



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Master Supply de México S. de R.L. de C.V.

*Uva #6121, Colonia El Granjero
Ciudad Juarez, Chihuahua, México C.P. 32690*

*(Hereinafter called the Organization) and hereby declares that Organization is accredited
in accordance with the recognized International Standard:*

ISO/IEC 17025:2005

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, Optical, Mechanical, Electrical, Time & Frequency,
Optical, 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/Operations Manager

Initial Accreditation Date:

June 06, 2016

Issue Date:

July 12, 2018

Expiration Date:

August 31, 2020

Accreditation No.:

89974

Certificate No.:

L18-327

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

Master Supply de México S de RL de CV

Uva #6121, Colonia El Granjero
 Ciudad Juarez, Chihuahua, México C.P. 32690
 Contact Name: Deisy Carolina Gallegos Phone: 656-233-0828

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

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
Dynamic Viscosity ^F	34.2 cP to 43.8 cP	1.5 % of reading	Viscosity Oil Standards and PRT Sensor Thermometer ASTM D2162-14
	121.7 cP to 165.3 cP	1.5 % of reading	
	236.7 cP to 331.3 cP	1.5 % of reading	
	753.6 cP to 1035 cP	1.2 % of reading	
Kinematic Viscosity Zahn cups (1 to 5) ^F Ford Standard and Dip Type Cups (0 to 5) ^F ISO Type Cup (3 mm, 4mm, 6mm and 8mm) DIN Type Cup (4 mm)	34.22 mm ² /s (cSt)	0.5 % of reading	Viscosity Oil Standards, PRT sensor Thermometer and stopwatch At 25 °C
	43.8 mm ² / s (cSt)	0.5 % of reading	
	121.7 mm ² /s (cSt)	0.5 % of reading	
	165.3 mm ² /s (cSt)	0.5 % of reading	
	236.7 mm ² /s (cSt)	0.5 % of reading	
	331.3 mm ² /s (cSt)	0.5 % of reading	
	753.6 mm ² /s (cSt)	0.5 % of reading	
	1 035 mm ² /s (cSt)	0.5 % of reading	
Gas Detection Equipment- CO ₂ Fixed Point ^{FO}	5 % Volume	0.058 % of reading	Pre-mixed Calibration Standard Gas
	10 % Volume	0.12 % of reading	
	30 % Volume	0.35 % of reading	
Gas Detection Equipment- O ₂ Fixed Point ^{FO}	0 % Volume	0.07 % of reading	BS EN 60079-29-4:2010 CSA Standard C22.2 No. 152-M1984
	5 % Volume	0.06 % of reading	
	15 % Volume	0.19 % of reading	
	21 % Volume	0.25 % of reading	
	23.8 % Volume	0.28 % of reading	
Gas Detection Equipment CO Fixed Point ^{FO}	100 ppm	1.2 % of reading	
Gas Detection Equipment- Propane (LEL) Fixed Point ^{FO}	0.52 % Volume (25 % LEL – Low Explosive Limit)	0.006 % of reading	
Gas Detection Equipment- CH ₄ ^{FO}	2.42 % Volume (50 % LEL)	1.2 % of reading	Pre-Mixed Calibration Standard Gas
Gas Detection Equipment Propane (C ₃ H ₈) Fixed Point ^{FO}	0.54 % Volume	0.006 % of reading	Standard Gas
pH Meter Fixed Points ^{FO}	4 pH	0.012 pH	Buffer Solution
	7 pH	0.012 pH	
	10 pH	0.012 pH	



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Electrolytic Conductivity ^{FO}	10 μ S/cm	0.55 μ S/cm	Conductivity Solutions
	100 μ S/cm	2.2 μ S/cm	
	1 000 μ S/cm	4.7 μ S/cm	
	1 500 μ S/cm	5.1 μ S/cm	
	10 000 μ S/cm	11 μ S/cm	
	100 000 μ S/cm	39 μ S/cm	

Dimensional

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Bench Micrometer ^F	1 mm to 101.6 mm	(0.9 + 0.000 1L) μ m	Grade 0 Gage Block (Comparison Method)
Dial and Digital Calipers ^F	1 mm to 1 000 mm	(9 + 0.001L) μ m	Grade 2 Gage Block Comparison
Dial and Digital Depth Micrometers ^F	1 mm to 101.6 mm	(1.0 + 2.3 x 10 ⁻⁵ L) μ m	Grade 0 Gage Block Comparison
Dial and Digital Indicators ^F	0.002 54 mm to 101.6 mm	(0.23 + 2.5 x 10 ⁻⁶ L) μ m	
Electronic Amplifier ^{FO}	0.001 mm to 0.4 mm	(1.2 + 0.005L) μ m	Grade 0 Gage Block Comparison
Micrometers – Digital and Dial ^F	1 mm to 76.2 mm	(0.4 + 0.001L) μ m	
	76.2 mm to 254 mm	(0.4 + 0.001L) μ m	
Laser Micrometer ^O	0.25 mm to 50 mm	(0.3 + 0.000 5L) μ m	Class XXX Cylindrical Pin
Optical Comparator and Vision Systems Length ^O X axis Linearity Y axis Linearity	0.1 mm to 300 mm	(4.2 + 0.012L) μ m	Glass Scales Multi-Magnification Scale
	0.1 mm to 300 mm		
Optical Comparator and Vision Systems Magnification ^O	10 X	0.05 % of magnification	Precision Angle Block Set
	20 X	0.05 % of magnification	
	25 X	0.05 % of magnification	
	31.25 X	0.03 % of magnification	
	50 X	0.01 % of magnification	
	62.5 X	0.01 % of magnification	
Optical Comparator and Vision Systems Squareness ^O	90°	0.11°	Precision Angle Block Set
Optical Comparator Angularity ^O	0° to 90°	(0.1 + 9.9 x 10 ⁻⁵ A) °	
Cylindrical Pin Outside Diameter ^F	0.22 mm to 50 mm	(0.33 + 2.6 x 10 ⁻⁶ L) μ m	Laser Micrometer Z Mike Model 1220S (Res.= 0.000 01 mm)
Surface Roughness Tester – R _z ^{FO}	0.34 μ m to 10.5 μ m	(0.05 + 0.006L) μ m	Roughness Standard



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Dimensional

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Surface Roughness Tester – RSm ^{FO}	9.9 μ m to 100.5 μ m	(0.03 + 0.002L) μ m	Roughness Standard Mahr Federal 2246001
Surface Roughness Tester – Ra ^F	0.1 μ m to 3.18 μ m	(0.02 + 0.006L) μ m	
Surface Plates Flatness Grade AA, A and BFO	150 mm to 2 400 mm	(0.14 + 67L) μ m	Repeat-o-Meter
Roughness Standard Ra ^F	0.37 μ m to 6 μ m	(29 + 0.28L) nm Ra	Surface Roughness Tester Mitutoyo SJ-400
Coating Thickness Measuring Equipment- Eddy Current & Magnetic Induction Coating Thickness Testers ^{FO}	23.8 μ m to 6 950 μ m	(237 + 0.05L) nm	Standard thickness Shims
Coating Thickness Standards -Foil and Coated Plates Thickness Shims ^{FO}	0.1 mm to 3.01 mm	(0.027 + 5.8L)nm	CMI (Eddy-Current) Thickness Meter
Ultrasonic Thickness Testers ^{FO}	1 mm to 50.8 mm	(0.07 + 7.4 x 10 ⁻⁸ L) mm	Grade 0 Gage Block Comparison
Rulers / Scales ^{FO}	0.1 mm to 1 000 mm	(57 + 9.6 x 10 ⁻⁶ L) μ m	Linear Scale
	1 000 mm to 5 000 mm	(60 + 7.1 x 10 ⁻⁶ L) μ m	
Measuring Tape ^{FO}	0.1 mm to 1 000 mm	(289 + 2.1 x 10 ⁻⁶ L) μ m	
	1 000 mm to 5 000 mm	(577 + 1.1 x 10 ⁻⁶ L) μ m	
Linear Measurement Scales ^{FO}	106 mm to 1 092 mm	(0.69 + 8.1 x 10 ⁻⁷ L) μ m	Grade 0 Gage Block Comparison
Angularity ^{FO}	1° to 90°	(0.002 9 + 1.4 x 10 ⁻⁵ L) °	Angle Blocks
Thread Plug Gage Major Diameter ^{FO}	(0 – 80 to 4 – 20)	55 μ m	Bench Micrometer ASME B89.1.17
Thread Plug Gage Pitch Diameter ^{FO}	(0 – 80 to 4 – 20)	55 μ m	Thread Wire & Bench Micrometer ASME B89.1.17

Time and Frequency

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Calibrate -Time Marker Output ^{FO}	2 ns to 20 ms	2.5 μ s/s	Philips 6669 Timer/Counter



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Time and Frequency

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Timers, Counters and Stop Watches ^O	1 s to 86 400 s	(13 + 0.02t) ms	Philips 6669 Timer/Counter, Agilent 33220A Function Generator
Time & Frequency Generators ^F	1 Hz to 120 MHz	0.08 μ Hz/Hz	Philips 6669 Timer/Counter
	120 MHz to 1 300 MHz	0.08 μ Hz/Hz	
Optical Tachometer and Tachometer Contact ^{FO}	0.1 rad/s to 10 470 rad/s	(0.039 + 1.6 x 10 ⁻⁵ ω) rad/s	Philips 6669 Timer/Counter., Agilent 33220A Function Generator
Rotation Measurement Speed, Line Speed, Centrifuges Rotation Speed ^{FO}	0.1 rad/s to 2 094 rad/s	0.017 rad/s	Tachometer AMETEK Takette 1716
Rotation Velocity Measurement and Centrifuges Rotation Speed ^{FO}	0.1 rad/s to 2 094 rad/s	0.009 6 rad/s	Monarch digital tachometer and Monarch Palm strobe

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	
Gas Flow Testers - Mass Flow Rate Meters Volumetric Flow Rate Meters Calibrated Flow Restrictors ^{FO}	0.01 cm ³ /min to 10 cm ³ /min	(0.003 3 + 0.64Q) cm ³ /min	Omega Gas Mass Flowmeter (Direct Comparison)	
	10 cm ³ /min to 500 cm ³ /min	(0.0074 + 0.9Q) cm ³ /min		
	0.5 L/min to 20 L/min	(0.0037 + 0.76Q) L/min		
		20 L/min to 500 L/min	(0.026 + 0.5Q) L/min	Endress + Hauser Coriolis Mass Flow Meter
		500 L/min to 2 500 L/min	(0.021 + 0.5Q) L/min	
		0.1 mL/min to 1 mL/min	(1.7 x 10 ⁻⁴ + 8.5 x 10 ⁻³ Q) mL/min	
		1 mL/min to 10 mL/min	(6.6 x 10 ⁻⁵ + 0.008 7Q) mL/min	
	10 mL/min to 100 mL/min	(3.9 x 10 ⁻⁶ + 0.043Q) mL/min	USON Leak Rate Calibration Kit (Bubble Displacement Meter), Stopwatch	
Air Velocity Handheld: Rotational Anemometers Pressure Anemometer Tube Anemometer Thermoelectric Anemometer ^F	1 m/s to 80 m/s	(0.13 + 0.002v) m/s	Pitot, Tube, Airflow Meter, Wind Tunnel	
	0.5 m/s to 25 m/s	(0.11 + 0.021v) m/s		



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Mechanical

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Pressure Gages and Transducers (Air or Nitrogen) ^{FO}	-14.5 psi to 14.5 psi	$(0.06 + 2.7 \times 10^{-5}P)$ psi	700PD4 Pressure Transducer Differential Pressure Module Pressure Calibrator G.E Druck DPI515 Pressure Controller/ Calibrator
	14.5 psi to 500 psi	$(0.06 + 2.7 \times 10^{-5}P)$ psi	
	300 psi to 3 000 psi	$(0.93 + 5.8 \times 10^{-5}P)$ psi	
Pressure - Gauges and Transducers (Liquid Compatible Media) ^{FO}	50 psi to 500 psi	$(0.06 + 2.7 \times 10^{-5}P)$ psi	Fluke 744 Process Calibrator 700P07 Pressure Transducer
	100 psi to 1 000 psi	0.12 psi	Fluke 744
	1 000 psi to 10 000 psi	$(1.2 + 1.9 \times 10^{-5}P)$ psi	Process Calibrator 700P08 Pressure Transducer
	500 psi to 5 000 psi	$(1.04 + 8.8 \times 10^{-8}P)$ psi	Fluke 744 Process Calibrator 700P30 Pressure Transducer
Force Gauges (Tension, Compression) ^{FO}	0.049 N to 9.806 N (Res.= 0.001 N)	$(0.01 + 1.9 \times 10^{-4}F)$ N	OIML Class M1 Deadweight set
	8.896 N to 215.74 N (Res.= 0.1 N)	$(0.29 + 8.7 \times 10^{-6}F)$ N	NIST ASTM Class 3 Deadweights
	4.4 N to 2 224 N (Res.= 0.1 N)	$(0.11 + 1.1 \times 10^{-4}F)$ N	NIST Class F Dead Weights
	445 N to 4 448 N (Res.= 1 N)	$(0.19 + 1.0 \times 10^{-3}F)$ N	Honeywell Load Cell (Comparison Method)
	4 448 N to 22 241 N (Res.= 1 N)	$(7.5 + 3.1 \times 10^{-4}F)$ N	MARK-10 Load Cell (Comparison Method)
	22 242 N to 44 482 N (Res.= 1 N)	$(9.9 + 2.2 \times 10^{-6}F)$ N	Transducer Techniques Load Cell & Indicator (Comparison Method)
	44 482 N to 88 964 N	$(28 + 2.4 \times 10^{-7}F)$ N	
Digital and Analog Dynamometers and Force Gauges Tools. (Tension, Compression) ^{FO}	4.4 N to 2 224 N (Res. = 0.1 N)	$(0.11 + 1.1 \times 10^{-4}F)$ N	NIST Class F Deadweights ISO 7500-1. 2015 (Comparison Method)
	445 N to 4 448 N (Res. = 1 N)	$(0.9 + 8.1 \times 10^{-4}F)$ N	Honeywell Load Cell ISO 7500-1.2015 (Comparison Method)
	4 449 N to 44 482 N (Res.= 1 N)	$(9.9 + 2 \times 10^{-6}F)$ N	
	44 482 N to 88 964 (Res.= 1 N)	$(28 + 2.4 \times 10^{-7}F)$ N	



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Mechanical

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Torque Meters ^{FO} (Clockwise and counterclockwise)	0.282 N·m to 2.82 N·m	0.057 % of reading + 0.002 9 N·m	AIMCO Torque Analyzer
	2.82 N·m to 28.2 N·m	0.37 % of reading + 0.02 N·m	
	6.78 N·m to 67.8 N·m	0.36 % of reading + 0.012 N·m	Mountz Torque transducer and Indicator
	54.23 N·m to 542.32 N·m	0.15 % of reading + 0.17 N·m	
Torque Transducers, Torque Analyzers ^F (Clockwise and counterclockwise)	0.56 N·m to 2.82 N·m (5 lbf·in to 25 lbf·in)	0.069 % of reading + 0.002 N·m (0.069 % of reading + 0.018 lbf·in)	Torque Calibration Wheel, Dead Weight Set
	2.82 N·m to 28.2 N·m (25 lbf·in to 250 lbf·in)	0.008 % of reading + 0.024 N·m (0.008 % of reading + 0.21 lbf·in)	
	6.77 N·m to 67.79 N·m (60 lbf·in to 600 lbf·in)	0.023 % of reading + 0.037 N·m (0.023 % of reading + 0.33 lbf·in)	
	13.55 N·m to 135.58 N·m (120 lbf·in to 1 200 lbf·in)	0.037 % of reading + 0.072 N·m (0.037 % of reading + 0.64 lbf·in)	
	54.23 N·m to 542.32 N·m (480 lbf·in to 4 800 lbf·in)	0.049 % of reading + 0.37 N·m (0.049 % of reading + 3.3 lbf·in)	

Mass, Force and Weighting 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 Scales ^{FO}	1 mg to 100 g (Res.= 0.000 1 g)	$(5 \times 10^{-5} + 5.4 \times 10^{-7}Wt) \text{ g}$	Verification with ASTM Class 1 Deadweights
	101 to 500 g (Res.= 0.001 g)	$(6.8 \times 10^{-4} + 3 \times 10^{-7}Wt) \text{ g}$	
	501 g to 1kg (Res.= 0.01 g)	$(4.5 \times 10^{-3} + 1.1 \times 10^{-6}Wt) \text{ g}$	
Scales ^{FO}	1 lb to 5 lb (Res.= 0.000 5 lb)	$(2.4 \times 10^{-4} + 2.7 \times 10^{-5}Wt) \text{ lb}$	NIST Class F Deadweights
	6 lb to 50 lb (Res.= 0.005 lb)	$(2.7 \times 10^{-3} + 2.3 \times 10^{-5}Wt) \text{ lb}$	
	51 lb to 500 lb (Res.= 0.02 lb)	$(0.01 + 2.8 \times 10^{-5}Wt) \text{ lb}$	
Scales - Proportional Testing ^{FO}	501 lb to 750 lb (Res. = 0.01 lb)	$(0.037 + 2.7 \times 10^{-5}Wt) \text{ lb}$	Set Mass Class OIML
	751 lb to 1 500 lb (Res. = 0.05 lb)	$(0.16 + 1.3 \times 10^{-4}Wt) \text{ lb}$	
	1 500 lb to 3 000 lb (Res. = 0.1 lb)	$(0.53 + 2.3 \times 10^{-5}Wt) \text{ lb}$	
Scales - Substitution Testing ^{FO}	505 kg to 5 000 kg (Res.= 1 kg)	$(1 + 7.7 \times 10^{-6}Wt) \text{ kg}$	Parallelepiped mass weight set Class M1



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Thermodynamic

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Relative Humidity ^{FO}	11 % RH to 97 % RH	1 % RH	Digital Temperature and Humidity Meter Avísala MI70/HMP75
Temperature Measure and Source Comparison ^{FO}	0 °C to 60 °C	$(0.16 + 4.2 \times 10^{-5} T) \text{ °C}$	Hart Scientific 1504 w/4K Thermistor, Jofra 601 Dry Well. Hart Scientific 1502 w/PRT PT100 Sensor, Jofra 601 Dry Well
	0 °C to 500 °C	$(0.13 + 0.000 2 T) \text{ °C}$	
Low Temperature Chambers and Freezer ^{FO}	-200 °C to 0 °C	$(0.13 + 1.1 \times 10^{-5} T) \text{ °C}$	Hart Scientific 1502 w/PRT PT100 Sensor
Chambers and Ovens of Temperature ^{FO}	0.1 °C to 500 °C	$(0.05 + 0.002 6 T) \text{ °C}$	Hart Scientific 1502 w/PRT PT100 Sensor
High Temperature Chambers and Ovens ^{FO}	500 °C to 1 300 °C	$(0.092 + 7.5 \times 10^{-4} T) \text{ °C}$	Fluke 754 w/TC "type K" Sensor
Wave Solder ^{FO}	200 °C to 450 °C	$(0.26 + 1.2 \times 10^{-4} T) \text{ °C}$	Hart Scientific 1502 w/PRT PT100 Sensor
Temperature Measurement Calibration of RTD Sensors ^{FO} Pt 385, 100Ω Pt 3 926, 100Ω Pt 385, 1 000Ω	0 °C to 500 °C	$(0.026 + 8.4 \times 10^{-5} T) \text{ °C}$	Hart Scientific 1502 Precision Thermometer, Jofra 601 Dry Well
IR Temperature - Calibrate IR Meters ^{FO}	35 °C to 500 °C	$(0.46 + 4.4 \times 10^{-5} T) \text{ °C}$	Hart Scientific 9132 IR Calibrator Hart Scientific 1502 Precision Thermometer, Fluke 5520A and JIS C 1612 2000 (Main & Aux. Outputs)

Optical

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Gloss Meters ^F	20° 60° 85°	0.82 GU 0.64 GU 0.69 GU	Gloss Standards; GU Represents Gloss Units



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UV Irradiance - Calibration of UV Light Meters and UV Dosimeters Wave Length ^F	0.1 mW/cm ² to 1 999.9 mW/cm ²	2.6 % of reading	UV Intensity and Power Meter, High Intensity Mercury Lamp UV Light Source (220 nm to 540 nm)
	1.999 W/cm ² to 20 W/cm ²	2.6 % of reading	
Luminance Meters and Sources Wave Length ^F	1 Lux to 5 300 Lux	(0.1 + 0.038Ev) Lux	U.V/ Visible Light Meter Spectroline XR 1000 SP250-37 (425 nm to 700 nm)

Electrical

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Equipment to Measure DC Voltage ^{FO}	0.33 mV to 330 mV	0.019 μ V/V + 0.68 μ V	Fluke 5520A
	330 mV to 3.3 V	23 μ V/V + 0.24 μ V	
	3.3 V to 33 V	0.003 2 mV/V + 60 μ V	
	33 V to 330 V	0.004 2 μ V/V + 0.028 mV	
	100 V to 1 000 V	4.1 μ V/V + 11 μ V	
Equipment to Output DC Voltage ^{FO}	0 mV to 100 mV	0.08 μ V/V + 148 μ V	HP 3458A
	100 mV to 1 V	0.09 μ V/V + 130 μ V	
	1 V to 10 V	115 μ V/V + 202 μ V	
	10 V to 100 V	113 μ V/V + 227 μ V	
	100 V to 1 000 V	113 μ V/V + 2 mV	
Equipment to Measure DC Current ^{FO}	0.33 μ A to 330 μ A	0.031 nA + 0.7 nA	Fluke 5520A
	330 μ A to 3.3 mA	0.002 4 μ A/A + 0.7 μ A	
	3.3 mA to 33 mA	0.035 μ A/A + 0.007 7 μ A	
	33 mA to 330 mA	0.003 6 μ A/A + 0.006 9 μ A	
	330 mA to 1.1 A	3.2 μ A/A + 0.006 mA	
	1.1 A to 3 A	0.042 mA/A + 0.037 mA	
	3 A to 11 A	0.008 1 mA/A + 0.017 mA	
	11 A to 20.5 A	0.005 4 mA/A + 0.64 mA	
Equipment to Output DC Current ^{FO}	10 μ A to 100 μ A	0.028 nA/ μ A + 0.24 nA	HP 3458A
	100 μ A to 1 mA	0.040 nA/ μ A + 1.0 nA	
	1 mA to 10 mA	0.036 μ A/mA + 0.0038 μ A	



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Uva #6121, Colonia El Granjero
 Ciudad Juarez, Chihuahua, México C.P. 32690
 Contact Name: Deisy Carolina Gallegos Phone: 656-233-0828

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 Current ^{FO}	10 mA to 100 mA	0.033 μ A/mA + 0.31 μ A	HP 3458A
	100 mA to 1 A	0.036 μ A/mA + 0.01 μ A	
DC Current Clamp on Meters ^{FO}	16.5 A to 1 000 A	12 mA/A + 75 mA	Fluke 5520A Fluke 5500-COIL
Equipment to Measure DC Power At the listed Voltage ^{FO} (33 mV to 1 020 V)	0.33 to 330 mA	0.021 % of reading	Fluke 5520A (Main & Aux Outputs) *Settling Time 30 s, add +/- 0.02 %
	0.33 A to 3 A	0.036 % of reading	
	3 A to 20.5 A	0.088 % of reading	
Power Supply AC/DC Current (100 Hz to 5 kHz)	1 A to 10 A	9.5 x 10 ⁻⁶ A/A + 0.005 8 A	Precision Current Shunt Resistor and HP 3458A Multimeter
	10 A to 60 A	1.3 x 10 ⁻⁵ A/A + 0.023 A	
	60 A to 300 A	1.1 x 10 ⁻³ A/A - 0.002 5 A	
Equipment to Measure Ionizers DC Voltage ^{FO}	0 kV to 5 kV	0.1 V/kV	ION Systems 91-0210
Equipment to Measure Capacitance ^{FO}	0.19 nF to 3.3 nF	0.1 pF/nF + 0.7 pF	Fluke 5520A
	3.3 nF to 11 nF	0.003 pF/nF + 1 pF	
	11 nF to 33 nF	0.0002 pF/nF + 1 pF	
	33 nF to 330 nF	0.019 pF/nF + 0.37 pF	
	0.33 μ F to 1.1 μ F	0.027 nF/ μ F + 0.062 nF	
	1.1 μ F to 3.3 μ F	0.002 nF/ μ F + 0.1 nF	
	3.3 μ F to 11 μ F	0.046 nF/ μ F + 0.55 nF	
	11 μ F to 33 μ F	0.015 nF/ μ F + 1.2 nF	
	33 μ F to 330 μ F	0.072 nF/ μ F + 7.7 nF	
	0.33 mF to 3.30 mF	0.15 μ F/mF + 0.057 μ F	
	3.3 mF to 11 mF	0.14 μ F/mF + 0.46 μ F	
	11 mF to 33 mF	0.24 μ F/mF + 1.7 μ F	
	33 mF to 110 mF	0.044 μ F/mF + 6.9 μ F	
Equipment to Measure Resistance ^{FO}	100 μ Ω to 100 m Ω	0.002 μ Ω /m Ω + 0.000 2 μ Ω	Precision High Power Calibration Resistors Precision Decade Resistor
	0.1 Ω to 11 Ω	0.009 m Ω / Ω + 0.7 m Ω	
	11 Ω to 33 Ω	0.02 m Ω / Ω + 0.5 m Ω	Fluke 5520A
	33 Ω to 330 Ω	0.006 m Ω / Ω + 0.77 m Ω	
	0.33 k Ω to 3.3 k Ω	0.000 11 Ω /k Ω + 0.7 Ω	
	3.3 k Ω to 11 k Ω	0.000 42 Ω /k Ω + 0.7 Ω	
	11 k Ω to 33 k Ω	0.001 1 Ω /k Ω + 0.12 Ω	



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Equipment to Output Resistance ^{FO}	33 k Ω to 330 k Ω	0.013 Ω /k Ω + 0.30 Ω	Fluke 5520A	
	0.33 M Ω to 3.3 M Ω	0.02 k Ω /M Ω + 109 Ω		
	3.3 M Ω to 33 M Ω	0.014 k Ω /M Ω + 0.032 k Ω		
	33 M Ω to 110 M Ω	0.000 11 k Ω /M Ω + 0.85 k Ω		
	110 M Ω to 330 M Ω	0.031 k Ω /M Ω + 2.2 k Ω		
	0.33 G Ω to 1.1 G Ω	7.4 k Ω /M Ω + 1.2 k Ω		
	Equipment to Output Resistance ^{FO}	1 Ω to 10 Ω	0.12 m Ω / Ω + 7 $\mu\Omega$	HP 3458A
		10 Ω to 100 Ω	0.008 m Ω / Ω + 133 $\mu\Omega$	
		0.1 k Ω to 1 k Ω	7.3 Ω /k Ω + 167 $\mu\Omega$	
		1 k Ω to 10 k Ω	0.07 Ω /k Ω + 0.012 $\mu\Omega$	
		10 k Ω to 100 k Ω	0.06 Ω /k Ω + 194 m Ω	
		0.1 M Ω to 1 M Ω	0.01 k Ω /M Ω + 18 Ω	
		1 M Ω to 10 M Ω	0.03 k Ω /M Ω + 18 Ω	
		10 M Ω to 100 M Ω	0.10 k Ω /M Ω + 56 Ω	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type B ^{FO}	600 to 800 $^{\circ}\text{C}$	0.44 $^{\circ}\text{C}$	Fluke 5520A Equipment Simulation of Thermocouple Output ITS-90	
	800 to 1 000 $^{\circ}\text{C}$	0.34 $^{\circ}\text{C}$		
	1 000 to 1 550 $^{\circ}\text{C}$	0.30 $^{\circ}\text{C}$		
	1 550 to 1 820 $^{\circ}\text{C}$	0.33 $^{\circ}\text{C}$		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type E ^{FO}	-250 $^{\circ}\text{C}$ to -100 $^{\circ}\text{C}$	0.5 $^{\circ}\text{C}$		
	-100 $^{\circ}\text{C}$ to -25 $^{\circ}\text{C}$	0.16 $^{\circ}\text{C}$		
	-25 $^{\circ}\text{C}$ to 350 $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$		
	350 $^{\circ}\text{C}$ to 650 $^{\circ}\text{C}$	0.16 $^{\circ}\text{C}$		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type J ^{FO}	650 $^{\circ}\text{C}$ to 1 000 $^{\circ}\text{C}$	0.21 $^{\circ}\text{C}$		
	-210 $^{\circ}\text{C}$ to -100 $^{\circ}\text{C}$	0.27 $^{\circ}\text{C}$		
	-100 $^{\circ}\text{C}$ to -30 $^{\circ}\text{C}$	0.16 $^{\circ}\text{C}$		
	-30 $^{\circ}\text{C}$ to 150 $^{\circ}\text{C}$	0.16 $^{\circ}\text{C}$		
	150 $^{\circ}\text{C}$ to 760 $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type K ^{FO}	760 $^{\circ}\text{C}$ to 1200 $^{\circ}\text{C}$	0.17 $^{\circ}\text{C}$		
	-200 $^{\circ}\text{C}$ to -100 $^{\circ}\text{C}$	0.33 $^{\circ}\text{C}$		
	-100 $^{\circ}\text{C}$ to -25 $^{\circ}\text{C}$	0.18 $^{\circ}\text{C}$		
	-25 $^{\circ}\text{C}$ to 120 $^{\circ}\text{C}$	0.16 $^{\circ}\text{C}$		
	120 $^{\circ}\text{C}$ to 1 000 $^{\circ}\text{C}$	0.26 $^{\circ}\text{C}$		
	1 000 $^{\circ}\text{C}$ to 1 372 $^{\circ}\text{C}$	0.4 $^{\circ}\text{C}$		



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Temperature Calibration Indication and Control Equipment used with Thermocouple Type N ^{FO}	-200 °C to -100 °C	0.4 °C	Fluke 5520A Equipment Simulation of Thermocouple Output ITS-90
	-100 °C to -25 °C	0.22 °C	
	-25 °C to 120 °C	0.19 °C	
	120 °C to 410 °C	0.18 °C	
	410 °C to 1 300 °C	0.27 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type R ^{FO}	0 °C to 250 °C	0.48 °C	Fluke 5520A Equipment Simulation of Thermocouple Output ITS-90
	250 °C to 400 °C	0.28 °C	
	400 °C to 1 000 °C	0.33 °C	
	1 000 °C to 1 767 °C	0.4 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type S ^{FO}	0 °C to 250 °C	0.47 °C	Fluke 5520A Equipment Simulation of Thermocouple Output ITS-90
	250 °C to 1 000 °C	0.36 °C	
	1 000 °C to 1 400 °C	0.37 °C	
	1 400 °C to 1 767 °C	0.46 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type T ^{FO}	-250 °C to -150 °C	0.63 °C	Electrical Simulation of RTD Fluke 5520A
	-150 °C to 0 °C	0.24 °C	
	0 °C to 120 °C	0.16 °C	
	120 °C to 400 °C	0.14 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type U ^{FO}	-200 °C to 0 °C	0.56 °C	Electrical Simulation of RTD Fluke 5520A
	0 °C to 600 °C	0.27 °C	
Temperature Calibration Indication and Control Equipment used with RTD Pt 385, 100 Ω ^{FO}	630 °C to 800 °C	0.23 °C	Electrical Simulation of RTD Fluke 5520A
Temperature Calibration Indication and Control Equipment used with Pt 385, 100 Ω Pt 3 926, 100 Ω ^{FO}	-200 °C to -80 °C	0.05 °C	Electrical Simulation of RTD Fluke 5520A
	-80 °C to 0 °C	0.05 °C	
	0 to °C 100 °C	0.07 °C	
	100 °C to 300 °C	0.09 °C	
	300 °C to 400 °C	0.1 °C	
	-200 °C to -80 °C	0.03 °C	
	-80 °C to 0 °C	0.03 °C	
	0 °C to 100 °C	0.04 °C	
	100 °C to 260 °C	0.05 °C	
	260 °C to 300 °C	0.06 °C	



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Temperature Calibration Indication and Control Equipment used with Pt 385, 100 Ω Pt 3 926, 100 Ω ^{FO}	300 °C to 400 °C	0.07 °C	Electrical Simulation of RTD Fluke 5520A	
	400 °C to 600 °C	0.07 °C		
	600 °C to 630 °C	0.23 °C		
Temperature Calibration Indication and Control Equipment used with Pt 385, 1 000 Ω ^{FO}	-200 °C to -80 °C	0.03 °C	Electrical Simulation of RTD Fluke 5520A (1-Yr cal. Interval) ASTM E 644-11 RTD	
	-80 °C to 0 °C	0.03 °C		
	0 °C to 100 °C	0.04 °C		
	100 °C to 260 °C	0.05 °C		
	260 °C to 300 °C	0.06 °C		
	300 °C to 400 °C	0.07 °C		
	400 °C to 600 °C	0.07 °C		
Equipment to Measure AC Voltage At the listed frequencies ^{FO}	600 °C to 630 °C	0.23 °C	Fluke 5520A (Sinewave Output)	
10 Hz to 45 Hz	1 mV to 33 mV	0.8 mV/V + 6 μ V		
10 Hz to 45 Hz	33 mV to 330 mV	0.3 mV/V + 8 μ V		
10 Hz to 45 Hz	0.33 V to 3.3 V	0.3 mV/V + 50 μ V		
10 Hz to 45 Hz	3.3 V to 33 V	0.3 mV/V + 650 μ V		
Equipment to Measure AC Voltage At the listed frequencies ^{FO}	45 Hz to 10 kHz	1 mV to 33 mV		0.15 mV/V + 6 μ V
	45 Hz to 10 kHz	33 mV to 330 mV		0.145 mV/V + 8 μ V
	45 Hz to 10 kHz	0.33 V to 3.3 V		0.15 mV/V + 60 μ V
	45 Hz to 10 kHz	3.3 V to 33 V		0.15 mV/V + 600 μ V
Equipment to Measure AC Voltage At the listed frequencies ^{FO}	10 kHz to 20 kHz	1 mV to 33 mV		0.2 mV/V + 6 μ V
	10 kHz to 20 kHz	33 mV to 330 mV		0.16 mV/V + 8 μ V
	10 kHz to 20 kHz	0.33 V to 3.3 V		0.19 mV/V + 60 μ V
	10 kHz to 20 kHz	3.3 V to 33 V		0.24 mV/V + 600 μ V
	10 kHz to 20 kHz	33 to 330 V		0.25 mV/V + 6 mV



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Equipment to Measure AC Voltage At the listed frequencies ^{FO}			Fluke 5520A (Sinewave Output)
20 kHz to 50 kHz	1 mV to 33 mV	1. mV/V + 6 μ V	
20 kHz to 50 kHz	33 mV to 330 mV	0.35 mV/V + 600 μ V	
20 kHz to 50 kHz	0.33 V to 3.3 V	0.3 mV/V + 50 μ V	
20 kHz to 50 kHz	3.3 V to 33 V	0.35 mV/V + 8 μ V	
20 kHz to 50 kHz	33 V to 330 V	0.3 mV/V + 6 mV	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			Fluke 5520A (Sinewave Output)
50 kHz to 100 kHz	1 mV to 33 mV	3.5 mV/V + 12 μ V	
50 kHz to 100 kHz	33 mV to 330 mV	0.8 mV/V + 32 μ V	
50 kHz to 100 kHz	0.33 V to 3.3 V	0.7 mV/V + 130 μ V	
50 kHz to 100 kHz	3.3 V to 33 V	0.9 mV/V + 1.6 mV	
50 kHz to 100 kHz	33 V to 330 V	2 mV/V + 50 mV	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
100 kHz to 500 kHz	1 mV to 33 mV	8 mV/V + 50 μ V	
100 kHz to 500 kHz	33 mV to 330 mV	2.4 mV/V + 600 μ V	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
100 kHz to 500 kHz	0.33 V to 3.3 V	2 mV/V + 70 μ V	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
45 Hz to 1 kHz	33 V to 330 V	0.19 mV/V + 2 mV	
45 Hz to 1 kHz	330 V to 1 020 V	0.3 mV/V + 10 mV	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
1 kHz to 10 kHz	33 V to 330 V	0.2 mV/V + 6 mV	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
1 kHz to 5 kHz	330 V to 1 020 V	0.25 mV/V + 10 mV	



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Equipment to Measure AC Voltage At the listed frequencies ^{FO}			Fluke 5520A (Sinewave Output)
5 kHz to 10 kHz	330 V to 1 020 V	0.3 mV/V + 10 mV	
Equipment to Output AC Voltage At the listed frequencies ^{FO}			HP 3458A (Sinewave Output) AC Mode = SYNC AC Band = \leq 2 MHz
1 Hz to 40 Hz	1 mV to 10 mV	0.035 % of reading + 3 μ V	
1 Hz to 40 Hz	10 mV to 100 mV	0.009 % of reading + 4 μ V	
1 Hz to 40 Hz	0.1 V to 1 V	0.009 % of reading + 40 μ V	
1 Hz to 40 Hz	1 V to 10 V	0.009 % of reading + 0.4 mV	
1 Hz to 40 Hz	10 V to 100 V	0.023 % of reading + 4 mV	
1 Hz to 40 Hz	100 V to 1 000 V	0.046 % of reading + 40 mV	
Equipment to Output AC Voltage At the listed frequencies ^{FO}			
40 Hz to 1 kHz	1 mV to 10 mV	0.023 % of reading + 1.1 μ V	
40 Hz to 1 kHz	10 mV to 100 mV	0.009 % of reading + 2 μ V	
40 Hz to 1 kHz	0.1V to 1 V	0.009 % of reading + 20 μ V	
40 Hz to 1 kHz	1 V to 10 V	0.046 % of reading + 20 mV	
40 Hz to 1 kHz	10 V to 100 V	0.023 % of reading + 2 mV	
40 Hz to 1 kHz	100 V to 1 000 V	0.009 % of reading + 0.2 mV	
Equipment to Output AC Voltage At the listed frequencies ^{FO}			
1 kHz to 20 kHz	1 mV to 10 mV	0.035 % of reading + 1.1 μ V	
1 kHz to 20 kHz	10 mV to 100 mV	0.017 % of reading + 2 μ V	
1 kHz to 20 kHz	0.1V to 1 V	0.017 % of reading + 20 μ V	
1 kHz to 20 kHz	1 V to 10 V	0.07 % of reading + 20 mV	
1 kHz to 20 kHz	10 V to 100 V	0.023 % of reading + 2 mV	
1 kHz to 20 kHz	100 V to 1 000 V	0.017 % of reading + 0.2 mV	
Equipment to Output AC Voltage At the listed frequencies ^{FO}			
20 kHz to 50 kHz	1 mV to 10 mV	0.12 % of reading + 1.1 μ V	
20 kHz to 50 kHz	10 mV to 100 mV	0.035 % of reading + 2 μ V	



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Equipment to Output AC Voltage At the listed frequencies ^{FO}			HP 3458A (Sinewave Output) AC Mode = SYNC AC Band = ≤ 2 MHz
20 kHz to 50 kHz	0.1V to 1 V	0.035 % of reading + 0.2 mV	
20 kHz to 50 kHz	1 V to 10 V	0.14 % of reading + 20 mV	
20 kHz to 50 kHz	10 V to 100 V	0.041 % of reading + 2 mV	
20 kHz to 50 kHz	100 V to 1 000 V	0.035 % of reading + 20 μ V	
Equipment to Output AC Voltage At the listed frequencies ^{FO}			Fluke 5520A (LCOMP off) Compliance Adder: 0.05 uA/V
50 kHz to 100 kHz	1 mV to 10 mV	0.58 % of reading + 1.1 μ V	
50 kHz to 100 kHz	10 mV to 100 mV	0.14 % of reading + 2 mV	
50 kHz to 100 kHz	0.1 V to 1 V	0.093 % of reading + 0.2 mV	
50 kHz to 100 kHz	1 V to 10 V	0.093 % of reading + 20 μ V	
50 kHz to 100 kHz	10 V to 100 V	0.093 % of reading + 2 μ V	
Equipment to Output AC Voltage At the listed frequencies ^{FO}			
100 kHz to 300 kHz	10 mV to 100 mV	4.6 % of reading + 2 μ V	
100 kHz to 300 kHz	0.1 V to 1 V	0.35 % of reading + 10 μ V	
100 kHz to 300 kHz	1 V to 10 V	0.35 % of reading + 1 mV	
100 kHz to 300 kHz	10 V to 100 V	0.35 % of reading + 0.1 mV	
Equipment to Output AC Voltage At the listed frequencies ^{FO}			
0.3 MHz to 1 MHz	10 mV to 100 mV	1.2 % of reading + 0.1 mV	
0.3 MHz to 1 MHz	0.1 V to 1 V	1.2 % of reading + 1 mV	
0.3 MHz to 1 MHz	1 V to 10 V	1.2 % of reading + 10 μ V	
Equipment to Measure AC Current At the listed frequencies ^{FO}			
45 Hz to 1 kHz	29 μ A to 329.99 μ A	0.13 % of reading + 0.1 μ A	
45 Hz to 1 kHz	0.33 mA to 3.299 9 mA	0.1 % of reading + 0.15 μ A	
45 Hz to 1 kHz	3.3 mA to 32.999 mA	0.04 % of reading + 2 μ A	
45 Hz to 1 kHz	33 mA to 329.99 mA	0.04 % of reading + 20 μ A	
45 Hz to 1 kHz	0.33 A to 1.099 99 A	0.05 % of reading + 100 μ A	
45 Hz to 1 kHz	1.1 A to 2.999 99 A	0.06 % of reading + 100 μ A	



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Equipment to Measure AC Current At the listed frequencies ^{FO}			Fluke 5520A (LCOMP off) Compliance Adder: 0.05 uA/V
45 Hz to 100 Hz	3 A to 10.999 9 A	0.06 % of reading + 2 mA	
45 Hz to 100 Hz	11 A to 20.5 A	0.12 % of reading + 5 mA	
Equipment to Measure AC Current At the listed frequencies ^{FO}			Fluke 5520A/SC600
100 Hz to 1 kHz	3 A to 10.999 9 A	0.1 % of reading + 2 mA	
100 Hz to 1 kHz	11 A to 20.5 A	0.15 % of reading + 5 mA	
Calibrate Oscilloscopes – Level Sine Amp 50 kHz ^{FO}	10 mv to 5 Vp-p	2 % of reading + 300 μ V	Fluke 5520A/SC600
Calibrate Oscilloscopes – Level Sine Flatness (5 mV to 5.5V) ^{FO}	50 kHz to 100 MHz	1.5 % of reading + 100 μ V	
	100 kHz to 300 MHz	2 % of reading + 100 μ V	
300 MHz to 600 MHz	4 % of reading + 100 μ V		
AC Clamp-On Meters (45 Hz to 1 kHz) ^{FO}	16.5 A to 1 000 A	0.45 % of reading + 0.5 A	Fluke 5520A Fluke 5500-COIL
Equipment to Measure AC Current At the listed frequencies ^{FO}			HP 3458A (Sinewave Output)
45 Hz to 5 kHz	0 A to 100 μ A	0.072 % of reading + 30 nA	
Equipment to Measure AC Current At the listed frequencies ^{FO}			HP 3458A (Sinewave Inputs)
100 Hz to 5 kHz	0.1 mA to 1 mA	0.042 % of reading + 0.2 μ V	
100 Hz to 5 kHz	1 mA to 10 mA	0.04 % of reading + 2 μ A	
100 Hz to 5 kHz	10 MA to 100 mA	0.041 % of reading + 20 μ A	
100 Hz to 5 kHz	0.1 A to 1 A	0.15 % of reading + 200 μ A	
NDT Electrical Meter Relativity Conductivity Electrolytic Measuring Equipment- Eddy- Current ^F	4.6 x 10 ⁶ S/m	9.2 x 10 ⁴ S/m	Conductivity Standard Centurion NDT (It is also reported in units % IACS)
	2.7 x 10 ⁷ S/m	2 x 10 ⁵ S/m	
	5.9 x 10 ⁷ S/m	4.9 x 10 ⁵ S/m	
Electrical Patient Simulator Fetal Simulator ^F	50 μ V to 2.5 mV	1 μ V + 0.09 μ V/V	Fluke 5520A/SC600 Agilent 34401A Multimeter, A-M Systems 3000 Differential Amplifier



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Electrical Patient Simulator Fetal Simulator ^F	1 T Ω	0.81 T Ω	Fluke 5520A/SC600 Agilent 34401A Multimeter, A-M Systems 3000 Differential Amplifier
Equipment to Measure DC/AC - High Voltage ^{FO}	1 kV to 5 kV	0.01 kV	3458A and High Prove- Voltage
Shunt AC/DC Current (100 Hz to 5 kHz) ^{FO}	100 $\mu\Omega$ to 10 Ω	0.49 % of reading	Agilent 6672A DC Power Supply and Agilent 3458A Digital Multimeter
Equipment to Measure Resistance Fixed Point ^{FO}	101.3 M Ω	0.006 M Ω	Precision AC current Shunt and HP 3458A
	1 G Ω	7.2 x 10 ⁻⁴ G Ω	General Radio 1433P Decade
	10 G Ω	0.007 G Ω	IET P40102 Decade
	100 G Ω	0.006 G Ω	Keithley 5155 Resistance Standard
	1 T Ω	8.1 x 10 ⁻³ T Ω	

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.
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.



Certificate of Accreditation: Supplement

Master Supply de México S de RL de CV

Uva #6121, Colonia El Granjero
Ciudad Juarez, Chihuahua, México C.P. 32690
Contact Name: Deisy Carolina Gallegos Phone: 656-233-0828

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

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 T represents temperature in °C or °F as appropriate to the uncertainty statement.
8. The term Q represents flow in cm³/min or mL/min (including SI multiple and submultiple units) appropriate to the uncertainty statement.
9. The term F represents force in Newton (N) or lbf grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.
10. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
11. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.
12. The term ω represents rotational speed in radian per second (including SI multiple and submultiple units) appropriate to the uncertainty statement.
13. The term E represents Illuminance in lux (lm/m²) (including SI multiple and submultiple units) appropriate to the uncertainty statement.
14. The term t represents time in seconds (s) or millisecond (ms) as appropriate to the uncertainty statement.
15. The term v represents speed in m/s as appropriate to the uncertainty statement.
16. The term P represents a specific pressure in units appropriate to the uncertainty statement.