



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Electronic & Mechanical
9 Main Street, Suite 3A
Sutton, MA 01590

Fulfills the requirements of

ISO/IEC 17025:2017

and national standard

ANSI/NCSL Z540-1-1994 (R2002)

In the field of

CALIBRATION

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

Jason Stine, Vice President

Expiry Date: 05 September 2025
Certificate Number: AC-1242



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
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).

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

AND

ANSI/NCSL Z540-1-1994 (R2002)

Electronic & Mechanical

9 Main St., Suite 3A
Sutton, MA 01590
Paul O'Malley 508-865-1125

CALIBRATION

Valid to: **September 5, 2025**

Certificate Number: **AC-1242**

Chemical Quantities

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Conductivity Meters	10 $\mu\text{S/cm}$	0.27 $\mu\text{S/cm}$	Accredited Solutions
	15 $\mu\text{S/cm}$	0.26 $\mu\text{S/cm}$	
	20 $\mu\text{S/cm}$	0.27 $\mu\text{S/cm}$	
	25 $\mu\text{S/cm}$	0.27 $\mu\text{S/cm}$	
	45 $\mu\text{S/cm}$	0.031 $\mu\text{S/cm}$	
	50 $\mu\text{S/cm}$	0.032 $\mu\text{S/cm}$	
	447 $\mu\text{S/cm}$	2.2 $\mu\text{S/cm}$	
pH Meters	4 pH	0.061 pH	Accredited Solutions
	7 pH	0.13 pH	
	10 pH	0.24 pH	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Source	(0 to 330) mV	4.7 $\mu\text{V/V} + 1.2 \mu\text{V}$	Fluke 5500A Multiproduct Calibrator
	(0.33 to 3.3) V	0.39 $\mu\text{V/V} + 1.9 \mu\text{V}$	
	(3.3 to 33) V	3.9 $\mu\text{V/V} + 1.9 \mu\text{V}$	
	(33 to 330) V	0.43 $\mu\text{V/V} + 0.19 \text{ mV}$	
	(330 to 1 020) V	0.14 $\mu\text{V/V} + 0.58 \text{ mV}$	



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Measure	(0 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1 000) V	1.3 mV/V + 1.4 μ V 10.3 mV/V + 2.7 μ V 9 μ V/V + 19.4 μ V 1.2 μ V/V + 2.3 mV 0.12 μ V/V + 3.9 mV	Agilent 34401A 6.5 Digit Multimeter
AC Voltage – Source	(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 (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 (0.33 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 (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 (33 to 330) V 45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (330 to 1 020) V 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	90 μ V/V + 7.8 μ V 39 μ V/V + 7.8 μ V 52 μ V/V + 7.8 μ V 65 μ V/V + 7.8 μ V 90 μ V/V + 12.8 μ V 0.26 mV/V + 23.3 μ V 65 μ V/V + 19.4 μ V 13 μ V/V + 7.8 μ V 26 μ V/V + 7.8 μ V 41 μ V/V + 15.5 μ V 62 μ V/V + 65.9 μ V 18 mV/V + 0.13 mV 39 μ V/V + 96.9 μ V 7.8 μ V/V + 23.3 μ V 21 μ V/V + 23.3 μ V 36 μ V/V + 0.12 mV 63 μ V/V + 0.66 mV 0.13 mV/V + 1.3 mV 39 μ V/V + 0.97 mV 10 μ V/V + 0.23 mV 21 μ V/V + 1 mV 49 μ V/V + 1.9 mV 62 μ V/V + 6.6 mV 13 μ V/V + 2.6 mV 21 μ V/V + 5.8 mV 23 μ V/V + 12.8 mV 13 μ V/V + 31 mV 52 μ V/V + 39 mV 52 μ V/V + 0.19 V	Fluke 5500A Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure	Up to 100 mV (3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (0.1 to 750) 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	0.26 V/V + 15.5 μV 90 mV/V + 15.5 μV 16 mV/V + 15.5 μV 31 mV/V + 19.4 μV 0.16 mV/V + 31 μV 0.16 mV/V + 0.19 mV 26 mV/V + 0.12 V 90 μV/V + 0.12 V 16 μV/V + 0.12 V 31 μV/V + 0.15 V 0.16 mV/V + 0.23 V 1 mV/V + 1.45 V	Agilent 34401A 6.5 Digit Multimeter
DC Current – Source	(0 to 3.3) mA (3.3 to 33) mA (33 to 330) mA (0.33 to 11) A	3.4 μA/A + 0.19 μA 2.6 μA/A + 97 nA 2.6 μA/A + 1.3 μA 15.5 μA/A + 0.13 mA	Fluke 5500A Multiproduct Calibrator
DC Current – Measure	(0 to 10) mA (10 to 100) mA (0.1 to 1) A (1 to 3) A	13 μA/A + 0.78 μA 13 μA/A + 1.9 μA 26 μA/A + 39 μA 31 μA/A + 2.3 mA	Agilent 34401A 6.5 Digit Multimeter
AC Current – Source	(30 to 330) μA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (0.33 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 (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	64.5 μA/A + 58 nA 32 μA/A + 58 nA 32.3 μA/A + 97 nA 0.1 mA/A + 58 nA 0.32 mA/A + 58 nA 52 μA/A + 0.12 μA 26 μA/A + 0.12 μA 26 μA/A + 0.12 μA 52 μA/A + 0.12 μA 0.16 mA/A + 0.12 μA 52 μA/A + 1.2 μA 26 μA/A + 1.2 μA 23 μA/A + 1.2 μA 52 μA/A + 1.2 μA 0.16 mA/A + 1.2 μA	Fluke 5500A Multiproduct Calibrator



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source	(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	52 μ A/A + 12 μ A 26 μ A/A + 12 μ A 23 μ A/A + 12 μ A 52 μ A/A + 12 μ A 0.16 mA/A + 12 μ A	Fluke 5500A Multiproduct Calibrator
	(0.33 to 2.2) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (2.2 to 11) A (45 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz	52 μ A/A + 0.12 mA 26 μ A/A + 0.12 mA 0.19 mA/A + 0.12 mA 16 μ A/A + 0.78 mA 26 μ A/A + 0.78 mA 85 μ A/A + 0.78 mA	
AC Current – Measure	Up to 1 A (3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz (1 to 3) A	0.26 mA/A + 0.16 mA 77 μ A/A + 0.16 mA 26 μ A/A + 0.16 mA	Agilent 34401A 6.5 Digit Multimeter
	(3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz	0.26 mA/A + 0.7 mA 90 μ A/A + 0.7 mA 39 μ A/A + 0.7 mA	
Resistance – Source	(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	3.1 $\mu\Omega/\Omega$ + 3.1 m Ω 3.1 $\mu\Omega/\Omega$ + 5.8 m Ω 2.3 $\mu\Omega/\Omega$ + 5.8 m Ω 2.3 $\mu\Omega/\Omega$ + 5.8 m Ω 2.3 $\mu\Omega/\Omega$ + 23.3 m Ω 2.3 $\mu\Omega/\Omega$ + 23.3 m Ω 2.3 $\mu\Omega/\Omega$ + 0.23 Ω 2.3 $\mu\Omega/\Omega$ + 0.23 Ω 2.8 $\mu\Omega/\Omega$ + 2.3 Ω 3.1 $\mu\Omega/\Omega$ + 2.3 Ω 3.9 $\mu\Omega/\Omega$ + 21.3 Ω 3.9 $\mu\Omega/\Omega$ + 21.3 Ω 15.5 $\mu\Omega/\Omega$ + 0.21 k Ω 26 $\mu\Omega/\Omega$ + 0.21 k Ω 0.13 m Ω/Ω + 2.1 k Ω 0.13 m Ω/Ω + 6.4 k Ω	Fluke 5500A Multiproduct Calibrator
Resistance – Measure	(0 to 100) Ω (0.1 to 1) k Ω (1 to 10) k Ω	2.6 $\mu\Omega/\Omega$ + 1.6 m Ω 2.6 $\mu\Omega/\Omega$ + 3.9 m Ω 2.6 $\mu\Omega/\Omega$ + 39 m Ω	Agilent 34401A 6.5 Digit Multimeter

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Measure	(10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ (10 to 100) MΩ	2.6 μΩ/Ω + 3.9 Ω 2.6 μΩ/Ω + 3.9 Ω 10 μΩ/Ω + 39 Ω 0.21 mΩ/Ω + 0.39 kΩ	Agilent 34401A 6.5 Digit Multimeter
Electrical Simulation of RTD Indicating Devices – Source	Pt 385, 100 Ω (-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C Pt 385, 200 Ω (-200 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C Pt 385, 500 Ω (-200 to -80) °C (-80 to 100) °C (100 to 260) °C (260 to 400) °C (400 to 600) °C (600 to 630) °C Pt 385, 1 000 Ω (-200 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 600) °C (600 to 630) °C Pt 3916, 100 Ω (-200 to -190) °C (-190 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	0.05 °C 0.07 °C 0.09 °C 0.1 °C 0.12 °C 0.23 °C 0.04 °C 0.05 °C 0.12 °C 0.13 °C 0.14 °C 0.16 °C 0.04 °C 0.05 °C 0.06 °C 0.08 °C 0.09 °C 0.11 °C 0.03 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.23 °C 0.25 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.08 °C 0.09 °C 0.1 °C 0.23 °C	Fluke 5500A Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of RTD Indicating Devices – Source	Pt 3926, 100 Ω (-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C Cu 427, 10 Ω (-100 to 260) °C PtNi 385, 120 Ω (-80 to 100) °C (100 to 260) °C	0.05 °C 0.07 °C 0.09 °C 0.1 °C 0.12 °C 0.3 °C 0.08 °C 0.14 °C	Fluke 5500A Multiproduct Calibrator
Electrical Simulation of RTD Indicating Devices ¹ (Process Controllers)	Pt 385, 100 Ω (-200 to 0) °C (0 to 400) °C (400 to 800) °C Pt 385, 200 Ω (-200 to 0) °C (0 to 400) °C (400 to 630) °C Pt 385, 500 Ω (-200 to 0) °C (0 to 400) °C (400 to 630) °C	0.41 °C 0.62 °C 0.95 °C 0.4 °C 0.61 °C 0.95 °C 0.4 °C 0.61 °C 0.95 °C	Fluke 744/741B Process Calibrator utilizing E&M 059 Procedure and Manufacturers Specifications.
Electrical Simulation of Thermocouple Indicating Devices – Source/Measure	Type B (600 to 800) °C (800 to 1 000) °C (1 000 to 1 550) °C (1 550 to 1 820) °C Type C (0 to 150) °C (150 to 650) °C (650 to 1 000) °C (1 000 to 1 800) °C (1 800 to 2 316) °C Type E (-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1 000) °C	0.34 °C 0.26 °C 0.23 °C 0.26 °C 0.23 °C 0.12 °C 0.24 °C 0.39 °C 0.65 °C 0.39 °C 0.12 °C 0.11 °C 0.12 °C 0.16 °C	Fluke 5500A Multiproduct Calibrator



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices – Source/Measure	Type J		Fluke 5500A Multiproduct Calibrator
	(-210 to -100) °C	0.21 °C	
	(-100 to -30) °C	0.12 °C	
	(-30 to 150) °C	0.11 °C	
	(150 to 760) °C	0.13 °C	
	(760 to 1 200) °C	0.18 °C	
	Type K		
	(200 to -100) °C	0.26 °C	
	(-100 to -25) °C	0.18 °C	
	(-25 to 120) °C	0.12 °C	
	(120 to 1 000) °C	0.2 °C	
	(1 000 to 1 372) °C	0.31 °C	
	Type L		
	(-200 to -100) °C	0.29 °C	
	(-100 to 800) °C	0.2 °C	
	(800 to 900) °C	0.13 °C	
	Type N		
	(-250 to -100) °C	0.31 °C	
	(-100 to -25) °C	0.17 °C	
	(-25 to 120) °C	0.15 °C	
	(120 to 410) °C	0.14 °C	
	(410 to 1 300) °C	0.21 °C	
	Type R		
	(0 to 250) °C	0.44 °C	
	(250 to 400) °C	0.27 °C	
	(400 to 1 000) °C	0.26 °C	
	(1 000 to 1 767) °C	0.31 °C	
	Type S		
(0 to 250) °C	0.36 °C		
(250 to 400) °C	0.28 °C		
(400 to 1 000) °C	0.29 °C		
(1 000 to 1 767) °C	0.36 °C		
Type T			
(-250 to -150) °C	0.49 °C		
(-150 to 0) °C	0.19 °C		
(0 to 120) °C	0.12 °C		
(120 to 400) °C	0.11 °C		
Type U			
(-200 to 0) °C	0.43 °C		
(0 to 600) °C	0.21 °C		



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices ¹ (Process Controllers)	Type B		Fluke 744/741B Process Calibrator utilizing E&M 059 Procedure and Manufacturers Specifications.
	(600 to 800) °C	1.6 °C	
	(800 to 1 000) °C	1.2 °C	
	(1 000 to 1 820) °C	1.1 °C	
	Type C		
	(0 to 800) °C	0.72 °C	
	(800 to 1 200) °C	0.94 °C	
	(1 200 to 1 800) °C	1.3 °C	
	(1 800 to 2 316) °C	2.3 °C	
	Type E		
	(-250 to -200) °C	1.6 °C	
	(-200 to -100) °C	0.6 °C	
	(600 to 1 000) °C	0.49 °C	
	Type J		
	(-210 to -100) °C	0.72 °C	
	(-100 to 800) °C	0.39 °C	
	(800 to 1 200) °C	0.6 °C	
	Type K		
	(-200 to -100) °C	0.83 °C	
	(-100 to 400) °C	0.39 °C	
	(400 to 1 200) °C	0.6 °C	
	(1 200 to 1 372) °C	0.83 °C	
	Type L		
(-200 to -100) °C	0.72 °C		
(-100 to 800) °C	0.39 °C		
(800 to 900) °C	0.6 °C		
Type N			
(-200 to -100) °C	1.2 °C		
(-100 to 900) °C	0.6 °C		
(900 to 1 300) °C	0.72 °C		
Type R			
(-20 to 0) °C	2.7 °C		
(0 to 100) °C	1.8 °C		
(100 to 1 767) °C	1.2 °C		
Type S			
(-20 to 0) °C	2.7 °C		
(0 to 200) °C	1.8 °C		
(200 to 1 400) °C	1.1 °C		
(1 400 to 1 767) °C	1.3 °C		

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices ¹ (Process Controllers)	Type T		Fluke 744/741B Process Calibrator utilizing E&M 059 Procedure and Manufacturers Specifications.
	(-250 to -200) °C	2 °C	
	(-200 to 0) °C	0.72 °C	
	(0 to 400) °C	0.39 °C	
Type U	(-200 to 0) °C	0.72 °C	
	(0 to 600) °C	0.39 °C	

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Calipers ¹	Up to 12 in	720 μin	Gage Blocks utilizing E&M 053 Procedure and Manufacturers Specifications.
Micrometers ^{1,2}	Up to 12 in	(750 + 16L) μin	Gage Blocks utilizing E&M 050 Procedure and Manufacturers Specifications.

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pressure ¹	Up to 400 psig	0.15 psi	Condec UPC 5000 utilizing Manufacturers Specifications.
	Up to 1 000 psig	0.16 psi	
	Up to 2 000 psig	0.17 psi	
Vacuum ¹	(-30 to 0) inHg	0.21 inHg	Druck DPI 705 Pressure Indicator utilizing Manufacturers Specifications.
Vacuum ¹	(0.001 to 1) Torr	0.037 Torr	Televac MX7B/MC300 Vacuum System
Scales and Balances ^{1,3}	Up to 2 000 g	0.02 % of reading + 6 mg	NIST Class F weights and 070 Digital Scale procedure utilized in the calibration of the weighing system.

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Uniformity Survey ¹	Type J (-17 to 871) °C	0.14 °C	Yokogawa GX20 Data Logger utilizing E&M 064 and Manufacturers Specifications.
	Type K (-17 to 1 370) °C	0.14 °C	
Temperature – Measure ¹	(-20 to 40) °C	0.26 °C	Vaisala HMP75 Temp/Humidity Probe
Humidity – Measure ¹	(15 to 95) %RH	2.3 % RH	Vaisala HMP75 Temp/Humidity Probe

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Measure	(3 to 5) Hz	0.000 03 % of reading	Agilent 34401A 6.5 Digit Multimeter
	(5 to 10) Hz	0.000 013 % of reading	
	10 Hz to 40 kHz	0.000 008 % of reading	
	(40 to 300) kHz	0.000 03 % of reading	
Timers ¹	Up to 30 min	0.94 s	Comparison to Digital Timer utilizing E&M 055 Procedure.

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 ($k=2$), corresponding to a confidence level of approximately 95%.

- Notes:
1. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
 2. L = length in inches.
 3. The CMC for scales and balances is highly dependent upon the resolution of the unit under test. The CMC presented here does not include the resolution of the unit under test. The resolution will be included in the reported measurement uncertainty at the time of calibration.
 4. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1242.



Jason Stine, Vice President