PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

International Vacuum Group, Inc.

7885 Tranmere Drive, Unit 9-10, Mississauga, ON, L5S 1V8, Canada

(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):

Electrical 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

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

Initial Accreditation Date:	*Issue Date:*	*Expiration Date:*
September 7, 2020	September 7, 2020	December 31, 2022

Accreditation No.:	*Certificate No.:*
110912	L20-537

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 Vacuum Group, Inc,
7885 Tranmere Drive, Unit 9-10, Mississauga, ON, L5S 1V8, Canada
Contact Name: Remus Bica Phone: 289-400-6407

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

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
DC Voltage[FO] Measurement	0 mV to 110 mV	0.025% of Reading + 0.015% of Full Scale	Electrical Measurement with Fluke741B, Fluke744 WI-700-001
	0 V to 1.1 V	0.025% of Reading + 0.005% of Full Scale	
	0 V to 11 V	0.025% of Reading + 0.005% of Full Scale	
	0 V to 110 V	0.05% of Reading + 0.005% of Full Scale	
	0 V to 300 V	0.05% of Reading + 0.005% of Full Scale	
Equipment to Output AC Voltage at the listed Frequencies[FO]			
20 Hz to 40 Hz	0 V to 1.1 V	2% of Reading + 10% of Full Scale	
40 Hz to 500 Hz	0 V to 1.1 V	0.5% of Reading + 5% of Full Scale	
500 Hz to 1 kHz	0 V to 1.1 V	2% of Reading + 10% of Full Scale	
1 kHz to 5 kHz	0 V to 1.1 V	10% of Reading + 20% of Full Scale	
Equipment to Output AC Voltage at the listed Frequencies[FO]			
20 Hz to 40 Hz	0 V to 11 V	2% of Reading + 10% of Full Scale	
40 Hz to 500 Hz	0 V to 11 V	0.5% of Reading + 5% of Full Scale	
500 Hz to 1 kHz	0 V to 11 V	2% of Reading + 10% of Full Scale	
1 kHz to 5 kHz	0 V to 11 V	10% of Reading + 20% of Full Scale	
DC Current[FO] Measurement	0 mA to 110 mA	0.01% of Reading + 0.015% of Full Scale	
Resistance Measurement[FO]	0 Ω to 11 Ω	0.05% of Reading + 0.05 Ω	
	0 Ω to 110 Ω	0.05% of Reading + 0.05 Ω	
	0 Ω to 1.1 kΩ	0.05% of Reading + 0.5 Ω	
	0 Ω to 11 kΩ	0.1% of Reading + 10 Ω	
Frequency Measurement[FO]	1.00 Hz to 109.99 Hz	0.05 Hz	
	110.0 Hz to 1099.9 Hz	0.5 Hz	
	1.100 kHz to 10.999 kHz	0.005 kHz	
	11.00 kHz to 50.00 kHz	0.05 kHz	
DC Voltage Output[FO]	0 mV to 110 mV	0.01% of Reading + 0.005% of Full Scale	
	0 V to 1.1 V	0.01% of Reading + 0.005% of Full Scale	
	0 V to 15 V	0.01% of Reading + 0.005% of Full Scale	
DC Current Output[FO]	22 mA/ Source mA	0.01% of Reading + 0.015% of Full Scale	
	22 mA/ Simulate Transmitter	0.02% of Reading + 0.03% of Full Scale	

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Resistance Sourcing[FO]	0 Ω to 11 Ω	0.01% of Reading + 0.02 Ω	Electrical Measurement with Fluke741B, Fluke744 WI-700-001
	0 Ω to 110 Ω	0.01% of Reading + 0.04 Ω	
	0 Ω to 1.1 k Ω	0.02% of Reading + 0. 5 Ω	
	0 Ω to 11 kΩ	0.03% of Reading + 5 Ω	
Frequency Sourcing[FO]	0.00 Hz to 10.99 Hz	0.01 Hz	
	11.00 Hz to 109.99 Hz	0.1 Hz	
	110.0 Hz to 1099.9 Hz	0.1 Hz	
	1.100 kHz to 21.999 kHz	0.002 kHz	
	22.000 kHz to 50.000 kHz	0.005 kHz	
Temperature Calibration Indication & Control Equipment used with Thermocouple Type E[FO]	-250 °C to -200 °C	0.2 °C	
	-200 °C to -100 °C	0.2 °C	
	-200 °C to -100 °C	0.2 °C	
	600 °C to 1 000 °C	0.2 °C	
Temperature Calibration Indication & Control Equipment used with Thermocouple Type N[FO]	-200 °C to -100 °C	0.2 °C	
	-100 °C to 900 °C	0.2 °C	
	900 °C to 1 300 °C	0.2 °C	
Temperature Calibration Indication & Control Equipment used with Thermocouple Type J[FO]	-210 °C to -100 °C	0.2 °C	
	-100 °C to 800 °C	0.2 °C	
	800 °C to 1 200 °C	0.2 °C	
Temperature Calibration Indication & Control Equipment used with Thermocouple Type K[FO]	-200 °C to -100 °C	0.2 °C	
	-100 °C to 400 °C	0.2 °C	
	400 °C to 1 200 °C	0.2 °C	
Temperature Calibration Indication & Control Equipment used with Thermocouple Type T[FO]	-250 °C to -200 °C	0.2 °C	
	-200 °C to 0 °C	0.2 °C	
	0 °C to 400 °C	0.2 °C	
Temperature Calibration Indication & Control Equipment used with Thermocouple Type S[FO]	-20 °C to 0 °C	0.2 °C	
	0 °C to 200 °C	0.2 °C	
	200 °C to 1 400 °C	0.2 °C	
	1 400 °C to 1 767 °C	0.2 °C	
Temperature Calibration Indication & Control Equipment used RTD Pt100 100Ω[FO]	-200 °C to 0 °C	0.2 °C	
	0 °C to 400 °C	0.2 °C	
	400 °C to 800 °C	0.2 °C	
Temperature Calibration Indication & Control Equipment used RTD Pt1000 1 000Ω[FO]	-200 °C to 0 °C	0.2 °C	
	0 °C to 400 °C	0.2 °C	
	400 °C to 630 °C	0.2 °C	

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Temperature Calibration Indication & Control Equipment used RTD 10Ω Cu10[FO]	-100 °C to 0 °C	0.2 °C	Electrical Measurement with Fluke741B, Fluke744 WI-700-001
	0 °C to 260 °C	0.2 °C	
Temperature Calibration Indication & Control Equipment used RTD 100Ω Pt(3916) [FO]	-200 °C to -190 °C	0.2 °C	
	-190 °C to 0 °C	0.2 °C	
	0 °C to 360 °C	0.2 °C	
Loop Power Supply[FO]	24 V	5%	
	28 V	5%	

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.