PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Ergonomics

405 Caredean Dr., Horsham, PA 19044

(Hereinafter called the Organization) and hereby declares that Organization is accredited in accordance with the recognized International Standard:

ISO/IEC 17025:2017

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 April 2017):

Dimensional, Electrical, Mass, Mechanical, and Thermodynamic 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:*
December 22, 2016	July 15, 2019	August 31, 2021
Revision Date:	*Accreditation No.:*	*Certificate No.:*
June 09, 2020	75821	L19-356-R1

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

Ergonomics

405 Caredean Dr., Horsham, PA 19044

Contact Name: Rudi Bauknecht Phone: 215-674-0663

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
Angle[F]	0° to 90°	0.4 min	Optical Comparator, Deltronic DH-216
Caliper[F]	0.5 mm to 300 mm	10.5 µm	Use of Step Gage Block and Optical Comparators
		10.7 µm	
		11.2 µm	
		11.8 µm	
Length [F]	0.005 mm to 50 mm	10.5 µm	Micrometer
	50 mm to 300 mm	11.8 µm	Optical Comparator, Caliper
	300 mm to 1 000 mm	(12 + 4L) µm	Optical Comparator

Electrical

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
Equipment to Measure AC Voltage (at the listed frequencies) [F]			Agilent 3458A
10 Hz to 1 kHz	0.2 V to 750 V	50 mV + 0.4 mV/V	
1 kHz to 20 kHz	0.2 V to 750 V	20 mV + 0.06 mV/V	
20 kHz to 100 kHz	0.2 V to 750 V	0.2 V + 3 mV/V	
100 kHz to 300 kHz	0.2 V to 750 V	0.1 V + 4 mV/V	
300 kHz to 2 MHz	0.2 V to 750 V	0.1 V + 15 mV/V	
Equipment to Measure AC Voltage (at the listed frequencies) [F]			
10 Hz to 100 kHz	750 V to 10 kV	50 mV + 0.44 mV/V	Agilent 3458A, Voltage Divider VD10 dwg 0393
Equipment to Measure AC Current (at the listed frequencies) [F]			Agilent 3485A
10 Hz to 5 kHz[F]	0.02 A to 3 A	6 µA + 2.1 mA/A	
Equipment to Measure DC Current[F]	0.003 A to 3 A	0.1 mA/A + 1µA	
Equipment to Measure Resistance[F]	0.003 mΩ to 100 Ω	5 µΩ + 15 µΩ/Ω	
	100 µΩ to 1 MΩ	50 µΩ + 8 µΩ/Ω	
Equipment to Measure DC Voltage[F]	0.001 mV to 1 000 V	17 µV/V	Agilent 3458A, Voltage Divider
	1 000 V to 10 000 V	0.4 µV/V	
Magnetic Field Strength[F]	100 nT to 10 000 nT	0.14 nT + 0.48 % of reading	Use of a Helmholtz coil
Electric Field Strength[F]	50 V to 5 kV DC	1 V/m + 0.5 % of reading	Requires Reference Plane

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Electrical

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Electric Field Strength[F]	20 Hz to 400 kHz	1 V/m + 0.5 % of reading	Requires Reference Plane

Mass, Force, and Weighing Devices

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
Mass[F]	Up to 300 g	8 mg	Direct Comparison on 6d Class II Scale Using ASTM Class I standard Weights as Verification
	300 g to 3.2 kg	10 mg	
	> 3.2 kg to 10 kg	0.85 g	
	10 kg to 60 kg	1.5 g	

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
Flow of Water[F]	Up to 5 L/min	7.7 mL	Gravimetric
	5 L/min to 15 L/min	24.6 mL	Apparatus IAW IEC 60068-2-68
	15 L/min to 50 L/min	76.8 mL	
	50 L/min to 110 L/min	295 mL	
Force[F]	Up to 2.9 N (0 g to 300 g•f)	0.000 025 N (2.5 mg•f)	Use of ASTM Class 6, NIST Class F Weights
	2.9 N to 11.77 N (300 g to 1.2 kg•f)	0.000 57 N (58 mg•f)	
	11.77 N to 98.067 N (1.2 kg to 10 kg•f)	0.005 7 N (580 mg•f)	
	98.067 N to 222.61 N (10 kg to 60 kg•f)	0.011 N (1.1 g•f)	
Impact Hammer[F]	Up to 2 J (0 Nm to 2 Nm)	0.01 J (0.01 Nm)	HC10 Ljungmann, AS IEC 60068-2-65

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

Thermodynamic

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
Temperature (Glow Wire Test)[F]	20 °C to 25 °C	0.39 °C	AEMC CA846
	961.8 °C	2.1 °C	PTL T 03.89 (99.97 % Ag)
Thermocouple[F]	0 °C to 100 °C (per 25 °C)	0.5 °C	Agilent 3458A DVM Type K Thermocouple

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 F means that the laboratory performs calibration of the indicated parameter at its fixed location. Example: Outside Micrometer[F] would mean that the laboratory performs this calibration at its fixed location.

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