



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

HSM Sistemas de Metrología, S. de R.L. de C.V.

***Blvd. Bernardo Quintana Arrijoja # 630, Local 21 Planta Alta, Col. Desarrollo San Pablo
Querétaro, Querétaro, México. C.P. 76125***

*(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, Chemical, Mass, Force and Weighing Devices,
Thermodynamic, Time and Frequency and Electrical Calibration
(As detailed in the supplement)***

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Tracy Szerszen
President
Perry Johnson Laboratory
Accreditation, Inc. (PJLA)
755 W. Big Beaver, Suite 1325
Troy, Michigan 48084

Initial Accreditation Date:

January 14, 2019

Issue Date:

April 03, 2021

Expiration Date:

May 31, 2023

Accreditation No.:

102290

Certificate No.:

L21-220

*The validity of this certificate is maintained through ongoing assessments based on a
continuous accreditation cycle. The validity of this certificate should be
confirmed through the PJLA website: www.pjllabs.com*



Certificate of Accreditation: Supplement

HSM Sistemas de Metrología, S. de R.L. de C.V.

Blvd. Bernardo Quintana Arrijoja #630, Local 21 Planta Alta, Col. Desarrollo San Pablo
 Querétaro, Querétaro, México. CP. 76125
 Contact Name: Francisco Hernandez Phone: 442-195-9668

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
Calipers ^{FO}	1 mm to 1 000 mm	(5 + 0.009L) μ m	Gage Blocks Mitutoyo, Starret RS81B Shars 303-5311C / Check Master Mitutoyo 513-359 JIS7516
Depth Calipers ^{FO}	1 mm to 600 mm	(5 + 0.005L) μ m	
Outside / Inside Micrometers ^{FO}	1 mm to 600 mm	(0.67 + 0.009L) μ m	
Thickness Gage ^{FO}	0.1 mm to 5 mm	(0.7 + 0.005L) μ m	Inductive Probe Sylvac P5i Digital Display Sylvac D70I Gage Blocks JIS7502
Thickness Foils ^{FO}	0.005 mm to 25 mm	(0.65 + 4 x 10 ⁻³ L) μ m	Micrometer JIS B7524
Thickness Meter ^{FO}	0.005 mm to 25 mm	(0.85 + 0.1L) μ m	Blocks, Thickness Foil ASTM-B499
Depth Micrometers ^{FO}	1 mm to 600 mm	(0.95 + 0.01L) μ m	Gage Blocks Mitutoyo Starret RS81B, Shars 303-311C Height Master Mitutoyo 513-359 JIS 7502
Digital and Dial Indicators ^{FO}	0.001 mm to 25 mm (Res.= 0.001 mm)	(1.2 + 0.02L) μ m	Dial Gage Tester Mitutoyo 170-102-12 JIS 7533
	0.01 mm to 25 mm (Res.= 0.01 mm)	5 μ m	
	1 mm to 25 mm (Res.= 0.01 mm)	(5 + 0.08L) μ m	Gage Blocks Mitutoyo Starret RS81B Shars 303-5311C
Height Gages ^{FO}	1 mm to 600 mm	(1 + 2.5 x 10 ⁻³ L) μ m	Dial Gage Tester Mitutoyo 170-102-12 JIS 7517
Steel Rules ^{FO}	5 mm to 1 000 mm (Res.=0.005 mm)	0.05 mm	Gage Blocks, Mitutoyo, Starret RS81B, Shars 303-5311C, Glass Rule Mitutoyo 182-514-10 JIS7516
Flexible Tape ^{FO}	5 mm to 10 000 mm	(0.1 + 2 x 10 ⁻⁴ L) mm	
Glass Rule ^F	5 mm to 1 000 mm	0.05 mm	Microscope CENAM Technical Guide
Dial Thickness Gage ^{FO}	1 mm to 25 mm (Res.= 0.001 mm)	(0.6 + 4 x 10 ⁻³ L) μ m	Gage Blocks Mitutoyo Starret RS81B Shars 303-5311C JIS7503



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Microscopes X Axis Linearity	0.01 mm to 200 mm	0.02 μ m	Crystal Scale ASTM E1951
Y Axis Linearity	0.01 mm to 200 mm	0.02 μ m	
Optical Comparators X axis Linearity	0.5 mm to 300 mm	(2 + 0.008L) μ m	Glass scale Mitutoyo 182-514-10, Angular Blocks HSM-DI-12, Glass Scale Mitutoyo 172-116 JIS7184
Y axis Linearity ^{FO}	0.5 mm to 300 mm	(2 + 0.008L) μ m	
Optical Comparators Magnification ^{FO}	5X	0.01 % of magnification	
	10X	0.01 % of magnification	
	20X	0.01 % of magnification	
	30X	0.01 % of magnification	
Optical Comparators Angularity ^{FO}	360°	0.014°	Angle Gage Blocks JIS7184
Optical Comparators Axial Squareness ^{FO}	76 mm Displacement	(2.4 + 0.025L) μ m	Glass Scale Mitutoyo 182-514-10, JIS7184
Length Measurement 3 axis (X, Y, Z) ^{FO}	5 mm to 100 mm Linear Measurements	[1.5 + (L/100 mm)] μ m	Fowler Zcat Portable CMM Gage Blocks HSM –PR-DI-21 & 17 Internal Methods
Length Measurement 3 axis (X, Y, Z) ^{FO}	1 mm to 100 mm Diametral Measurements	[2 + (D/100 mm)] μ m	
Length Measurement Bars ^{FO}	1 mm to 500 mm	[1.5 + (L/100 mm)] μ m	Gage Blocks, Inductive Sensor HSM –PR-DI-17
Pin Gages ^F	1 mm to 50 mm	0.48 μ m	Digital Micrometer ASME B89.1.5
Roughness Meter (RA) ^{FO}	2.91 μ m	0.028 μ m	Roughness Standard JIS B 0601
Roughness Meter (Ry) ^{FO}	9.2 μ m	0.05 μ m	
Angularity, Goniometer, Protractor ^{FO}	10° to 90°	0.014°	Angle Gage Blocks NMX-CH-151-IMNC-

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 Machines HRC ^{FO}	20 HRC to 100 HRC	0.38 HRC	Hardness Test Blocks Euramet-cg-16



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Indirect Verification of Rockwell Hardness Machines HRBW ^{FO}	40 HRBW to 100 HRBW	1.2 HRBW	Hardness Test Blocks Euramet-cg-16
Pressure Vacuum ^{FO}	-80 kPa to 0 kPa	0.67 kPa	Digital Pressure Gage Crystal 300PSIXP2I Hydraulic Pump Crystal Gauge Pump XP Euramet-cg-17
Pressure Meter ^{FO}	2 Pa to 200 Pa	0.011 Pa	
	200 Pa to 2 000 Pa	0.12 Pa	Digital Pressure Gage Crystal 10000PSIXP2I, Hydraulic Pump Crystal Gauge Pump XP Euramet-cg-17
	0.2 MPa to 2.07 MPa	0.002 4 MPa	
	2.07 MPa to 70 MPa	4.2 kPa	
Verification of the Shore Durometer Spring Force Type A, D ^{FO}	0.55 N to 8.05 N	0.32 N	Load Cell CENAM Technical Guide
Torque Tools, Electrical and Pneumatic Screwdriver, Bottle Cap Torque Tester (Dynamic and Static Torque) ^{FO}	0.3 N·m to 1.29 N·m	0.65 % of reading	Mountz Torque Analyzer ISO 6789
	1.3 N·m to 11.35 N·m	0.25 % of reading	
	11.35 N·m to 135.6 N·m	0.25 % of reading	
	135.6 N·m to 736 N·m	0.3 % of reading	

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 Meter ^{FO}	4 pH	0.02 pH	Reference Material Cole Parmer CENAM Technical Guide
	7 pH	0.12 pH	
	10 pH	0.22 pH	
Conductivity Meter ^{FO}	84.1 μ S/cm	0.96 μ S/cm	Reference Material Ricca Chemical CENAM Technical Guide
	1 413 μ S/cm	6.1 μ S/cm	Reference Material Control Company CENAM Technical Guide
	12.88 mS/cm	0.06 mS/cm	Reference Material Ricca Chemical, CENAM Technical Guide



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Kinematic Viscosity ^{F0}	255.8 mm ² /s	0.29 %	Cannon Certified Viscosity Reference Standard c100, Thermometer, StopWatch, ASTM D7945, ASTM D6299, ASTM D446, ASTM D445, ASTM D1200, ASTM D4212, ASTM D7279, ASTM D88
	230.4 mm ² /s	0.26 %	Cannon Certified Viscosity Reference Standard N100, Thermometer, StopWatch, ASTM D7945, ASTM D6299, ASTM D446, ASTM D445, ASTM D1200, ASTM D4212, ASTM D7279, ASTM D88
	94 mm ² /s	0.22 %	Cannon Certified Viscosity Reference Standard RT100, Thermometer, StopWatch, ASTM D7945, ASTM D6299, ASTM D446, ASTM D445, ASTM D1200, ASTM D4212, ASTM D7279, ASTM D88
	510.2 mm ² /s	0.29 %	Cannon Certified Viscosity Reference Standard Rt 500, Thermometer, StopWatch, ASTM D7945, ASTM D6299, ASTM D446, ASTM D445, ASTM D1200, ASTM D4212, ASTM D7279, ASTM D88
	1 012 mm ² /s	0.38 %	Cannon Certified Viscosity Reference Standard Rt1 000, Thermometer, StopWatch, ASTM D7945, ASTM D6299, ASTM D446, ASTM D445, ASTM D1200, ASTM D4212, ASTM D7279, ASTM D88
	5 147 mm ² /s	0.38 %	Cannon Certified Viscosity Reference Standard Rt5 000, Thermometer, StopWatch, ASTM D7945, ASTM D6299, ASTM D446, ASTM D445, ASTM D1200, ASTM D4212, ASTM D7279, ASTM D88



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Kinematic Viscosity ^{FO}	12 020 mm ² /s	0.44 %	Cannon Certified Viscosity Reference Standard Rt12 500 Thermometer, Stop Watch, ASTM D794, ASTM D6299, ASTM D446 ASTM D445, ASTM D1200 ASTM 4212, ASTM D7279 ASTM D88
Refractometer Meter @ 25 °C	0 % Brix	0.16 % Brix	Certified Reference Material OIMLR108
	2.5 % Brix	0.17 % Brix	
	5 % Brix	0.17 % Brix	
	7.5 % Brix	0.17 % Brix	
	10 % Brix	0.17 % Brix	
	15 % Brix	0.17 % Brix	

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
Force - Compression and Tension – Source and Measure ^{FO}	Up to 100 kgf	(0.03 % reading + 2×10^{-4} F) kgf	Weight Set F1 and M1 ISO 7500
	10 kgf to 500 kgf	(0.03 % of reading + 2×10^{-4} F) kgf	Load Cells ISO 7500
Balances & Scales ^O	0.001 g to 50 g (Res.= 0.000 5 g)	(0.86 + 5.4×10^{-3} Wt) mg	Weight Master Class F1 Euramet-cg 18
	0.01 g to 150 g (Res.= 0.002 g)	(1.7 + 3.6×10^{-3} Wt) mg	
	0.025 g to 500 g (Res.= 0.005 g)	(4.3 + 2.5×10^{-3} Wt) mg	
	0.05 g to 1 kg (Res.= 0.01 g)	(8.8 + 2.5×10^{-3} Wt) mg	
	0.1 g to 2 kg (Res.= 0.02 g)	(17.7 + 2.5×10^{-3} Wt) mg	
	0.25 g to 5 kg (Res.= 0.05 g)	(43.6 + 2.5×10^{-3} Wt) mg	
	0.5 g to 1 kg (Res.= 0.1 g)	(84 + 26×10^{-3} Wt) mg	



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Balances & Scales ⁰	1 g to 2 kg (Res.= 0.2 g)	(0.16 + 26 x 10 ⁻⁶ Wt) g	Weight Master Class F1 Euramet-cg-18
	0.25 g to 5 kg (Res.= 0.5 g)	(0.42 + 26 x 10 ⁻⁶ Wt) g	
	10 g to 12 kg (Res.= 2 g)	(1.7 + 44.5 x 10 ⁻⁶ Wt) g	
	25 g to 30 kg (Res.= 5 g)	(4.2 + 44.5 x 10 ⁻⁶ Wt) g	Weight Master Class F1 and M1 Euramet-cg-18
	50 g to 10 kg (Res.= 10 g)	(8.4 + 0.25 x 10 ⁻³ Wt) g	
	100 g to 20 kg (Res.= 20 g)	(16.5 + 0.26 x 10 ⁻³ Wt) g	
	250 g to 50 kg (Res.= 50 g)	(42 + 0.26 x 10 ⁻³ Wt) g	
	500 g to 100 kg (Res.= 100 g)	(83 + 0.26 x 10 ⁻³ Wt) g	
	1 000 g to 500 kg (Res.= 200 g)	(166 + 0.26 x 10 ⁻³ Wt) g	
	2 500 g to 500 kg (Res.= 500 g)	(420 + 0.65 x 10 ⁻³ Wt) g	
	5 000 g to 500 kg (Res.= 1 kg)	(838 + 1.46 x 10 ⁻³ Wt) g	
	10 kg to 500 kg (Res.= 2 kg)	(1 650 + 2.3 x 10 ⁻³ Wt) g	
	25 kg to 500 kg (Res.= 5 kg)	(4 190 + 4.6 x 10 ⁻³ Wt) g	
	500 kg to 1 000 kg (Res.= 5 kg)	(5.773 5 + 4.78 x 10 ⁻⁸ Wt) kg	Weight Master Class M1 Euramet-cg-18

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
Thermometer used with Thermocouple J, K, T, E Thermistor, Gas, Bimetallic	0 °C to 30 °C	0.03 °C	WIKA CTH7000 with SPRT Accumat AM1751 Ice Bath, Temperature Block Euramet-cg-8
	30 °C to 670 °C	0.26 °C	



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Industrial Thermometer used with RTD ^{FO}	-25 °C to 0 °C	0.18 °C	WIKA CTH7000 with SPRT Accumat AM1751, Ice Bath Temperature Block Euramet-cg-8	
	0 °C to 670 °C	0.08 °C		
Temperature Accuracy - Generation Ovens, Furnaces, Muffles ^{FO}	30 °C to 400 °C	0.025 °C		
	400 °C to 670 °C	0.035 °C		
Freezers ^{FO}	-50 °C to 30 °C	0.035 °C		
Liquid in Glass Thermometer (Res.= 0.1 °C) ^F	0 °C to 500 °C	0.06 °C		
Oven, Freezer Calibration / Temperature Uniformity Survey ^{FO}	-10 °C to 300 °C	0.25 °C		Fluke Hydra 2625 RTD Pt-100 AIAG-CQI9, AMS2750
	300 °C to 600 °C	0.35 °C		
	-100 °C to 760 °C	0.6 °C		Fluke Hydra 2625 Thermocouple J AIAG-CQI9, AMS2750
	250 °C to 1 000 °C	1.2 °C		
	1 000 °C to 1 767 °C	1.8 °C	Fluke Hydra 2625 Thermocouple R, S AIAG-CQI9, AMS2750	
	-100 °C to 1 000 °C	1 °C		
1 000 °C to 1 350 °C	1.8 °C	Fluke Hydra 2625 Thermocouple K AIAG-CQI9, AMS2750		
IR Thermometers ^{FO}	25 °C to 550 °C	1 °C	Fluke IR Thermometer Black Body Source Comparison CENAM Technical Guide	
Temperature Measurement Thermocouple Type K ^F	-25 °C to 0 °C	0.31 °C	WIKA CTH7000 with SPRT Accumat AM1751 Ice Bath, Temperature Dry Well Euramet-cg-8	
	0 °C to 500 °C	0.25 °C		
Temperature Measurement Thermocouple Type J ^F	-25 °C to 0 °C	0.31 °C		
	0 °C to 500 °C	0.25 °C		
Temperature Measurement Thermocouple Type T ^F	-25 °C to 0 °C	0.27 °C		
	0 °C to 500 °C	0.2 °C		
Temperature Measurement Thermocouple Type E ^F	-25 °C to 0 °C	0.27 °C		
	0 °C to 500 °C	0.2 °C		
Temperature Measurement Thermocouple Type R ^F	-25 °C to 0 °C	0.39 °C		
	0 °C to 500 °C	0.35 °C		
Thermocouple type S ^F	-25 °C to 0 °C	0.39 °C		
	0 °C to 500 °C	0.35 °C		
Temperature Measurement RTD Pt 100 ^F	-25 °C to 0 °C	0.2 °C		
	0 °C to 500 °C	0.2 °C		



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Thermohygrometers Temperature Only ^{FO}	7 °C to 50 °C	0.20 °C	WIKA CTH7000 with SPRT Comparison Humidity Chamber CENAM Technical Guide
Thermohygrometers Humidity Only ^{FO}	10 % RH to 80 % RH	0.65 % RH	ROTRONIC Thermohygrometer Model HC2A-S Comparison Humidity Chamber Sensor CENAM Technical Guide
Thermohygrometer Humidity Only ^F (Fixed Point)	11 % RH	0.7 % RH	Rotronic Thermohygrometer and SRM Salt Solutions CENAM Technical Guide
	35 % RH	0.7 % RH	
	50 % RH	0.7 % RH	
	75 % RH	0.7 % RH	
	80 % RH	0.7 % RH	
	95 % RH	0.7 % RH	

Time and Frequency

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Low Frequency Generator Photo-Tachometer ^{FO}	0.1 Hz to 10 000 Hz (6 rpm to 600 000 rpm)	1×10^{-6} Hz/Hz	HSM Low Frequency Generator, Universal Counter HP 5335B, CPEM 2014
Stopwatch ^{FO}	10 s to 1×10^7 s	1×10^{-8} s/s	Universal Counter GPS CENAM Technical Guide
Function Generator, Signal Generator ^F	0.1 Hz to 1.3 GHz	2×10^{-10} Hz/Hz	
Standard Oscillator	10 MHz	2×10^{-10} Hz/Hz	
Function Generator, Signal Generator / Period ^F	10 ns to 10 s	2×10^{-9} Hz/Hz	
Time Interval Counter, Universal Counter ^F	10 s to 86 400 s	2×10^{-10} s/s	



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Temperature Calibration Indication and Control Equipment used with Thermocouple Type B ^{FO}	200 °C to 800 °C	1.5 °C	Process Calibrator Mastech MS7220 Electrical Simulation of Thermocouple Output Euramet-cg-11
	208 °C to 1 800 °C	1.9 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type E ^{FO}	-200 °C to 1 000 °C	0.52 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type J ^{FO}	-200 °C to 1 200 °C	0.36 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type K ^{FO}	-200 °C to 1 370 °C	0.43 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type N ^{FO}	-200 °C to 1 300 °C	0.8 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type R ^{FO}	-200 °C to 1 760 °C	0.78 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type S ^{FO}	-200 °C to 1 760 °C	0.78 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type T ^{FO}	-200 °C to 400 °C	0.43 °C	
Temperature Calibration, Indication, and Control Equipment used with RTD Type Pt 100, 385 Ω and Pt 100, 3 926 Ω ^{FO}	-200 °C to 850 °C	0.35 °C	
Temperature Calibration, Indication, and Control Equipment used with RTD Type Pt 200, 385 Ω ^{FO}	-200 °C to 250 °C	0.25 °C	
	250 °C to 630 °C	0.25 °C	



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Temperature Calibration, Indication, and Control Equipment used with RTD Type Pt 500, 385 Ω^{FO}	-200 °C to 500 °C	0.25 °C	Process Calibrator Mastech MS7222 Electrical Simulation of RTD Output Euramet-cg 11
	500 °C to 630 °C	0.35 °C	
Temperature Calibration, Indication, and Control Equipment used with RTD Type Pt 1 000, 385 Ω^{FO}	-200 °C to 630 °C	0.25 °C	
Equipment to Measure DC Voltage	Up to 90 mV	0.024 % of reading + 6 μ V	Fluke 2635 Data Acquisition Unit CEM EL-001
	90 mV to 300 mV	0.023 % of reading + 20 μ V	
	300 mV to 900 mV	0.021 % of reading + 20 μ V	
	0.9 V to 3 V	0.024 % of reading + 0.2 mV	
	3 V to 30 V	0.024 % of reading + 2 mV	
	30 V to 300 V	0.024 % of reading + 20 mV	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
50 Hz to 100 Hz	0.01 mV to 300 mV	0.3 % of reading + 0.25 mV	
100 Hz to 10 kHz	0.01 mV to 300 mV	0.16 % of reading + 0.25 mV	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
50 Hz to 100 Hz	0.3 V to 3 V	0.16 % of reading + 0.25 mV	
100 Hz to 10 kHz	0.3 V to 3 V	0.29 % of reading + 2.5 mV	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
50 Hz to 100 Hz	3 V to 30 V	0.29 % of reading + 0.25 mV	
100 Hz to 10 kHz	3 V to 30 V	0.15 % of reading + 2.5 mV	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
50 Hz to 100 Hz	30 V to 300 V	0.14 % of reading + 20 mV	
100 Hz to 10 kHz	30 V to 300 V	0.16 % of reading + 0.2 mV	



Certificate of Accreditation: Supplement

HSM Sistemas de Metrología, S. de R.L. de C.V.

Blvd. Bernardo Quintana Arrijoja #630, Local 21 Planta Alta, Col. Desarrollo San Pablo
 Querétaro, Querétaro, México. C.P. 76125

Contact Name: Francisco Hernandez Phone: 442-195-9668

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 ^{FO}	Up to 300 Ω	0.014 % of reading + 20 m Ω	Fluke 2635 Data Acquisition Unit CEM EL-001
	0.3 k Ω to 3 k Ω	0.016 % of reading + 0.2 Ω	
	3 k Ω to 30 k Ω	0.014 % of reading + 2 Ω	
	30 k Ω to 300 k Ω	0.021 % reading + 20 Ω	
	300 k Ω to 3 M Ω	0.063 % of reading + 200 Ω	
	3 M Ω to 10 M Ω	0.17 % of reading + 2 k Ω	
Equipment to Output DC Voltage ^F	Up to 100 mV	0.005 % of reading + 3.5 μ V	DMM HP 34401A EL-001
	0.1 V to 1 V	0.004 % of reading + 7 μ V	
	1 V to 10 V	0.003 5 % of reading + 50 μ	
	10 V to 100 V	0.004 5 % of reading + 600 μ V	
	100 V to 1 000 V	0.004 5 % of reading + 100 μ V	
Equipment to Output Resistance ^F	Up to 100 Ω	0.01 % of reading + 4 m Ω	
	0.1 k Ω to 1 k Ω	0.01 % of reading + 0.01 Ω	
	1 k Ω to 10 k Ω	0.01 % of reading + 0.1 Ω	
	10 k Ω to 100 k Ω	0.01 % of reading + 1 Ω	
	0.1 M Ω to 1 M Ω	0.01 % of reading + 0.01 k Ω	
	1 M Ω to 10 M Ω	0.01 % of reading + 0.1 k Ω	
Equipment to Output DC Current ^F	Up to 10 mA	0.05 % of reading + 2 μ A	
	10 mA to 100 mA	0.05 % of reading + 5 μ A	
	0.1 A to 1 A	0.1 % of reading + 0.1 mA	
	1 A to 3 A	0.12 % of reading + 0.6 mA	
Equipment to Output AC Voltage At the listed frequencies 10 Hz to 20 kHz ^F	0.001 to 100 mV	0.06 of reading + 0.04 mV	
	0.1 V to 1 V	0.06 of reading + 0.3 mV	
	1 V to 10 V	0.06 of reading + 3 mV	
	10 V to 100 V	0.06 of reading + 30 mV	
	100 V to 750 V	0.06 of reading + 225 mV	
Equipment to Output AC Current ^F	10 μ A to 1 A	0.1 of reading + 0.4 mA	
	1 A to 3 A	0.15 of reading + 1.8 mA	



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DC Voltage Rectifier / Power Supply ^{FO}	0 mV to 100 mV	(0.005 % of reading + 3.5 μ V)	DMM HP 34401A Euromet-cg-15
	0.1 V to 1 V	(0.004 % of reading + 7 μ V)	
	1 V to 10 V	(0.003 5 % of reading + 50 μ V)	
	10 V to 100 V	(0.004 5 % of reading + 600 μ V)	
	0.001 mV to 100 mV 10 Hz to 20 kHz	(0.06 % of reading + 0.04 mV)	
	0.1 V to 1 V (10 Hz to 20 kHz)	(0.06 % of reading + 0.3 mV)	
	1 V to 10 V (10 Hz to 20 kHz)	(0.06 % of reading + 3 mV)	
	10 V to 100 V (10 Hz to 20 kHz)	(0.06 % of reading + 30 mV)	
Electrical Ripple Rectifier / Power Supply ^{FO}	0.1 %	0.01 %	
AC Current Rectifier / Power Supply ^{FO}	10 μ A to 1 A	(0.1 % of reading + 0.4 mA)	DMM UNI-T Euromet cg-15 DMM UNI-T Multi- Turn Euromet cg-15 DMM UNI-T Multi- Turn Euromet cg-15 DMM HP 34401A Euromet cg-15
	1 A to 3 A	(0.15 % of reading + 1.8 mA)	
	3 A to 40 A	(0.5 % of reading + 0.02 A)	
	40 A to 400 A	(1.2 % of reading + 0.2 A)	
	400 A to 2 000 A	(1.5 % of reading + 2 A)	
	40 A to 400 A	(0.8 % of reading + 0.2 A)	
	400 A to 2 000 A	(1 % of reading + 2 A)	
	2 000 A to 8 000 A	(1.5 % of reading + 2 A)	
Equipment to Measure Voltage At listed frequencies			DMM Keysight 34461A Euramet cg-15
3 Hz to 5 Hz	20 mV to 100 mV	1 % reading + 0.03 mV	
3 Hz to 5 Hz	0.1 V to 1 V	1 % of reading + 0.000 3 V	
3 Hz to 5 Hz	1 V to 10 V	1 % of reading + 0.003 V	
5 Hz to 10 Hz	20 mV to 100 mV	0.35 % of reading + 0.03 mV	
5 Hz to 10 Hz	0.1 V to 1 V	0.35 % of reading + 0.000 3 V	



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5 Hz to 10 Hz	1 V to 10 V	0.35 % of reading + 0.003 V	DMM Keysight 34461A Euramet-cg-15
10 Hz to 20 kHz	20 mV to 100 mV	0.06 % of reading + 0.03 mV	
10 Hz to 20 kHz	0.1 V to 1 V	0.06 % of reading + 0.000 3 V	
10 Hz to 20 kHz	1 V to 10 V	0.06 % of reading + 0.003 V	

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- The term D represents diameter in inches or millimeters as appropriate to the uncertainty statement.
- The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
- The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.