# Schedule of Accreditation

**issued by**

# United Kingdom Accreditation Service

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

**0690**

**Accredited to ISO/IEC 17025:2017**

## Airflow Measurements Ltd

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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 |
|---|---|---|---|
| **AIR VELOCITY** | | | |
| Calibration of Anemometers and Pitot Tubes by comparison | 0.1 m/s to 1 m/s<br>1 m/s to 2 m/s<br>2 m/s to 5 m/s<br>5 m/s to 10 m/s<br>10 m/s to 20 m/s<br>20 m/s to 30 m/s<br>30 m/s to 40 m/s<br>40 m/s to 50 m/s | 0.10 % + 0.035 m/s<br>0.10 % + 0.030 m/s<br>0.10 % + 0.13 m/s<br>0.25 % + 0.13 m/s<br>0.25 % + 0.11 m/s<br>0.25 % + 0.14 m/s<br>0.25 % + 0.24 m/s<br>0.25 % + 0.35 m/s | Usable wind tunnel diameter 100 mm. Calibrations by comparison with a master instrument within a characterised airstream. CMC above 30 m/s may.<br><br>increase for UUT > 3” diameter |
| **PRESSURE** | | | Methods consistent with EURAMET CG17. |
| <u>Gas pressure (absolute)</u> | | | |
| Calibration of pressure indicating instruments and gauges | 3.5 kPa to 131 kPa | 0.0050 % + 10 Pa | NOTE: Absolute pressure calibration can be carried out using associated barometric pressure measurement. The uncertainty values given below will be increased by 11 Pa. |
| <u>Gas pressure (gauge)</u> | | | |
| Calibration of pressure indicating instruments and gauges | -95 kPa to 0 Pa<br>0 Pa to 500 Pa<br>500 Pa to 2.5 kPa<br>2.5 kPa to 8 kPa<br>8 kPa to 24 kPa<br>24 kPa to 500 kPa<br>500 kPa to 4 MPa | 0.0050 % + 100 Pa<br>0.030 % + 0.15 Pa<br>0.030 % + 0.15 Pa<br>0.20 % + 0.95 Pa<br>0.20 % + 2.7 Pa<br>0.0050 % + 100 Pa<br>0.0050 % + 1.0 kPa | Calibration of devices with an electrical output may be undertaken |
| <u>Hydraulic pressure (gauge)</u> | | | |
| Calibration of pressure indicating instruments and gauges | 0.7 MPa to 2.8 MPa<br>2.8 MPa to 28 MPa | 0.030 % + 1.7 kPa<br>0.020 % + 1.7 kPa | |

| Measured Quantity Instrument or Gauge | Range | Expanded Measurement Uncertainty ($k$ = 2) | Remarks |
|---|---|---|---|
| **ELECTRICAL CALIBRATION**: Electrical values and uncertainties listed below are applicable for the calibration of both measuring instruments and for instruments with an output. The method used is by direct comparison against laboratory standards unless otherwise stated in the remarks column. | | | |
| DC VOLTAGE | | | |
| | 0 V to 100 mV | 6.5 µV | Direct measurement capability suitable for calibrating the outputs of devices submitted for calibration. |
| | 100 mV to 1 V | 41 µV/V + 2.0 µV | |
| | 1 V to 10 V | 36 µV/V + 53 µV | |
| | 10 V to 100 V | 47 µV/V + 740 µV | |
| | 100 V to 1 kV | 47 µV/V + 10 mV | |
| | 0 V to 100 mV | 0.0020 % + 5.0 µV | These are source values available for the calibration of measuring equipment. |
| | 100 mV to 1 V | 0.0010 % + 15 µV | |
| | 1 V to 20 V | 0.0010 % + 120 µV | |
| | 20 V to 200 V | 0.0010 % + 7.0 mV | |
| | 200 V to 1 kV | 0.0010 % + 24 mV | |
| DC RESISTANCE | | | |
| | 0 Ω to 10 Ω | 130 µΩ/Ω + 4.7 mΩ | Direct measurement capability suitable for calibrating the outputs of devices submitted for calibration. |
| | 10 Ω to 100 Ω | 130 µΩ/Ω + 12 mΩ | |
| | 100 Ω to 1 kΩ | 200 µΩ/Ω + 120 mΩ | |
| | 1 kΩ to 10 kΩ | 130 µΩ/Ω + 1.3 mΩ | |
| | 10 kΩ to 100 kΩ | 110 µΩ/Ω + 13 Ω | |
| | 100 kΩ to 1 MΩ | 950 µΩ/Ω + 37 Ω | |
| | 1 MΩ to 10 MΩ | 0.90 % + 1.1 k Ω | |
| | 100 µΩ | 0.10 µΩ | These are source values available for the calibration of measuring equipment using standard resistors |
| | 1 mΩ | 0.31 µΩ | |
| | 5 mΩ | 1.3 µΩ | |
| | 10 mΩ | 1.0 µΩ | |
| | 100 mΩ | 20 µΩ | |
| | 1 Ω | 430 µΩ | |
| | 1 Ω | 0.016 % | These are source values available for the calibration of measuring equipment using multi-function calibrator |
| | 10 Ω | 0.0051 % | |
| | 100 Ω | 0.0027 % | |
| | 1 kΩ | 0.0020 % | |
| | 10 kΩ | 0.0020 % | |
| | 100 kΩ | 0.016 % | |
| | 1 MΩ | 0.0031 % | |
| | 10 MΩ | 0.022 % | |
| | 100 MΩ | 0.062 % | |
| DC CURRENT | | | |
| | 0 A to 10 mA | 510 µA/A + 240 nA | Direct measurement capability suitable for calibrating the outputs of devices submitted for calibration. |
| | 10 mA to 100 mA | 510 µA/A + 6.5 µA | |
| | 100 mA to 1 A | 1000 µA/A + 160 µA | |
| | 1 A to 2 A | 1200 µA/A + 680 µA | |

| Measured Quantity Instrument or Gauge | Range | Expanded Measurement Uncertainty ($k$ = 2) | Remarks |
|---|---|---|---|
| DC CURRENT (continued) | | | |
| | 0 A to 200 µA | 0.0020 % + 25 nA | These are source values available for the calibration of measuring equipment. |
| | 200 µA to 2 mA | 0.0020 % + 100 nA | |
| | 2 mA to 20 mA | 0.0010 % + 5.0 µA | |
| | 20 mA to 200 mA | 0.0010 % + 10 µA | |
| | 200 mA to 2 A | 0.0050 % + 40 µA | |
| | 2 A to 20 A | 0.010 % + 600 µA | |
| | 10 A to 100 A | 0.080 % + 1.0 mA | For calibration of current clamps using a muilti turn coil. |
| | 100 A to 1000 A | 0.080 % + 1.0 mA | |
| AC VOLTAGE | | | |
| | 5 mV to 100 mV | 660 µV/V + 42 µV | Direct measurement capability suitable for calibrating the outputs of devices submitted for calibration. |
| | 100 mV to 1 V *45 Hz to 1 kHz* | 620 µV/V + 310 µV | |
| | 100 mV to 1 V *1kHz to 30 kHz* | 620 µV/V + 320 µV/ | |
| | 1 V to 10 V *45 Hz to 1 kH* | 400 µV/V + 37 mV | |
| | 1 V to 10 V 1 k*Hz to 30 kH* | 1200 µV/V + 5.1 mV | |
| | 10 V to 100 V *45 Hz to 1 kHz* | 480 µV/V + 260 mV | |
| | 10 V to 100 V *1 kHz to 30 kHz* | 620 µV/V + 58 mV | |
| | 100 V to 750 *V 45 Hz to 10 kHz* | 660 ppm + 240 mV | |
| | *45 Hz to 5 kHz:* | | |
| | 1 mV to 200 mV | 0.0050 % + 70 µV | These are source values available for the calibration of measuring equipment. |
| | 200 mV to 2 V | 0.010 % + 820 µV | |
| | 10 V to 20 V | 0.010 % + 12 mV | |
| | 20 V to 200 V | 0.010 % + 120 mV | |
| | 200 V to 1000 V | 0.010 % + 450 mV | |
| AC RESISTANCE | *At 50 Hz:* | | Calibration of loop impedance meters. |
| | 0 Ω to 0.3 Ω | 0.10 % + 20 mΩ | |
| | 0.3 Ω to 10 Ω | 0.10 % + 25 mΩ | |
| | 10 Ω to 100 Ω | 0.20 % + 200 mΩ | |
| | 100 Ω to 1 kΩ | 0.30 % + 250 mΩ | |
| AC CURRENT | | | |
| | *45 Hz to 1 kHz:* | | |
| | 1 µA to 1 A | 0.26 % + 400 µA | Direct measurement capability suitable for calibrating the outputs of devices submitted for calibration. |
| | 1 A to 2 A | 0.47 % + 12 mA | |
| | *45 Hz to 1 kHz:* | | |
| | 25 µA to 200 µA | 0.020 % + 500 nA | These are source values available for the calibration of measuring equipment. |
| | 200 µA to 2 mA | 0.015 % + 4.0 µA | |
| | 2 mA to 20 mA | 0.010 % + 40 µA | |
| | 20 mA to 200 mA | 0.015 % + 500 µA | |
| | 200 mA to 2 A | 0.015 % + 5.0 mA | |
| | 2 A to 20 A | 0.020 % + 15 mA | |
| | *45 Hz to 400 Hz* | | |
| | 10 A to 100 A | 0.10 % + 15 mA | For calibration of current clamps. |
| | 100 A to 1000 A | 0.10 % + 120 mA | |

| Measured Quantity Instrument or Gauge | Range | | Expanded Measurement Uncertainty ($k$ = 2) | | Remarks |
|---|---|---|---|---|---|
| RCD TRIP CURRENT | 0 mA to 300 mA | | 0.30 % + 5.0 mA | | |
| RCD TRIP TIME | 0 s to 400 ms<br>400 ms to 1 s | | 0.30 % + 5.0 ms<br>0.30 % + 10 ms | | |
| FREQUENCY | 1 Hz to 100 kHz<br>100 kHz, 1 MHz, 5 MHz and 10 MHz | | 100 μHz<br>1.0 part in $10^7$ | | |
| TIME INTERVAL | 1 μs<br>5 μs<br>20 μs<br>500 μs<br>1 ms<br>5 ms<br>10 ms<br>50 ms<br>100 ms | | 0.020 μs<br>0.10 μs<br>0.10 μs<br>11 μs<br>0.020 ms<br>0.10 ms<br>0.20 ms<br>1.1 ms<br>2.1 ms | | Repetitive signals suitable for calibrating oscilloscope time bases. |
| Elapsed time, single event | | | | | |
| Manually triggered devices<br>Electronically triggered devices | 0 s to 24 Hours<br>1 s to 24 hours | | 3.5 μs/s + 2.0 ms<br>3.5 μs/s | | |
| ELECTRICAL CALIBRATION OF TEMPERATURE INDICATORS AND CALIBRATORS | Type | Range °C | Without Cold Junction Compensation | Including Cold Junction Compensation | Methods consistent with Euramet CG-11 |
| Thermocouple indicators | T | -240 to -100 | 0.70 °C | 0.80 °C | |
| | | -100 to 0 | 0.70 °C | 0.80 °C | |
| | | 0 to 400 | 0.60 °C | 0.80 °C | |
| | K | -200 to -100 | 0.80 °C | 0.90 °C | |
| | | -100 to 0 | 0.70 °C | 0.80 °C | |
| | | 0 to 1370 | 0.60 °C | 0.80 °C | |
| | S | 0 to 1700 | 0.80 °C | 0.90 °C | |
| | R | -50 to 0 | 1.2 °C | 1.3 °C | |
| | | 0 to 1700 | 0.70 °C | 0.90 °C | |
| | N | -250 to 0 | 0.62 °C | 0.80 °C | |
| | | 0 to 1300 | 0.60 °C | 0.80 °C | |
| | J | -180 to 0 | 0.60 °C | 0.80 °C | |
| | | 0 to 700 | 0.60 °C | 0.80 °C | |
| | E | 0 to 800 | 0.60 °C | 0.80 °C | |
| | B | 0 to 1800 | 0.80 °C | 0.90 °C | |
| RTD indicators | Pt 100 | -200 to +800 | 0.050 °C | | |
| Reference junction compensation | 15 °C to 25 °C | | 0.50 °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 $1.5 \times 0.01 \times q$, where $q$ is the quantity value.

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