Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

0307

Accredited to ISO/IEC 17025:2017

Correct Gauge and Tool Services

Issue No: 029 **Issue date**: 03 July 2020

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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
Address No 7 Buffalo Road Lancashire Enterprises Business Park Centurian Way Leyland Near Preston PR26 6TZ	**Local contact** Mr P Duffy	Dimensional	A

Site activities performed away from the locations listed above:

Location details		Activity	Location code
At customers premises	Mr P Duffy	Dimensional	B

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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			
LENGTH				
Gauge blocks		Class C (see note 2)		
Inch (Steel & tungsten carbide)	As BS 4311-1:2007 0.01 inch to 0.4 inch. 0.4 inch to 1 inch 2 inch 3 inch 4 inch	 3.0 µ inch 4.0 µ inch 5.0 µ inch 6.0 µ inch 7.0 µ inch	Note 2. **Class C** uncertainties apply to the measurement of length of steel gauges by comparison with grade K standards of length of a similar material	A
Millimetre (Steel, tungsten carbide)	As BS EN ISO 3650:1999 0.5 to 10 10 to 25 30, 40, 50 60, 70, 75 80, 90, 100	 .080 .10 .12 .15 .18	Class C uncertainties apply to grade 0,1 & 2 gauges to BS EN ISO 3650:1999 and BS 4311:2007	A
Plain plug gauges (parallel)	1 to 50 diameter 50 to 100 100 to 150 150 to 200 200 to 300	0.80 on diameter 1.0 1.5 2.0 2.5.	By comparison to end standards using a length measuring instrument	A
Plain ring gauges (parallel)	2 to 10 diameter 10 to 25 25 to 50 50 to 100 100 to 150 150 to 250	1.0 on diameter 0.80 1.0 1.5 2.1 3.0	By comparison to master setting ring gauges using a length measuring instrument	A
Length gauges, flat and spherical ended (excluding length bars)	25 to 1000	1.0 + (8.0 x length in m)	By comparison to end standards	A
Plain gap gauges (parallel)	0.5 to 100 100 to 200 200 to 300	3.0 5.0 8.0	By comparison to end standards	A
Parallels	5 to 50 x 100 x 400	1.2 to 5.0	BS 906:1972 By comparison to end standards and reference datums	A
Feeler Gauges	0.02 to 1.00	3.0	BS 957:2008 By comparison to reference standards and reference datums	A

Measured Quantity Intrument 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				
LENGTH (cont'd)				
Screw plug gauges (parallel) including check and setting plugs. (See note 5)	1 to 100 diameter 100 to 150	3.0 on pitch diameter 4.0	By comparison to cylindrical setting standards using a length measuring instrument, and thread measuring cylinders	A
Screw plug gauges (taper) including check plugs. (See note 5)	5 to 100 diameter 100 to 150	5.0 on pitch diameter 8.0	By comparison to cylindrical setting standards using a length measuring instrument, and thread measuring cylinders	A
Screw ring gauges (parallel) (See notes 4 and 5)	1 to 100 diameter 100 to 150	5.0 on pitch diameter 6.0	By comparison to cylindrical vee standards using a length measuring instrument	A
Screw ring gauges (taper) (See note 5)	5 to 100 diameter 100 to 150	5.0 on pitch diameter 8.0	By comparison to cylindrical vee standards using a length measuring instrument and	A
Screw thread flank angles	0° to 52°	5.0 minutes of arc	Using optical projection	A
Screw thread pitch	0.2 to 8	1.5	Using a pitch measuring instrument	A
Screw thread adjustable calliper gauges (parallel) (See note 7)	3 to 50 diameter	See note 7	Using setting plugs	A
Thread measuring cylinder and specials	0.1 to 5.0 diameter	0.50	BS3777:1964 and BS 5590:197using a length measuring instrument	A
Vee blocks	20 to 150 diameter, vee capacity	2.5 to 5.0	BS 3731:1987 by comparison to reference datums and cylinders	A
Receiver, gauges, jigs fixtures	0 to 600 x 300 x 300	Length and diameter: 3.0 + (10 x length in m) Angle: 1.0 minute of arc See note 6	Comparison to reference datums and end standards	A
ANGLE				
Squares Blade type	50 to 300 300 to 600	3.0 on squareness 5.0 See note 3	BS 939:2007 comparison to reference squares and datums	A

Measured Quantity Intrument 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				
ANGLE (cont'd)				
Square Block type	50 to 300 300 to 600	3.0 on squareness 5.0 See note 3	BS 939:2007 comparison to reference squares and datums	A
Angle plates and box angle plates	50 to 60050 to	Squareness: 3.0 + (1.0 per 100 mm) Parallelism: 1.0 + (1.0 per 100 mm) See note 3	BS 5535:1978 comparison to reference squares and datums	A
Sine bars	100 to 300	Linear dimensions: 1.0 + (10 x length in m) Overall Performance: 3.0 Seconds of arc	BS 3064 Comparison to reference datums	A
Sine tables	100 to 500	Linear dimensions: 1.0 + (10 x length in m) Overall Performance: 3.0 Seconds of arc	BS 3064 Comparison to reference datums	A
MEASURING INSTRUMENTS AND MACHINES				
Micrometers			Comparison to end standards	
External	0 to 600	Heads 2.0 between any two points.	BS 870:2008	A
Internal Internal	0 to 900	Setting and extension rods 1.0 + (8.0 x length in m)	BS 959:2008	A
Depth	0 to 300		BS 6468:2008	A
Micrometer heads	0 to 10000	1.6	BS 1734:1954 comparison to end standard	A
Bench micrometer	0 to 100to 100	Overall performance 2.0	NPL MOY/SCMI 22 comparison to end standard	A
Height gauges - (Simple) including vernier, dial and digital types (See note 8 and note 9)	0 to 1000 0 to 1000	Length measurement error (E): 10 + (30 x length in metres)	BS EN ISO 13225:2012 Comparison to end standards	A
Vernier, dial and digital type gauges			Comparison to end standards	
Caliper	0 to 1000	Overall performance 10 + (30 x length in m)	BS 887:2008	A
Height	0 to 1000	Overall performance 10 + (30 x length in m)	BS 1643:2008	A
Depth	0 to 600	Overall performance 10 + (30 x length in m)	BS 6365:2008	A

Measured Quantity Intrument 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				
MEASURING INSTRUMENTS AND MACHINES (cont'd)				
Dial gauges and dial test indicators	0 to 50	1.0	BS 907:2008 and BS 2795:1981 Comparisons to length measuring instrument	A
Height setting micrometer	0 to 300	Heads 1.0 Stepped column 1.6 Overall performance 2.0	Comparison to end standards	A
Riser blocks for above	150 300	1.0 2.0	Comparison to end standards	A
Bevel protractors	0 to 360 degrees0 to o 360 degrees	6.0 minutes of arc	BS 1685:2008 Comparison to reference angles and datums	A
Comparators (external)	250 to 20 000 magnifications	1.0 % of range Minimum 0.20	BS 1054:1975 Comparison to end standards	A
Profile projectors	10 to 100 magnifications	125 at the screen 3.0 linear 3.0 minutes of arc	Comparison to reference scales and angles	A,B
Spirit levels	5 seconds of arc to 60 minutes of arc nominal sensitivity	Mean sensitivity 10 % of nominal Minimum of 0.50 seconds of arc	BS 3509:1962 and BS 958:1968 By comparison to a small angle generator	A
Electronic indicating levels	0 to 10 minutes of arc	1.0 % of range Minimum 0.50 seconds of arc	By comparison to a small angle generator	A
FORM				
Surface plates Granite Cast iron	160 x 100 to 4000 x 6000	1.5 + (0.80 x diagonal in m) See Note 3	BS 817:2008 and above using an electronic level.	A & B
Straight edges				
Cast iron	300 to 2000	2.0 + (3.0 x length in m) See note 3	BS 5204:Part 1:1975 using an electronic level	A
Steel, Granite	300 to 2000	2.0 + (3.0 x length in m) See note 3	BS 5204:Part 2:1977 using an electronic level	A
Radius Gauges	0.1 to 250	0.20 %, minimum 3.0	Using optical methods	A

Notes
1. All linear calibrations may be given in inch units.

2. Class C 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 grade 0,1 & 2 gauges to BS EN ISO 3650:1999 and BS 4311:2007

3 The uncertainty quoted is for the departure from flatness, straightness, or squareness, i.e. the distance separating the two parallel planes, which just enclose the surface under consideration.

4. 1 mm to 6 mm diameter range relates to functional test of size using check plugs.

5. Single start, symmetrical thread forms only.

6. Features and associated parts of these gauges / fixtures can be measured to the uncertainties given for equivalent items listed in this schedule.

7. Functional test of size using setting plugs.

8. Simple height gauges - vernier, dial and digital instruments designed only for measuring distances parallel to the beam.

9. Conformance statements cannot be made against specifications whose magnitudes are smaller than the specified CMC values

END

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 µV

Over the range 100 mV to 1 V, the CMC is 0.0025 %·V + 5.0 µV, 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 $0.0036\ \%\cdot p + (0.12\cdot 10^{-6}\cdot p\cdot 10^{-6}) + 4.0$ 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 $1.5 \cdot 0.01 \cdot i$, where i is the instrument indication.