



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

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 ANAB
and meets the requirements of international standard

ISO/IEC 17025:2005

while demonstrating technical competence in the fields of

CALIBRATION AND TESTING

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

ACT-1608
Certificate Number


ANAB Approval

Certificate Valid: 03/14/2017-01/15/2018
Version No. 015 Issued: 03/14/2017



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).



ANSI-ASQ National Accreditation Board

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, 2018

Certificate Number: ACT-1608

Dimensional

| PARAMETER / EQUIPMENT | RANGE | CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(\pm)] ^{3,4} | REFERENCE STANDARD OR EQUIPMENT |
|---|--------------------------------|---|---|
| Micrometers- O.D., Blade, Point, Spline, Tube, Disc, Depth, Indicating, Interchangeable, Bench and Pitch ² | Up to 48 in | (42 + 1.1L) μ in | Gage Blocks w/ Optical Flats, and Parallels |
| Calipers ² | Up to 72 in | (408 + 0.1L) μ in | Gage Blocks |
| Indicator Gages ² | Up to 6 in | (13 + 0.4L) μ in | Gage Blocks |
| Electronic Indicator Gages/ LVDT ² | Up to 4 in | (8.9 + 0.4L) μ in | Gage Blocks |
| Height Gages ² | Up to 48 in | (30 + 0.8L) μ in | Gage Blocks |
| Height Masters ² | Up to 1.5 in (1.5 to 24) in | 40 μ in (28 + 0.5L) μ in | Gage Blocks |
| Step Gages | Up to 48 in | (28 + 0.8L) μ in | Gage Blocks |
| Micrometer Length Standards ² | Up to 40 in | (6 + 1.5L) μ in | Universal Measuring Machine |
| Length – 1D ² | Up to 40 in | (7 + 1.6L) μ in | Universal Measuring Machine |
| Long Gage Blocks | 5 to 20 in | (11 + 1.2L) μ in | Universal Measuring Machine |
| Steel Rule | Up to 72 in | 2880 μ in (66 + 0.5L) μ in | Gage Block Video Measuring Machine |
| Tapes ² | Up to 25 ft | (3 600 + 0.1L) μ in (133 + 0.6L) μ in | Master Tape Video Measuring Machine |



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|--|----------------------------|---|--|
| Plug Gages ² | Up to 4 in (4 to 40) in | (6.3 + 1.1D) μ in (6.6 + 1.5D) μ in | Universal Measuring Machine |
| Spherical Diameters ² | Up to 8 in | (6.6 + 1.2D) μ in | Universal Measuring Machine |
| Thread Wires | Up to 0.6 in | (7.6 + 0.3D) μ in | Universal Measuring Machine |
| Thread Plug and Setting Gages ² | | | |
| Major Diameter | Up to 12 in | (11 + 1.2D) μ in | Universal Measuring Machine w/ Thread Wires |
| Pitch Diameter | Up to 12 in | (70 + 0.3D) μ in | |
| Thread Rings Pitch Diameter | Up to 4 in | (70 + 0.3D) μ in | Thread Setting Plug |
| Ring Gages/ Internal Diameter ² | (0.012 to 20) in | (5 + 1.1D) μ in | Universal Measuring Machine and Ring Gage Comparator |
| Feeler (Thickness) Gages | Up to 0.25 in | (7.6 + 0.6L) μ in | Universal Measuring Machine |
| Gage Blocks | (0.01 to 4) inch | (1.4 + 0.9L) μ in | Gage Block Comparator w/ Master Gage Blocks |
| Optical Comparators ² | Up to 12 in | (70+ 3.3L) μ in | Glass scales |
| Machine Tools ² | | | |
| Linearity | Up to 3 200 in | (2.4 + 1.3L) μ in | Laser Interferometer Ball Bar System |
| Volume | Up to 24 in | 50 μ in | |
| Video Measuring Systems ² | | | |
| (X/Y) | Up to 30 in | (53 + 0.3L) μ in | Glass grid Z step gage |
| (Z) | Up to 4 in | (24 + 0.8L) μ in | |
| Horizontal Measuring Machine ² | (0 to 8) in | (3 + 1L) μ in | Gage Blocks |

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|--|--|---|--|
| Coordinate Measuring Machines (CMM) ² | | | |
| Linear Displacement Accuracy | Up to 26 in Up to 24.41 in Up to 3 200 in | (41 + 0.3L) μ in (13 + 1.2L) μ in (2.4 + 1.3L) μ in | Step Gage Step Gage (Koba) Laser Interferometer |
| Volumetric Performance | Up to 36 in | (32 + 0.8L) μ in | Ball Bar |
| Sphere Repeatability | (0.75 to 1) in | 6.7 μ in | Sphere |
| Probing and Scanning Form | (1 to 1.18) in | (12 + 0.3L) μ in | Sphere |
| Surface Finish Analyzers ² | 120 μ in at 0.03 in cut-off | 3.8 μ in | Master Specimens |
| Surface Finish Specimen | (2 to 300) μ in | 3.7 μ in | Surface Finish Analyzer |
| Surface Finish (RA) | Up to 120 μ in | 3.7 μ in | Mitutoyo Surface Roughness Tester |
| Surface Plates ^{2,5} | | | |
| Flatness Repeatability | Up to 140 in Up to 140 in | (0.27 + 0.3L) μ in 19 μ in | Renishaw Laser Repeat-O-Meter |
| Vision (Z) | Up to 10 in | (76+ 0.8L) μ in | OGP Quest 450 |
| Two Dimensions (Vision) (X & Y) TouchProbe | Up to 25 in Up to 1 in Up to 8 in | (51 + 2L) μ in 116 μ in (110 +1.4L) μ in | OGP Quest 450 Gage Pins OGP Flash |
| Three Dimensions Single Point | Up to 67 in Up to 99 in Up to 67 in Up to 99 in | (28 + 3.5L) μ in (48 + 6.3L) μ in (51 + 2.9L) μ in (120 +5.2 L) μ in | PMM-C 12107 B&S Xcel 122010 PMM-C 12107 B&S Xcel 122010 |
| Scanning | | | |
| Form | Up to 100 μ in (100 to 500) μ in | 6.4 μ in 53.2 μ in | Mitutoyo RA2200 AH Roundness Tester |

Mechanical

| PARAMETER / EQUIPMENT | RANGE | CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)] | REFERENCE STANDARD OR EQUIPMENT |
|---|---|--|---|
| 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 | ASTM E18 Hardness Test Blocks |
| Torque - Wrenches | (5 to 50) ozf·in (4 to 50) lbf·in (30 to 400) lbf·in (80 to 1 000) lbf·in (20 to 250) lbf·ft | 0.45% of reading 0.37% of reading 0.29% of reading 0.35% of reading 0.44% of reading | Torque Tester |
| Pressure Gages Pressure Transducers ^{1,2} | (0 to 1) inH ₂ O (0 to 10) inH ₂ O (0 to 10) psi (0 to 100) psi (-14.7 to 200) psi (0 to 1 000) psi (0 to 3 000) psi (0 to 10 000) psi | 0.005 3 inH ₂ O 0.011 inH ₂ O 0.023 psi 0.033 psi 0.16 psi 0.54 psi 2.5 psi 8.8 psi | Ashcroft ATE-2 / AM2-1 Fluke 525A / 700 Series |



Dimensional Measurement/Testing

| PARAMETER / EQUIPMENT | RANGE | CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(\pm)] ³ | REFERENCE STANDARD OR EQUIPMENT |
|--|---|--|--|
| Length - 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) μ in (512 + 0.2L) μ in 124 μ in 120 μ in 310 μ in 120 μ in 116 μ in | Dial Height Gage Calipers Micrometers Dial Indicator Dial Indicator Drop Indicator Gage Pins |
| Vision (Z) | Up to 2 in Up to 10 in | (188 + 1L) μ in (80 + 1L) μ in | Tool makers Microscope OGP Quest 450 |
| Two Dimensions (Vision) (X & Y) TouchProbe | Up to 25 in Up to 1 in Up to 8 in | (69 + 1.7L) μ in 116 μ in (110 + 1.4L) μ in | 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) μ in (48 + 6.3L) μ in (51 + 2.9L) μ in (120 + 5.2 L) μ in | PMM-C 12107 B&S Xcel 122010 PMM-C 12107 B&S Xcel 122010 |
| Three Dimensional Length ² | 8 ft spherical volume Up to 708 in | (678 + 0.9L) μ in (1100 + 3.2L) μ in | Romer Absolute CMM Leica Laser Tracker (MR) w/ T-probe |
| Depth | Up to 6 in | 590 μ in | Depth Micrometer |
| Form Roundness | Up to 100 μ in (100 to 500) μ in | 4.8 μ in 53 μ in | Mitutoyo RA2200 AH Roundness Tester |
| Cylindricity | Up to 100 μ in (100 to 500) μ in | 39 μ in 66 μ in | Mitutoyo RA2200 AH Roundness Tester |
| Surface Finish (RA) | Up to 120 μ in | 3.7 μ in | Mitutoyo Surface Roughness Tester |
| Contour | Up to 4 in | (162 + 11L) μ in | 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. The use of (L) represents length in inches.
4. The use of (D) represents diameter in inches.
5. The CMC for Surface Plates represents the maximum closure error acceptable for Surface Plate Calibrations. L = Length in feet.
6. This scope is part of and must be included with the Certificate of Accreditation No. ACT-1608.


 Vice President