PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

International Light Technologies

10 Technology Drive, Peabody, MA 01960

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

ISO/IEC 17025:2017
& Meets the Requirements of ANSI/NCSI Z540.1-1994
& ANSI/NCSI Z540.3-2006 subclause 5.3

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):

Calibration of Electrical and Optical Devices

(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

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

Initial Accreditation Date:	*Issue Date:*	*Expiration Date:*
January 2, 2012	January 17, 2022	March 31, 2024
Revision Date:	*Accreditation No.:*	*Certificate No.:*
June 13, 2022	66765	L22-44-R1

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

International Light Technologies
10 Technology Drive, Peabody, MA 01960
Contact Name: John Ellis Phone: 407-961-6383

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

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Research Radiometers & Photometers Fixed points [F]	1 mA	3.6×10^{-7} A	Keithley Current Calibrator
	100 uA	3.4×10^{-8} A	
	10 uA	6.2×10^{-9} A	
	1 uA	6.5×10^{-10} A	
	100 nA	7.3×10^{-11} A	
	10 nA	7.9×10^{-12} A	
	1 nA	8.4×10^{-13} A	
	100 pA	2.6×10^{-13} A	
	10 pA	1.3×10^{-13} A	
	1 pA	4.2×10^{-14} A	

Optical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Spectroradiometers Spectral Irradiance At the listed Wavelengths [F]			Calibrated Standard Lamp OP-0152
200 nm to 350 nm	3×10^{-7} W/cm^{2}nm to 1×10^{-6} W/cm^{2}nm	4 % of Reading	
350 nm to 400 nm	4×10^{-8} W/cm^{2}nm to 2×10^{-6} W/cm^{2}nm	3 % of Reading	
400 nm to 900 nm	6×10^{-6} W/cm^{2}nm to 2×10^{-5} W/cm^{2}nm	3 % of Reading	
900 nm to 1 050 nm	6×10^{-6} W/cm^{2}nm to 2×10^{-5} W/cm^{2}nm	7 % of Reading	
1 050 nm to 1 250 nm	6×10^{-6} W/cm^{2}nm to 2×10^{-5} W/cm^{2}nm	15 % of Reading	
1 250 nm to 2 050 nm	5×10^{-6} W/cm^{2}nm to 1.5×10^{-5} W/cm^{2}nm	7 % of Reading	
1 250 nm to 2 500 nm	2×10^{-6} W/cm^{2}nm to 6×10^{-6} W/cm^{2}nm	14 % of Reading	
Spectroradiometers Spectral Radiance At the listed Wavelengths [F]			Calibrated Standard Lamp OP-0152
350 nm to 400 nm	2×10^{-7} W/sr cm^{2}nm to 6×10^{-7} W/sr cm^{2}nm	3 % of Reading	
400 nm to 900 nm	2×10^{-6} W/sr cm^{2}nm to 7×10^{-6} W/sr cm^{2}nm	3 % of Reading	
900 nm to 1 050 nm	2×10^{-6} W/sr cm^{2}nm to 7×10^{-6} W/sr cm^{2}nm	7 % of Reading	

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10 Technology Drive, Peabody, MA 01960
Contact Name: John Ellis Phone: 978-818-6180

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

Optical

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Spectroradiometers Spectral flux At the listed Wavelengths [F]			Calibrated Standard Lamp OP-0152
200 nm to 350 nm	1 x 10^{-7} W/nm to 1 x 10^{-5} W/nm	4 % of Reading	
350 nm to 400 nm	2 x 10^{-7} W/nm to 1 x 10^{-5} W/nm	3 % of Reading	
400 nm to 900 nm	2.5 x 10^{-6} W/nm to 2.5 x 10^{-4} W/m	3 % of Reading	
900 nm to 1 050 nm	2.5 x 10^{-6} W/nm to 2.5 x 10^{-4} W/m	7 % of Reading	
1 050 nm to 1 250 nm	3 x 10^{-6} W/nm to 2.5 x 10^{-4} W/m	15 % of Reading	
1 250 nm to 2 050 nm	2 x 10^{-6} W/nm to 2 x 10^{-4} W/m	7 % of Reading	
1 250 nm to 2 500 nm	7 x 10^{-7} W/nm to 8 x 10^{-5} W/m	14 % of Reading	
Belt Radiometers 200 nm to 500 nm	10 mW/cm^2 to 200 mW/cm^2	6.2 % of Reading	Calibrated Standard Lamp OP-0054, OP-0044, OP-0055, OP-0035, OP-0053, OP-0119, OP-118, OP-0121, OP-0124, OP-0125, OP-120, OP-0042, OP-0013, OP-0043
Handheld Radiometers At the listed Wavelengths [F]			Silicon Photodiodes Phototubes OP-0030
200 nm to 250 nm	1 x 10^{-10} W/cm^2 to 8 x 10^{-6} W/cm^2	11 % of Reading	
250 nm to 400 nm	1 x 10^{-10} W/cm^2 to 7 x 10^{-3} W/cm^2	5 % of Reading	Silicon Photodiodes Phototubes OP-0048, OP-0040, OP-0050
400 nm to 960 nm	1 x 10^{-10} W/cm^2 to 2 x 10^{-2} W/cm^2	4 % of Reading	Silicon Photodiodes Phototubes OP-0028, OP-0088, OP-0094
Extended UV Scanned Irradiance At the listed Wavelengths [F]			Silicon Photodiodes Phototubes OP-0036
200 nm to 250 nm	1 x 10^{-10} W/cm^2 to 8 x 10^{-6} W/cm^2	7.1 % of Reading	
250 nm to 400 nm	1 x 10^{-10} W/cm^2 to 7 x 10^{-3} W/cm^2	4.1 % of Reading	

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Irradiance Response At the listed Wavelengths [F]			Silicon Photodiodes Phototubes OP-0131
200 nm to 250 nm	1 x 10^{-10} W/cm^2 to 8 x 10^{-6} W/cm^2	11 % of Reading	
250 nm to 400 nm	1 x 10^{-10} W/cm^2 to 7 x 10^{-3} W/cm^2	4.5 % of Reading	Silicon Photodiodes Phototubes OP-0131, OP-0018, OP-0098, OP-0087, OP-0017, OP-0096, OP-0019, OP-0007, OP-0029, OP-0131
400 nm to 960 nm	1 x 10^{-10} W/cm^2 to 2 x 10^{-2}W/cm^2	3 % of Reading	Silicon Photodiodes Phototubes OP-0029, OP-0018, OP-0131
960 nm to 1 000 nm	1 x 10^{-10} W/cm^2 to 1 x 10^{-4} W/cm^2	4.5 % of Reading	Silicon Photodiodes Phototubes OP-0029, OP-0131, OP-0002
1 000 nm to 1 100 nm	1 x 10^{-10} W/cm^2 to 1 x 10^{-4} W/cm^2	5 % of Reading	Silicon Photodiodes Phototubes OP-0002, OP-0018, OP-0131
Radiance Response At the listed Wavelengths [F]			Silicon Photodiode OP-0041
200 nm to 250 nm	3 x 10^{-11} W/cm^2/sr to 3 x 10^{-6} W/cm^2/sr	11 % of Reading	
250 nm to 400 nm	3 x 10^{-11} W/cm^2/sr to 3 x 10^{-3} W/cm^2/sr	4.5 % of Reading	
400 nm to 960 nm	3 x 10^{-11} W/cm^2/sr to 7 x 10^{-3} W/cm^2/sr	3 % of Reading	
960 nm to 1 000 nm	3 x 10^{-11} W/cm^2/sr to 3 x 10^{-5} W/cm^2/sr	4.5 % of Reading	
1 000 nm to 1 100 nm	3 x 10^{-11} W/cm^2/sr to 3 x 10^{-5} W/cm^2/sr	5 % of Reading	

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Radiant Intensity Response Based on 125 mm distance. Values vary per application distance. At the listed Wavelengths [F]			Silicon Photodiode OP-0037
200 nm to 250 nm	1 x 10^{-8} W/sr to 2 x 10^{-3} W/sr	11 % of Reading	
250 nm to 400 nm	1 x 10^{-8} W/sr to 1 W/sr	4.5 % of Reading	
400 nm to 960 nm	1 x 10^{-8} W/sr to 3 W/sr	3 % of Reading	
960 nm to 1 000 nm	1 x 10^{-8} W/sr to 2 x 10^{-2} W/sr	4.5 % of Reading	
1 000 nm to 1 100 nm	1 x 10^{-8} W/sr to 2 x 10^{-2} W/sr	5 % of Reading	
Radiant Power Response At the listed Wavelengths [F]			Silicon Photodiodes OP-0049
200 nm to 250 nm	4 x 10^{-12} W to 4 x 10^{-7} W	11 % of Reading	
250 nm to 400 nm	4 x 10^{-12} W to 3 x 10^{-4} W	4.5 % of Reading	Silicon Photodiodes OP-0106
960 nm to 1 000 nm	4 x 10^{-12} W to 4 x 10^{-6} W	4.5 % of Reading	
1 000 nm to 1 100 nm	4 x 10^{-12} W to 4 x 10^{-6} W	5 % of Reading	
400 nm to 960 nm	4 x 10^{-12} W to 3 x 10^{-3} W	3 % of Reading	Silicon Photodiodes OP-0021, OP-0022 OP-0039, OP-0106
Illuminance Sensitivity At the listed Wavelength [F]			Silicon Photodiode OP-0070
400 nm to 700 nm	9 x 10^{-4} lx to 20 klx	2.4 % of Reading	
Luminance Sensitivity At the listed Wavelengths [F]			Silicon Photodiode OP-0071
400 nm to 700 nm	2 x 10^{-4} cd/m^2 to 60 kcd/m^2	2.4 % of Reading	
Luminous Intensity of a Standard Lamp At the listed Wavelengths [F]			Silicon Photodiode OP-0081
400 nm to 700 nm	3 x 10^{-7} cd to 4 x 10^{+2} cd	2.4 % of Reading	
Luminous Intensity Sensitivity *Based on 125 mm distance. Values vary per application distance.* At the listed Wavelengths [F]			Silicon Photodiode OP-0025
400 nm to 700 nm	1 x 10^{-7} cd to 30 cd	2.4 % of Reading	
Luminous Power Sensitivity At the listed Wavelengths [F]			Silicon Photodiode OP-0072
400 nm to 700 nm	3 x 10^{-8} lm to 8 lm	2.4 % of Reading	
Filter Transmission			Agilent UV-VIS Spectroscopy OP-0133
200 nm to 1 000 nm	1 % to 100 %	+/- 0.1 % of Reading	

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Optical Density[F]			Agilent UV-VIS Spectroscopy OP-0133
200 nm to 1 000 nm	Up to 2.5 OD	+/- 0.005 OD of Reading	
Wavelength			
200 nm to 1 000 nm	200 nm to 1 000 nm	+/- 0.5 nm of Reading	
Degrees Kelvin[F]			ILT950/960 Spectrometer OP-0155
Correlated Color Temperature (CCT) of Meters and Sources	2 000 K - 6 000 K	1 % of Reading	
	6 001 K - 7 500K	1.2 % of Reading	
	7 501 K - 10 000K	1.7 % of Reading	

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.