



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005 & ANSI/NCSL Z540-1-1994, & ANSI/NCSL Z540.3-2006

MITUTOYO AMERICA CORPORATION (MAC) FIELD SERVICE
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 Aurora, IL 60502
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CALIBRATION

Valid To: February 28, 2018

Certificate Number: 1643.01

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, 4} (±)	Comments
CMMs ³ –			In accordance with ISO 10360-2:
Length (3D)	Up to 1000 mm	(0.11 + 0.13L) µm	Gage blocks / step gage
Length (3D)	Up to 5 m	(0.71L) µm	He-Ne laser
E150	Up to 1000 mm	(0.25 + 0.74L) µm	Gage blocks / step gage
Probe Performance	(10 to 51) mm (sphere diameter)	0.025 µm	In accordance with ISO 10360-5: Sphere
Vision Instruments ³ –			In accordance with ISO 10360-7:
Length (3D)	Up to 300 mm (>300 to 1000) mm	(0.10 + 0.12L) µm (0.06 + 0.25L) µm	Linescale
Squareness	Up to 150 mm	(0.060 + 0.67L) µm	Gage blocks
Video Probe	Up to 600 mm	(0.076 + 0.70L) µm	Square
Magnification Offset	(0.02 to 4) mm	0.5 µm	Pixel chart
	0.5x to 30x	1.2 µm	Pixel chart

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Surface & Form Measuring Instruments ³ –			
Detector Accuracy	(-25 to +25) mm	(0.033 + 0.80L) μm	Gage blocks
Straightness	Up to 350 mm	0.025 μm	Straight edge
Radial Motion	0° to 360°	0.005 μm	Precision sphere
Axial Motion	0° to 360°	0.001 μm	Precision sphere
Parallelism	Up to 200 mm	0.13 μm/m	Cylindrical square
Squareness	Up to 100 mm	0.28 μm/m	Square reversal
Indirect Verification of Surface Finish	Up to 5 μm Ra	0.051 μm	Surface finish patch
Length (2D)	Up to 200 mm	(0.25 + 1.2L) μm	Pitch gage
Profile Projectors ³ –			
Squareness	Up to 150 mm	14 μm	Steel square
Length (2D)	Up to 300 mm	10 μm	Glass scale
Magnification	0x to 50x	17 μm/m	Glass scales
Linear Height ³ –			
Length (1D)	Up to 610 mm	(1.2 + 0.0025L) μm	Step gage

II. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Indirect Verification of Knoop Hardness Testers ³	(100 to 250) HK (250 to 650) HK > 650 HK	6.0 HK 7.7 HK 16 HK	ASTM E384

Parameter/Equipment	Range	CMC ² (±)	Comments
Indirect Verification of Rockwell and Rockwell Superficial Hardness Testers ³	<p>HRA: (80 to 93) HRA (70 to 79) HRA (60 to 69) HRA</p> <p>HRBW: (80 to 130) HRB (51 to 79) HRB (1 to 50) HRB</p> <p>HRC: (60 to 70) HRC (40 to 59) HRC (20 to 39) HRC</p> <p>HRD: (70 to 80) HRD (50 to 69) HRD (40 to 49) HRD</p> <p>HR30N: (77 to 85) HR30N (60 to 76) HR30N (40 to 59) HR30N</p> <p>HR30TW: (57 to 85) HR30T (50 to 56) HR30T (20 to 49) HR30T</p>	<p>0.17 HRA 0.18 HRA 0.29 HRA</p> <p>0.43 HRB 0.87 HRB 1.4 HRB</p> <p>0.32 HRC 0.33 HRC 0.38 HRC</p> <p>0.19 HRD 0.26 HRD 0.28 HRD</p> <p>0.28 HR30N 0.28 HR30N 0.55 HR30N</p> <p>0.40 HR30T 0.67 HR30T 0.91 HR30T</p>	ASTM E18
Indirect Verification of Vickers Hardness Testers ³ –	<p>> 1 kgf (100 to 240) HV (240 to 600) HV >600 HV</p> <p>≤ 1 kgf (100 to 240) HV (240 to 600) HV >600 HV</p>	<p>3.0 HV 4.0 HV 7.0 HV</p> <p>4.0 HV 8.0 HV 17 HV</p>	ASTM E384

¹ This laboratory offers field calibration service only.

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 or meters.





Accredited Laboratory

A2LA has accredited

MITUTOYO AMERICA CORPORATION (MAC) FIELD SERVICE

Aurora, IL

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 the requirements of ANSI/NCSLI Z540.3-2006 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 17th day of February 2016.

A handwritten signature in blue ink, appearing to read "Jim C. Bunt".

Senior Director of Quality & Communications
For the Accreditation Council
Certificate Number 1643.01
Valid to February 28, 2018

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