


# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

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

 <p><b>0227</b></p> <p>Accredited to ISO/IEC 17025:2017</p>	<p><b>M E Broadstone Limited</b> <b>(t/a Broadstone Gauge and Tool Company)</b></p> <p>Issue No: 023    Issue date: 23 September 2021</p>	
	<p>Unit 24 Ventura Place Factory Road Upton Poole Dorset BH16 5SW</p>	<p>Contact: Mr A Barfoot Tel: +44 (0)1202-621927 Fax: +44 (0)1202-632889 E-Mail: sales@broadstone-gauge.co.uk Website: www.broadstone-gauge.co.uk</p>
<p><b>Calibration performed at the above address only</b></p>		

### DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k=2$ )	Remarks
<p>RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED</p>			
LENGTH			
Thread measuring cylinders	BS 5590:1978 and specials 0.1 to 5	0.50	
Plain plug gauges (parallel) cylindrical setting standards	0.15 to 50 diameter 50 to 100 diameter 100 to 200 diameter 200 to 300 diameter 300 to 450 diameter	0.50 1.0 2.0 4.0 5.0	Calibrated by comparison to reference standards.
Plain plug gauges (taper)			Calibrated by comparison to reference standards.
Taper parallel to 1 in 8 on diameter	3 to 50 diameter 50 to 100 diameter	3.0 4.0	on diameter
Taper 1 in 8 to 1 in 3 on diameter	3 to 50 diameter 50 to 100 diameter	5.0 6.0	
Plain ring gauges (parallel) Including setting rings	1 to 10 diameter 10 to 50 diameter 50 to 100 diameter 100 to 200 diameter 200 to 300 diameter 300 to 450 diameter	2.0 1.0 1.5 2.0 4.0 6.0	Calibrated by comparison to reference standards.
Plain ring gauges (taper)			Calibrated by comparison to reference standards.
Taper parallel to 1 in 8 on diameter	3 to 50 diameter 50 to 100 diameter	4.0 5.0	on diameter
Taper 1 in 8 to 1 in 3 on diameter	3 to 50 diameter 50 to 100 diameter	6.0 7.0	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k=2)	Remarks
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED			
LENGTH (cont'd)			
Plain gap gauges (parallel)	BS 969 1 to 50 50 to 100 100 to 200 200 to 300	3.0 5.0 8.0 12	
Length gauges, flat and spherical ended	0 to 750	1.0 + (5.0 x length in m)	Calibrated by comparison to reference standards.
Screw plug gauges (parallel) including check and setting plugs See Note 3	1 to 100 diameter 100 to 150 diameter 150 to 250 diameter 250 to 350 diameter 350 to 450 diameter	3.0 4.0 5.0 on pitch 6.0 diameter 8.0	Calibrated using two wire method
Screw plug gauges (taper) See Note 2	5 to 100 diameter 100 to 150 diameter	5.0 on pitch 8.0 diameter	Calibrated by comparison to reference standards.
Screw ring gauges (parallel) See Notes 3 and 4	1 to 100 diameter 100 to 150 diameter	5.0 on pitch 7.0 diameter	Calibrated by comparison to reference standards.
Screw ring gauges (taper) See Note 2 and 5	1 up to 150 diameter	7.0 on pitch diameter	Calibrated by comparison to reference standards.
Screw pitch Screw flank angle	0.2 to 8 0° to 52°	2.0 5.0 minutes of arc	Calibrated by comparison to reference standards.
Screw thread adjustable caliper gauges (parallel) See Note 6	1.5 to 300 diameter	See note 6	
Parallels	BS 906:1972 5 to 50 x 100 x 400	1.5 to 5.0	
Vee blocks	BS 3731:1987 20 to 150	2.5 to 5.0	
Thread measuring Vee pieces (prisms)	MOY/SCM1/60 0 to 4.5	2.5	
ANGLE			
Squares			
Blade type	BS 939:2007 50 to 450	3.0 On squareness	See note 1
Right angle 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 1



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RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED			
<b>MEASURING INSTRUMENTS, MACHINES and TOOLS</b>			
Micrometers			
External	BS 870:2008 0 to 600	Heads 2 between any two points Setting and extension rods $1.0 + (5.0 \times \text{length in m})$	
Internal	BS 959:2008 0 to 900		
Depth	BS 6468:2008 0 to 300		
Micrometer heads	BS 1734:1951 0 to 50	1.0	
Micrometers, 3 point bore	5 to 200	5.0	
Vernier caliper, height and depth gauges	BS 887:2008 0 to 1000 BS EN ISO13225:2012 and BS 1643:2008 0 to 1000 BS 6365:2008 0 to 600	Overall performance $10 + (30 \times \text{length in m})$	
Dial gauges and dial test indicators	As BS 907:2008 and BS 2795:1981 0 to 50	1.0	
Feeler gauges	As BS 957:2008 0.025 to 1	3.0	
<b>ANCILLERY MEASUREMENTS</b>			
Flatness		0.2	See note 7
Parallelism		0.5	
Squareness		2.0	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k=2$ )	Remarks
Notes:  1 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.  2. Single start, symmetrical thread forms only.  3. Single and multi-start symmetrical and asymmetrical thread forms.  4. Includes use of check plugs for screw rings from 1 mm to 14 mm diameter.  5. Includes use of check plugs for screw rings (taper) from 1 mm to 14 mm diameter  6. Functional test of size using setting plugs calibrated with a CMC of 3.0 $\mu\text{m}$  7. Ancillary measurements made for completeness of calibration			
END			



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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 uncertainty of measurement 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 CIPM-ILAC definition of the CMC is as follows:

A CMC is a calibration and measurement capability available to customers under normal conditions:

- (a) as published in the BIPM key comparison database (KCDB) of the CIPM MRA; or
- (b) as described in the laboratory's scope of accreditation granted by a signatory to the ILAC Arrangement.

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 CMC is calculated according to the procedures given in M3003 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 CMC in certificates issued under its accreditation.

The CMC may be described using various methods in the Schedule of Accreditation:

As a single value that is valid throughout the range.

As an explicit function of the measurand or of a parameter (see below).

As a range of values. The range is stated such that the customer can make a reasonable estimate of the likely uncertainty at any point within the range.

As a matrix or table where the CMCs depend on the values of the measurand and a further quantity.

In graphical form, providing there is sufficient resolution on each axis to obtain at least two significant figures for the CMC.

### Expression of CMCs - symbols and units

In general, only units of the SI and those units recognised for use with the SI are used to express the values of quantities and of the associated CMCs. Nevertheless, other commonly used units may be used where considered appropriate for the intended audience. For example, the term "ppm" (part per million) is frequently used by manufacturers of test and measurement equipment to specify the performance of their products. Terms like this may be used in Schedules of Accreditation where they are in common use and understood by the users of such equipment, providing their use does not introduce any ambiguity in the capability that is being described.

When the CMC is expressed as an explicit function of the measurand or of a parameter, this often comprises a relative term (e.g., percentage) and an absolute term, i.e. one expressed in the same units as those of the measurand. This form of expression is used to describe the capability that can be achieved over a range of values. Some examples are shown below. It should be noted that these expressions are *not* mathematical formulae but are instead written in a commonly used shorthand for expressing uncertainties - therefore, for purposes of clarity, an indication of how they are to be interpreted is also provided below.

DC voltage, 100 mV to 1 V: 0.0025 % + 5.0  $\mu$ V

Over the range 100 mV to 1 V, the CMC is 0.0025 %·V + 5.0  $\mu$ V, where V is the measured voltage.

Hydraulic pressure, 0.5 MPa to 140 MPa: 0.0036 % + 0.12 ppm/MPa + 4.0 Pa

Over the range 0.5 MPa to 140 MPa, the CMC is 0.0036 %· $p$  + (0.12·10<sup>-6</sup>· $p$ ·10<sup>-6</sup>) + 4.0 Pa, where  $p$  is the measured pressure in Pa.

It should be noted that the percentage symbol (%) simply represents the number 0.01. In cases where the CMC is stated only as a percentage, this is to be interpreted as meaning percentage of the measured value or indication.

Thus, for example, a CMC of 1.5 % means 1.5 · 0.01 ·  $i$ , where  $i$  is the instrument indication.