



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: May 31, 2021

Certificate Number: 1741.03

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1, 6}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2, 4} (\pm)	Comments
Pin Gage ³ – Class ZZ	Up to 1 in	80 μ in	Micrometer
Calipers ³	Up to 40 in	(3.6 + 9.3L) μ in + 0.6R	Gage blocks
Micrometers ³	Up to 40 in	(3.6 + 9.3L) μ in + 0.6R	Gage blocks
Linear Indicators ³ – Dial and Test	Up to 4 in	(3.2 + 8.8L) μ in + 0.6R	Gage blocks
Height Gages ³	Up to 20 in (20 to 48) in	(2.5 + 10L) μ in + 0.6R (9.5 + 9.7L) μ in + 0.6R	Gage blocks
Steel Rules ³	Up to 72 in	(3.6 + 9.3L) μ in + 0.6R	Gage blocks
Tape Measures ³	Up to 25 ft	(3.6 + 9.3L) μ in + 0.6R	Gage blocks
Angle Indicators and Protractors ³	15°, 30°, 45°, 60°, 75°, 90°	0.03°	Angle block set

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Feeler/Thickness Gages ³	Up to 1 in	80 μin	Micrometer
Thickness/Snap Gages ³	Up to 4 in	(3.2 + 8.8L) μin + 0.6R	Gage blocks
Length ³ – Fixture / Gap Gages	Up to 6 in Up to 24 in	0.0015 in 0.0027 in	Caliper

II. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
DC Voltage ³ – Measure (Power Sources, Supplies, Hipot Testers)	(0 to 50) mV (50 to 500) mV 500 mV to 5 V (5 to 50) V (50 to 500) V (500 to 1000) V	0.06 % + 0.002 mV 0.03 % + 0.02 mV 0.03 % + 0.2 mV 0.03 % + 2 mV 0.036 % + 20 mV 0.036 % + 0.2 V	Fluke 287
	(1 to 6) kV	1.2 %	Fluke 80K-6 & DMM
DC Voltage ³ – Generate	Up to 100 mV Up to 1 V Up to 15 V	0.014 % + 5 μV 0.013 % + 50 μV 0.013 % + 500 μV	Fluke 754
DC Current ³ – Measure (Process Devices, Loop Calibrators)	(0 to 5) mA (5 to 50) mA (50 to 400) mA 400 mA to 10 A	0.1 % + 0.2 μA 0.07 % + 0.01 mA 0.19 % + 0.02 mA 0.37 % + 2 mA	Fluke 287
	(0 to 22) mA	0.014 % + 3 μA	Fluke 754

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
Resistance – Generate ³	(0 to 10) Ω (10 to 100) Ω (100 to 1000) Ω (1 to 10) kΩ	0.013 % + 0.01 Ω 0.013 % + 0.02 Ω 0.026 % + 0.2 Ω 0.026 % + 3 Ω	Fluke 754

Parameter/Range	Frequency	CMC ^{2,5,8} (±)	Comments
AC Voltage ³ – Measure (Hipot Testers, Power Sources)			
(5 to 50) V	(45 to 65) Hz 65 Hz to 10 kHz (10 to 20) kHz	0.37 % + 0.025 V 0.49 % + 0.025 V 0.85 % + 0.04 V	Fluke 287
(50 to 500) V	(45 to 65) Hz 65 Hz to 10 kHz	0.37 % + 0.25 V 0.49 % + 0.25 V	
(500 to 1000) V	(45 to 65) Hz 65 Hz to 10 kHz	0.37 % + 2.5 V 0.49 % + 2.5 V	
(1 to 6) kV	60 Hz	1.2 % of reading	Fluke 80K-6 & DMM
AC Current ³ – Measure			
(0 to 500) μA	45 Hz to 1 kHz	0.74 % + 0.2 μA	Fluke 287
(0.5 to 5) mA	45 Hz to 1 kHz	0.74 % + 0.5 μA	
(5 to 50) mA	45 Hz to 1 kHz	0.73 % + 0.02 mA	
(50 to 400) mA	45 Hz to 1 kHz	0.73 % + 0.05 mA	
(0.4 to 10) A	45 Hz to 1 kHz	0.97 % + 5 mA	

Parameter/Equipment	Range	CMC ² (±)	Comments
RTD Electrical Simulation ³ – Generate Pt 385, 100 Ω	(-200 to 100) °C (100 to 800) °C	0.07 °C 0.2 °C	Fluke 754
RTD Electrical Simulation ³ – Measure Pt 385, 100 Ω	(-200 to 100) °C (0 to 800) °C	0.09 °C 0.26 °C	Fluke 754
Thermocouple Simulation ³ – Type J Type K Type T	(-210 to -100) °C (-100 to 800) °C (800 to 1200) °C (-200 to -100) °C (-100 to 400) °C (400 to 1200) °C (1200 to 1372) °C (-250 to -200) °C (-200 to 0) °C (0 to 400) °C	0.73 °C 0.38 °C 0.62 °C 0.85 °C 0.38 °C 0.62 °C 0.85 °C 2.1 °C 0.73 °C 0.39 °C	Fluke 754

III. Mechanical

Parameter/Equipment	Range	CMC ^{2, 4, 8} (±)	Comments
Scales & Balances ³	(1 to 20 000) g (> 20 to 5000) kg	0.017 % + 0.6R 0.017 % per 20 kg + 0.6R	Class F weights (applied load)
	Up to 1000 lb	0.017 % + 0.6R	
Scales & Balances ³	(1 to 5) g	0.041 mg + 0.6R	Class 1 weights (applied load)
	(Up to 10) g	0.06 mg + 0.6R	
	(Up to 30) g	0.089 mg + 0.6R	
	(Up to 50) g	0.14 mg + 0.6R	
	(Up to 100) g	0.3 mg + 0.6R	
	(Up to 200) g	0.6 mg + 0.6R	

Parameter/Equipment	Range	CMC ^{2, 4, 7, 8} (±)	Comments
Scales & Balances ³ (cont)	(Up to 300) g (Up to 500) g (Up to 1000) g (> 1000) g	0.9 mg + 0.6R 1.4 mg + 0.6R 3 mg + 0.6R 3 mg per 1000 g + 0.6R	Class 1 weights (applied load)
Force ³	Up to 1000 lbf	0.05 % + 0.6R	Class F weights
Torque ³ – Click, Adjustable, Dial and Screwdriver Wrenches	5 in·lbf to 600 ft·lbf	0.65 %	CDI Suretest 5000-ST
Torque Testers ³	Up to 250 ft·lbf	0.08 %	Class F weights & arm
Rotary Torque Tools ³ – Pneumatic, DC, Pulse	(0 to 180) N·m	1.3 %	Transducers display
Pressure ³ – Measure & Measuring Equipment	Up to 30 psig Up to 100 psig (30 to 300) psig (300 to 3000) psig (3000 to 10 000) psig	0.05 % 0.06 % 0.06 % 0.07 % 0.07 %	Fluke 754 w/ 750 series modules Fluke 717 Fluke 754 w/ 750 series modules Druck DPI-104-3K Druck DPI-104-10K
Atmospheric Pressure (Vacuum) ³ – Measure & Measuring Equipment	(0.01 to 28) in Hg	0.042 in Hg	Fluke 754 w/750 series module

IV. Thermodynamics

Parameter/Equipment	Range	CMC ² (±)	Comments
Temperature – Measuring Equipment, Direct Method ³	(-30 to 125) °C	0.36 °C	Hart Scientific 7103
	(50 to 350) °C	0.74 °C	Hart Scientific 9009
Relative Humidity ³ – Measure	(10 to 90) % RH	1.4 % RH	Vaisala MI-70 w/ MP76B probe
Temperature – Measure ³	(-196 to 420) °C	0.07 °C	Fluke 1524 w/ PRT probe
Plate Temperature – Infrared Devices ³	Up to 100 °C	1 °C	Fluke 4181
	Up to 200 °C	1.2 °C	
	Up to 350 °C	1.7 °C	
	Up to 500 °C	2.3 °C	

V. Time & Frequency

Parameter/Equipment	Range	CMC ² (±)	Comments
Timers & Stopwatches ³	(1 to 3600) s	0.2 s	Monarch tachometer and timer

¹ This laboratory offers commercial 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 and this laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. 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 In the statement of CMC, L is the numerical value of the nominal length of the device measured in inches. In the statement of CMC, R is the resolution of the device.

⁵ 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.

⁶ This scope meets A2LA's *P112 Flexible Scope Policy*.

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 In the statement of CMC, percentages are percentage of reading, unless otherwise indicated.



Accredited Laboratory

A2LA has accredited

J.A. KING

Bessemer, AL

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 17th day of May 2019.

A blue ink signature of the Vice President of Accreditation Services.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1741.03
Valid to May 31, 2021

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