Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

0499

Accredited to ISO/IEC 17025:2017

PreSet Calibration Services Ltd

Issue No: 047 **Issue date:** 04 January 2021

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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 94A East Street Bridport Dorset DT6 3LL **Local contact** Mr S S Kick Tel: +44 (0)1308 456539 Fax: +44 (0)1308 421676 Email: lab@preset.com Website: www.preset.com	Electrical, Pressure, Humidity, Temperature, Time Interval and Weighing Instrument Calibration	Lab

Site activities performed away from the locations listed above:

Location details	Activity	Location code
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.	Electrical, Pressure, Humidity, Temperature, Time Interval and Weighing Instrument Calibration	Site

DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
TEMPERATURE			Calibration by comparison with reference instruments	Lab
Resistance thermometers	-95 °C to +100 °C 100 °C to 200 °C 200 °C to 600 °C	0.13 °C 0.17 °C 0.26 °C	In block bath	
Thermocouples	-95 °C to +100 °C 100 °C to 200 °C 200 °C to 600 °C 600 °C to 1100 °C 1100 °C to 1200 °C	0.17 °C 0.19 °C 0.42 °C 1.3 °C 2.1 °C	In block bath	
Electronic thermometers with sensors	As for sensor type above			
Temperature block calibrators	-95 °C to +200 °C 200 °C to 600 °C 600 °C to 1100 °C	0.27 °C 0.40 °C 1.9 °C		
Temperature controlled baths, fridges/refrigerators, freezers, autoclaves, ovens, furnaces and environmental chambers	-95 °C to +200 °C 200 °C to 500 °C 500 °C to 1100 °C	1.0 °C 2.0 °C 3.0 °C	Single and multipoint time dependent temperature profiling, also referred to as spatial temperature surveying or mapping	Site
Pt100 sensors	-95 °C to +200 °C 200 °C to 300 °C 300 °C to 500 °C 500 °C to 800 °C	0.44 °C 0.62 °C 2.0 °C 3.0 °C	In block bath	
Thermocouples	-95 °C to +200 °C 200 °C to 500 °C 500 °C to 1100 °C	1.0 °C 2.0 °C 3.0 °C	In block bath	
Electronic thermometers with sensors	As for sensor types above	As for sensor types above		
Temperature block calibrators	-95 °C to +200 °C 200 °C to 400 °C 400 °C to 1100 °C	0.35 °C 0.50 °C 2.5 °C		
HUMIDITY				Lab
Relative Humidity	10 %rh to 50 %rh 50 %rh to 95 %rh for the temperature range 10 °C to 40 °C	1.7 %rh 1.5 %rh	Calibration by comparison with reference instruments	
	10 %rh to 50 %rh 50 %rh to 95 %rh for the temperature range 40 °C to 60 °C	1.4 %rh 1.5 %rh		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
HUMIDITY (continued)				
Temperature sensors incorporated in humidity instruments	10 °C to 60 °C	0.37 °C		
Relative humidity	15 %rh to 95 %rh for the temperature range 10 °C to 60 °C	3.7 %rh		Site
Temperature (sensors incorporated in humidity instruments)	15 °C to 60 °C	0.60 °C		
PRESSURE			Methods consistent with EURAMET CG17.	Lab & Site
Hydraulic Pressure (Gauge)				
Calibration of pressure indicating instruments and gauges	0 MPa to 20 MPa 20 MPa to 70 MPa	50 ppm + 6.4 kPa 50 ppm + 14 kPa		
Gas Pressure (Gauge)				
Calibration of pressure indicating instruments and gauges	- 100 kPa to 0 kPa 0 kPa to 2.5 kPa 2.5 kPa to 400 kPa 400 kPa to 2 MPa 2 MPa to 4 MPa	0.65 kPa 12 Pa 0.67 kPa 0.80 kPa 0.90 kPa		
Gas Pressure (Absolute)				
Calibration of pressure indicating instruments and gauges	3.5 kPa to 700 kPa	0.13 kPa		
ELECTRICAL				
Values and uncertainties listed below are applicable for the calibration of both measurement instruments and for instruments with an output. the method used is by direct comparison unless otherwise stated in the remarks column.				
DC RESISTANCE				Lab & Site
Generation				
Specific values	1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ 1 GΩ	0.23 mΩ 0.90 mΩ 2.0 mΩ 15 mΩ 0.20 Ω 4.2 Ω 100 Ω 4.0 kΩ 0.20 MΩ 75 MΩ	These values can be generated for the. calibration of resistance measuring instruments	

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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
ELECTRICAL (continued)				
DC RESISTANCE (continued)				Lab & Site
Measurement	0 Ω to 100 Ω 100 Ω to 1 kΩ 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ	19 mΩ 120 mΩ 0.67 Ω 13 Ω 0.59 kΩ 4.0 kΩ 1.0 MΩ	Outputs of instruments can be measured	
DC Voltage				
Generation	0 mV to 20 mV 20 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1 kV	11 μV 11 μV 60 μV 220 μV 14 mV 33 mV	These values can be generated for the calibration of measuring instruments	
Measurement	0 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1 kV	9.2 μV 62 μV 670 μV 6.4 mV 62 mV	For measurement of instrument outputs	
DC Current				
Generation	0 μA to 200 μA 200 μA to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A 2 A to 20 A	25 nA 830 nA 12 μA 45 μA 130 μA 2.5 mA	These values can be generated for the calibration of measuring instruments	
	20 A to 50 A 50 A to 250 A 250 A to 500 A 500 A to 1000 A	0.27 A 0.84 A 1.5 A 1.5 A	Simulation using a 50 turn coil for the calibration of clampmeters	
Measurement	0 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 3 A 3 A to 10 A 10 A to 240 A 240 A to 1000 A	4.3 μA 35 μA 0.82 mA 1.9 mA 1.5 A 6.0 A 25 A	For measurement of instrument outputs	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL (continued)				Lab & Site
AC Voltage				
Generation	*40 Hz to 1 kHz:*		These values can be generated for the calibration of measuring instruments	
	20 mV to 200 mV	530 μV		
	200 mV to 2 V	830 μV		
	2 V to 20 V	7.4 mV		
	20 V to 200 V	130 mV		
	200 V to 700 V	400 mV		
Measurement	*40 Hz to 1 kHz:*		For measurement of instrument outputs	
	10 mV to 100 mV	78 μV		
	100 mV to 1 V	960 μV		
	1 V to 10 V	8.6 mV		
	10 V to 100 V	51 mV		
	100 V to 750 V	580 mV		
AC Current				
Generation	*40 Hz to 1 kHz*		These values can be generated for the	
	10 μA to 200 μA	530 nA		
	60 Hz to 1 kHz			
	200 μA to 2 mA	3.8 μA	calibration of measuring instruments	
	2 mA to 20 mA	40 μA		
	60 Hz to 1 kHz		Simulation using a 50 turn coil for the calibration of clampmeters	
	20 A to 50 A	0.59 A		
	50 to 250 A	2.7 A		
	250 to 500 A	3.0 A		
	500 A to 1000 A	3.0 A		
Measurement	*40 Hz to 1 kHz:*		For measurement of instrument outputs	
	100 mA to 1 A	1.6 mA		
	1 A to 3 A	1.7 mA		
Additional measurements in support of IEE 17th Edition test equipment				Lab & Site
RCD testers				
Trip current	6 mA, 10 mA and 30 mA	7.0 % + 20 μA		
	100 mA, 300 mA, and 500 mA	7.0 % + 160 μA		
	1000 mA	7.0 % + 840 μA		
Trip time	20 ms to 390 ms	1.0 ms		
	390 ms to 5 s	8.9 ms		
AC Resistance for loop testers at 50 Hz				
Nominal values; additive to prevailing loop impedance	0.05 Ω, 0.15 Ω, 0.33 Ω, 1.8 Ω, 3.3 Ω, 18 Ω and 33 Ω	0.054 Ω	Nominal laboratory loop impedance 0.4 Ω.	

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
Calibration of Portable Appliance Testers				Lab & Site
Earth Bond	20 mΩ	5.0 %		
	190 mΩ, 210 mΩ, 950 mΩ, 1 Ω 1.05 Ω, 1.08 Ω, 2 Ω 10 Ω and 18 Ω	1.0 %		
	0 V to 20 V	50 mV		
	100 mA to 50 A *50 Hz* 1 mA to 2 A *50 Hz* 0 mA to 2 A dc	0.50 % + 200 mA 0.50 % + 2.0 mA 0.10 % + 2.0 mA		
Insulation	95 kΩ, 105 kΩ, 500 kΩ, 950 kΩ, 1.05 MΩ, 5 MΩ and 10 MΩ	0.10 %		
	100 MΩ	1.0 %		
	0 kV to 1 kV	2.5 V		
	0 mA to 20 mA	50 μA		
Leakage	*At 50 Hz:* 50 μA to 20 mA	50 μA		
Load	*At 50 Hz* 2 V to 500 V	1.2 V		
	5 mA to 13 A at 50 Hz	6.5 mA		
Electrical calibration of temperature simulators, indicators, controllers and recorders for the following sensors:-				
Noble metal thermocouples	0 °C to 500 °C	1.5 °C	including cold junction compensation	Lab
	500 °C to 1500 °C	0.50 °C		
Base metal thermocouples	-160 °C to 0 °C	0.20 °C	including cold junction compensation	
	0 °C °C to 1200 °C	0.20 °C		
Resistance sensors (Pt100)	-200 °C to +800 °C	0.045 °C	Simulation	
	-200 °C to +800 °C	0.050 °C	Measurement	
Cold junction compensation	At ambient temperature	0.070 °C	Nominal laboratory ambient temperature 20 °C	
Noble metal thermocouples	0 °C to 1200 °C	0.80 °C	including cold junction compensation	Site

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL (continued) Electrical calibration of temperature simulators, indicators, controllers and recorders for the following sensors (continued):-				
Base metal thermocouples	-190 °C to 1300 °C	0.50 °C	including cold junction compensation	
Resistance sensors (Pt100)	-200 °C to +800 °C	1.2 °C	Simulation	
	-200 °C to +800 °C	0.20 °C	Measurement	
Frequency			These values can be generated for the calibration of measuring instruments	Lab & Site
Generation	0.1 Hz to 20 Hz 20 Hz to 50 Hz 50 Hz to 200 Hz 200 Hz to 1 kHz 1 kHz to 10 kHz 10 kHz to 500 kHz 500 kHz to 1 MHz 1 MHz to 10 MHz	1.4 mHz 7.2 mHz 7.5 mHz 650 mHz 0.54 Hz 15 Hz 250 Hz 280 Hz		
Time interval				
Timers	10 s to 72 hr	0.80 s		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
WEIGHING INSTRUMENTS			Methods consistent with EURAMET guide cg-18.	
Digital one pan non-automatic weighing instruments	Maximum capacity 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg 30 kg 50 kg 60 kg	CMC (mg) 0.003 1 0.003 9 0.004 7 0.062 0.077 0.093 0.13 0.17 0.28 0.52 1.4 7.8 16 390 770 1.6 g 2.3 g 3.9 g 5.1 g	Weights are available in OIML class: E2 from 1 mg to 200 g, Max. grouped load 500 g F1 from 100 mg to 1 kg, Max. grouped load 2 kg M1 from 5 kg to 20 kg, Max. grouped load 60 kg	Lab & Site
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.