



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

SITEC LAB S DE RL DE CV
 Epigmenio González, Number 5 Int 2
 San Pablo Tecnológico, Querétaro, MEXICO 76150
 Verónica Vega Sifuentes Phone: 442-257-6910

CALIBRATION

Valid To: February 28, 2025

Certificate Number: 5134.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations:^{1, 5}

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 4}	Comments
DC Voltage – Generate (±)	0 V to < 330 mV (0.33 to < 3.3) V (3.3 to < 33) V (33 to < 330) V (330 to 1020) V	48 μV/V + 2.4 μV 39 μV/V + 4.0 μV 39 μV/V + 39 μV 43 μV/V + 0.39 mV 43 μV/V + 1.2 mV	Direct comparison, multifunction calibrator
DC Current – Generate (±)	(0 to < 330) μA (0.33 to < 3.3) mA (3.3 to < 33) mA (33 to < 330) mA (0.33 to < 1.1) A (1.1 to < 3) A (3 to < 11) A (11 to 20) A	120 μA/A + 1.6 μA 80 μA/A + 0.04 μA 81 μA/A + 0.20 μA 83 μA/A + 2.0 μA 0.030 % + 0.035 mA 0.030 % + 0.035 mA 0.048 % + 0.36 mA 0.078 % + 0.58 mA	Direct comparison, multifunction calibrator
Resistance – Generate	(0 to < 11) Ω (11 to < 33) Ω (33 to < 110) Ω (110 to < 330) Ω (0.33 to < 1.1) kΩ (1.1 to < 3.3) kΩ (3.3 to < 11) kΩ	0.0074 % + 0.0013 Ω 0.0093 % + 0.0014 Ω 0.0071 % + 0.0014 Ω 0.0071 % + 0.0018 Ω 0.0070 % + 0.000 004 kΩ 0.0071 % + 0.000 016 kΩ 0.0070 % + 0.000 04 kΩ	Direct comparison, multifunction calibrator

Parameter/Equipment	Range	CMC ^{2, 4}	Comments
Resistance – Generate (cont)	(11 to < 33) kΩ (33 to < 110) kΩ (110 to < 330) kΩ (0.33 to < 1.1) MΩ (1.1 to < 3.3) MΩ (3.3 to < 11) MΩ (11 to < 33) MΩ (33 to < 110) MΩ (110 to < 330) MΩ (0.33 to 1.1) GΩ	0.0071 % + 0.000 16 kΩ 0.0085 % + 0.000 36 kΩ 0.0097 % + 0.0018 kΩ 0.012 % + 0.000 002 MΩ 0.012 % + 0.000 02 MΩ 0.047 % + 0.000 042 MΩ 0.078 % + 0.002 MΩ 0.39 % + 0.000 78 MΩ 0.40 % - 0.005 MΩ 1.2 % - 0.047 MΩ	Direct comparison, multifunction calibrator
Capacitance – Generate	(220 to < 400) pF (0.4 to < 1.1) nF (1.1 to < 3.3) nF (3.3 to < 11) nF (11 to < 33) nF (33 to < 110) nF (110 to < 330) nF (0.33 to < 1.1) μF (1.1 to < 3.3) μF (3.3 to < 11) μF (11 to < 33) μF (33 to < 110) μF (110 to < 330) μF (0.33 to < 1.1) mF (1.1 to < 3.3) mF (3.3 to < 11) mF (11 to < 33) mF (33 to < 110) mF	0.39 % + 7.7 pF 0.39 % + 0.0077 nF 0.39 % + 0.0078 nF 0.20 % + 0.0078 nF 0.20 % + 0.077 nF 0.20 % + 0.078 nF 0.20 % + 0.23 nF 0.20 % + 0.000 78 μF 0.22 % + 0.0022 μF 0.23 % + 0.0072 μF 0.33 % + 0.023 μF 0.37 % + 0.076 μF 0.38 % + 0.21 μF 0.38 % + 0.000 70 mF 0.38 % + 0.0022 mF 0.38 % + 0.0075 mF 0.60 % + 0.023 mF 0.87 % + 0.077 mF	Direct comparison, multifunction calibrator
DC Voltage – Measure	(0 to < 100) mV (0.1 to < 1) V (1 to < 10) V (10 to < 100) V (100 to 1000) V	0.000 77 % + 0.20 μV 0.000 32 % + 0.30 μV 0.0003 % + 0.60 μV 0.0096 % + 0.50 mV 0.000 98 % + 25 mV	Direct comparison, Reference multimeter
DC Current – Measure	(0 to < 10) μA (10 to < 100) μA (0.1 to < 1) mA (1 to < 10) mA (10 to < 100) mA (0.1 to < 1) A (1 to < 10) A (10 to 30) A	0.0014 % + 0.038 nA 0.0001 % + 2.5 nA 0.000 38 % + 0.0043 μA 0.000 23 % + 0.045 μA 0.0010 % + 0.21 μA 0.0019 % + 0.01 mA 0.024 % + 1.6 mA 0.055 % + 5.4 mA	Direct comparison, Reference multimeter

Parameter/Equipment	Range	CMC ^{2, 4}	Comments
Resistance – Measure	(0 to < 1) Ω (1 to < 10) Ω (10 to < 100) Ω (0.1 to < 1) kΩ (1 to < 10) kΩ (10 to < 100) kΩ (0.1 to < 1) MΩ (1 to < 10) MΩ (10 to < 100) MΩ (0.1 to < 1) GΩ	0.0016 % + 0.0040 mΩ 0.0011 % + 0.013 mΩ 0.000 33 % + 0.035 mΩ 0.000 29 % + 0.000 38 Ω 0.000 25 % + 0.0043 Ω 0.000 36 % + 0.030 Ω 0.0013 % + 0.000 80 kΩ 0.0022 % + 0.10 kΩ 0.013 % + 9.9 kΩ 0.14 % + 1.0 MΩ	Direct comparison, Reference multimeter
Capacitance – Measure	(0 to < 1) nF (1 to < 10) nF (10 to < 100) nF (0.1 to < 1) μF (1 to < 10) μF (10 to < 100) μF (0.1 to < 1) mF	0.19 % + 0.001 nF 0.09 % + 0.0023 nF 0.059 % + 0.015 nF 0.055 % + 0.15 nF 0.12 % + 0.0011 μF 0.13 % + 0.012 μF 0.16 % + 0.10 μF	Direct comparison, Reference multimeter
Electrical Simulation Thermocouples – Generate			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.5 °C 0.4 °C 0.36 °C 0.39 °C	Direct comparison, multifunction calibrator
Type C	(0 to 150) °C (150 to 650) °C (650 to 1000) °C (1000 to 1800) °C (1800 to 2316) °C	0.36 °C 0.32 °C 0.34 °C 0.57 °C 0.93 °C	
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.57 °C 0.22 °C 0.21 °C 0.25 °C 0.27 °C	

Parameter/Equipment	Range	CMC ^{2, 4}	Comments
Electrical Simulation Thermocouples – Generate (cont)			
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.33 °C 0.22 °C 0.21 °C 0.23 °C 0.28 °C	Direct comparison, multifunction calibrator
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000to 1372) °C	0.39 °C 0.26 °C 0.22 °C 0.32 °C 0.46 °C	
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.46 °C 0.28 °C 0.25 °C 0.29 °C 0.33 °C	
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.64 °C 0.41 °C 0.39 °C 0.46 °C	
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.48 °C 0.43 °C 0.48 °C 0.53 °C	
Type T	(-250 to -150) °C (-150 to 0) °C	0.71 °C 0.26 °C	
Type U	(0 to 120) °C (120 to 400) °C (-200 to 0) °C (0°C to 600) °C	0.22 °C 0.21 °C 0.63 °C 0.33°C	

Parameter/Equipment	Range	CMC ^{2, 4}	Comments
Electrical Simulation of RTD			
Pt 385, 100 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C	0.37 °C 0.3 °C 0.27 °C 0.29 °C 0.27 °C 0.25 °C 0.28 °C	Direct comparison, Multifunction calibrator
Pt 3926, 100 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.41 °C 0.67 °C 0.41 °C 0.19 °C 0.18 °C 0.19 °C	
Pt 3916, 100 Ω	(-200 to -190) °C (-190 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.22 °C 0.25 °C 0.19 °C 0.18 °C 0.19 °C 0.22 °C 0.29 °C 0.2 °C 0.19 °C	
Pt 385, 200 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.25 °C 0.34 °C 0.32 °C 0.25 °C 0.19 °C 0.34 °C 0.22 °C 0.2 °C	
Pt 385, 500 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.2 °C 0.25 °C 0.46 °C 0.31 °C 0.29 °C 0.34 °C 0.39 °C 0.31 °C	

Parameter/Equipment	Range	CMC ^{2, 4}	Comments
Electrical Simulation of RTD (cont)			
Pt 385, 1000 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.32 °C 0.38 °C 0.51 °C 0.23 °C 0.19 °C 0.18 °C 0.46 °C 0.25 °C	Direct comparison, multifunction calibrator
PtNi 385,120 Ω (Ni120)	(-80 to 0) °C (0 to 100) °C (100 to 260) °C	0.51 °C 0.23 °C 0.19 °C	
Cu 427 10 Ω	(-100 to 260) °C	0.18 °C	

Parameter/Range	Frequency	CMC ^{2, 4}	Comments
AC Current – Measure			
(0 to < 10) μA	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz	0.20 % + 2.5 nA 0.20 % + 0.000 05 nA 0.20 % + 0.000 05 nA	Direct comparison, Reference multimeter
(10 to < 100) μA	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz	0.030 % + 4.9 nA 0.054 % + 5.0 nA 0.075 % + 5.0 nA	
(0.1 to < 1) mA	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.024 % + 0.14 μA 0.048 % + 0.13 μA 0.069 % + 0.12 μA 0.41 % + 0.12 μA	
(1 to < 10) mA	1 Hz to 2 kHz (2 to -10) kHz (10 to 30) kHz (30 to 100) kHz	0.030 % + 0.51 μA 0.053 % + 0.55 μA 0.075 % + 0.50 μA 0.41 % + 1.0 μA	
(10 to < 100) mA	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz	0.030 % + 4.9 μA 0.053 % + 5.0 μA 0.075 % + 5.0 μA	

Parameter/Range	Frequency	CMC ^{2, 4}	Comments
AC Current – Measure (cont)			
(0.1 to < 1) A	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz	0.032 % + 0.10 mA 0.056 % + 0.10 mA 0.080 % + 0.10 mA	Direct comparison, Reference multimeter
(1 to < 30) A	1 Hz to 2 kHz (2 to 10) kHz	0.085 % + 12 mA 0.13 % + 12 mA	
AC Current – Generate			
(29 to < 330) μA	(20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.11 % + 0.092 μA 0.094 % + 0.087 μA 0.23 % + 0.13 μA 0.62 % + 0.16 μA 1.3 % + 0.29 μA	Direct comparison, multifunction calibrator
(0.33 to < 3.3) mA	(20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.10 % + 0.000 11 mA 0.079 % + 0.000 12 mA 0.16 % + 0.000 14 mA 0.39 % + 0.000 20 mA 0.78 % + 0.000 40 mA	
(3.3 to < 33) mA	(20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.072 % + 0.0015 mA 0.036 % + 0.0014 mA 0.066 % + 0.0015 mA 0.16 % + 0.0022 mA 0.31 % + 0.0031 mA	
(33 to < 330) mA	(20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.072 % + 0.015 mA 0.038 % + 0.014 mA 0.08 % + 0.039 mA 0.16 % + 0.073 mA 0.31 % + 0.16 mA	
(0.33 to < 1.1) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.14 % + 0.000 08 A 0.043 % + 0.000 075 A 0.46 % + 0.0008 A 1.9 % + 0.0039 A	
(1.1 to < 3) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.14 % + 0.000 08 A 0.051 % + 0.000 07 A 0.46 % + 0.0008 A 1.9 % + 0.0045 A	

Parameter/Range	Frequency	CMC ^{2, 4}	Comments
AC Current – Generate (cont)			
(3 to < 11) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.051 % + 0.0015 A 0.080 % + 0.0015 A 2.3 % + 0.002 A	Direct comparison, multifunction calibrator
(11 to < 20.5) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.095 % + 0.0038 A 0.12 % + 0.0038 A 2.3 % + 0.0039 A	
AC Voltage – Measure			
(0 to < 10) mV	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.030 % + 1.1 μV 0.038 % + 1.1 μV 0.039 % + 1.1 μV 0.30 % + 0.80 μV	Direct comparison, Reference multimeter
(10 to < 100) mV	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.012 % + 0.32 μV 0.014 % + 0.50 μV 0.025 % + 0.90 μV 0.055 % + 4.5 μV	
(0.1 to < 1) V	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.0083 % + 0.0050 mV 0.013 % + 0.0040 mV 0.023 % + 0.010 mV 0.055 % + 0.045 mV	
(1 to < 10) V	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.0082 % + 0.050 mV 0.013 % + 0.040 mV 0.023 % + 0.10 mV 0.055 % + 0.45 mV	
(10 to < 100) V	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.010 % + 0.50 mV 0.011 % + 0.60 mV 0.023 % + 1 mV 0.061 % + 5 mV	
(0.1 to < 1) kV	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.0010 % + 1.4 V 0.0010 % + 1.4 V 0.0030 % + 1.4 V 0.020 % + 1.4 V	

II. Thermodynamics

Parameter/Equipment	Range	CMC ²	Comments
Characterization of Climatic Chambers Temperature ³	(-80 to 0) °C (0 to 100) °C (100 to 200) °C	1.1 °C 0.81 °C 0.83 °C	Direct comparison, thermocouples and DAQ
Characterization of Climatic Chambers Relative Humidity ³	(10 to 30) % HR (30 to 50) % HR (50 to 85) % HR (85 to 97) % HR	0.85 % HR 1.4 % HR 1.5 % HR 1.5 % HR	Direct comparison, thermocouples and DAQ

III. Time & Frequency

Parameter/Equipment	Range	CMC ^{2, 4}	Comments
Frequency – Measure ³ 100 mV to 10 V	(3 to <10) Hz (0.10 to <1) kHz (1 to <300) kHz	0.070% + 0.0001 Hz 0.0020% + 0.0001 kHz 0.0054% + 0.0054 kHz	Direct comparison, digital multimeter

¹ This laboratory offers commercial calibration service and field calibration service where noted.

² Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMC's represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

³ Field calibration service is available for this calibration. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the Calibration and Measurement Capability Uncertainty (CMC) found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

⁴ The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMCs are expressed as either a specific value that covers the full range or as a percent or fraction of the reading plus a fixed floor specification.

⁵ This scope meets A2LA's *P112 Flexible Scope Policy*



Accredited Laboratory

A2LA has accredited

SITEC LAB S DE RL DE CV

San Pablo Tecnológico, Mexico

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 28th day of April 2023.

A blue ink signature of Mr. Trace McInturff, written over a horizontal line.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 5134.02
Valid to February 28, 2025

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration «field»Scope of Accreditation.