



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

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CALIBRATION

Valid To: October 31, 2018

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 calibrations¹:

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	(47 + 6.1D) μ in	Bench micrometer
	(5 to 15) in	(47 + 3.6D) μ in	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
Micrometers, Inside Diameter ³	Up to 48 in	(210 + 22L) μ in	Bench micrometer

Parameter/Equipment	Range	CMC ^{2,4} (\pm)	Comments
Indicators ³	Up to 4 in	42 μ in	Indi check gage
Micrometer Master, Outside Diameter	Up to 6 in (6 to 12) in	(130 + 1.2L) μ in (130 + 1.3L) μ in	Bench micrometer, master height gage
Length Standards, 1D	Up to 48 in	(61 + 14L) μ in	Bench micrometer, master height gage
Micrometers, Outside Diameter ³ –	Up to 24 in	(130 + 17L) μ in	Gage blocks
Indicating	Up to 4 in	(88 + 1.4L) μ in	
Optical Comparators ³ –	5 x 5 in	210 μ in	Glass scales, tooling balls
Magnification	10x, 20x, 50x, 100x	(190 + 0.37L) μ in	
Parallels	Up to 24 in	(29 + 3.2L) μ in	Electronic indicator
Plain Ring Gages	(0.06 to 1.125) in (1.125 to 12) in	(15 + 2.8D) μ in (18 + 5D) μ in	Federal internal, Zeiss OKM
Rules	Up to 72 in	1800 μ in	Zeiss instrument
Squares	Up to 12 in	74 μ in	Squaremaster
Super Micrometers ³	Up to 10 in	(36 + 4.8L) μ in	Gage blocks, optical flats
Thread Plug Gages –			
Pitch	(0.06 to 10) in	(96 + 6.5D) μ in	Bench micrometer, thread wires
Lead Angle	(0 to 360)°	6' 40"	

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



II. Dimensional Testing/Calibration¹

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
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
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
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
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
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
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

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.

