


# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

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

|  |  |   |
|--|--|---|
|  <p><b>UKAS</b><br/>CALIBRATION</p> <p>0601</p> <p>Accredited to<br/>ISO/IEC 17025:2017</p> | <h3>Electronic Temperature Instruments Limited</h3> <p>Issue No: 029    Issue date: 08 November 2021</p> |   |
|  | <p>ETI Ltd<br/>Unit 1<br/>Teville Industrials<br/>Worthing<br/>West Sussex<br/>BN14 8NW</p>              | <p>Contact: Mr G Hills<br/>Tel: +44 (0)1903 202151<br/>Fax: +44 (0)1903 202445<br/>E-Mail: sales@etiltd.co.uk<br/>Website: www.etiltd.co.uk</p> |
| <p><b>Calibration performed at the above address only</b></p>  |  |   |

### Calibration and Measurement Capability (CMC)

| Measured Quantity<br>Instrument or Gauge | Range             | Expanded Measurement<br>Uncertainty ( $k = 2$ ) | Remarks   |
|--|-------------------|---|---|
| TEMPERATURE                              |                   |   | Calibration by comparison with reference Platinum Resistance Thermometers in a stirred liquid bath above -50 °C and in a dry block below -50 °C<br>For probe length of greater than 120 mm, shorter probes will have an increased uncertainty |
| Platinum Resistance<br>Thermometers      | -100 °C to -50 °C | 0.13 °C<br>0.31 °C<br>0.37 °C                   | 4 Wire Configuration<br>3 Wire Configuration<br>2 Wire Configuration  |
|  | -50 °C to +250 °C | 0.020 °C<br>0.040 °C<br>0.18 °C                 | 4 Wire Configuration<br>3 Wire Configuration<br>2 Wire Configuration  |
| Thermistor                               | -100 °C to -50 °C | 0.13 °C   | At fixed temperatures   |
|  | -50 °C to +150 °C | 0.020 °C  |   |
| Resistance Sensors with<br>Indicators    | -100 °C to -50 °C | 0.13 °C   |   |
|  | -50 °C to +100 °C | 0.020 °C  |   |
|  | 100 °C to +250 °C | 0.040 °C  |   |
| Thermocouple Sensors with<br>Indicators  | -100 °C to -50 °C | 0.17 °C   |   |
|  | -50 °C to +250 °C | 0.15 °C   |   |
| Temperature data loggers                 | -50 °C to +250 °C | 0.040 °C  |   |



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| Measured Quantity<br>Instrument or Gauge                                    | Range   | Expanded Measurement<br>Uncertainty ( $k = 2$ )  | Remarks   |
|---|---|--|---|
| ELECTRICAL  |   |  | Calibration by comparison with reference instrument   |
| DC Resistance<br>Measurement  | 0 $\Omega$ to 200 $\Omega$<br>200 $\Omega$ to 1 k $\Omega$<br>1 k $\Omega$ to 10 k $\Omega$<br>10 k $\Omega$ to 100 k $\Omega$<br>100 k $\Omega$ to 1 M $\Omega$<br>1 M $\Omega$ to 10 M $\Omega$ | 0.0080 $\Omega$<br>0.038 $\Omega$<br>0.40 $\Omega$<br>5.0 $\Omega$<br>160 $\Omega$<br>2.9 k $\Omega$ | Including test caps and resistance simulators, used to calibrate resistance thermometers (thermistor and Pt100) |
| Sourcing  | 0 $\Omega$ to 200 $\Omega$<br>200 $\Omega$ to 1 k $\Omega$<br>1 k $\Omega$ to 10 k $\Omega$<br>10 k $\Omega$ to 100 k $\Omega$<br>100 k $\Omega$ to 1 M $\Omega$                                  | 0.0080 $\Omega$<br>0.038 $\Omega$<br>0.40 $\Omega$<br>5.0 $\Omega$<br>160 $\Omega$                   |   |
| DC Voltage<br>Measurement   | 0 mV to 200 mV  | 0.011 mV; 11 $\mu$ V   |   |
| Temperature indicators and simulators, calibration by electrical simulation |   |  |   |
| Base metal thermocouple<br>Type K   | -200 $^{\circ}$ C to -20 $^{\circ}$ C<br>20 $^{\circ}$ C to +200 $^{\circ}$ C<br>+200 $^{\circ}$ C to +800 $^{\circ}$ C<br>+800 $^{\circ}$ C to +1372 $^{\circ}$ C                                | 0.72 $^{\circ}$ C<br>0.29 $^{\circ}$ C<br>0.28 $^{\circ}$ C<br>0.32 $^{\circ}$ C                     | Including cold junction compensation  |
| Type J  | -200 $^{\circ}$ C to -100 $^{\circ}$ C<br>-100 $^{\circ}$ C to -20 $^{\circ}$ C<br>-20 $^{\circ}$ C to +200 $^{\circ}$ C<br>+200 $^{\circ}$ C to +1200 $^{\circ}$ C                               | 0.49 $^{\circ}$ C<br>0.27 $^{\circ}$ C<br>0.23 $^{\circ}$ C<br>0.20 $^{\circ}$ C                     |   |
| Type T  | -200 $^{\circ}$ C to -100 $^{\circ}$ C<br>-100 $^{\circ}$ C to -20 $^{\circ}$ C<br>-20 $^{\circ}$ C to +200 $^{\circ}$ C<br>+200 $^{\circ}$ C to +400 $^{\circ}$ C                                | 0.66 $^{\circ}$ C<br>0.36 $^{\circ}$ C<br>0.28 $^{\circ}$ C<br>0.20 $^{\circ}$ C                     |   |
| Type E  | -200 $^{\circ}$ C to -100 $^{\circ}$ C<br>-100 $^{\circ}$ C to -20 $^{\circ}$ C<br>-20 $^{\circ}$ C to +200 $^{\circ}$ C<br>+200 $^{\circ}$ C to +1000 $^{\circ}$ C                               | 0.41 $^{\circ}$ C<br>0.23 $^{\circ}$ C<br>0.19 $^{\circ}$ C<br>0.14 $^{\circ}$ C                     |   |
| Noble metal thermocouple  | 500 $^{\circ}$ C to 1700 $^{\circ}$ C   | 1.6 $^{\circ}$ C   | Including cold junction compensation  |
| Resistance thermometer (Pt100)  | -200 $^{\circ}$ C to +250 $^{\circ}$ C<br>250 $^{\circ}$ C to 850 $^{\circ}$ C  | 0.022 $^{\circ}$ C<br>0.13 $^{\circ}$ C  |   |
| Resistance thermometer (Pt1000)   | -200 $^{\circ}$ C to +250 $^{\circ}$ C<br>250 $^{\circ}$ C to 850 $^{\circ}$ C  | 0.015 $^{\circ}$ C<br>0.18 $^{\circ}$ C  |   |



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| Measured Quantity<br>Instrument or Gauge | Range                                | Expanded Measurement<br>Uncertainty ( $k = 2$ ) | Remarks  |
|--|--------------------------------------|---|--|
| HUMIDITY                                 |                                      |   | Calibration by comparison with<br>reference hygrometer and<br>reference Platinum Resistance<br>Thermometers in an air<br>chamber |
| Dew point                                | -20 °C to +60 °C                     | 0.18 °C   |  |
| Relative Humidity                        | 0 °C to 65 °C<br>10 %rh to 90 %rh    | 1.2 %rh   | Relative humidity limits<br>17 %rh to 90 %rh at 0 °C<br>10 %rh to 90 %rh above 7 °C  |
|  | 20 °C to 24 °C                       |   |  |
|  | 10 %rh to 50 %rh<br>50 %rh to 90 %rh | 0.6 %rh<br>1.0 %rh                              |  |
| Temperature in Air                       | 0 °C to 65 °C                        | 0.15 °C   |  |
| END                                      |                                      |   |  |



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**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:  $Q[a, b] = [a^2 + b^2]^{1/2}$