


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

| | | |
|--|---|--|
|  UKAS CALIBRATION 9558 Accredited to ISO/IEC 17025:2017 | Thermo Electron Manufacturing Limited trading as Unity Laboratory Services Issue No: 008 Issue date: 23 August 2021 | |
| | Stafford House Boundary Way Hemel Hempstead HP2 7GE United Kingdom | Contact: Simon Alexander Tel: +44 (0) 01442 233555 E-Mail: simon.alexander@thermofisher.com Website: www.thermoscientific.com |
| Calibration performed by the Organisation at the locations specified | | |

Locations covered by the organisation and their relevant activities

Laboratory locations:

| Location details | Activity | Location code |
|--|---|---------------|
| Address Unity Laboratory Services Stafford House Boundary Way Hemel Hempstead HP2 7GE United Kingdom Local contact Simon Alexander | Temperature Humidity Gas analysis Time Rotational speed | Lab |

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. | Temperature Humidity Gas analysis Time Rotational speed | Site |



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Calibration and Measurement Capability

| Measured Quantity Instrument or Gauge | Range | Expanded Measurement Uncertainty ($k = 2$) | Remarks | Location Code |
|--|---|--|--|------------------|
| TEMPERATURE | | | | Lab & site |
| Temperature controlled incubators, ovens, environmental chambers, fridges/refrigerators and freezers | -100 °C to -80 °C -80 °C to 0 °C 0 °C to 100 °C | 0.70 °C 0.60 °C 0.30 °C | Single and multipoint time dependent temperature profiling, also referred to as spatial temperature surveying or mapping | |
| Temperature indicators and recorders | -100 °C to 0 °C 0 °C to 50 °C | 0.55 °C 0.30 °C | By comparison in block calibrator | |
| HUMIDITY | | | | Lab & site |
| Relative humidity incators and recorders | 11 %rh to 90 %rh at 23 °C 11 %rh to 90 %rh at 37 °C 11 %rh to 90 %rh at 60 °C | 2.2 %rh 2.2 %rh 2.2 %rh | By comparison in humidity controlled chamber | |
| Temperature probes built in to humidity indicators and recorders | 23 °C 37 °C 60 °C | 0.25 °C 0.35 °C 0.45 °C | By comparison in temperature controlled chamber | |
| GAS ANALYSYS | | | | Lab & site |
| Gas analysers | Amount fraction mol/mol | Amount fraction mol/mol | | |
| carbon dioxide | 3 % at ambient, 23 °C, 37 °C 7 % at ambient, 23 °C, 37 °C 9 % at ambient, 23 °C, 37 °C 15 % at ambient, 23 °C, 37 °C | 0.12 % 0.20 % 0.09 % 0.13 % | By comparison with reference gas | |
| Temperature probes built in to carbon dioxide indicators and recorders | Ambient, 23 °C and 37 °C | 0.55 °C | By comparison in temperature controlled chamber | |
| ROTATIONAL SPEED | | | | Lab & site |
| Centrifuges | 100 rpm to 20000 rpm | 2.0 rpm | Using optical tachometer | |
| Centrifuge temperature | 0 °C to 25 °C | 1.7 °C | Using thermocouples | |
| TIME INTERVAL | | | | Lab & site |
| Timers | 60 s to 1 hour | 0.80 s | By comparison with a standard timer | |
| 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: $Q[a, b] = [a^2 + b^2]^{1/2}$