Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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Accredited to ISO/IEC 17025:2017

ITS Testing Services (UK) Limited (Aberdeen) trading as Calibration and Metering Services

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Calibration performed by the Organisation at the locations specified below

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
Unit 4B Howe Moss Drive Airport Industrial Park Dyce Aberdeen Scotland AB21 0GL	Volumetric measures, proving tanks and pipe provers	Lab A
Exploration Drive Aberdeen Science and Energy Park Aberdeen AB23 8HZ	DC & LF Electrical Gas Density Liquid Density Orifice plates Pressure Temperature	Lab B

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.	Volume - pipe provers Flow	Site

CALIBRATION AND MEASUREMENT CAPABILITY (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location
ELECTRICAL MEASUREMENTS				
DC RESISTANCE				Lab B
Measurement	0 Ω to 1 Ω 1 Ω to 10 Ω 10 Ω to 100 Ω	75 μΩ 60 μΩ/Ω 60 μΩ/Ω	Measurement of resistors with negligible power dissipation	
Specific Value	50 Ω	14 μΩ/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 100 MΩ to 1 GΩ	20 μΩ/Ω 10 μΩ/Ω 13 μΩ/Ω 30 μΩ/Ω 130 μΩ/Ω 220 μΩ/Ω 0.20 %	Using digital multimeter.	
Generation	1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ	66 μΩ/Ω 12 μΩ/Ω 7.2 μΩ/Ω 10 μΩ/Ω 10 μΩ/Ω 7.0 μΩ/Ω 20 μΩ/Ω 25 μΩ/Ω	Known values of resistance for application to application to resistance measuring instruments.	
DC VOLTAGE				Lab B
Measurement	0 mV to 10 mV 10 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1 kV	2.0 μV 5.0 μV/V +1.3 μV 5.0 μV/V + 2.0 μV 18 μV/V 18 μV/V 18 μV/V	Using digital multimeter	
Generation	0 mV to 220 mV 220 mV to 2.2 V 2.2 V to 11 V 11 V to 22 V 22 V to 220 V 220 V to 1000 V	7.5 μV/V + 1.0 μV 6.0 μV/V + 1.5 μV 7.0 μV/V 8.0 μV/V 8.0 μV/V 12 μV/V	Known values of DC voltage for application to voltage measuring instruments	
DC CURRENT				Lab B
Measurement	0 μA to 1 μA 1 μA to 10 μA 10 μA to 100 μA 100 μA to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A	160 pA 140 μA/A 120 μA/A 100 μA/A 100 μA/A 100 μA/A 250 μA/A	Using digital multimeter	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location
DC CURRENT (continued)				Lab B
Generation	0 mA to 2.2 mA	20 µA/A + 12 nA	Known values of DC current for application to current measuring instruments.	
	2.2 mA to 22 mA	17 µA/A + 120 nA		
	22 mA to 220 mA	30 µA/A + 1.2 µA		
	220 mA to 2.2 A	35 µA/A + 35 µA		
	2.2 A to 20 A	190 µA/A + 1.3 mA	.	
	20 A to 1000 A	0.20 %	Simulated using multi-turn coils; for the calibration of clamp-on ammeters and similar devices.	
AC VOLTAGE				Lab B
Measurement	*50 Hz to 1 kHz*			
	1 mV to 10 mV	5.0 µV	Using digital multimeter.	
	10 mV to 100 mV	15 µV		
	50 Hz to 20 kHz			
	100 mV to 1 V	500 µV/V		
	1 V to 10 V	500 µV/V		
	10 V to 100 V	550 µV/V		
	100 V to 700 V	510 µV/V		
Generation	*60 Hz to 20 kHz*		Known values of AC voltage for application to voltage measuring instruments.	
	10 mV to 220 mV	90 µV/V		
	220 mV to 2.2 V	70 µV/V		
	2.2 V to 220 V	71 µV/V		
	60 Hz to 1 kHz			
	220 V to 1100 V	90 µV/V		
AC CURRENT				Lab B
Measurement	*50 Hz to 1 kHz*		Known values of AC current for application to current measuring instruments.	
	10 µA to 100 µA	70 nA		
	100 µA to 1 mA	600 nA		
	1 mA to 10 mA	250 µA/A + 3.0 µA		
	10 mA to 100 mA	250 µA/A + 30 µA		
	100 mA to 1 A	250 µA/A + 300 µA		
Generation	*60 Hz*	250 µA/A		Lab B
	2.2 mA to 2.2 A	750 µA/A + 9 mA		
	2.2 A to 20 A			
	20 A to 1000 A	0.35 %	Simulated using multi-turn coils: for the calibration of clamp-on ammeters and similar instruments.	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location
Frequency				
Measurement	0.01 Hz to 0.1 Hz	2.0 in 10^2	By multi-period measurement	Lab B
	0.1 Hz to 1 Hz	2.0 in 10^3		
	1 Hz to 10 Hz	2.0 in 10^4		
	10 Hz to 100 Hz	2.0 in 10^5	By direct frequency measurement	
	100 Hz to 1 kHz	2.0 in 10^6		
	1 kHz to 10 kHz	2.0 in 10^7		
	10 kHz to 100 kHz	2.0 in 10^7		
	100 kHz to 1 MHz	7.0 in 10^8		
	1 MHz to 1.3 GHz	5.0 in 10^8		
Generation	10 MHz	3.0 in 10^{10}		
Time Interval	100 ns to 1000 s	50 ns	Electrically triggered devices	Lab B
	10 s to 1000 s	0.10 s	Mechanically triggered devices, e.g. stopwatches	Lab B
TEMPERATURE SIMULATION				
Temperature indicators, calibration by electrical simulation				Lab B
Resistance thermometers (PT 100)	-200 °C to +800 °C	0.050 °C	Application of known values of resistance corresponding to the equivalent temperatures.	Lab B
Thermocouples:				
Type K	-200 °C to +1200 °C	0.080 °C	By application of DC millivolts corresponding to the equivalent temperatures for the stated thermocouple types, with the reference junction disabled.	
Type J	-200 °C to +1190 °C	0.060 °C		
Type T	-200 °C to +400 °C	0.080 °C		
Type B	500 °C to 1800 °C	0.21 °C		
Type R	-40 °C to +250 °C	0.26 °C		
Type R	250 °C to 1750 °C	0.11 °C		
Type S	-40 °C to +300 °C	0.21 °C		
Type S	300 °C to 1750 °C	0.12 °C		
Type E	-200 °C to +990 °C	0.060 °C		
Type N	-200 °C to +1290 °C	0.12 °C		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location
TEMPERATURE SIMULATION (continued)				
Temperature indicators, calibration by electrical simulation (continued)				Lab B
Thermocouples:				
Type K	-200 °C to +1200 °C	0.37 °C	By application of DC millivolts corresponding to corresponding to the equivalent temperatures for the stated thermocouple types, with the reference junction enabled.	
Type J	-200 °C to +1190 °C	0.37 °C		
Type T	-200 °C to +400 °C	0.37 °C		
Type B	500 °C to 1800 °C	0.41°C		
Type R	-40 °C to +250 °C	0.44 °C		
Type R	250 °C to 1750 °C	0.38 °C		
Type S	-40 °C to +300 °C	0.41 °C		
Type S	300 °C to 1750 °C	0.38 °C		
Type E	-200 °C to +990 °C	0.36 °C		
Type N	-200 °C to +1290 °C	0.38 °C		
Temperature simulators, calibration by electrical simulation				Lab B
Resistance thermometers (PT 100)	-200 °C to +800 °C	0.020 °C	Measurement of resistance values corresponding to the equivalent temperatures	
Thermocouples:				
Type K	-200 °C to +1200 °C	0.13 °C	By measurement of DC millivolts corresponding to corresponding to the equivalent temperatures for the stated thermocouple types, with the reference junction disabled.	
Type J	-200 °C to +1190 °C	0.090 °C		
Type T	-200 °C to +400 °C	0.11 °C		
Type B	500 °C to 1800 °C	0.31 °C		
Type R	-40 °C to +450 °C	0.38 °C		
Type R	450 °C to 1750 °C	0.15 °C		
Type S	-40 °C to +400 °C	0.31 °C		
Type S	400 °C to 1750 °C	0.16 °C		
Type E	-200 °C to +990 °C	0.070 °C		
Type N	-200 °C to +1290 °C	0.16 °C		
Thermocouples:				
Type K	-200 °C to +1200 °C	0.38 °C	By measurement of DC millivolts corresponding to corresponding to he equivalent temperatures for the stated thermocouple types, with the reference junction enabled.	
Type J	-200 °C to +1190 °C	0.37 °C		
Type T	-200 °C to +400 °C	0.37°C		
Type B	500 °C to 1800 °C	0.44 °C		
Type R	-40 °C to +450 °C	0.52°C		
Type R	450 °C to 1750 °C	0.39 °C		
Type S	-40 °C to +400 °C	0.47 ^{0}C		
Type S	400 °C to 1750 °C	0.39 ^{0}C		
Type E	-200 °C to +990 °C	0.37 ^{0}C		
Type N	-200 °C to +1290 °C	0.39 ^{0}C		
Reference Junction Compensation	Nominal Ambient 17 °C to 23 °C	0.16 °C		Lab B

Calibration performed by the Organisation at the locations specified below

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location
TEMPERATURE MEASUREMENTS			Calibration performed within Liquid Baths.	Lab B
Digital Thermometers with the following sensors				
PRT Sensor	-25 °C to +140 °C	0.04 °C		
Thermocouple	-25 °C to +140 °C	0.28 °C		
Thermistor Sensors	-25 °C to 140°C	0.04 °C		
Resistance Thermometer (100 Ω)	-25 °C to +200 °C	0.04 °C		
PRESSURE MEASUREMENTS			Methods consistent with EURAMET CG3 and CG17.	Lab B
Gas Pressure (gauge)				
"Pressure equivalent" calibration of Dead Weight Testers (pressure balances supplied with an associated mass set)	2.5 kPa to 3.5 kPa 3.5 kPa to 100 kPa 100 kPa to 2.6 MPa	Q [0.013 %, 0.30 Pa] Q [0.0080 %, 0.30 Pa] Q [0.0080 %, 1.5 Pa]	Calibrations may be undertaken expressed in other units of pressure if required.	
"Pressure equivalent" calibration of Ametek gas pressure standards	2.5 kPa to 3.5 kPa 3.5 kPa to 100 kPa 100 kPa to 2.6 MPa	Q [0.013 %, 0.30 Pa] Q [0.010 %, 0.30 Pa] Q [0.010 %, 1.5 Pa]	Pressure and Differential pressure transmitters with electrical outputs may be calibrated.	
Calibration of pressure indicating instruments and gauges	-90 kPa to -3.5 kPa 1.5 kPa to 3.5 kPa 3.5 kPa to 100 kPa 100 kPa to 1 MPa 1 MPa to 21 MPa	Q [0.010 %, 0.30 Pa] Q [0.012 %, 0.30 Pa] Q [0.0080 %, 0.30 Pa] Q [0.0080 %, 1.5 Pa] 0.0080 %	Differential pressure cells may be calibrated using the digital communication protocol.	
Gas pressure (absolute)				
Calibration of pressure indicating instruments and gauges	100 Pa to 1.5 kPa 1.5 kPa to 130 kPa 130 kPa to 200 kPa 200 kPa to 2.1 MPa	Q [0.0045 %, 28 Pa] Q [0.0032 %, 8.0 Pa] Q [0.0045 %, 28 Pa] Q [0.0045 %, 120 Pa]		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location
PRESSURE (continued)				Lab B
Hydraulic Pressure (gauge)			Methods consistent with EURAMET CG3 and CG17	
"Pressure equivalent" calibration of Dead Weight Testers (pressure balances supplied with an associated mass set) and calibration of pressure indicating instruments and gauges	0.5 MPa to 7 MPa 7 MPa to 70 MPa 70 MPa to 140 MPa	Q [0.0090 %, 30 Pa] Q [0.0090 %, 300 Pa] Q [0.010 %, 600 Pa]		
Gas Pressure (differential)				
Calibration of pressure indicating instruments and gauges	*Line pressure 1 MPa to 21 MPa* 1.5 kPa to 1 MPa	Q [0.0080 %, 0.30 Pa] Combined (root sum square) with 0.60 µPa/Pa of line pressure, plus 0.0080 % of differential pressure, plus 10 Pa		
DIMENSIONAL				
Orifice Plates	Bore (d) diameters: 12.5 mm to 300 mm 300 mm to 500 mm Plate thickness (E) Edge thickness (e) Surface roughness of face - Ra Flatness of face Bevel angle (α) Edge angle Edge radius (G) Plate concentricity	 13 µm 15 µm 7.0 µm 31 µm 0.26 µm 48 µm 8.4 minutes of arc 8.4 minutes of arc 10 µm 51 µm	As BS EN ISO 5167-2:2022 and BS EN ISO 5167-2:2003 (withdrawn)	Lab B
DENSITY MEASUREMENTS				
Liquid density transducers				Lab B
Air Oil	1.2 kgm^{-3} 838 kgm^{-3} to 842 kgm^{-3}	0.10 kgm^{-3} 0.22 kgm^{-3}	By comparison with liquids of a known density at temperatures between 20 °C and 20.5 °C.	
Gas density transducers				Lab B
Nitrogen	6 kgm^{-3} to 256 kgm^{-3}	0.080 %	By comparison with known gases at controlled temperatures and pressures .	
Argon	35 kgm^{-3} to 413 kgm^{-3}	0.11 %		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location
FLOW and VOLUME MEASUREMENTS				
Volumetric measures and pipe provers				
Calibration of small volume piston prover	20 l to 40 l 40 l to 50 l 50 l to 120 l 120 l to 130 l	0.036 % 0.023 % 0.018 % 0.016 %	Gravimetric calibration using water.	Lab A
Calibration of Volumetric measures	20 l 40 l 60 l 80 l 100 l 120 l 140 l	0.031 % 0.019 % 0.016 % 0.015 % 0.014 % 0.014 % 0.013 %	Gravimeteric calibration using water.	Lab A
Volume			Using piston provers and volume measures.	
Calibration of pipe Provers				
Water	At flow rates of 300 l/min to 3000 l/min	0.025 %	Pipe provers from 4” to 36”.	Site
Hydrocarbons	At flow rates of 300 l/min to 3000 l/min	0.040 %	Pipe provers from 4” to 36”.	
Flow				
Water volume flow rate	0.95 l/min to 6623 l/min	0.025 %	Suitable for the calibration of 2” to 6” turbine meters.	Site
Hydrocarbon volume flow rate	0.95 l/min to 6623 l/min	0.040 %		
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 $1.5 \times 0.01 \times q$, where q is the quantity value.

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