



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

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CALIBRATION

Valid To: March 31, 2020

Certificate Number: 3039.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1,7}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2,4} (\pm)	Comments
Caliper Master	Up to 12 in	(94 + 2.8L) μ in	Electronic height gage, electronic indicator
Calipers ³	Up to 60 in	(700 + 8.5L) μ in	Gage blocks
Cylindrical Plug Gages, Master Discs, Pin Gages	(0.01 to 5) in (5 to 15) in	(47 + 6.1D) μ in (47 + 3.6D) μ in	Bench micrometer Gage blocks
Depth Micrometers ³	Up to 12 in	(200 + 1.8L) μ in	Depth micrometer master
Feeler Gages	Up to 0.500 in	36 μ in	Bench micrometer
Height Gages ³	Up to 24 in	(57 + 4L) μ in	Master height gage, gage blocks
Indicators ³	Up to 4 in	42 μ in	Indi check gage

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Length Standards, 1D	Up to 48 in	(61 + 14L) μin	Bench micrometer, master height gage
Micrometers, Inside Diameter ³	Up to 48 in	(210 + 22L) μin	Bench micrometer
Micrometer Master, Outside Diameter	Up to 6 in (6 to 12) in	(130 + 1.2L) μin (130 + 1.3L) μin	Bench micrometer, master height gage
Micrometers, Outside Diameter ³ – Indicating	Up to 24 in Up to 4 in	(130 + 17L) μin (88 + 1.4L) μin	Gage blocks
Optical Comparators/ Vision Systems ³ – Magnification	(5 x 5) in 10x, 20x, 50x, 100x	210 μin (190 + 0.37L) μin	Glass scales, tooling balls
Parallels	Up to 24 in	(29 + 3.2L) μin	Electronic indicator
Plain Ring Gages	(0.06 to 1.125) in (1.125 to 12) in	(15 + 2.8D) μin (18 + 5D) μin	Federal internal, Zeiss ULM
Rules	Up to 72 in	1800 μin	Zeiss instrument
Squares	Up to 12 in	74 μin	Squaremaster
Super Micrometers ³	Up to 10 in	(36 + 4.8L) μin	Gage blocks, optical flats
Thread Plug Gages – Pitch Lead Angle	 (0.06 to 10) in (0 to 360)°	 (96 + 6.5D) μin 6' 40"	 Bench micrometer, thread wires

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Thread Ring Gages – Pitch Lead Minor Angle	(0.060 to 0.3125) in (0.3125 to 10) in (0.3125 to 10) in (0.3125 to 10) in (0 to 360)°	(260 + 200D) μin (360 + 73D) μin 280 μin (110 + 3.5D) μin 33°	Contour reader, master plug
Depth Micrometer Master ³	Up to 12 in	(120 + 3.6L) μin	Height master, electronic indicator
Plain Tapered Plugs	Up to 6 in	(67 + 4.0D) μin	Bench micrometer
Plain Tapered Rings	Up to 2 in	(130 + 2D) μin	Master plugs
Tapered Thread Plugs – Pitch Diameter & Lead Angle Taper	(0.060 to 6) in (0 to 360)° (0.060 to 6) in	(96 + 3.1D) μin 6° (68 + 2.9D) μin	Bench micrometer, measuring wires
Tapered Thread Rings – Pitch Diameter Lead Angle Taper	(0.060 to 6) in (0.060 to 6) in (0 to 360)° (0.060 to 6) in	(600 + 200D) μin 340 μin 33° (140 + 1.8L) μin	Countour reader, master plugs, height gage

II. Dimensional Testing/Calibration^{1,6}

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Luer Tapered Rings ⁵ – Length Small Diameter Large Diameter	Up to 50 mm Up to 50 mm Up to 50 mm	(1.2 + 0.0037L) μm 3.9D μm 1.5D μm	Master plug, height gage, ISO 594/1 3a & 3b, ISO 80369
Luer Tapered Plugs ⁵ – Length Small Diameter Large Diameter	Up to 50 mm Up to 50 mm Up to 50 mm	1.7D μm 1.8D μm 1.2L μm	Bench micrometer, measuring wires, height gage, ISO 594/1 3c, ISO 80369
Luer Ref Conical Fitting ⁵ – Diameter Length Angle	Up to 50 mm Up to 50 mm Up to 50 mm	6.3 μm 1.2 μm 1.2°	Countour reader, comparator, height gage, ISO 594/2 Fig 5 & Fig 6, ISO 80369
Luer Ref Conical Fitting ⁵ – Interior Diameter Interior Diameter Angles	7.0 mm ID 7.9 mm ID Up to 360°	1.5D _L μm 8.5D _L μm 1.2°	Countour reader, vision machine, height gage, ISO 594/2 Fig 7, ISO 80369
Luer Ref Conical Fitting ⁵ – Interior Diameter Interior Diameter Angles	7.0 mm ID 7.9 mm ID Up to 360°	1.9D _L μm 8.5D _L μm 1.2°	Countour reader, vision machine, height gage, ISO 594/2 Fig 8, ISO 80369
Luer Ref Steel Male Conical Fitting ⁵ – Diameter Length	Up to 50 mm Up to 50 mm	1.7D _L μm 2.2L _L μm	Bench micrometer, measuring wires, ISO 594/1 Fig 5, ISO 80369
Luer Ref Steel Female Conical Fitting ⁵ – Diameter Length	Up to 50 mm Up to 50 mm	1.5D _L μin (1.2 + 0.0037L _L) μin	Master plugs, ISO 594/1 Fig 4, ISO 80369

¹ This laboratory offers commercial dimensional testing/calibration service 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. D is the numerical value of the nominal diameter of the device measured in inches. L_L is the numerical value of the nominal length of the device measured in millimeters. D_L is the numerical value of the nominal diameter of the device measured in millimeters.

⁵ This laboratory meets R205 – *Specific Requirements: Calibration Laboratory Accreditation Program* for the types of dimensional tests listed above and is considered equivalent to that of a calibration.

⁶ Pertains to Medical Small-Bore Gage and Connector Type Rings to additional requirements within ISO 80369-2, ISO 80369-3, ISO 80369-6, and ISO 80369-7.

⁷ This scope meets A2LA's P112 *Flexible Scope Policy*.