



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

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CALIBRATION

Valid To: August 31, 2012

Certificate Number: 1182.01

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 (±)	Comments
Angle Blocks	0° to 90°	14''	Vision measuring system
Angle Plates and Squares ⁴	Up to 18 in	(44 + 0.6L) μin	Master square
Bevel Protractors and Angle Gages	0° to 180°	0° 2' 53''	Optical/vision measuring system
Bore Gages ⁴	Up to 5 in	(62 + 0.3R) μin	Ring gages
Brinell Scopes – Reticle	Up to 10 mm	0.006 mm	Glass reticle
Micrometer	Up to 10 mm	0.007 mm	

Parameter/Equipment	Range	CMC ² (±)	Comments
Calipers ^{3,4} – Dial and Vernier Digital	Up to 72 inches Up to 20 inches (>20 to 72) inches	(710 + 2.5L) μin (310 + 2.6L) μin (980 + 2.5L) μin	Gage blocks and caliper checker
Coordinate Measuring Machines (CMM) ^{3,4} – Linear Length Repeatability Linear Displacement Accuracy Volumetric Performance	(0.1 to 500) mm (12 to 55) mm (0.1 to 80) m (0.1 to 1) m	0.67 μm 0.31 μm (0.3 + 1.4L) μm 0.4 μm	Gage Blocks per VDI/VDE 2617 2.1 Sphere per ANSI/ASME B89.4.1 sect. 5.3.3 Laser per ANSI/ASME B89.4.1 sect. 5.4.3 Ball bar or gage blocks per ANSI/ASME B89.4.1 sect. 5.5.2
Comparator Gages ^{3,4}	(1 to 20) μin resolution (>20 to 100) μin resolution	(3.1 + 0.5R) μin (-5 + 0.78R) μin	Gage blocks
Feeler Gages ⁴	Up to 0.2 in	(11 + 100L) μin	Universal length measuring machine
Gage Blocks ⁴	Up to 0.10 in (>0.10 to 4) in (>4 to 20) in	(3.5 + 0.01L) μin (1.7 + 1.2L) μin (7 + 0.8L) μin	Master gage blocks
Glass Graduated Rules and Reticles ⁴ – Linearity Squareness	Up to 24 in Up to 12 in	(80 + 2.2L) μin (120 + 5.3L) μin	Vision measuring system
Height Gages ^{3,4} – High Accuracy	Up to 48 in Up to 48 in	(1.5L + 0.6R) μin (4.5L + 0.6R) μin	Comparison to gage blocks

Parameter/Equipment	Range	CMC ² (±)	Comments
Height Masters ⁴	Up to 24 in	(23 + 3.2L) μin	Comparison to gage blocks
Indicator Calibrator – Linearity Anvil Flatness	Up to 0.2 in	13 μin 8 μin	Amplifier with gage probe Optical flat
Inch Bars, Reference Bars, Step Masters ⁴	Up to 40 in	(18 + 3.7L) μin	Comparison to gage blocks
Length Standards ⁴	Up to 24 in (>24 to 48) in (>48 to 72) in Up to 24 in	(5 + 2L) μin (25 + 2.6L) μin (-22 + 3L) μin (5 + 3L) μin	Mikroktor and Gage block ULM & length standards
Machine Tools ^{3,4} – Linear Displacement Accuracy	(0.1 to 80) m	(0.3 + 1.4L) μm	Laser
Micrometers ^{3,4}	Up to 24 in	(31 + 6L) μin	Comparison to gage blocks

Parameter/Equipment	Range	CMC ² (±)	Comments
Optical Coordinate Measuring Machines and Video systems ^{3,4} –			
Linear Displacement Accuracy	Stage Length: Up to 44 in	$(0.9T - 0.08)L + (-2.3T + 240) \mu\text{in}$	Glass grid
Linear Displacement Accuracy	Stage Length: Up to 34 in	$(1T - 0.7)L + (8T + 99) \mu\text{in}$	Glass rule
	Stage Length: (>34 to 44) in	$(1T - 0.7)L + (-0.8T + 180) \mu\text{in}$	Glass rule
	Column Height: Up to 8 in	$(1.4T)L + (-1T + 133) \mu\text{in}$	Gage blocks, indicator
Squareness	Up to 18 in	$(5.3L + 117) \mu\text{in}$	Glass rule or Optical ball bar (<i>T</i> = ABS value of gage environmental temperature from 68 °F)
Optical Comparators and Optical Measuring Machines ^{3,4} –			
Magnification –			
Up to 8 in (>8 to 16) in (>16 to 24) in	10x, 20x, 25x, 30x, 31.25x, 50x, 62.5x, 100x, 250x and 500x	0.012 % of magnification 0.012 % of magnification 0.012 % of magnification	Glass masters, angle blocks and measuring rods
Linear Axis	X & Y Axis	$(1.4T - 4.4)L +$ $(-1.4T + 110) \mu\text{in}$	(<i>T</i> = ABS value of gage environmental temperature from 68°)
Squareness	3 in	83 μin	
Angularity	0° to 360°	1'	

Parameter/Equipment	Range	CMC ² (±)	Comments
Indicators ^{3,4} –			
Up to 1 in	0.000020 in resolution 0.000050 in resolution 0.000100 in resolution 0.000500 in resolution 0.001000 in resolution	(8 + 0.6R) μin (8 + 0.6R) μin (0.3R) μin (0.3R) μin (0.3R) μin	Universal length measuring machine (ULM)
Up to 1 in	0.000020 in resolution 0.000050 in resolution 0.000100 in resolution 0.000500 in resolution 0.001000 in resolution	(20 + 0.8R) μin (20 + 0.6R) μin (20 + 0.3R) μin (0.1R) μin (0.1R) μin	Indicator calibrator
Up to 10 in	0.000020 in resolution 0.000050 in resolution 0.000100 in resolution 0.000500 in resolution 0.001000 in resolution	(4L + 0.6R) μin (4L + 0.6R) μin (4L + 0.6R) μin (4L + 0.2R) μin (4L + 0.2R) μin	Gage blocks
Parallels ⁴	Up to 36 in	(27 + 3L) μin	Amplifier, gage probe and surface plate
Plain Pin/Plug Gages ⁴ –			
Low Accuracy High Accuracy	Up to 16 in Up to 16 in	(33 + 1.4D) μin (10 + 1.3D) μin	Universal length measuring machine
Pitch Gages –			
English Metric Acme	(2 to 84) TPI (0.25 to 11.5) mm (1 to 12) TPI	220 μin	Optical/vision measuring system
Precision Levels ⁴ –			
Bubble Levels	Up to 0.0005 resolution >0.0005 resolution	(0.4R) in (0.2R) in	Amplifier with gage probe
High Accuracy Electronic Levels	Up to ± 1000”	5”	Sine plate and gage blocks

Parameter/Equipment	Range	CMC ² (±)	Comments
Radius Gages ⁴	Up to 12 in	(210 + 14L) μin	Optical/vision measuring system
Plain Ring Gages ⁴	Up to 4 in Up to 18 in	(14 + 1.5D) μin (10 + 3.7D) μin	Internal comparator High accuracy ULM
Roundness Measuring Systems ³ –			
Radial Departure	0° to 360°	7 μin	Precision sphere
Gage Head Calibration	200 μin	8 μin	Gage blocks
Steel Rulers ⁴	Up to 144 in	(290 + 18L) μin	Optical/vision measuring system
Sine Plates and Sine Bars –			
Angle Parallelism	Up to 10 in Up to 10 in	5” 63 μin	Gage blocks, angle blocks, surface plate, amplifier with gage head
Spheres & Precision Balls ⁴	Up to 3 in	(7 + 3.8D) μin	ULM, comparison to master balls
Surface Roughness Specimens	(2 to 500) μin	4 μin	Surface finish analyzer
Surface Plates ^{3,4} –			
Grades AA, A and B –			
Flatness	Up to 108 in DL (>108 to 354) in DL	(26 + 0.3DL) μin (81 + 1.3DL) μin	Precision level system,
Repeat Reading	Up to 0.002 in	26 μin	Repeat-O-Meter

Parameter/Equipment	Range	CMC ² (±)	Comments
Threaded Plug Gages ⁴ – Major Diameter Pitch Diameter	Up to 12 in Up to 12 in	(29 + 1.7D) μin (73 + 2D) μin	ULM and 3-wire method
Thread Wires	Up to 0.500 in diameter	13 μin	ULM and master thread wires
V-Blocks ⁴ – Parallelism Squareness	Up to 10 in Up to 10 in	32 μin (63 + 10L) μin	Surface plate, gage pin, master square, amp. and gage head
Roundness ⁴ – Form	Up to 10 in diameter	(5 + 4.4D) μin	Roundness measuring system
Flatness	Under 5 in Over 5 in	8 μin 9 μin	Optical flat

II. Dimensional Inspection

Parameter/Equipment	Range	CMC ² (±)	Comments
Length ⁴ – 1-Dimensional 2-Dimensional 3-Dimensional	Up to 12 in Up to (12 x 12 x 4) in Up to (12 x 12 x 4) in	(68 + 1.2L) μin (130 + 20L) μin (240 + 53L) μin	Vision coordinate measuring machine
Surface Finish	500 μin	4 μin	Surface analyzer

III. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Scales and Balances ³	(>10 to 500) mg (>0.5 to 200) g >200 to 2 kg (>2 to 10) kg (>10 to 29) kg	0.42 mg 0.012 g 0.12 g 0.058 g 0.34 g	Class 3, 6 and F weights
Torque Wrenches ⁴	4 in·lb to 250 ft·lb (>250 to 600) ft·lb	(0.017T - 0.002) ft·lb (0.01T + 3.5) ft·lb	Torque tester
Indirect Verification of Rockwell Hardness Testers ³ –	HRA: Low Middle High HRB: Low Middle High HRC: Low Middle High HR15N: Low Middle High HR30N: Low Middle High HR45N: Low Middle High	0.68 HRA 0.65 HRA 0.62 HRA 1.2 HRB 1.1 HRB 0.84 HRB 0.72 HRC 1.1 HRC 0.72 HRC 1.1 HR15N 1.2 HR15N 0.87 HR15N 1.1 HR30N 0.73 HR30N 0.68 HR30N 0.86 HR45N 0.86 HR45N 0.69 HR45N	Indirect verification per ASTM E18

Parameter/Equipment	Range	CMC ² (±)	Comments
Indirect Verification of Rockwell Hardness Testers (cont) ³ –	HR15T:		Indirect verification per ASTM E18
	Low	0.96 HR15T	
	Middle	0.85 HR15T	
	High	0.93 HR15T	
	HR30T:		
	Low	1.1 HR30T	
	Middle	0.79 HR30T	
	High	0.91 HR30T	
	HR45T:		
Low	1.3 HR45T		
Middle	1.3 HR45T		
High	0.96 HR45T		

¹ This laboratory offers commercial calibration and field calibration services.

² Calibration and Measurement Capability (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. Calibration and Measurement Capabilities 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. In the statement of CMC, R is the numerical value of the resolution of the device in microinches. In the statement of CMC, D is the numerical value of the nominal diameter of the device measured in inches. Pitch diameter is measured by the three-wire method. Major diameter is calibrated by direct measurement. DL is the diagonal length of the Unit under test in inches; T is either the torque of the unit under test in ft·lbs, unless otherwise noted.



World Class Accreditation

The American Association for Laboratory Accreditation

Accredited Laboratory

A2LA has accredited

A.A. JANSSON, INC.

Waterford, MI

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration. 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 8 January 2009*).

Presented this 22nd day of November 2010.





Peter Meyer

President & CEO
For the Accreditation Council
Certificate Number 1182.01
Valid to August 31, 2012

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