



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Metrocal, S.A. de C.V.

***Av. Lázaro Cardenas #3141, Col. Valle del Marquez
Monterrey, Nuevo León, México. C.P. 64790***

*(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):

***Optical, Dimensional, Thermodynamic, Chemical, Mechanical, Time &
Frequency and Mass, Force, and Weighing Devices 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:

December 17, 2004

Issue Date:

October 04, 2023

Expiration Date:

December 31, 2025

Accreditation No.:

46962

Certificate No.:

L23-759

*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

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Av. Lázaro Cardenas #3141, Col. Valle del Marquez

Monterrey, Nuevo León, México. C.P. 64790

Contact Name: Isaac Gonzalez Phone: 818-365-7188

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

Optical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
ρ (λ) Spectral Reflectance ^{FO}	ρ (400 nm to 700 nm): 0.35 % to 92.13 %	2.5 % of reading	Ceramic Research Tiles ASTM E-1164
Color Values ^{FO}	CIE L* 4.19 to 96.61	0.5	
	CIE a* -34.83 to 58.01	0.5	
	CIE b* -40.49 to 87.63	0.5	
	X: 0.42 to 101.56	0.5	
	Y: 0.46 to 91.48	0.5	
Z: 0.3 to 106.22	0.5		
Spectrophotometers τ : (λ) Transmittance ^{FO}	τ : 3 % to 90 %	0.4 % of reading	CENAM Glass Filters ASTM E-275
Spectrophotometers α (λ) Absorbance ^{FO}	α (λ): 0.02 to 2	0.05 % of reading	
Spectrophotometers λ Wavelength ^{FO}	λ : 230 nm to 700 nm	0.27 nm	Holmium Oxide ASTM E-275
ρ (e): Glossmeters ^{FO} 20°	ρ (e): (0.4 to 92.1) Gloss Units	0.3 Gloss Units	Ceramic Research Gloss and Semi-Gloss Std. ASTM D-523
ρ (e): Glossmeters ^{FO} 60°	ρ (e): (4.4 to 94.9) Gloss Units	0.3 Gloss Units	
ρ (e): Glossmeters ^{FO} 85°	ρ (e): (17.6 to 99.8) Gloss Units	0.3 Gloss Units	
ρ (e): Gloss Tiles ^F 20°	ρ (e): (0.4 to 92.1) Gloss Units	0.3 Gloss Units	Elcometer 480T Glossmeter 20 / 60 / 85 ASTM D-523
ρ (e): Gloss Tiles ^F 60°	ρ (e): (4.4 to 94.9) Gloss Units	0.3 Gloss Units	
ρ (e): Gloss Tiles ^F 85°	ρ (e): (17.6 to 99.8) Gloss Units	0.3 Gloss Units	
E_v Illuminance ^O	120 lux to 3 000 lux	1.3 % of reading	LC-1 Meter
E_v Light Color ^O	2 856 K	15 K	NIST Special Pub 250-37
E (v) Light Meters ^F	120 lux to 3 000 lux	2 % of reading	LC-1 Meter, Optical Bench NIST Special Pub 250-37
E (λ) UV Spectral Radiance ^O	220 nm to 420 nm 0 W/m ² /nm to 2 W/m ² /nm	5 % of reading	UV Radiometer UVCN-20 CENAM Technical Guide

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Micrometers ^F	1.27 mm to 101.6 mm (0.05 in to 4 in)	0.8 μ m (0.032 μ m)	Gage Blocks Grade 0 ASME B89.1.13



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Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Calipers ^F	1.27 mm to 304.8 mm (0.05 in to 10 in)	10 μ m (0.39 μ in)	Gage Blocks Grade 0 ASME B89.1.14
Metal Rules ^F	10 mm to 1 000 mm	(0.1 + 1.2 x 10 ⁻⁴ L) mm	Vision System CENAM Technical Guide
Measuring Tape ^F	0.1 m to 5 m	1 mm	Chrome Rule ASME B89.1.7
Coating Thickness Gauge Ferrous Base ^F	12.5 μ m to 13 000 μ m	(1 + 3 x 10 ⁻⁴ L) μ m	Foil Thickness Standards ASTM D 7091p
Coating Thickness, Gauge Non-Ferrous Base ^F	12.5 μ m to 13 000 μ m	(1 + 3 x 10 ⁻⁴ L) μ m	Foil Thickness Standards ASTM E 376
Ultrasonic Thickness ^F Gauge ^F	2.5 mm to 25 mm	0.02 mm	Block Gages ASTM E797

Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Glass Thermometers ^{FO}	-80 °C to 0 °C	(0.02 + 1.39 x 10 ⁻³ T) °C	Liquid Bath, Standard Pt100 ASTM E1
	0 °C to 150 °C	(0.02 + 6.34 x 10 ⁻⁴ T) °C	
Thermocouple Type B, E, J, K, N, R, S, T ^{FO}	-80 °C to 0 °C	(0.1 + 4.2 x 10 ⁻⁴ T) °C	Liquid Bath, Standard Pt100 ASTM E230
	0 °C to 1 100 °C	(0.1 + 8.42 x 10 ⁻⁴ T) °C	Dry Block Thermocouple ASTM E230
Thermometer RTD ^{FO}	-80 °C to 0 °C	(0.02 + 2.04 x 10 ⁻⁴ T) °C	Liquid Bath, Dry Block, Standard Pt100 ASTM E1137
	0 °C to 400 °C	(0.02 + 1.02 x 10 ⁻⁴ T) °C	
Thermistor ^{FO}	-80 °C to 0 °C	(0.02 + 2.04 x 10 ⁻⁴ T) °C	Liquid Bath, Dry Block Standard Pt100 ITS-90
	0 °C to 300 °C	(0.02 + 1.02 x 10 ⁻⁴ T) °C	
Digital Thermometer ^{FO} (Indicator and Probe)	-80 °C to 0 °C	(0.02 + 2.04 x 10 ⁻⁴ T) °C	Liquid Bath, Dry Block Standard Pt100 Thermocouple EA Guide 13
	0 °C to 400 °C	(0.02 + 1.02 x 10 ⁻⁴ T) °C	
	400 °C to 1 100 °C	(0.1 + 8.42 x 10 ⁻⁴ T) °C	
Infrared Thermometer ^{FO}	100 °C to 400 °C	0.5 °C	Blackbody Source OMEGA BB703 CENAM Technical Guide



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Thermodynamic

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Hygrometer ^{FO}	30 % RH to 70 % RH	2 % RH	Digital Hygometer Lutron MHB-382SD CENAM Technical Guide

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 (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Weights F1, F2 M1, M2, M3 ^F	1 g	18 μ g	Double Substitution with Class E2 Weights, CENAM Technical Guide M01
	2 g	22 μ g	
	5 g	26 μ g	
	10 g	34 μ g	
	20 g	44 μ g	
	50 g	101 μ g	
	100 g	140 μ g	
	200 g	210 μ g	
	500 g	1.6 mg	
	1 kg	2.7 mg	
	2 kg	9.5 mg	
	5 kg	16 mg	
	10 kg	85 mg	
	20 kg	90 mg	
Balance ^{FO}	10 g to 2 000 g	$(1.34 + 2.2 \times 10^{-3}Wt)$ mg	F1 Weights SIM-MWG7 CENAM Technical Guide
	100 g to 20 kg	$(9.05 + 2.2 \times 10^{-3}Wt)$ mg	
Scales ^{FO}	1 kg to 200 kg	$(0.39 + 4.7 \times 10^{-5}Wt)$ g	M1 Weights SIM-MWG7 CENAM Technical Guide
Analytical Balances ^{FO}	1 mg to 20 g	$(0.017 + 2 \times 10^{-3}Wt)$ mg	E2 Weights SIM-MWG7 CENAM Technical Guide
	1 g to 200 g	$(0.15 + 1.5 \times 10^{-3}Wt)$ mg	
Force-Tension (Load Cell) ^F	900 N to 8 826 N	0.5 % of reading	Load Cell ISO 376
Dynamometer ^F	900 N to 8 826 N	0.5 % of reading	Load Cell ISO 7500
Pycnometer ^F	10 g/cm ³ to 100 g/cm ³	2 % of reading	Analytical Balance and GR-300 CENAM Technical Guide



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Chemical

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pH Meter Fixed Point ^{FO}	2 pH	0.02 pH	CRMs-pH Buffer Solution CENAM Technical Guide
	4 pH	0.01 pH	
	7 pH	0.01 pH	
	10 pH	0.01 pH	
Conductivity Meters Fixed Point ^{FO}	25 μ S	1.5 μ S	CRMs-Conductivity Solution CENAM Technical Guide
	1 015 μ S	5 μ S	
	12 850 μ S	45 μ S	
Dynamic Viscosity Rotational Meter ^{FO}	10 mPa.s to 30 000 mPa.s	0.4 % of reading	Cannon, Brookfield STD CENAM Technical Guide
Kinematic Viscosity Zahn, Ford, Din and ISO Cup ^{FO}	15 mm ² /s to 1 200 mm ² /s	0.8 % of reading	Cannon, Flow Time 20 s to 100 s ASTM D1200 ASTM D4212 ASTM D5125

Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Vacuum Gauge ^{FO}	-80 kPa to -0.8 kPa	0.5 % of reading	Digital Vacuum Gage OMEGA DPG8000-VAC CENAM Technical Guide
Pressure Gauge ^{FO}	0.4 MPa to 4 MPa	0.05 % of reading	Manometer Tek Know PM350 CENAM Technical Guide
Micropipettes ^F	1 μ L to 10 μ L	1.4 % of reading	Analytical Balance and AD4212B-101 CENAM Technical Guide
	10 μ L to 1000 μ L	0.12 % of reading	
Pipettes ^F	1 mL to 10 mL	0.08 % of reading	Analytical Balance and GR-300 CENAM Technical Guide
	10 mL to 100 mL	0.02 % of reading	
Burette ^F	100 mL to 2 000 mL	0.015 % of reading	Precision Balance and GF30K CENAM Technical Guide
Flask ^F	2 L to 20 L	0.007 % of reading	



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Time and Frequency

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Tachometer ^F	50 r/min to 25 000 r/min	$(1 + 1.1 \times 10^{-4}L)$ r/min	Tachometer Shimpo
Centrifuges ^{FO}	50 r/min to 25 000 r/min	$(1 + 1.1 \times 10^{-4}L)$ r/min	DT-205L CENAM Technical Guide

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 presence of a superscript O means that the laboratory performs calibration of the indicated parameter onsite at customer locations. Example: Outside Micrometer^O would mean that the laboratory performs this calibration onsite at the customer's location.
5. 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.
6. 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.
7. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
8. The term T represents temperature in °C or °F as appropriate to the uncertainty statement.
9. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.