Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

0580

Accredited to ISO/IEC 17025:2017

Furness Controls Limited

Issue No: 039 **Issue date:** 01 April 2020

Beeching Road **Bexhill** **East Sussex** **TN39 3LG**	**Contact: Mr D B Walker** **Tel: +44 (0)1424-819980** **E-Mail: calibration@furness-controls.com** **Website: www.furness-controls.com**

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
Address Beeching Road Bexhill East Sussex TN39 3LJ	**Local contact** Doug Walker	Flow calibration Pressure calibration Electrical Calibration	Perm
Techniparc 3 rue Boole 91240 St. Michel sur Orge France	Thierry Jéhanno Tel.+33 1 69460020	Flow calibration Pressure calibration Electrical Calibration	France and site
Furness Controls GmbH Halskestraße 23 D - 47877 Willich Germany	Karsten Bartsch Tel. +49 21 54 49 96 80	Flow calibration Pressure calibration Electrical Calibration	Germany and site

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	**Site contact:** Sarah Hedge 4 The Pavilions Amber Close Tamworth Staffordshire B77 4RP Tel: +44 (0)1827 59950	Flow calibration Pressure calibration	Site

DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
PRESSURE				
Gas pressure (gauge)				
Calibration of pressure indicating instruments and gauges Pressure equivalent calibration of Furness controls FRS 4's and other dead weight testers	-100 kPa to -10 kPa -10 kPa to 0 Pa 0 Pa to 3 kPa 3 kPa to 12 kPa 12 kPa to 30 kPa 30 kPa to 40 kPa 40 kPa to 4 MPa	0.010 % 0.010 % + 0.30 Pa 0.010 % + 0.030 Pa 0.010 % + 0.30 Pa 0.010 % + 1.0 Pa 0.010 % + 2.0 Pa 0.010 %		Perm
Gas pressure (absolute)				
Calibration of pressure indicating instruments and gauges	0 Pa to 4 MPa	0.010 % + 10 Pa		Perm
Gas pressure (gauge)				
Calibration of pressure indicating instruments and gauges	-100 kPa to -24 kPa -24 kPa to -10 kPa -10 kPa to -2.4 kPa -2.4 kPa to -1 kPa -1 kPa to 1 kPa 1 kPa to 2.4 kPa 2.4 kPa to 10 kPa 10 kPa to 24 kPa 24 kPa to 100 kPa 100 kPa to 400 kPa 400 kPa to 1.6 MPa 1.6 MPa to 4 MPa	0.25 % + 100 Pa 0.30 % + 4.0 Pa 0.30 % + 0.70 Pa 0.30 % + 0.40 Pa 0.30 % + 0.070 Pa 0.30 % + 0.40 Pa 0.30 % + 0.70 Pa 0.30 % + 4.0 Pa 0.25 % + 50 Pa 0.25 % + 200 Pa 0.25 % + 800 Pa 0.25 % + 2.0 kPa		Site
Gas pressure (absolute)				
Calibration of pressure indicating instruments and gauges	0 Pa to 160 kPa	0.25 % + 100 Pa		Site
FLOW				
Flow Rate - Gas Volume	0.02 ml/min to 500 l/min 500 l/min to 2000 l/min	0.65 % 0.80 %	Calibration medium Air. Calibrations up to 10 l/min can be undertaken on Nitrogen.	Perm
Gas - Volume Passed (at flow rates of 2 l/min to 500 l/min)	10 l to 200 l 200 l to 10000 l	0.36 % 0.65 %		Perm
Gas volume flow rate	0.04 ml/min to 0.4 ml/min 0.4 ml/min to 500 l/min 500 l/min to 2000 l/min	1.2 % + 0.0014 ml/min 1.2 % 1.3 %	Calibration medium Air.	Site

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
French Capability				France
FLOW				
Flow Rate - Gas Volume	0.04 ml/min to 0.4 ml/min 0.4 ml/min to 300 l/min	0.95 % + 0.0010 ml/min 1.0 %	Calibration medium Air	
PRESSURE				
Gas pressure (gauge)				
Calibration of pressure indicating instruments and gauges Furness Controls FRS 4s, pressure equivalent	-100 kPa to -10 kPa -10 kPa to 0 Pa 0 Pa to 3 kPa 3 kPa to 12 kPa 12 kPa to 30 kPa 30 kPa to 40 kPa 40 kPa to 100 kPa 100 kPa to 400 kPa 400 kPa to 1.6 MPa 1.6 MPa to 4 MPa	0.10 % + 100 Pa 0.014 % + 0.50 Pa 0.014 % + 0.040 Pa 0.014 % + 0.50 Pa 0.014 % + 1.0 Pa 0.014 % + 2.0 Pa 0.10 % + 50 Pa 0.10 % + 200 Pa 0.10 % + 800 Pa 0.10 % + 2 kPa		
Gas pressure (absolute)				
Calibration of pressure indicating instruments and gauges	1 kPa to 160 kPa 160 kPa to 200 kPa	0.10 % + 100 Pa 0.10 % + 200 Pa		
German Capability				Germany
FLOW				
Flow Rate - Gas Volume	0.04 ml/min to 0.4 ml/min 0.4 ml/min to 500 l/min	0.95 % + 0.0010 ml/min 1.0 %	Calibration medium Air	
PRESSURE				
Gas pressure (gauge)				
Calibration of pressure indicating instruments and gauges Furness controls FRS 4's. pressure equivalent	-100 kPa to -10 kPa -10 kPa to 0 Pa 0 Pa to 3 kPa 3 kPa to 12 kPa 12 kPa to 30 kPa 30 kPa to 40 kPa 40 kPa to 400 kPa 400 kPa to 1.6 MPa	0.15 % + 100 Pa 0.014 % + 0.50 Pa 0.014 % + 0.040 Pa 0.014 % + 0.50 Pa 0.014 % + 1.0 Pa 0.014 % + 2.0 Pa 0.15 % + 200 Pa 0.15 % + 800 Pa		
Gas pressure (absolute)				
Calibration of pressure indicating instruments and gauges	1 kPa to 160 kPa	0.10 % + 100 Pa		

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL				
DC Voltage				
Measurement	0 V to 11 V 11 V to 55 V	35 ppm + 30 µV 35 ppm + 300 µV		Perm France Germany
DC Current				
Measurement	0 A to 110 mA	100 ppm + 1.0 µA		Perm France Germany
RESISTANCE				
Measurement	0 Ω to 1.1 kΩ	150 ppm + 5.0 mΩ		Perm France Germany

Calibration methods:

Pressure and flow calibrations of devices with an electrical output may be undertaken at all sites.

Pressure calibration methods are consistent with EURAMET CG17 and CG3

Flow calibrations are performed under steady conditions for items connected in series with a reference standard.

Electrical calibrations are performed by direct measurement of the device output.

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 uncertainty of measurement 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 CIPM-ILAC definition of the CMC is as follows:

A CMC is a calibration and measurement capability available to customers under normal conditions:
(a) as published in the BIPM key comparison database (KCDB) of the CIPM MRA; or
(b) as described in the laboratory's scope of accreditation granted by a signatory to the ILAC Arrangement.

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 CMC is calculated according to the procedures given in M3003 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 CMC in certificates issued under its accreditation.

The CMC may be described using various methods in the Schedule of Accreditation:

As a single value that is valid throughout the range.
As an explicit function of the measurand or of a parameter (see below).
As a range of values. The range is stated such that the customer can make a reasonable estimate of the likely uncertainty at any point within the range.
As a matrix or table where the CMCs depend on the values of the measurand and a further quantity.
In graphical form, providing there is sufficient resolution on each axis to obtain at least two significant figures for the CMC.

Expression of CMCs - symbols and units

In general, only units of the SI and those units recognised for use with the SI are used to express the values of quantities and of the associated CMCs. Nevertheless, other commonly used units may be used where considered appropriate for the intended audience. For example, the term "ppm" (part per million) is frequently used by manufacturers of test and measurement equipment to specify the performance of their products. Terms like this may be used in Schedules of Accreditation where they are in common use and understood by the users of such equipment, providing their use does not introduce any ambiguity in the capability that is being described.

When the CMC is expressed as an explicit function of the measurand or of a parameter, this often comprises a relative term (e.g., percentage) and an absolute term, i.e. one expressed in the same units as those of the measurand. This form of expression is used to describe the capability that can be achieved over a range of values. Some examples are shown below. It should be noted that these expressions are *not* mathematical formulae but are instead written in a commonly used shorthand for expressing uncertainties - therefore, for purposes of clarity, an indication of how they are to be interpreted is also provided below.

DC voltage, 100 mV to 1 V: 0.0025 % + 5.0 µV

Over the range 100 mV to 1 V, the CMC is 0.0025 %·V + 5.0 µV, where V is the measured voltage.

Hydraulic pressure, 0.5 MPa to 140 MPa: 0.0036 % + 0.12 ppm/MPa + 4.0 Pa

Over the range 0.5 MPa to 140 MPa, the CMC is $0.0036\ \%\cdot p + (0.12\cdot 10^{-6}\cdot p\cdot 10^{-6}) + 4.0$ Pa, where p is the measured pressure in Pa.

It should be noted that the percentage symbol (%) simply represents the number 0.01. In cases where the CMC is stated only as a percentage, this is to be interpreted as meaning percentage of the measured value or indication.

Thus, for example, a CMC of 1.5 % means $1.5 \cdot 0.01 \cdot i$, where i is the instrument indication.