


# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

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

 <p style="text-align: center;"><b>0316</b></p> <p style="text-align: center;">Accredited to <b>ISO/IEC 17025:2005</b></p>	<h3 style="margin: 0;">Cuthbertson Laird Group</h3> <p style="margin: 0;">Issue No: 026    Issue date: 13 May 2008</p>	
	<p>Parkburn Court Burnbank Hamilton Scotland ML3 0QQ</p>	<p>Contact: Mr G A Vallance Tel: +44 (0)1698-829711 Fax: +44 (0)1698-828363 E-Mail: <a href="mailto:hamilton@cuthbertsonlaird.co.uk">hamilton@cuthbertsonlaird.co.uk</a> Website: <a href="http://www.cuthbertsonlaird.co.uk">www.cuthbertsonlaird.co.uk</a></p>
<p><b>Calibration performed by the Organisations at the locations specified below</b></p>		

### Locations covered by the organisation and their relevant activities

#### Laboratory locations:

Location details	Activity	Location code
<p><b>Address</b> Parkburn Court Burnbank Hamilton Scotland ML3 0QQ</p> <p style="margin-left: 100px;"><b>Local contact</b> Mr G A Vallance</p>	Dimensional & Electrical	A

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

Location details	Activity	Location code
At customers premises	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																						
<b>LENGTH</b>																						
Gauge Blocks		Class (See Notes)	<b>NOTES</b>	A																		
Inch (Steel)	As BS 4311:Parts 1&3:1993 Up to 0.4 in Above 0.4 in up to 1 in Size 2 in Size 3 in Size 4 in	<table border="0"> <tr> <td>C</td> <td>D</td> <td>E</td> <td rowspan="7">} <math>\mu</math> inches</td> </tr> <tr> <td>3</td> <td>4</td> <td>6</td> </tr> <tr> <td>4</td> <td>5</td> <td>8</td> </tr> <tr> <td>5</td> <td>7</td> <td>10</td> </tr> <tr> <td>6</td> <td>8</td> <td>12</td> </tr> <tr> <td>7</td> <td>10</td> <td>14</td> </tr> </table>	C	D	E	} $\mu$ inches	3	4	6	4	5	8	5	7	10	6	8	12	7	10	14	<b>Class C</b> uncertainties apply to the measurement of length by comparison with grade K standards of length of a similar material. <b>Class C</b> uncertainties apply to new grade 0, 1 and 2 gauges to BS EN ISO 3650:1999 and represent the best capability for all Grades of used gauges to BS 4311:Part 3:1993.
C	D	E	} $\mu$ inches																			
3	4	6																				
4	5	8																				
5	7	10																				
6	8	12																				
7	10	14																				
Millimetre (Steel)	As BS EN ISO 3650:1999 & As BS 4311:Parts 1&3:1993 Up to 10 Above 10 up to 25 Sizes 30, 40, 50 60, 70, 75 80, 90, 100	<table border="0"> <tr> <td>C</td> <td>D</td> <td>E</td> </tr> <tr> <td>.08</td> <td>.10</td> <td>.15</td> </tr> <tr> <td>.10</td> <td>.13</td> <td>.20</td> </tr> <tr> <td>.12</td> <td>.17</td> <td>.25</td> </tr> <tr> <td>.15</td> <td>.21</td> <td>.30</td> </tr> <tr> <td>.18</td> <td>.25</td> <td>.35</td> </tr> </table>		C	D	E	.08	.10	.15	.10	.13	.20	.12	.17	.25	.15	.21	.30	.18	.25	.35	<b>Class D and E</b> uncertainties are the maximum applicable to the measurement of length of grade 3 and 4 gauges respectively to BS 4311:Part 3:1993, by comparison with grade K standards of length of a similar material.
C	D	E																				
.08	.10	.15																				
.10	.13	.20																				
.12	.17	.25																				
.15	.21	.30																				
.18	.25	.35																				
Plain Plug Gauges (Parallel)	From 1 up to 50 diameter Above 50 up to 150  From 150 up to 200 Above 200 up to 300	<table border="0"> <tr> <td>0.8</td> <td rowspan="3">} on diameter</td> </tr> <tr> <td>1.0</td> </tr> <tr> <td>3</td> </tr> <tr> <td>5</td> <td></td> </tr> </table>	0.8	} on diameter	1.0	3	5		1 All calibrations must be carried out in Accordance with procedures agreed by UKAS.  2 All calibrations may be given in Metric or Imperial units.	A												
0.8	} on diameter																					
1.0																						
3																						
5																						
Length Gauges, Flat and Spherical Ended (excluding Length Bars)	Up to 1 m	1 + (8 x length in m)	3 The uncertainty quoted is for the departure from flatness, straightness, parallelism or squareness, ie the distance separating the two parallel planes which just enclose the surface under consideration.	A																		
<b>ANGLE</b>																						
Squares Blade Type	As BS 939 up to 450	3 on squareness See Note 3		A																		



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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				
MEASURING INSTRUMENTS AND MACHINES				
Micrometers External Internal Depth	As BS 870 up to 1000 As BS 959 As BS 6468 and up to 300	Heads: 2.0 between any two points Setting and extension rods: $1 + (8 \times \text{length in m})$		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, BS 1643 and BS 6365 Up to 1000	Overall performance: $10 + (30 \times \text{length inm})$		A
Dial Gauges and Dial Test Indicators	As BS 907 and BS 2795	1.0		A
Surface Plates Granite Cast Iron	As BS 817	$1.5 + (0.8 \times \text{diagonalin m})$ See Note 3		A & B
Feeler Gauges	As BS 957	3		A
Spirit Levels	As BS 958 and BS 3509	Mean sensitivity: 10% of nominal Minimum 0.5 seconds of arc		A



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ELECTRICAL RESISTANCE (Spot 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 $\Omega$  Up to 10 $\Omega$ 10 $\Omega$ to 100 $\Omega$ 100 $\Omega$ to 1 k $\Omega$ 1 k $\Omega$ to 10 k $\Omega$ 10 k $\Omega$ to 100 k $\Omega$ 100 k $\Omega$ to 1 M $\Omega$ 1 M $\Omega$ to 10 M $\Omega$ 10 M $\Omega$ to 100 M $\Omega$ 100 M $\Omega$ to 1 G $\Omega$ 1 G $\Omega$ to 2 G $\Omega$	14 ppm 8.5 ppm 5 ppm 6.5 ppm 8 ppm 14 ppm 60 ppm 610 ppm 0.65%  200 $\mu\Omega$ 58 ppm 9 ppm 9 ppm 9 ppm 30 ppm 130 ppm 220 ppm 0.29% 2%		A
DC VOLTAGE	Up to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V 1 kV to 2 kV 10 kV to 35 kV	0.55 $\mu$ V 3 ppm 2 ppm 2.5 ppm 12 ppm 1.5% 0.25%	Measurement only	A
DC CURRENT	Up to 1 $\mu$ A 1 $\mu$ A to 10 $\mu$ A 10 $\mu$ A to 100 $\mu$ A 100 $\mu$ A to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 2.2 A 2.2 A to 11 A  11 A to 200 A 200 to 550 A 550 to 1000 A	75 pA 20 ppm 18 ppm 16 ppm 16 ppm 34 ppm 120 ppm 150 ppm ) Generate 350 ppm ) only  0.2 A 1 A 2 A	Simulated current using a multi turn coil	A



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AC RESISTANCE Generation only All at a nominal 50 Hz Spot values	20 mΩ	0.60%		A		
	50 mΩ	0.25%				
	100 mΩ	0.15%				
	200 mΩ	0.15%				
	500 mΩ	0.8%				
	1 Ω	0.43%				
	2 Ω	0.35%				
	4 Ω	0.36%				
	9 Ω	0.45%				
	Ranges	0.38 Ω to 0.5 Ω			6 mΩ	Earth Loop
		0.5 Ω to 1 Ω			15 mΩ	
		1 Ω to 5 Ω			15 mΩ	
	5 Ω to 10 Ω	35 mΩ				
	10 Ω to 100 Ω	60 mΩ				
	100 Ω to 1 kΩ	.6 Ω				
AC VOLTAGE	40 Hz to 1 kHz	300 ppm	The product of 1*V may be reported as such in terms of VA.	A		
	40 Hz to 1 kHz	120 ppm				
	40 Hz to 1 kHz	77 ppm				
	1 kHz to 100 kHz	100 ppm				
	40 Hz to 1 kHz	240 ppm				
	1 kHz to 100 kHz	250 ppm				
	40 Hz to 1 kHz	250 ppm				
	1 kHz to 100 kHz	250 ppm				
	40 Hz to 1 kHz	400 ppm				
	40 Hz to 1 kHz	500 ppm				
	50 Hz	2.3%			Generate only Measurement only Measurement only	
	50 Hz	1.5%				
AC CURRENT	45 Hz to 1 kHz	500 ppm	At increased uncertainty current up to 550 amps can be simulated using a multi turn coil. Suitable for the calibration of clamp meters.	A		
	45 Hz to 1 kHz	450 ppm				
	45 Hz to 5 kHz	300 ppm				
	45 Hz to 5 kHz	300 ppm				
	45 Hz to 5 kHz	360 ppm				
	40 Hz to 1 kHz	0.27 % ) Generate				
	50 Hz	330 ppm ) only				
		2.3% + 300 mA				



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FREQUENCY	0.1 Hz to 10 Hz 10 Hz to 1 kHz 1 kHz to 2.1 GHz	30 in $10^8 + 40 \mu\text{Hz}$ 30 in $10^8 + 3 \mu\text{Hz}$ 30 in $10^8$	May be reported as events per unit time, such as RPM	A
Elapsed time	Up to 100 s	1.3 ms	Suitable for RCD trip times	
ELECTRICAL SIMULATION				
Temperature simulators, calibration by electrical simulation				
Resistance thermometer (Pt 100)	-200°C to 800°C	0.05°C		A
Base metal thermocouples	-200°C to 0°C	0.07°C	Excluding cold junction compensation	A
	0°C to 1370°C	0.02°C	Excluding cold junction compensation	
	-200°C to 0°C	0.19°C	Including cold junction compensation	
	0°C to 1370°C	0.17°C	Including cold junction compensation	
Noble metal thermocouples	-200°C to 0°C	0.08°C	Excluding cold junction compensation	A
	0°C to 1370°C	0.02°C	Excluding cold junction compensation	
	-200°C to 0°C	0.22°C	Including cold junction compensation	
	0°C to 1370°C	0.20°C	Including cold junction compensation	
Temperature of reference junction/Cold junction compensation	At ambient temperature of 20 °C ± 3 °C	0.1°C		A
Temperature indicators, calibration by electrical simulation			As per simulators	A
END				