



SCOPE OF ACCREDITATION TO ISO 17025:2017
& ANSI/NCSL Z540-1-1994

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CALIBRATION

Valid To: April 30, 2026

Certificate Number: 2073.01

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

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 4, 8} (±)	Comments
DC Resistance – Measure	(0.1 to 1) Ω	0.52 μΩ/Ω	MIL 6010C system w/ SR-104
	(1 to 10) Ω	0.42 μΩ/Ω	
	(10 to 100) Ω	0.33 μΩ/Ω	
	100 Ω to 1 kΩ	0.24 μΩ/Ω	
	(1 to 10) kΩ	0.16 μΩ/Ω	
	(10 to 100) kΩ	0.46 μΩ/Ω	MIL 6000B system w/ SR104 & SRL standards
	100 kΩ to 1 MΩ	0.62 μΩ/Ω	
	(1 to 10) MΩ	1.0 μΩ/Ω	
	(10 to 100) MΩ	4.2 μΩ/Ω	
	100 MΩ to 1 GΩ	9.8 μΩ/Ω	
	0.1 mΩ	0.050 %	Current characterization method w/standards
	(0.2 to 1) mΩ	29 μΩ/Ω + 41 nΩ	
	(1 to 2) mΩ	46 μΩ/Ω + 23 nΩ	
	(2 to 20) mΩ	57 μΩ/Ω	
	(20 to 100) mΩ	17 μΩ/Ω + 3 nΩ	
	(100 to 200) mΩ	25 μΩ/Ω	
	(0.2 to 1) Ω	6 μΩ/Ω + 3.4 μΩ	

Parameter/Equipment	Range	CMC ^{2, 4, 8} ($\pm$)	Comments
DC Resistance – Measure (cont)	(1 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 (20 to 200) M Ω 200 M Ω to 2 G Ω (2 to 20) G Ω (20 to 200) G Ω 200 G Ω to 1 T Ω (1 to 2) T Ω (2 to 20) T Ω (20 to 200) T Ω	7 $\mu\Omega/\Omega$ + 2.4 $\mu\Omega$ 4 $\mu\Omega/\Omega$ + 10 $\mu\Omega$ 2.7 $\mu\Omega/\Omega$ + 20 $\mu\Omega$ 3.8 $\mu\Omega/\Omega$ + 60 $\mu\Omega$ 0.9 $\mu\Omega/\Omega$ + 2 m Ω 2.7 $\mu\Omega/\Omega$ + 10 m Ω 3 $\mu\Omega/\Omega$ + 0.6 Ω 6.3 $\mu\Omega/\Omega$ + 2 Ω 8.5 $\mu\Omega/\Omega$ 0.0026 % 0.03 % 0.032 % 0.35 % 0.5 % 1.5 % 2.5 %	Ratio transfer method Voltage characterization method w/standards Keithley 6517A w/ faraday cage
DC Resistance – Generate, Fixed Points	0.1 m Ω 1 m Ω 10 m Ω 100 m Ω 1 Ω 10 Ω 100 Ω 1 k Ω 10 k Ω 100 k Ω 1 M Ω 10 M Ω 100 M Ω 1 G Ω 10 G Ω 100 G Ω 1 T Ω 10 T Ω	4 $\mu\Omega/\Omega$ 4 $\mu\Omega/\Omega$ 4 $\mu\Omega/\Omega$ 4 $\mu\Omega/\Omega$ 4 $\mu\Omega/\Omega$ 4 $\mu\Omega/\Omega$ 1 $\mu\Omega/\Omega$ 1.7 $\mu\Omega/\Omega$ 0.5 $\mu\Omega/\Omega$ 3.7 $\mu\Omega/\Omega$ 3.7 $\mu\Omega/\Omega$ 6.2 $\mu\Omega/\Omega$ 10 $\mu\Omega/\Omega$ 100 $\mu\Omega/\Omega$ 100 $\mu\Omega/\Omega$ 0.020 % 0.025 % 0.10 %	Otto Wolff 15283/61 L&N 4223-B Guildline 9334A SRL-0.1 SRL-1 SRL-10 IET (esi) SR-102 Guildline 9334A IET (esi) SR-104 SRL-100k SRL-1M SRL-10M Guildline 9334A SRL-1G SRC-10G SRL-100G OhmLabs 112 OhmLabs 113

Parameter/Range	Frequency	CMC ^{2, 4, 8} (±)	Comments
Capacitance – Generate (cont) Fixed Points Algorithmic Derivation @ Freq: 50 pF 100 pF 200 pF 500 pF 1 nF 2 nF 10 nF 20 nF 50 nF 100 nF	1 kHz to 1 MHz	0.017 % 0.021 % 0.014 % 0.012 % 0.013 % 0.016 % 0.057 % 0.12 % 0.028 % 0.56 %	Various standard capacitors characterized at time of use ⁵ GR/IET 1406E GR/IET 1406D GR/IET 1406C GR/IET 1406B GR/IET 1406A GR/IET 1407B GR/IET 1407D GR/IET 1407E GR/IET 1407F GR/IET 1407G
Inductance – Measure ⁵ 10 nH to 100 kH 1 pH to 100 H	12 Hz to 100 kHz 10 Hz to 2 MHz	0.01 % + 50 nH 0.05 % + 120 pH	IET (GenRad) 1689/1693 IET (Quadtech) 7600+
Inductance – Measure, Fixed Points 10 µH 50 µH 100 µH 200 µH	100 Hz 400 Hz 1 kHz 10 kHz 100 kHz 100 Hz 400 Hz 1 kHz 10 kHz 100 Hz 200 Hz 400 Hz 1 kHz 10 kHz 100 Hz 400 Hz 1 kHz 10 kHz	1.5 % 0.29 % 0.12 % 0.07 % 0.10 % 0.31 % 0.08 % 0.04 % 0.06 % 0.017 % 0.017 % 0.017 % 0.011 % 0.017 % 0.1 % 0.04 % 0.03 % 0.06 %	IET (GenRad) 1482 standard inductors w/ precision LCR meter

Parameter/Range	Frequency	CMC ^{2, 4, 8} (±)	Comments
Inductance – Measure, Fixed Points (cont)			
500 µH	100 Hz	0.06 %	IET (GenRad) 1482 standard inductors with precision LCR meter
	400 Hz	0.03 %	
	1 kHz	0.02 %	
	10 kHz	0.06 %	
1 mH	100 Hz	0.012 %	
	200 Hz	0.012 %	
	400 Hz	0.012 %	
	1 kHz	0.011 %	
	10 kHz	0.017 %	
2 mH	100 Hz	0.04 %	
	400 Hz	0.03 %	
	1 kHz	0.02 %	
	10 kHz	0.06 %	
5 mH	100 Hz	0.03 %	
	400 Hz	0.02 %	
	1 kHz	0.02 %	
	10 kHz	0.06 %	
10 mH	100 Hz	0.013 %	
	200 Hz	0.013 %	
	400 Hz	0.013 %	
	1 kHz	0.011 %	
	10 kHz	0.015 %	
20 mH	100 Hz	0.03 %	
	400 Hz	0.02 %	
	1 kHz	0.02 %	
	10 kHz	0.07 %	
50 mH	100 Hz	0.015 %	
	200 Hz	0.015 %	
	400 Hz	0.015 %	
	1 kHz	0.014 %	
	10 kHz	0.023 %	
100 mH	100 Hz	0.012 %	
	200 Hz	0.012 %	
	400 Hz	0.012 %	
	1 kHz	0.011 %	
	10 kHz	0.021 %	

Parameter/Range	Frequency	CMC ^{2, 4, 8} (±)	Comments
Inductance – Measure, Fixed Points (cont)			
200 mH	100 Hz 200 Hz 400 Hz 1 kHz 10 kHz	0.015 % 0.015 % 0.015 % 0.014 % 0.051 %	IET (GenRad) 1482 standard inductors w/ precision LCR meter
500 mH	100 Hz 200 Hz 400 Hz 1 kHz 10 kHz	0.015 % 0.015 % 0.015 % 0.014 % 0.051 %	
1 H	100 Hz 200 Hz 400 Hz 1 kHz	0.011 % 0.011 % 0.011 % 0.011 %	
2 H	100 Hz 400 Hz 1 kHz	0.03 % 0.03 % 0.03 %	
5 H	100 Hz 200 Hz 400 Hz 1 kHz	0.03 % 0.03 % 0.03 % 0.04 %	
10 H	100 Hz 200 Hz 400 Hz 1 kHz	0.012 % 0.012 % 0.012 % 0.011 %	
Inductance – Generate, Fixed Points			
10 µH	100 Hz 400 Hz 1 kHz 10 kHz 100 kHz	1.5 % 0.29 % 0.12 % 0.07 % 0.10 %	
50 µH	100 Hz 400 Hz 1 kHz 10 kHz	0.31 % 0.08 % 0.04 % 0.06 %	

Parameter/Range	Frequency	CMC ^{2, 4, 8} (±)	Comments
Inductance – Generate, Fixed Points (cont)			
100 µH	100 Hz	0.017 %	IET (GenRad) 1482 standard inductors
	200 Hz	0.017 %	
	400 Hz	0.017 %	
	1 kHz	0.011 %	
	10 kHz	0.017 %	
200 µH	100 Hz	0.1 %	
	400 Hz	0.04 %	
	1 kHz	0.03 %	
	10 kHz	0.06 %	
500 µH	100 Hz	0.06 %	
	400 Hz	0.03 %	
	1 kHz	0.02 %	
	10 kHz	0.06 %	
1 mH	100 Hz	0.012 %	
	200 Hz	0.012 %	
	400 Hz	0.012 %	
	1 kHz	0.011 %	
	10 kHz	0.017 %	
2 mH	100 Hz	0.04 %	
	400 Hz	0.03 %	
	1 kHz	0.02 %	
	10 kHz	0.06 %	
5 mH	100 Hz	0.03 %	
	400 Hz	0.02 %	
	1 kHz	0.02 %	
	10 kHz	0.06 %	
10 mH	100 Hz	0.013 %	
	200 Hz	0.013 %	
	400 Hz	0.013 %	
	1 kHz	0.011 %	
	10 kHz	0.015 %	
20 mH	100 Hz	0.03 %	
	400 Hz	0.02 %	
	1 kHz	0.02 %	
	10 kHz	0.07 %	

Parameter/Range	Frequency	CMC ^{2, 4, 8} (±)	Comments
Inductance – Generate, Fixed Points (cont)			
50 mH	100 Hz	0.015 %	IET (GenRad) 1482 standard inductors
	200 Hz	0.015 %	
	400 Hz	0.015 %	
	1 kHz	0.014 %	
	10 kHz	0.023 %	
100 mH	100 Hz	0.012 %	
	200 Hz	0.012 %	
	400 Hz	0.012 %	
	1 kHz	0.011 %	
	10 kHz	0.021 %	
200 mH	100 Hz	0.015 %	
	200 Hz	0.015 %	
	400 Hz	0.015 %	
	1 kHz	0.014 %	
	10 kHz	0.051 %	
500 mH	100 Hz	0.015 %	
	200 Hz	0.015 %	
	400 Hz	0.015 %	
	1 kHz	0.014 %	
	10 kHz	0.051 %	
1 H	100 Hz	0.011 %	
	200 Hz	0.011 %	
	400 Hz	0.011 %	
	1 kHz	0.011 %	
2 H	100 Hz	0.03 %	
	400 Hz	0.03 %	
	1 kHz	0.03 %	
5 H	100 Hz	0.03 %	
	400 Hz	0.03 %	
	1 kHz	0.04 %	
10 H	100 Hz	0.012 %	
	200 Hz	0.012 %	
	400 Hz	0.012 %	
	1 kHz	0.011 %	

Parameter/Equipment	Range	CMC ^{2,3,8} (±)	Comments
DC Voltage – Generate, Cardinal Points	10 V	17 µV/V	Fluke 732A
DC Voltage – Measure	(0 to 200) mV 200 mV to 2 V (2 to 20) V (20 to 200) V (200 to 1000) V	4.5 µV/V + 0.1 µV 3 µV/V + 0.4 µV 3 µV/V + 4 µV 4.5 µV/V + 40 µV 4.5 µV/V + 0.5 mV	Fluke 8508A
DC Current – Measure	(0 to 200) µA 200 µA to 2 mA (2 to 20) mA (20 to 200) mA 200 mA to 2 A (2 to 20) A	12 µA/A + 0.2 nA 12 µA/A + 2 nA 13 µA/A + 20 nA 36 µA/A + 0.4 µA 0.017 % + 8 µA 0.038 % + 20 µA	Fluke 8508A

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
AC Voltage – Measure			
(0 to 200) mV	(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	0.013 % + 4 µV 0.011 % + 4 µV 0.011 % + 2 µV 0.011 % + 4 µV 0.030 % + 8 µV 0.071 % + 20 µV	Fluke 8508A
(0.2 to 2) V	(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	0.011 % + 20 µV 85 µV/V + 20 µV 65 µV/V + 20 µV 85 µV/V + 20 µV 0.021 % + 40 µV 0.051 % + 200 µV 0.3 % + 2 mV 1 % + 2 mV	
(2 to 20) V	(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	0.011 % + 200 µV 85 µV/V + 200 µV 65 µV/V + 200 µV 85 µV/V + 200 µV 0.021 % + 400 µV 0.051 % + 2 mV 0.3 % + 20 mV 1 % + 20 mV	

Parameter/Range	Frequency	CMC ^{2, 3, 4, 8} ($\pm$)	Comments
AC Voltage – Measure (cont)			
(20 to 200) V	(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	0.011 % + 2 mV 85 μ V/V + 2 mV 65 μ V/V + 2 mV 85 μ V/V + 2 mV 0.021 % + 4 mV 0.051 % + 20 mV 0.3 % + 200 mV 1 % + 200 mV	Fluke 8508A
(200 to 1050) V	(10 to 40) Hz (40 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.011 % + 0.02 V 95 μ V/V + 0.02 V 0.021 % + 0.04 V 0.051 % + 0.2 V	
AC Current – Measure			
(0 to 200) μ A	10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.028 % + 0.02 μ A 0.065 % + 0.02 μ A 0.4 % + 0.02 μ A	Fluke 8508A
200 μ A to 2 mA	10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.028 % + 0.2 μ A 0.065 % + 0.2 μ A 0.4 % + 0.2 μ A	
(2 to 20) mA	10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.028 % + 2 μ A 0.065 % + 2 μ A 0.4 % + 2 μ A	
(20 to 200) mA	10 Hz to 10 kHz (10 to 30) kHz	0.025 % + 20 μ A 0.060 % + 20 μ A	
200 mA to 2 A	10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.060 % + 200 μ A 0.070 % + 200 μ A 0.3 % + 200 μ A	
(2 to 20) A	10 Hz to 2 kHz (2 to 10) kHz	0.08 % + 2 mA 0.25 % + 2 mA	
AC Resistance – Measure ⁵			
0.01 m Ω to 100 M Ω 0.1 m Ω to 100 M Ω	12 Hz to 200 kHz 10 Hz to 2 MHz	0.02 % 0.05 %	IET (GenRad) 1689/1693 Quadtech 7600

Parameter/Range	Frequency	CMC ^{2, 8} ($\pm$)	Comments
AC Resistance – Generate Fixed Points: 24.9 Ω 374 Ω 5.97 k Ω 95.317 k Ω	 1 kHz 1 kHz 1 kHz 1 kHz	 20 $\mu\Omega/\Omega$ 20 $\mu\Omega/\Omega$ 20 $\mu\Omega/\Omega$ 20 $\mu\Omega/\Omega$	 IET (GenRad) 1689-9604 Digibridge calibration kit

II. Time & Frequency

Parameter/Equipment	Range	CMC ^{2, 8} ($\pm$)	Comments
Frequency – Measure	0.01 Hz to 125 MHz	20 $\mu\text{Hz}/\text{Hz}$	Precision counter

¹ This laboratory offers commercial 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 The measurands stated are measured with the Fluke 8508A. This capability is suitable for the calibration of the parameters indicated. CMCs are expressed as either a specific value that covers the full range or as a combination of the fraction/percent of the reading/output plus a range specification.

⁴ In the statement of CMC, percentages are to be read as percent of reading unless otherwise noted.

⁵ CMC is defined at 1 kHz only. The laboratory implements the IET Uncertainty calculator for intermediate values and frequencies.

⁶ CMC is defined at 1 kHz only. The laboratory implements the IET Uncertainty calculator for intermediate values and frequencies which utilizes the "AH2700a Complete Specifications in Excel" spreadsheet from Andeen-Hagerling.

⁷ This laboratory 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



Accredited Laboratory

A2LA has accredited

IET LABS, INC.

West Roxbury, MA

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 ANSI/NCCL Z540-1-1994 and 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 13th day of March 2024.

A blue ink signature of Mr. Trace McInturff.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2073.01
Valid to April 30, 2026

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