:Part 1:1972 up to 50 x 100 x 400	Dependant on size and grade From 1.5 up to 5		A
Vee blocks	As BS 3731:1987 up to 150	Dependant on size and grade.		A
Receiver, position and profile gauges, jigs and fixtures	Up to 1000 x 600 x 600	Minimum per co- ordinate $3 + (10 \times \text{length in m})$		A
ANGLE				
Squares				A
Blade type	As BS 939:1977 up to 300 Above 300 up to 600	3 } 5 }		A
Cylindrical	As BS 939:1977 up to 300 Above 300 up to 600	2 } 5 } On squareness See note 3		
Block	As BS 939:1977 up to 300 Above 300 up to 600	3 } 5 }		



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RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
ANGLE (Cont'd)				
Right angle and box angle plates	As BS 5535:1978	Squareness: 3 + (1 per 100 mm) Parallelism: 1 + (1 per 100 mm) See Note 3		A
Sine bars and tables	As BS 3064:1978 up to 250 length	Linear dimensions 1 + (10 x length in m) Overall performance 3 seconds of arc		A
Electronic indicating levels	Up to 20 minutes of arc	1 % of range Minimum 0.5 seconds of arc		A
Spirit levels	As BS 3509:1962 and BS 958:1968	Mean sensitivity 10% of nominal Minimum 0.5 seconds of arc		A
Clinometers	From 0 - 360 deg	10 seconds of arc or greater Dependant on sensitivity		A
Thread measuring vee pieces (prisms)	As NPL Schedule MOY/SCM1/60	Within schedule requirements		A
FORM				
Surface plates Granite Cast iron	As BS 817:1988 and above up to 1600 x 1000	1.5 + (0.8 x diagonal in m) See note 3		A
Straightedges Cast iron Steel Granite	As BS 5204:Part 1:1975 As BS 5204:Part 2:1977 Up to 1800	1 + (2 x length in m) See note 3		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 870:1959 As BS 959:1959 As BS 6468:1984	Heads: 2.0 Setting and extension rods $1 + (8 \times \text{length in m})$		A
Micrometer heads	As BS 1734:1951		1.0	A
Bore micrometers (three point)	Up to 150 diameter	5.0		A
Bench micrometers		Overall performance 2.0		A
Height setting micrometer	Up to 300	Heads:1.2 Stepped column 2 Overall performance 2.5		A
Riser blocks for above	150 300	1.0 2.0		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
Comparators (external)	As BS 1054:1975 up to 10 000 magnifications	1% of range Minimum 0.2		A
Dial gauges and dial test indicators	As BS 907:1965 and BS 2795:1981	1.0		A
Bevel protractors	As BS 1685:1959	1 minute of arc + 1 vernier division		A
Thread diameter measuring	Up to 200 capacity	Dependant on quality and overall performance		A
Steel Rules	As BS 4372:1968 Up to 1000	$15 + (20 \times \text{length in m})$		A
Feeler Gauges	As BS 975:Part 1:1941 BS 957:Part 2:1969	3		A
Electronic Height Gauges with microprocessor control	Up to 1m	$1 + (8 \times \text{length in m})$		A, B



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MEASURING INSTRUMENTS AND MACHINES (Cont'd)				
Surface plates Granite Cast iron	As BS 817:1988	1.5 + (0.8 x length in m)		A, B
Coordinate measuring machines	As ISO 10360-2	1 + (3 x length in m)		B
Profile projectors	Up to 100 magnification	125 at the screen Linear 5 Angular 3 minutes of arc		B
<b>ELECTRICAL</b>				
DC VOLTAGE				
Generation Specific Values	100 mV 1 V 10 V 100 V 1000 V	8 ppm 4 ppm 3 ppm 4 ppm 6 ppm		A
Generation and Measurement	Up to 10 mV 10 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1 kV	100 ppm + 1.0 $\mu$ V 10 ppm + 0.5 $\mu$ V 5 ppm + 2 $\mu$ V 5.0 ppm 8.0 ppm 15 ppm		A
AC VOLTAGE				
Generation and Measurement	1 kHz 100 $\mu$ V to 1 mV 1 mV to 100 mV  100 kHz 100 $\mu$ V to 1 mV 1 mV to 10 mV 10 mV to 100 mV 100 V  30 kHz 1000 V  30 Hz to 10 kHz 100 $\mu$ V to 2 mV 2 mV to 20 mV 20 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V	0.5% 0.05%  1% 0.5% 0.1% 0.03%  0.05%  0.5% 0.1% 0.1% 0.03% 0.03% 0.03%		A



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AC VOLTAGE (cont'd)  Generation and Measurement (cont'd)	<i>50 Hz to 10 kHz</i> 200 V to 1000 V <i>10 kHz to 100 kHz</i> 100 $\mu$ V to 2 mV 2 mV to 20 mV 20 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V  <i>100 kHz to 330 kHz</i> 2 V to 20 V  <i>30 Hz, 100 Hz, 300 Hz, 1 kHz,</i> <i>3 kHz, 10 kHz, 30 kHz</i> 100 mV to 1 V 1 V to 10 V 10 V to 100 V  <i>45 Hz, 100 Hz, 300 Hz, 1 kHz,</i> <i>3 kHz, 10 kHz</i> 100 V to 1000 V  <i>100 kHz, 300 kHz, 1 MHz</i> 1 V 10 V	0.04%  1.0% 0.15% 0.1% 0.05% 0.05% 0.05%  0.15%  0.05% 0.02% 0.02%  0.02%  0.5% 0.5%		A
DC RESISTANCE  Specific Values	10 $\Omega$ 100 $\Omega$ 1 k $\Omega$ 10 k $\Omega$ 100 k $\Omega$ 1 M $\Omega$ 10 M $\Omega$ 100 M $\Omega$ 1 G $\Omega$	15 ppm 10 ppm 18 ppm 6 ppm 10 ppm 20 ppm 30 ppm 0.03% 0.3%		A
Other Values	Up to 10 $\Omega$ 10 $\Omega$ to 20 $\Omega$ 20 $\Omega$ to 200 $\Omega$ 200 $\Omega$ to 2 k $\Omega$ 2 k $\Omega$ to 20 k $\Omega$ 20 k $\Omega$ to 200 k $\Omega$ 200 k $\Omega$ to 2 M $\Omega$ 2 M $\Omega$ to 20 M $\Omega$ 20 M $\Omega$ to 200 M $\Omega$ 200 M $\Omega$ to 1 G $\Omega$	60 ppm + 7 $\mu\Omega$ 60 ppm 20 ppm 22 ppm 10 ppm 15 ppm 30 ppm 40 ppm 600 ppm 0.6%		



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DC RESISTANCE (cont'd)				A		
Current Carrying Resistors	250 $\mu\Omega$ at 10 A	600 ppm	Higher currents are available but will result in increased uncertainties	A		
	1 m $\Omega$ at 10 A	250 ppm				
	3 m $\Omega$ at 10 A	250 ppm				
	5 m $\Omega$ at 10 A	250 ppm				
	10 m $\Omega$ at 1 A	150 ppm				
	100 m $\Omega$ at 1 A	50 ppm				
DC CURRENT	10 $\mu$ A to 100 $\mu$ A	80 ppm	For the calibration of clamp meters only	A		
	100 $\mu$ A to 100 mA	50 ppm				
	100 mA to 1 A	90 ppm				
	1 A to 10 A	0.02%				
AC CURRENT	10 A to 100 A	0.1%	For the calibration of clamp meters only	A		
	100 A to 500 A	0.2%				
	100 $\mu$ A to 1 mA	0.03%				
	10 Hz to 5 kHz					
	1 mA to 10 mA	0.03%				
	10 Hz to 5 kHz					
	10 mA to 100 mA	0.03%				
	10 Hz to 5 kHz					
	100 mA to 1 A	0.035%				
	10 Hz to 5 kHz					
	1 A to 10 A	0.05%				
	50 Hz to 400 Hz					
Generation Only	10 A to 100 A	0.1% ——— ]	For the calibration of clamp meters only	A		
	Up to 100 Hz					
	100 Hz to 440 Hz					
	100 A to 500 A	0.2% ——— ]				
	Up to 100 Hz					
CAPACITANCE	1 pF to 1 $\mu$ F	50 ppm		A		
	1 kHz					
FREQUENCY				A		
Specific Values	1 MHz, 5 MHz and 10 MHz	3 in 10 <sup>9</sup>				
Other Values	1 Hz to 10 Hz	3 in 10 <sup>5</sup> ——— ]	Period Mode	A		
	10 Hz to 100 Hz					
	100 Hz to 1 kHz					
	1 kHz to 10 kHz					
	10 kHz to 100 kHz					
	100 kHz to 1 MHz					
	1 MHz to 10 MHz					
	10 MHz to 1 GHz					
						Frequency Mode



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TIME INTERVAL	1 s to 1000 s	2 ms		A
ELECTRICAL SIMULATION OF TEMPERATURE READING INSTRUMENTS	Ice Point	0.06 °C	Support measurement suitable for measurement of cold junction compensation devices	A
Cold junction	laboratory ambient temperature	0.5 °C		
Electrical calibration of temperature simulators for the following sensors:				
Noble metal thermocouples	-200 °C to 1800 °C	0.20 °C	Excluding cold junction compensation	
Base metal thermocouples	-200 °C to 1380 °C	0.10 °C	Excluding cold junction compensation	
Resistance sensors	-200 °C to 800 °C	0.05 °C	(PT 100)	
Electrical calibration of temperature indicators, controllers and recorders for the following sensors:				
Noble metal thermocouples	-200 °C to 1800 °C	0.25 °C	Excluding cold junction compensation	
Base metal thermocouples	-200 °C to 1380 °C	0.15 °C	Excluding cold junction compensation	
Cold junction	laboratory ambient temperature	0.50 °C		
Resistance sensors	-200 °C to 800 °C	0.08 °C		
END				