SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017
& ANSI/NCSL Z540-1-1994 & ANSI/NCSL Z540.3:2006

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CALIBRATION

Valid To: August 31, 2022 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 calibrations[1, 10]:

I. Dimensional

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Angle Blocks	Up to 90°	9″	Vision measuring system
Angle Plates & Squares	Up to 18 in	(38 + 0.64*L*) µin	Master square
Angle Meters	Up to 360°	35′	Sine plate
Bore Gages –			
Two Point	Up to 10 in	(25 +17*L*) µin	ULM
Three Point	Up to 8 in	(62 + 3.5*L* +0.6*R*) µin	Ring gages
Brinell Scopes –			
Reticle	Up to 10 mm	0.019 mm	Glass reticle
Micrometer	Up to 10 mm	0.019 mm	

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Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Calipers[3, 6] –			
Dial & Vernier	Up to 80 in	(100 + 3.5*L*) µin	Gage blocks and caliper checker
Digital	Up to 20 in (>20 to 80) in	(110 + 3.5*L*) µin (59 + 7.5*L*) µin	
Comparator Gages, Differential Probes (LVDT), Blanchette OD & Mikrokator[3]	2 µin resolution 5 µin resolution 10 µin resolution 20 µin resolution 50 µin resolution 100 µin resolution	4 µin 5 µin 8 µin 12 µin 34 µin 73 µin	Master gage blocks
Concentricity Gage	Up to 4 in	36 µin	Indicator and master pin gage
Depth Micrometer –			
Linearity Resolution			
0.001 in	Up to 12 in	320 µin	Comparison to gage blocks
0.0004 in	Up to 12 in	248 µin	
0.0001 in	Up to 12 in	(40 + 10*L*) µin	
0.000040 in	Up to 12 in	(40 + 0.01*L*) µin	
Flatness Resolution			
0.001 in	Up to 12 in	300 µin	
0.0004 in	Up to 12 in	200 µin	
0.0001 in	Up to 12 in	54 µin	
0.000040 in	Up to 12 in	47 µin	
Feeler Gages	Up to 0.2 in	(11 + 100*L*) µin	Universal length measuring machine
Flatness	Up to 5 in (5 to 12) in	8 µin 9 µin	Optical flat
Gage Blocks	Up to 0.10 in (>0.10 to 4) in (>4 to 20) in	3.5 µin (1.7 + 1.2*L*) µin (7 + 0.8*L*) µin	Master gage blocks

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Glass Graduated Rules & Reticles –			
Linearity	Up to 24 in	(80 + 2.2*L*) µin	Vision measuring system
Squareness	Up to 12 in	(120 + 5.3*L*) µin	
Height Gages[3] –			
Resolution			
0.000050 in	Up to 48 in	(45 + 3.5*L*) µin	Comparison to gage blocks
0.000100 in		(58 + 3.3*L*) µin	
0.000500 in		(240 + 2.5*L*) µin	
0.001000 in		(580 + 0.5*L*) µin	
Height Masters	Up to 24 in	(22 + 1.8*L*) µin	Comparison to gage blocks
Indicators[3] – Dial, Digital & Test			
0.000 020 in resolution	Up to 1 in	30 µin	Universal length measuring machine (ULM)
0.000 050 in resolution		35 µin	
0.000 100 in resolution		35 µin	
0.000 500 in resolution		100 µin	
0.001 000 in resolution		200 µin	
0.000 020 in resolution	Up to 0.2 in	28 µin	Indicator calibrator
0.000 050 in resolution		34 µin	
0.000 100 in resolution		34 µin	
0.000 500 in resolution		34 µin	
0.001 000 in resolution		45 µin	
0.000 020 in resolution	Up to 12 in	14 µin	Gage blocks, gage stand, anvil or master flat
0.000 050 in resolution		21 µin	
0.000 100 in resolution		(100 + 4.5*L*) µin	
0.000 500 in resolution		(166 + 0.5*L*) µin	
0.001 000 in resolution		(300 + 0.3*L*) µin	
Indicator Calibrator –			
Linearity	Up to 0.2 in	13 µin	Amplifier with gage probe
Anvil Flatness	Up to 60 µin	8 µin	Optical flat

Parameter/Equipment	Range	CMC[2, 4, 8] (±)	Comments
Inch Bars, Reference Bars, Step Masters	Up to 40 in	(20 + 2.2*L*)	Comparison to gage blocks
Inside Micrometers	Up to 24 in	(50 + 6*L*) µin	Universal length measuring machine
Length Standards	Up to 24 in (>24 to 72) in Up to 24 in	(6 + 2*L*) µin (17 + 2.3*L*) µin (5 + 3*L*) µin	Mikrokator and gage blocks ULM & length standards
Outside Micrometers[3] – Resolution 0.000 005 in 0.000 020 in 0.000 050 in 0.0001 in 0.001 in Anvil Parallelism	 Up to 1 in Up to 1 in Up to 50 in Up to 50 in Up to 50 in Up to 1 in	 12 µin 21 µin (24 + 9*L*) µin (69 + 6*L*) µin (580 + 2*L*) µin 31 µin	 Comparison to gage blocks Gage ball
Optical Coordinate Measuring Machines & Video Systems[3] – Linear Displacement Accuracy[7]	 Stage Length: Up to 44 in Stage Length: Up to 34 in Stage Length: (> 34 to 44) in Column Height: Up to 8 in Up to 18 in FOV[9]	 [(0.9*T* – 0.08)*L* + (-2.3*T* + 240)] µin [(1*T* – 0.7)*L* + (-0.8*T* + 99)] µin [(1*T* – 0.7)*L* + (-0.8*T* + 180)] µin [(1.4*T*)*L* + (-1*T* + 130)] µin (5.3*L* + 120) µin (110 + 0.6*L*) µin	 Glass grid Glass rule Gage blocks, indicator Glass rule or optical ball bar Glass rule

Parameter/Equipment	Range	CMC[2, 4, 8] (±)	Comments
Optical Comparators & Optical Measuring Machines[3] –			
Magnification –			
Up to 8 in	10x, 20x, 25x, 30x	0.012 % of magnification	Glass masters, angle blocks and measuring rods
(>8 to 16) in	31.25x, 50x, 62.5x	0.012 % of magnification	
(>16 to 24) in	100x, 250x, 500x	0.012 % of magnification	
Linear Axis[8]	X & Y Axis	$[(1.4T - 4.4)L + (-1.4T + 110)]$ µin	
Squareness	3 in	83 µin	
Angularity	(0 to 360)°	1′	
Parallels, Straight Edges, 1-2-3 Blocks –			
Parallel & Straight	Up to 40 in	$(10 + 3L)$ µin	Amplifier, gage probe and surface plate
Length, Width, Height	Up to 40 in	37 µin	
Pitch Gages –			
English	(2 to 84) TPI	220 µin	Optical/vision measuring system
Metric	(0.25 to 11.5) mm	5.6 µm	
Acme	(1 to 12) TPI	220 µin	
Plain Pin/Plug Gages –			
Low Accuracy	Up to 16 in	$(33 + 1.4D)$ µin	Universal length measuring machine
High Accuracy	Up to 16 in	$(10 + 1.3D)$ µin	
Plain Ring Gages	(0.050 to 0.70) in	15 µin	Internal comparator
	Up to 18 in	$(10 + 3.7D)$ µin	High accuracy ULM
Precision Levels –			
Bubble Levels	Up to 15 in	100 µin	Amplifier with gage probe
High Accuracy Inclinometers, Digital Protractors	Up to ± 1000 arc-sec	1 arc-sec	Sine plate and gage blocks

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Protractors			
Bevel	Up to 180º	0º 2' 50"	Optical/vision measuring system
Non-Bevel	(0 to 360)º	0º 5' 15"	Sine Plate, gage blocks
Radius Gages	Up to 12 in	(210 + 14*L*) µin	Optical/vision measuring system
Roundness – Form	Up to 10 in diameter	[(3*D* + 6) + 3*H*] µin	Roundness measuring system
Roundness Measuring Systems[3] –			
Radial Departure	Up to 360°	7 µin	Precision sphere
Gage Head Calibration	200 µin	5 µin	Gage blocks
Axial Error	100 µin	7 µin	Precision sphere
Coning	100 µin	7 µin	Precision sphere
Steel Rulers & Tape Measures	Up to 300 in	(290 + 18*L*) µin	Vision measuring system
Sine Plates & Sine Bars –			Master gage blocks, master angle blocks, surface plate, amplifier with gage head
Angle	Up to 20 in	5″	
Parallelism	Up to 20 in	63 µin	
Spheres & Precision Balls –			
Diameter	Up to 3 in	(19 + 1.2*D*) µin	Universal length measuring machine, master precision balls
High Accuracy	Up to 3 in	(8.5 + 1.5*D*) µin	
Sphericity	Up to 3 in	(3*D* + 6) + 3*H* µin	Roundness measuring system

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Surface Plates[3] –			
Grades AA, A and B			
Flatness	Up to 354 in *DL*	$10\sqrt{DL}$ µin	Precision level system,
Repeat Reading	Up to 0.002 in	26 µin	Repeat-O-Meter
Surface Finish Testers for Ra[3] –			
(2 to 500) µin	(113 to 120) µin	4 µin	Master surface finish roughness specimen at indicated points in range
(0.05 to 12.5) µm	(2.88 to 3.06) µm	0.09 µm	
Surface Roughness Specimens –			
Ra	(2 to 500) µin	3 µin	Surface finish analyzer
Rq	(2 to 500) µin	3 µin	
Ry (Rmax)	(2 to 500) µin	7 µin	
Threaded Plug Gages –			
Major Diameter	Up to 12 in	(29 + 1.7*D*) µin	ULM and 3-wire method
Pitch Diameter	Up to 12 in	(73 + 2*D*) µin	
Thread Wires –			
Working	Up to 0.500 in diameter	13 µin	Mikrokator and master thread wires
Master	Up to 0.500 in diameter	10 µin	Universal length measuring machine
V-Blocks –			
Parallelism	Up to 10 in	32 µin	Surface plate, gage pin, master square, amp. and gage head
Squareness	Up to 10 in	(63 + 10*L*) µin	

II. Dimensional Testing[1]

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Length[5] – Measure			
1-Dimensional	Up to 12 in	(68 + 1.2*L*) µin	Vision coordinate measuring machine
2-Dimensional	Up to (12 x 12) in	(130 + 20*L*) µin	
3-Dimensional	Up to (12 x 12 x 4) in	(240 + 53*L*) µin	
Surface Finish[5] –			
Ra	(2 to 500) µin	5 µin	Surface analyzer
Ry (Rmax)	(2 to 500) µin	7 µin	
Flatness[5]	Up to 5 in	8 µin	Optical flat
	(5 to 12) in	9 µin	
Roundness – Form[5]	Up to 10 in diameter	[(3*D* + 6) + 3*H*] µin	Roundness measuring system

III. Mechanical

Parameter/Equipment	Range	CMC [2, 4] (±)	Comments
Scales & Balances[3]	(>0 to ≤ 500) mg > 500 mg to ≤ 5 g (> 5 to ≤ 10) g (> 10 to ≤ 30) g (> 30 to ≤ 50) g (> 50 to ≤ 80) g (> 80 to ≤ 100) g (> 100 to ≤ 150) g (> 150 to ≤ 200) g (> 200 to ≤ 300) g (> 300 to ≤ 500) g (> 500 to ≤ 1000) g (> 1 to ≤ 1.5) kg (> 1.5 to ≤ 2) kg (> 2 to ≤ 3) kg (> 3 to ≤ 4) kg (> 4 to ≤ 5) kg (> 5 to ≤ 6) kg (> 6 to ≤ 8) kg (> 8 to ≤ 10) kg (> 10 to ≤ 15) kg (> 15 to ≤ 20) kg (> 20 to ≤ 25) kg (> 25 to ≤ 29.532) kg	0.05 mg 0.05 mg 0.05 mg 0.05 mg 0.06 mg 0.06 mg 0.06 mg 0.06 mg 0.07 mg 1.2 mg 6.3 mg 12 mg 14 mg 24 mg 27 mg 29 mg 0.78 mg 12 mg 1.1 mg 1.6 mg 1.3 mg 1.9 mg 2.1 mg 31 mg	Class 2, 3, 6 and F weights
Torque Wrenches	(5 to 50) in·lbf (40 to 400) in·lbf (100 to 1000) in·lbf (25 to 250) ft·lbf (60 to 600) ft·lbf	1.9 % of reading 1.8 % of reading 1.2 % of reading 0.8 % of reading 1.5 % of reading	Torque tester

Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Rockwell Hardness Testers[3]	HRA: < 70 (≥ 70 and < 80) ≥ 80 HRBW: < 60 (≥ 60 and < 80) ≥ 80 HRC: < 35 (≥ 35 and < 60) ≥ 60 HR15N: < 78 (≥ 78 and < 90) ≥ 90 HR30N: < 55 (≥ 55 and < 77) ≥ 77 HR45N: < 37 (≥ 37 and < 66) ≥ 66 HR15TW: < 81 (≥ 81 and < 87) ≥ 87 HR30TW: < 57 (≥ 57 and < 70) ≥ 70 HR45TW: < 33 (≥ 33 and < 53) ≥ 53	0.14 HRA 0.12 HRA 0.11 HRA 0.66 HRBW 0.54 HRBW 0.43 HRBW 0.35 HRC 0.33 HRC 0.31 HRC 0.36 HR15N 0.25 HR15N 0.22 HR15N 0.41 HR30N 0.36 HR30N 0.31 HR30N 0.48 HR45N 0.42 HR45N 0.42 HR45N 0.58 HR15TW 0.42 HR15TW 0.33 HR15TW 0.50 HR30TW 0.42 HR30TW 0.34 HR30TW 0.49 HR45TW 0.46 HR45TW 0.44 HR45TW	Indirect verification per ASTM E18

[1] This laboratory offers commercial dimensional testing, calibration 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 numerical value of the nominal length of the device measured in inches or meters; *R* is the numerical value of the resolution of the device in microinches; *D* is the numerical value of the nominal diameter of the device and *H* is the height at which the part was measured in inches. Pitch diameter is measured by the three-wire method. Major diameter is calibrated by direct measurement. In the statement of CMC, *DL* is the diagonal length of the Unit under test in inches; and, *Q* is the torque of the unit under test in ft·lbf, unless otherwise noted.

[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] Repeatability of the Unit Under Test has not been utilized in the calculation of the CMC value for this measurement parameter.

[7] In the statement of CMC, *T* = greater of 1 ºF or ABS value of gage environmental temperature from 68 °F.

[8] In the statement of CMC, *T* = greater of 4 ºF or ABS value of gage environmental temperature from 68 °F.

[9] In the statement of CMC, FOV = Field of View

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

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 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994, ANSI/NCSL Z540.3:2006, and *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 17th day of November 2020.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1182.01
Valid to August 31, 2022
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For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.