



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board/AClass
500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

Productivity Quality, Inc./Advanced Inspection Services, LLC
15150 25th Ave N, Suite 200
Plymouth, MN 55447

has been assessed by AClass
and meets the requirements of international standard

ISO/IEC 17025:2005

while demonstrating technical competence in the field(s) of

CALIBRATION & TESTING

Refer to the accompanying Scope(s) of Accreditation for information regarding the types of calibrations and/or tests to which this accreditation applies.

ACT-1608

Certificate Number

AClass Approval

Certificate Valid: 11/26/2013-01/15/2016
Version No. 003 Issued: 11/26/2013



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. 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 January 2009).



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Productivity Quality, Inc. / Advanced Inspection Services, LLC

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CALIBRATION & TESTING

Valid to: January 15, 2016

Certificate Number: ACT-1608

I. Dimensional Calibration

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Micrometers- O.D., Blade, Point, Spline, Tube, Disc, Depth, Indicating, Interchangeable, Bench and Pitch ²	Up to 48 in	(35 + 0.8L) μin	Gage Blocks w/ Optical Flats, and Parallels	NAVAIR 17-20MD-06 B89.1.13
Calipers ²	Up to 72 in	(408 + 0.1L) μin	Gage Blocks	NAVAIR 17-20MD-07 T.O.33K6-4-552-1
Indicator Gages ²	Up to 4 in	(14 + 0.3L) μin	Gage Blocks	T.O.33K6-4-889-1
Electronic Indicator Gages/ LVDT ²	Up to 4 in	(7 + 0.5L) μin	Gage Blocks	T.O.33K6-4-3589-1
Height Gages ²	Up to 48 in	(30 + 0.8L) μin	Gage Blocks	NAVAIR 17-20MD-62
Height Masters ²	Up to 1.5 in (1.5 to 24) in	40 μin (30 + 0.8L) μin	Gage Blocks	T.O.33K6-4-673-1
Step Gages	Up to 48 in	(28 + 0.8L) μin	Gage Blocks	T.O.33K6-4-673-1
Micrometer Length Standards ²	Up to 40 in	(7 + 1.6L) μin	Universal Measuring Machine	T.O.33K6-4-369-1
Length – 1D ²	Up to 40 in	(7 + 1.6L) μin	Universal Measuring Machine	PQI 5.4 234
Long Gage Blocks	5 to 20 in	(11 + 1.2L) μin	Universal Measuring Machine	ASME B89.1.9
Steel Rule	Up to 72 in	2880 μin (50 + 4.6L) μin	Gage Block Video Measuring Machine	NIST Handbook 44



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Tapes ²	Up to 25 ft	(3600 + 0.3L) μin (126 + 4.4L) μin	Master Tape Video Measuring Machine	ASME B89.1.7
Plug Gages ²	Up to 4 in (4 to 40) in	(7 + 1D) μin (11 + 1.5D) μin	Universal Measuring Machine	ASME B89.1.5
Spherical Diameters ²	Up to 8 in	(7 + 1.2D) μin	Universal Measuring Machine	PQI 5.4 236
Thread Wires	Up to .6 in	(8 + 0.3D) μin	Universal Measuring Machine	ASME B89.1.17
Thread Plug and Setting Gages ²				
Major Diameter Pitch Diameter	Up to 12 in Up to 12 in	(11 + 1.2D) μin (70 + 0.3D) μin	Universal Measuring Machine w/ Thread Wires	ANSI ASME B1.2 ANSI ASME B1.16M
Thread Rings Pitch Diameter	Up to 4 in	(70 + 0.3D) μin	Thread Setting Plug	ANSI/ASME B1.2-1983 ANSI/ASME B1.16M- 1984 NAVAIR 17-20MD-143
Ring Gages/ Internal Diameter ²	(0.040 to 0.100) in (0.100 to 10) in (10 to 20) in	(3 + 1D) μin (4 + 2.9D) μin (4 + 1.6D) μin	Universal Measuring Machine and Ring Gage Comparator	ANSI B89.1.6
Feeler (Thickness) Gages	Up to 0.250 in	11 μin	Universal Measuring Machine	NAVAIR 17-20MD-15
Gage Blocks	(0.01 to 4) inch	(1.5 + 0.9L) μin	Gage Block Comparator w/ Master Gage Blocks	ASME B89.1.9
Optical Comparators ²	Up to 12 in	(65+ 0.2L) μin	Glass scales	5.4 58 Mfg Procedure
Machine Tools ²				
Linearity Volume	Up to 3 200 in Up to 24 in	(3 + 1.4L) μin 50 μin	Laser Interferometer Ball Bar System	ASME B5.54
Video Measuring Systems ²				
(X/Y) (Z)	Up to 30 in Up to 4 in	(47 + 0.3L) μin 73 μin	Glass grid Z step gage	5.4 17 Mfg Procedure

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Horizontal Measuring Machine ²	Up to 0.0002 in (0.0002 to 2) in (2 to 8) in	3.4 µin (3 + 0.8L) µin (2 + 1.1L) µin	Gage Blocks	5.4 66 Mfg Procedure
Coordinate Measuring Machines (CMM) ²				
Linear Displacement Accuracy	Up to 26 in Up to 24.41 in Up to 3 200 in	(27 + 0.7L) µin (13 + 1.2L) µin (3 + 1.4L) µin	Step Gage Step Gage (Koba) Laser Interferometer	ASME B89.4.1 ISO 10360-2 ASME B89.4.1
Volumetric Performance	Up to 36 in	(15 + 1.1L) µin	Ball Bar	ASME B89.4.1
Sphere Repeatability	(0.750 to 1.00) in	3.6 µin	Sphere	ASME B89.4.1
Probing and Scanning Form	1 to 1.18 in	12 µin	Sphere	ISO 10360-2, -4
Surface Finish Analyzers ²	120 µin at 0.03 in cut-off	2.2 µin	Master Specimens	ASME B46.1
Surface Finish Specimen	(2-300) µin	3.7 µin	Surface Finish Analyzer	ASME B46.1
Surface Finish (RA) ³	Up to 120 µin	3.7 µin	Mitutoyo Surface Roughness Tester	5.4.101
Surface Plates ^{2,6}				
Flatness Repeatability	(0 to 140) in (0 to 140) in	66 µin 19 µin	Renishaw Laser Repeat-O-Meter	GGG-P-463
Vision (Z)	Up to 10 in	(76+ 0.8L) µin	OGP Quest 450	
Two Dimensions (Vision) (X & Y) TouchProbe	Up to 25 in Up to 1 in Up to 8 in	(51 + 2.0L) µin 116 µin (110 +1.4L) µin	OGP Quest 450 Gage Pins OGP Flash	
Three Dimensions Single Point Scanning	Up to 67 in Up to 99 in Up to 67 in Up to 99 in	(28 + 3.5L) µin (48 + 6.3L) µin (51 + 2.9L) µin (120 +5.2 L) µin	PMM-C 12107 B&S Xcel 122010 PMM-C 12107 B&S Xcel 122010	5.4 101
Form	Up to 100 µin (100 to 500) µin	6.4 µin 53.2 µin	Mitutoyo RA2200 AH Roundness Tester	

II. Mechanical Calibration

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Rockwell Hardness Testers ²	HRB: Low Middle High HRC: Low Middle High	0.71 HRB 0.71 HRB 0.71 HRB 0.71 HRC 0.71 HRC 0.71 HRC	Hardness Test Blocks	ASTM E18
Torque - Wrenches	4-50 in lbf 30-400 in lbf 80-1000 in lbf 20-250 ft lbf	0.39% 0.32% 0.34% 0.52%	Torque Tester	ASME B107.14M-1994 T.O. 33K6-4-2193-1 ASME B107.29-2005

III. Dimensional Testing

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Length ³ - One Dimension	Up to 24 in Up to 12 in Up to 3.2 in Up to 0.008 in Up to 0.03 in Up to 2 in Up to 1 in	(590 + 0.2L) μin (512 + 0.2L) μin 124 μin 130 μin 310 μin 120 μin 116 μin	Dial Height Gage Calipers Micrometers Dial Indicator Dial Indicator Drop Indicator Gage Pins	Blue Print or Customer Specification
Vision (Z) Two Dimensions (Vision) (X & Y) TouchProbe	Up to 2 in Up to 10 in Up to 25 in Up to 1 in Up to 8 in	(188 + 1.0L) μin (76+ 0.8L) μin (51 + 2.0L) μin 116 μin (110 +1.4L) μin	Tool makers Microscope OGP Quest 450 OGP Quest 450 Gage Pins OGP Flash	Blue Print or Customer Specification
Three Dimensions Single Point Scanning	Up to 67 in Up to 99 in Up to 67 in Up to 99 in	(28 + 3.5L) μin (48 + 6.3L) μin (51 + 2.9L) μin (120 +5.2 L) μin	PMM-C 12107 B&S Xcel 122010 PMM-C 12107 B&S Xcel 122010	



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Three Dimensional Length ^{2,3}	8 ft spherical volume Up to 708 in	(778 + 7.0L) μin (1360 + 3.1L) μin	Romer Absolute CMM Leica Laser Tracker (MR) w/ T-probe	Blue Print or Customer Specification
Depth	Up to 6 in	590 μin	Depth Micrometer	Blue Print or Customer Specification
Form Roundness	Up to 100 μin (100 to 500) μin	6.4 μin 53.2 μin	Mitutoyo RA2200 AH Roundness Tester	Blue Print or Customer Specification
Cylindricity	Up to 100 μin (100 to 500) μin	40 μin 66 μin	Mitutoyo RA2200 AH Roundness Tester	
Surface Finish (RA) ³	Up to 120 μin	3.7 μin	Mitutoyo Surface Roughness Tester	
Surface Finish (S _a)	Up to 0.032 in	2.5 μin	Zygo ZeGage	
Contour	Up to 4 in	(220 + 8.5 L) μin	Mitutoyo Contracer	

Notes:

1. Calibration and Measurement Capabilities (Expanded Uncertainties) are based on approximately a 95% confidence interval, using a coverage of $k=2$.
2. This organization performs on-site calibrations. Since field (on-site) conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected in the field (on-site) than what is reported on the accredited scope.
3. These parameters have been verified and authorized for accredited calibration at the satellite site maintained at 2322 Alpine Rd., Eau Claire, WI 54703. Phone 715-874-4696.
4. The use of (L) represents length in inches.
5. The use of (D) represents diameter in inches.
6. The CMC for Surface Plates represents the maximum closure error acceptable for Surface Plate Calibrations.
7. This scope is part of and must be included with the Certificate of Accreditation No. ACT-1608.



Vice President

