Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

0604

Accredited to ISO/IEC 17025:2017

Young Calibration Limited

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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 5 Cecil Pashley Way Shoreham Airport Shoreham-by-Sea West Sussex BN43 5FF	**Local contact** Dr Mark Hindle	Pressure Electrical Temperature indicators - Electrical simulation Air velocity Air flow Water flow Hydrocarbon flow Temperature Humidity	Lab

Site activities performed away from the locations listed above:

Location details		Activity	Location code
The customer's 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	**Local contact** Dr Mark Hindle	Pressure Electrical Temperature indicators - Electrical simulation Temperature Humidity	Site

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
FLOW				
Hydrocarbon oils				
Calibration of flow meters using gravimetric and reference meter methods				
Volume flow rate	0.5 l/min to 440 l/min	0.40 %	Calibrations are carried out with fluids within the viscosity range 5 to 20cSt at fluid temperatures of up to 60 °C	Lab
Quantity of fluid passed	0.33 l to 361.7 l 361.7 l to 4 400 l (at flow rates of 0.5 l/min to 440 l/min)	0.40 % 1.0 %		
Mass flow rate	0.5 kg/min to 367.4 kg/min	0.40 %	Calibrations are carried out at pressures of up to 10 bar	
Mass of fluid passed	0.4 kg to 302 kg 302 kg to 3 674 kg (at flow rates of 0.5 kg/min to 367.4 kg/min)	0.40 % 1.0 %		
Water				
Calibration of flow meters using gravimetric and reference meter methods				
Volume flow rate	1.0 ml/hr to 2400 ml/hr 1.0 ml/hr to 2400 ml/hr	Q[0.10 %,0.0040 ml/hr] Q[0.55 %, 0.36 ml/hr]	Gravimetric Reference meter	Lab
	0.04 l/min to 1 000 l/min	0.15 %	Gravimetric	
Quantity of fluid passed	0.25 l to 801.6 l 801.6 l to 7 000 l (at flow rates of 0.04 l/min to 1 000 l/min)	0.15 % 1.0 %	Using both flying start/stop and standing start/stop methods	
Mass flow rate	1 g/hr to 2400 g/hr 1 g/hr to 2400 g/hr	Q[0.10 %, 0.0040 g/hr] Q[0.55 %, 0.36 g/hr]	Gravimetric Reference meter	
	0.04 kg/min to 998 kg/min	0.15 %	Gravimetric	
Mass of fluid passed	0.25 g to 800 kg 800 kg to 9 980 kg (at flow rates of 0.04 kg/min to 998 kg/min)	0.15% 1.0 %	Gravimetric Reference meter	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Gas			Calibration of flow meters with an electrical or pressure output can be undertaken	
Calibration of flow meters using Sonic nozzle method				
Volume flow rate	1 ml/min to 50 ml/min 50 ml/min to 2500 l/min	Q[0.49 %,0.059 ml/min] 0.49 %	Calibrations are carried out at pressures of up to 8 bar	Lab
Quantity of gas passed	300 ml to 50000 l (at flow rates of 1 ml/min to 50 ml/min 50 ml/min to 2600 l/min)	Q[0.50 %,0.059 ml/min] 0.50 %		
Mass flow rate	0.001 2 g/min to 0.0060 g/min 0.0060 g/min to 3.02 kg/min	Q[0.48 %,0.071 mg/min] 0.48 %		
Mass of gas passed	0.36 g to 60.4 kg (at flow rates of 0.001 2 g/min to 0.0060 g/min 0.0060 g/min to 3.02 kg/min)	Q[0.50 %,0.071 mg/min] 0.50 %		
Calibration of flow meters using Turbine meter method				
Volume flow rate	10 l/s to 450 l/s	0.90 %	Calibrations are carried out at ambient conditions	
Quantity of gas passed	300 l to 540 kl (at flow rates of 10 l/s to 450 l/s)	0.90 %		
Mass flow rate	12 g/s to 0.54 kg/s	0.90 %		
Mass of gas passed	0.36 kg to 643 kg (at flow rates of 12 g/s to 0.54 kg/s)	0.90 %		
Calibration of flow meters using LDA method				
Volume flow rate	40 l/s to 1 250 l/s	Q[0.70 %, 0.030 l/s]	Calibrations are carried out at ambient conditions using a laser doppler anemometer	Lab
Quantity of gas passed	12 kl to 375 kl (at flow rates of 40 l/s to 1 250 l/s)	Q[0.70 %, 9.0 l]		
Mass flow rate	48 g/s to 1.488 kg/s	Q[0.70 %, 0.036 g/s]		
Mass of gas passed	14.28 kg to 1 785 kg (at flow rates of 48 g/s to 1.488 kg/s)	Q[0.70 %, 11 g]		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
AIR VELOCITY				
Pitot tubes	1.0 m/s to 80 m/s	0.15 % + 0.000 20 m/s	1) Calibrations are performed against a laser doppler anemometer, or a secondary standard where requested.	Lab
Thermal and ultrasonic anemometers	0.05 m/s to 80 m/s	0.16 % + 0.000 30 m/s		
Vane anemometers	0.1 m/s to 40 m/s	0.20 % + 0.0010 m/s	2) Pitot tube uncertainty dependant on pitot differential pressure range	
Rotating cup anemometers	1.0 m/s to 21 m/s	0.23 %	3) Air velocity instruments up to 480 x 120 mm diameter (working area): uncertainty is dependent on design of instrument under test.	
PRESSURE			Methods consistent with EURAMET CG17	
Gas pressure (absolute)				
Calibration of pressure indicating instruments and gauges	5 kPa to 130 kPa	22 Pa	Devices with an electrical output can also be calibrated.	Lab
Gas pressure (gauge)				
Calibration of pressure indicating instruments and gauges	-90 kPa to 0 Pa 0 Pa to 2.5 kPa 2.5 kPa to 5 kPa 5 kPa to 6.9 kPa 6.9 kPa to 20 kPa 20 kPa to 270 kPa 270 kPa to 2.1 MPa 2.1 MPa to 3.5 MPa	38 Pa 0.045 % + 0.060 Pa 0.046 % + 0.31 Pa 9 Pa 16 Pa 0.029 % 0.023 % 1.1 kPa	Absolute pressure calibrations can be undertaken using gauge pressure generation and the associated barometric pressure with the additional absolute pressure uncertainty as listed	Lab
	0 kPa to 270 kPa 270 kPa to 1.6 MPa	0.029 % + 0.84 kPa 0.023 % + 0.90 kPa	Oxygen-duty pressure instruments	Lab & Site
Hydraulic pressure (gauge)				
Calibration of pressure indicating instruments and gauge	0.55 MPa to 55 MPa 55 MPa to 110 MPa	0.019 % + 90 Pa 0.018 %		Lab
	0 kPa to 5.5 MPa 5.5 MPa to 40 MPa 40 MPa to 70 MPa	0.023 % + 11 kPa 0.018 % + 12 kPa 72 kPa	Oxygen-duty pressure instruments	Lab & Site
Gas pressure (absolute)				
Calibration of pressure indicating instruments and gauges	5.0 kPa to 130 kPa	22 Pa		Site

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
PRESSURE (continued)				
Gas pressure (gauge)				
Calibration of pressure indicating instruments and gauges	-90 kPa to 0 Pa 0 Pa to 2.5 kPa 2.5 kPa to 5.0 kPa 5.0 kPa to 6.9 kPa 6.9 kPa to 34.5 kPa 34.5 kPa to 250 kPa 2.1 MPa to 3.5 Mpa	38 Pa 0.045 % + 0.060 Pa 0.046 % + 0.31 Pa 9 Pa 16 Pa 82 Pa 1.1 kPa		Site
ELECTRICAL				Lab and site
DC Voltage Generation	0 V to 330 mV 330 mV to 3.3 V 3.3 V to 33 V 33 V to 1000 V	0.012 % + 6.0 µV 0.0070 % + 33 µV 0.0070 % + 370 µV 0.0073 % + 29 mV	Using multifunction calibrator.	
Measurement	0 V to 100 mV 100 mV to1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	0.0047 % + 5.5 µV 0.0034 % + 34 µV 0.0033 % + 330 µV 0.0048 % + 3.3 mV 0.0051 % + 31 mV	Using digital multimeter.	
Mains Voltage Measurement Mains Voltage Frequency	200 V to 300 V Nominal 50 Hz	1.0 % 2.5 %		
DC Current Generation	0 mA to 33 mA 33 mA to 330 mA 330 mA to 2.2 A 2.2 A to 11 A	0.016 % + 0.35 µA 0.017 % + 4.5 µA 0.041 % + 190 µA 0.079 % + 460 µA	Using multifunction calibrator.	
Measurement	0 mA to 30 mA 0 mA to 100 mA 0 mA to 10A	0.017 % + 6.0 µA 0.060 % + 7.5 µA 0.21 % + 1.2 mA	Using digital multimeter.	
DC Resistance	0 Ω to 33 Ω 33 Ω to 330 Ω 330 Ω to 1.1 kΩ 1.1 kΩ to 3.3 kΩ 3.3 kΩ to 11 kΩ 11 kΩ to 33 kΩ 33 kΩ to 110 kΩ 110 kΩ to 330 kΩ 330 kΩ to 1.1 MΩ 1.1 MΩ to 3.3 MΩ 3.3M Ω to 11 MΩ 11 MΩ to 33 MΩ 33 MΩ to 110 MΩ	25 mΩ 60 mΩ 210 mΩ 500 mΩ 1.6 Ω 5.0 Ω 25 Ω 60 Ω 200 Ω 800 Ω 10 kΩ 43 kΩ 800 kΩ	Using multifunction calibrator.	
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 100 MΩ to 1 GΩ	20 mΩ 150 mΩ 1.5 Ω 15 Ω 140 Ω 5.0 kΩ 1.1 % + 23 kΩ 3.2 % + 7.4 MΩ	Using digital multimeter.	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL (continued)				Lab and site
Frequency			Using GPS disciplined oscillator and frequency counter.	
Specific values	1 MHz, 5 MHz and 10 MHz	0.12 parts in 10^6		
Ranges source and measure	0.5 Hz to 250 kHz	3.7 parts in 10^6	Frequency can be expressed in other units, for example RPM, at equivalent uncertainties.	
Source only	250 MHz to 1 GHz	0.13 parts in 10^6		
Elapsed time	10 s to 24 hours	0.13 parts in 10^6 + 54 ms	For calibration of timers and stopwatches.	
Electrical calibration of temperature indicators				
Ambient	15 °C to 30 °C	0.41 °C	For reporting reference junction temperature.	
Base Metal Thermocouples	-270 °C to 0 °C 0 °C to 1370 °C	0.67 °C 0.55 °C	Including reference junction compensation	
Noble Metal Thermocouples	-50 °C to +399 °C 400 °C to 1760 °C	0.96 °C 0.70 °C		
PRTs Generate resistance (Pt 100)	-200 °C to +850 °C	0.43 °C		
Measure resistance (Pt 100)	-200 °C to +850 °C	0.27 °C		
TEMPERATURE			By comparison with Reference thermometers	
Resistance thermometers and electronic probes with indicators	-40 °C to +20 °C 20 °C to 200 °C 0 °C	0.35 °C 0.059 °C 0.043 °C	In dry block calibrator In liquid bath In dry block calibrator	Lab
Base metal thermocouples	-40 °C to +20 °C 20 °C to 200 °C	0.55 °C 0.70 °C	In dry block calibrator In liquid bath	
Block Calibrators	-40 °C to +200 °C	0.045 °C		Lab and site
Liquid baths	-40 °C to +200 °C	0.045 °C	Single and multipoint time dependent temperature profiling, also referred to as spatial temperature surveying or mapping	
Air temperature	0 °C to 60 °C 0 °C to 60 °C	0.19 °C 0.21 °C	In air chamber In air chamber	Lab Site

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
HUMIDITY			By comparison with chilled mirror hygrometer and reference thermometers	
Dew point	-20 °C to +60 °C	0.31 °C		Lab
Relative humidity	Relative Humidity derived from dew point and temperature		Achievable ranges:- 0 °C to 10 °C 20 %rh to 95 %rh	Lab
	Temperature range 0 °C to 60 °C 5 %rh to 20 %rh 20 %rh to 40 %rh 40 %rh to 60 %rh 60 %rh to 80 %rh 80 %rh to 95 %rh	 0.22 °C 0.20 %rh 0.31 %rh 0.70 %rh 1.4 %rh 1.9 %rh	10 °C to 18 °C 10 %rh to 95 %rh 18 °C to 60 °C 5 %rh to 95 %rh	
	Temperature range 0 °C to 60 °C 5 %rh to 20 %rh 20 %rh to 40 %rh 40 %rh to 60 %rh 60 %rh to 80 %rh 80 %rh to 95 %rh	 0.22 °C 1.3 %rh 1.4 %rh 1.7 %rh 2.2 %rh 2.5 %rh	By comparison with reference hygrometer	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 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: $Q[a, b] = [a^2 + b^2]^{1/2}$