Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

9460

Accredited to ISO/IEC 17025:2005

NDT Maincal Limited

Issue No: 006 **Issue date:** 10 May 2019

Unit 1a
Bingswood Trading Estate
Whaley Bridge
High Peak
SK23 7LY

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E-Mail: Lee@maincal.com
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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 NDT Maincal Limited Unit 1a Bingswood Trading Estate Whaley Bridge High Peak SK23 7LY United Kingdom **Local contact** Lee Wilde Tel: +44 (0) 1663 735283 Fax: +44 (0) 1663 733482 E-Mail: Lee@maincal.com	Magnetic particle inspection and associated equipment Ultrasonic test equipment Pressure indicator	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.	Magnetic particle inspection and associated equipment Ultrasonic test equipment Pressure indicator	Site

UKAS CALIBRATION
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DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
DC Current	0 A to 2.5 A 2.5 A to 10 A	0.1 A 4.0 %		Lab & Site
DC Current All waveforms	10 A to 50 A 50 A to 3 kA	5.0 % 3.0 %		Lab & Site
AC Current 50Hz all waveforms	50 A to 3.5 kA	3.0%		Lab & Site
AC & DC half wave peak current	50 A to 2.5 kA 2.5 kA to 4.95 kA	4.2 % 4.5 %		Lab & Site
Frequency	10 Hz to 15 MHz	0.50 %		Lab & Site
Current Shot elapsed time	0 s to 1.9 s 1.9 s to 4.8 s	22 ms 56 ms		Lab & Site
AC Conductivity Nominal 60 kHz Sourcing nominal values				Lab
	2 MS/m to 60 MS/m	0.75 %	Note; 58.0 MS/m = 100 % on the International Annealed Copper Scale	
Measurement	2 MS/m to 60 MS/m	1.3%		
Thickness	0 mm to 100 mm	0.50 mm	Supplementary information for the calibration of conductivity blocks only	

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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks	Location Code
ELECTRICAL VERIFICATION of ULTRASONIC FLAW DETECTION EQUIPMENT	As BS EN 12668-1:2010 Group 2 tests and including the following calibrations and quantities:			Lab & Site
	Stability after warm up (height)	0.50 % of screen height	These claims are all dominated by the resolution of the digital readout rather than the display resolution.	
	Stability after warm up (width)	0.50 % of screen width		
	Jitter - screen height	0.50 % of screen height		
	Jitter - screen width	0.50 % of screen width		
	Stability against voltage variation (height)	0.50 % of screen height		
	Stability against voltage variation (width)	0.5 % of screen width		
	Transmitter voltage 50 V to 500 V	4.2 %		
	Pulse risetime 30 V to 450 V	3.0 ns		
	Pulse duration 1 ms to 25 ns	2.0 ns + 2.0 %		
	Pulse Reverberation	2.5 V		
	Amplifier frequency response 100 kHz to 50 MHz	4.0 % of screen height		
	Equivalent input noise	5.0 nV/√Hz		
	Linearity of vertical display	2.5 % of screen height		
Attenuation	Accuracy of attenuator reference to a nominal *1 V at f0*			
	0 dB to 60 dB	0.50 dB		
	60 dB to 90 dB	2.0 dB		
	Linearity of timebase x axis	1.0 % of screen width		
PRESSURE Gas pressure gauge				
Calibration of pressure indicating instruments and gauges	0 Pa to 200 kPa 200 kPa to 400 kPa 400 kPa to 700 kPa	2.3 kPa 3.6 kPa 4.2 kPa	Calibration by comparison with a digital pressure standard. Calibrations can be undertaken in other pressure units.	Lab & 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 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.