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

CAL-LABS
14747 Artesia B1 #4G
La Mirada, CA 90638
Michelle Brophy Phone: 714 522 8915

CALIBRATION

Valid To: June 30, 2019 Certificate Number: 1672.01

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

I. Dimensional

Parameter/Equipment	Range	CMC[2] (±)	Comments
Caliper Checker	Up to 6 in Up to 12 in	50 µin 64 µin	Height master, electronic indicator
Calipers[3] –			
Dial & Digital	Up to 8 in (8 to 24) in	0.00042 in 0.00051 in	Gage blocks and ring gage
Digital	(24 to 48) in (48 to 80) in	0.001 in 0.0013 in	
Vernier	Up to 12 in (12 to 24) in (24 to 48) in (48 to 60) in (60 to 80) in	0.00060 in 0.00080 in 0.0011 in 0.0013 in 0.0015 in	
Jaw Parallelism Dial & Digital Vernier		 0.00041 in 0.00060 in	 Cylindrical plug

5202 Presidents Court, Suite 220 | Frederick, MD 21703-8398 | Phone: 301 644 3248 | Fax: 240 454 9449 | www.A2LA.org

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Cylindrical Plugs[3] –			
Class X, XX	Up to 1 in (1 to 2) in (2 to 3) in (3 to 4) in (4 to 5) in	9.7 µin 13 µin 15 µin 17 µin 21 µin	Gage blocks, Universal Supermicrometer™
Class Y, Z, ZZ or Unmarked	Up to 1 in (1 to 2) in (2 to 3) in (3 to 4) in (4 to 5) in	23 µin 31 µin 25 µin 39 µin 47 µin	
Cylindrical Rings, Steel/Carbide[3]	(0.040 to 1) in (>1 to 3) in (>3 to 10) in	10 µin (10 + 1.5*D*) µin (10 + 2.8*D*) µin	Gage blocks, Universal Supermicrometer™
Gage Blocks –	(0.050 to 1) in (1 to 2) in (2 to 3) in (3 to 4) in	3.8 µin 5.3 µin 6.6 µin 8.5 µin	Gage block comparator, master gage block
Fixed Points	5 in 6 in 7 in 8 in 10 in 12 in 16 in 20 in	15 µin 16 µin 18 µin 19 µin 23 µin 27 µin 34 µin 41 µin	Electronic indicator, master gage blocks
Height Gages –			
Dial, Digital	Up to 40 in	(300 + 3.0*L*) µin	Height master, gage blocks, electronic indicator
0.000050" Resolution	Up to 24 in	0.00015 in	
Vernier	Up to 40 in	0.00060 in	
Scriber Parallelism	All	0.00011 in	

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Height Masters			
Column	Up to 12 in	(17 + 2.2*L*) µin	Master gage blocks, electronic indicator
Head	Up to 1.5 in	18 µin	
Indicator Calibrator[3]	Up to 2 in	28 µin	Gage blocks Grade 0, electronic indicator, optical flat
Indicators[3]	Up to 1 in	54 µin	Gage blocks, Height gage
	MAHR (R: 0.00002 in)	13 µin	
Micrometers[3] –			
Head Accuracy, O.D., Blades, Point, Spline, Tube, Anvil, Disc, Indicating, Interchangeable, Bench	Up to 1 in >1 to 4 in (>4 to 36) in	70 µin (70 + 7L) µin (90 + 7*L*) µin	Gage blocks
Flatness	Up to 36 in	19 µin	Optical parallel
Parallelism	Up to 1 in (1 to 4) in	50 µin 71 µin	Ball tester, cyl. plug Gage blocks, cyl. plug
High Accuracy 0.000005″ Resolution			
Head Accuracy	Up to 1 in	19 µin	Gage blocks
Parallelism	Up to 1 in	19 µin	Ball tester
Micrometer Heads	Up to 2 in	24 µin	Gage blocks and Mahr/electronic indicator
Micrometer Standards	Up to 4 in (5 to 11) in (12 to 36) in	30 µin (30 + 2.2*L*) µin (30 + 3*L*) µin	Laser and P&W measuring machine

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Microscopes[3] – Metallurgical, Scope with Reticle			
Scale Factor/Magnification	Up to 100x	0.17 % of scale factor	Stage micrometer, up to 0.2 in
	Up to 200x	0.38 % of scale factor	
	Up to 500x	0.67 % of scale factor	
	Up to 1000x	1.5 % of scale factor	
Imaging Software	Up to 1 in	0.00026″	Stage micrometer, up to 0.2 in
Toolmakers, Up to 6 in Stage Travel	20 µin resolution	(95 + 3*L*) µin	Stage micrometer, up to 6 in
Optical Comparator[3] –			
Stage Travel	Up to 6 in	0.00028 in	Glass scales
Magnification	10x to 31.25x 50x to 62x 100x	0.025 % of mag. 0.048 % of mag. 0.075 % of mag.	Glass scales with screen overlay scale
Angular/Protractor	0° to 360°	3.0'	True square
Chart Alignment	Up to 30 in diameter	0.00012″	Stage micrometer
Stage Parallelism	Up to 16 in travel	0.00012″	Master ball
Axis Squareness	Up to 12 in travel	0.00012″	Granite square
Pin Gages[3] –			
Class Z	Up to 1 in	22 µin	Gage blocks & Supermicrometer™
Class ZZ	Up to 1 in	93 µin	Gage blocks & digital micrometer
Riser Blocks	6 in 12 in	27 µin 48 µin	Gage blocks, electronic indicator

Parameter/Equipment	Range	CMC[2, 4, 5] (±)	Comments
Rulers	Up to 24 in (>24 to 72) in	0.00085 in 0.0010 in	P & W measuring machine
Stage Micrometers / Glass Scales	Up to 12 in	52 µin	Microscope & laser
Supermicrometer™ [3] –			
Spindle Meter (Comparator) Parallelism Flatness	Up to 1 in	16 µin 9.4 µin 17 µin 17 µin	Gage blocks, optical parallels
Tailstock Force	8 oz 16 oz 40 oz	7.7 % 5.3 % 3.6 %	
Surface Plate, Granite[3] –			
Repeatability	(12 in × 12 in) to (72 in × 144 in)	34 µin	Repeat-O-Meter
Flatness	Up to (9 in × 12 in)	28 µin	Electronic gage head and amplifier
	(12 in × 12 in) to (18 in × 24 in)	50 µin	Planekator
	24 in × 24 in	75 µin	
	(24 in × 36 in) to (36 in × 48 in)	90 µin	Autocollimator
	(36 in × 60 in) to (48 in × 60 in)	120 µin	
	(48 in × 72 in) to (48 in × 96 in)	190 µin	
	(72 in × 96 in) to (72 in × 144 in)	210 µin	

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Thread Wires, Working 60°	(4 to 80) TPI (0.3 to 6.0) mm	16 µin 0.42 µm	Gage blocks, Universal Supermicrometer™
Thread Wires, Master	(4 to 80) TPI (0.3 to 6.0) mm	16 µin 0.42 µm	Gage blocks, Universal Supermicrometer™
Thread Plug Gages, 60º –			
Pitch Diameter	Up to 1 in (1 to 6) in	85 µin (90 + 4*D*) µin	Three wire method using Supermicrometer™
Major Diameter	Up to 1 in (1 to 6) in	55 µin (55 + 7*D*) µin	Gage Blocks using Supermicrometer™

II. Mechanical

Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Rockwell Hardness & Rockwell Superficial Hardness Testers[3]	HRA: (20 to 65) HRA (70 to 78) HRA (80 to 84) HRA HRBW: (40 to 59) HRBW (60 to 79) HRBW (80 to 100) HRBW HRC: (20 to 30) HRC (35 to 55) HRC (60 to 65) HRC HREW: (70 to 79) HREW (84 to 90) HREW (93 to 100) HREW HR15N: (70 to 77) HR15N (78 to 88) HR15N (90 to 92) HR15N HR30N: (42 to 50) HR30N (55 to 73) HR30N (77 to 82) HR30N HR45N: (20 to 31) HR45N (37 to 61) HR45N (66 to 72) HR45N	 0.48 HRA 0.37 HRA 0.31 HRA 0.69 HRBW 0.70 HRBW 0.60 HRBW 0.44 HRC 0.41 HRC 0.38 HRC 0.63 HREW 0.65 HREW 0.61 HREW 0.50 HR15N 0.62 HR15N 0.47 HR15N 0.82 HR30N 0.65 HR30N 0.61 HR30N 0.55 HR45N 0.68 HR45N 0.51 HR45N	ASTM E18-17

Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Rockwell Hardness and Rockwell Superficial Hardness Testers[3] (cont)	HR15TW: (74 to 80) HR15TW (81 to 86) HR15TW (87 to 93) HR15TW HR30TW: (43 to 56) HR30TW (57 to 69) HR30TW (70 to 83) HR30TW HR45TW: (13 to 32) HR45TW (33 to 52) HR45TW (53 to 73) HR45TW	 0.75 HR15TW 0.73 HR15TW 0.57 HR15TW 0.57 HR30TW 0.61 HR30TW 0.47 HR30TW 0.67 HR45TW 0.64 HR45TW 0.66 HR45TW	ASTM E18

[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 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 and, D is the numerical value of the nominal diameter of the device measured in inches.

[5] In the statement of CMC, the value is defined as the percentage of reading, unless otherwise noted.

Accredited Laboratory

A2LA has accredited

CAL-LABS

La Mirada, CA

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/NCSLI Z540-1-1994 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 8 January 2009*).

Presented this 29th day of June 2017.

President and CEO
For the Accreditation Council
Certificate Number 1672.01
Valid to June 30, 2019
Revised August 03, 2018

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