Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

0250

Accredited to ISO/IEC 17025:2017

National Gear Metrology Laboratory

Issue No: 021 **Issue date:** 22 January 2025

Advanced Engineering Research Hub
Newcastle University
Unit B1 & B2
Wincomblee Road
Walker
NE6 3QS

Contact: Steve Wilson
Tel: +44 (0)191 208-6192
E-Mail: s.j.wilson@ncl.ac.uk
Website: www.ncl.ac.uk/gears

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 National gear Metrology Laboratory Advanced Engineering Research Hub Newcastle University Unit B1 & B2 Wincomblee Road Walker NE6 3QS	**Local contact** Steve Wilson	Dimensional (Gears)	A

Site activities performed away from the locations listed above:

Location details		Activity	Location code
At customers premises	Steve Wilson	Verification of instruments for the measurement of gears.	B

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
GEARS, GEAR ARTEFACTS, SPLINES, SPLINE GAUGES **External and Internal (1D measurement).** (see notes 1 to 5)			NOTES 1. Measured by CNC GMM or CMM, verified by comparison with reference artefacts using a tactile probe.	
Profile total deviation(F_{α})		1.25	2. Maximum diameter 850 mm, Maximum length 1000 mm, Max Weight 500 kg.	A
Profile slope deviation ($f_{H\alpha}$)		1.00		
Profile form deviation ($f_{f\alpha}$)		0.75		
Profile crown (C_{α})		1.00		
Profile twist (S_{α})		1.00		
Tip and root relief ($C_{\alpha a}$ and $C_{\alpha f}$)		1.20		
Helix (alignment) total deviation (F_{β})	Helix angle 0° to 55°	1.30	3. The uncertainties stated assume that journal diameters or reference surfaces have been used to define the measurement axis.	A
Helix (alignment) slope deviation ($f_{H\beta}$)		1.00		
Helix (alignment) form deviation ($f_{f\beta}$)		0.80		
Helix crown (C_{β})		1.10	4. All 1D measurements are reported as deviations from nominal geometry.	
Helix twist (S_{β})		1.10		
End relief ($C_{\beta I}$ and $C_{\beta II}$)		1.20		
Single pitch (f_p)	0.15 to 25 mm Module	0.70	5. All 1D measurements are measured and evaluated in accordance with ISO 1328-1 and ISO 21771, unless stated otherwise in the calibration certificate.	A
Single pitch difference (f_u)		0.70		A
Cumulative pitch (F_p)		1.10		A
Radial runout of tooth space (F_r)		1.40		A
Dimension over/under pins or balls (Mdr or Mdk)		1.50		A

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
RANGE IN MILLIMETRES AND UNCERTAINTY IN MICROMETRES UNLESS OTHERWISE STATED				
VERIFICATION OF INSTRUMENTS FOR THE MEASUREMENT OF GEARS in accordance with ISO 18653 and ISO TR 10064-1, using the direct comparator method. (See notes 1 and 5)				
External and Internal gear parameters				
Profile total deviation (F_{α})	Helix angle 0° to 45° 0.15 to 25 Module	1.25		B
Profile slope deviation ($f_{H\alpha}$)		1.00		B
Profile form deviation ($f_{f\alpha}$)		0.75		B
Helix (alignment) total deviation (F_{β})		1.30		B
Helix (alignment) slope deviation ($f_{H\beta}$)		1.00		B
Helix (alignment) form deviation ($f_{f\beta}$)		0.80		B
Single pitch (f_p)		0.70		B
Single pitch difference (f_u)		0.70		B
Cumulative pitch (F_p)		1.10		B
Radial runout of tooth space (F_r)		1.40		B
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 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: $Q[a, b] = [a^2 + b^2]^{1/2}$