



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
& ANSI/NCSL Z540-1-1994

LEDFORD GAGE LAB, INC.
227 Industrial Dr.
Mulvane, KS 67110
Blaine Johnson Phone: 316 777 9300

CALIBRATION

Valid To: December 31, 2019

Certificate Number: 1560.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations¹:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2,4} (\pm)	Comments
Gage Blocks	Up to 4 in	$(4.3 + 1.6L) \mu\text{in}$	Mechanical comparator, twin head
Micrometers – 50 μin Graduation 100 μin Graduation 1000 μin Graduation	Up to 6 in	$(62 + 0.9L) \mu\text{in}$ $(86 + 2.L) \mu\text{in}$ 590 μin	Gage blocks
Calipers – Dial, Digital, Vernier 500 μin Graduation 1000 μin Graduation	Up to 12 in	$(620 + 1.4L) \mu\text{in}$ $(580 + 4L) \mu\text{in}$	Gage blocks
Gage Pins	(0.01 to 1) in	27 μin	Supermicrometer™

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Optical Comparators ³ – Linearity	Up to 6 in	(170 + 6L) μin	Glass master scales
Indicators – Dial, Digital Test Type 20 μin Graduation 50 μin Graduation 100 μin Graduation 500 μin Graduation 1000 μin Graduation	Up to 1 in	24 μin 48 μin 69 μin 290 μin 580 μin	LabConcept and Fowler/Trimos TULM 210
Plug Gages – Plain, Cylindrical Threaded, 60° – Pitch Diameter Major Diameter	Up to 10 in Up to 2 in Up to 2 in	(26 + 1.6L) μin 140 μin 32 μin	LabConcept and Fowler/Trimos TULM 210 Supermicrometer™
Ring Gages – Plain Threaded, 60° – Pitch Diameter	Up to 10 in Up to 2 in Up to 2 in	(26 + 2L) μin 100 μin 300 μin	LabConcept and Fowler/Trimos TULM 210 LabConcept and Fowler/Trimos TULM 210 Set plug masters
Labconcept Trimos Universal Measuring Machines ³ – Length	Up to 80 in	(13 + 0.2L) μin	Optodyne laser system

II. Mechanical

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
Indirect Verification of Rockwell Hardness Testers ³	<p>HRC (< 35) HRC (≥ 35 and < 60) HRC (≥ 60) HRC</p> <p>HRBW (< 60) HRBW (≥ 60 and < 80) HRBW (≥ 80) HRBW</p> <p>HREW (< 84) HREW (≥ 84 and < 93) HREW (≥ 93) HREW</p>	<p>0.48 HRC 0.51 HRC 0.42 HRC</p> <p>0.55 HRBW 0.58 HRBW 0.92 HRBW</p> <p>0.48 HREW 0.59 HREW 0.61 HREW</p>	ASTM E18
<p>Torque Wrenches –</p> <p>Snap Type</p> <p>(5 to 50) in·ozf (20 to 200) in·ozf</p> <p>(5 to 50) in·lbf (40 to 400) in·lbf (100 to 1000) in·lbf</p> <p>(25 to 250) ft·lbf (60 to 600) ft·lbf (100 to 1000) ft·lbf</p> <p>Dial and Beam</p> <p>(5 to 50) in·ozf (20 to 200) in·ozf (5 to 50) in·lbf</p> <p>(40 to 400) in·lbf (100 to 1000) in·lbf</p> <p>(25 to 250) ft·lbf (60 to 600) ft·lbf (100 to 1000) ft·lbf</p>	<p>(5 to 50) in·ozf (20 to 200) in·ozf</p> <p>(5 to 50) in·lbf (40 to 400) in·lbf (100 to 1000) in·lbf</p> <p>(25 to 250) ft·lbf (60 to 600) ft·lbf (100 to 1000) ft·lbf</p> <p>(5 to 50) in·ozf (20 to 200) in·ozf (5 to 50) in·lbf</p> <p>(40 to 400) in·lbf (100 to 1000) in·lbf</p> <p>(25 to 250) ft·lbf (60 to 600) ft·lbf (100 to 1000) ft·lbf</p>	<p>0.078 % + 0.45 in·ozf 0.11 % + 0.86 in·ozf</p> <p>0.048 % + 0.54 in·lbf 0.11 % + 1.8 in·lbf 0.21 % + 1.5 in·lbf</p> <p>0.097 % + 1.3 ft·lbf 0.14 % + 2 ft·lbf 0.14 % + 3.1 ft·lbf</p> <p>0.024 % + 1.1 in·ozf 0.065 % + 1.7 in·ozf 0.052 % + 0.5 in·lbf</p> <p>0.11 % + 1.8 in·lbf 0.14 % + 3.1 ft·lbf</p> <p>0.046 % + 2 ft·lbf 0.078 % + 2.3 ft·lbf 0.16 % + 2.6 ft·lbf</p>	<p>CDI series 5000 torque transducers</p>

¹ This laboratory offers commercial and field calibration service.

² Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMCs represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

³ Field calibration service is available for this calibration and this laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

⁴ In the statement of CMC, L is the numerical value of the nominal length of the device measured in inches

⁵ In the statement of CMC, percentages are to be read as percent of reading unless otherwise noted.



Accredited Laboratory

A2LA has accredited

LEDFORD GAGE LAB, INC.

Mulvane, KS

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and R205 – *Specific Requirements: Calibration Laboratory Accreditation Program*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).



Presented this 2nd day of January 2018.

A handwritten signature in black ink, appearing to read "L. J. ...", positioned above a horizontal line.

President and CEO
For the Accreditation Council
Certificate Number 1560.01
Valid to December 31, 2019

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.