Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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9157

Accredited to ISO/IEC 17025:2005

Sheffield Calibration Services Limited

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Calibrations performed by the Organization at the locations specified below

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
Address 180 Attercliffe Road Sheffield South Yorkshire S4 7WZ **Local contact** Mr Mark Walster	Dimensional	P

Site activities performed away from the locations listed above:

Location details	Activity	Location code
Customers' sites or premises The customer's sites or premises must be suitable for the nature of the particular calibrations undertaken and will be subject of contract review arrangements between the laboratory and the customer	Dimensional	S

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 UNCERTAINTIES IN MICROMETRES UNLESS OTHERWISE STATED				
LENGTH				
Gauge blocks Inch (Steel, tungsten carbide and ceramic)	As BS 4311:Part 1: 2007 0.01in to 0.4 in 0.4 in to 1 in Size 2 in Size 3 in Size 4 in	Class (See footnotes) C D 3.0 4.0) 4.0 5.0) µ 5.0 7.0) inches 6.0 8.0) 7.0 10)	NOTES 1. All dimensional calibrations can be given in Inch units.	P
Millimetre (Steel, tungsten carbide and ceramic)	As BS EN ISO 3650:1999 0.5 to 10 10 to 25 Sizes 30, 40, 50, 60, 70, 75, 80, 90, 100	C D .080 .10 .10 .13 .12 .17 .15 .21 .18 .25	2. 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.	
Comparison **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 and 2 gauges to BS EN ISO 3650:1999 and BS 4311:Part 1:2007. **Class D** uncertainties represent the best capability for the measurement of length of tungsten carbide and ceramic gauges by comparison with grade K standards of length of a dissimilar material.				
Thread measuring cylinders	As BS 3777:1964, BS 5590:1978 and specials 0.1 to 5	0.50		P
Plain plug gauges (parallel) cylindrical setting standards, gear measuring cylinders and rollers	1 to 50 diameter 50 to 100 100 to 150 150 to 200 200 to 300 300 to 400	0.50 0.80 1.0 1.5 2.0 on diameter 2.5		P
Plain ring gauges (parallel) and setting standards	1.5 to 25 diameter 25 to 50 50 to 100 100 to 150 150 to 300	0.80 1.0 1.5 2.0 2.5		P

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 UNCERTAINTIES IN MICROMETRES UNLESS OTHERWISE STATED				
LENGTH (cont'd)				
Screw plug gauges (parallel) including check and setting plugs See Note 3	1 to 100 diameter 100 to 200	3.0 4.0 on pitch diameter	3. Single start symmetrical and asymmetrical thread forms only.	P
Screw ring gauges (parallel) See Note 3	3 to 100 diameter 100 to 200	5.0 6.0		P
	Pitch 0.2 to 8 Flank angle 0° to 30°	1.5 5.0 minutes of arc		
Length gauges, flat and spherical ended	1 to 1000	1.0 + (5.0 x length in m)		P
Plain gap gauges (parallel)	1 to 100 100 to 200 200 to 300	2.0 3.0 4.0		P
Graduated rules	As BS 4372:1968 0 to 2000	5.0 + (10 x length in m)		P
ANGLE				
Squares				
Blade type	As BS 939:2007 50 to 450	3.0 on squareness See Note 2		P
MEASURING INSTRUMENTS ANDMACHINES				
Micrometers				P
External Internal Depth	As BS 870:2008 0 to 1000 As BS 959:2008 0 to 900 As BS 6468:2008 0 to 300	Heads: 2.0 between any two points Setting and extension rods: 1.0 + (5.0 x length in m)		
Micrometer heads	As BS 1734:1959 0 to 50	1.0 between any two points		P

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 UNCERTAINTIES IN MICROMETRES UNLESS OTHERWISE STATED				
LENGTH (cont'd)				
Vernier gauges				
Caliper	As BS 887:2008 0 to 1000	Overall performance: 10 + (30 x length in m)		P
Height	As BS 1643:2008 0 to 1000			
Depth	As BS 6365:2008 0 to 1000			
Height gauges, electronic	0 to 1000	Overall performance 2.0 + (10 x length in m)		P
Dial gauges and dial test indicators	As BS 907:2008 and BS 2795:1981 0 to 100	1.0		P
Receiver, position and profile gauges, jigs and fixtures	Maximum size 0 to 500 x 750 x 1000	See Note 4	4. Features and associated parts of these gauges can be measured to the uncertainties given for equivalent items listed in this schedule.	P
FORM				
Surface Plates				
Granite	As BS 817:2008 160 x 100 to 2500 x 1600	1.5 + (0.8 x diagonal in m) See Note 2		P & S
Cast iron				
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.