



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Ingeniería y Metrología Certificada para Calibración de Control y Pruebas, S.A. de C.V.

***Privada de la Secundaria Federal 2, No. 4, Col. Magisterial Vista Hermosa
Tlaxcala, Tlaxcala, México. C.P. 90014***

*(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, Electrical, Thermodynamic, Mechanical, Mass, Force and Weighing Devices, Chemical, Time and Frequency, Optical and Acoustic 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 18, 2006

Issue Date:

May 20, 2019

Expiration Date:

June 30, 2021

Revision Date:

July 08, 2020

Accreditation No.:

54194

Certificate No.:

L19-255-R3

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.pjlabs.com*



Certificate of Accreditation: Supplement

Ingeniería y Metrología Certificada para Calibración de Equipos de Control y Pruebas, S.A. de C.V.

Privada de la Secundaria Federal 2, No. 4, Col. Magisterial Vista Hermosa
Tlaxcala, Tlaxcala, México. C.P. 90014
Contact: Saul Morales Phone: 246- 466-7041

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 Gauge ^{FO}	0.7 mm to 1 500 mm	(6.88 + 0.020 7L) μ m	Gage Blocks Mitutoyo 516-943, 611682-031 611684-031, 611685-031 CENAM Technical Guide
Micrometers ^{FO}	0.7 mm to 1 000 mm	(0.69 + 0.011 3L) μ m	Gage Blocks Mitutoyo 516-107 611682-031, 611684-031 CENAM Technical Guide
Monitoring Indicators and Level Type ^{FO}	0.005 mm to 50 mm	(1.35 + 0.005L) μ m	Mitutoyo 164-162 NMX-CH-149-IMNC
Metallic and Glass Scales Error of Indication ^F	0.005 mm to 2 000 mm	(40.61 + 2 x 10 ⁻⁵ L) μ m	Longitude Scale Mitutoyo 172-171
Flexible Tapes Measure and Flexo Meter ^F Error of Indication	50 000 mm	(0.105 + 9.88 x 10 ⁻⁶ L) mm	Mitutoyo 182-309 PC-DI-12-02
Height Gage ^F	12 mm to 1 000 mm	(12.58 + 0.047 4L) μ m	Mitutoyo 515-359 NMX-CH-141-IMNC
Sieve ^O	0.01 mm to 50 mm	3.2 μ m	Mitutoyo PV500
Reticle Radius ^F	0.01 mm to 50 mm	3.2 μ m	Optical Comparator PC-DI-12-10
Reticle for Length ^F	0.01 mm to 50 mm	3.2 μ m	
Digital Protractor ^F	0° to 360 °	0.039°	
Optical Comparators ^O X axis Linearity Y axis Linearity	500 mm	8.6 μ m	Mitutoyo 172-116 Mitutoyo 183-110 PC-DI-12-07
	500 mm	8.6 μ m	
Optical Comparator Angularity ^O	0° to 360 °	0.039°	
Axial Orientation ^O	1° at 4 in Y axis travel	0.075°	
Magnification ^O	5X	0.5 %	
	10X	0.5 %	
	20X	0.5 %	
	31.25X	0.5 %	
	50X	0.5 %	
	62.5X	0.5 %	
100X	0.5 %		
Microscopes Scale ^{FO} (X, Y)	200 mm	2.3 μ m	Mitutoyo 172-116 PC-DI-12-07
Microscopes Scale Magnification ^{FO}	5X	0.5 %	
	10X	0.5 %	
	15X	0.5 %	



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Microscopes Scale Magnification ^{FO}	20X	0.5 %	Mitutoyo 172-116 PC-DI-12
	50X	0.5 %	
Thickness Gages ^{FO}	25 mm to 100 mm	$(1.5 + 0.076L) \mu\text{m}$	Gage Blocks Mitutoyo 516-943 USBR 1007 NMX-CH-149-IMNC
Coating Thickness Gauge ^{FO}	25 μm to 2 000 μm	$(0.558 + 0.095L) \mu\text{m}$	Film Standards Mitutoyo D 7091-12 ASTM D7091
Surface Roughness Tester Ra ^{FO}	0.42 μm to 2.94 μm	0.074 μm	Mitutoyo 178-604 Roughness Specimen JIS B 0601
Surface Roughness Tester Ry ^{FO}	1.7 μm to 11.4 μm	0.13 μm	
Ultrasonic Thickness Gauge ^{FO}	2.5 mm a 112.5 mm (Res.= 0.001 mm)	0.024 mm	Test Blocks Delfesko Nodet ASTM E797-15
Length Meter ^F	0.4 m to 20 m (Res.= 0.001 m)	1 mm	Laser Distance Measure Leica Model: Disto D510 ISO-16331-1
Feeler Gauges ^F	0.1 mm to 3 mm	$(1.4 \times 10^{-3} + 1.6 \times 10^{-3}) \text{ mm}$	Micrometer JIS B7524

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 ^{FO}	0.001 mV to 200 mV	20 μV	Multifunction calibrator Fluke 5100B, Manual Spec + UUT Resolution CENAM Technical Guide
	0.2 V to 2 V	150 μV	
	2 V to 20 V	1.5 mV	
	20 V to 200 V	15 mV	
	200 V to 1 100 V	78 mV	
Equipment to Measure DC Current ^{FO}	0.1 μA to 200 μA	0.076 μA	
	0.2 mA to 2 mA	0.65 μA	
	2 mA to 20 mA	6.5 μA	
	20 mA to 200 mA	65 μA	
	0.1 A to 2 A	640 μA	



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Equipment to Output DC Voltage ^{FO}	10 mV to 100 mV	25 μ V	Multimeter, Fluke 8520A Manual Spec + UUT Stability CENAM Technical Guide
	0.1 V to 1 V	150 μ V	
	1 V to 10 V	1.2 mV	
	10 V to 100 V	17 mV	
	100 V to 1 000 V	260 mV	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			Multifunction calibrator Fluke 5100B Manual Spec + UUT Resolution CENAM Technical Guide
2 mV to 200 mV	50 Hz to 1 kHz	190 μ V	
0.2 V to 2 V	50 Hz to 1 kHz	1.4 mV	
2 V to 20 V	50 Hz to 1 kHz	13 mV	
20 V to 200 V	50 Hz to 1 kHz	130 mV	
200 V to 1 100 V	50 Hz to 1 kHz	650 mV	
Equipment to Measure DC Current ^{FO}	10 μ A to 200 μ A	76 nA	
	0.2 mA to 2 mA	660 nA	
	2 mA to 20 mA	6.5 μ A	
	20 mA to 200 mA	65 μ A	
	0.2 A to 2 A	650 μ A	
Equipment to Measure AC Current At the listed frequencies ^{FO}			
50Hz to 1 kHz	10 μ A to 200 μ A	2.5 μ A	
50Hz to 1 kHz	0.2 mA to 2 mA	4.3 μ A	
50Hz to 1 kHz	2 mA to 20 mA	22 μ A	
50Hz to 1 kHz	20 mA to 200 mA	190 μ A	
50Hz to 1 kHz	0.2 A to 2 A	1.9 mA	
Equipment to Output AC Voltage At the listed frequencies ^{FO}			Fluke 8520A Manual Spec + UUT Resolution CENAM Technical Guide
40Hz to 20 kHz	0.1 V to 1 V	2.4 mV	
40Hz to 20 kHz	1 V to 10 V	24 mV	
40Hz to 20 kHz	10 V to 100 V	240 mV	
40Hz to 20 kHz	100 V to 650 V	1.6 V	



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Equipment to Measure AC & DC Current (Transconductance Amplifier) ^{FO}	2 A to 20 A	0.035 % of reading	Multifunction calibrator Fluke 5100B and Transconductance Amplifier Fluke 5220A Manual Specs + UUT Resolution CENAM Technical Guide
Equipment to Measure AC & DC Current At the listed frequencies ^O			Multifunction Calibrator Fluke 5100B and Transconductance Amplifier Fluke 5220A Manual Specs + UUT Resolution CENAM Technical Guide
30Hz to 1 kHz	2 A to 20 A	0.064 % of reading	Manual Specs + UUT Resolution CENAM Technical Guide
Equipment to Measure AC & DC Current (Current Transformers with Ratio Transformation) ^{FO}	20 A to 30 A	0.25 % of reading	Multifunction calibrator Fluke 5100B in conjunction with 5220A Transconductance Amplifier and 30 turns coil Manual Spec + UUT Resolution CENAM Technical Guide
	30 A to 60 A	0.28 % of reading	
	60 A to 120 A	0.34 % of reading	
	120 A to 300 A	0.5 % of reading	
Equipment to Measure AC & DC Current At the listed frequencies ^{FO}			Multifunction calibrator Fluke 5100B in conjunction with 5220A Transconductance Amplifier and 30 turns coil Manual Spec + UUT Resolution CENAM Technical Guide
45 Hz to 65 Hz	20 A to 30 A	0.48 % of reading	Manual Spec + UUT Resolution CENAM Technical Guide
45 Hz to 65 Hz	30 A to 60 A	0.51 % of reading	
45 Hz to 65 Hz	60 A to 120 A	0.59 % of reading	
45 Hz to 65 Hz	120 A to 300 A	0.63 % of reading	
Equipment to Output DC Voltage ^{FO}	1 mV to 110 mV	20 μ V	Calibrator Fluke 741 B Manual Spec + UUT Resolution
	0.11 V to 1.1 V	200 μ V	
	1.1 V to 15 V	2.7 mV	
Equipment to Measure AC & DC Current ^{FO}	0.2 mA to 1 mA Genrad 1434G 1 000 Ω , 0.1 %	0.11 % of reading	Multimeter Fluke 8520 A and reference shunt Manual Spec + UUT Resolution CENAM Technical Guide
	1 mA to 10 mA Genrad 1434G 100 Ω , 0.1 %	0.11 % of reading	
	10 mA to 100 mA Genrad 1434G 10 Ω , 0.1 %	0.11 % of reading	
	0.70 A to 1.99 A Shunt 1 Ω , 0.1 %	0.11 % of reading	
	2 A to 10 A Shunt 0.1 Ω , 1 %	1 % of reading	



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Equipment to Measure AC & DC Current At the listed frequencies ^{FO}			Genrad 1434G, 1 000 Ω 0.1% CENAM Technical Guide
40 Hz to 20 kHz	0.2 mA to 1 mA	0.14 % of reading	
40 Hz to 20 kHz	1mA to 10 mA	0.14 % of reading	
Equipment to Measure AC & DC Current At the listed frequencies ^{FO}			Genrad 1434G 10 Ω , 0.1 % CENAM Technical Guide
40 Hz to 20 kHz	10 mA to 100 mA	0.14 % of reading	
40 Hz to 20 kHz	0.1 A to 1 A	0.14 % of reading	Shunt 1 Ω , 0.1 % CENAM Technical Guide
40 Hz to 20 kHz	1 A to 10 A	1.01 % of reading	Shunt 0.1 Ω , 1 % CENAM Technical Guide
Electrical Resistance – Generate ^{FO}	0.1 Ω to 1 Ω	35 m Ω	Decade Box Yokogawa 2786 and Genrad 1434G Manual Spec + UUT Resolution RTD's 100 Ω to 1 000 Ω α =386, 3916, 3926 CENAM Technical Guide
	1 Ω to 10 Ω	40 m Ω	
	10 Ω to 100 Ω	85 m Ω	
	100 Ω to 1 000 Ω	505 m Ω	
	1 k Ω to 10 k Ω	5 Ω	
	10 k Ω to 100 k Ω	50 Ω	
Electrical Resistance – Measure ^{FO}	1 Ω to 10 Ω	3.3 m Ω	Multimeter, Fluke 8520 A Manual Spec + UUT Stability CENAM Technical Guide
	10 Ω to 100 Ω	25 m Ω	
	100 Ω to 1 k Ω	250 m Ω	
	1k Ω to 10 k Ω	2.5 Ω	
	10 k Ω to 100 k Ω	26 Ω	
	100 k Ω to 1 M Ω	305 Ω	
	1M Ω to 10 M Ω	7.5 k Ω	
Temperature Calibration, Indication and Control Equipment used with RTD Type Pt 385 and Pt 3926, 25 Ω to 100 Ω ^{FO}	-200 $^{\circ}$ C to 962 $^{\circ}$ C	0.065 $^{\circ}$ C	Electrical Simulation of Thermocouple Output Thermometer Hart 1502A Manual Spec + UUT Resolution CENAM Technical Guide
Temperature Calibration, Indication and Control Equipment used with RTD Type Pt 3916, 25 Ω to 100 Ω ^{FO}	-200 $^{\circ}$ C to 962 $^{\circ}$ C	0.065 $^{\circ}$ C	



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Temperature Calibration, Indication and Control Equipment used with RTD Type Pt 3926, 25 Ω to 100 Ω ^{FO}	-200 °C to 962 °C	0.065 °C	Electrical Simulation of Thermocouple Output Thermometer Hart 1502A Manual Spec + UUT Resolution CENAM Technical Guide
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J ^{FO}	-210 °C to -100 °C	0.24 °C	Electrical Simulation of Thermocouple Output Omega DP41-TC CENAM Technical Guide
	-100 °C to 800 °C	0.29 °C	
	800 ° to 1 200 °C	0.31 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple K ^{FO}	-200 °C to -100 °C	0.24 °C	Electrical Simulation of Thermocouple Output Omega DP41-TC CENAM Technical Guide
	-100 °C to 400 °C	0.26 °C	
	400 °C to 1 200 °C	0.31 °C	
	1 200 °C to 1 372 °C	0.32 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple T ^{FO}	-250 °C to -200 °C	0.25 °C	
	-200 °C to 0 °C	0.24 °C	
	0 °C to 400 °C	0.26 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple E ^{FO}	-250 °C to -200 °C	0.25 °C	
	-200 °C to -100 °C	0.24 °C	
	-100 °C to 600 °C	0.27 °C	
	600 °C to 1 000 °C	0.3 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple R ^{FO}	-20 °C to 0 °C	0.24 °C	
	0 °C to 100 °C	0.25 °C	
	100 °C to 1 767 °C	0.34 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple S ^{FO}	-20 °C to 0 °C	0.24 °C	
	0 °C to 200 °C	0.25 °C	
	200 °C to 1 400 °C	0.32 °C	
	1 400 °C to 1 767 °C	0.34 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple N ^{FO}	-200 °C to -100 °C	0.24 °C	
	-100 °C to 900 °C	0.29 °C	
	900 °C to 1 300 °C	0.32 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple B ^{FO}	600 °C to 800 °C	0.29 °C	
	800 °C to 1 000 °C	0.3 °C	
	1 000 °C to 1 820 °C	0.35 °C	



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Temperature Calibration, Indication and Control Equipment used with Thermocouple C ^{FO}	0 °C to 800 °C	0.29 °C	Electrical Simulation of Thermocouple Output Omega DP41-TC CENAM Technical Guide
	800 °C to 1 200 °C	0.31 °C	
	1 200 °C to 1 800 °C	0.35 °C	
	1 800 °C to 2 316 °C	0.37 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple J ^{FO}	-210 °C to -100 °C	0.36 °C	Fluke 741B Electrical Simulation of Thermocouple Output CENAM Technical Guide
	-100 °C to 800 °C	0.24 °C	
	800 ° to 1 200 °C	0.24 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple K ^{FO}	-200 °C to -100 °C	0.47 °C	
	-100 °C to 400 °C	0.36 °C	
	400 °C to 1 200 °C	0.36 °C	
	1 200 °C to 1 372 °C	0.36 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple T ^{FO}	-250 °C to -200 °C	1.1 °C	
	-200 °C to 0 °C	0.47 °C	
	0 °C to 400 °C	0.36 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple E ^{FO}	-250 °C to -200 °C	0.7 °C	
	-200 °C to -100 °C	0.36 °C	
	-100 °C to 600 °C	0.36 °C	
	600 °C to 1 000 °C	0.24 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple R ^{FO}	-20 °C to 0 °C	1.4 °C	
	0 °C to 100 °C	1.3 °C	
	100 °C to 1 767 °C	1.1 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple S ^{FO}	-20 °C to 0 °C	1.4 °C	
	0 °C to 200 °C	1.3 °C	
	200 °C to 1 400 °C	1.1 °C	
	1 400 °C to 1 767 °C	1.2 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple N ^{FO}	-200 °C to -100 °C	1.1 °C	
	-100 °C to 900 °C	0.94 °C	
	900 °C to 1 300 °C	0.47 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple B ^{FO}	600 °C to 800 °C	1.2 °C	
	800 °C to 1 000 °C	0.94 °C	
	1 000 °C to 1 820 °C	0.94 °C	



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Temperature Calibration, Indication and Control Equipment used with RTD Type Pt 385, Pt 3916 and Pt 3926, 25 Ω to 100 Ω	-195 °C to 800 °C	0.066 °C	Electrical Simulation of RTD Output Fluke 744 CENAM Technical Guide
pH Simulation – Generate ^{FO}	0.01 pH to 14 pH	0.006 pH	Multifunction Fluke 5100A @ 25°C CENAM Technical Guide
pH Simulation – Measure ^{FO}	0.01 pH to 14 pH	0.006 pH	Multimeter Fluke 8520 A @ 25°C CENAM Technical Guide
Conductivity Simulation–Generate ^{FO}	0.1 μ S/cm to 20 mS/cm	0.06 % of reading	Resistance Decade Genrad 1434G CENAM Technical Guide
Conductivity Simulation–Measure ^{FO}	0.1 μ S/cm to 20 mS/cm	0.06 % of reading	Multimeter Fluke 8520 A CENAM Technical Guide
Humidity Meters “Moisture Content” (Wood or Concrete) ^F Electrical Simulation	10 % RH to 90 % RH (1 K Ω to 100 G Ω)	(0.1884 + 0.0247H) % RH	Resistance Decade OIML R 92

Chemical

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pH Meters ^{FO}	4 pH to 10 pH	0.02 pH	pH buffer Solutions J.T. BAKER 5657 (4pH) J.T. BAKER 5656 (7pH) J.T. BAKER 5655 (10pH) DMR 283a CENAM DMR-206 Ib/IIB CENAM DMR-3Li CENAM Technical Guide
Conductivity ^{FO}	4 μ S/cm to 84 μ S/cm	1 μ S/cm	Conductivity Solutions DMR-296b (148.16 μ S) 12K82 (Hanna) 21B72 (Hanna) 10D72 (Hanna) CENAM Technical Guide
	84 μ S/cm to 148.16 μ S/cm	1.5 μ S/cm	
	148.16 μ S/cm to 1 413 μ S/cm	5.8 μ S/cm	
	1 413 μ S/cm to 12 850 μ S/cm	57 μ S/cm	



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Refractometers ^{FO}	0.006 nm to 1.332 99 nm	0.000 2 nm	Reference Materials CNM-MR-520-110 DMR-98b CENAM CNM-IM-730-021 PC-OP-6-02
	1.472 3 nm to 1.467 9 nm	0.000 9 nm	
	1.4 nm to 1.7 nm	0.000 2 nm	
Density Immersion ^{FO}	0.5 g/cm ³ to 1.6 g/cm ³ (Res.= 0.000 2 g/cm ³)	0.000 12 g/cm ³	Balance Ohaus Model Explorer CENAM Technical Guide
Alcohol Meter ^F	0.000 019 BAC to 0.16 BAC	(9.9 x 10 ⁻³ + 9 x 10 ⁻⁴ BAC) BAC	SRM CENAM CMR-6300593 CMR-6300593a CMR-6300597a CMR-6300591a Alcohol Reference Solution (ARS)
Photometer Chlorine Free and Total ^{FO}	0.001 mg/L to 1 mg/L	(0.022 9 + 0.010 9X) mg/L	SRM Hanna PC-OP-6-04

Thermodynamic

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Industrial Thermometer – Indicator and Sensor RTD Pt 385 100 Ω ^{FO}	-40 °C to 0 °C	0.06 °C	Thermometer Hart Scientific 1502 A ASTM-E 1137
Industrial Thermometer – Indicator and Sensor RTD Pt 3916 100 Ω ^{FO}	-40 °C to 0 °C	0.06 °C	
Industrial Thermometer – Indicator and Sensor RTD Pt 3926 100 Ω ^{FO}	-40 °C to 0 °C	0.06 °C	
Industrial Thermometer Indicator and Sensor RTD Pt 385, 100 Ω ^{FO}	0 °C to 600 °C	0.28 °C	
Industrial Thermometer Indicator and Sensor RTD Pt 3916 100 Ω ^{FO}	0 °C to 600 °C	0.28 °C	
Industrial Thermometer – Indicator and Sensor RTD Pt 3926 100 Ω ^{FO}	0 °C to 600 °C	0.28 °C	



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Contact: Saul Morales Phone: 246- 466-7041

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

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
Industrial Thermometer Indicator and Sensor RTD Pt 385 100 Ω ^{FO}	-196 °C to 700 °C	0.26 °C	Omega DP41-Sensor RTD's Measure ASTM-E 1137
Industrial Thermometer Indicator and Sensor RTD Pt3916 100 Ω ^{FO}	-196 °C to 650 °C	0.26 °C	
Industrial Thermometer Indicator and Sensor RTD Pt 3926 100 Ω ^{FO}	-196 °C to 650 °C	0.26 °C	
Industrial Thermometer Indicator and Thermocouple Type J ^{FO}	-196 °C to 760 °C	0.31 °C	Omega DP41-Termocouple Measure ASTM E220-02
Industrial Thermometer Indicator and Thermocouple Type K ^{FO}	-196°C to 1 372 °C	0.31 °C	Omega DP41-Termocouple Measure ASTM E220
Industrial Thermometer Indicator and Thermocouple Type T ^{FO}	-196 °C to 400 °C	0.31 °C	
Industrial Thermometer Indicator and Thermocouple Type E ^{FO}	-196 °C to 1 000 °C	0.31 °C	
Industrial Thermometer Indicator and Thermocouple Type R ^{FO}	-50 °C to 1 768 °C	0.31 °C	
Industrial Thermometer – Indicator and Thermocouple Type S ^{FO}	-50 °C to 1 768 °C	0.31 °C	
Liquids in Glass Thermometers ^{FO}	0 °C to 420 °C	0.3 °C	Thermometer Hart Scientific 1502 A CENAM Technical Guide
Liquids in Glass Thermometers ^{FO}	420 °C to 600 °C	0.35 °C	Omega DP41-TC Measurement CENAM Technical Guide
Sterilizer and Climatic Chambers, Ovens, Incubators ^{FO}	-100 °C to 340 °C	0.5 °C	Hydra Fluke 2625 CENAM Technical Guide
Water Baths. Temperature Control and Bain-Marie ^{FO}	-100 °C to 340 °C	0.09 °C	Thermometer Hart Scientific 1502 A CENAM Technical Guide



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Furnaces Sensor ^{FO}	50 °C to 900 °C	0.25 °C	Omega DP41-TC Measurement PC-T-03-3 NMX-CH-70-SCFI CENAM Technical Guide
Bi-Metal Thermometers ^{FO}	0 °C to 600 °C	0.5 °C	
Thermostats ^{FO}	0 °C to 600 °C	0.7 °C	
Humidity Meters ^F	10 % RH to 90 % RH	0.6 % RH	Vaisala PTU301 Measurement CENAM Technical Guide
	11.3 % RH	0.9 % RH	Vaisala Standard Salts Cal CENAM Technical Guide
	32.9 % RH	0.6 % RH	
	75.5 % RH	0.7 % RH	
	97.5 % RH	1.7 % RH	
Infrared / No contact Thermometers ^F	25 °C to 350 °C	0.7 °C	Thermometer Hart Scientific 1502 A and Blackbody CENAM Technical Guide PC-T-3-07
Liquids in Glass Thermometers ^F	-20 °C to 0 °C	0.25 °C	Thermometer Hart Scientific 1502 A CENAM Technical Guide

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
Light Meters Luxmeters ^F	1 lux to 5 000 lux	2.2 % of reading	Lutron Lux-1108 CIE 69
Spectrophotometers ^{FO} UV-Visible (Absorbance) at listed wavelengths (325 nm to 900 nm)	0.04 Abs to 0.45 Abs	0.004 5 Abs	Reference Materials Cobalt Chloride Hexahydrate 1905132 Product Number 2208 PC-OP-6-01
Spectrophotometers UV-Visible ^o Wavelength	279.1 n·m to 637.65 n·m	0.09 n·m	Holmio Crystal Agilent UV/Vis CENAM Technical Guide
Spectrophotometers IR Wavelength ^O	539.41 cm ⁻¹ to 3 082.26 cm ⁻¹	0.045 cm ⁻¹	Test Film NIST 1921b ASTM E932



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Spectrophotometers UV-Visible (Absorbance) ^{FO}	$\lambda=235$ nm ($\alpha= 0.748$)	0.0029 Abs	Potassium Dichromate Merck KGaA CENAM Technical Guide UV/Vis
	$\lambda=257$ nm ($\alpha= 0.868$)	0.0029 Abs	
	$\lambda=313$ nm ($\alpha= 0.292$)	0.0029 Abs	
	$\lambda=350$ nm ($\alpha= 0.644$)	0.0029 Abs	
MultiPhotometers ^{FO} (Absorbance)	$\lambda=420$ nm ($\alpha= 0.4$)	0.14 Abs	SRM Hanna PC-OP-6-04
	$\lambda=466$ nm ($\alpha= 0.4$)	0.14 Abs	
	$\lambda=560$ nm ($\alpha= 0.5$)	0.14 Abs	
	$\lambda=610$ nm ($\alpha= 0.5$)	0.14 Abs	

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
Tachometers ^{FO}	0.1 rad/sec to 10 471.9 rad/sec (Res.= 0.001 rad/sec)	0.000 61 rad/sec	Frequency Calibration Hewlett Packard model:3325A PC-FT-18
	0.1 rad/sec to 10 471.9 rad/sec (Res.= 0.01 rad/sec)	0.006 rad/sec	
	0.1 rad/sec to 10 471.9 rad/sec (Res.= 0.1 rad/sec)	0.06 rad/sec	
Equipment to Measure Frequency with Mechanical Signals ^F	1 Hz to 1 000 Hz	(0.058 + 1 x 10 ⁻⁵ F) Hz	Software Test Tone Generation V4.6 PC-FT-18-04
Equipment Generate Frequency Electrical Signal ^{FO}	3 Hz to 300 kHz	0.024 Hz	Multímeter Digital Agilent Model: 34410A CENAM Technical Guide
Timer and Chronometers ^F	10 s to 86 400 s	0.1 s	Universal Counter Hp Model:5334A/B Functions Generation Model: 3325A Totalizer Method NIST 960-12



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Oximeters ^F	60 BPM to 120 BPM	0.58 BPM	Software Test Tone Generation V4.6 PC-FT-18-05
Equipment to Measurement Frequency Electrical Signal @ 50Hz Senoidal Weave ^F	0.000 001 Hz to 20 MHz	2.8×10^{-4} Hz	HP 3325A CENAM Technical Guide

Acoustic

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
Sonometers - Low Level ^F	35 dB to 74 dB	2 dB	Sonometer Electrical Electronic TEST-1351 And Multi Tone Generator CEI IEC 61672-1 CEI IEC 61672-2
Sonometers - High Level ^F	74 dB to 130 dB		

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
Mass M1-M2-M3 ^F	5 kg	14 mg	Substitution Class F2 Mass Ohaus DV215 CD CENAM Technical Guide
	10 kg	20 mg	
	20 kg	54 mg	
Mass Class, F1, F2, M1, M2, M3	0.1 g	0.017 mg	Mass Class E2 OIML R 111 Substitution Method
	0.2 g	0.02 mg	
	0.5 g	0.027 mg	
	1 g	0.033 mg	
	2 g	0.04 mg	
	5 g	0.04 mg	
	10 g	0.067 mg	
	20 g	0.083 mg	
	50 g	0.1 mg	
	100 g	0.17 mg	
200 g	0.33 mg		



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Mass, Force and Weighing Devices

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No- Automatic Weighing Devices ^{FO}	1 mg to 100 g (Res.= 0.01 mg)	$(1 \times 10^{-4} + 5.09 \times 10^{-7}Wt)$ g	Class E2 Weights CENAM Technical Guide
	1 mg to 220 g (Res.= 0.01 mg)	$(1 \times 10^{-4} + 5.32 \times 10^{-7}Wt)$ g	Class E2 Weights CENAM Technical Guide
	0.01 g to 500 g (Res.= 0.1 mg)	$(2 \times 10^{-4} + 4.27 \times 10^{-7}Wt)$ g	Class E2 Weights CENAM Technical Guide
	1 g to 2 000 g (Res.= 0.1 mg)	$(2 \times 10^{-4} + 5.23 \times 10^{-7}Wt)$ g	Class E2 Weights CENAM Technical Guide
	2 g to 5 000 g (Res.= 0.001 g)	$(1.2 \times 10^{-3} + 4.27 \times 10^{-7}Wt)$ g	Class E2 Weights CENAM Technical Guide
	5 g to 10 000 g (Res.= 0.01 g)	$(1.16 \times 10^{-2} + 1.54 \times 10^{-7}Wt)$ g	Class E2 Weights CENAM Technical Guide
	1 g to 5 000 g (Res.= 0.001 g)	$(1.20 \times 10^{-3} + 1.71 \times 10^{-6}Wt)$ g	Class F1 Weights CENAM Technical Guide
	20 g to 15 000 g (Res.=0.01 g)	$(1.16 \times 10^{-2} + 1.3 \times 10^{-6}Wt)$ g	Class F1 Weights CENAM Technical Guide
	50 g to 24 000 g (Res.=0.1 g)	$(1.16 \times 10^{-1} + 3.71 \times 10^{-7}Wt)$ g	Class F1 Weights CENAM Technical Guide
	5 kg to 50 kg (Res.= 0.001 kg)	1.2 g	Class F2 Weights CENAM Technical Guide
	20 kg to 1 155 kg (Res.= 0.01 kg)	70 g	Class M1 Weights CENAM Technical Guide
	20 kg to 7 000 kg (Res.= 0.1 kg)	0.12 kg	Class M1 Weights CENAM Technical Guide
	Force – Compression and Tension - Measure ^{FO}	4.9 N to 490 N	0.3 % of reading
490 N to 9 807 N		0.2 % of reading	ABB/Altech 20210 Load Cell NMX-CH-376-IMNC
98 N to 980 N		0.3 % of reading	Class M1 and M2 NMX-CH-376-IMNC
Force –Band Tension Measure ^F	0.06 N to 300 N (Res.= 0.01 N)	0.005 8 N	Software Test Tone Generation V4.6 PC-FT-18-03
	300 N to 43 200 N (Res.= 0.1 N)	0.058 N	



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Mechanical

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Pressure Manometers ^F	100 kPa to 10 050 kPa	0.15 % of reading	Ametek TDQ-100000-1 Dead Weight Tester CENAM Technical Guide
	10 050 kPa to 100 500 kPa	0.16 % of reading	
Pressure Transducers ^{FO}	100 kPa to 10 050 kPa	0.17 % of reading	Ametek DQ-100000-1 DMM Fluke 8520A + Shunt - Dead Weight Tester CENAM Technical Guide
	10 000 kPa to 100 500 kPa	0.18 % of reading	
Pressures Gages – Direct Comparison ^{FO}	206.8 kPa to 2 068.427 kPa	1.1 kPa	Dwyer DCGII-106 No. 211H143D0047 CENAM Technical Guide
	4.1 MPa to 41 MPa	31 kPa	Foxboro 41MPa Part # D0175 WC Reference Model IGP10-22 F CENAM Technical Guide
Pressure Transducers (mA and or V) – Direct Comparison ^{FO}	206.8 kPa to 2 068.427 kPa	1.1 kPa	Dwyer DCGII-106 No. 211H143D0047 DMM Fluke 8520A + Shunt CENAM Technical Guide
	4.1 MPa to 41 MPa	31 kPa	Foxboro 41MPa. Part # D0175 WC Reference Model IGP10-22 F sensor 316 L DMM Fluke 8520A + Shunt CENAM Technical Guide
Vacuum Meters (Manovacuum meters) – Direct Comparison ^{FO}	-7 kPa to 0.1 kPa	0.029 kPa	Love Controls No. 1033045 CENAM Technical Guide
	0.1 kPa to 7 kPa	0.029 kPa	
	-67.708 kPa to -0.1 kPa	0.2 kPa	Foxboro IAP10-D22DIC- M1L1 No.97121443 CENAM Technical Guide
Vacuum Meters ^{FO}	-78 kPa to -1 kPa	0.24 kPa	Fluke No. 98158401 700 PV4 Fluke 741B No. 8366015 CENAM Technical Guide
Mercury Column Gauge Meters Direct Comparison ^F	-78 kPa to -1 kPa	0.24 kPa	Fluke No. 98158401 700 PV4 CENAM Technical Guide
Vacuum Transducer Direct Comparison ^{FO}	-78 kPa to -1 kPa	0.25 kPa	Fluke No. 98158401 700 PV4 Fluke 741B No. 8366015 DMM Fluke 8520A CENAM Technical Guide



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Absolute Pressure Gages Direct Comparison ^{FO}	77.985 kPa to 2 067.533 kPa	1.9 kPa	Foxboro IAP10-22D1F -M1L1 No.02391565 CENAM Technical Guide
Pressure Gages Direct Comparison ^{FO}	200 kPa to 2 067.533 kPa	1.9 kPa	Foxboro IAP10-D22D1F-M1L1 CENAM Technical Guide
Absolute Pressure Transducers (mA / V) Direct Comparison ^{FO}	77.985 kPa to 2 067.533 kPa	1.9 kPa	Foxboro IAP10-22D1F-M1L1 No.02391565 DMM Fluke 8520A CENAM Technical Guide
Pressure Transducers (mA / V) – Direct Comparison ^{FO}	200 kPa to 2 068.427 kPa	1.9 kPa	Foxboro IAP10-D22D1F-M1L1 DMM Fluke 8520A CENAM Technical Guide
Pressure Gages – Direct Comparison ^{FO}	2 060 kPa to 20 684.3 kPa	8.2 kPa	Foxboro IGP10-D22E1F-M1L1 No. 00212419 CENAM Technical Guide
Pressure Transducers (mA / V) – Direct Comparison ^{FO}	2 060 kPa to 20 684.3 kPa	8.2 kPa	Foxboro IGP10-D22E1F-M1L1 No.00212419 DMM Fluke 8520A CENAM Technical Guide
Pressure Gages- Direct Comparison ^{FO}	0.69 kPa to 6.9 kPa	0.011 kPa	Fluke 700 P02 No. 83850208 CENAM Technical Guide
Pressure Transducers (mA / V) – Direct Comparison ^{FO}	0.69 kPa to 6.9 kPa	0.011 kPa	Fluke 700 P02 No. 83850208 DMM Fluke 8520A CENAM Technical Guide
Pressure Gages– Direct Comparison ^{FO}	0.025 4 kPa to 0.25 kPa	0.007 kPa	Fluke 700 P00 No. 83051011 DMM Fluke 8520A CENAM Technical Guide
Pressure Transducers (mA / V) – Direct Comparison ^{FO}	0.025 4 kPa to 0.25 kPa	0.007 kPa	Fluke 700 P00 No. 83051011 DMM Fluke 8520A CENAM Technical Guide
Air Velocity Anemometers ^F	0.1 m/s to 30 m/s	(0.091 7 + 0.012 3Va) m/s	Omega HHF141 No.1017581 ASTM D 3796
Door Closing Meter - Velocity ^F	0.3 m/s to 10 m/s (Res.= 0.01 m/s)	0.012 m/s	Tachometer Shimpo Model: DT-207L PC-FT-18-02
Superficial Tension Test ^O	0.008 N·m to 0.065 N·m (8 dyne/cm to 65 dyne/cm)	0.000 6 N·m (0.6 dyne/cm)	Class E2 Mass ASTM D-971



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Security and Light Valves ^F	0.6 MPa to 41 MPa	30 kPa	Foxboro 41MPa Part # D0175 WC Model IGP10-22 F Sensor 316 L No. 212426 PC-P-2-05
Torsional Par Wrenches ^{FO}	0.1 N·m to 250 N·m	0.62 N·m	Torsional par Tranducer: Buster Model: Trascal7280 ISO 6789
	250 N·m to 440 N·m	1.2 N·m	
	440 N·m to 1 000 N·m	2.7 N·m	
Torsional Par Transducers ^F	0.1 N·m to 500 N·m	$(6.4 \times 10^{-3} + 1 \times 10^{-4}T)$ N·m	Arm and Class F1 CENAM Technical Guide
Indirect Verification of Rockwell Hardness Testers HRC ^O	25 HRC to 45 HRC	0.32 HRC	ASTM E 18-08a
	46 HRC to 65 HRC	0.32 HRC	Calibrated Rockwell Hardness Test Blocks
	66 HRC to 70 HRC	0.32 HRC	
Direct Verification of Durometer Hardness ^F Tester Types A, B, C, D, DO, E, M, O, OO, OOO, OOO-S. Extension at zero reading			ASTM D 2240 -05
Indenter Shape (Not all parameters apply to all of Durometer Types)	2.46 mm to 2.554 mm	5.2 μ m	Optical Comparators PV 500 ASTM D 2240 -05
Indenter Diameter	1.25 to 50 mm	5.2 μ m	Optical Comparators PV 500 ASTM D 2240 -05
Indenter Tip Diameter	1.27 to 12 mm	5.2 μ m	
Indenter Tip Radius	0.1 to 11 mm	5.2 μ m	
Indenter Tip Angle	30° to 35°	0.03°	
Durometer Indenter Spring Types A, B, C, D, DO, E, M, O, OO, OOO, OOO-S.	0.55 N to 8.05 N 4.5 N to 45 N	0.7 N 1 N	Ohaus Explorer Pro 32 000 uc ASTM D 2240 -05
Micropipettes ^F	1 μ L to 500 μ L	$(1.6 \times 10^{-2} + 3 \times 10^{-3}V)$ μ L	Mettler PM-480
Pipettes ^F	1 mL to 100 mL	$(2.2 \times 10^{-3} + 7.9 \times 10^{-5}V)$ mL	Ohaus Discovery
Burettes ^F	1 mL to 100 mL	$(8.1 \times 10^{-4} + 1.9 \times 10^{-4}V)$ mL	Ohaus Explorer
Probes ^F	100 mL to 1 000 mL	$(7 \times 10^{-1} + 3.2 \times 10^{-3}V)$ mL	CENAM Technical Guide
Volumetric Flask ^F	1 mL to 250 mL	$(1.3 \times 10^{-3} + 3.3 \times 10^{-4}V)$ mL	



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Volumetric Flask ^F	250 mL to 2 000 mL	$(7 \times 10^{-2} + 3.2 \times 10^{-5}V)$ mL	Mettler PM-480 Ohaus Discovery Ohaus Explorer CENAM Technical Guide
	2 000 mL to 20 000 mL	$(8.8 + 1.1 \times 10^{-3}V)$ mL	
Density Digital Density Meters ^{FO}	0.000 1 g/cm ³ to 1 g/cm ³	5.8×10^{-5} g/cm ³	Reference Materials CNM-IM-730-021 CENAM Technical Guide
Oxygen Meters ^{FO}	5 mg/L to 14 mg/L	0.03 mg/L	Reference Materials CNM-IM-730-021 ASTM D888-92 CENAM Technical Guide
Vibrometers ^F	2 mm/s to 80 mm/s	$(6.4 \times 10^{-3} + 5 \times 10^{-3}VL)$ mm/s	Software Test Tone Generation V4.6 Displacement Micro-epsilon Model: NCDT 1420 ISO-16063-21
Bauman Meters ^{FO}	0.1mmHg to 300 mmHg (0.1 kPa to 40 kPa)	0.19 mmHg (24 kPa)	Manometer Ashcrof Model: 238A624-01 PC-P-02-07
Flow Meters (Water) ^{FO}	1 L/min to 500 L/min (Res.= 0.01 L/min)	0.005 8 L/min	Balance Tecnorcor Model: IPEN (Static Havey) ME-008 CENAM Technical Guide
	1 L/min to 160 L/min (Res.= 0.01)	$(6.6 \times 10^{-3} + 1.1 \times 10^{-3}Q)$ L/min	Micromotion Model: DS100S128 (Direct Comparison) ISO 10790
	1 L/min to 1 000 L/min (Res.= 0.01)	$(8.1 \times 10^{-3} + 9 \times 10^{-4}Q)$ L/min	Euromag Model: MC 608A (Direct Comparison) ISO 10790
	1 L/min to 4 500 L/min (Res.= 0.01)	$(8.9 \times 10^{-3} + 2 \times 10^{-4}Q)$ L/min	Badger Meter Model: Primo (Direct Comparison) ISO 10790
	1 L/min to 8 000 L/min (Res.= 0.01)	$(8.2 \times 10^{-3} + 8 \times 10^{-4}Q)$ L/min	Ultrasonic Flow Meter Model: TDS-100 H (Direct Comparison) ISO 10790



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Flow Meters (Gas) ^{FO}	0.1 L/min to 250 L/min	(0.659 1 + 0.001 1Q) L/min	Flow Meter Alicate Scientific Model: MCR-250SLPM-FT-IPC/5M (Direct Comparison)
Flow Meter ^O	0.001 L/s to 45 L/s (Res.= 0.01 L/s)	(0.0767 + 0.038 5Q) L/s	Rule Standard Mitutoyo ASTM D 5242-2001 Parshall Method
Centrifuge Mixer ^F	100 L/min to 400 L/min (Res.= 1 L/min)	0.6 L/min	Aneno Meter Chronometer PC-FL-17-03
	100 L to 1 000 L (Res.= 1 L)	0.6 L/min	
Barometer ^F	7.5 kPa to 105 kPa	0.077 kPa	Absolute Manometer CENAM Technical Guide
Mass Flow (Water) ^{FO}	1 L/min to 500 kg/min (Res. 0.01 kg/min)	0.005 8 kg/min	Balance Tecnor Model: I PEN (Static Havey) ME-008
	1 kg/min to 160 kg/min (Res.= 0.01 kg/min)	(6.6 x 10 ⁻³ + 1.1 x 10 ⁻³ Wt) kg/min	Micromotion Model: DS100S128 (Direct Comparison) ISO 10790 Measurement of Fluid Flow in Close Conduits
	1 kg/min to 1 000 kg/min (Res.= 0.01 kg/min)	(8.1 x 10 ⁻³ + 9 x 10 ⁻⁴ Wt) kg/min	Euromag Model: MC 608A (Direct Comparison) ISO 10790 Measurement of Fluid Flow in Close Conduits
	1 kg/min to 4 500 kg/min	(8.9 x10 ⁻³ + 2 x 10 ⁻⁴ Wt) kg/min	Badger Meter Model: Primo (Direct Comparison) ISO 10790
	1 kg/min to 8 000 kg/min	(8.2 x 10 ⁻³ + 8 x 10 ⁻⁴ Wt) kg/min	Ultrasonic Flow Meter Model: TDS-100 H (Direct Comparison) ISO 10790



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Privada de la Secundaria Federal 2, No. 4, Col. Magisterial Vista Hermosa
Tlaxcala, Tlaxcala, México C.P. 90014

Contact: Saul Morales Phone: 246- 466-7041

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
Viscosity Dynamic ^{FO}	Up to 6.7 mPa·s	0.015 mPa·s	Reference Materials Brookfield 071408 CNM-CC-710-335 CNM-CC-710-336 CNM-CC-710-33 CNM-CC-710-338 CNM-CC-710-339 NMX-U-038-SCFI
	6.7 mPa·s to 48.4 mPa·s	0.12 mPa·s	
	48.4 mPa·s to 303 mPa·s	0.11 mPa·s	
	303 mPa·s to 950 mPa·s	0.3 mPa·s	
	950 mPa·s to 2 213 mPa·s	0.4 mPa·s	
	2 213 mPa·s to 12 500 mPa·s	3.9 mPa·s	
	12 500 mPa·s to 22 532 mPa·s	8.8 mPa·s	
Kinematic Viscosity Ubbelohden ^O	5.55 mm ² /s @ 40 °C	0.01 mm ² /s	CNM-CC-710-335 ASTM D446 - 12
	8.84 mm ² /s @ 25 °C	0.017 mm ² /s	
	31.17 mm ² /s @ 40 °C	0.095 mm ² /s	CNM-CC-710-336 ASTM D446 - 12
	58.82 mm ² /s @ 25 °C	0.14 mm ² /s	
	23.15 mm ² /s @ 100 °C	0.53 mm ² /s	
	171.25 mm ² /s @ 40 °C	0.93 mm ² /s	
	364.94 mm ² /s @ 25 °C	1.1 mm ² /s	
Kinematic Viscosity Ford Cups No. 1, 2, 3, 4, 5, 6 ^F	10 mm ² /s to 1 200 mm ² /s	0.23 mm ² /s	Cannon Standard Oil ASTM D1200
Kinematic Viscosity Zahn Cups No. 1, 2, 3, 4, 5 ^F	5 mm ² /s to 1 800 mm ² /s	0.23 mm ² /s	Cannon Standard Oil ASTM D4212
Kinematic Viscosity DIN Cups No. 3, 4, 5, 6 ^F	10 mm ² /s to 700 mm ² /s	0.23 mm ² /s	Cannon Standard Oil DIN-53211
Kinematic Viscosity ISO Cups No. 3, 4, 5, 6 ^F	10 mm ² /s to 700 mm ² /s	0.23 mm ² /s	Cannon Standard Oil ISO-2431
Kinematic Viscosity Shell Cups No. 1, 2, 3, 4, 5, 6 ^F	2 mm ² /s to 1 300 mm ² /s	0.22 mm ² /s	Cannon Standard Oil ASTM-D4212

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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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. 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 D represents diameter in inches or millimeters as appropriate to the uncertainty statement.
8. The term F represents Frequency in Hz or millihertz as appropriate to the uncertainty statement.
9. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
10. The term T represents torque in N•m (including SI multiple and submultiple units) for the international system of units (the SI) or ozf•in, lbf•in and lbf•ft for the USC system of units.
11. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.
12. The term V represents Volume in liters or milliliters (including SI multiple and submultiple units) as appropriate to the uncertainty statement.
13. The term Va represents the air velocity in meters/second or feet/second (including SI multiple and submultiple units) appropriate to the uncertainty statement
14. The term VL represents the Lineal Velocity in mm/s (including SI multiple and submultiple units) as appropriate to the uncertainty statement.



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15. The term Q represents Flow Rate in L/min including SI multiple and submultiple units) as appropriate to the uncertainty statement.
16. The term H represents Humidity
17. The term X represents Chlorine
18. The term BAC represents Blood Alcohol Concentration

