PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Precision Calibration Services, Inc.

29912 Gratiot Ave, Roseville, MI 48066

(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):

Dimensional, Mechanical, and Mass, Force, & Weighing Device Calibration

(As detailed in the supplement)

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. 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:

Tracy Szerszen
President/Operations Manager

Initial Accreditation Date:	*Issue Date:*	*Expiration Date:*
June 2, 2015	August 17, 2017	September 30, 2019

Accreditation No.:	*Certificate No.:*
76211	L17-363

Perry Johnson Laboratory
Accreditation, Inc. (PJLA)
755 W. Big Beaver, Suite 1325
Troy, Michigan 48084

The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: www.pjlabs.com

Certificate of Accreditation: Supplement

Precision Calibration Services, Inc.
29912 Gratiot Ave, Roseville, MI 48066
Contact Name: Ron Warax Phone: 586-779-4516

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

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Mechanical Tools (Linear Displacement Accuracy)[FO]	100 µin to 300 in	(31 + 0.1L) µin	Laser Measuring System Optodyne
Ring Gages[FO]	0.04 in to 14 in	(15 + 1.4L) µin	P&W LabMaster
Height Gages[FO]	500 µin to 48 in	(159.2 + 3.8L) µin	Master Gage Blocks
Calipers[FO]	2 000 µin to 60 in	(662 + 8.2L) µin	
Micrometer Standards[FO]		(12.6 + 7.8L) µin	
Bore Gages[FO]	0.125 in to 18 in	(8.46 + 21.73L) µin	Master Gage Blocks
Magnification[FO]	5X to 250X	(116 + 0.7L) µin	Glass Scale
Angularity[FO]	6 min to 360°	2 min	
Protractor[FO]	0° to 360°	(18 + 10.4L) min	Comparator J & L CLS14S
Tool Maker's Magnification[FO]			
Linearity[FO]	5X to 250X	(116 + 0.7L) µin	Glass Scale
Thread Wires[FO]	4 TPI to 80 TPI	(27 + 4.5L) µin	Universal Measuring Machine P&W
Thread Rings Pitch Diameter[FO]	0.04 to 14 in	(45 + 1.1L) µin	P&W LabMaster
Brinell Scopes[FO]	1 750 µin to 0.4 in	(580 + 11L) µin	Glass Reticle Comparator
Parallels[FO]	300 µin to 36 in	(7.5 + 5L) µin	Amplifier, Gage Probe, Surface Plate
Pitch Gages[FO]	500 µin to 0.25 in	(150.4 + 1.47L) µin	Optical Comparator
Sine Plates and Sine Bars[FO]	1 000 µin to 10 in	(30.5 + 3.3L) µin	Amplifier, Gage Probe, Sine Plate, Gage Blocks, Comparator

Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Microhardness Hardness Tester Indirect Verification Knoop Vickers[FO]	458 HK	9.15 HK	Hardness Blocks
	463 HK	12 HK	
	464 HK	14 HK	
	441 HV	12 HV	
	440 HV	15 HV	
	441 HV	22 HV	

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Brinell Hardness Tester Indirect Verification[FO]	100 BHN to 200 BHN	4.3 BHN	Hardness Blocks Stage Micrometer
	200 BHN to 300 BHN	2.1 BHN	
Durometers[FO]	Type A, BO, CD, DO	0.59 N	Durometer Calibrator Rex RDC-1
Pressure[FO]	100 psi to 10 000 psi	0.34 psi	Deadweight Tester
Rockwell Hardness Testers Indirect Verification[FO]	HRA Low	0.53 HRA	Hardness Blocks
	HRA Med	0.44 HRA	
	HRA High	0.36 HRA	
	HRB Low	1.9 HRB	
	HRB Med	1.4 HRB	
	HRB High	1.1 HRB	
	HRC Low	0.34 HRC	
	HRC Med	0.32 HRC	
	HRC High	0.33 HRC	
	HR15N Low	0.34 HR15N	
	HR15N Med	0.33 HR15N	
	HR15N High	0.42 HR15N	
	HR30N Low	0.34 HR30N	
Rockwell Hardness Testers Indirect Verification[FO]	HRC Low	0.34 HRC	Calibration of Standardized Rockwell Hardness and Rockwell Superficial Hardness Test Blocks 3,4,7
	HRC Med	0.32 HRC	
	HRC High	0.33 HRC	
	HR15N Low	0.34 HR15N	
	HR15N Med	0.33 HR15N	
	HR15N High	0.42 HR15N	
	HR30N Low	0.34 HR30N	
	HR30N Med	0.46 HR30N	
	HR30N High	0.38 HR30N	
	HR45N Low	0.41 HR45N	
	HR45N Med	0.39 HR45N	
	HR45N High	0.47 HR45N	

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Rockwell Hardness Testers Indirect Verification[FO]	HR30N Med	046 HR30N	Hardness Blocks
	HR30N High	0.38 HR30N	
	HR45N Low	0.41 HR45N	
	HR45N Med	0.39 HR45N	
	HR45N High	0.47 HR45N	
	HR15T Low	0.49 HR15T	
	HR45T Med	1.4 HR15T	
	HR45T High	0.72 HR15T	
	HR30T Low	0.88 HR30T	
	HR30T Med	0.62 HR30T	
	HR30T High	0.44 HR30T	
	HR45T Low	0.86 HR45T	
	HR45T Med	1.2 HR45T	
	HR45T High	0.85 HR45T	

1. The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represents the smallest measurement uncertainty attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is typically expressed at a confidence level of 95 % using a coverage factor *k* (usually equal to 2). The actual measurement uncertainty associated with a specific calibration performed by the laboratory will typically be larger than the CMC for the same calibration since capability and performance of the device being calibrated and the conditions related to the calibration may reasonably be expected to deviate from ideal to some degree.

2. The laboratories range of calibration capability for all disciplines for which they are accredited is the interval from the smallest calibrated standard to the largest calibrated standard used in performing the calibration. The low end of this range must be an attainable value for which the laboratory has or has access to the standard referenced. Verification of an indicated value of zero in the absence of a standard is common practice in the procedure for many calibrations but by its definition it does not constitute calibration of zero capacity.

3. The presence of a superscript FO means that the laboratory performs calibration of the indicated parameter both at its fixed location and onsite at customer locations. Example: Outside Micrometer[FO] would mean that the laboratory performs this calibration at its fixed location and onsite at customer locations.

4. Measurement uncertainties obtained for calibrations performed at customer sites can be expected to be larger than the measurement uncertainties obtained at the laboratories fixed location for similar calibrations. This is due to the effects of transportation of the standards and equipment and upon environmental conditions at the customer site which are typically not controlled as closely as at the laboratories fixed location.

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

5. The term D represents diameter in inches or millimeters as appropriate to the uncertainty statement.

6. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.