



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: August 31, 2024

Certificate Number: 3338.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1, 8}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2, 6} (\pm)	Comments
Calipers ³	Up to 24 in	(280 + 9.1L) μ in	Gage blocks
Height Gages ³	Up to 24 in	(370 + 7.8L) μ in	Surface plate, gage blocks, length bars
Indicators ³	Up to 25.4 mm	9.4 μ m	Precision micrometer head
Micrometers ³	Up to 1 in (1 to 2) in (2 to 10) in (10 to 24) in	(1 + 30L) μ in (2 + 29L) μ in (24 + 4.6L) μ in (280 + 3.6L) μ in	Gage blocks
Ruler & Tape Measures	Up to 1200 mm (Up to 47.24 in)	0.17 mm	Magnifier & linear scales

II. Dimensional Testing¹

Parameter/Equipment	Range	CMC ^{2, 6} (\pm)	Comments
Fixtures (3D) & Workpieces (3D) ³	Up to 2400 mm	(44 + 0.01L) μ m	Faro articulated arm CMM

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 5, 7} (\pm)	Comments
DC Voltage – Measuring Equipment ³	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V 100 V to 1020 V	24 μ V/V + 1.5 μ V 15 μ V/V + 0.34 μ V 17 μ V/V + 23 μ V 20 μ V/V + 0.28 mV 21 μ V/V + 2.3 mV	Fluke 5522A/Fluke 5500A
DC Voltage – Measure ³	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1000) V (1 to 40) kV	41 μ V/V + 12 μ V 28 μ V/V + 0.1 mV 66 μ V/V + 1 mV 31 μ V/V + 11 mV 57 μ V/V + 14 mV 2 % + 0.05 kV	HP 34401A Fluke HV probe
DC Current – Measuring Equipment ³	Up to 330 μ A 330 μ A to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1.1 A (1.1 to 2.9) A (2.9 to 11) A (11 to 20.5) A	0.014 % + 40 nA 170 μ A/A + 80 nA 120 μ A/A + 320 nA 130 μ A/A + 2.6 μ A 0.023 % + 56 μ A 0.037 % + 30 μ A 0.07 % + 300 μ A 0.12 % + 560 μ A	Fluke 5522A/Fluke 5500A Fluke 5522A
Clamp-on Meters	Up to 150 A (150 to 1000) A	0.4 % + 92 mA 0.35 % + 170 mA	Fluke 5522A-Fluke 5500A/50 turn coil

Parameter/Equipment	Range	CMC ^{2, 4, 5, 7} (\pm)	Comments
DC Power ³ – Generate 33 mV to 1020 V	(3.3 to 8.99) mA (9 to 32.999) mA (33 to 89.99) mA (90 to 329.99) mA (0.33 to 0.8999) A (0.9 to 2.1999) A (2.2 to 4.4999) A (4.5 to 11) A (11 to 20) A	3.2 μ W/W + 0.03 μ W 10 μ W/W + 0.10 μ W 31 μ W/W + 0.31 μ W 110 μ W/W + 1.1 μ W 320 μ W/W + 3.2 μ W 750 μ W/W + 7.5 μ W 1.4 mW/W + 13 μ W 1.9 mW/W + 19 μ W 2.2 μ W/W + 21 μ W	Fluke 5522A/Fluke 5500A Fluke 5522A
Resistance – Generate ³	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω 330 Ω to 1.1 k Ω (1.1 to 3.3) k Ω (3.3 to 11) k Ω (11 to 33) k Ω (33 to 110) k Ω (110 to 330) k Ω 330 k Ω to 1.1 M Ω (1.1 to 3.3) M Ω (3.3 to 11) M Ω (11 to 33) M Ω (33 to 110) M Ω (110 to 330) M Ω (330 to 1100) M Ω	0.044 % + 12 m Ω 0.010 % + 16 m Ω 0.004 % + 17 m Ω 0.004 % + 25 m Ω 0.003 % + 2.7 m Ω 0.003 % + 23 m Ω 0.004 % + 82 m Ω 0.003 % + 1.3 Ω 0.003 % + 1.2 Ω 0.004 % + 2.3 Ω 0.001 % + 120 Ω 0.007 % + 210 Ω 0.015 % + 310 Ω 0.02 % + 10 k Ω 0.08 % + 0.8 k Ω 0.36 % + 100 k Ω 1.8 % + 710 k Ω	Fluke 5522A/Fluke 5500A Fluke 5522A
High Resistance ³	(1 to 10) M Ω @ 500 V (10 to 100) M Ω @ 1000 V (100 to 1000) M Ω @ 1000 V	0.12 M Ω 0.1 % + 0.11 M Ω 1.3 %	High resistance decade box PPM inv

Parameter/Equipment	Range	CMC ^{2, 5, 7} (\pm)	Comments
Capacitance – Generate ³ @ 1 kHz	(220 to 399.9) 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) μ F (1.1 to 3.3) μ F (3.3 to 11) μ F (11 to 33) μ F (33 to 110) μ F (110 to 330) μ F (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	1.0 % + 12 pF 0.40 % + 14 pF 1.3 % + 5 pF 0.45 % + 7 pF 0.14 % + 120 pF 0.42 % + 11 pF 0.14 % + 1.2 nF 0.43 % + 0.97 nF 0.16 % + 13 nF 0.28 % + 15 nF 0.33 % + 120 nF 0.26 % + 1.1 μ F 0.41 % + 1.1 μ F 0.20 % + 12 μ F 0.42 % + 11 μ F 0.51 % + 14 μ F 0.74 % + 99 μ F 1.3 % + 130 μ F	Fluke 5522A/Fluke 5500A Fluke 5522A

Parameter/Range	Frequency	CMC ^{2, 5, 7} (\pm)	Comments
AC Voltage – Generate			
(1 to 33) mV (33 to 330) mV (0.33 to 3.3) V (3.3 to 33) V (33 to 330) V (330 to 1020) V	45 Hz to 10 kHz 45 Hz to 10 kHz 45 Hz to 10 kHz 45 Hz to 10 kHz 45 Hz to 1 kHz 45 Hz to 1 kHz	0.021 % + 7.0 μ V 0.017 % + 11 μ V 0.017 % + 84 μ V 0.019 % + 760 μ V 0.017 % + 0.69 mV 0.035 % + 2.2 mV	Fluke 5522A/Fluke 5500A
AC Voltage – Measure ³			
Up to 100 mV	50 Hz to 100 kHz	0.07 % + 48 μ V	HP 34401
(1 to 750) V	50 Hz to 100 kHz	0.4 % + 22 mV	
(0.75 to 25) kV	60 Hz	1.9 % + 0.13 kV	Fluke HV probe
(1 to 25) kV	60 Hz	1.6 % + 0.026 kV	Tektronix HV probe

Parameter/Range	Frequency	CMC ^{2, 5, 7} (±)	Comments
AC Current – Generate ³			
(29.00 to 329.99) µA	45 Hz to 1 kHz	0.14 % + 26 nA	
(0.33 to 3.299 99) mA	45 Hz to 1 kHz	0.14 % + 49 nA	Fluke 5522A/Fluke 5500A
(3.3 to 32.9999) mA	45 Hz to 1 kHz	0.075 % + 14 µA	
(33 to 329.999) mA	45 Hz to 1 kHz	0.021 % + 140 µA	
(0.33 to 1.099 99) A	45 Hz to 1 kHz	0.060 % + 110 µA	
(1.1 to 2.999 99) A	45 Hz to 1 kHz	0.075 % + 110 µA	
(3 to 10.9999) A	45 Hz to 1 kHz	0.070 % + 2.5 mA	
(11 to 20.5) A	45 Hz to 1 kHz	0.14 % + 5.1 mA	Fluke 5522A
Clamp-On Meters			
Toroidal:			
Up to 150 A	(45 to 65) Hz	0.33 % + 120 mA	Fluke 5522A-Fluke 5500A /50 turn coil
(150 to 1000) A	(45 to 65) Hz	0.42 % + 12 mA	
Non-Toroidal:			
Up to 150 A	(45 to 65) Hz	1.2 % + 250 mA	Fluke 5522A-Fluke 5500A /50 turn coil
(150 to 1000) A	(45 to 65) Hz	0.71 % + 970 mA	

Parameter/Equipment	Range	CMC ^{2, 5, 7} (±)	Comments
AC Power Generate ³ – (33 to 329.999) mV @ (45 & 60) Hz	(3.3 to 8.99) mA (9 to 32.999) mA (33 to 89.99) mA (90 to 329.99) mA (0.33 to 0.8999) A (0.9 to 2.1999) A (2.2 to 4.4999) A (4.5 to 11) A	0.069 % + 1.2 µW 0.037 % + 70 µW 0.037 % + 70 µW 0.011 % + 670 µW 0.039 % + 290 µW 0.043 % + 590 mW 0.060 % + 13 mW 0.070 % + 14 mW	Fluke 5522A/Fluke 5500A <i>PF = 1</i>

Parameter/Equipment	Range	CMC ^{2, 5, 7} (\pm)	Comments
AC Power Generate ³ (cont) –			Fluke 5522A/Fluke 5500A $PF = 0.8$
(33 to 329.999) mV @ (45 & 60) Hz	(3.3 to 8.99) mA (9 to 32.999) mA (33 to 89.99) mA (90 to 329.99) mA (0.33 to 0.8999) A (0.9 to 2.1999) A (2.2 to 4.4999) A (4.5 to 11) A	0.064 % + 17 μ W 0.065 % + 16 μ W 0.050 % + 190 μ W 0.050 % + 190 μ W 0.060 % + 1.8 mW 0.060 % + 1.8 mW 0.060 % + 9.9 mW 0.060 % + 9.9 mW	
330 mV to 1020 V @ (45 & 60) Hz	(3.3 to 8.99) mA (9 to 32.999) mA (33 to 89.99) mA (90 to 329.99) mA (0.33 to 0.8999) A (0.9 to 2.1999) A (2.2 to 4.4999) A (4.5 to 11) A	0.18 % + 3.9 μ W 0.18 % + 1.3 μ W 0.18 % + 0.38 μ W 0.18 % + 0.14 μ W 0.18 % + 3.9 mW 0.18 % + 1.3 mW 0.18 % + 5.6 mW 0.18 % + 2.9 mW	$PF = 0.8$
Electrical Simulation of RTD Indicators ³ –			
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	0.12 °C 0.12 °C 0.13 °C 0.13 °C 0.13 °C 0.14 °C 0.18 °C	Fluke 5522A/Fluke 5500A
PT 3916, 100 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (600 to 630) °C	0.23 °C 0.20 °C 0.18 °C 0.13 °C 0.19 °C 0.18 °C	

Parameter/Equipment	Range	CMC ² (\pm)	Comments
Electrical Simulation of RTD Indicators ³ – (cont)			
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	0.12 °C 0.12 °C 0.12 °C 0.13 °C 0.13 °C 0.19 °C	Fluke 5522A/Fluke 5500A
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	0.12 °C 0.12 °C 0.12 °C 0.12 °C 0.14 °C 0.14 °C 0.15 °C 0.15 °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	0.12 °C 0.12 °C 0.12 °C 0.12 °C 0.13 °C 0.13 °C 0.13 °C 0.14 °C	
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	0.12 °C 0.12 °C 0.12 °C 0.12 °C 0.13 °C 0.13 °C 0.13 °C 0.18 °C	

Parameter/Equipment	Range	CMC ² (\pm)	Comments
Electrical Simulation of Thermocouple Indicators ³ –			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.3 °C 0.12 °C 0.11 °C 0.12 °C	Fluke 5522A/Fluke 5500A
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.31 °C 0.1 °C 0.09 °C 0.1 °C 0.14 °C	
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.17 °C 0.1 °C 0.09 °C 0.1 °C 0.14 °C	
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.2 °C 0.13 °C 0.1 °C 0.16 °C 0.24 °C	
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.36 °C 0.22 °C 0.21 °C 0.24 °C	
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.34 °C 0.22 °C 0.24 °C 0.28 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.38 °C 0.14 °C 0.1 °C 0.09 °C	

IV. Fluid Quantities

Parameter/Equipment	Range	CMC ^{2, 4} (\pm)	Comments
Volume – Volumetric Containers ³	(1000 to 2000) mL (2000 to 10 000) mL (10 000 to 20 000) mL	0.19 % 0.017 % 0.019 %	ISO 4787: gravimetric method using analytical balance & electronic balance

V. Mechanical

Parameter/Equipment	Range	CMC ^{2, 4} (\pm)	Comments
Scales & Balances ³	1 mg to 210 g (210 to 5000) g (5000 to 34 000) g (34 to 1000) kg	3.5 μ g/g + 72 μ g 2 μ g/g + 5 mg 15 μ g/g 0.11 kg + 0.002 %	ASTM Class 1 weights NIST Class F weights OIML Class M1 weights
Pressure Gauges ³ – Pneumatic	(0 to 30) psig (30 to 300) psig (300 to 1000) psig	0.06 % 0.06 % 0.17 %	Crystal digital manometer Druck pressure calibrator Crystal digital manometer
Hydraulic	(1000 to 10 000) psig	0.11 % + 0.6 psi	Ametek dead weight tester
Vacuum Gauges ³	(-13 to 0) psig	0.37 % + 0.11 psi	Druck pressure calibrator
Force Gauges ³ – Tension	Up to 250 kg	0.005 % + 0.012 kg	OIML Class M1

Parameter/Equipment	Range	CMC ^{2, 4} (\pm)	Comments
Torque Wrenches	(25 to 250) lbf·in (10 to 250) lbf·ft (100 to 1000) lbf·ft	0.36 % 0.72 % 0.70 %	Load cells

VI. Thermodynamic

Parameter/Equipment	Range	CMC ^{2, 4, 9} (\pm)	Comments
Temperature – Measuring Equipment ³	(-7.7 to 110) °C (50 to 300) °C (15 to 45) °C	0.15 % + 0.4 °C 0.39 % + 0.6 °C 1.2 °C	Hart dual dry block Rotronic hygrothermometer
Infrared Temperature – Thermometers ³	(50 to 450) °C	0.7 % + 0.43 °C	Hart calibrator 9132 $\epsilon = 0.95$, spectral band (8 to 14) μm
Relative Humidity ³ – @ (20 to 35) °C Drybulb	(10 to 90) % RH	2.5 % RH	Rotronic Hygro Palm 3

VII. Time & Frequency

Parameter/Equipment	Range	CMC ^{2, 9} (\pm)	Comments
Frequency ³ – Measuring Equipment	(0.01 to 119.99) Hz (120.0 to 1199.9) Hz (1.200 to 11.999) kHz (12.00 to 119.99) kHz (120.0 to 1199.9) kHz (1.200 to 2.000) MHz	4.5 µHz/Hz + 0.016 Hz 4.2 µHz/Hz + 0.12 Hz 3.1 µHz/Hz + 1.6 mHz 4.6 µHz/Hz + 12 mHz 1.3 µHz/Hz + 120 mHz 0.42 µHz/Hz + 2 mHz	Fluke 5522A/Fluke 5500A Fluke 5522A
Stopwatches & Timers ³	Up to 3600 s	0.6 µs/s + 0.04 s	Stopwatch

¹ This laboratory offers commercial dimensional testing/calibration service and field calibration service.

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. CMCs 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 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 actual 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 CMCs are expressed as percent of reading, unless otherwise indicated

⁵ The measurands stated are generated with the Fluke 5522A. The CMC for power output in watts or volts-amps-reactive (VARs) is based on the root sum square (rss) of the individual uncertainties in percent for the selected voltage, current, and power factor (*PF*) parameters.

⁶ In the statement of CMC, *L* is the numerical value of the nominal length of the device measured in inches for English Units and in meters for Metric Units; *V* is the numerical value of the nominal volume in mL units.

⁷ 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 fraction/percentage of the reading plus a fixed floor specification.

⁸ This scope meets A2LA's *P112 Flexible Scope Policy*.

⁹ The type of instrument or material being calibrated is defined by the parameter. This indicates the laboratory is capable of calibrating instruments that measure or generate the values in the ranges indicated for the listed measurement parameter.



Accredited Laboratory

A2LA has accredited

METRICA INDUSTRIAL, SA de CV

Nuevo Leon, 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 laboratory also meets R205 – Specific Requirements: Calibration Laboratory Accreditation Program. 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 10th day of October 2022.

A blue ink signature of a person's name, appearing to read "John Doe".

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3338.01
Valid to August 31, 2024

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