



# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

## *Certificate of Accreditation*

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

***Servicios Profesionales de Calibración y Mantenimiento, S.A. de C.V.  
(SICAAM)***

***Calle Mier No. 270, Col. Obrera  
Ciudad Reynosa, Tamaulipas, México. C.P. 88680***

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

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

For PJLA:

Tracy Szerszen  
President/Operations Manager

*Initial Accreditation Date:*

December 11, 2004

*Issue Date:*

October 12, 2017

*Expiration Date:*

December 31, 2019

*Revision Date:*

June 19, 2019

*Accreditation No.:*

47418

*Certificate No.*

L17-439-R2

Perry Johnson Laboratory  
Accreditation, Inc. (PJLA)  
755 W. Big Beaver, Suite 1325

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



# Certificate of Accreditation: Supplement

## Servicios Profesionales de Calibración y Mantenimiento S.A. de C.V. (SICAAM)

Calle Mier No. 270, Col. Obrera  
Reynosa, Tamaulipas, México. CP.88680  
Contact Name: Eng. Benigno Cruz Phone: 899-925-6848

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

### Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Outside Micrometers <sup>F</sup>	0.05 in to 20 in	(36.6 + 7.8L) $\mu$ in	Gage Blocks GGG-C-105C Federal Specification
Calipers <sup>FO</sup>	0.05 in to 40 in	(439 + 0.21L) $\mu$ in	
Inside Micrometer <sup>FO</sup>	0.1 in to 12 in	(39.9 + 10.1L) $\mu$ in	Gage Blocks and Webber, Accessories Model 11-A GGG-C-105C Federal Specification
Depth Micrometers <sup>FO</sup>	0 in to 6 in	(36.7 + 6.07L) $\mu$ in	Height Master GGG-C-105C Federal Specification
Laser Micrometers and Z Mike <sup>FO</sup>	0.1 in to 2 in	(35.2 + 8L) $\mu$ in	Master PinsXXX PC-CML-001 SICAAM Procedure
Steel Tapes <sup>F</sup>	5 mm to 100 000 mm	(254.7 + 0.2L) $\mu$ m	Gage Blocks and VisionSystem NMX-CH-148-IMNC JIS B 7516
Precision Level <sup>F</sup>	0.02 mm to 2.5 mm	0.005 mm	Surface Plate, Gage Block Set & Parallel Bar JIS B 7510
Dial Indicators <sup>FO</sup>	0.05 in to 4 in	(36.8 + 4.4L) $\mu$ in	Universal Length Machine NMX-CH-463-IMNC JIS B 7503
Height Gages <sup>FO</sup>	0.05 in to 24 in	(263.5 + 0.22L) $\mu$ in	Gage Blocks, Electrical Amplifier NMX-CH-141-IMNC
Height Masters <sup>FO</sup>	0.5 in to 24 in	(4.13 + 5.7L) $\mu$ in	
Gage Blocks Steel <sup>F</sup>	0.05 in to 4 in	(3.94 + 2.3L) $\mu$ in	Universal Length Machine ASME B89.1.9-2002 ASME B89.1.6-2002
	5 in to 40 in	(13.61 + 1.7L) $\mu$ in	
Gage Blocks Ceramic and Gage Blocks CC and TC <sup>F</sup>	0.01 in to 4 in	(3.98 + 1.14L) $\mu$ in	
Plain Cylindrical Ring Gages <sup>F</sup>	0.25 in to 14 in	(19 + 3.8D) $\mu$ in	
Thread Plug Gage Pitch Diameter(PD) <sup>F</sup>	5-40 to 14-6	(61.31 + 0.12D) $\mu$ in	Universal Length Machine with Thread Wire Set ASME B1.1-2003
Thread Plug Gage, Tapered <sup>F</sup>	1/16-27 to 10-8	(61.29 + 0.31L) $\mu$ in	Universal Length Machine with Thread Wire Set, Sine Block ASME B1.1-2003
Thread Ring Gage Pitch Diameter(PD) <sup>F</sup>	12 - 24 to 8 - 16	(200 + 1D) $\mu$ in	Universal Length Machine with TPI Anvils (accessories) and Inside Jaws ASME B1.1-2003



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Thickness Gage <sup>F</sup>	25.4 $\mu$ m to 762 $\mu$ m	(0.02 + 0.02L) $\mu$ m	Thickness Gage Standards Films ASTM D7091-05
	1 mil to 30 mil	0.02 mil	
Optical Comparator Movement X axis Linearity Y axis Linearity <sup>O</sup>	0.01 mm to 300 mm 0.01 mm to 300 mm	(36.91 + 1.4L) $\mu$ m	Ruler Glass Scales JIS B 7184
Optical Comparators Angularity <sup>O</sup>	0° to 180°	0.5°	Angle Reticule JIS B 7184
Optical Comparator Magnification <sup>O</sup>	10X	0.05 % of magnification	Magnification Check Scale JIS B 7184
	20X	0.02 % of magnification	
	50X	0.02 % of magnification	
Surface Plates Repeat Measurement <sup>O</sup>	0.002 in	58 $\mu$ m	Repeat-o-Meter ASME B89.3.7
CMM –Verification Volumetric Diagonal and Length X,Y,Z	X: 0.5 in to 40 in Y: 0.5 in to 40 in Z: 0.5 in to 40 in Volumetric Diagonal = 0.5 in to 40 in	(24.95 + 0.66L) $\mu$ m	Check Master Master Ball 1 in NMX-CH-10360-1-IMNC NMX-CH-10360-2-IMNC
Probing Errors <sup>O</sup>	1 in	60 $\mu$ m	
Glass Scales <sup>F</sup>	0.01 mm to 1 000 mm	(0.035 + 0.01L) mm	St- Industries 22-2 600 JIS B 7184

### Chemical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
pH <sup>FO</sup>	4 pH	0.03 pH	Hanna Buffer Solution ISO 10523 JIS K 0130
	7 pH	0.03 pH	
	10 pH	0.03 pH	
Conductivity <sup>FO</sup>	1.42 mS/cm	0.5 mS/cm	
	12.88 mS/cm	0.5 mS/cm	

### Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Pressure <sup>FO</sup>	3 psi to 300 psi	0.3 psi	Process Calibrator Druck DPI 610 ASME B 40.100



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Pressure <sup>FO</sup>	301 psi to 10 000 psi	(0.04 + 0.001P) psi	Ametek T-100-1/C, Dead Weights Balance PROY-NMX-CH-258-IMNC
Vacuum <sup>FO</sup>	3 in·Hg to 30 in·Hg	0.24 in·Hg	Process Calibrator Druck DPI 610 ASME B40.100
Torque Measure <sup>FO</sup>	10 lbf·in to 100 lbf·in (1.1 N·m to 11.29 N·m)	0.3 % of reading	Torque Mate 200 and PTT 2000 Mounts with Transducers PROY-NMX-CH-157-IMNC ASME B 107.300
	1 lbf·in to 10 lbf·in (0.11 N·m to 1.1 N·m)	0.3 % of reading	
	25 lbf·in to 250 lbf·in (2.82 N·m to 28.25 N·m)	0.3 % of reading	
	120 lbf·in to 1 200 lbf·in (13.56 N·m to 135.58 N·m)	0.3 % of reading	
	10 lbf·ft to 100 lbf·ft (1.12 N·m to 135.58 N·m)	0.3 % of reading	
	100 lbf·ft to 1 000 lbf·ft (11.29 N·m to 1 355.8 N·m)	0.3 % of reading	
Dynamic Torque <sup>FO</sup>	10 lbf·in to 100 lbf·in (1.2 N·m to 11.29 N·m)	0.3 % of reading	Mountz Torque Mate 200, Transducer 738F PROY-NMX-CH-157-IMNC ASME B 107.3
	120 lbf·in to 1 200 lbf·in (13.6 N·m to 135.58 N·m)	0.6 % of reading	
	360 lbf·in to 3 600 lbf·in (40.7 N·m to 406.75 N·m)	0.12 % of reading	
	74 lbf·ft to 738 lbf·ft (100 N·m to 1 000 N·m)	1.9 lbf·ft (2.5 Nm)	Mountz Cell RTSX738F and Display Mountz PROY-NMX-CH-157-IMNC ASME B 107.300
Air Velocity Meters (Anemometer) <sup>FO</sup>	40 ft/min to 6 800 ft/min	1 % of reading	High Accuracy Anemometer Dwyer 471 MSHA PH-09-II-1 Handbook
Viscometers <sup>F</sup>	100 cps to 30 000 cps	1 % of Viscosity Value	VI-STD-PNT/100 VI-STD-PNT/5500 VI-STD-HT30 ASTM D 445-18
Viscosity Cups Ford <sup>F</sup>	20 cSt to 880 cSt	2 % of reading	Viscosity Solutions, Stop Watch and Thermometer ASTM D 445-18
Viscosity Cups Zahn <sup>F</sup>	20 cSt to 880 cSt	2 % of reading	
Air Flow Meters <sup>FO</sup>	$3.3 \times 10^{-3} \text{ m}^3/\text{s}$ to $3.3 \times 10^{-7} \text{ m}^3/\text{s}$	1 % of reading	FC0210 Micro-calibrator Furness Control Limited ISO 11631:1998
	0.000 025 $\text{m}^3/\text{s}$ to 0.000 25 $\text{m}^3/\text{s}$	2.5 % of reading	FMA 1822 Flowmeter Omega ISO 11631:1998



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Leak Tester <sup>FO</sup>	$3.3 \times 10^{-8} \text{ m}^3/\text{s}$ to $3.3 \times 10^{-7} \text{ m}^3/\text{s}$	1 % of reading	FC0210 Microcalibrador Furness Control Limited NIST SP250-38
	0.000 025 $\text{m}^3/\text{s}$ to 0.000 25 $\text{m}^3/\text{s}$	2.5 % of reading	FMA 1844 Flowmeter Omega NIST SP250-38
Indirect Verification of Rockwell Hardness <sup>FO</sup>	HRB		ASTM E18-08A and Calibrated Rockwell Hardness Test Blocks
	40 HRB to 59 HRB	1.1 HRB	
	60 HRB to 90 HRB	0.66 HRB	
	91 HRB to 100 HRB	0.46 HRB	
	HRC		
	20 HRC to 39 HRC	0.38 HRC	
	40 HRC to 59 HRC	0.34 HRC	
Tachometers Measurement <sup>FO</sup>	30 rpm to 20 000 rpm	0.25 % of reading	RPM and Speed Meters Stroboscope Lamp Monarch DBX ISO 2954:2012

### Mass, Force, and Weighing Devices

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Force Gages Compression <sup>FO</sup>	1 lbf to 100 lbf	$(0.016 + 17 \times 10^{-3}\text{F}) \text{ lbf}$	Class F Weights NXM-CH-7500-1-IMNC
	100 lbf to 10 000 lbf	$(1.0371 + 72 \times 10^{-4}\text{F}) \text{ lbf}$	Chatillon Load Cell NXM-CH-7500-1-IMNC
	2 000 lbf to 10 000 lbf	$(2.274 3 + 4 \times 10^{-4}\text{F}) \text{ lbf}$	Chatillon Load Cell NXM-CH-7500-1-IMNC
Force Gages Tension <sup>FO</sup>	1 lb to 100 lbf	$(0.017 + 17 \times 10^{-3}\text{F}) \text{ lbf}$	Class F Weights NXM-CH-7500-1-IMNC
	100 lbf to 2 000 lbf	$(7.9 + 5 \times 10^{-3}\text{F}) \text{ lbf}$	Chatillon Load Cell NXM-CH-7500-1-IMNC
	2000lbf to 10 000 lbf	$(2.274 3 + 4 \times 10^{-4}\text{F}) \text{ lbf}$	NMX-CH-7500-1-IMNC
Scales and Balances <sup>FO</sup>	1 g to 200 g	$(2 \times 10^{-4} + 2 \times 10^{-6}\text{Wt}) \text{ g}$	Class 1 Weights EURAMET cg-18
	1 g to 500 g	$(2 \times 10^{-4} + 2.54 \times 10^{-6}\text{Wt}) \text{ g}$	
	200 g to 3 kg	$(1.15 + 4.85 \times 10^{-5}\text{Wt}) \text{ g}$	ASTM E617 Class 6 Weights.





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### Mass, Force, and Weighing Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Scales and Balances <sup>FO</sup>	2 kg to 27 kg	$(1.02 + 7.73 \times 10^{-5}Wt) \text{ g}$	Class F Weights EURAMET cg-18
	0.5 lb to 25 lb	$(3 \times 10^{-4} + 4.27 \times 10^{-5}Wt) \text{ lb}$	Class 2 Weights EURAMET cg-18
	1 lb to 220 lb	$(3 \times 10^{-4} + 1.16 \times 10^{-6}Wt) \text{ lb}$	Class F Weights EURAMET cg-18
	1 kg to 1 000 kg	$(1.148 \times 10^{-4} + 22 \times 10^{-4}Wt) \text{ kg}$	Class M1 EURAMET cg-18
	1 001 kg to 5 000 kg	$(2.148 \times 10^{-4} + 92 \times 10^{-4}Wt) \text{ kg}$	EURAMET cg-18

### Thermodynamic

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Chart Recorders, Term-Hygrometers, Humidity Meters <sup>F</sup>	10 % RH to 90 % RH	1 % of reading	Fluke 971 temperature Humidity Meter ISO/TR 18931:2001
Bimetallic Thermometers <sup>FO</sup>	-15 °C to 110 °C	0.2 °C	Fluke 9009 Dry Block Calibrator PROY-NMX-270- IMNC-2008
	50 °C to 350 °C	0.6 °C	
Temperature Measurement <sup>FO</sup>	-200 °C to 850 °C.	0.019 °C	Burns Engr. & Omega 3925 & DP95-A ISO 17.200
Temperature Measurement Thermocouples Type J <sup>FO</sup>	-15 °C to 110 °C	0.3 °C	Fluke 9009, Dry Block Calibrator and Fluke 5500 ISO 17.200
	50 °C to 350 °C	0.7 °C	
Temperature Measurement Thermocouples Type K <sup>FO</sup>	-15 °C to 110 °C	0.3 °C	
	50 °C to 350 °C	0.7 °C	
Temperature Measurement Thermocouples Type T <sup>FO</sup>	-15 °C to 110 °C	0.3 °C	
	50 °C to 350 °C	0.7 °C	
Temperature Measurement Thermocouples Type E <sup>FO</sup>	-15 °C to 110 °C	0.3 °C	
	50 °C to 350 °C	0.7 °C	
Temperature Measurement RTD Pt 100 $\Omega$ <sup>FO</sup>	-15 °C to 110 °C	0.25 °C	
	50 °C to 350 °C	0.65 °C	



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### Thermodynamic

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Equipment to Measure Temperature <sup>FO</sup>	-40 °C to 500 °C	0.05 °C	Digital RTD Thermometer Omega Thermotron Manufacture: Thermatron Model: CDS-5 Dry Block Manufacture: Fluke Model: 9009 Liquid BathManufacture: PolyScience, Model:9702 ISO 17.200.20

### Electrical

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Equipment to Measure DC Voltage <sup>FO</sup>	1 mV to 330 mV	0.007 % of reading + 1 $\mu$ V	Fluke 5520A 3-IT-5.4-005 SICAAM Procedure 3-IT-5.4-031SICAAM Procedure
	330 mV to 3.3 V	0.003 % of reading + 2 $\mu$ V	
	3.3 V to 33 V	0.003 1 % of reading + 20 $\mu$ V	
	33 V to 330 V	0.004 % of reading + 150 $\mu$ V	
	330 V to 1 000 V	0.005 1 % of reading + 1.5 mV	
Equipment to Measurement AC Voltage At the listed frequencies <sup>FO</sup>			
10 Hz to 45 Hz	1 mV to 33 mV	0.03 % of reading + 6 $\mu$ V	
45 Hz to 10 kHz	1 mV to 33 mV	0.015 % of reading + 6 $\mu$ V	
10 kHz to 20 kHz	1 mV to 33 mV	0.02 % of reading + 6 $\mu$ V	
20 kHz to 50 kHz	1 mV to 33 mV	0.1 % of reading + 6 $\mu$ V	
50 kHz to 100 kHz	1 mV to 33 mV	0.35 % of reading + 12 $\mu$ V	
100 kHz to 500 kHz	1 mV to 33 mV	0.8 % of reading + 50 $\mu$ V	
Equipment to Measurement AC Voltage At the listed frequencies <sup>FO</sup>			
10 Hz to 45 Hz	33 mV to 330 mV	0.03 % of reading + 8 $\mu$ V	
45 Hz to 10 kHz	33 mV to 330 mV	0.015 % of reading + 8 $\mu$ V	
10 kHz to 20 kHz	33 mV to 330 mV	0.02 % of reading + 8 $\mu$ V	



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### Electrical

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Equipment to Measurement AC Voltage At the listed frequencies <sup>FO</sup>			Fluke 5520A 3-IT-5.4-005 SICAAM Procedure
20 kHz to 50 kHz	33 mV to 330 mV	0.035 % of reading + 6 $\mu$ V	
50 kHz to 100 kHz	33 mV to 330 mV	0.08 % of reading + 35 $\mu$ V	
100 kHz to 500 kHz	33 mV to 330 mV	0.2 % of reading + 70 $\mu$ V	
Equipment to Measurement AC Voltage At the listed frequencies <sup>FO</sup>			
10 Hz to 45 Hz	330 mV to 3.3 V	0.03 % of reading + 50 $\mu$ V	
45 Hz to 10 kHz	330 mV to 3.3 V	0.015 % of reading + 60 $\mu$ V	
10 kHz to 20 kHz	330 mV to 3.3 V	0.019 % of reading + 60 $\mu$ V	
20 kHz to 50 kHz	330 mV to 3.3 V	0.03 % of reading + 50 $\mu$ V	
50 kHz to 100 kHz	330 mV to 3.3 V	0.07 % of reading + 125 $\mu$ V	
100 kHz to 500 kHz	330 mV to 3.3 V	0.24 % of reading + 0.6 mV	
Equipment to Measurement AC Voltage At the listed frequencies <sup>FO</sup>			
10 Hz to 45 Hz	3.3 V to 33 V	0.03 % of reading + 0.65 mV	
45 Hz to 10 kHz	3.3 V to 33 V	0.015 % of reading + 0.6 mV	
10 kHz to 20 kHz	3.3 V to 33 V	0.024 % of reading + 0.6 mV	
20 kHz to 50 kHz	3.3 V to 33 V	0.035 % of reading + 0.6 mV	
50 kHz to 100 kHz	3.3 V to 33 V	0.09 % of reading + 1.6 mV	
Equipment to Measurement AC Voltage At the listed frequencies <sup>FO</sup>			
45 Hz to 1 kHz	33 V to 330 V	0.019 % of reading + 2 mV	
1 kHz to 10 kHz	33 V to 330 V	0.02 % of reading + 6 mV	
10 kHz to 20 kHz	33 V to 330 V	0.025 % of reading + 6 mV	
20 kHz to 50 kHz	33 V to 330 V	0.03 % of reading + 6 mV	
50 kHz to 100 kHz	33 V to 330 V	0.2 % of reading + 50 mV	
Equipment to Measurement AC Voltage At the listed frequencies <sup>FO</sup>			
45 Hz to 1 kHz	330 V to 1 020 V	0.03 % of reading + 10 mV	





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Equipment to Measurement AC Voltage At the listed frequencies <sup>FO</sup>			Fluke 5520A 3-IT-5.4-005 SICAAM Procedure 3-IT-5.4-031 SICAAM Procedure
1 kHz to 5 kHz	330 V to 1 020 V	0.025 % of reading + 10 mV	
5 kHz to 10 kHz	330 V to 1 020 V	0.03 % of reading + 10 mV	
Equipment to Measurement AC Current At the listed frequencies <sup>FO</sup>			Hp 3458 option 002 Nplc 100 24 hrs/ $\pm$ °C of ACAL 3-IT-5.4-006 SICAAM Procedure
10 Hz to 1 kHz	1 mA to 10 mA	0.03 % of reading + 2 $\mu$ A	
1 kHz to 50 kHz	1 mA to 10 mA	0.4 % of reading + 2 $\mu$ A	
Equipment to Measurement AC Current At the listed frequencies <sup>FO</sup>			
10 Hz to 1 kHz	10 mA to 100 mA	0.03 % of reading + 20 $\mu$ A	
1 kHz to 50 kHz	10 mA to 100 mA	0.4 % of reading + 20 $\mu$ A	
Equipment to Measurement AC Current At the listed frequencies <sup>FO</sup>			
10 Hz to 1 kHz	0.1 A to 1 A	0.1 % of reading + 200 $\mu$ A	
1 kHz to 50 kHz	0.1 A to 1 A	1 % of reading + 40 mA	
Equipment to Measurement AC Current At the listed frequencies <sup>FO</sup>			Fluke 5520 3-IT-5.4-006 SICAAM Procedure
10 Hz to 20 Hz	29 $\mu$ A to 330 $\mu$ A	0.2 % of reading + 0.1 $\mu$ A	
20 Hz to 45Hz	29 $\mu$ A to 330 $\mu$ A	0.15 % of reading + 0.1 $\mu$ A	
45 Hz to 1 kHz	29 $\mu$ A to 330 $\mu$ A	0.13 % of reading + 0.1 $\mu$ A	
1 kHz to 5 kHz	29 $\mu$ A to 330 $\mu$ A	0.3 % of reading + 0.15 $\mu$ A	
5 kHz to 10 kHz	29 $\mu$ A to 330 $\mu$ A	0.8 % of reading + 0.2 $\mu$ A	
10 kHz to 30 kHz	29 $\mu$ A to 330 $\mu$ A	1.6 % of reading + 0.4 $\mu$ A	
Equipment to Measurement AC Current At the listed frequencies <sup>FO</sup>			
10 Hz to 20 Hz	0.33 mA to 3.3 mA	0.2 % of reading + 0.15 $\mu$ A	
20 Hz to 45Hz	0.33mA to 3.3 mA	0.13 % of reading + 0.15 $\mu$ A	
45 Hz to 1 kHz	0.33 mA to 3.3 mA	0.1 % of reading + 0.15 $\mu$ A	



# Certificate of Accreditation: Supplement

## Servicios Profesionales de Calibración y Mantenimiento S.A. de C.V. (SICAAM)

Calle Mier No. 270, Col. Obrera  
Reynosa, Tamaulipas, México. CP.88680  
Contact Name: Eng. Benigno Cruz Phone: 899-925-6848

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

### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measurement AC Current At the listed frequencies <sup>FO</sup>			Fluke 5520 3-IT-5.4-005 SICAAM Procedure 3-IT-5.4-009 SICAAM Procedure
1 kHz to 5 kHz	0.33 mA to 3.3 mA	0.2 % of reading + 0.2 µA	
5 kHz to 10 kHz	0.33 mA to 3.3 mA	0.2 % of reading + 0.3 µA	
10 kHz to 30 kHz	0.33 mA to 3.3mA	1 % of reading + 0.6 µA	
Equipment to Measurement AC Current At the listed frequencies <sup>F</sup>			
10 Hz to 20 Hz	3.3 mA to 33 mA	0.18 % of reading + 2 µA	
20 Hz to 45Hz	3.3 mA to 33 mA	0.09 % of reading + 2 µA	
45 Hz to 1 kHz	3.3 mA to 33 mA	0.04 % of reading + 2 µA	
1 kHz to 5 kHz	3.3 mA to 33 mA	0.08 % of reading + 2 µA	
5 kHz to 10 kHz	3.3 mA to 33 mA	0.2 % of reading + 3 µA	
10 kHz to 30 kHz	3.3 mA to 33 mA	0.4 % of reading + 4 µA	
Equipment to Measurement AC Current At the listed frequencies <sup>F</sup>			
10 Hz to 20 Hz	33 mA to 330 mA	0.18 % of reading + 20 µA	
20 Hz to 45Hz	33 mA to 330 mA	0.09 % of reading + 20 µA	
45 Hz to 1 kHz	33 mA to 330 mA	0.04 % of reading + 20 µA	
1 kHz to 5 kHz	33 mA to 330 mA	0.1 % of reading + 50 µA	
5 kHz to 10 kHz	33 mA to 330 mA	0.2 % of reading + 100 µA	
10 kHz to 30 kHz	33 mA to 330 mA	0.4 % of reading + 200 µA	
Equipment to Measurement AC Current At the listed frequencies <sup>F</sup>			
10 Hz to 45 Hz	0.33 mA to 1.1 A	0.18 % of reading + 100 µA	
45 Hz to 1 kHz	0.33 mA to 1.1 A	0.05 % of reading + 100 µA	
1 kHz to 5 kHz	0.33 mA to 1.1 A	0.6 % of reading + 1 mA	
5 kHz to 10 kHz	0.33 mA to 1.1 A	2.5 % of reading + 5 mA	
Equipment to Measurement AC Current At the listed frequencies <sup>F</sup>			
10 Hz to 45 Hz	1.1 A to 3 A	0.18 % of reading + 100 µA	
45 Hz to 1 kHz	1.1 A to 3 A	0.06 % of reading + 100 µA	
1 kHz to 5 kHz	1.1 A to 3 A	0.018 % of reading + 1 mA	



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Reynosa, Tamaulipas, México. CP.88680  
Contact Name: Eng. Benigno Cruz Phone: 899-925-6848

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

### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measurement AC Current At the listed frequencies <sup>F</sup>			Fluke 5520 3-IT-5.4-005 SICAAM Procedure
5 kHz to 10 kHz	1.1 A to 3 A	2.5 % of reading + 5 mA	
Equipment to Measurement AC Current At the listed frequencies <sup>F</sup>			
45 Hz to 100 Hz	3.3 A to 11 A	0.06 % of reading + 2 mA	
100 Hz to 1kHz	3.3 A to 11 A	0.1 % of reading + 2 mA	
1 kHz to 5 kHz	3.3 A to 11 A	3 % of reading + 2 mA	
Equipment to Measurement AC Current 45 Hz to 100 Hz <sup>FO</sup>	1 A to 1 000 A	0.56 % of reading + 2.5 Amp	Fluke 5520 w/ Coil 5500A 3-IT-5.4-005 SICAAM Procedure
Equipment to Output DC Resistance <sup>FO</sup>	0.001 $\Omega$ to 10 $\Omega$	0.0018 % of reading + 50 $\mu\Omega$	HP 3458 Option 002, NPLC 100 with 24 Hours / $\pm$ $^{\circ}$ C of ACAL 3-IT-5.4-011 SICAAM Procedure
	10 $\Omega$ to 100 $\Omega$	0.0015 % of reading + 0.5 m $\Omega$	
	100 $\Omega$ to 1 k $\Omega$	0.0013 % of reading + 5 m $\Omega$	
	1 000 $\Omega$ to 10 k $\Omega$	0.0013 % of reading + 50 m $\Omega$	
	10 k $\Omega$ to 100 k $\Omega$	0.0013 % of reading + 500 m $\Omega$	
	100 k $\Omega$ to 1 M $\Omega$	0.0018 % of reading + 2 $\Omega$	
	1 M $\Omega$ to 10 M $\Omega$	0.05 % of reading + 100 $\Omega$	
	10 M $\Omega$ to 100 M $\Omega$	0.5 % of reading + 1 000 $\Omega$	
Equipment to Measure DC Resistance <sup>FO</sup>	0.001 $\Omega$ to 11 $\Omega$	0.008 % of reading + 0.001 $\Omega$	Fluke 5520A (Applies to 4-wire Compensation only 0.2 wire Above k $\Omega$ 3-IT-5.4-005 SICAAM Procedure
	11 $\Omega$ to 33 $\Omega$	0.003 % of reading + 0.0015 $\Omega$	
	33 $\Omega$ to 110 $\Omega$	0.0028 % of reading + 0.0014 $\Omega$	
	110 $\Omega$ to 330 k $\Omega$	0.0028 % of reading + 0.002 $\Omega$	
	330 $\Omega$ to 1.1 k $\Omega$	0.0028 % of reading + 0.002 $\Omega$	
	1.1 k $\Omega$ to 3.3 k $\Omega$	0.0028 % of reading + 0.02 $\Omega$	
	3.3 k $\Omega$ to 11 k $\Omega$	0.0028 % of reading + 0.02 $\Omega$	
	11 k $\Omega$ to 33 k $\Omega$	0.0028 % of reading + 0.2 $\Omega$	
	33 k $\Omega$ to 110 k $\Omega$	0.0028 % of reading + 0.2 $\Omega$	
	110 k $\Omega$ to 330 k $\Omega$	0.0032 % of reading + 2 $\Omega$	
	330 k $\Omega$ to 1.1 M $\Omega$	0.0032 % of reading + 2 $\Omega$	
	1.1 M $\Omega$ to 3.3 M $\Omega$	0.006 % of reading + 30 $\Omega$	
	3.3 M $\Omega$ to 11 M $\Omega$	0.013 % of reading + 50 $\Omega$	



# Certificate of Accreditation: Supplement

**Servicios Profesionales de Calibración y Mantenimiento  
S.A. de C.V. (SICAAM)**

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Contact Name: Eng. Benigno Cruz Phone: 899-925-6848

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## Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure DC Resistance <sup>F0</sup>	11 M $\Omega$ to 33 M $\Omega$	0.025 % of reading + 2.5 k $\Omega$	Fluke 5520A (Applies to 4-wire Compensation only 0.2 wire Above k $\Omega$ 3-IT-5.4-005 SICAAM Procedure
	33 M $\Omega$ to 110 M $\Omega$	0.05 % of reading + 3 k $\Omega$	
	110 M $\Omega$ to 330 M $\Omega$	0.3 % of reading + 0.1 M $\Omega$	
	330 M $\Omega$ to 1 100 M $\Omega$	1.5 % of reading + 0.5 M $\Omega$	
Temperature Calibration, Indication, and Control Equipment used Thermocouple Type E <sup>F0</sup>	-250 °C to -100 °C	0.5 °C	Fluke 5520 Electrical Simulation of Thermocouple output ASTM E220-13
	-100 °C to -25 °C	0.16 °C	
	-25 °C to 300 °C	0.14 °C	
	350 °C to 650 °C	0.16 °C	
	650 °C to 1 000 °C	0.21 °C	
Temperature Calibration, Indication, and Control Equipment used Thermocouple Type J <sup>F0</sup>	-210 °C to -100 °C	0.27 °C	
	-100 °C to -30 °C	0.16 °C	
	-30 °C to 150 °C	0.14 °C	
	150 °C to 760 °C	0.17 °C	
	760 °C to 1 200 °C	0.23 °C	
Temperature Calibration, Indication, and Control Equipment used Thermocouple Type K <sup>F0</sup>	-200 °C to -100 °C	0.33 °C	
	-100 °C to -25 °C	0.18 °C	
	-25 °C to 120 °C	0.16 °C	
	120 °C to 1 000 °C	0.26 °C	
	1 000 °C to 1 372 °C	0.4 °C	
Temperature Calibration, Indication, and Control Equipment used Thermocouple Type R <sup>F0</sup>	0 °C to 250 °C	0.57 °C	
	250 °C to 400 °C	0.35 °C	
	400 °C to 1000 °C	0.33 °C	
	1 000 °C to 1 767 °C	0.4 °C	
Temperature Calibration, Indication, and Control Equipment used Thermocouple Type T <sup>F0</sup>	-250 °C to -150 °C	0.6 °C	
	-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 RTD Pt 395, 100 $\Omega$ <sup>F0</sup>	-200 °C to -80 °C	0.05 °C	
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.07 °C	
	100 °C to 300 °C	0.09 °C	
	300 °C to 400 °C	0.1 °C	



# Certificate of Accreditation: Supplement

## Servicios Profesionales de Calibración y Mantenimiento S.A. de C.V. (SICAAM)

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Reynosa, Tamaulipas, México. CP.88680  
Contact Name: Eng. Benigno Cruz Phone: 899-925-6848

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### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature calibration Indication, and Control Equipment used with RTD Pt 395, 100 $\Omega$ <sup>FO</sup>	400 °C to 630 °C	0.12 °C	Fluke 5520 Electrical Simulation of Thermocouple Output 3-IT-5.4-003 and 3-IT-5.4- 004 SICAAM Procedure
	630 °C to 800 °C	0.23 °C	
Equipment to Output Electrical Capacitance At the listed frequencies <sup>FO</sup>			Fluke 5520A 3-IT-5.4 SICAAM Procedure
10 Hz to 3 kHz	0.19 nF to 3.3 nF	0.5 % of reading + 0.01 nF	
10 Hz to 1 kHz	33 nF to 110 nF	0.25 % of reading + 0.1 nF	
10 Hz to 1 kHz	110 nF to 330 nF	0.25 % of reading + 0.3 nF	
10 Hz to 600 Hz	0.33 nF to 1.1 $\mu$ F	0.25 % of reading + 1 nF	
10 Hz to 300 Hz	1.1 nF to 3.3 $\mu$ F	0.25 % of reading + 10 nF	
10 Hz to 150 Hz	3.3nF to 11 $\mu$ F	0.25 % of reading + 10 nF	
10 Hz to 120 Hz	11 nF to 33 $\mu$ F	0.4 % of reading + 30 nF	
10 Hz to 80 Hz	33 nF to 110 $\mu$ F	0.45 % of reading + 100 nF	
Equipment to Output Electrical Capacitance At the listed frequencies <sup>FO</sup>			
0.1 Hz to 50 Hz	110 mF to 330 $\mu$ F	0.45 % of reading + 300 nF	
0.1 Hz to 20 Hz	0.33 mF to 1.1 mF	0.45 % of reading + 1 $\mu$ F	
0.1 Hz to 6 Hz	1.1 mF to 3.3 mF	0.45 % of reading + 3 $\mu$ F	
0.1 Hz to 2 Hz	3.3 mF to 11 mF	0.45 % of reading + 10 $\mu$ F	
0.1 Hz to 6 Hz	11 mF to 33 mF	0.75 % of reading + 30 $\mu$ F	
0.1 Hz to 0.2 Hz	3.3 mF to 11 mF	1.1 % of reading + 100 $\mu$ F	
Oscilloscope <sup>FO</sup>			Fluke 5520A W/SC 1100 3-IT-5.4-031 SICAAM Procedure
DCSignal into 50 $\Omega$	1 mV to 6.6 V	0.25 % of output + 40 $\mu$ V	
DCSignal in to 1 M $\Omega$	1 mV to 130 V	0.05 % of output + 40 $\mu$ V	
Square Wave Signal into 50 $\Omega$ 1 kHz	1 mV to 6.6 V	0.25 % of output + 40 $\mu$ V	
Square Wave Signal into 1 M $\Omega$ 1 kHz	1 mV to 130 V	0.1 % of output + 40 $\mu$ V	
Square Wave Signal into 50 $\Omega$ 1 kHz	1 mV to 6.6 V	0.25 % of output + 40 $\mu$ V	
Square Wave Signal into 1M $\Omega$ 1 kHz <sup>FO</sup>	1 mV to 130 V	0.1 % of output + 40 $\mu$ V	
Leveled Sine Wave 50 $\Omega$	50 kHz reference	2 % of output + 300 $\mu$ V	





# Certificate of Accreditation: Supplement

## Servicios Profesionales de Calibración y Mantenimiento S.A. de C.V. (SICAAM)

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Contact Name: Eng. Benigno Cruz Phone: 899-925-6848

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### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Amplitude @ 50 kHz <sup>FO</sup>	50 kHz to 100 MHz	3.5 % of output + 300 $\mu$ V	Fluke 5520A W/SC 1100 3-IT-5.4-031 SICAAM Procedure
	100 MHz to 300 MHz	4 % of output + 300 $\mu$ V	
	300 MHz to 600 MHz	6 % of output + 300 $\mu$ V	
	600 MHz to 1.1 GHz	7 % of output + 300 $\mu$ V	
Time Marker 50 $\Omega$ Generate and Period Spike, Square, Sine <sup>FO</sup>	1 mV to 6.6 V	0.25 % of output + 40 $\mu$ V	
	1 mV to 130 V	0.1 % of output + 40 $\mu$ V	
Time Marker 50 $\Omega$ Generate and Period Spike, Square, Sine <sup>FO</sup>	5 s to 50 ms	0.1 % of reading	
	20 ms to 100 ns	0.000 25 % of reading	
	50 ns to 20 ns	0.000 25 % of reading	
	5 ns to ns	0.000 25 % of reading	
Rise Time <sup>FO</sup>	Up to 300 pS	(0 Ps/-100 Ps)	
AC Measurement Multiproduct Calibrators At the listed frequencies <sup>FO</sup>			5790A/AF 3-IT-5.4-005 SICAAM Procedure 3-IT-5.4-006 SICAAM Procedure 3-IT-5.4-031 SICAAM Procedure
10 Hz to 20 Hz	0.001 mV to 2.2 mV	1.7 % of reading + 1.3 $\mu$ V	
20 Hz to 40 Hz	0.001 mV to 2.2 mV	0.74 % of reading + 1.3 $\mu$ V	
40 Hz to 20 kHz	0.001 mV to 2.2 mV	0.42 % of reading + 1.3 $\mu$ V	
20 kHz to 50 kHz	0.001 mV to 2.2 mV	0.81 % of reading + 2 $\mu$ V	
50 kHz to 100 kHz	0.001 mV to 2.2 mV	1.2 % of reading + 2.5 $\mu$ V	
100 kHz to 300 kHz	0.001 mV to 2.2 mV	2.3 % of reading + 4 $\mu$ V	
300 kHz to 500 kHz	0.001 mV to 2.2 mV	2.4 % of reading + 8 $\mu$ V	
500 kHz to 1 MHz	0.001 mV to 2.2 mV	3.5 % of reading + 8 $\mu$ V	
AC Measurement Multiproduct Calibrators At the listed frequencies <sup>FO</sup>			
10 Hz to 20 Hz	2.2 mV to 7 mV	0.85 % of reading + 1.3 $\mu$ V	
20 Hz to 40 Hz	2.2 mV to 7 mV	0.37 % of reading + 1.3 $\mu$ V	
40 Hz to 20 kHz	2.2 mV to 7 mV	0.21 % of reading + 1.3 $\mu$ V	
20 kHz to 50 kHz	2.2 mV to 7 mV	0.40 % of reading + 2 $\mu$ V	
50 kHz to 100 kHz	2.2 mV to 7 mV	0.60 % of reading + 2 $\mu$ V	
100 kHz to 300 kHz	2.2 mV to 7 mV	1.2% of reading + 2.5 $\mu$ V	
300 kHz to 500 kHz	2.2 mV to 7 mV	1.3 % of reading + 4 $\mu$ V	
500 kHz to 1 MHz	2.2 mV to 7 mV	2 % of reading + 8 $\mu$ V	



# Certificate of Accreditation: Supplement

## Servicios Profesionales de Calibración y Mantenimiento S.A. de C.V. (SICAAM)

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Contact Name: Eng. Benigno Cruz Phone: 899-925-6848

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

### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
AC Measurement Multiproduct Calibrators At the listed frequencies <sup>FO</sup>			5790A/AF 3-IT-5.4-005 / 3-IT-5.4- 006 / 3-IT-5.4-031 SICAAM Procedures
10 Hz to 20 Hz	7 mV to 22 mV	0.29 % of reading + 1.3 $\mu$ V	
20 Hz to 40 Hz	7 mV to 22 mV	0.19 % of reading + 1.3 $\mu$ V	
40 Hz to 20 kHz	7 mV to 22 mV	0.11 % of reading + 1.3 $\mu$ V	
20 kHz to 50 kHz	7 mV to 22 mV	0.21 % of reading + 2 $\mu$ V	
50 kHz to 100 kHz	7 mV to 22 mV	0.31 % of reading + 2.5 $\mu$ V	
100 kHz to 300 kHz	7 mV to 22 mV	0.81 % of reading + 4 $\mu$ V	
300 kHz to 500 kHz	7 mV to 22 mV	0.89 % of reading + 8 $\mu$ V	
500 kHz to 1 MHz	7 mV to 22 mV	1.7 % of reading + 8 $\mu$ V	
AC Measurement Multiproduct Calibrators At the listed frequencies <sup>FO</sup>			
10 Hz to 20 Hz	22 mV to 70 mV	0.24 % of reading + 1.5 $\mu$ V	
20 Hz to 40 Hz	22 mV to 70 mV	0.12 % of reading + 1.5 $\mu$ V	
40 Hz to 20 kHz	22 mV to 70 mV	0.065 % of reading + 1.5 $\mu$ V	
20 kHz to 50 kHz	22 mV to 70 mV	0.13 % of reading + 2 $\mu$ V	
50 kHz to 100 kHz	22 mV to 70 mV	0.26 % of reading + 2.5 $\mu$ V	
100 kHz to 300 kHz	22 mV to 70 mV	0.51 % of reading + 4 $\mu$ V	
300 kHz to 500 kHz	22 mV to 70 mV	0.67 % of reading + 8 $\mu$ V	
500 kHz to 1 MHz	22 mV to 70 mV	1.1 % of reading + 8 $\mu$ V	
AC Measurement Multiproduct Calibrators At the listed frequencies <sup>FO</sup>			
10 Hz to 20 Hz	70 mV to 220 mV	0.21 % of reading + 1.5 $\mu$ V	
20 Hz to 40 Hz	70 mV to 220 mV	0.085 % of reading + 1.5 $\mu$ V	
40 Hz to 20 kHz	70 mV to 220 mV	0.038 % of reading + 1.5 $\mu$ V	
20 kHz to 50 kHz	70 mV to 220 mV	0.069 % of reading + 2 $\mu$ V	
50 kHz to 100 kHz	70 mV to 220 mV	0.16 % of reading + 2.5 $\mu$ V	
100 kHz to 300 kHz	70 mV to 220 mV	0.25 % of reading + 4 $\mu$ V	
300 kHz to 500 kHz	70 mV to 220 mV	0.38 % of reading + 8 $\mu$ V	
500 kHz to 1 MHz	70 mV to 220 mV	0.6 % of reading + 0 $\mu$ V	



# Certificate of Accreditation: Supplement

## Servicios Profesionales de Calibración y Mantenimiento S.A. de C.V. (SICAAM)

Calle Mier No. 270, Col. Obrera  
Reynosa, Tamaulipas, México. CP.88680  
Contact Name: Eng. Benigno Cruz Phone: 899-925-6848

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

### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
AC Measurement Multiproduct Calibrators At the listed frequencies <sup>FO</sup>			5790A/AF 3-IT-5.4-005 / 3-IT-5.4- 006 / 3-IT-5.4-031 SICAAM Procedures
10 Hz to 20 Hz	220 mV to 700 mV	0.21 % of reading + 1.5 $\mu$ V	
20 Hz to 40 Hz	220 mV to 700 mV	0.076 % of reading + 1.5 $\mu$ V	
40 Hz to 20 kHz	220 mV to 700 mV	0.033 % of reading + 1.5 $\mu$ V	
20 kHz to 50 kHz	220 mV to 700 mV	0.051 % of reading + 2 $\mu$ V	
50 kHz to 100 kHz	220 mV to 700 mV	0.079 % of reading + 2.5 $\mu$ V	
100 kHz to 300 kHz	220 mV to 700 mV	0.18 % of reading + 4 $\mu$ V	
300 kHz to 500 kHz	220 mV to 700 mV	0.3 % of reading + 8 $\mu$ V	
500 kHz to 1 MHz	220 mV to 700 mV	0.6 % of reading + 0 $\mu$ V	
AC Measurement Multiproduct Calibrators At the listed frequencies <sup>FO</sup>			
10 Hz to 20 Hz	700 mV to 2.2 V	0.2 % of reading	
20 Hz to 40 Hz	700 mV to 2.2 V	0.066 % of reading	
40 Hz to 20 kHz	700 mV to 2.2 V	0.024 % of reading	
20 kHz to 50 kHz	700 mV to 2.2 V	0.046 % of reading	
50 kHz to 100 kHz	700 mV to 2.2 V	0.071 % of reading	
100 kHz to 300 kHz	700 mV to 2.2 V	0.16 % of reading	
300 kHz to 500 kHz	700 mV to 2.2 V	0.26 % of reading	
500 kHz to 1 MHz	700 mV to 2.2 V	0.6 % of reading	
AC Measurement Multiproduct Calibrators At the listed frequencies <sup>FO</sup>			
10 Hz to 20 Hz	2.2 V to 70 V	0.2 % of reading	
20 Hz to 40 Hz	2.2 V to 70 V	0.068 % of reading	
40 Hz to 20 kHz	2.2 V to 70 V	0.032 % of reading	
20 kHz to 50 kHz	2.2 V to 70 V	0.057 % of reading	
50 kHz to 100 kHz	2.2 V to 70 V	0.094 % of reading	
100 kHz to 300 kHz	2.2 V to 70 V	0.2 % of reading	
300 kHz to 500 kHz	2.2 V to 70 V	0.41 % of reading	
500 kHz to 1 MHz	2.2 V to 70 V	0.6% of reading	



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### Electrical

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AC Measurement Multiproduct Calibrators At the listed frequencies <sup>FO</sup>			5790A/AF 3-IT-5.4-005 / 3-IT-5.4-006 / 3-IT-5.4-031 SICAAM Procedures
10 Hz to 20 Hz	70 V to 220 V	0.2 % of reading	
20 Hz to 40 Hz	70 V to 220 V	0.068 % of reading	
40 Hz to 20 kHz	70 V to 220 V	0.031 % of reading	
20 kHz to 50 kHz	70 V to 220 V	0.069 % of reading	
50 kHz to 100 kHz	70 V to 220 V	0.098 % of reading	
100 kHz to 300 kHz	70 V to 220 V	0.21 % of reading	
300 kHz to 500 kHz	70 V to 220 V	0.5 % of reading	
AC Measurement Multiproduct Calibrators At the listed frequencies <sup>FO</sup>			
10 Hz to 20 Hz	220 V to 700 V	0.2 % of reading	
20 Hz to 40 Hz	220 V to 700 V	0.099 % of reading	
40 Hz to 20 kHz	220 V to 700 V	0.041 % of reading	
20 kHz to 50 kHz	220 V to 700 V	0.13 % of reading	
50 kHz to 100 kHz	220 V to 700 V	0.5 % of reading	
AC Measurement Multiproduct Calibrators At the listed frequencies <sup>FO</sup>			
10 Hz to 20 Hz	700 V to 1 000 V	0.2 % of reading	
20 Hz to 40 Hz	700 V to 1 000 V	0.099 % of reading	
40 Hz to 20 kHz	700 V to 1 000 V	0.038 % of reading	
20 kHz to 50 kHz	700 V to 1 000 V	0.13 % of reading	
50 kHz to 100 kHz	700 V to 1 000 V	0.5 % of reading	
Equipment to Measurement Capacitance 1 kHz <sup>FO</sup>	10 pF to 100 $\mu$ F	0.061 % of reading	
Equipment to Measurement Inductance 1 kHz <sup>FO</sup>	1 mH to 10 H	0.061 % of reading	
Equipment to Measure DC Resistance <sup>FO</sup>	1 $\Omega$ to 100 k $\Omega$	0.08 % of reading	
Equipment to Output DC Current <sup>FO</sup>	1 A to 10 A	23 mA	Fluke 8845A 3-IT-5.4-006 SICAAM Procedure
Equipment to Output LCR Inductance <sup>FO</sup>	1 mH to 200 mH	0.002 mH	GR 1482E Standard Inductor PC-IND-001 SICAAM Procedure



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**Servicios Profesionales de Calibración y Mantenimiento  
S.A. de C.V. (SICAAM)**

Calle Mier No. 270, Col. Obrera  
Reynosa, Tamaulipas, México. CP.88680  
Contact Name: Eng. Benigno Cruz Phone: 899-925-6848

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

## Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Output LCR Capacitance <sup>O</sup>	1 pF to 1 000 pF	1 % of reading	HP 16381A, HP 16382 A, HP 16383A, HP 16384A PC-CAP-001 SICAAM Procedure
	1 nF to 500 nF	0.001 6 nF	GR 1409-X Standard Capacitor PC-CAP-001 SICAAM Procedure
Equipment to Measure RF/Microwave Amplitude Modulation <sup>FO</sup>	Depth 5 % to 99 %	3 % of reading + 1 digit	HP 8902A Measuring Receiver (0.15 MHz to 10 MHz and Rates 20 Hz to 10 kHz) National Instrument Executive 3.3 Version Software Agilent VEE Version 6 & 7 Software Sure CAL Version 5.1 Software MET/CAL Version 6 Software
	Depth 5 % to 99 %	3 % of reading + 1 digit	HP 8902A Measuring Receiver (10 MHz to 1 300 MHz and Rates 50 Hz to 50 kHz) National Instrument Executive 3.3 Version Software Agilent VEE Version 6 & 7 Software Sure CAL Version 5.1 Software MET/CAL Version 6 Software
Equipment to Measure RF/Microwave Frequency Modulation <sup>FO</sup>	Deviations $\leq$ 40 kHz <sub>PEAK</sub>	2 % of reading + 1 digit	HP8902A Measuring Receiver (0.25 MHz to 10 MHz and rates 20 Hz to 10kHz) National Instrument Executive 3.3 Version Software Agilent VEE Version 6 & 7 Software Sure CAL Version 5.1 Software MET/CAL Version 6 Software
Equipment to Measure RF/Microwave Frequency Modulation <sup>FO</sup>	Deviations $\leq$ 400 kHz <sub>PEAK</sub>	5 % of reading + 1 digit	HP8902A Measuring Receiver (10 MHz to 1 300 MHz and Rates 20 Hz to 200 kHz) National Instrument Executive 3.3 Version Software Agilent VEE Version 6 & 7 Software Sure CAL Version 5.1 Software MET/CAL Version 6 Software





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Equipment to Measure Tuned RF Power (150 kHz to 1 300 MHz) <sup>FO</sup>	0 dB to -3 dB	0.11 dB	HP8902A w / 11 722A HP8903B, Agilent E4407B National Instrument Executive 3.3 Version Software Agilent VEE Version 6 & 7 Software Sure CAL Version 5.1 Software MET/CAL Version 6 Software
	30 dB to 0.01 dB	0.11 dB	
	-3 dB to -10 dB	0.11 dB	
	-10 dB to -40 dB	0.15 dB	
	-40 dB to -50 dB	0.18 dB	
	-50 dB to -80 dB	0.27 dB	
	-80 dB to -90 dB	0.32 dB	
Equipment to Measure RF Power Distortion (10 KHz to 26.5 GHz) <sup>FO</sup>	-70 dB to 20 dB	1.3 dB	Agilent E4407B National Instrument Executive 3.3 Version Software Agilent VEE Version 6 & 7 Software Sure CAL Version 5.1 Software MET/CAL Version 6 Software
	-99.9 dB to 0 dB	1.2 dB	
	-99.9 dB to 0 dB	2.5 dB	
Oscilloscopes AC Voltage (Leveled Sine Wave) 50 $\Omega$ <sup>FO</sup>	5 mV to 5.5 V 50 kHz (Reference)	2 % of output + 300 $\mu$ V	Fluke 5500A / SC600 3-IT-5.4-031 SICAAM Procedure
	5 mV to 5.5 V (0.05 MHz to 100 MHz)	3.5 % of output + 300 $\mu$ V	



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Oscilloscopes <sup>FO</sup>			Fluke 5500A/SC600 3-IT-5.4-031 SICAAM Procedure
AC Voltage (Leveled Sine Wave) 50 $\Omega$	5 mV to 5.5 V (100 MHz to 300 MHz)	4 % of output + 300 $\mu$ V	
	5 mV to 5.5 V (300 MHz to 600 MHz)	6 % of output + 300 $\mu$ V	
DC Voltage (DC Signal) 50 $\Omega$ Load <sup>FO</sup>	0 V to 6.6 V	0.25 % of output + 40 $\mu$ V	
Volt source (DC Signal) 1M $\Omega$ Load <sup>FO</sup>	0 V to 130 V	0.05 % of output + 40 $\mu$ V	
(Sq. Wave Signal) 50 $\Omega$ Load 10 Hz to 10KHz	1 mV to 6.6 Vp-p	0.25 % of output + 40 $\mu$ V	
(Sq. Wave Signal) 1 M $\Omega$ Load 10 Hz to 10KHz <sup>FO</sup>	1 mV to 130 Vp-p	0.1 % of output + 40 $\mu$ V	
Time Interval <sup>FO</sup>	5 nS to 5 S	0.1 ms/s	Tektronix TDS 210 Oscilloscope National Instrument Executive 3.3 Version Software Agilent VEE Version 6 & 7 Software Sure CAL Version 5.1 Software MET/CAL Version 6 Software
Rise Time Generate <sup>FO</sup>	$\leq$ 300 pS	(> 0 pS / -100 pS )	Fluke 5500A / SC600 National Instrument Executive 3.3 Version Software Agilent VEE Version 6 & 7 Software Sure CAL Version 5.1 Software MET/CAL Version 6 Software
Equipment to Output AC Voltage Wave <sup>FO</sup> @ 12 Hz to 100 kHz	2 mV p-p to 55 V p-p (1 M $\Omega$ ) 2 mV p-p to 2.5 V p-p (50 $\Omega$ )	3 % of p-p output + 100 $\mu$ V	Fluke 5500A / SC600 3-IT-5.4-031 SICAAM Procedure



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Equipment to Measure Frequency <sup>FO</sup>	50 Hz to 100 KHz	5.5 Hz	HP PM6681R / 676 National Instrument Executive 3.3 Version Software Agilent VEE Version 6 & 7 Software Sure CAL Version 5.1 Software MET/CAL Version 6 Software
	100 kHz to 20 000 kHz	13.9 Hz	
	20 MHz to 100 MHz	30 Hz	
	100 MHz to 225 MHz	48 Hz	
	225 MHz to 1 300 MHz	65 Hz	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type E <sup>FO</sup>	-196 °C to -100 °C	0.5 °C	Electrical Simulation of Thermocouple Output Fluke 5500A ASTM E220-13
	-100 °C to -25 °C	0.16 °C	
	-25 °C to 350 °C	0.14 °C	
	350 °C to 650 °C	0.16 °C	
	650 °C to 1 000 °C	0.21 °C	
Temperature Calibration, Indication, and Control Equipment used Thermocouple Type J <sup>FO</sup>	-196 °C to -100 °C	0.27 °C	
	-100 °C to -30 °C	0.16 °C	
	-30 °C to 150 °C	0.14 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type J <sup>FO</sup>	150 °C to 760 °C	0.17 °C	Fluke 5500A Electrical Simulation of Thermocouple Output ASTM E220-13
	760 °C to 1 200 °C	0.23 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type K <sup>FO</sup>	-196 °C to -100 °C	0.33 °C	
	-100 °C to -25 °C	0.18 °C	
	-25 °C to 120 °C	0.16 °C	
	120 °C to 1 000 °C	0.26 °C	
	1 000 °C to 1 372 °C	0.4 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type T <sup>FO</sup>	-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 RTD Type Pt 385 100 $\Omega$ <sup>FO</sup>	-200 °C to -80 °C	0.05 °C	Fluke 5500A Electrical Simulation of RTD Output 3-IT-5.4-003 SICAAM Procedure 3-IT-5.4-004 SICAAM Procedure
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.07 °C	
	100 °C to 300 °C	0.09 °C	
	300 °C to 400 °C	0.1 °C	
	400 °C to 630 °C	0.12 °C	
630 °C to 800 °C	0.23 °C		



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## Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure AC Voltage Hipot <sup>FO</sup>	0.05 kV to 0.5 kV	2.1V	Hi Pot Calibrator Chroma 9102 3-IT-5.4-008 SICAAM Procedure
	0.6 kV to 1 kV	3.6 V	
	1.1 kV to 1.9 kV	6.3 V	
	2 kV to 3 kV	16 V	
	3.1 kV to 4 kV	19 V	
	4.1 kV to 5 kV	22 V	
	5.1 kV to 6 kV	25 V	
Equipment to Measure DC Voltage Hipot <sup>FO</sup>	0.05 kV to 0.499 9 kV	1.4 V	
	0.5 kV to 0.999 9 kV	2.4 V	
	1 kV to 1.999 9 kV	4.1 V	
	2 kV to 3 kV	11 V	
	3 kV to 4 kV	12 V	
	4 kV to 5 kV	14 V	
	5 kV to 6 kV	16 V	
	6 kV to 7 kV	17 V	
	7 kV to 8 kV	19 V	
8 kV to 9 kV	21 V		
9 kV to 10 kV	24 V		
Equipment to Measure AC Current Hipot <sup>F</sup>	10 $\mu$ A to 100 $\mu$ A	0.36 $\mu$ A	
	100 $\mu$ A to 190 $\mu$ A	0.66 $\mu$ A	
	0.18 mA to 1 mA	0.003 6 mA	
	1 mA to 1.9 mA	0.006 3 mA	
	2 mA to 10 mA	0.036 mA	
	10 mA to 19.999 mA	0.066 mA	
	20 mA to 100 mA	0.36 mA	
100 mA to 199.99 mA	0.66 mA		
Equipment to Measure DC Current Hi Pot <sup>F</sup>	10 $\mu$ A to 100 $\mu$ A	0.24 $\mu$ A	
	100 $\mu$ A to 190 $\mu$ A	0.41 $\mu$ A	
	0.18 mA to 1 mA	0.000 9 mA	
	1 mA to 1.9 mA	0.004 mA	
	2 mA to 10 mA	0.024 mA	
	10 mA to 19.999 mA	0.043 mA	
	20 mA to 100 mA	0.24 mA	
100 mA to 199.99 mA	0.43 mA		



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Equipment to Measure AC Current Bound Ground <sup>F</sup>	0.5 A to 5 A	0.022 A	Hi Pot Calibrator Chroma 9102 3-IT-5.4-008 SICAAM Procedure
	5 A to 10 A	0.036 A	
	10 A to 20 A	0.066 A	
	20 A to 30 A	0.096 A	
	30 A to 45 A	0.2 A	
Equipment to Output Insulation Resistance <sup>F</sup>	10 M $\Omega$	0.12 M $\Omega$	
	90.9 M $\Omega$	0.91 M $\Omega$	
	1 000 M $\Omega$	20 M $\Omega$	
Equipment to Measure DC High Voltage <sup>F0</sup>	2 kV to 100 kV	3 % of reading	Gamma High Voltage RR-100-2N-M1072 3-IT-5.4-008 SICAAM Procedure
Equipment to Output DC High Voltage <sup>F0</sup>	2 kV to 20 kV	0.1 kV	Hubbell Hipotronics KVM20-A- DSYS-122 3-IT-5.4-008 SICAAM Procedure
Equipment to Output AC High Voltage <sup>F0</sup>	2 kV to 20 kV	0.2 kV (RMS)	Hubbell Hipotronics KVM20-A- DSYS-122 3-IT-5.4-008 SICAAM Procedure
	2 kV to 20 kV	0.4 kV (Peak)	

### Optical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure Laser Power <sup>F0</sup>	10mW to 30W	3 % of reading	Low Power Thermal Sensors -10mW to 50W & Starlite Meter Ass ISO 11554:2017
Equipment to Measure Energy Meter Spectral (0.19 $\mu$ m to 20 $\mu$ m) <sup>F0</sup>	6mJ to 30J	5 % of reading	
Equipment to Measure Light <sup>F</sup>	10 lux to 11 000 lux (Res.= 1 lux)	1 % of reading	Light Meter ASTM E 824-10

### Time and Frequency

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Stopwatch <sup>F0</sup>	10 s to 24 hrs	(0.005 2 + 2.2 x 10 <sup>-4</sup> % of reading) s	Universal Counter HP 5334A NIST SP 960-12





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### Acoustic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Sound Level Meter <sup>F</sup>	94 dB & 114 dB	(0.606 + 0.01 % of reading) dB	Extech 407722 ISO 6926:2016
Sound Level Calibrator <sup>F</sup>	94 dB & 114 dB	(1.74 + 0.01 % of reading) dB	HP 3458A ISO 6926:2016

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<sup>F</sup> 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<sup>O</sup> 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<sup>FO</sup> 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 L represents length in inches or millimeters as appropriate to the uncertainty statement.
9. The term P represents pressure in units appropriate to the uncertainty statement.
10. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) as appropriate to the uncertainty statement.
11. The term F represents force in pound-force (lbf) as appropriate to the uncertainty statement