THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

PRODUCTIVITY QUALITY, INC. / ADVANCED INSPECTION SERVICES, LLC.

Minneapolis, MN

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* 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 18 June 2005*).

Presented this 27th day of May 2008.

President
For the Accreditation Council
Certificate Number 1610.01
Valid to January 31, 2010

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

SCOPE OF ACCREDITATION TO ISO 17025:2005

PRODUCTIVITY QUALITY, INC. / ADVANCED INSPECTION SERVICES, LLC
15200 25th Avenue, N
Minneapolis, MN 55447
Mark Tobias Phone: 763 249 8139

CALIBRATION

Valid To: January 31, 2010 Certificate Number: 1610.01

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

I. Dimensional

Parameter/Equipment	Range	Best Uncertainty[2, 3, 5] (±)	Comments
Calipers	(0 to 72) in	(620 + 5.1*L*) µin	Gage block comparison
Coordinate Measuring Machines (CMM) –			ANSI/ASME B89.4.1
Linear Displacement Accuracy	Up to 26 in Up to 3200 in	(170 + 3.3*L*) µin (3 + 1.4*L*) µin	Step gage Laser interferometer
Volumetric Performance	Up to 36 in	(87 + 5.0*L*) µin	Ball bar
Sphere Repeatability	(0.750 to 1.00) in	7 µin	
Horizontal Measuring Machine	(0 to 4) in (0 to 8) in	(9 + 9.0*L*) µin (9 + 9.8*L*) µin	Gage block comparison
Indicators	(0 to 4) in	(29 + 5.8*L*) µin	Gage block comparison

Parameter/Equipment	Range	Best Uncertainty[2, 3, 5] (±)	Comments
Internal Diameter	(0 to 4) in	(20 + 14*L*)µin	Universal measuring machine
Laboratory Only	(0 to 20) in	(20 + 15*L*)µin	
Machine Tools –			ANSI/ASME B5.54
Linearity	Up to 3200 in	(3 + 1.4*L*) µin	Laser interferometer
Volume	Up to 24 in	170 µin	Ball bar system
Optical Comparators –			
Linearity	Up to 10 in (0 to 12) in	170 µin 91 µin	Gage blocks Glass scales
Magnification	10× to 100×	290 µin	Master spheres/glass scale
Screen Angle	15°, 30°, 45°	0.06°	Angle blocks
Outside Micrometers	(0 to 24) in	(52 + 8.8*L*)µin	Gage block comparison
Plug Gages –	(0 to 4) in	(14 + 15*L*)µin	Universal measuring machine
Laboratory Only	(0 to 40) in	(14 + 16*L*)µin	
Thread Plug and Setting Gages –			
Major Diameter	(0 to 4) in	(15 + 15*L*) µin	Universal measuring machine
Pitch Diameter	(0 to 4) in	(93 + 5.8*L*) µin	
Video Measuring Systems – Linear and Non-linear Calibration			
Measuring Stage			
(X/Y)	6 in x 8 in 6 in x 12 in 8 in x 8 in 12 in x 12 in 18 in x 18 in 18 in x 24 in 24 in x 30 in	68 µin 79 µin 80 µin 99 µin 130 µin 150 µin 170 µin	Glass grid
(Z)	(0 to 4) in	59 µin	Z step gage

Parameter/Equipment	Range	Best Uncertainty[2, 3] (±)	Comments
Surface Plates –			
Flatness	(0 to 140) in	100 µin	Renishaw laser
Repeatability	(0 to 140) in	36 µin	Repeat-o-meter, indicator

II. Dimensional Testing

Parameter/Equipment	Range	Best Uncertainty[2, 5] (±)	Comments
Length[4] –			
One Dimension	(0 to 24) in	(220 + 22*L*) µin	Electronic height gage
	(0 to 6) in	(860 + 4.1*L*) µin	Calipers
	(0 to 12) in	(1000 + 5.9*L*) µin	Calipers
	(0 to 3.2) in	(160 + 9.3*L*) µin	Micrometers
	(0 to 0.008) in	180 µin	Dial indicator
	(0 to 0.03) in	590 µin	Dial indicator
	(0 to 2) in	(140 + 6.1*L*) µin	Electronic drop indicator
Two Dimensions (Vision)	Up to 8 in	(120 + 21*L*) µin	OGP Flash 200
	Up to 24 in	(130 + 6.0*L*) µin	OGP Quest 600
	Up to 30 in	(230 + 24*L*) µin	OGP Avant 800
Three Dimensions	8 ft spherical volume	(2100 + 15*L*) µin	Romer Infinite AACMM
	Up to 40 in	(33 + 7.0*L*) µin	PMM-C 1086
	Up to 87 in	(130 + 29*L*) µin	B&S Global 122210
Depth[4]	(0 to 6) in	0.0014 in	Depth micrometer

Parameter/Equipment	Range	Best Uncertainty[2] (±)	Comments
Form[4] –			
Flatness	Up to 0.008 in Up to 0.030 in	0.0002 in 0.0008 in	Surface plate and dial indicator
Roundness	(0 to 100) µin (100 to 500) µin	11 µin 54 µin	Mitutoyo RA2100 roundness tester
Cylindricity	(0 to 100) µin (100 to 500) µin	60 µin 130 µin	Mitutoyo RA2100 roundness tester

[1] This laboratory offers commercial calibration service and on-site calibration services.

[2] "Best Uncertainty" 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 of nearly ideal measuring equipment. Best uncertainties represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The best uncertainty of a specific calibration performed by the laboratory may be greater than the best uncertainty due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

[3] On-site calibration service is available for this parameter. The uncertainties achievable on a customer's site can normally be expected to be larger than the Best Measurement Capabilities (BMC) that the accredited laboratory has been assigned as Best Uncertainty 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 uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the calibration uncertainty being larger than the BMC."

[4] Advanced Inspection Services, a subsidiary of Productivity Quality, Inc., provides accredited dimensional inspections. The Quality Manager for this laboratory is Diana McInerny and can be contacted by telephone at 763 473 2258.

[5] In the statement of best uncertainty, L is the numerical value of the measured length in inches; D is the numerical value of the nominal diameter of the device measured in inches.