



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Calidad MX, S.A. de C.V.

***Av. López Mateos # 1001, Local 203 Altos, Col. 21 de Enero
Guadalupe, Nuevo León, México C.P. 67160***

*(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, Optical, Chemical, Thermodynamic, Acoustic, Mechanical, Time
& Frequency, Mass, Force and Weighing Devices and 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

Initial Accreditation Date:

July 14, 2011

Issue Date:

February 21, 2024

Expiration Date:

February 28, 2026

Accreditation No.

70242

Certificate No.:

L24-156

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.pjllabs.com*



Certificate of Accreditation: Supplement

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Av. López Mateos # 1001, Local 203 Altos, Col. 21 de Enero

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Contact: Alejandro Lujan Phone: (52) 818-379-2710

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

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION OR MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Caliper ^{FO}	0.105 in to 24 in	$(7.7 + 1.1 \times 10^{-2}L) \mu\text{in}$	Mitutoyo Gage	CENAM Technical Guide
Micrometer ^{FO}	0.105 in to 24 in	$(5.82 \times 10^{-1} + 6 \times 10^{-6}L) \mu\text{in}$	Block, Grade 0	
Micrometer Heads ^F	2.6 mm to 25.4 mm	$(5.76 \times 10^{-4} + 6.1 \times 10^{-6}L) \text{ mm}$	Gage Block Grade 0	DIN-030 CEM
Coating Thickness Gauge ^{FO}	20 μm to 2 600 μm	$(5.78 \times 10^{-2} + 1.84 \times 10^{-1} L) \mu\text{m}$	Defelco Certified Thickness Standards	ASTM-D7091-13
Tape ^{FO}	50 m maximum	0.1 cm	Standard Tape	NOM-046-SCFI-1999
Rule ^{FO}	100 cm maximum	0.006 cm	Standard Rule Glass Microrule	NOM-040-SCFI-1994
Sieves ^F	45 μm to 13 200 μm	0.38 μm	Microscope Glass Microrule	ASTM E11-17
	16 mm to 125 mm	0.012 mm	Interior Caliper	ASTM E11-17
CMM ^O	Up to 1 000 mm	$(1.16 + 1 \times 10^{-6}L) \mu\text{m}$	Gage Blocks	ISO-10360-2
Height Gauges ^{FO}	Up to 609.6 mm	$(5.51 \times 10^{-3} + 3 \times 10^{-6}L) \text{ mm}$	Mitutoyo Gage Block Grade 0	DI-008 CEM
Height Master ^{FO}	Up to 304.8 mm	$(6.21 \times 10^{-4} + 1 \times 10^{-6}L) \text{ mm}$		
Angle Meter ^{FO}	Up to 90°	0.007°	Angle Block	DI-003 CEM
Granite Surface Plates Repeat Measurement	0.05 mm	1.2 μm	Repeat-O-Meter with Micro Indicator	DI-015 CEM
Roughness Tester ^{FO} Ra (Fixed point) Ry (Fixed point)	2.94 μm	0.08 μm	Roughness Specimen	DI-025 CEM
	9.3 μm	0.12 μm		
Dial Indicator ^{FO}	Up to 25.4 mm	$(4.7 + 4 \times 10^{-3}L) \mu\text{m}$	Head Micrometer	JIS B 7503
Optical Comparator Length ^O			Glass Reticules	DI-001 CEM
X Axis Linearity Y Axis linearity	1 mm to 200 mm 1 mm to 200 mm	$(9.87 \times 10^{-4} + 1 \times 10^{-6}L) \text{ mm}$ $(9.87 \times 10^{-4} + 1 \times 10^{-6}L) \text{ mm}$		
Optical Comparator Angularity ^O	Up to 90°	0.05°	Angular Block	DI-001 CEM
Microscopes ^{FO}	Up to 100 mm	$(1.51 \times 10^{-3} + 4.9 \times 10^{-5}L) \text{ mm}$	Glass Scale, Reticule	DI-006 CEM
Vision System ^O	Up to 200 mm	$(1.51 \times 10^{-3} + 4.9 \times 10^{-5}L) \text{ mm}$		
Pin Gauge ^F	0.152 mm to 25.4 mm	1.2 μm	Master Micrometer	DI-016 CEM
Tread Plugs Pitch Diameter ^F	0-40 to 4-12	1.4 μm	Wire with Micrometer	ASME B1.2
Feeler Gauge ^F	0.03 mm to 0.9 mm	1.3 μm	Micrometer Digital	JIS B 7524
Bore Gauges ^F	10 mm to 60 mm	$(6.84 \times 10^{-4} + 8.1 \times 10^{-6}L) \text{ mm}$	Ring Gauge Master	ASME B89.1.1.6



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Optical

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ρ (λ) Spectral Reflectance ^{FO} CIE L: CIE a*: CIE b*:	Color Values:		White Standard Tile	CENAM Technical Guide
	0 to 100	0.36 Units		
	-28 to 36	0.26 Units		
	-26 to 63	0.24 Units		
Spectrophotometers Transmittance ^{FO}	τ : 1 % to 95 %	0.27 % of reading	Neutral density Filters, Holmium Oxide Glass	
	λ : 230 nm to 700 nm	0.5 nm		
Gloss/Specular Reflectance Meter Angle of Incline ^{FO}	20° to 92.1° 60° to 94.9° 85° to 99.8°	0.5 Gloss Units 0.5 Gloss Units 0.5 Gloss Units	Ceram Research Gloss and Semi-Gloss Standards	ASTM D-523-14
Ev Illuminance ^O Light Booth	100 lux to 6 000 lux	1 % of reading	Luxmeter Minolta CL-200	NIST SP 250-37
Ev Light Color ^O Light Booth	2856 K	20 K		
Ev Light Meters ^F	100 lux to 6 000 lux	2 % of reading	Luxometer Minolta CL-200	CENAM Technical Guide

Chemical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION OR MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
pH Meters ^{FO}	4 pH to 10 pH	0.02 pH	SRM NIST Traceable, (Buffer, 4.01, 7.01, 10.01)	CENAM Technical Guide
Conductivity Meters Fixed Points ^{FO}	84 μ S/cm	1 μ S/cm	SRM NIST Traceable	
	1 413 μ S/cm	7 μ S/cm		
Turbidimeter ^{FO}	0.1 NTU to 100 NTU	0.5 NTU	HACH Standard	EPA Method 180.1
	100 NTU to 800 NTU	5 NTU		
Refractive Index ^{FO}	1 °Brix to 80 °Brix	0.55 % of reading	Sucrose Standards	OIML R-108



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Mechanical

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Burette ^F	10 mL	14 μ L	Analytical Balance AND HR200	CENAM Technical Guide	
	25 mL	35 μ L			
	50 mL	50 μ L			
Volumetric Pipettes and Pipettes ^F	1 mL	3.3 μ L			
	5 mL	3.3 μ L			
	10 mL	3.3 μ L			
	25 mL	5.3 μ L			
Micropipettes and Pipettes ^F	1 μ L	0.023 μ L			Micro Analytical Balance AND AD-4212B-PT Analytical Balance AND HR200
	2 μ L	0.023 μ L			
	5 μ L	0.059 μ L			
	10 μ L	0.051 μ L			
	20 μ L	0.042 μ L			
	50 μ L	0.015 μ L			
	100 μ L	0.015 μ L			
	200 μ L	0.083 μ L			
	500 μ L	0.32 μ L			
	1 000 μ L	0.32 μ L			
	2 000 μ L	0.32 μ L			
Graduated Cylinder ^F	25 mL	1.2 mL	Analytical Balance AND HR200 OHAUS SPX2202	CENAM Technical Guide	
	50 mL	1.2 mL			
	100 mL	1.2 mL			
	250 mL	1.2 mL			
	500 mL	1.2 mL			
	1 000 mL	1.2 mL			
	2 000 mL	1.2 mL			
Volumetric Flask ^F	10 mL	0.02 μ L			
	25 mL	0.02 μ L			
	50 mL	0.02 μ L			
	100 mL	0.03 mL			
	250 mL	0.07 mL			
	500 mL	0.08 mL			
	1 000 mL	0.15 mL			
	2 000 mL	0.33 mL			



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Containers ^F	10 L	0.34 mL	Analytical Balance AND HR200 OHAUS SPX2202	CENAM Technical Guide
	20 L	0.34 mL		
	200 L	1.7 mL		
Pressure Gauge Pressure Transducer ^{FO}	1 psi to 1 000 psi	0.6 % of reading	Digital Manometer Ametek EPC2000	
	1 000 psi to 10 000 psi	0.2 % of reading	Digital Manometer Adittel GP10K	
	0.02 H ₂ O to 280 in H ₂ O	0.02 % of reading	AMETEC EPC 2000	
Vacuum ^{FO} (Pressure Gauge Pressure Transducer)	-14 psi to 0 psi	0.02 % of reading		
Dynamic Viscosity Meters ^{FO}	0.1 Pa·s to 30 Pa·s	0.58 % of reading	Cannon Standard OIL	NMX-U-038-SCFI
Kinematic Viscosity Ford Cup No.4 ^{FO}	121.6 mm ² /s	1.4 % of reading		ASTM D4212 – 16
Kinematic Viscosity Zahn Cups No. 2 ^{FO}	48.75 mm ² /s	1.1 % of reading		
Kinematic Viscosity Zahn Cups No. 3 ^{FO}	42.37 mm ² /s	1.1 % of reading		
Kinematic Viscosity Zahn Cups No. 4 ^{FO}	32.57 mm ² /s	1.1 % of reading		
Torque Wrench Torque Transducer ^F	2 N·m to 500 N·m	1 % of reading	Torque Transducer CEDAR Mod. DIS-IP500 500 N·m	CENAM Technical Guide
Torque Wrench Torque Transducer ^F	2 N·m to 500 N·m	1 % of reading	Torque Transducer CEDAR Mod. DIS-IP500 500 N·m	CENAM Technical Guide
Torque Wrench Torque Transducer ^{FO}	0.1 N·m to 15 N·m	0.5 % of reading	Torque Transducer CEDAR Mod.	IM-CD150M
Indirect Verifications Hardness Tester HRC ^O	20 HRC to 30 HRC	0.42 HRC		
	30 HRC to 60 HRC	0.39 HRC		
	60 HRC to 70 HRC	0.38 HRC		



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Indirect Verifications Hardness Tester HRB ^O	40 HRB to 60 HRB	0.38 HRB	E18-16 Test Blocks	CENAM Technical Guide
	60 HRB to 80 HRB	0.36 HRB		
	80 HRB to 100 HRB	0.42 HRB		
Indirect Verifications Hardness Tester HB ^O	120 HB to 300 HB at 10/1 500 kgf	1.8 HB		
	300 HB to 600 HB at 10/3 000 kgf	6 HB		
Direct Verification of Durometer Hardness Tester ^F Types A, B, C, D, E, O, & DO Extension at zero reading Durometer Indentor Spring Types A, B, E & O Types C, D & DO	2.46 mm to 2.54 mm	3.7 μ m	Head Micrometer	ASTM D-2240
	0.55 N to 9.05 N 0.445 N to 44.45 N	1.4 N 1.4 N	Electronic Balance	

Time & Frequency

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	
Stopwatch ^F	60 s to 86 400 s	16 s/day	Direct Comparison Stopwatch, UTC	CENAM Technical Guide
Tachometer ^F	1 rev/min to 10 000 rev/min	0.2 % of reading	Tachometer	ASTM-F2046-00

Mass, Force and Weighting Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION OR MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Force Compression and Tension (Force Gages, Load Cell and Universal Machines) ^{FO}	1 N to 4 906 N	0.3 % of reading	Transducer Load Cell	CENAM Technical Guide
	4 906 N to 44 444 N	0.3 % of reading		
	44 444 N to 222 222 N	0.1 % of reading		
Analytical Balance ^{FO}	1 mg to 200 g (Res. = 0.1 mg)	($2 \times 10^{-4} + 5.21 \times 10^{-6}W_t$) g	OIML E2 Weights	



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Mass, Force and Weighting Devices

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Precision Balance ^{FO}	0.1 g to 10 000 g (Res = 0.01 g)	$(1.16 \times 10^{-2} + 3.35 \times 10^{-6}Wt) \text{ g}$	OIML F1 and M1 Weights	CENAM Technical Guide
Scale ^{FO}	5 kg to 200 kg (Res.= 1 g)	$(1.142 \text{ 9} + 2.45 \times 10^{-6}Wt) \text{ g}$	OIML M1 Weights	
Weighing Devices ^O	200 kg to 10 000 kg (Res.= 0.5 kg)	$(5.85 \times 10^{-1} + 3.1 \times 10^{-5}Wt) \text{ kg}$	OIML M2 Weights	
Mass Class F1, M1 Weights ^{FO}	0.1 g	0.05 mg	Class E2 and F1 Mass Micro and Analytical Balance Precision Balance (Res.= 0.01 g)	OIML R-111
	0.5 g	0.05 mg		
	1 g	0.13 mg		
	2 g	0.16 mg		
	5 g	0.18 mg		
	10 g	0.22 mg		
Mass Class F1, M1 Weights ^{FO} (Res.= 0.01 g)	20 g	0.28 mg	Class E2 and F1 Mass Analytical Balance Precision Balance	
	100 g	0.18 mg		
	200 g	0.34 mg		
	500 g	0.13 mg		
Mass Class M1, M2 Weights ^{FO} (Res.= 0.01 g)	1 kg	19 mg	Class F1 Mass Precision Balance	
	2 kg	35 mg		
	5 kg	150 mg		
Mass Class M2, M3 Weights ^{FO}	10 kg	580 mg	Class M1 Mass Balance	
	20 kg	580 mg		

Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION OR MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Temperature Measurement Thermocouple Type K ^{FO}	0 °C to 500 °C	0.24 °C	Fluke 724, Dry Well	NIST 250-35
	501 °C to 1 100 °C	0.24 °C		
Temperature Measurement Thermocouple Type J ^{FO}	0 °C to 500 °C	0.24 °C		
	501 °C to 1 100 °C	0.24 °C		



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Thermodynamic

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Temperature Measurement RTD Pt 100 ^{FO}	-80 °C to 420 °C	0.11 °C	Fluke 724 with Dry Well, Freezer, Dry Ice Bath Comparison	CENAM Technical Guide
Bimetallic Thermometer ^{FO}	-20 °C to 500 °C	1.2 °C	Fluke 724, Dry Well	NIST 250-35
Temperature Controllers ^{FO}	0 °C to 1 100 °C	0.5 °C		
IR Thermometer ^{FO}	50 °C to 500 °C	0.64 °C	Fluke 724 Dry Block Black Body (Temperature Generator)	CENAM Technical Guide
Temperature Generation: Ovens, Furnaces, Muffles, Freezers and Incubators ^{FO}	-20 °C to 0 °C	1.4 °C	Fluke 724	NIST 250-35
	0 °C to 25 °C	1.4 °C		
	25 °C to 100 °C	1.5 °C		
	100 °C to 450 °C	1.7 °C		
	450 °C to 900 °C	1.9 °C		
Relative Humidity Meter ^{FO}	11.3 % RH	1.5 % RH	Saturated Salt Solution	OIML R-121
	35 % RH	1.5 % RH		
	95 % RH	1.5 % RH		

Acoustic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION OR MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Sonometer ^{FO}	94 dB	0.7 dB	Acoustical Calibrator 1 kHz	ANSI S1.4
	114 dB	0.88 dB		

Electrical

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Equipment to Measure Resistance ^{FO}	0.1 Ω to 1 Ω	0.002 6 Ω	Process Calibrator Fluke 743 B	CENAM Technical Guide



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Equipment to Measure Resistance ^{FO}	1 Ω to 2 Ω	0.002 4 Ω	Process Calibrator Fluke 743 B	CENAM Technical Guide
	2 Ω to 5 Ω	0.002 5 Ω		
Equipment to Measure Resistance ^{FO}	5 Ω to 10 Ω	0.002 4 Ω	Process Calibrator Fluke743 B	CENAM Technical Guide
	10 Ω to 20 Ω	0.004 9 Ω		
	20 Ω to 50 Ω	0.007 Ω		
	50 Ω to 100 Ω	0.039 Ω		
	100 Ω to 200 Ω	0.017 Ω		
	200 Ω to 500 Ω	0.018 Ω		
	500 Ω to 1 000 Ω	0.9 Ω		
Equipment to Output DC Voltage ^{FO}	100 mV to 1 V	0.001 8 V	Fluke 5500A Multimeter	
	1 V to 10 V	0.002 V		
	10 V to 100 V	0.003 V		
	100 V to 1 000 V	0.048 V		
Equipment to Output AC Voltage At the listed frequencies 50 Hz to 1 kHz ^{FO}	0.001 V to 750 V	0.13 V		
Equipment to Output AC Current At the listed frequencies 10 Hz to 900 Hz ^{FO}	0.01 A to 3 A	0.001 3 A		
	3 A to 10 A	0.024 A		
Equipment to output DC Current ^{FO}	0.000 01 mA to 9.999 9 mA	0.001 9 mA		
	10 mA to 99.999 mA	0.006 8 mA		
	100 mA to 1 A	0.006 9 mA		
	1 A to 3 A	0.000 7 A		
	3 A to 10 A	0.006 8 A		
Equipment to Output Resistance ^{FO}	Up to 100 Ω	0.01 % of reading + 0.004 range	Agilent Multimeter 34401A	Procedure EL-024 Procedure EL-025
	100 Ω to 1 k Ω	0.01 % of reading + 0.001 range		
	1 k Ω to 10 k Ω	0.01 % of reading + 0.001 range		
	10 k Ω to 100 k Ω	0.01 % of reading + 0.001 range		
	100 k Ω to 1 M Ω	0.01 % of reading + 0.001 range		
	1 M Ω to 10 M Ω	0.04 % of reading + 0.001 range		
	10 M Ω to 100 M Ω	0.8 % of reading + 0.01 range		



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Electrical Current Derivator (Shunt) ^{FO}	10 A to 150 A	0.007 9 A	Fluke 5500A Multimeter	CENAM Technical Guide
Equipment to Output AC High Voltage (Hy-Pot) ^O	1 kV to 6 kV	0.38 kV	Fluke 177 Multimeter	
Equipment to Output DC High Voltage (Hy-Pot) ^O	1 kV to 6 kV	0.1 kV	Fluke 177 Multimeter Fluke 80K-40	
Equipment to Measurement Resistance ^{FO}	100 Ω	0.03 Ω	Megabox Resistance	
	500 Ω	0.18 Ω		
	1 k Ω	0.014 k Ω		
	10 k Ω	0.022 k Ω		
	100 k Ω	0.02 k Ω		
	1 M Ω	0.015 M Ω		
	10 M Ω	0.023 M Ω		
	100 M Ω	0.022 M Ω		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type E	-130 °C to 800 °C	0.89 °C	Fluke 5500A Electrical Simulation of Thermocouple Output	
	-60 °C to 1 000 °C	0.26 °C		
	-40 °C to 1 200 °C	0.77 °C		
	-140 °C to 130 °C	1.2 °C		
Equipment to Measurement DC Voltage ^{FO}	0 mV to 329.99 mV	0.006 % of reading + 3 μ V	Fluke 5500A Multicalibrator	
	329.99 mV to 3.299 V	0.005 % of reading + 5 μ V		
	3.299 V to 32.999 V	0.005 % of reading + 50 μ V		
	30 V to 329.99 V	0.005 5 % of reading + 500 μ V		
	100 V to 1 020 V	0.005 5 % of reading + 1 500 μ V		
Equipment to Measurement DC Current ^{FO}	Up to 3.299 99 mA	0.013 % of reading + 0.05 μ A	Fluke 5500A Multicalibrator	
	3.299 99 mA to 32.999 9 mA	0.01 % of reading + 0.25 μ A		
	32.999 9 mA to 329.999 mA	0.01 % of reading + 3.3 μ A		
	329.999 mA to 2.199 99 A	0.03 % of reading + 44 μ A		
	2.199 99 A to 11 A	0.06 % of reading+ 330 μ A		
Equipment to Measure Resistance ^{FO}	0 Ω to 10.999 Ω	0.012 % of reading + 0.008 Ω	Fluke 5500A Multicalibrator	
	11 Ω to 32.999 Ω	0.012 % of reading + 0.001 5 Ω		
	33 Ω to 109.999 Ω	0.009 % of reading + 0.001 5 Ω		



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Calidad Mx, S.A. de C.V.

Av. López Mateos # 1001, Local 203 Altos, Col. 21 de Enero
 Guadalupe, Nuevo León, México C.P. 67160
 Contact: Alejandro Lujan Phone: (52) 818-379-2710

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

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION OR MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Equipment to Measure Resistance ^{FO}	110 Ω to 329.999 Ω	0.009 % of reading + 0.001 5 Ω	Fluke 5500A Multicalibrator	CENAM Technical Guide
	330 Ω to 1.099 99 k Ω	0.009 % of reading + 0.06 Ω		
	1.1 k Ω to 3.299 99 k Ω	0.009 % of reading + 0.06 Ω		
	3.3 k Ω to 10.999 9 k Ω	0.009 % of reading + 0.6 Ω		
	11 k Ω to 32.999 9 k Ω	0.009 % of reading + 0.6 Ω		
	33 k Ω to 109.999 k Ω	0.011 % of reading + 6 Ω		
	110 k Ω to 329.999 k Ω	0.012 % of reading + 6 Ω		
	330 k Ω to 1.099 99 M Ω	0.015 % of reading + 55 Ω		
	1.1 M Ω to 3.299 99 M Ω	0.015 % of reading + 55 Ω		
	3.3 M Ω to 10.999 9 M Ω	0.06 % of reading + 550 Ω		
	11 M Ω to 32.999 9 M Ω	0.1 % of reading + 550 Ω		
	33 M Ω to 109.999 M Ω	0.5 % of reading + 5 500 Ω		
110 M Ω to 330 M Ω	0.5 % of reading + 16 500 Ω			
Equipment to Measure AC Voltage At the listed frequencies ^{FO}				
10 Hz to 45 Hz	1 mV to 32.999 mV	0.35 % of reading + 20 μ V		
45 kHz to 10 kHz	1 mV to 32.999 mV	0.15 % of reading + 20 μ V		
10 kHz to 20 kHz	1 mV to 32.999 mV	0.2 % of reading + 20 μ V		
20 kHz to 50 kHz	1 mV to 32.999 mV	0.25 % of reading + 20 μ V		
50 kHz to 100 kHz	1 mV to 32.999 mV	0.35 % of reading + 33 μ V		
100 kHz to 500 kHz	1 mV to 32.999 mV	1 % of reading + 60 μ V		
Equipment to Measure AC Voltage At the listed frequencies ^{FO}				
10 Hz to 45 Hz	33 mV to 329.999 mV	0.25 % of reading + 50 μ V		
45 kHz to 10 kHz	33 mV to 329.999 mV	0.05 % of reading + 20 μ V		
10 kHz to 20 kHz	33 mV to 329.999 mV	0.1 % of reading + 20 μ V		
20 kHz to 50 kHz	33 mV to 329.999 mV	0.16 % of reading + 40 μ V		
50 kHz to 100 kHz	33 mV to 329.999 mV	0.24 % of reading + 170 μ V		
100 kHz to 500 kHz	33 mV to 329.999 mV	0.7 % of reading + 330 μ V		
Equipment to Measure AC Voltage At the listed frequencies ^{FO}				
10 Hz to 45 Hz	0.33 V to 3.299 99 V	0.15 % of reading + 250 μ V		



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Equipment to Measure AC Voltage At the listed frequencies ^{FO}			Fluke 5500A Multicalibrator	CENAM Technical Guide
45 kHz to 10 kHz	0.33 V to 3.299 99 V	0.03 % of reading + 60 μ V		
10 kHz to 20 kHz	0.33 V to 3.299 99 V	0.08 % of reading + 60 μ V		
20 kHz to 50 kHz	0.33 V to 3.299 99 V	0.14 % of reading + 300 μ V		
50 kHz to 100 kHz	0.33 V to 3.299 99 V	0.24 % of reading + 1 700 μ V		
100 kHz to 500 kHz	0.33 V to 3.299 99 V	0.5 % of reading + 3 300 μ V		
Equipment to Measure AC Voltage At the listed frequencies ^{FO}				
10 Hz to 45 Hz	3.3 V to 32.999 9 V	0.15 % of reading + 2 500 μ V		
45 kHz to 10 kHz	3.3 V to 32.999 9 V	0.04 % of reading + 600 μ V		
10 kHz to 20 kHz	3.3 V to 32.999 9 V	0.08 % of reading + 2 600 μ V		
20 kHz to 50 kHz	3.3 V to 32.999 9 V	0.19 % of reading + 5 000 μ V		
50 kHz to 100 kHz	3.3 V to 32.999 9 V	0.24 % of reading + 17 000 μ V		
Equipment to Measure AC Voltage At the listed frequencies ^{FO}				
45 Hz to 1 kHz	33 V to 329.999 9 V	0.05 % of reading + 6 600 μ V		
1 kHz to 10 kHz	33 V to 329.999 9 V	0.08 % of reading + 15 000 μ V		
10 kHz to 20 kHz	33 V to 329.999 9 V	0.09 % of reading + 33 000 μ V		
Equipment to Measure AC Voltage At the listed frequencies ^{FO}				
45 Hz to 1 kHz	330 V to 1 020 V	0.05 % of reading + 80 000 μ V		
1 kHz to 5 kHz	330 V to 1 020 V	0.2 % of reading + 100 000 μ V		
5 kHz to 10 kHz	330 V to 1 020 V	0.2 % of reading + 500 000 μ V		
Equipment to Measure AC Current At the listed frequencies ^{FO}				
10 Hz to 20 Hz	0.029 mA to 0.329 99 mA	0.25 % of reading + 0.15 μ A		
20 Hz to 45 Hz	0.029 mA to 0.329 99 mA	0.13 % of reading + 0.15 μ A		
45 Hz to 1 kHz	0.029 mA to 0.329 99 mA	0.13 % of reading + 0.25 μ A		
1 kHz to 5 kHz	0.029 mA to 0.329 99 mA	0.4 % of reading + 0.15 μ A		
5 kHz to 10 kHz	0.029 mA to 0.329 99 mA	1.3 % of reading + 0.15 μ A		



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Equipment to Measure AC Current At the listed frequencies ^{FO}			Fluke 5500A Multicalibrator	CENAM Technical Guide
10 Hz to 20 Hz	0.33 mA to 3.299 9 mA	0.2 % of reading + 0.3 μ A		
20 Hz to 45 Hz	0.33 mA to 3.299 9 mA	0.1 % of reading + 0.3 μ A		
45Hz to 1 kHz	0.33 mA to 3.299 9 mA	0.1 % of reading + 0.3 μ A		
1 kHz to 5 kHz	0.33 mA to 3.299 9 mA	0.2 % of reading + 0.3 μ A		
5 kHz to 10 kHz	0.33 mA to 3.299 9 mA	0.6 % of reading + 0.3 μ A		
Equipment to Measure AC Current At the listed frequencies ^{FO}				
10 Hz to 20 Hz	3.3 mA to 32.999 9 mA	0.2 % of reading + 3 μ A		
20 Hz to 45 Hz	3.3 mA to 32.999 9 mA	0.1 % of reading + 3 μ A		
45Hz to 1 kHz	3.3 mA to 32.999 9 mA	0.09 % of reading + 3 μ A		
1 kHz to 5 kHz	3.3 mA to 32.999 9 mA	0.2 % of reading + 3 μ A		
5 kHz to 10 kHz	3.3 mA to 32.999 9 mA	0.6 % of reading + 3 μ A		
Equipment to Measure AC Current At the listed frequencies ^{FO}				
10 Hz to 20 Hz	33 mA to 329.999 mA	0.2 % of reading + 30 μ A		
20 Hz to 45 Hz	33 mA to 329.999 mA	0.1 % of reading + 30 μ A		
45Hz to 1 kHz	33 mA to 329.999 mA	0.09 % of reading + 30 μ A		
1 kHz to 5 kHz	33 mA to 329.999 mA	0.2 % of reading + 30 μ A		
5 kHz to 10 kHz	33 mA to 329.999 mA	0.6 % of reading + 30 μ A		
Equipment to Measure AC Current At the listed frequencies ^{FO}				
10 Hz to 45 Hz	0.33 A to 2.199 99 A	0.2 % of reading + 300 μ A		
45 Hz to 1 kHz	0.33 A to 2.199 99 A	0.1 % of reading + 300 μ A		
1 kHz to 5 kHz	0.33 A to 2.199 99 A	0.75 % of reading + 300 μ A		
Equipment to Measure AC Current At the listed frequencies ^{FO}				
45 Hz to 65 Hz	2.2 A to 11 A	0.06 % of reading + 2 000 μ A		
65 Hz to 500 Hz	2.2 A to 11 A	0.1 % of reading + 2 000 μ A		
500 Hz to 1 kHz	2.2 A to 11 A	0.33 % of reading + 2 000 μ A		



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Equipment to Measure Capacitance ^{FO}	0.33 nF to 0.4999 nF	0.5 % of reading + 0.01 pF	Fluke 5500A Multicalibrator Eurament_cg-11	Eurament_cg-11 CENAM Technical Guide
	0.5 nF to 1.0999nF	0.5 % of reading + 0.01 pF		
	1.1 nF to 3.2999 nF	0.5 % of reading + 0.01 pF		
	3.3 nF to 10.999nF	0.5 % of reading + 0.01 pF		
	11 nF to 32.999 nF	0.25 % of reading + 0.1 pF		
	33 nF to 109.99 nF	0.25 % of reading + 0.1 pF		
	110 nF to 329.99 nF	0.25 % of reading + 0.3 pF		
	0.33 μ F to 1.0999 μ F	0.25 % of reading + 1 pF		
	1.1 μ F to 3.2999 μ F	0.35 % of reading + 3 pF		
	3.3 μ F to 10.999 μ F	0.35 % of reading + 10 nF		
	11 μ F to 32.999 μ F	0.4 % of reading + 30 nF		
	33 μ F to 109.99 μ F	0.5 % of reading + 100 nF		
	110 μ F to 329.99 μ F	0.7 % of reading + 300 nF		
0.33 mF to 1.1 mF	1 % of reading + 300 nF			
Equipment to Measure Frequency ^{FO}	0.01 Hz to 119.99 Hz	0.000 025 Hz		
	120 Hz to 1199.9 Hz	0.000 025 Hz		
	1.2 kHz to 11.999 kHz	0.016 Hz		
	12 kHz to 119.99 kHz	0.016 Hz		
	120 kHz to 1199.9 kHz	0.016 Hz		
1.2 MHz to 2 MHz	0.016 Hz			
Temperature Calibration Indication and Control Equipment used with Thermocouple Type B ^{FO}	600 °C to 800 °C	0.44 °C	Fluke 5500A Multicalibrator Electrical Simulation of Thermocouple Output	
	800 °C to 1 000 °C	0.34 °C		
	1 000 °C to 1 550 °C	0.3 °C		
	1 550 °C to 1 820 °C	0.33 °C		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type C ^{FO}	0 °C to 150 °C	0.3 °C		
	150 °C to 650 °C	0.26 °C		
	650 °C to 1 000 °C	0.31 °C		
	1 000 °C to 1 800 °C	0.5 °C		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type E ^{FO}	1 800 °C to 2 316 °C	0.84 °C		
	-250 °C to -100 °C	0.5 °C		
	-100 °C to -25 °C	0.16 °C		
	-25 °C to 350 °C	0.14 °C		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type E ^{FO}	350 °C to 650 °C	0.16 °C		
	650 °C to 1 000 °C	0.21 °C		



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Temperature Calibration Indication and Control Equipment used with Thermocouple Type J ^{FO}	-210 °C to -100 °C	0.27 °C	Fluke 5500A Multicalibrator Electrical Simulation of Thermocouple Output	Eurament cg-11 CENAM Technical Guide
	-100 °C to -30 °C	0.16 °C		
	-30 °C to 150 °C	0.14 °C		
	150 °C to 760 °C	0.17 °C		
	760 °C to 1 200 °C	0.23 °C		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type K ^{FO}	-200 °C to -100 °C	0.33 °C		
	-100 °C to -25 °C	0.18 °C		
	-25 °C to 120 °C	0.16 °C		
	120 °C to 1 000 °C	0.26 °C		
	1 000 °C to 1 372 °C	0.4 °C		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type L ^{FO}	-200 °C to -100 °C	0.37 °C		
	-100 °C to 800 °C	0.26 °C		
	800 °C to 900 °C	0.17 °C		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type N ^{FO}	-200 °C to -100 °C	0.4 °C		
	-100 °C to -25 °C	0.22 °C		
	-25 °C to 120 °C	0.19 °C		
	120 °C to 410 °C	0.18 °C		
	410 °C to 1 300 °C	0.27 °C		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type R ^{FO}	0 °C to 250 °C	0.57 °C		
	250 °C to 400 °C	0.35 °C		
	400 °C to 1 000 °C	0.33 °C		
	1 000 °C to 1 767 °C	0.4 °C		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type S ^{FO}	0 °C to 250 °C	0.47 °C		
	250 °C to 1 000 °C	0.36 °C		
	1 000 °C to 1 400 °C	0.37 °C		
	1 400 °C to 1 767 °C	0.46 °C		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type T ^{FO}	-250 °C to -150 °C	0.63 °C		
	-150 °C to 0 °C	0.24 °C		
	0 °C to 120 °C	0.16 °C		
	120 °C to 400 °C	0.14 °C		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type U ^{FO}	-200 °C to 0 °C	0.56 °C		
	0 °C to 600 °C	0.27 °C		



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Temperature Calibration Indication and Control Equipment used with RTD Pt 385, 100 Ω^{FO}	-200 °C to -80 °C	0.05 °C	Fluke 5500A Multicalibrator Electrical Simulation of RTD Output	Eurament_cg-11 CENAM Technical Guide
	-80 °C to 0 °C	0.05 °C		
	0 °C to 100 °C	0.07 °C		
	100 °C to 300 °C	0.09 °C		
	300 °C to 400 °C	0.1 °C		
	400 °C to 630 °C	0.12 °C		
	630 °C to 800 °C	0.23 °C		
Temperature Calibration Indication and Control Equipment used with RTD Pt 3926, 100 Ω^{FO}	-200 °C to -80 °C	0.05 °C		
	-80 °C to 0 °C	0.05 °C		
	0 °C to 100 °C	0.07 °C		
	100 °C to 300 °C	0.09 °C		
	400 °C to 630 °C	0.12 °C		
Temperature Calibration Indication and Control Equipment used with RTD Pt 3916, 100 Ω^{FO}	-200 °C to -190 °C	0.25 °C		
	-190 °C to -80 °C	0.04 °C		
	-80 °C to 0 °C	0.05 °C		
	0 °C to 100 °C	0.06 °C		
	100 °C to 260 °C	0.07 °C		
	260 °C to 300 °C	0.08 °C		
	300 °C to 400 °C	0.09 °C		
	400 °C to 600 °C	0.1 °C		
Temperature Calibration Indication and Control Equipment used with RTD Pt 385, 200 Ω^{FO}	-200 °C to -80 °C	0.04 °C		
	-80 °C to 0 °C	0.04 °C		
	0 °C to 100 °C	0.04 °C		
	100 °C to 260 °C	0.05 °C		
	260 °C to 300 °C	0.12 °C		
	300 °C to 400 °C	0.13 °C		
	400 °C to 600 °C	0.14 °C		
	600 °C to 630 °C	0.16 °C		
Temperature Calibration Indication and Control Equipment used with RTD Pt 385, 500 Ω^{FO}	-200 °C to -80 °C	0.04 °C		
	-80 °C to 0 °C	0.05 °C		
	0 °C to 100 °C	0.05 °C		



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Temperature Calibration Indication and Control Equipment used with RTD Pt 385, 500 Ω^{FO}	100 °C to 260 °C	0.06 °C	Fluke 5500A Multicalibrator Electrical Simulation of RTD Output	Eurament_cg-11 CENAM Technical Guide
	260 °C to 300 °C	0.08 °C		
	300 °C to 400 °C	0.08 °C		
	400 °C to 600 °C	0.09 °C		
	600 °C to 630 °C	0.11 °C		
Temperature Calibration Indication and Control Equipment used with RTD Pt 385, 1 000 Ω^{FO}	-200 °C to -80 °C	0.03 °C		
	-80 °C to 0 °C	0.03 °C		
	0 °C to 100 °C	0.04 °C		
	100 °C to 260 °C	0.05 °C		
	260 °C to 300 °C	0.06 °C		
	300 °C to 400 °C	0.07 °C		
Temperature Calibration Indication and Control Equipment used with RTD Pt Ni 385, 120 Ω^{FO}	400 °C to 600 °C	0.07 °C		
	600 °C to 630 °C	0.23 °C		
	-80 °C to 0 °C	0.08 °C		
	0 °C to 100 °C	0.08 °C		
Temperature Calibration Indication and Control Equipment used with RTD Pt Cu 427, 10 Ω^{FO}	100 °C to 260 °C	0.14 °C		
	-100 °C to 260 °C	0.3 °C		
Equipment to Output AC Voltage ^{FO}	Up to 100 mV	0.005 % of reading + 0.003 5 % range	Agilent Multimeter 34401A	EL-024, EL-025
	100 mV to 1 V	0.004 % of reading + 0.000 7 % range		
	1 V to 10 V	0.003 5 % of reading + 0.000 5 % range		
	10 V to 100 V	0.004 5 % of reading + 0.000 6 % range		
	100 V to 1 000 V	0.004 5 % of reading + 0.001 % range		
Equipment to Output AC Voltage At the listed frequencies ^{FO}				
3 Hz to 5 Hz	Up to 100 mV	1 % of reading + 0.04 range		
5 Hz to 10 Hz	Up to 100 mV	0.35 % of reading + 0.04 range		
10 Hz to 20 kHz	Up to 100 mV	0.06 % of reading + 0.04 range		



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Equipment to Output AC Voltage At the listed frequencies ^{FO}			Agilent Multimeter 34401A	EL-024, EL-025
20 kHz to 50 kHz	Up to 100 mV	0.12 % of reading + 0.04 range		
50 kHz to 100 kHz	Up to 100 mV	0.6 % of reading + 0.08 range		
100 kHz to 300 kHz	Up to 100 mV	4 % of reading + 0.5 range		
Equipment to Output AC Voltage At the listed frequencies ^{FO}			Agilent Multimeter 34401A	EL-024, EL-025
3 Hz to 5 Hz	1 V to 750 V	1 % of reading + 0.03 range		
5 Hz to 10 Hz	1 V to 750 V	0.35 % of reading + 0.03 range		
10 Hz to 20 kHz	1 V to 750 V	0.06 % of reading + 0.03 range		
20 kHz to 50 kHz	1 V to 750 V	0.12 % of reading + 0.04 range		
50 kHz to 100 kHz	1 V to 750 V	0.6 % of reading + 0.08 range		
100 kHz to 300 kHz	1 V to 750 V	4 % of reading + 0.5 range		
Equipment to Voltage Direct Current ^{FO}				
Up to 10 mA		0.05 % of reading + 0.02 range		
10 mA to 100 mA		0.05 % of reading + 0.005 range		
100 mA to 1 A		0.1 % of reading + 0.01 range		
1 A to 3 A		0.12 % of reading + 0.02 range		
Equipment to Output AC Current At the listed frequencies ^{FO}				
3 Hz to 5 Hz	Up to 1 A	1 % of reading + 0.04 range		
5 Hz to 10 Hz	Up to 1 A	0.3 % of reading + 0.04 range		
10 Hz to 5 kHz	Up to 1 A	0.1 % of reading + 0.04 range		
Equipment to Output AC Current At the listed frequencies ^{FO}				
3 Hz to 5 Hz	Up to 3 A	1.1 % of reading + 0.06 range		
5 Hz to 10 Hz	Up to 3 A	0.35 % of reading + 0.06 range		
10 Hz to 5 kHz	Up to 3 A	0.15 % of reading + 0.06 range		
Equipment to Output Frequency ^{FO}				
3 Hz to 5 Hz		0.1 % of reading		
5 Hz to 10 Hz		0.05 % of reading		
10 Hz to 40 Hz		0.03 % of reading		
40 Hz to 300 KHz		0.01 % of reading		



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

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.
4. The presence of a superscript O means that the laboratory performs calibration of the indicated parameter onsite at customer locations.
5. 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.
6. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
7. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.