Schedule of Accreditation

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United Kingdom Accreditation Service

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0404

Accredited to ISO/IEC 17025:2017

A1-CBISS Limited trading as HITEK

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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 Ground Floor Penmaen House London Road Ashington West Sussex RH20 3JR **Local contact** Mr Jeff King Tel: +44 (0)1403 243535	Electrical Time	P

Site activities performed away from the locations listed above:

Location details		Activity	Location code
Calibrations may be performed in a mobile laboratory that is taken to the customers' sites, or in suitable areas within the customers' premises. The customers' premises must be appropriate for the nature of the particular calibrations undertaken and will be the subject of contract review arrangements between the laboratory and the customer.	Contact as above	Electrical Time	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
ELECTRICAL			Electrical calibrations are performed by comparison with a reference standard measuring the output of instruments or generating the output, as stated.	
DC Voltage	0 mV to 100 mV	6.0 ppm + 1.5 μV		P & S
	100 mV to 1 V	5.0 ppm + 2.0 μV		P & S
	1 V to 10 V	16.0 ppm + 16 μV		P & S
	10 V to 100 V	6.5 ppm + 120 μV		P & S
	100 V to 1000 V	24 ppm + 2.5 mV		P & S
	1 kV to 50 kV	0.45 %	Using high voltage divider.	P
DC Resistance	0 Ω to 10 Ω	14 ppm + 250 μΩ		P & S
	10 Ω to 100 Ω	17 ppm + 0500 μΩ		P & S
	100 Ω to 1 kΩ	13 ppm + 3mΩ		P & S
	1 kΩ to 10 kΩ	12 ppm + 6 mΩ		P & S
	10 kΩ to 100 kΩ	16 ppm + 21 mΩ		P & S
	100 kΩ to 1 MΩ	23 ppm + 160 mΩ		P & S
	1 MΩ to 10 MΩ	53 ppm + 22 Ω		P & S
	10 MΩ to 100 MΩ	230 ppm + 70 Ω		P & S
	100 MΩ to 1 GΩ	0.20 % + 130 Ω		P
	1 GΩ to 10 GΩ	0.24 %	Voltage and current method; applied voltages in the range 100 V to 500 V.	P
AC Voltage				P & S
	20 Hz to 1 kHz			P & S
	1 mV to 10 mV	200 ppm + 36 μV		
	10 mV to 100 mV	300 ppm + 0.5 mV		
	100 mV to 1 V	220 ppm + 5.0 mV		
	1 kHz to 20 kHz			P & S
	1 mV to 10 mV	0.25 % + 1.5 μV		
	10 mV to 100 mV	210 ppm + 5 μV		
	100 mV to 1 V	210 ppm + 37 μV		
	1 V to 10 V	220 ppm + 0.50 mV		
	10 V to 100 V	200 ppm + 4.5 mV		
	100 V to 1000 V	330 ppm + 31 mV		
	20 kHz to 100 kHz			P & S
	100 mV to 1 V	310 ppm + 37 μV		
	1 V to 10 V	300 ppm + 0.50 mV		
	10 V to 100 V	320 ppm + 4.5 mV		
	1000 V to 30 kV		Using high voltage divider.	P
	50 Hz	1.5 %		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC Current	100 nA to 1 μA	53 ppm + 28 pA		P
	1 μA to 10 μA	95 ppm + 95 pA		P & S
	10 μA to 100 μA	27 ppm + 1.0 nA		P & S
	0.1 mA to 1 mA	22 ppm + 5.5 nA		P & S
	1 mA to 10 mA	24 ppm + 0.50 μA		P & S
	10 mA to 100 mA	23 ppm + 1 μA		P & S
	100 mA to 1 A	45 ppm + 16 μA		P & S
	1 A to 10 A	0.18 %		P & S
	10 A to 100A	0.30 % + 0.0050 A		P & S
	10 A to 110 A	0.80 % +0.15 A	Using multi turn coil method; for the calibration of clamp-on ammeters.	P & S
	110A to 1100A	0.80 %		
AC Current	*40 Hz to 1 kHz*			
	10 μA to 100 μA	0.030 % + 20 nA		P & S
	100 μA to 1 mA	0.040 % + 160 nA		P & S
	1 mA to 10 mA	0.040 % + 1.2 μA		P & S
	10 mA to 100 mA	0.040 % + 11 μA		P & S
	100 mA to 1 A	0.030 % + 200 μA		P & S
	1 A to 10 A	0.38 %		P & S
	100 Hz			
	10 A to 20 A	0.050 % + 5.0 mA	Generation only	P & S
	45 Hz to 65 Hz			
	10 A to 110 A	0.80 % +0.30 A	Using multi turn coil method; for the calibration of clamp-on ammeters.	P & S
	110 A to 1100 A	1.1 %		P & S
Frequency				P
	0.01 Hz to 0.1 Hz	1.5 ppm		
	0.1 Hz to 10 kHz	0.15 ppm		
	10 kHz to 1 MHz	1.5 ppm		
	1 MHz to 10 MHz	0.15 ppm		
	10 MHz to 20 GHz	0.030 ppm		
Temperature indicators and simulators, calibration by electrical simulation			Simulated using equivalent DC voltages.	
Base metal thermocouple	-200 °C to +1600 °C	0.10 °C	Excluding cold junction compensation	P
Cold junction compensation	At 0 °C	0.050 °C	These are supplementary measurements for monitoring temperature and can be reported on UKAS certificates to assure the operation of the thermocouple.	P & S
Resistance thermometer (Pt 100)	-200 °C to +800 °C	0.020 °C	Simulated using known values of resistance that correspond to the stated temperatures.	P

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
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.