



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: February 28, 2023

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<sup>1, 8</sup>:

I. Dimensional

Parameter/Equipment	Range	CMC <sup>2, 4, 10</sup> (±)	Comments
Coordinate Measuring Machines <sup>3</sup> –  Linearity Volumetric	Up to 120 in Up to 120 in	(44 + 0.6L) µin (75 + 3.5L) µin	Gage blocks
Optical Comparators <sup>3</sup> –  Linear Axis Magnification	(4 to 24) in 10x to 100x lenses	110 µin 0.05 % Magnification	Glass standards
Vision Systems <sup>3</sup> –  Linear XY-Axis Z-Axis	Up to 26 in Up to 4 in	45 µin 75 µin	Glass standards
Calipers <sup>3</sup>	Up to 24 in	310 µin	Gage blocks

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Micrometers <sup>3</sup>	Up to 4 in	51 µin	Gage blocks
Cylindrical Pins and Plugs <sup>3</sup>	Up to 2 in	43 µin	Laser mike
Indicators <sup>3</sup>	Up to 1 in	310 µin	Gage blocks
Surface Measurements <sup>3</sup> – Gages			
Average Roughness (Ra)	Up to 2 in	4 µin	Surface roughness standard
Waviness Height (Wt)	Up to 2 in	4 µin	Optical flat
Gage Blocks	Up to 12 in	32 µin	Universal measuring system
Height Gages <sup>3</sup>	Up to 40 in	130 µin	Step gages
Plain Ring Gages	Up to 10 in	22 µin	Universal measuring system
Surface Finish Specimen – Average Roughness (Ra)	(2 to 500) µin	6 µin	Surface finish system comparison to master surface patch
Thread Gages			
Pitch Major	Up to 10 in Up to 10 in	170 µin 70 µin	Universal measuring system
Bore Gages	Up to 10 in	60 µin	Ring gages
Radius Gages	Up to 0.75 in	78 µin	Vision system
Pressure Gages <sup>3</sup>	(-10 to 580) psig (580 to 5000) psig	1.3 psi 8.9 psi	Gage mode / reference pressure gage

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Steel Rules	Up to 18 in	76 µin	Vision system
Glass Scales	Up to 6 in Up to 10 in Up to 13 in Up to 16 in Up to 18 in	66 µin 67 µin 68 µin 69 µin 70 µin	Vision system
Thread Rings <sup>9</sup>	Up to 10 in	X (Set Plug Tolerance)	Set using master plug gages. ASME/ANSI B1.2-1983 & ASME/ANSI B1.3-2007

## II. Dimensional Testing/Calibration<sup>1</sup>

Parameter/Equipment	Range	CMC <sup>2, 4</sup> (±)	Comment
Coordinate Measuring Machine <sup>5</sup> –  Fixtures, Gages & Parts  Linearity Volumetric	Up to 96 in Up to 40 in	(77 + 2.5L) µin (130 + 5.8L) µin	Zeiss coordinate measuring machine

### III. Dimensional Testing<sup>6</sup>

Parameter/Equipment	Range	CMC <sup>2, 4</sup> (±)	Technique/Method
Linear Measure <sup>7</sup>	(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 μin 66 μin 440 μin 140 μin 55 μin 330 μin 40 μin 4 μin	Calipers, micrometers, indicators, optical comparator, vision systems, pin gages, laser micrometer, surface
Contour <sup>7</sup>	Up to 4 in	43 μin	Contour tracer

### IV. Mechanical

Parameter/Equipment	Range	CMC <sup>2, 10</sup> (±)	Comment
Force Measurement <sup>3</sup>	500 lb. Max	2 lbf	Load cell
Torque Wrenches <sup>3</sup>	(5 to 50) in·oz 4 in·lb to 250 ft·lb (60 to 600) ft·lb	2 % 2 % 2 %	Torque tester
Indirect Rockwell Hardness Testers <sup>3</sup>	HRA: Low Medium High  HRBW: Low Medium High  HRC: 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	Indirect verification per ASTM E18; hardness blocks

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comment
Indirect Rockwell Hardness Testers <sup>3</sup> (cont)	HR15N: Low Medium High  HR30N: Low Medium High	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

#### V. Thermodynamics

Parameter/Equipment	Range	CMC <sup>2, 11</sup> (±)	Comment
Thermometers – Measuring Equipment <sup>3</sup>	(-22 to 300) °F	0.5 °F	PRT w/ indicator & dry block

#### Mechanical Testing

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

#### Test

Force Measurement<sup>7</sup>

#### Test Method

Force gage

## 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 <sup>2, 4</sup> ( $\pm$ )	Comment
Radius Gages	Up to 0.75 in	78 $\mu$ in	Vision system
Steel Rules	Up to 18 in	76 $\mu$ in	Vision system
Glass Scales	Up to 6 in Up to 10 in Up to 13 in Up to 16 in Up to 18 in	66 $\mu$ in 67 $\mu$ in 68 $\mu$ in 69 $\mu$ in 70 $\mu$ in	Vision system

### II. Dimensional Testing/Calibration<sup>1</sup>

Parameter/Equipment	Range	CMC <sup>2, 4</sup> ( $\pm$ )	Comment
Coordinate Measuring Machine <sup>7</sup> –  Fixtures, Gages & Parts  Linearity Volumetric	    Up to 64 in Up to 40 in	    (77 + 2.5L) $\mu$ in (130 + 5.8L) $\mu$ in	    Zeiss CMM

### III. Dimensional Testing<sup>6</sup>

Parameter/Equipment	Range	CMC <sup>2, 4</sup> ( $\pm$ )	Technique/Method
Linear Measure <sup>7</sup>	(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 $\mu$ in 66 $\mu$ in 440 $\mu$ in 140 $\mu$ in 55 $\mu$ in 330 $\mu$ in 4 $\mu$ in	Calipers, micrometers, indicators, optical comparator, vision systems, pin gages, surface

### Mechanical Testing

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

#### Test

Force Measurement<sup>7</sup>

#### Test Method

Force gage

## 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 <sup>2</sup> (±)	Comment
Calipers <sup>3</sup>	Up to 24 in	310 µin	Gage blocks
Micrometers <sup>3</sup>	Up to 4 in	51 µin	Gage blocks
Cylindrical Pins and Plugs <sup>3</sup>	Up to 2 in	43 µin	Laser mike
Indicators <sup>3</sup>	Up to 1 in	310 µin	Gage blocks
Surface Measurements <sup>3</sup> – Gages			
Average Roughness (Ra)	Up to 2 in	4 µin	Surface roughness standard
Waviness Height (Wt)	Up to 2 in	4 µin	Optical flat
Tapered Plain Rings & Plugs			
Diameter	Up to 20 in	50 µin	Micura
Angle	Up to 20 in	0.14°	



Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comment
Radius Gages	Up to 0.75 in	78 μin	Vision system
Steel Rules	Up to 18 in	76 μin	Vision system
Glass Scales	Up to 6 in Up to 10 in Up to 13 in Up to 16 in Up to 18 in	66 μin 67 μin 68 μin 69 μin 70 μin	Vision system

## II. Dimensional Testing/Calibration<sup>1</sup>

Parameter/Equipment	Range	CMC <sup>2, 4</sup> (±)	Comment
Coordinate Measuring Machine <sup>5</sup> –  Fixtures, Gages & Parts			
Linearity Volumetric	Up to 40 in Up to 28 in	(77 + 2.5L) μin (130 + 5.8L) μin	Zeiss CMM
Linearity Volumetric	Up to 20 in Up to 14 in	(29 + 2.5L) μin (36 + 2.5L) μin	Zeiss Micura CMM

## III. Dimensional Testing<sup>6</sup>

Parameter/Equipment	Range	CMC <sup>2, 4</sup> (±)	Technique/Method
Linear Measure <sup>7</sup>	(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 μin 66 μin 440 μin 140 μin 55 μin 330 μin 4 μin 40 μin	Calipers, micrometers, indicators, optical comparator, vision systems, pin gages, surface, laser micrometer

## Mechanical Testing

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

<u>Test</u>	<u>Test Method</u>
Force Measurement <sup>7</sup>	Force gage

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<sup>1</sup> This laboratory offers commercial calibration, field calibration, dimensional testing and mechanical testing services.

<sup>2</sup> 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.

<sup>3</sup> 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.

<sup>4</sup> In the statement of CMC,  $L$  is the numerical value of the nominal length of the device measured in inches.

<sup>5</sup> 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.

<sup>6</sup> This laboratory offers dimensional testing services only for these parameters.

<sup>7</sup> This test is not equivalent to that of a calibration.

<sup>8</sup> This scope meets A2LA's *P112 Flexible Scope Policy*.

<sup>9</sup> Adjustable thread rings are set to applicable specifications using calibrated master set plug gages.

<sup>10</sup> In the statement of CMC, percentages are percentage of reading, unless otherwise indicated.

<sup>11</sup> 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. CMC's 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 18<sup>th</sup> day of December 2020.

A blue ink signature of the Vice President of Accreditation Services.

Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 1453.01  
Valid to February 28, 2023  
Revised January 27, 2023

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