



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

Perry Johnson Laboratory Accreditation, Inc., has assessed the Laboratory of:

**Assurance Technologies, Inc.
1251 Humbracht Circle, Unit A
Bartlett, IL 60103**

(Hereinafter called the Organization) and hereby declares that Organization 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 (as outlined by the joint ISO-ILAC-IAF Communiqué dated January 2009):

**Calibration of Chemical, Dimensional, Electrical, Mass, Force,
Weighing Device, Mechanical, and Thermodynamic Measuring Equipment
(As detailed in the supplement)**

Such testing and/or calibration services shall only be offered at or from the address given above. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

The validity of this certificate is mandated through ongoing surveillance.

Tracy Szerszen
President/Operations Manager

Perry Johnson Laboratory
Accreditation, Inc. (PJLA)
26555 Evergreen, Suite 1325
Southfield, Michigan 48076

Initial Accreditation Date:
October 01, 2005

Accreditation No.:
59361

Issue Date:
October 27, 2009

Certificate No.:
L09-101

Expiration Date:
October 26, 2011

Page No.:
Page 1 of 9



Certificate of Accreditation: Supplement

Assurance Technologies, Inc.
1251 Humbracht Circle, Unit A
Bartlett, IL 60103

Accreditation is granted to this facility to perform the following calibrations:

Chemical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
pH Meter / Probe Calibration	4, 7, 10 pH units	0.035 pH units	pH Calibration Buffers

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
Optical Comparator Linear Accuracy X and Y Axis	101.6 mm to 304.8 mm (4 in to 12 in)	(3.31 + 0.015L) μ m [(130 + 15L) μ in]	Glass Scale OEM/GIDEP
Video Comparator Linear Accuracy X and Y Axis	101.6 mm to 1 219.2 mm (4 in to 48 in)	(0.36 + 0.017L) μ m [(14 + 17L) μ in]	Glass Scale OEM/GIDEP
Bore Gages	6 mm to 304.8 mm (0.236 2 in to 12 in)	2.97 μ m (120 μ in)	Ring Gage OEM/GIDEP
Film Coating Thickness gages	0.022 9 mm to 1.524 mm (0.9 mil to 60 mil)	2.794 μ m (0.11 mils)	Film Thickness Standards OEM/GIDEP
Feeler Gages	0 mm to 5.1 mm (0 in to 0.200 in)	3.581 μ m (141 μ in)	GIDEP
Gage Blocks	0 mm to 203.2 mm (0 in to 8 in)	(0.051 + 0.003L) μ m [(2 + 3L) μ in]	P&W Laseruler ANSI B89-1.9
Microscopes	0 mm to 25.4 mm (0 in to 1 in)	3.048 μ m (120 μ in)	Glass Scale OEM/GIDEP
Indicators	0 mm to 101.6 mm (0 in to 4 in)	(2.007 + 0.007L) μ m [(79 + 7.1L) μ in]	Gage Blocks ASME B891.10M
Height Gages	0 mm to 1 219.2 mm (0 in to 48 in)	(13.72 + 0.02L) μ m [(540 + 20L) μ in]	Gage Blocks OEM/GIDEP
Outside Micrometers	0 mm to 457.2 mm (0 in to 18 in)	(1.35 + 0.007L) μ m [(53 + 6.7L) μ in]	Gage Blocks Measuring Rods ANSI B89.1.13
	457.2 mm to 1 219.2 mm (18 in to 48 in)	(3.81 + 0.012L) μ m [(150 + 12L) μ in]	
Depth Micrometers	0 mm to 304.8 mm (0 in to 12 in)	(2.44 + 0.008L) μ m [(96 + 8.4 L) μ in]	Gage Blocks ANSI B89.1.13



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Calipers	0 mm to 1 016 mm (0 in to 40 in)	$(8.64 + 0.037L) \mu\text{m}$ [(340 + 37L) μin]	Gage Blocks OEM/GIDEP
Pin Gages	0.254 mm to 25.4 mm (0.01 in to 1 in)	$(0.77 + 0.004D) \mu\text{m}$ [(30 + 4.4D) μin]	Laser Micrometer ANSI/ASME 89.1.5M
Thread Plug Gage Pitch Diameter	M 1.6 x 0.35 to M 100 x 6 (0-80-13 to 4-10)	$(2.3 + 0.011D) \mu\text{m}$ [(90.6 + 11D) μin]	Thread Measuring Wires Supermicrometer
Thread Plug Gage Major Diameter	M 1.6 x 0.35 to M 100 x 6 (0-80-13 to 4-10)	$(0.89 + 0.006D) \mu\text{m}$ [(35 + 6D) μin]	Supermicrometer
Radius Gages	0.254 mm to 25.4 mm (0.01 in to 1 in)	$(2.37 + 0.009R) \mu\text{m}$ [(93 + 9.3R) μin]	Video Comparator GIDEP
Squares	25.4 mm to 304.8 mm (1 in to 12 in)	3.048 μm (120 μin)	Video Comparator GIDEP
Steel Rules	76.2 mm to 609.6 mm (3 in to 24 in)	$(2.29 + 0.016L) \mu\text{m}$ [(90 + 16L) μin]	Video Comparator GIDEP
Glass Scales	76.2 mm to 609.6 mm (3 in to 24 in)	$(2.34 + 0.015L) \mu\text{m}$ [(92 + 15L) μin]	Video Comparator GIDEP
Setting Masters, 1D	0.381 mm to 152.4 mm (0.015 in to 6 in)	$(2.34 + 0.016D) \mu\text{m}$ [(92 + 16D) μin]	Video Comparator GIDEP
Surface Plates Repeat Measurements only	0.0508 mm (0.002 in)	1.092 μm (43 μin)	Repeat-O-Meter GIDEP
Coordinate Measuring Machines Linear Accuracy	101.6 mm to 508 mm (4 in to 20 in)	$(1.82 + 0.008L) \mu\text{m}$ [(32 + 8.4L) μin]	Gage Blocks Ball Bar ISO 10360-2
Coordinate Measuring Machines Volumetric Accuracy	101.6 to 304.8 mm (4 in to 12 in)	3.56 μm (140 μin)	
Brenco Hand Gages Hole Check, ID Digital: Resolution 0.000 1 in	0.254 mm to 8.382 mm (0.01 in to 0.33 in)	3.81 μm (150 μin)	Setting Masters OEM
Brenco Hand Gages Chamfer Check, ID Digital: Resolution 0.000 1 in	0.508 mm to 101.6 mm (0.02 in to 4 in)	40.64 μm (1 600 μin)	Setting Masters OEM
Brenco Hand Gages Countersink, ID Digital: Resolution 0.000 1 in	9.144 mm to 19.812 mm (0.36 in to 0.78 in)	30.48 μm (1 200 μin)	Setting Masters OEM



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Magnetic Particle Inspection Units Shot Time	0.05 s	0.017 s	Oscilloscope ASTM E 1444
Magnetic Particle Inspection Units Current (DC Halfwave, DC Fullwave and AC)	1 000 A to 10 000 A	3.5 % of reading	Digital Multimeter with calibrated Shunts ASTM E1444
Gaussmeters	10 Gauss	0.27 gauss	-10, 5, 10, 20, and 50 Gauss Calibration Standards
	20 Gauss	0.29 gauss	
	50 Gauss	1.8 gauss	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K	-200 °C to 1 371 °C	1.5 °C	Electrical Simulation of Thermocouple Output Omega CL23A Calibrator ASTM E220
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J	-210 °C to 759 °C	1.5 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T	-200 °C to 400 °C	1.5 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type E	-50 °C to 750 °C	1.5 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type C	0 °C to 1 800 °C	1.5 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type R	0 °C to 1 750 °C	1.5 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type S	0 °C to 1 750 °C	1.5 °C	



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Temperature Calibration, Indication and Control Equipment used with Thermocouple Type N	-50 °C to 1 300 °C	1.5 °C	Electrical Simulation of Thermocouple Output Omega CL23A Calibrator ASTM E220

Mass, Force, and Weighing Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
Balance	0.001 g to 6 200 g (2.2 x 10 ⁻⁶ lb to 13.67 lb)	(1.16 x 10 ⁻² + 1.57 x 10 ⁻⁶ wt) g [(0.46 + 1.57 x 10 ⁻³ wt) lb]	NIST Handbook 44 Class 1
Scale	22.68 g to 90.72 kg (0.05 lb to 200 lb)	27.669 g (0.061 lbs)	NIST Handbook 44 Class F
Force	0.044 5 N to 889.644 N (0.01 lbf to 200 lbf)	9.78 N (2.2 lbf)	Master Load Cell OEM/GIDEP
	889.6 N to 3 336.2 N (200 lbf to 750 lbf)	16.9 N (3.8 lbf)	Master Load Cell OEM/GIDEP

Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
Tensile Testers	0 N to 444.8 N (0 lbf to 100 lbf)	3.25 N (0.73 lbf)	Load Cell ASTM E4
	444.8 N to 2 224.1 N (100 lbf to 500 lbf)	9.34 N (2.1 lbf)	
	2 224.1N to 4 448.2 N (500 lbf to 1 000 lbf)	20.91 N (4.7 lbf)	
	4 448.2 N to 22 224.1 N (1 000 lbf to 5 000 lbf)	57.8 N (13 lbf)	
	22 224.1 N to 44 448.2 N (5 000 lbf to 10 000 lbf)	133.5 N (30 lbf)	
Crosshead Speed	0 mm/min to 393.7 mm/min (0 in/min to 15.5 in/min)	1.25 mm/min (4.9 x 10 ⁻² in/min)	Digital Stopwatch Linear Scale
Crosshead Travel	0 mm to 609.6 mm (0 in to 24 in)	0.177 8 mm (0.007 in)	Linear Scale
Torque Tools	1.130 N·m to 22.597 N·m (10 lbf·in to 200 lbf·in)	0.20 N·m (1.8 lbf·in)	Larson Torque System ASME B107.14M
	13.56 N·m to 352.51 N·m (10 lbf·ft to 260 lbf·ft)	2.1 N·m (1.6 lbf·ft)	Larson Torque System ASME B107.14M



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Profilometer	0.305 μ m Ra (12 μ in Ra)	0.089 μ m Ra (3.5 μ in Ra)	Roughness Specimen ASME B46.1
	0.508 μ m Ra (20 μ in Ra)		
Pressure	0 to 200 psi	(0.54 psi + 4.4 x 10 ⁻³ P) psi	Pressure Calibrator OEM and GIDEP
Light Booth White Light Illuminance	215.28 mc to 2 152.78 mc (20 fc to 200 fc)	6 % of reading	Digital Photometer OEM
Rockwell Hardness Testers Indirect Verification	HRA		Test Blocks ASTM E18
	60 to 69 HRA	0.69 HRA	
	70 to 79 HRA	0.49 HRA	
	80 to 84 HRA	0.51 HRA	
	HRBW		
	10 to 50 HRBW	1.1 HRBW	
	51 to 79 HRBW	0.82 HRBW	
	80 to 100 HRBW	0.69 HRBW	
	HRC		
	20 to 39 HRC	0.47 HRC	
	40 to 59 HRC	0.48 HRC	
	60 to 68 HRC	0.43 HRC	
	HRFW		
	40 to 69 HRFW	0.56 HRFW	
	70 to 86 HRFW	0.69 HRFW	
	87 to 100 HRFW	0.68 HRFW	
	HRHW		
	60 to 87 HRHW	0.6 HRHW	
	88 to 92 HRHW	0.61 HRHW	
	93 to 100 HRHW	0.55 HRHW	
HR15N			
60 to 79 HR15N	0.64 HR15N		
80 to 89 HR15N	0.5 HR15N		
90 to 92 HR15N	0.41 HR15N		



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Rockwell Hardness Testers Indirect Verification	HR30N		Test Blocks ASTM E18
	40 to 59 HR30N	0.63 HR30N	
	60 to 76 HR30N	0.47 HR30N	
	77 to 82 HR30N	0.42 HR30N	
	HR45N		
	20 to 49 HR45N	0.61 HR45N	
	50 to 66 HR45N	0.52 HR45N	
	67 to 72 HR45N	0.46 HR45N	
	HR15TW		
	60 to 79 HR15TW	0.99 HR15TW	
	80 to 86 HR15TW	1.1 HR15TW	
	87 to 93 HR15TW	0.99 HR15TW	
	HR30TW		
	43 to 56 HR30TW	0.85 HR30TW	
	57 to 69 HR30TW	1 HR30W	
	70 to 83 HR30TW	1 HR30TW	
	HR45TW		
	1 to 17 HR45TW	0.98 HR45TW	
18 to 52 HR45TW	1 HR45TW		
53 to 73 HR45TW	0.98 HR45TW		
Indirect Verification of Leeb Hardness Testers	300 LD to 900 LD	12 LD	Test Blocks ASTM A 956



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Direct Verification of Durometer Hardness Tester Types A, B, C, D, E, O & DO Extension at zero reading	2.46 mm to 2.54 mm	7.4 μ m	ASTM D-2240 Video Comparator 20x
Indenter Shape (Not all parameters apply to all of Durometer Types) Indenter Diameter Indenter Tip Diameter Indenter Tip Radius Indenter Tip Angle		7.4 μ m 7.4 μ m 7.4 μ m 0.06°	Video Comparator 20x Video Comparator 20x Video Comparator 20x Video Comparator 20x
Durometer Indenter Spring Types A, B, E & O Types C, D & DO	0.55 N to 8.05 N 4.445 N to 44.45 N	1.4 N 1.4 N	Load Cell Load Cell
Indirect Verification of Durometer Hardness Tester Types A, B, C, D, E, O & DO	0 Duro to 100 Duro	N / A	Test Blocks Indirect Verification is not an Accredited Calibration per ASTM D-2240 and is offered only as a service to the customer
Durometer Test Blocks	5 Duro to 100 Duro	0.52 Duro	ASTM D-2240
Indirect Verification of Brinell Hardness Tester HBW 10/3000	92.5 HBW to 650 HBW	4 HBW	Stage Micrometer ASTM E-10
Indirect Verification of Micro Hardness Tester Vickers	100 to 900 HV	15 HV	Stage Micrometer ASTM E384
Indirect Verification of Micro Hardness Tester Knoop	100 to 900 HK	17 HK	



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Thermodynamics

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Oven Calibration	0 °C to 537.78 °C (32 °F to 1 000 °F)	$(0.95 + 1.3 \times 10^{-3}T)$ °C [(1.71 + 1.3 x 10 ⁻³ T) °F]	SAE AMS 2750D ASTM E145
Temperature Measurement Equipment	0 °C to 482.22 °C (32 °F to 900 °F)	1.5 °C (2.7 °F)	Omega Ice Point Cell Omega Hot Point

1. Remarks: This column shall include pertinent information about the calibration of the Measured Instrument or parameter. The information should include the type of standards used and any pertinent information about the measurement method. This column is not to be used for commercial advertisement of laboratory services
2. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
3. The term D represents diameter in inches or millimeters as appropriate to the uncertainty statement.
4. The term R represents radius in inches or millimeters as appropriate to the uncertainty statement.
5. The term P represents pressure in psi.
6. The term T represents temperature in °C or °F as appropriate to the uncertainty statement.
7. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.
8. For complete calibration of surface plates, repeat measurement accuracy is only valid in conjunction with flatness measurement; however this check is offered as a service to the customer.
9. Indirect verification of Durometer is not an accredited calibration per ASTM D2240-05 and is offered only as a service to customers who do not wish to perform this interim check of their own Durometer.



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This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (as outlined by the joint ISO-ILAC-IAF Communiqué dated January 2009):

**Dimensional Measurements
(As detailed in the supplement)**

Such testing and/or calibration services shall only be offered at or from the address given above. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

A handwritten signature in black ink, appearing to read 'Tracy Szerszen'.

The validity of this certificate is mandated through ongoing surveillance.

Tracy Szerszen
President/Operations Manager
Perry Johnson Laboratory
Accreditation, Inc. (PJLA)
26555 Evergreen, Suite 1325
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Certificate of Accreditation: Supplement

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Accreditation is granted to this facility to perform the following testing:

FIELD OF TEST	ITEMS, MATERIALS OR PRODUCTS TESTED	SPECIFIC TESTS OR PROPERTIES MEASURED	SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED	RANGE (WHERE APPROPRIATE) AND DETECTION LIMIT
Dimensional Inspection	Customer Supplied Product	Mechanical Inspection and Testing	OEM Instructions ANSI/ASME Y14.5-2009	0 in to 36 in (0 mm to 914.4mm) 3.937 μin (0.1 μm)