SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017
& ANSI/NCSL Z540-1-1994

TRI-STATE INSTRUMENT SERVICE, INC.
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CALIBRATION

Valid To: June 30, 2024 Certificate Number: 1622.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following dimensional calibrations[1, 6]:

I. Dimensional

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Bench Micrometers[3]	Up to 2 in	20 µin	Gage blocks
Bore Gages – Internal Diameter (Hole Test – 3 Point)	Up to 0.1 in travel (0.0625 to 8) in	40 µin (65 + 1.5*D*) µin	Micrometer heads & custom fixture Ring gages
Dial Indicator – Calibrator & Micrometer Heads	Up to 1 in Up to 2 in	5.4 µin (10 + 1.0*L*) µin	Heidenhain CT-2501 Heidenhain CT-6001
Calipers[3]	(0.01 to 12) in (12 to 48) in	330 µin (330 + 6.0*L*) µin	Gage blocks Mic standards
Chamfer Check[3]	(0.02 to 2) in	500 µin	Special ring gages

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Height Gages –	Up to 24 in (24 to 40) in	(130 + 2.5*L*) µin (170 + 2.5*L*) µin	Webber bar & high-resolution height gage
High Resolution	24 in w/ ≤ 0.001 in resolution	(25 + 2.0*L*) µin	
LH-600 Type	Up to 39 in < 0.0001 in resolution	(14 + 2.0*L*) µin	
Height Masters, Digi-Checks, Hite-Indicator	Up to 24 in	(14 + 2.0*L*) µin	Webber bar & high-resolution height gage
Indicators[3] –			
Dial & Digital	< 0.01 in (0.01 to 1) in (1 to 2) in (2 to 4) in	5 µin 15 µin 24 µin (40 + 17*L*) µin	Heidenhain Micrometer heads & custom fixture
Test	(0.001, 0.0005, 0.0001) in (0.01, 0.005, 0.001) mm	20 µin 0.0005 mm	
Micrometers –			
Outside – Spindle Only[3]	(Up to 12) in (12 to 40) in	(33 + 2.0*L*) µin (75 + 2.0*L*) µin	Gage blocks & micrometer standards
Depth[3]	Up to 12 in	(150 + 8.0*L*) µin	Gage blocks
Inside	(0.25 to 24) in	(150 + 1.5*L*) µin	CMM or LH-600
Thread	Up to 2 in	75 µin	Thread plugs
V-Anvil	(0.09 to 4) in	100 µin	CMM & pin gages
Calibration Masters –			
Mikemaster	Up to 3 in	15 µin	THV
Outside Diameter	(0.5 to 12) in	(20 + 3.2*D*) µin	ULM
Kalmaster	Up to 12 in	(25 + 1.5*L*) µin	LH-600 & Webber bar
Depth Master	Up to 12 in	(25 + 1.5*L*) µin	LH-600 & Webber bar

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Levels Electronic Levels	Up to 15 in length Up to 100 arc sec.	100 µin/ft 1.3 arc sec.	Special level checker
Standards – Micrometer Thread Micrometer	 Up to 24 in (> 24 to 40) in Up to 4 in	 (15 + 5*L*) µin (110 + 1.5*L*) µin (50 + 2*L*) µin	 ULM LH-600 & Webber bar ULM
Squares	Up to 30 in	(120 + 15*L*) µin	CMM
Sine Bars (Up to 10 in) – Angle Parallelism Flatness	 Up to 45 ° 	 0.000 85 ° 25 µin 25 µin	 CMM
Surface Finish	Up to 400 Ra µin patch	2.3 µin Ra	Reference master
Surface Finish Testers – Ra Parameter Linearity Repeatability	 Up to 400 Ra Up to 400 Ra Actual	 2.5 µin Ra 2.5 µin Ra 0.6 resolution	 Reference master
Optical Comparators[3] – Magnification Linear Travel Squareness	 Up to 100 X Up to 12 in (12 to 20) in X to Y Axis	 0.01 % magnification 240 µin 320 µin 100 µin	 Glass scales, length standards, angle blocks, squares

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Major Diameter –			
Pin Gages	(0.011 to 1) in	10 µin	THV
Reversible Wires	Up to 1 in	7 µin	THV
Plain Plugs	Up to 2 in (2 to 12) in	(7 + 1*D*) µin (7 + 1.5*D*) µin	THV ULM
XX – Tolerance Plug	Up to 2 in	5 µin	THV
Inside Diameter – Ring Gages	(0.04 to 4) in	(7 + 0.5*D*) µin	Diamet, P&W internal
	(4 to 12) in	(7 + 1.5*D*) µin	ULM
Rules –			
Steel	Up to 48 in (> 48 to 120) in	(120 + 4*L*) µin (200 + 6*L*) µin	CMM & video system
Glass	Up to 24 in	(20 + 2*L*) µin	
Thread Gages –			
Standard Work & Set Plugs – Pitch Diameter	Up to 6 in	(45 + 2*D*) µin	Custom bench micrometer, thread wires
Adjustable Ring Gages	(0.04 to 6) in	150 µin	Set plugs
Adjustable & Solid Ring Gage – Pitch Diameter	(0.5 to 6) in	91 µin	2 Point P.D. ULM
Surface Plates[3] –			
Flatness Grade AA, A, & B	(10 to 108) in Diagonal	(29 + 1*D*) µin	Electronic level system
Repeatability	Up to 0.002 in	20 µin	Repeat-o-meter
Spheres & Precision Balls	Up to 2 in	(5 + 1*D*) µin	THV

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Optical Parallels –			
Parallelism Length – Thickness	Up to 1 in Thick	5 µin	Heidenhain
Flatness – Parallels	Up to 4 in Diameter	5 µin	Three optical flat method Comparison to master
Optical Flats	Up to 4 in Diameter	5 µin	
Length – Between Two Planes (Step Length)	(0.01 to 1.5) in	32 µin	Heidenhain
Plain Tapered Plugs – External Diameter			
0.75 TPF	(0.01 to 4) in	49 µin	Custom bench micrometer & rolls
All Tapers	(0.01 to 8) in	25 µin	Standard measuring machine, gage block & rolls
Plain Tapered Rings – Internal Diameter			
0.75 TPF	(0.04 to 4) in	71 µin	CMM
All Tapers	(0.04 to 8) in	81 µin	
External Tapered Thread Plug			
Pitch Diameter	(0.047 to 4) in	72 µin	Custom bench micrometer
Major Diameter	(0.1 to 4) in	44 µin	Custom bench micrometer
Internal Tapered Thread Plug			
Pitch Diameter	(0.06 to 4) in	91 µin	Tapered master plug & Heidenhain (stand-off method)

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Thread Wires			
Inch	(4 to 120) TPI	6.5 µin	Master wire & THV
Metric	(0.2 to 10) Pitch	6.5 µin	
Gage Block	Up to 4 in	(3.8 + 0.5*L*) µin	CT-6001 Heidenhain w/ master gage blocks single point measurement
Geometry[5]			Various measuring devices including but not limited to:
Length			
1D	Up to 28 in	(30 + 4*L*) µin	Video, CMM, height gage, gage blocks, ULM, THV, optical comparators, masters, etc.
2D	20 in x 38 in	(40 + 4*L*) µin	
3D	20 in x 28 in x 16 in	(40 + 4*L*) µin	
Angles	Up to 360 °	15 sec	
Diameter/Radius	Up to 12 in	(40 + 4*L*) µin	
Straightness	Up to 50 in	50 µin per 12 in	
Radius Gages	Up to 2 in	150 µin	Optical/video comparator

[1] This laboratory offers commercial and field calibration 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 nominal length in inches; *D* is the nominal diameter in inches.

[5] For Geometry measurements the best CMC may vary depending upon the type of measuring equipment utilized.

[6] This scope meets A2LA's *P112 Flexible Scope Policy*.

Accredited Laboratory

A2LA has accredited

TRI-STATE INSTRUMENT SERVICE, INC.

Ft. Wayne, IN

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 the requirements of ANSI/NCSL Z540-1-1994 and – 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 25th of August 2022.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1622.01
Valid to June 30th 2024

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