

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

 0438 Accredited to ISO/IEC 17025:2017	European Instruments Limited	
	Issue No: 020 Issue date: 10 August 2020	
	Shotover Kilns Old Road Headington Oxford OX3 8ST	Contact: Mr D Hitchcock Tel: +44 (0)1865-750375 Fax: +44 (0)1865-769985 E-Mail: sales@ei.co.uk Website: https://ei.uk/calibration
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 Shotover Kilns Old Road Headington Oxford OX3 8ST	Mass (weights) Volume Volumetric equipment (pipettes)	Perm lab

Site activities performed away from the locations listed above:

Location details	Activity	Location code
At customers' premises The customers' site or premises must be suitable for the nature of the particular calibrations undertaken and will be the subject of contract review arrangements between the laboratory and the customer.	Mass (Weighing machines) Volume Volumetric equipment (pipettes)	Site



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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
MASS (See Notes 1 & 2)	Nominal value (g)	(mg)	<p>NOTES</p> <p>1. Calibrations can be given in other units as required.</p> <p>2. Intermediate values of weights can be calibrated with an uncertainty not less than that interpolated from the next higher and next lower nominal values.</p> <p>3 Calibrated using Borda substitution method.</p>	Perm Lab
	25 000	250		
	20 000	60		
	10 000	10		
	5 000	5.0		
	2 000	2.0		
	1 000	0.50		
	500	0.25		
	200	0.10		
	100	0.050		
	50	0.030		
	20	0.025		
	10	0.020		
	5	0.015		
	2	0.012		
	1	0.010		
	0.5	0.008 0		
	0.2	0.006 0		
	0.1	0.005 0		
	0.05	0.004 0		
	0.02	0.003 0		
0.01	0.002 0			
0.005	0.002 0			
0.002	0.002 0			
0.001	0.002 0			
NON-AUTOMATIC WEIGHING MACHINES See notes 3 and 4	200 mg	0.0045 mg	<p>4 Weights are available in OIML Class:</p> <p>E2 from 1 mg to 500 g, max. grouped load 5 kg</p> <p>F1 from 10 mg to 10 kg, max. grouped load 201 kg</p> <p>M1 from 5 kg to 20 kg, max. grouped load 1755 kg</p> <p>5 Other loads within the overall listed range may also be used.</p> <p>6. Calibration method in line with the requirements of Euramet gauge cg-18</p>	Site
	500 mg	0.0061 mg		
	1 g	0.0076 mg		
	2 g	0.0092 mg		
	5 g	0.011 mg		
	10 g	0.016 mg		
	20 g	0.022 mg		
	50 g	0.036 mg		
	100 g	0.069 mg		
	200 g	0.13 mg		
	500 g	0.34 mg		
	1 kg	0.75 mg		
	2 kg	3.3 mg		
	5 kg	4.6 mg		
	10 kg	32 mg		
	20 kg	36 mg		
	50 kg	310 mg		
	100 kg	320 mg		
	200 kg	1.5 g		
	500 kg	4.9 g		
1000 kg	9.8 g			
1755 kg	14 g			



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k=2$)	Remarks	Location Code
VOLUME of liquids (See Note 5)	0.2 μ L to 20 μ L 20 μ L to 100 μ L 100 μ L to 200 μ L 200 μ L to 500 μ L 0.5 mL to 1 mL 1 mL to 2 mL 2 mL to 5 mL 5 mL to 10 mL	0.090 μ L 0.30 μ L 0.80 μ L 2.6 μ L 0.005 mL 0.013 mL 0.022 mL 0.075 mL	7. For water delivered from piston and/or plunger operated volumetric apparatus using procedures agreed with UKAS (gravimetric method). Single Channel Pipettes and Multi-Channel Pipettes Users requiring conformity to ISO 8655 should note that this cannot be demonstrated using fewer than 10 readings.	Perm Lab, Site
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 μ V

Over the range 100 mV to 1 V, the CMC is 0.0025 %·V + 5.0 μ 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 + (0.12·10⁻⁶· p ·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 · 0.01 · i , where i is the instrument indication.