



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: October 31, 2026

Certificate Number: 1741.24

In recognition of the successful completion of the A2LA evaluation process (including an assessment of the organization's compliance with A2LA's Calibration Program Requirements), accreditation is granted to this laboratory to perform the following calibrations^{1, 8}:

I. Chemical

Parameter/Equipment	Range	CMC ² (±)	Comments
pH Meters ³	4 pH 7 pH 10 pH	0.03 pH 0.03 pH 0.03 pH	Standard pH solutions
Conductivity Meters ³	1 µS/cm 10 µS/cm 100 µS/cm 1000 µS/cm 10 000 µS/cm 100 000 µS/cm	0.62 µS/cm 0.63 µS/cm 2.3 µS/cm 5.4 µS/cm 42 µS/cm 370 µS/cm	Standard conductivity solutions

II. Dimensional

Parameter/Equipment	Range	CMC ² (±)	Comments
Pin Gage ³ – Class Z & ZZ	Up to 1 in	44 µin	Micrometer

Parameter/Equipment	Range	CMC ^{2, 6, 7} (\pm)	Comments
Angle Indicators & Protractors ³	30°, 45°, 60°, 75°, 90°	0.27°	Angle block set
Calipers ³	Up to 48 in	(4.9 + 9.5L) μ in + 0.6R	Gage blocks
Linear Dial & Test Indicators ³	Up to 12 in	(6.2 + 9.5L) μ in + 0.6R	Gage blocks
Thickness/Snap Gages ³	Up to 12 in	(6.2 + 9.5L) μ in + 0.6R	Gage blocks
Steel Rules & Tapes Measures ³	Up to 25 ft	(3 + 13L) μ in + 0.6R	Gage blocks
Micrometers ³	Up to 48 in	(6.2 + 9.5L) μ in + 0.6R	Gage blocks
Height Gages ³	Up to 48 in	(6.2 + 9.5L) μ in + 0.6R	Gage blocks
Feeler Gages ³	Up to 0.25 in	44 μ in	Micrometer
Surface Plates ³ – Grades AA, A & B			Surface Plate Stds
Repeatability	0.002 in	36 μ in	Repeat-o-meter
Flatness	Up to 120DL in	(33 + 0.54DL) μ in	Federal level systems
Coating Thickness Gauges ³ Film Ultrasonic	Up to 65 mils	0.1 mils	Coating thickness standards

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 4, 5} (\pm)	Comments
DC Voltage – Measure ³	(0 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1000) V (1 to 6) kV	11 μ V/V + 0.3 μ V 10 μ V/V + 0.3 μ V 10 μ V/V + 0.5 μ V 11 μ V/V + 30 μ V 27 μ V/V + 100 μ V 1.2 %	Agilent 3458A Fluke 80K-6 & DMM
DC Voltage – Generate ³	(0 to 330) mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (100 to 1020) V	17 μ V/V + 1 μ V 9 μ V/V + 2 μ V 10 μ V/V + 15 μ V 15 μ V/V + 150 μ V 15 μ V/V + 1.5 mV	Fluke 5522A
DC Power ³ – Generate 33 mV to 1020 V (0.33 to 329.99) mA (0.33 to 2.9999) A (3 to 20.5) A	(0.01 to 330) W (0.33 to 3.3) kW (3.3 to 20.5) kW	0.022 % 0.022 % 0.07 %	Fluke 5522A
DC Current – Measure ³	Up to 100 nA 100 nA to 1 μ A (1 to 10) μ A (10 to 100) μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A (1 to 100) A	32 μ A/A + 0.04 nA 23 μ A/A + 0.04 nA 23 μ A/A + 0.1 nA 23 μ A/A + 0.8 nA 23 μ A/A + 5 nA 23 μ A/A + 50 nA 37 μ A/A + 0.5 μ A 0.011 % + 10 μ A 0.3 %	Agilent 3458A Empro shunt w/ Agilent 3458A
DC Current – Generate ³	(0 to 330) μ A (0 to 3.3) mA (0 to 33) mA (0 to 330) mA (0 to 1.1) A (5.17 to 3) A (0 to 11) A (11 to 21) A	0.012 % + 0.02 μ A 0.008 % + 0.05 μ A 0.01 % + 0.25 μ A 0.011 % + 2.5 μ A 0.016 % + 40 μ A 0.028 % + 40 μ A 0.04 % + 500 μ A 0.08 % + 750 μ A	Fluke 5522A

Parameter/Equipment	Range	CMC ^{2, 4, 5} (\pm)	Comments
Resistance – Measure ³	(0 to 10) Ω (10 to 100) Ω 100 Ω to 1 k Ω (1 to 10) k Ω (10 to 100) k Ω 100 k Ω to 1 M Ω (1 to 10) M Ω (10 to 100) M Ω 100 M Ω to 1 G Ω	18 $\mu\Omega/\Omega$ + 50 $\mu\Omega$ 15 $\mu\Omega/\Omega$ + 0.5 m Ω 14 $\mu\Omega/\Omega$ + 0.5 m Ω 12 $\mu\Omega/\Omega$ + 5 m Ω 12 $\mu\Omega/\Omega$ + 50 m Ω 17 $\mu\Omega/\Omega$ + 2 Ω 51 $\mu\Omega/\Omega$ + 100 Ω 0.051 % + 1 k Ω 0.11 % + 10 k Ω	Agilent 3458A
Resistance – Generate ³	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω 110 Ω to 1.1 k Ω (1.1 to 11) k Ω (11 to 110) k Ω 110 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	32 $\mu\Omega/\Omega$ + 0.001 Ω 36 $\mu\Omega/\Omega$ + 0.0015 Ω 22 $\mu\Omega/\Omega$ + 0.0014 Ω 22 $\mu\Omega/\Omega$ + 0.002 Ω 22 $\mu\Omega/\Omega$ + 0.02 Ω 22 $\mu\Omega/\Omega$ + 0.2 Ω 25 $\mu\Omega/\Omega$ + 2 Ω 47 $\mu\Omega/\Omega$ + 30 Ω 0.01 % + 50 Ω 0.02 % + 2.5 k Ω 0.039 % + 3 k Ω 0.24 % + 100 k Ω 1.2 % + 500 k Ω	Fluke 5522A
Fixed Points ³	0.1 Ω 1 Ω 10 Ω 100 Ω 1 k Ω 10 k Ω 100 k Ω 1 M Ω	19 $\mu\Omega$ 64 $\mu\Omega$ 630 $\mu\Omega$ 6.2 m Ω 62 m Ω 690 m Ω 6.2 Ω 65 Ω	Fixed resistors CHA resistors

Parameter/Range	Frequency	CMC ^{2, 4} (±)	Comments
Capacitance – Generate ³ (220.0 to 399.9) pF (0.4 to 1.0999) nF (1.1 to 3.2999) nF (3.3 to 10.9999) nF (11 to 109.999) nF (110 to 329.999) nF (0.33 to 1.099 99) μF (1.1 to 3.299 99) μF (3.3 to 10.9999) μF (11 to 32.9999) μF (33 to 109.999) μF (110 to 329.999) μF (0.33 to 1.099 99) mF (1.1 to 3.299 99) mF (3.3 to 10.9999) mF (11 to 32.9999) mF (33 to 110) mF	(10 to 10 000) Hz (10 to 10 000) Hz (10 to 3000) Hz (10 to 1000) Hz (10 to 1000) Hz (10 to 1000) Hz (10 to 600) Hz (10 to 300) Hz (10 to 150) Hz (10 to 120) Hz (10 to 80) Hz (0 to 50) Hz (0 to 20) Hz (0 to 6) Hz (0 to 2) Hz (0 to 0.60) Hz (0 to 0.20) Hz	0.39 % + 10 pF 0.39 % + 0.01 nF 0.39 % + 0.01 nF 0.2 % + 0.1 nF 0.2 % + 0.1 nF 0.2 % + 0.3 nF 0.2 % + 1 nF 0.2 % + 3 nF 0.2 % + 10 nF 0.32 % + 30 nF 0.36 % + 100 nF 0.36 % + 300 nF 0.36 % + 1μF 0.37 % + 3μF 0.37 % + 10 μF 0.6 % + 30 μF 0.87 % + 100 μF	Fluke 5522A
AC Voltage – Generate ³ (1 to 33) mV (33 to 330) mV 330 mV to 3.3 V (3.3 to 33) V	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.063 % + 6 μV 0.014 % + 6 μV 0.017 % + 6 μV 0.078 % + 6 μV 0.28 % + 12 μV 0.63 % + 50 μV 0.024 % + 8 μV 0.012 % + 8 μV 0.013 % + 8 μV 0.028 % + 8 μV 0.063 % + 32 μV 0.16 % + 70 μV 0.024 % + 50 μV 0.012 % + 60 μV 0.015 % + 60 μV 0.024 % + 50 μV 0.055 % + 130 μV 0.19 % + 600 μV 0.024 % + 650 μV 0.012 % + 600 μV 0.019 % + 600 μV 0.028 % + 600 μV 0.07 % + 1.6 mV	Fluke 5522A

Parameter/Range	Frequency	CMC ^{2, 4} (±)	Comments
AC Voltage – Generate ³ (cont)			
(33 to 330) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.015 % + 2 mV 0.016 % + 6 mV 0.02 % + 6 mV 0.024 % + 6 mV 0.16 % + 50 mV	Fluke 5522A
(330 to 1020) V	45 Hz to 10 kHz	0.024 % + 10 mV	
AC Voltage – Measure ³			
Up to 10 mV	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.031 % + 0.03 % of rng 0.021 % + 0.011 % of rng 0.031 % + 0.011 % of rng 0.11 % + 0.011 % of rng 0.51 % + 0.011 % of rng 4.1 % + 0.02 % of rng	Agilent 3458A
10 mV to 10 V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.008 % + 0.004 % of rng 0.008 % + 0.002 % of rng 0.015 % + 0.002 % of rng 0.031 % + 0.002 % of rng 0.081 % + 0.002 % of rng 0.31 % + 0.01 % of rng	
(10 to 100) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.021 % + 0.004 % of rng 0.021 % + 0.002 % of rng 0.021 % + 0.002 % of rng 0.036 % + 0.002 % of rng 0.13 % + 0.002 % of rng 0.41 % + 0.01 % of rng	
(100 to 600) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.041 % + 0.004 % of rng 0.041 % + 0.002 % of rng 0.061 % + 0.002 % of rng 0.13 % + 0.002 % of rng 0.31 % + 0.002 % of rng	Agilent 3458A
(1 to 6) kV	60 Hz	1.5 %	Fluke 80K-6 & DMM
(6 to 40) kV	60 Hz	6.1 %	Fluke 80K-40 & DMM

Parameter/Range	Frequency	CMC ^{2, 4, 5} (\pm)	Comments
AC Current – Generate ³			
(0 to 0.33) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.16 % + 0.1 μ A 0.12 % + 0.1 μ A 0.097 % + 0.1 μ A 0.24 % + 0.15 μ A 0.63 % + 0.2 μ A 1.3 % + 0.4 μ A	Fluke 5522A
(0.33 to 3.3) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.13 % + 0.15 μ A 0.097 % + 0.15 μ A 0.078 % + 0.15 μ A 0.16 % + 0.2 μ A 0.39 % + 0.3 μ A 0.78 % + 0.6 μ A	
(3.3 to 33) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.14 % + 2 μ A 0.07 % + 2 μ A 0.032 % + 2 μ A 0.063 % + 2 μ A 0.16 % + 3 μ A 0.32 % + 4 μ A	
(33 to 330) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.14 % + 20 μ A 0.07 % + 20 μ A 0.032 % + 20 μ A 0.078 % + 50 μ A 0.16 % + 100 μ A 0.32 % + 200 μ A	
(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 % + 100 μ A 0.039 % + 100 μ A 0.47 % + 1 mA 2 % + 5 mA	
(1.1 to 3) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.14 % + 100 μ A 0.047 % + 100 μ A 0.47 % + 1 mA 2 % + 5 mA	
(3 to 11) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.047 % + 2mA 0.078 % + 2 mA 2.4 % + 2 mA	
(11 to 20.5) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.094 % + 5mA 0.12 % + 5 mA 2.4 % + 5 mA	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of Thermocouples ³ – (cont)			
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.24 °C 0.18 °C 0.18 °C 0.18 °C 0.22 °C	Fluke 5522A
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.29 °C 0.19 °C 0.19 °C 0.24 °C 0.34 °C	
Type R	(0 to 250) °C (250 to 1000) °C (1000 to 1767) °C	0.59 °C 0.37 °C 0.42 °C	
Type S	(0 to 250) °C (250 to 1400) °C (1400 to 1767) °C	0.49 °C 0.39 °C 0.48 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 400) °C	0.64 °C 0.25 °C 0.18 °C	

IV. Fluid Quantities

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
Fume Hoods – Air Velocity Only ³	(70 to 200) ft/min	> 4.4 % or 4.4 ft/min	Anemometer
Viscosity - Measuring Instruments	Up to 150 000 cP	0.9 %	Viscosity reference solutions

Parameter/Equipment	Range	CMC ^{2, 5, 6, 7} (\pm)	Comments
Speed ³ – Measuring Equipment (Simulation) RPM/Totalizer/Rate Meters	(6 to 100 000) rpm	0.003 %	Fluke 5522A
Speed ³ – Measure Optic/Non-contact: RPM Totalizer/Rate Meters Contact: RPM Totalizer/Rate Meters	(5 to 200 000) rpm (2 to 3300) fpm (0.5 to 12 000) rpm (2 to 3300) fpm	0.018 % 0.018 % 0.22 % 0.22 %	Monarch PLT200
Rotary Torque Measure ³ – Pneumatic, DC, Pulse	(2.5 to 25) N·m (25 to 75) N·m (75 to 180) N·m (180 to 500) N·m	0.33 N·m 1 N·m 2.5 N·m 6.6 N·m	Aimco ADTS w/ rotary transducers
Totalize Meters ³ – Distance Measure Mechanical Counter/Totalizers	Up to 200 ft Up to 999 999 counts	0.64 % 0.02 % + 0.6R	Monarch PLT200
Pressure ³ – Measure & Measuring Equipment	(0 to 28) in·H ₂ O (-15 to 300) psig Up to 1000 psig Up to 3000 psig Up to 10 000 psig	0.0097 in·H ₂ O 0.23 psig 0.7 psig 2.1 psig 7 psig	Merriam M2000 Additel pressure modules & process calibrator
Indirect Verification of Rockwell Hardness Testers ³	HRC: (20 to 30) HRC (35 to 55) HRC (60 to 65) HRC HRBW: (40 to 59) HRBW (60 to 79) HRBW (80 to 100) HRBW	0.84 HRC 0.84 HRC 0.84 HRC 0.81 HRBW 0.81 HRBW 0.81 HRBW	Indirect verification per ASTM E18

VI. Optical Quantities

Parameter/Equipment	Range	CMC ^{2, 5, 7} (±)	Comments
Light Booths ³ – Illuminance Color Temperature (CCT), Incandescent	Up to 50 000 Lux (2300 to 6500) K	2.7 % 60 K	Illuminance spectrophotometer

VII. Thermodynamics

Parameter/Equipment	Range	CMC ^{2, 7} (±)	Comments
Temperature – Measuring Instruments ³	(-25 to 140) °C	0.085 °C	Hyperion w/ref probe
	(35 to 660) °C	0.12 °C	Jupiter w/ref probe
	(-25 to 140) °C	0.19 °C	Hyperion dry well/bath
	(35 to 660) °C	0.59 °C	Jupiter dry well
Temperature – Measure ³	(-75 to 660) °C	0.054 °C	PRT w/indicator
Plate Temperature – Infrared Devices ³	35 to 100 °C	1 °C	Fluke 4181
	Up to 200 °C	1.2 °C	Spectral band (8 to 14) µm Emissivity 0.95
	Up to 350 °C	1.7 °C	
	Up to 500 °C	2.3 °C	
Relative Humidity ³ – Measure	(10 to 90) % RH	1.5 % RH	Rhotronic probe
Relative Humidity ³ – Measuring Equipment	(20 to 80) % RH	1.5 % RH	Rhotronic probe

VIII. Time & Frequency

Parameter/Equipment	Range	CMC ^{2, 5, 7} (±)	Comments
Timers & Stopwatches ³	(1 to 3600) s	0.32 s	Monarch tachometer & timer

¹ This laboratory offers commercial calibration and field calibration services.

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 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. CMC's 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 In the statement of CMC a percentage denotes a percent of reading unless otherwise noted.

⁶ In the statement of CMC, L is the numerical value of the nominal length of the device measured in inches, R is the numerical value of the resolution of the device, DL is the length of the diagonal in inches and t represents the time.

⁷ 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.

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



Accredited Laboratory

A2LA has accredited

CROSS TECHNOLOGIES, INC.

Marietta, GA

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 the requirements of 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 4th day of October 2024.

A blue ink signature of Trace McInturff, written in a cursive style.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1741.24
Valid to October 31, 2026
Revised May 16, 2025

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