Schedule of Accreditation
issued by
United Kingdom Accreditation Service
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

UKAS CALIBRATION **0175** **Accredited to ISO/IEC 17025:2017**	**Isothermal Technology Ltd** **Issue No:** 061 **Issue date:** 23 July 2024	
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Calibration performed at the above address only

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (*k* = 2)	Remarks
TEMPERATURE Platinum resistance thermometers			Unless otherwise stated calibration by comparison with reference instruments
Calibration by comparisons	-80 °C to -40 °C -40 °C to +50 °C 50 °C to 156 °C 156 °C to 300 °C 300 °C to 420 °C 420 °C to 660 °C	7.0 mK 4.0 mK 5.0 mK 6.5 mK 20 mK 35 mK	In a fluid bath or a fixed point cell bath
Calibration at fixed points			Uncertainty in the determination of $W(t_{90})$ used to calculate ITS-90 coefficients
See Note 1 BP Nitrogen (See Note 4) BP Nitrogen (See Note 5) TP Argon TP Mercury TP Water (See Note 3) MP Gallium FP Indium FP Tin FP Zinc FP Aluminium FP Silver	 -195.798 °C -195.798 °C -189.3442 °C -38.8344 °C 0.01 °C 29.7646 °C 156.5985 °C 231.928 °C 419.527 °C 660.323 °C 961.78 °C	 2.0 mK 0.60 mK 0.50 mK 0.24 mK 0.070 mK 0.15 mK 1.0 mK 1.0 mK 1.2 mK 2.0 mK 7.0 mK	Note: TP = Triple Point FP = Freezing Point MP = Melting Point BP = Boiling Point Note 1: Suitable only for HT/SPRTs with high stability. Includes extrapolation to zero power and immersion checks.
See Note 2 BP Nitrogen TP Argon TP Mercury TP Water (See Note 3) MP Gallium FP Indium FP Tin FP Zinc FP Aluminium FP Silver	 -195.798 °C -189.3442 °C -38.8344 °C 0.01 °C 29.7646 °C 156.5985 °C 231.928 °C 419.527 °C 660.323 °C 961.78 °C	 5.0 mK 2.0 mK 1.0 mK 0.50 mK 1.0 mK 2.0 mK 2.5 mK 3.0 mK 6.0 mK 10 mK	Note 2: Suitable for most SPRTs using nominal current. Note 3: Determination of R(0.01°C) Note 4: measured in a comparator Note 5: measured at TP Argon and extrapolated according to Euromet Technical Guide 1

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (*k* = 2)	Remarks
TEMPERATURE (cont'd)			
Fixed point cells			
See Note 6			
TP Argon	-189.3442 °C	0.80 mK	
TP Mercury	-38.8344 °C	0.20 mK	Note: TP = Triple Point
TP Water	0.01 °C	0.070 mK	FP = Freezing Point
MP Gallium	29.7646 °C	0.070 mK	MP = Melting Point
FP Indium	156.5985 °C	0.40 mK	BP = Boiling Point
FP Tin	231.928 °C	0.60 mK	
FP Zinc	419.527 °C	0.90 mK	Note 6: . Suitable for optimal
FP Aluminium	660.323 °C	1.1 mK	realisations. Includes 3 melts,
FP Silver	961.78 °C	2.0 mK	3 freezes, 2 intercomparisons.
See Note 7			Note 7: Also appropriate for slim
TP Mercury	-38.8344 °C	1.0 mK	cells. Includes 1 melt, 1 freeze,
TP Water	0.01 °C	0.50 mK	1 intercomparison sequence
MP Gallium	29.7646 °C	1.0 mK	using a monitor SPRT.
FP Indium	156.5985 °C	2.0 mK	
FP Tin	231.928 °C	2.0 mK	
FP Zinc	419.527 °C	2.0 mK	
FP Aluminium	660.323 °C	6.0 mK	
FP Silver	961.78 °C	10 mK	
Metal block calibrators and portable liquid baths	0 °C	10 mK	Suitable for zero reference baths
	-80 °C to 0 °C	25 mK	
	0 °C to 156 °C	20 mK	
	156 °C to 300 °C	35 mK	
	300 °C to 420 °C	50 mK	
	420 °C to 660 °C	65 mK	
	660 °C to 1100 °C	1.0 °C	
	1100 °C to 1300 °C	3.0 °C	
Thermocouples			Thermocouples without a cold junction will have increased uncertainty
Platinum thermocouples			
Calibration by comparisons	-50 °C to 0 °C	0.50 °C	In a fluid bath
	0 °C to 50 °C	0.45 °C	or a fixed point cell bath
	50 °C to 660 °C	0.40 °C	
	660 °C to 1100 °C	0.70 °C	In a furnace
	1100 °C to 1300 °C	1.7 °C	
Other thermocouples	-196 °C	0.30 °C	In liquid Nitrogen
	-80 °C to 0 °C	0.25 °C	In a fluid bath
	0 °C to 50 °C	0.10 °C	or a fixed point cell bath
	50 °C to 300 °C	0.25 °C	
	300 °C to 420 °C	0.30 °C	
	420 °C to 660 °C	0.40 °C	
	660 °C to 1100 °C	0.80 °C	In a furnace
	1100 °C to 1300 °C	2.2 °C	
Compensating and extension cables	-25 °C to +200 °C	1.0 °C	In a liquid bath

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2))	Remarks
ELECTRICAL			Unless otherwise stated calibration by comparison with reference instruments
DC VOLTAGE			
Specific Values	10 mV 20 mV 50 mV 100 mV 250 mV 500 mV 1 V 2 V	100 nV 150 nV 150 nV 200 nV 500 nV 1.0 µV 2.0 µV 3.0 µV	
Other values	0 mV to 140 mV 140 mV to 1.4 V	12 µV/V + 0.60 µV 12 µV/V + 1.3 µV	
DC RESISTANCE Measurement	0.1 Ω to 1 kΩ 1 kΩ to 100 kΩ	0.30 µΩ/Ω 12 µΩ/Ω	Resistors suitable for oil immersion can be measured over the range 20 °C to 23 °C
Specific Values	1 Ω 5 Ω 10 Ω 25 Ω 100 Ω 400 Ω	0.080 µΩ/Ω 0.080 µΩ/Ω 0.075 µΩ/Ω 0.072 µΩ/Ω 0.072 µΩ/Ω 0.10 µΩ/Ω	
AC RESISTANCE	*At 75 Hz:* 0.1 Ω to 400 Ω 400 Ω to 1 kΩ	 2.0 µΩ/Ω 2.2 µΩ/Ω	The uncertainties can only be realised for resistors with suitable AC characteristics
DC RESISTANCE RATIO			
Resistance ratio	0.16 to 6.27	30 x 10^{-9}	DC ratio bridge calibration using RBC 100A
TEMPERATURE SIMULATION			
Temperature indicators and simulators, calibration by electrical simulation, for the following sensor types:			
Base metal thermocouple	-200 °C to +1600 °C	0.18 °C	including cold junction compensation
Noble metal thermocouple	-200 °C to +1760 °C	0.22 °C	including cold junction compensation
Resistance sensors (Pt100/Pt25)	-200 °C to +800 °C	0.0020 °C	

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 measurement uncertainty 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 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 measurement uncertainty is calculated according to the procedures given in the GUM 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 measurement uncertainty in certificates issued under its accreditation.

Expression of CMCs - symbols and units

It should be noted that the percentage symbol (%) represents the number 0.01. In cases where the measurement uncertainty is stated as a percentage, this is to be interpreted as meaning percentage of the measurand.
Thus, for example, a measurement uncertainty of 1.5 % means 1.5 × 0.01 × q, where q is the quantity value.

The notation Q[a, b] stands for the root-sum-square of the terms between brackets: $Q[a, b] = [a^2 + b^2]^{1/2}$