



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ALABAMA SCALE & INSTRUMENT, INC.
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CALIBRATION

Valid to: April 30, 2024

Certificate Number: 1876.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory at the location listed above to perform the following calibrations^{1,7}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Calipers, Verniers & Linear Scales ³	Up to 36 in	$(360 + 4.5L) \mu\text{in} + 0.6R$	Gage blocks, rod standards
Height Gages ³	Up to 36 in	$(370 + 4.1L) \mu\text{in} + 0.6R$	Gage blocks
Indicators ³	Up to 2 in	$(28 + 6.3L) \mu\text{in} + 0.6R$	Gage blocks
Micrometers ³ –			
Outside	Up to 1 in (1 to 12) in (12 to 24) in	47 μin $(88 + 3.2L) \mu\text{in}$ 1200 μin	Gage blocks, rod standards
Inside	Up to 36 in	$(68 + 26L) \mu\text{in}$	
Depth	Up to 6 in	580 μin	
Gage Blocks	Up to 1 in (1 to 4) in	4.1 μin $(3.5 + 0.63L) \mu\text{in}$	Gage block comparator, master gage blocks

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Rules ³ & Tapes ³	Up to 60 in	0.032 in	Gage blocks, linear standards
Thread Plugs – Major Diameter Pitch Diameter	Up to 4 in (4 to 80) TPI Up to 4 in (4 to 80) TPI	53 μin 100 μin	Supermicrometer™ with thread measuring wires
Length Standards – Setting Rods	(1 to 20) in (20 to 40) in	(59 + 1.8L) μin (35 + 3.1L) μin	Gage blocks, digital probe with amplifier

II. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,6,9} (±)	Comments
DC Voltage – Generate ^{3,5}	(0 to 330) mV 330 mV to 3.3 V (3.3 to 33) V (30 to 330) V (100 to 1000) V	0.005 % + 2 μV 0.004 % + 4 μV 0.004 % + 39 μV 0.004 % + 390 μV 0.004 % + 1.2 mV	Transmille 4010-SYS
DC Voltage – Measure ³	(0 to 200) mV 100 mV to 2 V (1 to 20) V (10 to 200) V (100 to 1000) V (1000 to 20 000) V	5.1 μV/V + 100 nV 3.5 μV/V + 400 nV 3.5 μV/V + 4 nV 5.5 μV/V + 40 μV 5.5 μV/V + 500 μV 2.3 %	Fluke 8508A Fluke 80k-40

Parameter/Equipment	Range	CMC ^{2, 6, 9} (\pm)	Comments
DC Current – Generate ⁵	(0 to 3.3) mA (3.3 to 33) mA (33 to 330) mA 330 mA to 2.2 A (2.2 to 11) A (11 to 500) A	0.02 % + 0.04 μ A 0.01 % + 0.2 μ A 0.01 % + 2.6 μ A 0.02 % + 34 μ A 0.05 % + 260 μ A 0.041 %	Transmille 4010-SYS Transmille 4010-SYS plus coil, clamp on only
DC Current – Measure	Up to 200 μ A 200 μ A to 2 mA (2 to 20) mA (20 to 200) mA 200 mA to 2 A (2 to 20) A	23 μ A/A + 0.4 nA 12 μ A/A + 4 nA 15 μ A/A + 40 nA 48 μ A/A + 0.8 μ A 190 μ A/A + 16 μ A 400 μ A/A + 0.4 mA	Fluke 8508A
Resistance – Generate ^{3, 5}	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω (0.33 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 (0.33 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	0.009 % + 0.0078 Ω 0.009 % + 0.012 Ω 0.009 % + 0.012 Ω 0.007 % + 0.016 Ω 0.007 % + 0.016 Ω 0.007 % + 0.16 Ω 0.007 % + 0.08 Ω 0.007 % + 0.78 Ω 0.009 % + 0.78 Ω 0.009 % + 7.8 Ω 0.012 % + 7.8 Ω 0.012 % + 120 Ω 0.047 % + 190 Ω 0.078 % + 2.0 k Ω 0.39 % + 2.3 k Ω 0.39 % + 78 k Ω	Transmille 4010-SYS
Resistance – Measure ³	(0 to 2) Ω (2 to 20) Ω (20 to 200) Ω 200 Ω to 2 k Ω (2 to 20) k Ω (20 to 200) k Ω 200 k Ω to 2 M Ω (2 to 20) M Ω	17 $\mu\Omega/\Omega$ + 4 $\mu\Omega$ 10 $\mu\Omega/\Omega$ + 14 $\mu\Omega$ 8 $\mu\Omega/\Omega$ + 50 $\mu\Omega$ 8 $\mu\Omega/\Omega$ + 0.5 m Ω 8 $\mu\Omega/\Omega$ + 5 m Ω 8 $\mu\Omega/\Omega$ + 50 m Ω 9 $\mu\Omega/\Omega$ + 1 Ω 20 $\mu\Omega/\Omega$ + 100 Ω	Fluke 8508A

Parameter/Range	Frequency	CMC ^{2,9} (±)	Comments
AC Voltage – Measure ³ (cont)			
(2 to 20) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz	150 µV/V + 1.2 mV 120 µV/V + 200 µV 90 µV/V + 200 µV 75 µV/V + 200 µV 110 µV/V + 200 µV 220 µV/V + 400 µV 570 µV/V + 2 mV 3000 µV/V + 20 mV 10 000 µV/V + 200 mV	Transmille 4010-SYS
(20 to 200) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz	150 µV/V + 12 mV 120 µV/V + 2 mV 91 µV/V + 2 mV 77 µV/V + 2 mV 110 µV/V + 2 mV 220 µV/V + 4 mV 570 µV/V + 20 mV 3000 µV/V + 200 mV 10 000 µV/V + 2 V	
(20 to 1000) V	(1 to 10) Hz (10 to 40) Hz 40 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	150 µV/V + 70 mV 120 µV/V + 20 mV 120 µV/V + 20 mV 230 µV/V + 40 mV 580 µV/V + 200 mV	
AC Voltage – Generate ^{3,5}			
(1 to 33) mV	(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	0.27 % + 16 µV 0.12 % + 16 µV 0.16 % + 16 µV 0.19 % + 16 µV 0.27 % + 26 µV 0.78 % + 47 µV	Transmille 4010-SYS
(33 to 330) mV	(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	0.19 % + 39 µV 0.04 % + 16 µV 0.08 % + 16 µV 0.12 % + 31 µV 0.19 % + 130 µV 0.54 % + 260 µV	

Parameter/Range	Frequency	CMC ^{2,9} (±)	Comments
AC Voltage – Generate ^{3,5} (cont)			
330 mV to 3.3 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	0.12 % + 190 µV 0.02 % + 47 µV 0.06 % + 47 µV 0.11 % + 230 µV 0.19 % + 1.3 mV 0.39 % + 2.6 mV	Transmille 4010-SYS
(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	0.12 % + 1.9 mV 0.03 % + 470 µV 0.06 % + 2.0 mV 0.15 % + 3.9 mV 0.19 % + 13 mV	
(33 to 330) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz	0.04 % + 5 mV 0.06 % + 12 µV 0.07 % + 26 µV	
(330 to 1020) V	45 Hz to 1 kHz (1 to 10) kHz (5 to 10) kHz	0.04 % + 62 mV 0.16 % + 78 µV 0.16 % + 390 µV	
AC Current – Generate ^{3,5}			
(0 to 330) µA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.26 % + 0.12 µA 0.20 % + 0.12 µA 0.20 % + 0.19 µA 0.36 % + 0.12 µA 0.98 % + 0.10 µA	Transmille 4010-SYS
330 µA to 3.3 mA	(10 to 20) Hz 20 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.16 % + 0.23 µA 0.08 % + 0.23 µA 0.16 % + 0.2 µA 0.47 % + 0.2 µA	
(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	0.16 % + 2.3 µA 0.08 % + 2.3 µA 0.07 % + 2.3 µA 0.16 % + 2.3 µA 0.47 % + 2.3 µA	
(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	0.16 % + 23 µA 0.08 % + 23 µA 0.07 % + 23 µA 0.16 % + 23 µA 0.47 % + 23 µA	

Parameter/Range	Frequency	CMC ^{2, 6, 9} (±)	Comments
AC Current – Generate ^{3, 5} (cont)			
330 mA to 2.2 A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz	0.16 % + 230 µA 0.08 % + 230 µA 0.58 % + 230 µA	Transmille 4010-SYS
(2.2 to 11) A	(45 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz	0.07 % + 2 mA 0.10 % + 2 mA 0.34 % + 2 mA	Transmille 4010-SYS, plus coil, clamp-on only
(11 to 500) A	(50 to 60) Hz	0.39 %	
AC Current – Measure ³			
(0 to 200) µA	1 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	500 µA/A + 20 nA 710 µA/A + 20 nA 0.40 % + 20 nA	Fluke 8508A
200 µA to 2 mA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	320 µA/A + 200 nA 310 µA/A + 200 nA 710 µA/A + 200 nA 0.40 % + 200 nA	
(2 to 20) mA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	310 µA/A + 2 µA 300 µA/A + 2 µA 710 µA/A + 2 µA 0.40 % + 2 µA	
(20 to 200) mA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz	310 µA/A + 20 µA 290 µA/A + 20 µA 630 µA/A + 20 µA	
200 mA to 2 A	10 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz	620 µA/A + 200 µA 740 µA/A + 200 µA 0.30 % + 200 µA	
(2 to 20) A	10 Hz to 2 kHz (2 to 10) kHz	820 µA/A + 2 mA 0.25 % + 2 mA	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of Thermocouple Indicating Systems ^{3,5} –			
Type E	(-250 to -100) °C (-100 to 650) °C (650 to 1000) °C	0.45 °C 0.26 °C 0.28 °C	Transmille 4010-SYS
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.32 °C 0.27 °C 0.26 °C 0.28 °C 0.31 °C	
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.35 °C 0.27 °C 0.26 °C 0.31 °C 0.39 °C	
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 410) °C (410 to 1300) °C	0.39 °C 0.29 °C 0.27 °C 0.31 °C	
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.50 °C 0.36 °C 0.35 °C 0.39 °C	
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.43 °C 0.36 °C 0.37 °C 0.43 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 400) °C	0.54 °C 0.30 °C 0.26 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of RTD Measuring Equipment ^{3,5} –			
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	0.14 °C 0.14 °C 0.15 °C 0.16 °C 0.17 °C 0.19 °C 0.37 °C	Transmille 4010- SYS
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	0.13 °C 0.13 °C 0.13 °C 0.14 °C 0.15 °C 0.15 °C 0.27 °C 0.37 °C	

III. Fluid Quantities

Parameter/Equipment	Range	CMC ^{2,6,8} (±)	Comments
Flow ³ (Water)	Up to 0.25 gpm (0.25 to 10) gpm (10 to 200) gpm	0.012 gpm 0.031 gpm 0.53 gpm	Gravimetric determination
Air Velocity – Measure ³	Up to 3500 FPM	6.1 %	Extech SDL350 anemometer

IV. Mechanical

Parameter/Equipment	Range	CMC ^{2, 4, 6} (±)	Comments
Scales ³ & Balances ³	Up 500 mg 500 mg to 50 g (50 to 200) g (200 to 500) g (500 g to 1000) g (1 to 2) kg (2 to 5) kg (5 to 10) kg (10 to 25) kg (25 to 32) kg (0.005 to 0.02) lb (0.02 to 0.05) lb (0.05 to 0.1) lb (0.1 to 0.5) lb (0.5 to 1.0) lb (1.0 to 5) lb (5 to 10) lb (10 to 20) lb (20 to 30) lb Up to 600 lb (600 to 2000) lb	0.19 mg 0.14 mg 0.58 mg 1.4 mg 2.8 mg 230 mg 580 mg 1.2 g 2.9 g 3.8 g 2.1 mg 5.0 mg 11 mg 52 mg 81 mg 270 mg 540 mg 1.1 g 1.6 g 8 g + 0.6R 13 g + 0.6R	Verification with Class 1, 4 & F weights
Pressure Gauges ³ , Transducers ³ , & Transmitters ³ –			
Pneumatic	(-14 to 30) psig (30 to 710) psig	0.033 psi 0.046 %	Gage comparison dead weight system
Hydraulic	(10 to 16 000) psig	0.009 %	Dead weight system
Torque Wrenches ³	(15 to 50) ozf·in (50 to 200) ozf·in (12.5 to 50) lbf·in (50 to 400) lbf·in (400 to 600) lbf·in (600 to 1000) lbf·in (83 to 250) lbf·ft (250 to 500) lbf·ft (500 to 1000) lbf·ft (1000 to 2000) lbf·ft	0.29 ozf·in 0.84 ozf·in 0.28 lbf·in 1.5 lbf·in 3.6 lbf·in 13 lbf·in 1.4 lbf·ft 5.9 lbf·ft 7.5 lbf·ft 12 lbf·ft	Digital torque calibrator

Parameter/Equipment	Range	CMC ^{2, 6} (\pm)	Comments
Torque Analyzers ³ & Transducers ³	5 lbf·in to 250 lbf·ft (250 to 2000) lbf·ft	0.20 % of applied load 0.23 % of applied load	Torque arms with Class 4 & F weights, including specific arms
Force – Tension & Compression ³	(1 to 50 000) lbf (50 001 to 100 000) lbf	0.041 % 0.046 %	Class 4 & F weights & deadweights Load cell comparison

V. Thermodynamics

Parameter/Equipment	Range	CMC ^{2, 8} (\pm)	Comments
Temperature – Measure	(-74 to 419) °C (>419 to 660) °C	0.032 °C 0.039 °C	ASI-01-228AB
Measuring Equipment ³	(>661 to 1065) °C (-20 to 29.7) °C (>29.7 to 660) °C	1.9 °C 0.066 °C 0.12 °C	Fluke 52 with Type K ASI-01-228AB
Relative Humidity – Measure ³	(15 to 75) % RH (75 to 95) % RH	2.0 % RH 3.1 % RH	Vaisala HMI41 with HMP42
Humidity – Measuring Equipment ³	(15 to 75) % RH (75 to 95) % RH	2.1 % RH 3.1 % RH	Vaisala HMI41 with HMP42, with chamber

VI. Time & Frequency

Parameter/Equipment	Range	CMC ² (\pm)	Comments
Digital/Mechanical Tachometer ³	(20 to 1000) RPM (1001 to 30 000) RPM	0.06 RPM 0.68 RPM	Strobe standard
Timers & Stopwatches ³	1 sec to 24 hr	0.06 + 0.27 sec/24 hr	Reference stopwatch

¹ This laboratory offers commercial calibration services and field calibration services (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. 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 In the statement of CMC, L is the numerical value of the nominal length of the device measured in inches, and LSD is least significant digit, and R is the resolution of the unit under test.

⁵ Fluke 5500A CMCs are based upon the temperature the standard was calibrated ($t_{cal} \pm 5 \text{ }^\circ\text{C}$) and assuming the instrument is zeroed at least every seven days or when the ambient temperature changes more than $5 \text{ }^\circ\text{C}$. For Resistance, a zero calibration is performed at least every 12 hours within $\pm 1 \text{ }^\circ\text{C}$ of use. For AC Current, CMCs are determined with the LCOMP off. CMCs are also based upon 1-year floor specifications. CMCs are expressed as either a fraction of the reading or as a fraction of the reading plus a fixed floor specification.

⁶ In the statement of CMC, percentages are percentage of reading, unless otherwise indicated.

⁷ This scope meets A2LA's *P112 Flexible Scope Policy*.

⁸ 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.

⁹ 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.



Accredited Laboratory

A2LA has accredited

ALABAMA SCALE & INSTRUMENT, INC. d.b.a. ASI Calibration Labs – Alabama

Mobile, 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 14th day of June 2022.

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

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1876.01
Valid to April 30, 2024

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