SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

PRECISION MEASURING CORP.
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Fraser, MI 48026
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CALIBRATION

Valid To: January 31, 2012 Certificate Number: 1768.01

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, 4] (±)	Comments
Linear Displacement Accuracy[3] –			ANSI/ASME B89.4.1, sect 5.4
CMMs	Up to 130 ft	(54 + 3.6*L*) µin	Laser
Boring Mills, Lathes, Machining Centers, Layout Machines	Up to 130 ft	(74 + 3.6*L*) µin	Laser
Straightness and Squareness[3] –			
CMMs, Boring Mills, Lathes, Machining Centers, Layout Machines	Up to 10 ft	(21 + 0.01*S* + 0.5F^2) µin	Laser with short range optics
	(3 to 50) ft	(100 + 0.025*S* + 0.05F^2) µin	Laser with long range optics
	Up to 18 in	180 µin	Master square and indicator

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Angle[3] – CMMs, Boring Mills, Lathes, Machining Centers, Layout Machines, etc.	10 degrees 200 arc sec	(0.24 + 0.002*B* + 0.05*M*) arc sec (0.66 + 0.005*B*) arc sec	Laser Electronic level
Surface Plate Flatness[3]	To 20 ft × 30 ft	(59 + 4.8*D*) μin	Electronic levels Note: Uncertainty is to be no less than the acceptable closure error for the procedure.
Volumetric Performance[3] – CMMs	(10 to 42) in	(11 + 16*L*) μin	Ball bar; ANSI/ASME B89.4.1, sect. 5.5.2
Repeatability[3]	2 in	38 μin	Master sphere; ANSI/ASME B89.4.1, sect. 5.3

II. Dimensional Testing

Parameter/Equipment[5]	Range	CMC[2, 4] (±)	Comments
3D Coordinates	110 in × 45 in × 54 in 28 in × 19 in × 18 in	(1800 + 49*L*) μin (1000 + 6.3*L*) μin	Mitutoyo CHN 1612 CMM Mitutoyo BHN 706 CMM
3D Coordinates	115 ft hemisphere	(1400 + 5.3*L*) μin	SMX or Faro laser tracker

Parameter/Equipment[5]	Range	CMC[2, 4] (±)	Comments
Length Measurements –			
Fixtures, Products, Go-No Go Gages, Inner Diameter, Outer Diameter	Up to 2 in Up to 8 in	(110 + 10*L*) μin 1200 μin	Micrometer Caliper
Diameter Measurements	(0.061 to 1.0) in	600 μin	Pin gages

[1] This laboratory offers commercial calibration service 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, for linear measurements; *L* is the nominal length of the device in inches, except where noted. For straightness and squareness measurements; *S* is the straightness error in micro-inches and *F* is the distance the optics travel during test in feet. With angle measurements, *B* is the measured error in arc-seconds and *M* is the distance optics travel during test in meters. With flatness measurements, *D* is the diagonal length of the surface plate.

[5] This laboratory meets *R205 – Specific Requirements: Calibration Laboratory Accreditation Program* for the types of dimensional tests listed above. Accredited test reports issued containing appropriate statements of measurement results, measurement uncertainty, and traceability are considered equivalent to a "calibration" certificate.

The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Laboratory

A2LA has accredited

PRECISION MEASURING CORP.

Fraser, 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 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 June 2010.

President & CEO
For the Accreditation Council
Certificate Number 1768.01
Valid to January 31, 2012
REVISED November 23, 2011

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