



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Metrología e Ingeniería Avanzada, S.A. de C.V.

*Azucena #200, Colonia Miraflores 2^{do} Sector
San Nicolás de los Garza, Nuevo León, México. C.P. 66410*

*(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, Chemical, Mass, Force and Weighing Devices, Electrical,
Mechanical, Thermodynamic and Time and Frequency 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

<i>Initial Accreditation Date:</i>	<i>Issue Date:</i>	<i>Expiration Date:</i>
February 09, 2016	March 11, 2022	April 30, 2024

:	<i>Accreditation No.:</i>	<i>Certificate No.:</i>
	60119	L22-191

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.pjilabs.com*



Certificate of Accreditation: Supplement

Metrología e Ingeniería Avanzada, S.A. de C.V.

Azucena #200, Colonia Miraflores 2^{do} Sector
 San Nicolás de los Garza, Nuevo León, México. C.P. 66410
 Contact Name: Pedro Ramirez Rangel Phone: 811-505-9601

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

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
Caliper ^{FO}	12.7 mm to 1 016 mm	$(6.99 + 9.8 \times 10^{-3}L) \mu\text{m}$	Gauge Blocks
Depth Gauge ^{FO}	12.7 mm to 304.4 mm	$(6.08 + 1.24 \times 10^{-3}L) \mu\text{m}$	NMX-CH-002-IMNC CAN/CGSB-39.19-98
Depth Micrometer ^{FO}	12.7 mm to 304.4 mm	$(1.95 + 1.3 \times 10^{-2}L) \mu\text{m}$	Gauge Blocks ASME B89.1.13
Outside Micrometer ^{FO}	2.5 mm to 609.6 mm	$(6.76 \times 10^{-1} + 1.48 \times 10^{-2}L) \mu\text{m}$	Gauge Blocks NMX-CH-099-IMNC ASME B 89.1.13
Two Contacts Interior Micrometer ^F	25 mm to 1 016 mm (1 in to 40 in)	$(5.68 \times 10^{-1} + 8.48 \times 10^{-3}L) \mu\text{m}$ [(22.21 + 8.5L) μin]	Gauge Blocks NMX-CH-093-IMNC ASME B89.1.13
Height Gage ^{FO}	12.7 mm to 101 6 mm	$(7.22 + 9.23 \times 10^{-3}L) \mu\text{m}$	Gauge Blocks NMX-CH-141-IMNC CAN/CGSB-39.19-98
Dial Indicator ^O	0.000 12 mm to 101.6 mm	$(2.2 + 5.4 \times 10^{-3}L) \mu\text{m}$	I-Checker
Level Indicator ^O	0.000 12 mm to 1.905 mm	$(2.6 + 0.11L) \mu\text{m}$	DPPI-001
Linear Gage ^O	0.1 mm to 101.6 mm	$(0.16 + 9.4 \times 10^{-3}L) \mu\text{m}$	Brand: Mitutoyo Model: 170-322A NMX-CH-463-IMNC ASME B89.1.10M
Profiles Projector ^O			Glass Scales JIS B-7184
X axis Linearity	300 mm	$(5.26 + 2.04^{-4}L) \mu\text{m}$	
Y axis Linearity	150 mm	$(5.26 + 2.04^{-4}L) \mu\text{m}$	
Profiles Projector Magnification ^O			Amplification Grid JIS B-7184
	5X	0.007 6 %	
	10X	0.007 6 %	
	20X	0.007 6 %	
	50X	0.007 6 %	
	100X	0.007 6 %	
Profiles Projector Angularity ^O	90° to 360°	1.2°	Angular Grid JIS B-7184
Threaded Rings and Bolts Class ZZ, Z, Y, X, XX ^F	0.2 mm to 485 mm	$(4.07 \times 10^{-1} + 1.42 \times 10^{-2}L) \mu\text{m}$	ULM 600-E Brand: Mahr
Tapered Threaded Rings and Bolts ^F	0.2 mm to 485 mm	$(4.07 \times 10^{-1} + 1.42 \times 10^{-2}L) \mu\text{m}$	Series: 1666/ 16 JIS B 0251
Rings, Bolts and Smooth Master Discs Class ZZ, Z, Y, X, XX ^F	2 mm to 304.8 mm	$(3.53 \times 10^{-1} + 1.35 \times 10^{-2}L) \mu\text{m}$	ULM 600-E Brand Mahr Series: 1666/ 16
Tapered Rings, Bolts and Smooth Master Discs ^F	2 mm to 304.8 mm	$(3.53 \times 10^{-1} + 1.35 \times 10^{-2}L) \mu\text{m}$	ANSI/ ASME B1.1



Certificate of Accreditation: Supplement

Metrología e Ingeniería Avanzada, S.A. de C.V.

Azucena # 200, Colonia Miraflores 2^{do} Sector
San Nicolás de las Garzas, Nuevo León, México. C.P. 66410
Contact Name: Pedro Ramirez Rangel Phone: 811-505-9601

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

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
Ruler ^F	5 mm to 2 000 mm	0.6 mm	Rule, Reticule Mitutoyo JIS B 7516
Bore Gauge ^F	6 mm to 100 mm	2.6 μ m	I-Checker JIS B 7515
Flexometer / Tapes ^F	0.01 mm to 30 m	$(8.2 \times 10^{-4} + 2 \times 10^{-5}L)$ m	Rule, Reticule Mitutoyo NOM-046-SCFI
Thickness Gauge with Indicator ^F	Up to 101.6 mm	$(2.2 + 4.5 \times 10^{-3}L)$ μ m	Gauge Blocks PRO-CAL-012
Coating Thickness Gauge Ferrous Base ^F	0.022 mm to 12.255 mm	1.4 μ m	Set of 8 Calibration Sheets PRO-CAL-013
Coating Thickness Gauge Non-Ferrous Base ^F	0.022 mm to 12.255 mm	1.4 μ m	
Roughness Meter Ra ^{FO}	4 μ m	0.039 μ m	Roughness specimen ISO 4287 NMX-CH-4287-IMNC
Lineal Height Gage ^{FO}	Up to 1 016 mm	$(1 \times 10^{-1} + 1.48 \times 10^{-2}L)$	Gauge Blocks Set, Grade K NMX-CH-141-IMNC
Measuring Bench ^{FO}	Up to 1 016 mm	$(1 \times 10^{-1} + 1.48 \times 10^{-2}L)$	

Chemical

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
pH Meters, Controllers Recorders ^{FO}	4 pH	0.013 pH	Certified Buffer Solutions Thermometer Fluke 725 PRO-CAQ-001
	7 pH	0.013 pH	
	10 pH	0.013 pH	
Conductivity Meters, Controllers and Recorders ^{FO}	84 μ S/cm	3.6 μ S/cm	Certified Conductivity Standards Thermometer Fluke 725 PRO-CAQ-002
	1 413 μ S/cm	1.6 μ S/cm	

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
Analytical Balances ^O	0.2 g to 8 200 g (Res.= 0.000 01 g)	$(1.2 \times 10^{-5} + 1 \times 10^{-6}Wt)$ g	Set of Weights Class E2 CENAM Technical Guide
Digital and Mechanical Scales ^{FO}	0.3 kg to 200 kg (Res.= 0.001 kg)	$(8.19 \times 10^{-4} + 4 \times 10^{-6}Wt)$ kg	Weight Set Class M1 CENAM Technical Guide



Certificate of Accreditation: Supplement

Metrología e Ingeniería Avanzada, S.A. de C.V.

Azucena # 200, Colonia Miraflores 2^{do} Sector
 San Nicolás de las Garzas, Nuevo León, México. C.P. 66410
 Contact Name: Pedro Ramirez Rangel Phone: 811-505-9601

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 (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Output DC Volts ^F	Up to 3.3 mV	0.098 % of reading	Multi-Product Calibrator 5500A Euramet cg-15
	3.3 mV to 329 mV	0.006 9 % of reading	
	0.33 mV to 3.29 V	0.005 2 % of reading	
	3.3 V to 32.9 V	0.005 3 % of reading	
	33 V to 329 V	0.005 7 % of reading	
	330 V to 1 000 V	0.005 7 % of reading	
Equipment to Output DC Current ^F	0.3 mA to 3.2 mA	0.015 % of reading	Multi-product Calibrator 5500A / Coil 9100-200 Euramet cg-15
	3.3 mA to 32 mA	0.011 % of reading	
	33 mA to 329 mA	0.012 % of reading	
	0.33 A to 2.1 A	0.033 % of reading	
	2.2 A to 11 A	0.064 % of reading	
	Up to 100 A	0.2 % of reading	
	100 A to 550 A	0.2 % of reading	
Equipment to Output Resistance ^F	Up to 1 Ω	0.86 % of reading	Multi-Product Calibrator 5500A Euramet cg-15
	1 Ω to 10 Ω	0.097 % of reading	
	11 Ω to 32 Ω	0.06 % of reading	
	33 Ω to 100 Ω	0.024 % of reading	
	101 Ω to 329 Ω	0.014 % of reading	
	0.33 k Ω to 1 k Ω	0.015 % of reading	
	1.1 k Ω to 3.2 k Ω	0.012 % of reading	
	3.3 k Ω to 10 k Ω	0.015 % of reading	
	11 k Ω to 32 k Ω	0.011 % of reading	
	33 k Ω to 100 k Ω	0.017 % of reading	
	101 k Ω to 329 k Ω	0.014 % of reading	
	0.33 M Ω to 1 M Ω	0.021 % of reading	
	1.1 M Ω to 3.2 M Ω	0.017 % of reading	
	3.3 M Ω to 10 M Ω	0.066 % of reading	
	11 M Ω to 32 M Ω	0.12 % of reading	
	33 M Ω to 100 M Ω	0.51 % of reading	
101 M Ω to 330 M Ω	0.51 % of reading		



Certificate of Accreditation: Supplement

Metrología e Ingeniería Avanzada, S.A. de C.V.

Azucena # 200, Colonia Miraflores 2^{do} Sector
 San Nicolás de las Garzas, Nuevo León, México. C.P. 66410
 Contact Name: Pedro Ramirez Rangel Phone: 811-505-9601

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 (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Output AC Volts 45 Hz to 1kHz	Up to 3 mV	0.82 % of reading	Multi-product Calibrator 5500A Euramet-cg-15
	3 mV to 33 mV	0.11 % of reading	
	33 mV to 329 mV	0.057 % of reading	
	0.33 V to 3.29 V	0.033 % of reading	
	3.3 V to 32.9 V	0.043 % of reading	
	33 V to 329 V	0.053 % of reading	
	330 V to 1 000 V	0.059 % of reading	
Equipment to Output AC Current 45 Hz to 1 kHz ^F	033 mA to 3.3 mA	0.18 % of reading	
	3.3 mA to 32 mA	0.1 % of reading	
	33 mA to 329 mA	0.1 % of reading	
	0.33 A to 2.1 A	0.12 % of reading	
	2.2 A to 11 A	0.082 % of reading	
Equipment to Output AC Current 50 Hz to 400 Hz ^F	Up to 100 A	0.2 % of reading	Multi-Product Calibrator 5500A / Coil 9100-200 Euramet cg-15
	100 A to 550 A	0.2 % of reading	
Equipment to Capacitance Source ^F	1.1 nF to 3.2 nF	0.81 % of reading	Multi-Product Calibrator 5500A Euramet cg-15
	3.3 nF to 10 nF	0.6 % of reading	
	11 nF to 32 nF	0.56 % of reading	
	33 nF to 100 nF	0.35 % of reading	
	101 nF to 329 nF	0.34 % of reading	
	0.33 μ F to 1 μ F	0.35 % of reading	
	1.1 μ F to 3.2 μ F	0.46 % of reading	
	3.3 μ F to 10 μ F	0.46 % of reading	
	11 μ F to 32 μ F	0.51 % of reading	
33 μ F to 100 μ F	0.61 % of reading		
Equipment to Measure Frequency ^F	Up to 60 Hz	0.077 % of reading	Multi-Product Calibrator 5500A Euramet cg-15 PRO-CAE-001
	60 Hz to 120 Hz	0.04 % of reading	
	120 Hz to 1 000 Hz	0.032 % of reading	
	1 kHz to 10 kHz	0.22 % of reading	
	10 kHz to 100 kHz	0.32 % of reading	



Certificate of Accreditation: Supplement

Metrología e Ingeniería Avanzada, S.A. de C.V.

Azucena # 200, Colonia Miraflores 2^{do} Sector
 San Nicolás de las Garzas, Nuevo León, México. C.P. 66410
 Contact Name: Pedro Ramirez Rangel Phone: 811-505-9601

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 (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure DC Voltage ^F	1.1 mV to 100 mV	0.72 % of reading	Fluke 8846A 6 ½ Digits Euramet-cg-15
	0.101 V to 1 V	0.32 % of reading	
	1.1 V to 10 V	0.29 % of reading	
	11 V to 100 V	0.44 % of reading	
	101 V to 1 000 V	0.51 % of reading	
	Up to 1 kV	2 % of reading	
	1 kV to 6 kV	2 % of reading	
	6 kV to 15 kV	0.8 % of reading	
Equipment to Measure DC Current ^F	Up to 100 μ A	0.077 % of reading	Fluke 8846A 6 ½ Digits Euramet-cg-15
	0.101 mA to 1 mA	5.5 % of reading	
	0.101 mA to 10 mA	7 % of reading	
	10.1 mA to 100 mA	5.5 % of reading	
	100.1 mA to 400 mA	5.5 % of reading	
	0.401 A to 1 A	7.1 % of reading	
	1.1 A to 3 A	12 % of reading	
3.1 A to 10 A	16 % of reading		
Equipment to Measure AC Voltage At the listed frequencies 50 Hz to 1 kHz ^F	Up to 100 mV	0.68 % of reading	
	0.101 V to 1 V	0.68 % of reading	
	1.1 V to 10 V	0.68 % of reading	
	10.1 V to 100 V	0.68 % of reading	
	101 to 1 000 V	0.68 % of reading	
Equipment to Measure AC Voltage At the listed frequencies 50 Hz to 60 Hz ^F	Up to 1 kV	5 % of reading	Fluke 80K-15 Euramet-cg-15
	1 kV to 6 kV	5 % of reading	
	6 kV to 10 kV	5.1 % of reading	
Equipment to Measure AC Current ^F 50 Hz to 1 kHz	Up to 100 μ A	0.14 % of reading	Fluke 8846A 6 ½ Digits Euramet-cg-15
	0.101 mA to 1 mA	0.6 % of reading	
	1.1 mA to 10 mA	0.06 % of reading	
	10.1 mA to 100 mA	0.14 % of reading	
	100.1 mA to 400 mA	0.14 % of reading	
	0.401 mA to 1 A	1.1 % of reading	
	1.1 mA to 3 A	0.73 % of reading	
3.1 mA to 10 A	0.44 % of reading		



Certificate of Accreditation: Supplement

Metrología e Ingeniería Avanzada, S.A. de C.V.

Azucena # 200, Colonia Miraflores 2^{do} Sector
 San Nicolás de las Garzas, Nuevo León, México. C.P. 66410
 Contact Name: Pedro Ramirez Rangel Phone: 811-505-9601

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 (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure Resistance ^F	10.1 Ω to 100 Ω	0.071 % of reading	Fluke 8846A 6 ½ Digits Euramet-cg-15
	0.101 k Ω to 1 k Ω	0.14 % of reading	
	1.1 k Ω t to 10 k Ω	0.018 % of reading	
	10.1 k Ω to 100 k Ω	0.011 % of reading	
	0.101 M Ω to 1 M Ω	0.15 % of reading	
	1.1 M Ω to 10 M Ω	0.078 % of reading	
	10.1 M Ω t to 100 M Ω	0.81 % of reading	
Temperature Calibration Indication and Control Equipment used with RTD Type Pt 385, 100 Ω ^F	-200 °C to 0 °C	0.077 °C	Multi-Product Calibrator 5500A Electrical Simulation of RTD Output Euramet-cg-15
	1 °C to 100 °C	0.091 °C	
	101 °C to 300 °C	0.11 °C	
	301 °C to 400 °C	0.12 °C	
	401 °C to 630 °C	0.13 °C	
	631 °C to 800 °C	0.24 °C	
Temperature Calibration Indication and Control Equipment used with RTD Type Pt 3916, 100 Ω ^F	-200 °C to -191 °C	0.26 °C	
	-190 °C to -80 °C	0.071 °C	
	-79 °C to 0 °C	0.077 °C	
	1 °C to 100 °C	0.084 °C	
	101 °C to 260 °C	0.091 °C	
	261 °C to 300 °C	0.099 °C	
	301 °C to 400 °C	0.11 °C	
	401 °C to 600 °C	0.12 °C	
	601 °C to 630 °C	0.24 °C	
Temperature Calibration Indication and Control Equipment used with RTD Type Pt 3926, 100 Ω ^F	-200 °C to 0 °C	0.077 °C	
	1 °C to 100 °C	0.091 °C	
	101 °C to 300 °C	0.11 °C	
	301 °C to 400 °C	0.12 °C	
	401 °C to 630 °C	0.13 °C	
Temperature Calibration Indication and Control Equipment used with RTD Type Pt Cu 10.9 Ω ^F	-100 °C to 260 °C	0.31 °C	
Temperature Calibration Indication and Control Equipment used with RTD Type Pt Ni 120 Ω ^F	-80 °C to 100 °C	0.099 °C	
	101 °C to 260 °C	0.15 °C	



Certificate of Accreditation: Supplement

Metrología e Ingeniería Avanzada, S.A. de C.V.

Azucena # 200, Colonia Miraflores 2^{do} Sector
 San Nicolás de las Garzas, Nuevo León, México. C.P. 66410
 Contact Name: Pedro Ramirez Rangel Phone: 811-505-9601

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 (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature Calibration Indication and Control Equipment used with RTD Type Pt 385, 100 Ω^{FO}	-200 °C to 0 °C	0.36 °C	Calibrator 725 Electrical Simulation of RTD Output Euramet-cg-15
	1 °C to 100 °C	0.36 °C	
	101 °C to 300 °C	0.37 °C	
	301 °C to 400 °C	0.38 °C	
	401 °C to 630 °C	0.38 °C	
	631 °C to 800 °C	0.48 °C	
Temperature Calibration Indication and Control Equipment used with RTD Type Pt 3916, 100 Ω^{FO}	-200 °C to -191 °C	0.48 °C	
	-190 °C to -80 °C	0.33 °C	
	-79 °C to 0 °C	0.33 °C	
	1 °C to 100 °C	0.33 °C	
	101 °C to 260 °C	0.33 °C	
	261 °C to 300 °C	0.34 °C	
	301 °C to 400 °C	0.35 °C	
	401 °C to 600 °C	0.35 °C	
Temperature Calibration Indication and Control Equipment used with RTD Type Pt 3926, 100 Ω^{FO}	601 °C to 630 °C	0.46 °C	
	-200 °C to 0 °C	0.33 °C	
	1 °C to 100 °C	0.34 °C	
	101 °C to 300 °C	0.35 °C	
	301 °C to 400 °C	0.35 °C	
Temperature Calibration Indication and Control Equipment used with RTD Type Pt Ni 120 Ω^F	401 °C to 630 °C	0.36 °C	
	-70 °C to 100 °C	0.26 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type B	101 °C to 260 °C	0.3 °C	
	600 °C to 799 °C	0.56 °C	Calibrator 5500A Electrical Simulation of Thermocouple Output Euramet-cg-15
	800 °C to 999 °C	0.43 °C	
	1 000 °C to 1 550 °C	0.38 °C	
1 551 °C to 1 820 °C	0.42 °C		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type E ^F	-250 °C to -101 °C	0.64 °C	
	-100 °C to -26 °C	0.2 °C	
	-25 °C to 350 °C	0.19 °C	
	351 °C to 650 °C	0.21 °C	
	651 °C to 1 000 °C	0.27 °C	



Certificate of Accreditation: Supplement

Metrología e Ingeniería Avanzada, S.A. de C.V.

Azucena # 200, Colonia Miraflores 2^{do} Sector
 San Nicolás de las Garzas, Nuevo León, México. C.P. 66410
 Contact Name: Pedro Ramirez Rangel Phone: 811-505-9601

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 (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature Calibration Indication and Control Equipment used with Thermocouple Type J ^F	-210 °C to -101 °C	0.35 °C	Calibrator 5500A Electrical Simulation of Thermocouple Output Euramet-cg-15
	-100 °C to -31 °C	0.21 °C	
	-30 °C to 150 °C	0.19 °C	
	151 °C to 760 °C	0.22 °C	
	761 °C to 1 200 °C	0.3 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type K ^F	-200 °C to -101 °C	0.42 °C	
	-100 °C to -26 °C	0.24 °C	
	-25 °C to 120 °C	0.21 °C	
	121 °C to 1 000 °C	0.33 °C	
	1 001 °C to 1 370 °C	0.51 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type R ^F	0 °C to 249 °C	0.72 °C	
	250 °C to 399 °C	0.45 °C	
	400 °C to 1 000 °C	0.42 °C	
	1 001 °C to 1 760 °C	0.51 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type S ^F	0 °C to 249 °C	0.59 °C	
	250 °C to 1 000 °C	0.46 °C	
	1 001 °C to 1 400 °C	0.47 °C	
	1 401 °C to 1 760 °C	0.59 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type T ^F	-250 °C to -151 °C	0.8 °C	
	-150 °C to -1 °C	0.31 °C	
	0 °C to 119 °C	0.21 °C	
	120 °C to 400 °C	0.19 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type B ^{F0}	600 °C to 799 °C	2.2 °C	Calibrator 725 Electrical Simulation of Thermocouple Output Euramet-cg-15
	800 °C to 999 °C	1.8 °C	
	1 000 °C to 1 550 °C	1.4 °C	
	1 551 °C to 1 820 °C	1.4 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type E ^{F0}	-250 °C to -101 °C	1 °C	
	-100 °C to -26 °C	0.92 °C	
	-25 °C to 350 °C	0.72 °C	
	351 °C to 650 °C	0.72 °C	
	651 °C to 1 000 °C	0.74 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type J ^{F0}	-210 °C to -101 °C	1 °C	



Certificate of Accreditation: Supplement

Metrología e Ingeniería Avanzada, S.A. de C.V.

Azucena # 200, Colonia Miraflores 2^{do} Sector
 San Nicolás de las Garzas, Nuevo León, México. C.P. 66410
 Contact Name: Pedro Ramirez Rangel Phone: 811-505-9601

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 (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature Calibration Indication and Control Equipment used with Thermocouple Type J ^{FO}	-100 °C to -31 °C	1 °C	Calibrator 725 Electrical Simulation of Thermocouple Output Euramet-cg-15
	-30 °C to 150 °C	0.72 °C	
	151 °C to 760 °C	0.73 °C	
	761 °C to 1 200 °C	0.74 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type K ^{FO}	-200 °C to -101 °C	1.2 °C	
	-100 °C to -26 °C	1.2 °C	
	-25 °C to 120 °C	0.82 °C	
	121 °C to 1 000 °C	0.85 °C	
	1 001 °C to 1 370 °C	0.9 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type R ^{FO}	0 °C to 249 °C	1.9 °C	
	250 °C to 399 °C	1.8 °C	
	400 °C to 1 000 °C	1.4 °C	
	1 001 °C to 1 760 °C	1.5 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type S ^{FO}	0 °C to 249 °C	1.9 °C	
	250 °C to 399 °C	1.5 °C	
	400 °C to 1 000 °C	1.5 °C	
	1 001 °C to 1 760 °C	1.6 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type T ^{FO}	-250 °C to -151 °C	1.4 °C	
	-150 °C to -1 °C	1.2 °C	
	0 °C to 119 °C	0.82 °C	
	120 °C to 400 °C	0.82 °C	

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
Indirect Verification of Rockwell Hardness Testers HRC ^O	20 HRC to 40 HRC	0.35 HRC	ISO 6508-2 / ASTM E 18 and calibrated Rockwell Hardness Test Blocks
	40 HRC to 60 HRC	0.29 HRC	
	60 HRC to 90 HRC	0.16 HRC	
	Up to 100 HRC	0.16 HRC	
Indirect Verification of Rockwell Hardness Testers HRBW ^O	20 HRBW to 40 HRBW	0.25 HRBW	
	40 HRBW to 60 HRBW	0.29 HRBW	
	60 HRBW to 90 HRBW	0.25 HRBW	



Certificate of Accreditation: Supplement

Metrología e Ingeniería Avanzada, S.A. de C.V.

Azucena # 200, Colonia Miraflores 2^{do} Sector
San Nicolás de las Garzas, Nuevo León, México. C.P. 66410
Contact Name: Pedro Ramirez Rangel Phone: 811-505-9601

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

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
Durometer Indentor Spring Types A, B, E & O	0.55 N to 8.05 N	1.2 N	Electronic Balance PRO-CAD-002 ASTM D2240
Torque Meter Clockwise and Counter Clockwise ^F	2.26 N·m to 11.3 N·m	0.26 N.m	Torque Tester Sturtevant STT100-P, STT80-P STT600-P ASME B107.300
	21.96 N·m to 108.47 N·m	0.21 N.m	
	162.7 N·m to 813.49 N·m	0.76 N.m	

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
Ovens, Furnaces Refrigerators, Muffles and Incubators ^{FO}	50 °C to 1 100 °C	0.66 °C	Thermocouple and Fluke725 Indicator Type K and T CENAM Technical Guide
	20 °C to 250 °C	0.59 °C	

Time and 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
Stopwatches, Timers ^{FO}	Up to 36 000 s	0.056 s/hr	Standard Timers PRO-CATI-001

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.



Certificate of Accreditation: Supplement

Metrología e Ingeniería Avanzada, S.A. de C.V.

Azucena # 200, Colonia Miraflores 2^{do} Sector
San Nicolás de las Garzas, Nuevo León, México. C.P. 66410
Contact Name: Pedro Ramirez Rangel Phone: 811-505-9601

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

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 Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.

