



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

INSPECTION ENGINEERING L.L.C.
30903 Viking Parkway
Westlake, OH 44145
David Wilkens Phone: 440 892 9277

CALIBRATION

Valid To: January 31, 2025

Certificate Number: 1453.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory at the location listed above as well as the two satellite laboratory locations listed below to perform the following calibrations and dimensional inspections^{1, 8}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2, 4} (\pm)	Comments
Bore Gages	Up to 10 in	60 μ in	Ring gages
Calipers ³	Up to 24 in	310 μ in	Gage blocks
Coordinate Measuring Machines ³ – Linearity Volumetric	Up to 120 in Up to 120 in	(44 + 0.6L) μ in (75 + 3.5L) μ in	Gage blocks
Cylindrical Pins and Plugs ³	0.011 to 2 in 2 to 3 in	43 μ in 12 μ in	Laser mike Universal measuring system
Gage Blocks	Up to 12 in	(7 + 1.3L) μ in	Universal measuring system
Glass Scales	Up to 18 in	(48 + 4L) μ in	Vision system

Parameter/Equipment	Range	CMC ^{2, 4} (\pm)	Comments
Height Gages ³	Up to 40 in	$(120 + 3L) \mu\text{in}$	Gage blocks
Indicators ³	Up to 1 in	$310 \mu\text{in}$	Gage blocks
Micrometers ³	Up to 4 in	$51 \mu\text{in}$	Gage blocks
Optical Comparators ³ – Linear Axis Magnification	(4 to 24) in 10x to 100x lenses	$110 \mu\text{in}$ 0.06 % Magnification	Glass standards
Plain Ring Gages	Up to 10 in	$22 \mu\text{in}$	Universal measuring system
Radius Gages	Up to 0.75 in	$78 \mu\text{in}$	Vision system
Steel Rules	Up to 18 in	$76 \mu\text{in}$	Vision system
Surface Finish Specimen – Average Roughness (Ra)	(2 to 500) μin	$6 \mu\text{in}$	Surface finish system comparison to master surface patch
Surface Measurements ³ – Gages			
Average Roughness (Ra)	Up to 2 in	$4 \mu\text{in}$	Surface roughness standard
Waviness Height (Wt)	Up to 2 in	$4 \mu\text{in}$	Optical flat
Thread Gages			
Pitch Major	Up to 10 in Up to 10 in	$170 \mu\text{in}$ $70 \mu\text{in}$	Universal measuring system

Parameter/Equipment	Range	CMC ² (\pm)	Comments
Thread Rings ⁹	Up to 10 in	X (Set Plug Tolerance)	Set using master plug gages. ASME/ANSI B1.2-1983 & ASME/ANSI B1.3-2007
Vision Systems ³ – Linear XY-Axis Z-Axis	 Up to 26 in Up to 4 in	 45 μ in 75 μ in	 Glass standards

II. Dimensional Testing/Calibration¹

Parameter/Equipment	Range	CMC ^{2, 4} (\pm)	Comment
Coordinate Measuring Machine ⁵ – Fixtures, Gages & Parts Linearity Volumetric	 Up to 96 in Up to 40 in	 (77 + 2.5L) μ in (130 + 5.8L) μ in	 Zeiss coordinate measuring machine

III. Dimensional Testing⁶

Parameter/Equipment	Range	CMC ^{2, 4, 10} (\pm)	Comment
Contour ⁷	Up to 4 in	43 μ in	Contour tracer
Linear Measure ⁷	(0.001 to 8) in (0.0001 to 1) in (0.0001 to 1) in Up to 10 in Up to 26 in Up to 0.750 in Up to 2 in Up to 0.016 in	440 μ in 66 μ in 440 μ in 140 μ in 55 μ in 330 μ in 40 μ in 4 μ in	Calipers, micrometers, indicators, optical comparator, vision systems, pin gages, laser micrometer, surface

IV. Mechanical

Parameter/Equipment	Range	CMC ^{2, 4} (\pm)	Comment
Indirect Rockwell Hardness Testers ³	HRA: Low Medium High HRBW: Low Medium High HRC: Low Medium High HR15N: Low Medium High HR30N: Low Medium High	0.6 HRA 0.5 HRA 0.5 HRA 1.0 HRBW 0.7 HRBW 0.5 HRBW 1.0 HRC 0.7 HRC 0.7 HRC 0.8 HR15N 0.8 HR15N 0.8 HR15N 0.7 HR30N 0.7 HR30N 0.7 HR30N	Indirect verification per ASTM E18; hardness blocks
Pressure Gages ³	(-10 to 580) psig (580 to 5000) psig	1.3 psi 8.9 psi	Gage mode / reference pressure gage
Torque Wrenches ³	(5 to 50) oz·in 4 lb·in to 250 lb·ft (60 to 600) lb·ft	2 % 2 % 2 %	Torque tester

V. Thermodynamics

Parameter/Equipment	Range	CMC ^{2, 10} (\pm)	Comment
Thermometers – Measuring Equipment ³	(-22 to 300) °F	0.5 °F	PRT w/ indicator & temperature bath

SATELLITE LOCATION

INSPECTION ENGINEERING L.L.C
11647 Lebanon Rd.
Sharonville, OH 45241
David Wilkens Phone: 440 892 9277

CALIBRATION

I. Dimensional

Parameter/Equipment	Range	CMC ^{2, 4} (\pm)	Comment
Glass Scales	Up to 18 in	$(48 + 4L) \mu\text{in}$	Vision system
Radius Gages	Up to 0.75 in	78 μin	Vision system
Steel Rules	Up to 18 in	76 μin	Vision system

II. Dimensional Testing/Calibration¹

Parameter/Equipment	Range	CMC ^{2, 4} (\pm)	Comment
Coordinate Measuring Machine ⁷ – Fixtures, Gages & Parts			
Linearity	Up to 64 in	$(77 + 2.5L) \mu\text{in}$	Zeiss coordinate measuring machine
Volumetric	Up to 40 in	$(130 + 5.8L) \mu\text{in}$	
3D Scanner ⁷ – Parts			
Volumetric	Up to 40 in	0.004 in	ATOS Q 3D scanner

III. Dimensional Testing⁶

Parameter/Equipment	Range	CMC ^{2, 4, 10} (\pm)	Technique/Method
Linear Measure ⁷	(0.001 to 8) in (0.0001 to 1) in (0.0001 to 1) in Up to 10 in Up to 26 in Up to 0.750 in Up to 0.016 in	440 μ in 66 μ in 440 μ in 140 μ in 55 μ in 330 μ in 4 μ in	Calipers, micrometers, indicators, optical comparator, vision systems, pin gages, surface

SATELLITE LOCATION

INSPECTION ENGINEERING L.L.C
2550 Boulevard of the Generals, Ste 310
Norristown, PA 19403
David Wilkens Phone: 440 892 9277

CALIBRATION

I. Dimensional

Parameter/Equipment	Range	CMC ^{2, 4} (\pm)	Comment
Glass Scales	Up to 18 in	$(48 + 4L) \mu\text{in}$	Vision system
Radius Gages	Up to 0.75 in	78 μin	Vision system
Steel Rules	Up to 18 in	76 μin	Vision system
Tapered Plain Rings & Plugs			
Diameter	Up to 20 in	50 μin	Zeiss Micura coordinate measuring machine
Angle	Up to 20 in	0.14°	

II. Dimensional Testing/Calibration¹

Parameter/Equipment	Range	CMC ^{2, 4} (\pm)	Comment
Coordinate Measuring Machine ⁵ –			
Fixtures, Gages & Parts			
Linearity	Up to 40 in	$(77 + 2.5L) \mu\text{in}$	Zeiss coordinate measuring machine
Volumetric	Up to 28 in	$(130 + 5.8L) \mu\text{in}$	
Linearity	Up to 20 in	$(29 + 2.5L) \mu\text{in}$	Zeiss Micura coordinate measuring machine
Volumetric	Up to 14 in	$(36 + 2.5L) \mu\text{in}$	

III. Dimensional Testing⁶

Parameter/Equipment	Range	CMC ^{2, 4, 10} (\pm)	Technique/Method
Linear – Measure ⁷	(0.001 to 8) in (0.0001 to 1) in (0.0001 to 1) in Up to 10 in Up to 26 in Up to 0.750 in Up to 0.016 in Up to 2 in	440 μ in 66 μ in 440 μ in 140 μ in 55 μ in 330 μ in 4 μ in 40 μ in	Calipers, micrometers, indicators, optical comparator, vision systems, pin gages, surface

¹ This laboratory offers commercial calibration, field calibration, dimensional testing and mechanical testing services.

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. 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, and percentages are percentage of reading, unless otherwise indicated.

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 This laboratory offers dimensional testing services only for these parameters.

⁷ This test is not equivalent to that of a calibration.

⁸ This scope meets A2LA's *P112 Flexible Scope Policy*.

⁹ Adjustable thread rings are set to applicable specifications using calibrated master set plug gages.

¹⁰ The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMCs are expressed as either a specific value that covers the full range or as a percent or fraction of the reading plus a fixed floor specification.



Accredited Laboratory

A2LA has accredited

INSPECTION ENGINEERING L.L.C.

Westlake, OH

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets 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 April 2017).



Presented this 9th day of February 2023.

A blue ink signature of Mr. Trace McInturff.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1453.01
Valid to January 31, 2025

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