



# 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 Dimensional, Mass, Light, Electrical, Pressure, pH,  
Time and Hardness 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)  
755 W. Big Beaver, Suite 1325  
Troy, Michigan 48084

<i>Initial Accreditation Date:</i>	<i>Issue Date:</i>	<i>Revision Date:</i>	<i>Expiration Date:</i>
October 05, 2005	October 27, 2009	November 05, 2010	October 26, 2011

<i>Accreditation No:</i>	<i>Certificate No:</i>	<i>Page No:</i>
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# Certificate of Accreditation: Supplement

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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 pH units	0.035 pH units	pH Calibration Buffers
	7 pH units	0.035 pH units	
	10 pH units	0.035 pH units	

## 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) $\mu$ m [(130 + 15L) $\mu$ 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) $\mu$ m [(14 + 17L) $\mu$ in]	Glass Scale OEM/GIDEP
Bore Gages	6 mm to 304.8 mm (0.236 2 in to 12 in)	2.97 $\mu$ m (120 $\mu$ 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 mm (0.11 mils)	Film Thickness Standards OEM/GIDEP
Feeler Gages	0 mm to 5.1 mm (0 in to 0.200 in)	3.581 $\mu$ m (141 $\mu$ in)	GIDEP
Gage Blocks	0 mm to 203.2 mm (0 in to 8 in)	(0.051 + 0.003L) $\mu$ m [(2 + 3L) $\mu$ in]	P&W Laseruler ANSI B89-1.9
Microscopes	0 mm to 25.4 mm (0 in to 1 in)	3.048 $\mu$ m (120 $\mu$ in)	Glass Scale OEM/GIDEP
Indicators	0 mm to 101.6 mm (0 in to 4 in)	(2.007 + 0.007L) $\mu$ m [(79 + 7.1L) $\mu$ in]	Gage Blocks ASME B89.1.10M
Height Gages	0 mm to 1 219.2 mm (0 in to 48 in)	(13.72 + 0.02L) $\mu$ m [(540 + 20L) $\mu$ in]	Gage Blocks OEM/GIDEP
Outside Micrometers	0 mm to 457.2 mm (0 in to 18 in)	(1.35 + 0.007L) $\mu$ m [(53 + 6.7L) $\mu$ 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) $\mu$ m [(150 + 12L) $\mu$ in]	
Depth Micrometers	0 mm to 304.8 mm (0 in to 12 in)	(2.44 + 0.008L) $\mu$ m [(96 + 8.4 L) $\mu$ in]	Gage Blocks ANSI B89.1.13
Calipers	0 mm to 1 016 mm (0 in to 40 in)	(8.64 + 0.037L) $\mu$ m [(340 + 37L) $\mu$ in]	Gage Blocks OEM/GIDEP
Pin Gages	0.254 mm to 25.4 mm (0.01 in to 1 in)	(0.77 + 0.004D) $\mu$ m [(30 + 4.4D) $\mu$ in]	Laser Micrometer ANSI/ASME 89.1.5M



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## Dimensional

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Thread Plug Gage Pitch Diameter	M 1.6 x 0.35 to M 100 x 6 (0-80 to 4-10)	$(3.05 + 0.65D) \mu\text{m}$ [[120 + 25.6D] $\mu\text{in}$ ]	Thread Measuring Wires ASME B1.2
Thread Plug Gage Major Diameter	M 1.6 x 0.35 to M 100 x 6 (0-80 to 4-10)	$(0.66 + 0.40D) \mu\text{m}$ [(26 + 15.9D) $\mu\text{in}$ ]	Supermicrometer ASME B1.2
Thread Rings Pitch Diameter	M 1.6 x 0.35 to M 100 x 6 (0-80 to 4-10)	$(4.57 + 2.05D) \mu\text{m}$ [(180 + 80.71D) $\mu\text{in}$ ]	Master Threaded Set Plug ASME B1.2
Thread Rings Minor Diameter	M 1.6 x 0.35 to M 100 x 6 (0-80 to 4-10)	$(1.45 + 0.48D) \mu\text{m}$ [(57 + 18.8D) $\mu\text{in}$ ]	Master Plain Class X Set Plug ASME B1.2
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) $\mu\text{in}$ ]	Video Comparator GIDEP
Squares	25.4 mm to 304.8 mm (1 in to 12 in)	3.048 $\mu\text{m}$ (120 $\mu\text{in}$ )	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) $\mu\text{in}$ ]	Video Comparator GIDEP
Glass Scales	25.4 mm to 609.6 mm (1 in to 24 in)	$(2.34 + 0.015L) \mu\text{m}$ [(92 + 15L) $\mu\text{in}$ ]	Video Comparator DP- MET210 and 33K6-5-194-1
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) $\mu\text{in}$ ]	Video Comparator GIDEP
Surface Plates Repeat Measurements only	0.0508 mm (0.002 in)	1.092 $\mu\text{m}$ (43 $\mu\text{in}$ )	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) $\mu\text{in}$ ]	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 $\mu\text{m}$ (140 $\mu\text{in}$ )	
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 $\mu\text{m}$ (150 $\mu\text{in}$ )	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 $\mu\text{m}$ (1 600 $\mu\text{in}$ )	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 $\mu\text{m}$ (1 200 $\mu\text{in}$ )	Setting Masters OEM



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Recess & Penetration Points			
Hexalobular	0.001 in to 1.0 in	91 $\mu$ in	Vision System ASME B18.6.3 ASME B18.3 ISO 10664 IFI-562
Phillips			
I	0.01 in to 0.5 in	91 $\mu$ in	
IA	0.015 in to 0.5 in		
II	0.024 in to 0.69 in		
Hex	0.028 in to 1 in	91 $\mu$ in	
Slot Width of Blade	0.001 in to 0.75 in	91 $\mu$ in	
Square Width across Flats	0.049 in to 0.27 in	91 $\mu$ in	
Surface Roughness Specimen $R_a$	0.1 $\mu$ in to 500 $\mu$ in	3.6 $\mu$ in	Surface Finish Analyzer ASME B46.1
Profilometer Surface Roughness $R_a$	0.304 8 $\mu$ m (12 $\mu$ in to 120 $\mu$ in)	0.089 $\mu$ m (3.5 $\mu$ in)	Roughness Specimen ASME B46.1
Precision Levels	2 in to 48 in	0.000 9° 170 $\mu$ in per foot	Navair 17-20MD-10 Surface Plate with Levelers & Gage Blocks

## Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	REMARKS
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



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Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J	-210 °C to 759 °C	1.5 °C	Electrical Simulation of Thermocouple Output Omega CL23A Calibrator ASTM E220
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	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type N	-50 °C to 1 300 °C	1.5 °C	

## 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)	



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Tensile Testers	4 448.2 N to 22 224.1 N (1 000 lbf to 5 000 lbf)	57.8 N (13 lbf)	Load Cell ASTM E4
	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 ( $4.9 \times 10^{-2}$ 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
Pressure	0 psi to 200 psi	( $0.54 \text{ psi} + 4.4 \times 10^{-3} \text{P}$ ) 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 HRA to 69 HRA	0.69 HRA	
	70 HRA to 79 HRA	0.49 HRA	
	80 HRA to 84 HRA	0.51 HRA	
	HRBW		
	10 HRBW to 50 HRBW	1.1 HRBW	
	51 HRBW to 79 HRBW	0.82 HRBW	
	80 HRBW to 100 HRBW	0.69 HRBW	
	HRC		
	20 HRC to 39 HRC	0.47 HRC	
	40 HRC to 59 HRC	0.48 HRC	
	60 HRC to 68 HRC	0.43 HRC	
	HRFW		
	40 HRFW to 69 HRFW	0.56 HRFW	
	70 HRFW to 86 HRFW	0.69 HRFW	
87 HRFW to 100 HRFW	0.68 HRFW		



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Rockwell Hardness Testers Indirect Verification	HRHW		Test Blocks ASTM E18
	60 HRHW to 87 HRHW	0.6 HRHW	
	88 HRHW to 92 HRHW	0.61 HRHW	
	93 HRHW to 100 HRHW	0.55 HRHW	
	HR15N		
	60 HR15N to 79 HR15N	0.64 HR15N	
	80 HR15N to 89 HR15N	0.5 HR15N	
	90 HR15N to 92 HR15N	0.41 HR15N	
	HR30N		
	40 HR30N to 59 HR30N	0.63 HR30N	
	60 HR30N to 76 HR30N	0.47 HR30N	
	77 HR30N to 82 HR30N	0.42 HR30N	
	HR45N		
	20 HR45N to 49 HR45N	0.61 HR45N	
	50 HR45N to 66 HR45N	0.52 HR45N	
	67 HR45N to 72 HR45N	0.46 HR45N	
	HR15TW		
	60 HR15TW to 79 HR15TW	0.99 HR15TW	
	80 HR15TW to 86 HR15TW	1.1 HR15TW	
	87 HR15TW to 93 HR15TW	0.99 HR15TW	
	HR30TW		
	43 HR30TW to 56 HR30TW	0.85 HR30TW	
	57 HR30TW to 69 HR30TW	1 HR30W	
70 HR30TW to 83 HR30TW	1 HR30TW		
HR45TW			
1 HR45TW to 17 HR45TW	0.98 HR45TW		
18 HR45TW to 52 HR45TW	1 HR45TW		
53 HR45TW 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 $\mu$ 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 $\mu$ m 7.4 $\mu$ m 7.4 $\mu$ 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 HV to 900 HV	15 HV	Stage Micrometer ASTM E384
Indirect Verification of Micro Hardness Tester Knoop	100 HK to 900 HK	17 HK	
Vacuum	0.02 inHg to 30 inHg	0.36 in·Hg	GIDEP 33K6-4-430-1 Transcat DG-B/9511-07



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## 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 ( $2.2 \times 10^{-6}$ lb to 13.67 lb)	$(1.16 \times 10^{-2} + 1.57 \times 10^{-6} \text{ Wt})$ g [( $0.46 + 1.57 \times 10^{-3}$ Wt) lb]	NIST Handbook 44 Class I
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

## Thermodynamics

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	REMARKS
Oven Calibration	0 °C to 537.78 °C (32 °F to 1 000 °F)	$(0.95 + 1.3 \times 10^{-3}T)$ °C [( $1.71 + 1.3 \times 10^{-3}T$ ) °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. The term X represents the measured value in inches.
9. 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.
10. 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