



# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

## Certificate of Accreditation

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

### ***Accuracy Calibration Services S. de R.L. de C.V.***

***Juan de Grijalva #07, Fracc. Conquistadores  
Ciudad Rio Bravo, Tamaulipas, México. C.P. 88993***

*(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):

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

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

For PJLA:

Tracy Szerszen  
President

*Initial Accreditation Date:*

March 17, 2011

*Issue Date:*

June 28, 2023

*Expiration Date:*

September 30, 2025

*Accreditation No.:*

69876

*Certificate No.:*

L23-501

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



# Certificate of Accreditation: Supplement

## Accuracy Calibration Services S. de R.L. de C.V.

Juan de Grijalva #07, Frac. Conquistadores  
 Ciudad Rio Bravo, Tamaulipas, México. C.P. 88993  
 Contact Name: Hector Millan Espinoza Phone: 899-933-8666

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

### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure DC Current <sup>FO</sup>	4.3 $\mu$ A to 3.299 99 mA	0.13 % of reading + 0.05 $\mu$ A	Fluke 5500A Euramet-cg-15
	3.3 mA to 32.999 9 mA	0.01 % of reading + 0.25 $\mu$ A	
	33 mA to 329.999 mA	0.01 % of reading + 3.3 $\mu$ A	
	330 mA to 2.199 9 A	0.34 % of reading + 44 $\mu$ A	
	2.2 A to 11 A	0.06 % of reading + 330 $\mu$ A	
Equipment to Measure AC Current At the listed frequencies <sup>FO</sup>			
10 Hz to 20 Hz	29 $\mu$ A to 0.329 99 mA	0.24 % of reading + 0.15 $\mu$ A	
20 Hz to 45 Hz	29 $\mu$ A to 0.329 99 mA	0.13 % of reading + 0.15 $\mu$ A	
45 Hz to 1 kHz	29 $\mu$ A to 0.329 99 mA	0.13 % of reading + 0.25 $\mu$ A	
1 kHz to 5 kHz	29 $\mu$ A to 0.329 99 mA	0.4 % of reading + 0.15 $\mu$ A	
5 kHz to 10 kHz	29 $\mu$ A to 0.329 99 mA	1.3 % of reading + 0.015 mA	
Equipment to Measure AC Current At the listed frequencies <sup>FO</sup>			
10 kHz to 20 kHz	0.33 mA to 3.299 9 mA	0.2 % of reading + 0.3 $\mu$ A	
20 Hz to 45 Hz	0.33 mA to 3.299 9 mA	0.1 % of reading + 0.3 $\mu$ A	
45 Hz to 1 kHz	0.33 mA to 3.299 9 mA	0.1 % of reading + 0.3 $\mu$ A	
1 kHz to 5 kHz	0.33 mA to 3.299 9 mA	0.2 % of reading + 0.3 $\mu$ A	
5 kHz to 10 kHz	0.33 mA to 3.299 9 mA	0.6 % of reading + 0.3 $\mu$ A	
Equipment to Measure AC Current At the listed frequencies <sup>FO</sup>			
10 Hz to 20 Hz	3.3 mA to 32.999 mA	0.2 % of reading + 3 $\mu$ A	
20 Hz to 45 Hz	3.3 mA to 32.999 mA	0.1 % of reading + 3 $\mu$ A	
45 Hz to 1 kHz	3.3 mA to 32.999 mA	0.09 % of reading + 3 $\mu$ A	
1 kHz to 5 kHz	3.3 mA to 32.999 mA	0.2 % of reading + 3 $\mu$ A	
5 kHz to 10 kHz	3.3 mA to 32.999 mA	0.6 % of reading + 3 $\mu$ A	
Equipment to Measure AC Current At the listed frequencies <sup>FO</sup>			
10 Hz to 20 Hz	33 mA to 329.99 mA	0.2 % of reading + 30 $\mu$ A	
20 Hz to 45 Hz	33 mA to 329.99 mA	0.1 % of reading + 30 $\mu$ A	



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Equipment to Measure AC Current At the listed frequencies <sup>FO</sup>			Fluke 5500A Euramet-cg-15
45 Hz to 1 kHz	33 mA to 329.99 mA	0.09 % of reading + 30 $\mu$ A	
1 kHz to 5 kHz	33 mA to 329.99 mA	0.2 % of reading + 30 $\mu$ A	
5 kHz to 10 kHz	33 mA to 329.99 mA	0.6 % of reading + 30 $\mu$ A	
Equipment to Measure AC Current At the listed frequencies <sup>FO</sup>			
10 Hz to 45 Hz	0.33 A to 2.199 99 A	0.2 % of reading + 300 $\mu$ A	
45 Hz to 1 KHz	0.33 A to 2.199 99 A	0.1 % of reading + 300 $\mu$ A	
1 KHz to 5 KHz	0.33 A to 2.199 99 A	0.75 % of reading + 300 $\mu$ A	
Equipment to Measure AC Current At the listed frequencies <sup>FO</sup>			
45 Hz to 60 Hz	2.2 A to 11 A	0.06 % of reading + 2 mA	
65 Hz to 500 Hz	2.2 A to 11 A	0.1 % of reading + 2 mA	
500 Hz to 1 KHz	2.2 A to 11 A	0.33 % of reading + 2 mA	
Equipment to Output Resistance <sup>FO</sup>			
	28 m $\Omega$ to 10.99 $\Omega$	9.3 m $\Omega$	
	11 $\Omega$ to 32.999 $\Omega$	19 m $\Omega$	
	33 $\Omega$ to 109.999 $\Omega$	25 m $\Omega$	
	110 $\Omega$ to 329.999 $\Omega$	45 m $\Omega$	
	330 $\Omega$ to 1.099 99 k $\Omega$	0.16 $\Omega$	
	1.1 k $\Omega$ to 3.299 99 k $\Omega$	0.36 $\Omega$	
	3.3 k $\Omega$ to 10.999 9 k $\Omega$	1.6 $\Omega$	
	11 k $\Omega$ to 32.999 9 k $\Omega$	3.6 $\Omega$	
	33 k $\Omega$ to 109.999 k $\Omega$	19 $\Omega$	
	110 k $\Omega$ to 329.999 k $\Omega$	46 $\Omega$	
	330 k $\Omega$ to 1.099 9 M $\Omega$	220 $\Omega$	
	1.1 M $\Omega$ to 3.2999 9 M $\Omega$	550 $\Omega$	
	3.3 M $\Omega$ to 10.999 9 M $\Omega$	7.2 k $\Omega$	
	11 M $\Omega$ to 32.999 9 M $\Omega$	39 k $\Omega$	
	33 M $\Omega$ to 109.999 M $\Omega$	610 k $\Omega$	
	110 M $\Omega$ to 330 M $\Omega$	1.9 M $\Omega$	



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Equipment to Measure DC Voltage <sup>FO</sup>	0.69 mV to 329.999 9 mV	210 $\mu$ V	Fluke 5500A Euramet-cg-15
	330 mV to 3.299 9 V	170 $\mu$ V	
	3.3 V to 32.999 9 V	1.8 mV	
	33 V to 329.999 9 V	19 mV	
	330 V to 1 020 V	58 mV	
Equipment to Measure AC Voltage At the listed frequencies <sup>FO</sup>			
10 Hz to 40 Hz	1 mV to 32.999 mV	140 $\mu$ V	
40 Hz to 10 kHz	1 mV to 32.999 mV	71 $\mu$ V	
10 kHz to 20 kHz	1 mV to 32.999 mV	89 $\mu$ V	
20 kHz to 50 kHz	1 mV to 32.999 mV	0.12 mV	
50 kHz to 100 kHz	1 mV to 32.999 mV	0.34 mV	
100 kHz to 500 kHz	1.35 mV to 32.999 mV	0.45 mV	
Equipment to Measure AC Voltage At the listed frequencies <sup>FO</sup>			
10 Hz to 40 Hz	33 mV to 329.99 mV	0.85 mV	
40 Hz to 10 kHz	33 mV to 329.99 mV	0.85 mV	
10 kHz to 20 kHz	33 mV to 329.99 mV	0.35 mV	
20 kHz to 50 kHz	33 mV to 329.99 mV	0.56 mV	
50 kHz to 100 kHz	33 mV to 329.99 mV	2 mV	
100 kHz to 500 kHz	33 mV to 329.99 mV	6.4 mV	
Equipment to Measure AC Voltage At the listed frequencies <sup>FO</sup>			
10 Hz to 40 Hz	330 mV to 3.299 9 V	2.6 mV	
40 Hz to 10 kHz	330 mV to 3.299 9 V	2.6 mV	
10 kHz to 20 kHz	330 mV to 3.299 9 V	2.7 mV	
20 kHz to 50 kHz	330 mV to 3.299 9 V	5 mV	
50 kHz to 100 kHz	330 mV to 3.299 9 V	9.7 mV	
100 kHz to 500 kHz	330 mV to 3.299 9 V	20 mV	



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Equipment to Measure AC Voltage At the listed frequencies <sup>FO</sup>			Fluke 5500A Euramet-cg-15
10 Hz to 40 Hz	3.3 V to 32.999 9 V	14 mV	
40 Hz to 10 kHz	3.3 V to 32.999 9 V	14 mV	
10 kHz to 20 kHz	3.3 V to 32.999 9 V	29 mV	
20 kHz to 50 kHz	3.3 V to 32.999 9 V	68 mV	
50 kHz to 100 kHz	3.3 V to 32.999 9 V	98 mV	
Equipment to Measure AC Voltage At the listed frequencies <sup>FO</sup>			
40 Hz to 1 kHz	33 V to 329.999 V	0.17 V	
1 kHz to 10 kHz	33 V to 329.999 V	0.27 V	
10 kHz to 20 kHz	33 V to 329.999 V	0.32 V	
Equipment to Measure AC Voltage At the listed frequencies <sup>FO</sup>			
40 Hz to 1 kHz	330 V to 1 020 V	0.58 V	
1 kHz to 5 kHz	330 V to 1 020 V	2.2 V	
5 kHz to 10 kHz	330 V to 1 020 V	2.6 V	
Equipment to Measure Capacitance At the listed frequencies <sup>FO</sup>			
0.33 nF to 0.499 9 nF	50 Hz to 1 000 Hz	0.012 nF	
0.5 nF to 1.099 9 nF	50 Hz to 1 000 Hz	0.015 nF	
1.1 nF to 3.299 nF	50 Hz to 1 000 Hz	0.026 nF	
3.3 nF to 10.999 nF	50 Hz to 1 000 Hz	0.064 nF	
11 nF to 32.999 nF	50 Hz to 1 000 Hz	0.18 nF	
33 nF to 109.99 nF	50 Hz to 1 000 Hz	0.37 nF	
110 nF to 329.99 nF	50 Hz to 1 000 Hz	1.2 nF	
0.33 $\mu$ F to 1.099 9 $\mu$ F	50 Hz to 1 000 Hz	3.8 nF	
1.1 $\mu$ F to 3.299 9 $\mu$ F	50 Hz to 1 000 Hz	15 nF	
3.3 $\mu$ F to 10.999 $\mu$ F	50 Hz to 400 Hz	49 nF	
11 $\mu$ F to 32.999 $\mu$ F	50 Hz to 400 Hz	270 nF	



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Equipment to Measure Capacitance At the listed frequencies <sup>FO</sup>			Fluke 5500A Euramet-cg-15
33 $\mu$ F to 109.99 $\mu$ F	50 Hz to 200 Hz	650 nF	
110 $\mu$ F to 329.99 $\mu$ F	50 Hz to 100 Hz	2.6 $\mu$ F	
330 $\mu$ F to 1.1 mF	50 Hz to 100 Hz	12 $\mu$ F	
Equipment to Output DC Current <sup>FO</sup>	30 $\mu$ A to 100 $\mu$ A	0.002 5 % of reading + 0.8 nA	HP 3458A CEM EL-001
	100 $\mu$ A to 1 mA	0.002 5 % of reading + 5 nA	
	1 mA to 10 mA	0.002 5 % of reading + 50 nA	
	10 mA to 100 mA	0.004 % of reading + 500 nA	
	100 mA to 1 A	0.012 % of reading + 10 $\mu$ A	
Equipment to Output DC Current Indirect Method <sup>FO</sup>	1 A to 100 A	0.16 A	HP 3458A W/ 100 HA Current Shunt CEM EL-001
Equipment to Output Resistance <sup>FO</sup>	200 $\mu\Omega$ to 10 $\Omega$	0.001 5 % of reading + 50 $\mu\Omega$	HP 3458A CEM EL-001
	10 $\Omega$ to 100 $\Omega$	0.001 2 % of reading + 500 $\mu\Omega$	
	100 $\Omega$ to 1 k $\Omega$	0.001 % of reading + 500 $\mu\Omega$	
	1 k $\Omega$ to 10 k $\Omega$	0.01 % of reading + 5 m $\Omega$	
	10 k $\Omega$ to 100 k $\Omega$	0.01 % of reading + 50 m $\Omega$	
	100 k $\Omega$ to 1 M $\Omega$	0.15 % of reading + 2 $\Omega$	
	1 M $\Omega$ to 10 M $\Omega$	0.05 % of reading + 100 $\Omega$	
	10 M $\Omega$ to 100 M $\Omega$	0.05 % of reading + 1 k $\Omega$	
Equipment to Output AC Voltage At the listed Frequencies <sup>FO</sup>			
1 Hz to 40 Hz	1 mV to 10 mV	0.03 % of reading + 0.03 mV	
40 Hz to 1 kHz	1 mV to 10 mV	0.02 % of reading + 0.011 mV	
1 kHz to 20 kHz	1 mV to 10 mV	0.03 % of reading + 0.011 mV	
20 kHz to 50 kHz	1 mV to 10 mV	0.1 % of reading + 0.011 mV	
50 kHz to 100 kHz	1 mV to 10 mV	0.5 % of reading + 0.011 mV	
100 kHz to 300 kHz	1 mV to 10 mV	4 % of reading + 0.02 mV	



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Equipment to Output AC Voltage At the listed Frequencies <sup>FO</sup>			HP 3458A CEM EL-001
1 Hz to 40 Hz	100 mV to 10 V	0.007 % of reading + 0.004 V	
40 Hz to 1 kHz	100 mV to 10 V	0.007 % of reading + 0.002 V	
1 kHz to 20 kHz	100 mV to 10 V	0.014 % of reading + 0.002 V	
20 kHz to 50 kHz	100 mV to 10 V	0.03 % of reading + 0.002 V	
50 kHz to 100 kHz	100 mV to 10 V	0.08 % of reading + 0.002 V	
100 kHz to 300 kHz	100 mV to 10 V	0.3 % of reading + 0.01 V	
300 kHz to 1 MHz	100 mV to 10 V	1 % of reading + 0.01 V	
1 MHz to 2 MHz	100 mV to 10 V	1.5 % of reading + 0.01 V	
Equipment to Output AC Voltage At the listed Frequencies <sup>FO</sup>			
1 Hz to 40 Hz	10 V to 100 V	0.02 % of reading + 0.04 V	
40 Hz to 1 kHz	10 V to 100 V	0.02 % of reading + 0.02 V	
1 KHz to 20 kHz	10 V to 100 V	0.02 % of reading + 0.02 V	
20 kHz to 50 kHz	10 V to 100 V	0.035 % of reading + 0.02 V	
50 kHz to 100 kHz	10 V to 100 V	0.12 % of reading + 0.02 V	
100 kHz to 300 kHz	10 V to 100 V	0.4 % of reading + 0.1 V	
300 kHz to 1 MHz	10 V to 100 V	1.5 % of reading + 0.1 V	
Equipment to Output AC Voltage At the listed Frequencies <sup>FO</sup>			
1 Hz to 40 Hz	100 V to 1 000 V	0.04 % of reading + 0.4 V	
40 Hz to 1 kHz	100 V to 1 000 V	0.04 % of reading + 0.2 V	
1 kHz to 20 kHz	100 V to 1 000 V	0.06 % of reading + 0.2 V	
20 kHz to 50 kHz	100 V to 1 000 V	0.12 % of reading + 0.2 V	
50 kHz to 100 kHz	100 V to 1 000 V	0.3 % of reading + 0.2 V	
Equipment to Output DC Voltage <sup>FO</sup>	1 mV to 100 mV	0.000 9 % of reading + 0.3 μV	
	100 mV to 1 V	0.000 8 % of reading + 0.3 μV	
	1 V to 10 V	0.000 8 % of reading + 0.5 μV	
	10 V to 100 V	0.001 % of reading + 30 μV	
	100 V to 1 000 V	0.001 % of reading + 0.1 mV	



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Temperature Calibration, Indication and control Equipment used with Thermocouple Type J <sup>FO</sup>	-210 °C to -100 °C	0.26 °C	Fluke 5500A Electrical Simulation of Thermocouple Output Euramet cg-11
	-100 °C to -30 °C	0.42 °C	
	-30 °C to 150 °C	0.21 °C	
	150 °C to 760 °C	0.29 °C	
	760 °C to 1 200 °C	0.73 °C	
Temperature Calibration, Indication and control Equipment used with Thermocouple Type K <sup>FO</sup>	-200 °C to -100 °C	0.34 °C	
	-100 °C to -25 °C	0.18 °C	
	-25 °C to 120 °C	0.19 °C	
	120 °C to 1 000 °C	0.27 °C	
	1 000 °C to 1 372 °C	0.48 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type B <sup>FO</sup>	600 °C to 800 °C	0.44 °C	
	800 °C to 1 000 °C	0.34 °C	
	1 000 °C to 1 550 °C	0.3 °C	
	1 550 °C to 1 820 °C	0.33 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type C <sup>FO</sup>	0 °C to 150 °C	0.3 °C	
	150 °C to 650 °C	0.26 °C	
	650 °C to 1 000 °C	0.31 °C	
	1 000 °C to 1 800 °C	0.5 °C	
	1 800 °C to 2 316 °C	0.84 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type E <sup>FO</sup>	-250 °C to -100 °C	0.5 °C	
	-100 °C to -25 °C	0.16 °C	
	-25 °C to 350 °C	0.14 °C	
	350 °C to 650 °C	0.14 °C	
	650 °C to 1 000 °C	0.16 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type N <sup>FO</sup>	-200 °C to -100 °C	0.4 °C	
	-100 °C to -25 °C	0.22 °C	
	-25 °C to 120 °C	0.19 °C	
	120 °C to 1 000 °C	0.18 °C	
	1 000 °C to 1 372 °C	0.27 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type R <sup>FO</sup>	0 °C to 250 °C	0.57 °C	





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Temperature Calibration Indication and Control Equipment used with Thermocouple Type R <sup>FO</sup>	250 °C to 400 °C	0.35 °C	Fluke 5500A Electrical Simulation of Thermocouple Output Euramet cg-11
	400 °C to 1 000 °C	0.33 °C	
	1 000 °C to 1 767 °C	0.33 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type S <sup>FO</sup>	0 °C to 250 °C	0.47 °C	
	250 °C to 1 000 °C	0.36 °C	
	1 000 °C to 1 400 °C	0.36 °C	
	1 400 °C to 1 767 °C	0.37 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type T <sup>FO</sup>	-250 °C to -150 °C	0.63 °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 Thermocouple Type U <sup>FO</sup>	-200 °C to 0 °C	0.56 °C	
	0 °C to 600 °C	0.27 °C	
Temperature Calibration Indication and Control Equipment used with RTD Pt 395, 100 $\Omega$ <sup>FO</sup>	-196 °C to 0 °C	0.05 °C	Fluke 5500A Electrical Simulation of RTD Output Euramet cg-11
	0 °C to 100 °C	0.05 °C	
	100 °C to 300 °C	0.07 °C	
	300 °C to 400 °C	0.09 °C	
	400 °C to 630 °C	0.1 °C	
630 °C to 800 °C	0.12 °C		
Temperature Calibration Indication and Control Equipment used with RTD Pt 3 926, 100 $\Omega$ <sup>FO</sup>	-196 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.05 °C	
	100 °C to 300 °C	0.07 °C	
	300 °C to 400 °C	0.09 °C	
Temperature Calibration Indication and Control Equipment used with RTD Pt 3 916, 100 $\Omega$ <sup>FO</sup>	400 °C to 630 °C	0.1 °C	
	-196 °C to -190 °C	0.25 °C	
	-190 °C to 80 °C	0.04 °C	
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.6 °C	
	100 °C to 260 °C	0.06 °C	
260 °C to 300 °C	0.07 °C		



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Temperature Calibration Indication and Control Equipment used with RTD Pt 3916, 100 $\Omega^{FO}$	300 °C to 400 °C	0.08 °C	Fluke 5500A Electrical Simulation of RTD Output Euramet cg-11
	400 °C to 600 °C	0.09 °C	
	600 °C to 630 °C	0.23 °C	
Temperature Calibration Indication and Control Equipment used with RTD Pt 385, 200 $\Omega^{FO}$	-196 °C to 100 °C	0.04 °C	
	100 °C to 260 °C	0.04 °C	
	260 °C to 300 °C	0.05 °C	
	300 °C to 400 °C	0.12 °C	
	400 °C to 600 °C	0.13 °C	
	600 °C to 630 °C	0.14 °C	
Temperature Calibration Indication and Control Equipment used with RTD Pt 385, 500 $\Omega^{FO}$	-196 °C to -80 °C	0.04 °C	
	-80 °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	0.08 °C	
	400 °C to 600 °C	0.08 °C	
Temperature Calibration Indication and Control Equipment used with RTD Pt 385, 1 000 $\Omega^{FO}$	-160 °C to 0 °C	0.03 °C	
	0 °C to 100 °C	0.03 °C	
	100 °C to 260 °C	0.04 °C	
	260 °C to 300 °C	0.05 °C	
	300 °C to 400 °C	0.06 °C	
	400 °C to 600 °C	0.07 °C	
Temperature Calibration Indication and Control Equipment used with RTD Ni 385 120 $\Omega^{FO}$	-80 °C to 100 °C	0.08 °C	
	100 °C to 260 °C	0.14 °C	
Temperature Calibration Indication and Control Equipment used with RTD Cu 10 $\Omega^{FO}$	-100 °C to 260 °C	0.3 °C	



# Certificate of Accreditation: Supplement

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Juan de Grijalva # 07, Fracc. Conquistadores  
 Ciudad Rio Bravo, Tamaulipas, México. CP.88993  
 Contact Name: Hector Millan Espinoza Phone: 899-933-8666

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
RF Microwave Equipment to Output Amplitude Modulated Signals At the listed frequencies <sup>F0</sup>			HP 8901B Internal Procedure 33K3-4-718-1 33K3-4- 489-1
50 Hz to 10 kHz Depths: 5 % to 99 %	150 KHz to 10 MHz	2.6 % of reading + 1 digit	33K-4-2116-1
20 Hz to 10 kHz Depths: 5% to 99%	150 KHz to 10 MHz	3.4 % of reading + 1 digit	
50 Hz to 50 kHz Depths: 5% to 99%	150 kHz to 1.3 GHz	2.5 % of reading + 1 digit	
Rate: 20 Hz to 100 kHz Depths: 5% to 99%	150 kHz to 1.3 GHz	3.3 % of reading + 1 digit	
Equipment to Output Frequency Modulated Signals At the listed frequencies <sup>F0</sup>			
20 Hz to 10 kHz Dev: $\leq$ 40 kHz peak	0.25 MHz to 10 MHz	2.7 % of reading + 1 digit	HP 5384A Internal Procedure 33K3-4-718-1 33K3-4- 489-1 33K-4-2116-1
50 Hz to 100 kHz Dev: $\leq$ 400 kHz peak	10 MHz to 1.3 GHz	1.7 % of reading + 1 digit	
20 Hz to 200 kHz Dev: $\leq$ 400 kHz peak	10 MHz to 1.3 GHz	5.2 % of reading + 1 digit	
Equipment to Measure Frequency <sup>F0</sup>	150 kHz to 10 MHz	7.2 Hz	
	10 MHz to 100 MHz	8.3 Hz	
	100 MHz to 225 MHz	12 Hz	
	225 MHz to 1 300 MHz	27 Hz	
	10 Hz to 100 KHz	5.1 Hz	
	100 kHz to 50 000 KHz	11 Hz	
	50 MHz to 100 MHz	27 Hz	
	100 MHz to 3 GHz	67 Hz	
Equipment to Measure Signal Measuring At the listed frequencies <sup>F0</sup>			6062A Internal Procedure 33K3-4-718-1
Up to 20 MHz	-1.87 W to 0.8 W	0.04 W + 1.05 Hz	33K3-4- 489-1
100 KHz to 2 000 MHz	-4.23 W to 0.43 W	0.04 W + 1.05 Hz	33K-4-2116-1



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### Electrical

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Equipment to Output Distortion At the listed frequencies <sup>FO</sup>			HP 8903A (Rate: 20 Hz to 100 kHz) Internal Procedure 33K3-4-2957-1 33K3-4- 2894-1 33K3-4-489-1
50 Hz to 100 Hz	1 mW to 1.259 mW	0.003 % of reading	
20 Hz to 20 KHz	-99.99 dB to 0 dB	1.2 dB	
20 KHz to 100 KHz	-99.99 dB to 0 dB	2.5 dB	
Equipment to Measure Audio RMS Measure <sup>FO</sup>	0 Vrms to 7 Vrms	$5.8 \times 10^{-5}$ Vrms	Agilent 34401A NMX-CH-389-1-IMNC
Equipment to Output LCR Inductance <sup>FO</sup>	1 mH	0.002 mH	Standard Inductors CENAM Technical Guide
	10 mH	0.012 mH	
	100 mH	0.12 mH	
Equipment to Measure RF Power At the listed frequencies 10 MHz to 18 GHz <sup>FO</sup>	-2.33 W to -0.67 W	0.06 W	HP 437B, HP 8481B, HP 8484A CENAM Technical Guide
	-0.67 W to 0.67 W	0.04 W	

### Times & Frequency

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure Frequency <sup>FO</sup>	0.01 Hz to 11.999 kHz	0.086 % of reading	Fluke 5500A CENAM Technical Guide
	12 kHz to 2 MHz	0.086 % of reading	
Equipment to Output Frequency <sup>FO</sup>	1 Hz to 40 Hz	0.05 % of reading	HP 3458A CENAM Technical Guide
	40 Hz to 10 MHz	0.01 % of reading	
Timer Interval <sup>FO</sup>	0.35 ms to 5 s	0.1 ms/s	Tektronix TDS 3032 CENAM Technical Guide

### Mass, Force & Weighing Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Analytical Balance <sup>O</sup>	1 g to 100 g	$(9 \times 10^{-4} + 2 \times 10^{-4}Wt)$ g	Weight Set, Class F, 1 g to 100 g 500 g to 3 Kg, 5 lbs to 250 lbs NIST Handbook 44 OIML R111 CENAM Technical Guide
Electronic Balance - Counting Balance <sup>O</sup>	500 g to 3 kg	$(2.1 \times 10^{-4} + 6.866 \times 10^{-8}Wt)$ g	
	5 lb to 250 lb	$(3 \times 10^{-4} + 1 \times 10^{-4}Wt)$ lb	



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### Mass, Force & 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 Gauges- Tension and Compression Source and Measure <sup>F</sup>	1 lbf to 10 000 lbf	2.2 lbf	Load Cell CENAM Technical Guide

### 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 <sup>FO</sup>	0.1 in to 6 in (2.54 mm to 152.4 mm)	(478.67 + 1.34L) $\mu$ in [(12.16 + 1.34 x 10 <sup>-3</sup> L) $\mu$ m]	Gage Blocks JIS B7507
Digital and Dial Indicators <sup>FO</sup>	0.1 in to 2 in (2.54 mm to 50.8 mm)	(59.84 + 74.01 x 10 <sup>-2</sup> L) $\mu$ in [(1.52 + 1.88 x 10 <sup>-2</sup> L) $\mu$ m]	
Depth Gages <sup>FO</sup>	0.1 in to 6 in (2.54 mm to 152.4 mm)	(478.67 + 1.34L) $\mu$ in [(12.2 + 1.34 x 10 <sup>-3</sup> L) $\mu$ m]	
Thickness Gages <sup>FO</sup>	0.1 in to 0.5 in (2.54 mm to 12.7 mm)	(59.84 + 2.91 x 10 <sup>-2</sup> L) $\mu$ in [(1.52 + 7.4 x 10 <sup>-4</sup> L) $\mu$ m]	
Gage Blocks <sup>F</sup>	0.1 in to 20 in (2.54 mm to 508 mm)	(3 + 1.7L) $\mu$ in [(0.076 + 0.001 7L) $\mu$ m]	Gage Blocks Comparator Master Gage Blocks b Grade 00 ASME Y 14.43
Optical Comparator X axis Linearity <sup>O</sup> Y axis Linearity <sup>O</sup>	10 in	(370 + 60L) $\mu$ in	Glass Scales JIS B7184
Optical Comparator Angularity <sup>O</sup>	0° to 180°	0.2°	
Optical Comparator Magnification	10X 20X 50X	0.03 % 0.03 % 0.04 %	Glass Standard JIS B7184
Squareness <sup>F</sup>	4 in of Y axis travel or maximum Y axis travel if maximum is less than 4 in.	300 $\mu$ in	Master Square JIS B7184
Surface Plates Flatness <sup>O</sup>	16 in to 50 in	98 $\mu$ in	Planekator JIS B7513
CMM Repeatability <sup>O</sup>	1 in	94 $\mu$ in	Sphere 1 in UNE-EN-ISO 10360-2
Level <sup>FO</sup>	0.2 in to 8 in	330 $\mu$ in	Precision Level & Angle Blocks JIS 7184



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### 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
Radius Gage <sup>FO</sup>	0.01 in to 1 in	350 $\mu$ m	Optical Comparator B-I006P153
Angle Blocks <sup>FO</sup>	0° to 180°	0.1°	
Plain Cylindrical Ring Gage <sup>FO</sup>	0.25 in to 14 in	(19 + 3.8D) $\mu$ m	Bore Gage ASME B89.1.1
Thread Plug Gage Pitch Diameter (PD) <sup>FO</sup>	5-40 to 14-6	(130 + 2D) $\mu$ m	Micrometer with Thread Wire Set ASME B89.1.1
Thread Plug Gage Tapered <sup>FO</sup>	1/16 -27 to 10-8	(140 + 2D) $\mu$ m	Micrometer with Thread Wire Set Sine Block ASME B89.1.1
Thread Ring Gage <sup>FO</sup> Pitch Diameter (PD)	14-24 to 8-16	(200 + 1D) $\mu$ m	Machine with TPI Anvils (accessories) and Inside Jaws ASME B89.1.1
Roughness Tester Ra (Fixed point) <sup>FO</sup>	117 $\mu$ m	0.76 $\mu$ m	Roughness Standard ASME B46.1
Coating Thickness Gage <sup>FO</sup>	52.47 $\mu$ m to 179.13 $\mu$ m	1.2 $\mu$ m	Coating Thickness Standard Comparison JIS 7502

### 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
Vacuum Gauges <sup>FO</sup>	-99.898 kPa to 0.102 kPa (-29.5 inHg to 0.03 inHg)	7.6 kPa [(2.244 inHg)]	Fluke PV 350 ISO 3567
Pressure Gauges <sup>FO</sup>	0.1 MPa to 2.413 1 MPa (14.5 psi to 349.99 psi)	5.6 kPa [(0.81 psi)]	
Pressure Gauges <sup>F</sup>	100 psi to 10 000 psi	1.4 % of reading	Dead Weight Tester Ametek R-55
Indirect Verification of Rockwell Hardness Testers HRC <sup>O</sup>	20 HRC to 39 HRC	0.37 HRC	Calibrated Rockwell Hardness Test Blocks ASTM E18
	40 HRC to 59 HRC	0.35 HRC	
	60 HRC to 70 HRC	0.32 HRC	
Torque Wrench <sup>FO</sup>	0.1 N•m to 10 N•m	0.62 % reading	Torque Analyzer Crane with Load Cell Rotary NMX-CH-157-IMNC ASME B 107.300
Electronic Screwdriver <sup>FO</sup>	0.1 N•m to 10 N•m	0.62 % reading	
Torque Tester Analog / Digital <sup>F</sup>	20 lbf•in to 400 lbf•in	0.44 lbf•in	Weights Class F and 4 in Torque Wheel NMX-CH-157-IMNC ASME B 107.300



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### 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 <sup>FO</sup>	4 pH	0.03 pH	Hanna Buffer Solution CENAM Technical Guide NMX-CH-068
	7 pH	0.03 pH	
	10 pH	0.03 pH	
Conductivity Meter <sup>FO</sup>	1.42 mS/cm	0.5 mS/cm	Hanna Buffer Solution CENAM Technical Guide
	12.88 mS/cm	0.05 mS/cm	
Viscosity Cup Ford <sup>F</sup>	20 cSt to 880 cSt	2 % of reading	Viscosity Solutions Stopwatch & Thermometer ASTM D7945, ASTM D1200 ASTM D6299, ASTM D4212 ASTM D 446, ASTM D7579 ASTM D 445, ASTM D88
Viscosity Cups Zhan <sup>F</sup>	20 cSt to 880 cSt	2 % of reading	

### Acoustic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Acoustical Measuring Equipment Fixed Points <sup>F</sup>	94 dB @ 1 kHz	0.5 dB	Acoustical Calibrator Simpson ANSI S1.4
	114 dB @ 1 kHz	0.5 dB	

### 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
Chart Recorders Termo-Hygrometers, Humidity Meters <sup>F</sup>	10 % RH to 90 % RH	2.3 % of reading	Humidity Calibration Salts Sensor CENAM Technical Guide

### Optical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Light Meter <sup>F</sup>	11 lux to 5 394 lux	4.9 % of reading	Light Master Exttech Comparison CENAM Technical Guide



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

1. The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represent the smallest measurement uncertainties attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is 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 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.
5. 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.
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 Wt. represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.
8. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
9. The term D represents diameter in inches or millimeters as appropriate to the uncertainty statement.