



# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

## *Certificate of Accreditation*

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

***Laboratorio de Precisión, S.A. de C.V.***  
***Horizonte #28, entre Astro Rey Sur y Nuevo Amanecer***  
***Matamoros, Tamaulipas, México. C.P 87314***

*(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, Mechanical, Electrical, Thermodynamic, Acoustic, Optical, Chemical, Time and 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

<i>Initial Accreditation Date:</i>	<i>Issue Date:</i>	<i>Expiration Date:</i>
October 31, 2003	November 07, 2024	November 30, 2026

<i>Accreditation No.</i>	<i>Certificate No.:</i>
40937	L24-859

*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.pjilabs.com](http://www.pjilabs.com)*



# Certificate of Accreditation: Supplement

## Laboratorio de Precisión, S.A. de C.V.

Horizonte #28 entre Astro Rey Sur y Amanecer  
 Matamoros, Tamaulipas, México C.P. 87314  
 Contact Name: Aaron Lucio Phone: 868-810-2272

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

### Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Caliper Check <sup>F</sup>	0.001 mm to 1 100 mm	$(0.0041 + 1.7 \times 10^{-4}L)$ mm	Vision Meter System	DI-08 Internal Procedure
Calipers <sup>F</sup>	Up to 300 mm	$(27.4 + 0.11L)$ $\mu$ m	Gage Blocks Universal Length Machine	DI-01 Internal Procedure
	301 mm to 1 900 mm	$(42.2 + 0.15L)$ $\mu$ m		
CMM -Linearity <sup>O</sup>	750 mm to 2 250 mm	$(0.035 + 2.25 \times 10^{-3}L)$ mm	Block Gauge, Caliper Check, Square, Ball Bar	ASME B89.4.1 DI-22 Internal Procedure
Depth Micrometer <sup>FO</sup>	0.01 mm to 500 mm	$(0.022 + 2.1 \times 10^{-4}L)$ mm	Block Gauge	DI-05 Internal Procedure
Dial/ Digital Thickness Gage <sup>FO</sup>	0.001 mm to 500 mm	$(0.008 1 + 8.3 \times 10^{-5}L)$ mm	Dial Gage Tester Block Gauge	DI-12 Internal Procedure
Gage Blocks <sup>FO</sup>	0 .5 mm to 100 mm	$(0.028 + 2.7 \times 10^{-4}L)$ mm	CMM, Blocks Comparator, Micrometer, Block Gauge	DI-06 Internal Procedure
	100 mm to 500 mm	$(0.46 + 3.5 \times 10^{-4}L)$ mm		
	501 mm to 1 100 mm	$(0.004 1 + 2.1 \times 10^{-4}L)$ mm	Vision Meter System	DI-08 Internal Procedure
	1 101 mm to 3 000 mm	$(0.004 1 + 3.4 \times 10^{-4}L)$ mm	ULM	
Glass Ruler <sup>F</sup>	0.1 mm to 1 100 mm	$(4.2 \times 10^{-3} + 4.8 \times 10^{-3}L)$ mm	Vision Meter System	DI-20 Internal Procedure
Height Gage <sup>FO</sup>	0.01 mm to 600 mm	$(0.003 + 3 \times 10^{-4}L)$ mm	Block Gauge, Caliper Check	DI-07 Internal Procedure
Master Height Gage <sup>F</sup>	0.001 mm to 600 mm	$(0.002 + 1.4 \times 10^{-4}L)$ mm	CMM	DI-08 Internal Procedure
Outside Micrometer <sup>F</sup>	0.001 mm to 500 mm	$(0.005 6 + 1.7 \times 10^{-4}L)$ mm	Block Gauge	DI-02 Internal Procedure
Micrometer Head <sup>F</sup>	0.001 mm to 50 mm	$(0.005 6 + 1.7 \times 10^{-4}L)$ mm		
Bi-Directional Dial Indicators <sup>F</sup>	0.3 $\mu$ m to 100 mm	$(0.03 + 0.1L)$ $\mu$ m	Universal Dial Calibrator	DI-12 Internal Procedure
Microscope-Reticule <sup>O</sup>	0.001 mm to 600 mm	$(0.002 4 + 3.7 \times 10^{-4}L)$ mm	Glass Ruler and Palatine	DI-16 Internal Procedure
Microscope-Magnification <sup>O</sup>	200 X Only	2.4 % of reading		
Optical Comparator – Linear <sup>O</sup>	150 mm to 600 mm	$(0.002 4 + 3.7 \times 10^{-4}L)$ mm	Glass Ruler, Block Gauge, Angle Gauge	DI-18 Internal Procedure
Optical Comparator – Angle <sup>O</sup>	0° to 360°	2°		
Optical Comparator – Magnification <sup>O</sup>	200 X Only	2.4 % of reading		



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Parallels <sup>F</sup>	25 mm to 600 mm	$(0.002\ 2 + 1.4 \times 10^{-3}L)$ mm	Optical Comparator, Touch Probe	DI-11 Internal Procedure
Pin Gages <sup>F</sup>	0.5 mm to 100 mm	$(0.046 + 3.5 \times 10^{-4}D)$ mm	Micrometer	DI-25 Internal Procedure
Surface Plate, Repeat Measurement Only <sup>O</sup>	150 mm to 2 250 mm Diagonal	1.7 $\mu$ m	Repeat Reading Gage with Electronic Indicator	DI-10 Internal Procedure
Thickness Sensor (Electronic, Ultrasonic, & Magnetic) <sup>F</sup>	25 $\mu$ m to 2 000 $\mu$ m	$(0.005\ 8 + 9.8 \times 10^{-3}L)$ mm	Coatings Thickness Plates, Block Gages & Master Gage Plates	DI-19 Internal Procedure
Pitch Diameter Thread Gage <sup>F</sup>	(M1.6 x 0.35 to M39 x 4)	$(0.07 + 0.011D)$ mm	Thread Wire, Super Micrometer	DI-14 Internal Procedure
Rules <sup>F</sup>	150 mm to 5 000 mm	$(0.005\ 8 + 9.8 \times 10^{-3}L)$ mm	Steel Ruler, Flex Meter and Vision Meter	DI-04 Internal Procedure
Angle Blocks <sup>F</sup>	0° to 90°	0.18°	Protractor, CMM and Optical Comparator	DI-15 Internal Procedure
Angle Meter - Protractor <sup>F</sup>	0° to 180°	0.18°	Angle Gauge, CMM	DI-13 Internal Procedure
Inside Micrometer <sup>FO</sup>	20 mm to 300 mm	$(5.3 + 4.05 \times 10^{-2}L)$ $\mu$ m	Caliper Check	DI-19 Internal Procedure
Measurement Tape Error of Indication <sup>F</sup>	1 m to 50 m	$(0.058 + 1.29 \times 10^{-4}L)$ mm	Flex Meter, Steel Ruler	DI-04 Internal Procedure
Radius Gages <sup>F</sup>	0.5 mm to 1 000 mm	$(0.053 + 9.7 \times 10^{-4}L)$ mm	CMM, Optical Comparator	DI-17, DI-03 Internal Procedures
Ring Gages <sup>F</sup>	5 mm to 1 000 mm	$(0.048 + 1.02 \times 10^{-3}L)$ mm		
Roughness Block Ra <sup>F</sup>	1.68 $\mu$ m to 6.3 $\mu$ m	0.56 $\mu$ m	Surface Roughness Tester	DI-23 Internal Procedure
Roughness Block Rz <sup>F</sup>	2.76 $\mu$ m to 25 $\mu$ m	0.92 $\mu$ m		
Roughness Tester Ra <sup>F</sup>	0.49 $\mu$ m to 5.82 $\mu$ m	$(1.12 \times 10^{-1} + 7.69 \times 10^{-2}L)$ $\mu$ m	Roughness Master Block Set	
Roughness Tester Rz <sup>F</sup>	0.5 $\mu$ m to 11.4 $\mu$ m	$(0.14 + 6.2 \times 10^{-3}L)$ $\mu$ m		
	11.4 $\mu$ m to 23.6 $\mu$ m	$(0.77 + 6.6 \times 10^{-3}L)$ $\mu$ m		
Sphere Gages <sup>F</sup>	1 mm to 100 mm	$(0.052 + 9.8 \times 10^{-4}L)$ mm	CMM	DI-24 Internal Procedure
Thickness Foils <sup>F</sup>	0.1 $\mu$ m to 25 mm	$(0.25 + 0.08L)$ $\mu$ m	Universal Length Sensor	DI-08 Internal Procedure / JIS B 7524



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Laser Micrometers & Z Mike <sup>F</sup>	0.1 mm to 50 mm	$(0.05 + 0.01L) \mu\text{m}$	Master Pin Set	DI-02 Internal Procedure
Thread Ring Gage Pitch Diameter <sup>F</sup>	M 1.6 x 0.35 to M 100 x 6 0-80 to 4-10	$(2.3 + 2 \times 10^{-3}D) \mu\text{m}$ $(87 + 2D) \mu\text{in}$	ULM	DI-14 Internal Procedure

### Mass, Force and Weighing Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Weighing Devices	1 mg to 0.05 kg (Res.= 1 mg)	$(0.103 + 0.28Wt) \text{ mg}$	Class F Weights and Weight Set	NIST Handbook 44 MF-03 Internal Procedure
	0.05 kg to 1 kg (Res.= 1 g)	$(11.252 + 0.702Wt) \text{ mg}$		
	1 kg to 50 kg (Res.= 5 g)	$(0.832 + 0.513Wt) \text{ g}$		
	50 kg to 500 kg (Res.= 0.1 kg)	$(0.091 + 0.07Wt) \text{ kg}$		
Weighing Devices <sup>O</sup>	500 kg to 5 000 kg (Res.= 2 kg)	$(0.434 + 0.871Wt) \text{ kg}$		MF-03 Internal Procedure
	5 000 kg to 10 000 kg (Res.= 5 kg)	$(10.45 + 0.009Wt) \text{ kg}$		
Tension - Compression & Dynamometer Force Devices <sup>FO</sup>	100 N to 10 000 N	0.7 % of reading	Class F Weights & Force Gage	MF-02 Internal Procedure
	1 kN to 100 kN	0.4 % of reading		
Mass Weight Class M1, M2 & M3 <sup>FO</sup>	2 mg	0.045 mg	Double Substitution with Air Buoyancy Correction. Class F Mass set and Analytic Balance	MF-01 Internal Procedure
	5 mg	0.045 mg		
	10 mg	0.045 mg		
	20 mg	0.074 mg		
	50 mg	0.11 mg		
	100 mg	0.12 mg		
	200 mg	0.16 mg		
	500 mg	0.24 mg		
	1 g	0.28 mg		
	2 g	0.32 mg		
Mass Weight Class M1, M2 & M3 <sup>FO</sup>	5 g	0.32 mg		
	10 g	0.57 mg		



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Mass Weight Class M1, M2 & M3 <sup>FO</sup>	20 g	0.57 mg	Double Substitution with Air Buoyancy Correction. Class F Mass set and Analytic Balance	MF-01 Internal Procedure
	50 g	0.75 mg		
	100 g	1.2 mg		
	500 g	6.3 mg		
	1 kg	13 mg	OIML Class F2 Mass Set Weight Scale	
	2 kg	29 mg		
	5 kg	200 mg		
	10 Kg	200 mg		
Tension - Compression & Dynamometer Force Devices <sup>FO</sup>	1 N to 10 N	0.2 % of reading	Class F Weights and Force Gage	ME-03 Internal Procedure
	10 N to 100 N	0.2 % of reading		
	20 Kg	29 mg		

### Mechanical

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Durometer Hardness (Direct Verification Scale: A, B, E, O) Extension at Zero readings  Diameter of the Base of the Frustum Diameter of the Top of the Frustum Cone Angle Tip Radius Indenter Thickness Indenter Thickness <sup>FO</sup>	2.46 mm to 2.54 mm	8.1 $\mu$ m  5 $\mu$ m 5 $\mu$ m 0.03° 5 $\mu$ m 5 $\mu$ m 5 $\mu$ m	Load Cell, Force gauge & Balance & Gage Block The Dimensional Characteristics of the Indenters are Verified by Optical Projection	ASTM D2240 ME-04 Internal Procedure
Verification Durometer Spring <sup>FO</sup>	0.55 N to 8.05 N	62 m	The Durometer Spring is Verified with Dead Weights,	ME-04 Internal Procedure
Leak Standards (Air Flow Devices) <sup>FO</sup>	0.1 cm <sup>3</sup> /s to 500 cm <sup>3</sup> /s	0.4 % of reading	Air Mass Flow Meter Aalborg GFM 17	NIST-SP250-38 / ME-05 Internal Procedure



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Pressure Measurement Devices <sup>FO</sup>	1 k Pa to 700 kPa	0.62 kPa + 0.026 % of reading	Pressure Pump and Digital Pressure Gauge	ME-01 Internal Procedure
	700 kPa to 67 000 kPa	4.2 kPa + 0.026 % of reading		
Vacuum Measurement Devices <sup>FO</sup>	-100 kPa to 0.1 kPa	0.015 kPa + 0.012 % of reading	Vacuum Pump and Gauge	ME-06 Internal Procedure
Volume Containers <sup>FO</sup>	1 mL to 1 000 mL	0.1 mL	Analytical Balance	
Volume Measurement Devices <sup>FO</sup>	0.1 L to 10 L	20 mL	Analytical Balance & Flow Meter / Master Containers	ME-06 Internal Procedure
	10 L to 40 L	0.1 L		
	40 L to 200 L	0.5 L		
Viscosity Meters and Cups Ford <sup>FO</sup>	10 Centistokes 35 Centistokes 60 Centistokes	2 % of reading	Viscosity Solutions, StopWatch and Master Container	ME-07 Internal Procedure
Viscosity Meters and Cups Zahn <sup>FO</sup>	20 Centistokes 60 Centistokes 100 Centistokes	2 % of reading		
Torque Force Tools <sup>FO</sup>	1 N·m to 10 N·m	0.7 % of reading	Digital Torque Analyzer	ME-02 Internal Procedure
	33.8 N·m to 100 N·m	1.2 % of reading	Electronic Torque Tester	
	101 N·m to 338 N·m	1.2 % of reading		
	339 N.m to 1 355 N.m	0.3 % of reading	Torque Stand & Force Cell	
Indirect Verification of Rockwell Hardness Tester HRA <sup>FO</sup>	20 HRA to 40 HRA	0.7 HRA	Indirect Method - Block Master Rockwell A, B, C	ME-04 Internal Procedure
	45 HRA to 75 HRA	0.71 HRA		
	80 HRA to 88 HRA	0.6 HRA		
Indirect Verification of Rockwell Hardness Tester HRB <sup>FO</sup>	20 HRB to 50 HRB	0.95 HRB	Block Master Rockwell B	ME-04 Internal Procedure
	60 HRB to 80 HRB	0.95 HRB		
	85 HRB to 100 HRB	0.95 HRB		
Indirect Verification of Rockwell Hardness Tester HRC <sup>FO</sup>	20 HRC to 30 HRC	0.42 HRC	Indirect Method - Block Master Rockwell A, B, C	ME-04 Internal Procedure
	35 HRC to 55 HRC	0.41 HRC		
	60 HRC to 70 HRC	0.37 HRC		
Air Velocity Meters - Anemometer <sup>FO</sup>	Up to 2 000 cm/min	0.5 % of reading	Precision Anemometer	ME-08 Internal Procedure



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### Acoustic

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Sound Meters Devices <sup>FO</sup>	10 dB to 140 dB	0.76 dB + 0.032 % of reading	Sound Calibrator, Multi dB Generator and Multimeter	SD-01 Internal Procedure
Sound Chambers (Generator) <sup>O</sup>	20 dB to 140 dB	2 dB	Sound Calibrator, Sound Meter and Frequency	

### Time and Frequency

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Clock <sup>FO</sup>	9 h: 59 min: 59 s	4 s	Digital Stopwatch	TF-01 Internal Procedure
Chronometer <sup>FO</sup>	23 h: 59 min: 59 s	4 s		
Timers <sup>FO</sup>	23 h: 59 min: 59 s	4 s		
Tachometers <sup>FO</sup>	1.047 rad/s to 10 471.9 rad/s	0.1 % of reading + 1 Digit	Tachometer Master	TF-02 Internal Procedure

### Thermodynamic

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Glass Thermometers and Bimetallic Thermometers <sup>FO</sup>	-30 °C to 150 °C	1 °C	Temperature Bath and Agilent 34970A TC type J/K	EL-11, EL-13 Internal Procedures
	150 °C to 400 °C	1 °C		
Thermal Chambers <sup>O</sup>	-40 °C to 200 °C	1 °C	Agilent 34970A - TC type J/K	EL-13 Internal Procedure
Thermal Oven <sup>O</sup>	50 °C to 400 °C	1 °C		
Thermal Controllers <sup>O</sup>	40 °C to 1 760 °C	2 °C	Fluke 5100 & Agilent 34970A - TC type J/K	EL-01 Internal Procedure
Hygrometers <sup>FO</sup>	10 % RH to 90 % RH	2 % RH	Temperature and Humidity Recorder & Humidity Chamber Generator	ASTM E104 TD-04 Internal Procedure
Humidity Tester <sup>FO</sup>	10 % RH to 90 % RH	2 % RH		
Humidity Chamber <sup>O</sup>	10 % RH to 90 % RH	2 % RH		
Infrared Temperature Medical / Industrial Meter <sup>F</sup>	20° to 400°C	(1.26 + 1 x 10 <sup>-2</sup> T) °C	Black Body / IR Meter	TD-01 Internal Procedure



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### Chemical

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Conductivity Device Fixed Point <sup>FO</sup>	84 $\mu$ S	3 % of reading	Standard Solutions	NIST-NISTIR-6191 Q1-05 Internal Procedure
	1 413 $\mu$ S	3 % of reading		
	12 880 $\mu$ S	3 % of reading		
pH Meter <sup>FO</sup>	4 pH units	0.01 pH units	pH Buffer Solution	Q1-02 Internal Procedure
	7 pH units	0.01 pH units		
	10 pH units	0.01 pH units		
Gas Detectors Oxygen (O <sub>2</sub> ) <sup>FO</sup>	Up to 1 000 cmol	5 % of reading	Precision Gas Sensor	QI-06 Internal Procedure
Gas Detectors Methane (CH <sub>4</sub> ) <sup>FO</sup>	Up to 1 000 cmol	5 % of reading		
Gas Detectors Carbon Monoxide (CO) <sup>FO</sup>	Up to 1 000 cmol	5 % of reading		
Gas Detectors Hydrogen Sulfide (H <sub>2</sub> S) <sup>FO</sup>	Up to 1 000 cmol	5 % of reading		

### Electrical

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Capacitance Meter <sup>FO</sup>	1 nF	0.2 pF	General Radio Standard Capacitor, Model 1409-F- 0.001 $\mu$ F Model 1409-Y -1 $\mu$ F Decade Condenser 219-M	EL-07 Internal Procedure
	1 $\mu$ F	0.2 nF		
	10 $\mu$ F to 10 000 $\mu$ F	0.05 % of reading		
Resistors and Resistance Generator <sup>FO</sup>	1 $\Omega$ to 100 $\Omega$	0.02 % of reading + 0.004 % of range	HP 34401A-Measuring	EL-03 Internal Procedure
	100 $\Omega$ to 1 k $\Omega$	0.02 % of reading + 0.001 % of range		
	1 k $\Omega$ to 10 k $\Omega$	0.02 % of reading + 0.001 % of range		
	10 k $\Omega$ to 100 k $\Omega$	0.02 % of reading + 0.001 % of range		
	100 k $\Omega$ to 1 M $\Omega$	0.02 % of reading + 0.001 % of range		
	1 M $\Omega$ to 10 M $\Omega$	0.08 % of reading + 0.001 % of range		
	10 M $\Omega$ to 100 M $\Omega$	1 % of reading + 0.01 % of range		



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Equipment to Output DC Voltage <sup>FO</sup>	Up to 100mV	0.009 % of reading + 0.003 5 % of range	HP 34401A Measuring	EL-02 Internal Procedure
	100 mV to 1V	0.008 % of reading + 0.000 7 % of range		
Equipment to Output DC Voltage <sup>FO</sup>	1 V to 10 V	0.007 5 % of reading + 0.000 5 % of range	HP 34401A – Measuring Fluke 376 FC I-Flex 2500	EL-05, EL-02, EL-06, EL-01 Internal Procedures
	10 V to 100 V	0.008 5 % of reading + 0.000 6 % of range		
	100 V to 1 000 V	0.008 5 % of reading + 0.001 % of range		
Equipment to Output DC Current <sup>FO</sup>	Up to 10 mA	0.09 % of reading + 0.02 % of range		
	10 mA to 100 mA	0.09 % of reading + 0.005 % of range		
	100 mA to 1 A	0.2 % of reading + 0.01 % of range		
	1 A to 3 A	0.22 % of reading + 0.02 % of range		
	3 A to 1 000 A	0.2 % of reading		
Equipment to Output AC Voltage (At the listed frequencies) <sup>FO</sup>				
3 Hz to 5 Hz	1 mV to 100 mV	2 % of reading + 0.04 % of range		
5 Hz to 10 Hz	1 mV to 100 mV	0.75 % of reading + 0.04 % of range		
10 Hz to 20 kHz	1 mV to 100 mV	0.09 % of reading + 0.04 % of range		
20 kHz to 50 kHz	1 mV to 100 mV	0.22 % of reading + 0.05 % of range		
50 kHz to 100 kHz	1 mV to 100 mV	0.9 % of reading + 0.08 % of range		
Equipment to Output AC Voltage (At the listed frequencies) <sup>FO</sup>				
3 Hz to 5 Hz	0.06 V to 750 V	2 % of reading + 0.03 % of range		
5 Hz to 10 Hz	0.06 V to 750 V	0.75 % of reading + 0.03 % of range		
10 Hz to 20 kHz	0.06 V to 750 V	0.09 % of reading + 0.03 % of range		



# Certificate of Accreditation: Supplement

## Laboratorio de Precisión, S.A. de C.V.

Horizonte #28 entre Astro Rey Sur y Amanecer  
 Matamoros, Tamaulipas, México. C.P. 87314  
 Contact Name: Aaron Lucio Phone: 868-810-2272

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 ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Equipment to Output AC Voltage (At the listed frequencies) <sup>FO</sup>			HP 34401A – Measuring Fluke 376 FC I-Flex 2500	EL-01, EL-04, EL-06 Internal Procedures
20 kHz to 50 kHz	0.06 V to 750 V	0.22 % of reading + 0.05 % of range		
50 kHz to 100 kHz	0.06 V to 750 V	0.9 % of reading + 0.08 % of range		
100 kHz to 300 kHz	0.06 V to 750 V	6 % of reading + 0.5 % of range		
Equipment to Output AC Current (At the listed frequencies) <sup>FO</sup>				
3 Hz to 5 Hz	1 mA to 1 A	2.1 % of reading + 0.04 % of range		
5 Hz to 10 Hz	1 mA to 1 A	0.6 % of reading + 0.04 % of range		
10 Hz to 5 kHz	1 mA to 1 A	0.2 % of reading + 0.04 % of range		
Equipment to Output AC Current (At the listed frequencies) <sup>FO</sup>				
3 Hz to 5 Hz	1 A to 3 A	2 % of reading + 0.06 % of range		
5 Hz to 10 Hz	1 A to 3 A	0.75 % of reading + 0.06 % of range		
10 Hz to 5 kHz	Up to 2 500 A	0.2 % of reading		
Equipment to Output Frequency Generators <sup>FO</sup>				
Equipment to Output Frequency Generators <sup>FO</sup>	3 Hz to 5 Hz	0.2 % of reading		
	5 Hz to 10 Hz	0.1 % of reading		
	10 Hz to 40 Hz	0.06 % of reading		
	40 Hz to 300 kHz	0.02 % of reading		
Equipment to Output DC Voltage Meter <sup>FO</sup>			Fluke 5100 Source Multiplication Coil	EL-02, EL-05 Internal Procedures
Equipment to Output DC Voltage Meter <sup>FO</sup>	20 mV to 199.999 mV	0.008 % of reading + 0.001 % of range + 5 $\mu$ V		
	0.2 V to 1.999 99 V	0.008 % of reading + 0.001 % of range + 5 $\mu$ V		
Equipment to Output DC Voltage Meter <sup>FO</sup>	2 V to 19.999 9 V	0.008 % of reading + 0.001 % of range + 5 $\mu$ V		
Equipment to Output DC Voltage Meter <sup>FO</sup>	20 V to 199.999 V	0.008 % of reading + 0.001 % of range + 5 $\mu$ V		
	200 V to 1 100 V	0.008 % of reading + 0.001 % of range + 5 $\mu$ V		
Equipment to Output DC Current Meter <sup>FO</sup>	10 $\mu$ A to 199.999 $\mu$ A	0.025 % of output + 0.002 % of range + 0.02 $\mu$ A		



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### Electrical

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Equipment to Output DC Current Meter <sup>FO</sup>	0.2 mA to 1.999 99 mA	0.025 % of output + 0.002 % of range + 0.02 $\mu$ A	Fluke 5100 Source Multiplication Coil	EL-02, EL-05 Internal Procedures	
	2 mA to 19.999 9 mA	0.025 % of output + 0.002 % of range + 0.02 $\mu$ A			
	20 mA to 199.999 mA	0.025 % of output + 0.002 % of range + 0.02 $\mu$ A			
	0.2 A to 1.999 99 A	0.025 % of output + 0.002 % of range + 0.02 $\mu$ A			
	1.999 99 A to 100 A	0.2 % of output			
Equipment to Output AC Voltage Meter (At the listed frequencies) <sup>FO</sup>					EL-01, EL-04, EL-06 Internal Procedures
10 kHz to 50 kHz	20 mV to 199.999 mV	0.09 % of reading + 0.008 % of range + 50 $\mu$ V			
50 Hz to 10 kHz	20 mV to 199.999 mV	0.065 % of reading + 0.005 % of range + 50 $\mu$ V			
Equipment to Output AC Voltage Meter (At the listed frequencies) <sup>FO</sup>					
10 kHz to 50 kHz	0.2 V to 1.999 9 V	0.09 % of reading + 0.008 % of range + 50 $\mu$ V			
50 Hz to 10 kHz	0.2 V to 1.999 99 V	0.065 % of reading + 0.005 % of range + 50 $\mu$ V			
Equipment to Output AC Voltage Meter (At the listed frequencies) <sup>FO</sup>					
10 kHz to 50 kHz	2 V to 19.999 V	0.09 % of reading + 0.008 % of range + 50 $\mu$ V			
50 Hz to 10 kHz	2 V to 19.999 V	0.065 % of reading + 0.005 % of range + 50 $\mu$ V			
Equipment to Output AC Voltage Meter (At the listed frequencies) <sup>FO</sup>					
10 kHz to 50 kHz	20 V to 199.999 V	0.09 % of reading + 0.008 % of range + 50 $\mu$ V			
50 Hz to 10 kHz	20 V to 199.999 V	0.065 % of reading + 0.005 % of range + 50 $\mu$ V			



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Equipment to Output AC Voltage Meter (At the listed frequencies) <sup>FO</sup>			Fluke 5100 Source Multiplication Coil	EL-01, EL-04, EL-06 Internal Procedures
10 kHz to 50 kHz	200 V to 1 100 V	0.09 % of reading + 0.008 % of range + 50 $\mu$ V		
50 Hz to 10 kHz	200 V to 1 100 V	0.065 % of reading + 0.005 % of range + 50 $\mu$ V		
Equipment to Output AC Current Meter (At the listed frequencies) <sup>FO</sup>				EL-01, EL-04, EL-06 Internal Procedures
50 Hz to 1 kHz	0.2 A to 1.999 A	0.09 % of reading + 0.005 % of range + 0.02 $\mu$ A		
50 Hz to 1 kHz	2 mA to 19.999 mA	0.09 % of reading + 0.005 % of range + 0.02 $\mu$ A		
50 Hz to 1 kHz	19.999 mA to 100 A	0.2 % of reading		
50 Hz to 1 kHz	10 $\mu$ A to 199.999 $\mu$ A	0.09 % of reading + 0.005 % of range + 0.02 $\mu$ A	Fluke 5100 – Source	EL-01, EL-04, EL-06, EL-03 Internal Procedures
50 Hz to 1 kHz	20 mA to 199.999 mA	0.09 % of reading + 0.005 % of range + 0.02 $\mu$ A		
Equipment to Output Resistance Meters <sup>FO</sup>	Up to 1 $\Omega$	0.025 % of reading		
	1 $\Omega$ to 10 $\Omega$	0.02 % of reading		
	10 $\Omega$ to 100 $\Omega$	0.006 % of reading		
	100 $\Omega$ to 1k $\Omega$	0.006 % of reading		
	1k $\Omega$ to 10 k $\Omega$	0.006 % of reading		
	10 k $\Omega$ to 100 k $\Omega$	0.006 % of reading		
	100 k $\Omega$ to 1M $\Omega$	0.02 % of reading		
Equipment to Output Frequency Meters <sup>FO</sup>	1 M $\Omega$ to 10 M $\Omega$	0.06 % of reading		
	10 Hz to 30 Hz	0.6 % of reading		
	30 Hz to 1 MHz	0.45 % of reading		
	1M Hz to 5 MHz	0.9 % of reading		
Equipment to Output DC High Voltage (DC HI-POT) <sup>FO</sup>	5 MHz to 10 MHz	0.9 % of reading		
	Up to 20 kV	3 % of reading	Brandenburg 139 P HP/ Agilent	EL-02 Internal Procedures
20 kV to 40 kV				
Equipment to Output AC High Voltage (AC HI-POT) <sup>FO</sup>	Up to 40 kV	5 % of reading	HP 34401A Fluke 80K-40	EL-01 Internal Procedures



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Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type B <sup>FO</sup>	600 °C to 800 °C	2.2 °C	Fluke 5100 Electric Simulation of Thermocouple Output Agilent 34970A-TC Type J/K	TD-01 Internal Procedure
	800 °C to 1 760 °C	2.2 °C		
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type E <sup>FO</sup>	-200 °C to 0 °C	0.75 °C		
	0 °C to 1 000 °C	0.71 °C		
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type J <sup>FO</sup>	-210 °C to 0 °C	0.52 °C		
	0 °C to 760 °C	0.52 °C		
	760 °C to 1 200 °C	0.52 °C		
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type K <sup>FO</sup>	-200 °C to 0 °C	0.62 °C		
	0 °C to 500 °C	0.62 °C		
	500 °C to 1 372 °C	0.62 °C		
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type N <sup>FO</sup>	-200 °C to 0 °C	0.61 °C		
	0 °C to 600 °C	0.61 °C		
	600 °C to 1 300 °C	0.61 °C		
Gaussmeter / Tesla-Meter / Magnetic Meter <sup>F</sup>	Up to 1 500 $\mu$ T (Up to 15 G)	2 % of reading	Multi-Function WK Meter	EL-23 Internal Procedure
Metal Detectors Meters <sup>F</sup>	1 mm to 100 mm	(0.05 + 5L) mm	Mass Weight / Distance Stand	EL-24 Internal Procedure

### Optical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Photometers & Luminance Devices <sup>FO</sup>	10 Lux to 400 000 Lux	7 % of reading	Luxmeter and Light Chamber	IL-01 Internal Procedure
Refractometers <sup>FO</sup>	0 °Bx to 60 °Bx	0.1 °Bx	R °Bx Standards	IL-02-02 Internal Procedure

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.



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### **Laboratorio de Precisión, S.A. de C.V.**

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

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 D represents diameter in inches or millimeters as appropriate to the uncertainty statement.
7. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
8. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.
9. The term T represents temperature in °C or °F as appropriate to the uncertainty statement.