Schedule of Accreditation

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United Kingdom Accreditation Service

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Accredited to ISO/IEC 17025:2017

Western Pegasus Ltd

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Calibration performed at the above address only

DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k=2)	Remarks
RANGE IN MILLIMETERS AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED			
SPUR/HELICAL MASTER GEARS			
Bore Diameter	11 to 50 50 to 100	1.0 2.5	Horizontal measuring machine and reference setting standards.
Tip Diameter	25 to 100 100 to 200	1.0 3.5	Horizontal measuring machine and reference setting standards.
Dimension Over/Pins (Mdr)	25 to 100 100 to 200	5.0 7.5	Horizontal measuring machine or floating carriage micrometer and reference setting standards.
Profile total deviation(F_α)	Overworking length of tooth	1.5 to 2.5 depending upon size	CNC gear measuring machine
Helix (Lead) total deviation(F_β)	0 to 50 face width 50 to 100 face width	1.5 2.5	CNC gear measuring machine (with a maximum of 45° helix angle)
Radial Runout of Tooth Space (F_r)	50 to 100	1.0	CNC gear measuring machine
Single pitch (f_p)	25 to 200 reference circle diameter	1.0	CNC gear measuring machine
Pitch difference (f_u)	25 to 200	1.0	CNC gear measuring machine
Cumulative pitch (F_p)	25 to 200 reference circle diameter	3.5	CNC gear measuring machine

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k=2)	Remarks
RANGE IN MILLIMETERS AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED			
SPLINE GAUGES, INVOLUTE			
Spur and helical external including Taper Masters			
Major Diameter	5 to 100 100 to 200	1.0 3.5	Horizontal measuring machine and reference setting standards.
Dimensions over pins- spur gauges (Mdr)	From 5 up to 100 Above 100 up to 200	2.5 3.5	Horizontal measuring machine or floating carriage micrometer and reference setting standards.
Profile total deviation(F_α)	Over working Length of Tooth	1.5 to 2.5 depending upon size	CNC gear measuring machine
Helix (Lead) total deviation(F_β)	50 face width 50 up to 100 face width	1.5 2.5	CNC gear measuring machine
Single Pitch (f_p)	5 to 200 diameter	1.0	CNC gear measuring machine
Pitch difference (f_u)	5 to 200 diameter	1.0	CNC gear measuring machine
Cumulative Pitch (F_p)	5 to 200 diameter	3.5	CNC gear measuring machine
Spur and helical Internal		Even teeth Odd teeth	
Minor diameter	12 to 100 100 to 200	2.5 3.5 3.5 5.0	Horizontal measuring machine or floating carriage micrometer and reference setting standards.
Dimension between pins- spur (Mdk)	12 to 100 100 to 200	2.5 5.0	Horizontal measuring machine and reference setting standards.
Dimension between balls- helical (Mdr)	12 to 100 diameter 100 to 200 diameter	5.0 7.5	Horizontal measuring machine and reference setting standards.
Profile total deviation(F_α)	Over working length of tooth	1.5 to 2.5 depending upon size	CNC gear measuring machine
Helix (Lead) total deviation(F_β)	0 to 50 face width	1.5 to 2.5 depending upon size	CNC gear measuring machine
Single pitch (f_p)	12 to 200 diameter	1.0	CNC gear measuring machine
Pitch difference (f_u)	12 to 200 diameter	1.0	CNC gear measuring machine
Cumulative pitch (F_p)	12 to 200 diameter	3.5	CNC gear measuring machine

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k=2)	Remarks
RANGE IN MILLIMETERS AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED			
SPLINE GAUGES STRAIGHT SIDED			
Plugs and rings			
Major diameter (plug)	10 to 100 diameter 100 to 200 diameter	1.0 3.5	Horizontal measuring machine and reference setting standards.
Minor diameter (plug)	10 to 100 diameter 100 to 200 diameter	1.0 3.5	Horizontal measuring machine and reference setting standards.
		Even Teeth / Odd Teeth	
Major Diameter (ring)	12 to 50 diameter 50 to 100 diameter 100 to 200 diameter	2.5 / 3.5 3.5 / 5.0 5.0 / 7.5	Horizontal measuring machine and reference setting standards.
Minor Diameter (ring)	12 to 50 diameter 50 to 100 diameter 100 to 200 diameter	2.5 / 3.5 3.5 / 5.0 5.0 / 7.5	Horizontal measuring machine and reference setting standards.
Spline Width	2 to 20	1.0	Gauge blocks
Helix (Lead) total deviation(F_β)	0 to 50 face width 50 up to 100 face width	1.5 2.5	CNC gear measuring machine
Single pitch (f_p)	30 to 200	1.0	CNC gear measuring machine
Pitch difference (f_u)	30 to 200	1.0	CNC gear measuring machine
Cumulative pitch (F_p)	30 to 200	3.5	CNC gear measuring machine

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k=2)	Remarks
RANGE IN MILLIMETERS AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED			
SERRATION GAUGES STRAIGHT SIDED as BS 2059 (excluding taper serrations) **Plugs and rings**			
Major diameter (plug)	6 to 100 diameter 100 to 150 diameter	1.0 3.5	Horizontal measuring machine or floating carriage micrometer and reference setting standards.
		Even Teeth Odd Teeth	
Minor diameter (ring)	6 to 100 diameter 100 to 150 diameter	2.5 3.5 3.5 5.0	Horizontal measuring machine and reference setting standards.
Dimension over pins (Mdk)	6 to 75 diameter 75 to 150 diameter	1.0 3.5	Horizontal measuring machine and reference setting standards.
Dimension under pins (Mdk)	6 to 100 diameter 100 to 150 diameter	2.5 5.0	Horizontal measuring machine and reference setting standards.
Serration angle	13 to 25 diameter 25 to 75 diameter 75 to 150 diameter	20 minutes of arc 15 minutes of arc 10 minutes of arc	CNC gear measuring machine
Single pitch (f_p)	0 to 50 face width 50 to 100 face width	1.0 2.5	CNC gear measuring machine
Pitch difference (f_u)	6 to 150 diameter	1.0	CNC gear measuring machine
Cumulative pitch (F_p)	6 to 150 diameter	3.5	CNC gear measuring machine
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.